Managing Antarctic tourism

by

Phillip John Tracey, BAppSc(Hons)

Submitted in fulfilment of the requirements

for the Degree of

Doctor of Philosophy

Institute of Antarctic and Southern Ocean Studies
University of Tasmania
April 2001

This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgment is made in the text of the thesis.

This thesis may be made available for loan and limited copying in accordance with the *Copyright Act 1968.*

Phillip Tracey

Phillip Tracey

10/4/01

Date

Abstract

Antarctic tourism began before the Antarctic Treaty was signed, and is now a substantial industry exhibiting rapid growth. Concern has been expressed about the effects of tourism on scientific, environmental and other important Antarctic values. The *Protocol on Environmental Protection to the Antarctic Treaty* forms the main mechanism for managing Antarctic tourism within the Antarctic Treaty System (ATS). This thesis argues that despite the framework provided by the Protocol, the tourism management system is inadequate, and that the management systems governing similar forms of tourism in other natural areas provide a superior model.

The research included a comprehensive analysis of the industry and its development. Physical, environmental, operational and geographical aspects of Antarctic tourism were analysed. An examination of site use and the spatial development of tourism shows that concern about high use levels is justified for a small proportion of sites, and identifies trends in the geographic spread of tourism activity. The impacts of tourism on Antarctic values were reviewed, with the main concerns identified as low-risk, high-magnitude impacts, and cumulative impacts. Social, economic, and industrial aspects of tourism were analysed. The economic analysis shows the market economic value of the industry to be approximately fifty five million US dollars for the 1996/97 season. A forecast of the development of Antarctic tourism predicts continued growth, increasing diversification, and development of substantial new markets.

The management of Antarctic tourism was examined in detail. The system includes tourism management within the ATS, measures imposed from outside the ATS, and industry self regulation. An analysis of the legislative and administrative approaches of different nations shows that there is considerable variation in the way that tourism management provisions of the Protocol are interpreted and applied.

Detailed case studies were conducted on the management of tourism at southern oceanic islands and northern polar locations. The case studies show that cruise tourism is managed very differently in these areas than in the Antarctic, with management planning regarded as the most appropriate model for management. Management measures specific to cruise tourism in high latitude locations were identified.

It is argued that there are significant shortcomings in the tourism management system, based on analysis of the existing system, the characteristics of the industry and the Antarctic environment, management planning theory, and the standards set by management of similar activities in the case study areas.

An alternative model for the management of Antarctic tourism using a management planning approach is proposed, taking into account the case studies, industry analysis and forecast, and the structure and implementation of the present system. The thesis argues that this alternative is suitable for application within the framework of the ATS, and that it would overcome the shortcomings identified in the existing management system.

Acknowledgments

I am very grateful to Bruce Davis, Marcus Haward and Rosemary Sandford for advice, insight, support and patience as supervisors.

The financial support of an Australian Postgraduate Award, and an Antarctic Cooperative Research Centre top-up scholarship is gratefully acknowledged. My employers over the period of my candidature have my appreciation for their understanding. I am indebted to the students and staff of the Institute of Antarctic and Southern Ocean Studies, University of Tasmania, and the Antarctic Cooperative Research Centre for the supportive and stimulating academic environment in which I studied. Thanks are due to my office colleagues, especially Ilse, Siobhan, Edmund and Caroline.

I would like to thank the following for kind and generous assistance, comment on the research, responses to requests for assistance, research materials, case study material, or other assistance: Tom Maggs, Martin Betts, Ewan McIvor, Lorne Kriwoken, Joe Montgomery, J. Brady, Michael Hall, Margaret Johnston, Peter Timonin, Gary Gauthier, Geoff Copston, Ruth Davis, Gorden Cessford, Paul Dingwall, Greg Mortimer, Darrel Schoeling, Kelvin Michael, Bill Fox, Lynn Peplinski, Marc Maguet, Clay Anderson, Toril Bakken, Svein Halvorsen, and many others. Important information was supplied by the following organisations among others: WWF Arctic Programme, Ministry of Environment (Norway); US NPS–Sitka National Historic Park; US NPS–Glacier Bay National Park and Preserve; US Environment Protection Agency; US NPS–Kenai Fjords National Park; Marine Section, Prairie and Northern Region, Transport Canada; Northern Region Canadian Coast Guard; Australian Antarctic Division; the UTAS Library Document Delivery Service; and Tasmanian Parks and Wildlife Service.

Many thanks are also due to my friends and family.

My warmest gratitude and heartfelt appreciation goes to Jenn for her understanding and support.

Contents

CHAPTER 2: PHYSICAL, ENVIRONMENTAL, OPERATIONAL AND GEOGRAPHICAL ASPECTS OF ANTARCTIC TOURISM 41

CHAPTER 3: SOCIAL, ECONOMIC AND INDUSTRY ASPECTS OF ANTARCTIC TOURISM **125**

Figures, tables, and maps

Figures

Tables

Maps

Acronyms and abbreviations

AAT	Australian Antarctic Territory
AEPS	Arctic Environmental Protection Strategy
AIRSS	Arctic Ice Regime Shipping Standards (Canada)
AMAP	Arctic Monitoring and Assessment Programme
ANARE	Australian National Antarctic Research Expeditions
ANI	Adventure Network International
ANLICA	*Alaskan National Interest Lands Conservation Act*
ASAC	Antarctic Science Advisory Committee (Australia)
ASMA	Antarctic Specially Managed Area
ASOC	Antarctic and Southern Ocean Coalition
ASPA	Antarctic Specially Protected Area
ASPPR	Arctic Shipping Pollution Prevention Regulations
ASTI	Area of Special Tourist Interest
ATCM	Antarctic Treaty Consultative Meeting
ATCP	Antarctic Treaty Consultative Party
ATP	Antarctic Treaty Party
ATS	Antarctic Treaty System
BAS	British Antarctic Survey
CC	Carrying Capacity
CCAMLR	Convention on the Conservation of Antarctic Marine Living Resources (also Commission for the Conservation of Antarctic Marine Living Resources)
CCGN	Northern Region Canadian Coast Guard
CEE	Comprehensive Environmental Evaluation
CEMP	CCAMLR Ecosystem Monitoring Program
CEP	Committee for Environmental Protection (of the ATS)
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CLIA	Cruise Line International Association
CMS	Conservation Management Strategy
COMNAP	Council of Managers of National Antarctic Programs
CRAMRA	Convention for the Regulation of Antarctic Mineral Resource Activities
DPWH	Department of Parks, Wildlife and Heritage (Tasmania)
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency, US
FACH	Fuerza Aérea de Chile
GNWT	Government of the Northwest Territories
HRSCERA	House of Representatives Standing Committee on Environment, Recreation and the Arts (Australia)
IAATO	International Association of Antarctica Tour Operators
IACS	International Association of Classification Societies
ICAIR	International Centre for Antarctic Information and Research
IEE	Initial Environmental Evaluation
IMO	International Maritime Organisation
IP	Information Paper (of the ATCM)
IRB	Inflatable Rubber Boat
IUCN	International Union for the Conservation of Nature and Natural Resources (World Conservation Union)
IWC	International Whaling Commission
LAC	Limits of Acceptable Change (management system)

MARPOL 73/78	The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978
MBO	Management By Objectives
MPA	Multiple-use Planning Area
NERC	National Environment Research Council (UK)
NGO	Non-governmental Organisation
NMFS	National Marine Fisheries Service (US)
NORDREG	Arctic Traffic System (Canadian Coast Guard)
NPI	Norwegian Polar Institute
NPS	National Park Service (US)
NSF	National Science Foundation (US)
NWT	Northwest Territories
PAC	Project Antarctic Conservation
PATA	Pacific Asia Travel Association
PEE	Preliminary Environmental Evaluation
PERM	Preliminary Environmental Review Memorandum
Polar Code	International Code of Safety for Ships in Polar Waters
Protocol	Protocol on Environmental Protection to the Antarctic Treaty
Rec.	Recommendation (of the ATCM)
ROS	Recreation Opportunity Spectrum
SCALOP	Standing Committee on Antarctic Logistics and Operations (of COMNAP)
SCAR	Scientific Committee on Antarctic Research
SCUBA	Self-contained Underwater Breathing Apparatus
SGSSI	South Georgia and the South Sandwich Islands
SOLAS	International Convention for the Safety of Life at Sea, 1974
SOPEP	Shipboard Oil Pollution Emergency Plan
SPA	Specially Protected Area
SPRI	Scott Polar Research Institute (UK)
SRA	Specially Reserved Area
SSSI	Site of Special Scientific Interest
TANGO	Tourism and Non-Governmental Operations (working group of COMNAP)
TAP	The Antarctica Project
Treaty	Antarctic Treaty of 1959
UKAHT	UK Antarctic Heritage Trust
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
USFWS	US Fish and Wildlife Service
VAMP	Visitor Activity Management Process
VERP	Visitor Experience and Resource Protection Framework
VIM	Visitor Impact Management process
VMP	Vessel Management Plan
WCMC	World Conservation Monitoring Centre
WP	Working Paper (of the ATCM)
WTO	World Tourism Organisation
WWF	World Wide Fund for Nature, also known as World Wildlife Fund

Introduction

i.1 Managing Antarctic tourism

Antarctic tourism continues to grow rapidly, activities of tourists are diversifying, and the industry and destination is maturing. Interest is being shown in the destination by global cruise corporations. Access to the Antarctic as a tourism resource remains open and unregulated. Despite the recent entry into force of a broad environmental protection instrument within the Antarctic Treaty System (ATS), concerns remain about the impacts of tourism on the Antarctic environment and on science, and about the appropriateness and effectiveness of present management systems.

This thesis is a multidisciplinary study of the Antarctic tourism industry, the management of the industry, and case studies of tourism management in other high latitude cruise tourism locations. This research contributes significantly to the understanding of the industry, its structure, operations, development, use of the Antarctic resource, and its place in the broader cruise tourism industry.

The thesis argues that the present management system has key weaknesses when the characteristics of the industry, the stated and implied aims of the ATS as regards tourism and conservation management, and best practice management for cruise tourism in similar environments (as established from theory and case study research) are taken into account. The thesis supports long-standing calls for more comprehensive regulation of the Antarctic tourism industry.

The last significant management measure passed within the ATS relating to tourism was at the 1994 Antarctic Treaty Consultative Meeting (ATCM) (Rec. XVIII-1), while the primary instrument, the *Protocol on Environmental Protection to the Antarctic Treaty* (the Protocol), has been in existence for almost a decade, but has only been in force since 1998. Much of the academic attention paid to tourism regulation dates from the first half of the 1990s. Significant growth of the industry has occurred since that time. Sufficient time has elapsed, and enough progress has been made on implementation of the Protocol, for a consideration of the effectiveness of the tourism management system to be made.

This research provides a comprehensive analysis of the present state of Antarctic tourism and its management. Previous studies have concentrated on specific aspects, including impacts on wildlife, on-site behaviour, site management, or visitor expectations, yet few studies have attempted an overview of all aspects of the industry. Additionally, many authors have called for the examination of tourism management systems in other locations. This thesis provides the first detailed comparative case study research examining cruise tourism management for southern oceanic islands and high latitude northern locations.

This thesis argues that sufficient information is available to make decisions over the need for more comprehensive regulation, the objectives of such regulation, and the form that it should take. This position is in contrast to some who suggest that a better understanding of tourism impacts is required before regulation should be extended. A course of action that can take into account all aspects of Antarctic tourism—the experiential, economic, legal, and operational aspects of the industry, environmental impacts, the consensus nature of the Antarctic Treaty and Protocol, and interaction with other values of Antarctica—is proposed.

The research has five broad components:

1. an examination of the industry, including the physical, biotic, and cultural environment, operations, site use, environmental impacts, and social aspects

including economics, visitor experience, characteristics of tourists, and tourism theory;
2. an examination of the management system presently in place;
3. case study analyses of cruise tourism management in other high latitude natural areas;
4. an examination of management theory applicable to tourism in natural areas, and an assessment of the present management system; and
5. conclusions and recommendations.

The research used primary sources (multilateral agreements, ATS documents, data on site use, government policy and management documentation, management plans, legislation, non-government organisation documents, marketing documents, and industry documents including environmental assessments), as well as drawing on secondary sources and the research of others. Supply of case study documents was the result of the considerable efforts and generosity of many protected area managers and others. Working papers (WP) and information papers (IP) tabled at ATCMs are referred to in the text with details of the author, paper number, year, and meeting, and are listed in a separate reference list.

i.2 DEFINITIONS AND KEY TERMS

It is necessary to define what is meant by Antarctic tourism. Human activities in the Antarctic include scientific activities conducted by governments, private expeditions, organised commercial tourism, private self-organised tourism, information activities such as documentary making and journalism, conservation related activity (such as monitoring of the activities of others, or protest actions), resource activity (such as fisheries activity), and blends of all of these. Further complicating any definition is the fact that many of the activities of people in Antarctica, regardless of the primary reason for their presence, are undertaken for pleasure and recreation. Scientific personnel and support staff are involved in recreational activities during leisure time, which is tourism according to some definitions. On the other hand, the fact that there are no local resident populations removes one complicating factor.

In defining Antarctic tourism, the insights of other authors are instructive. A simple definition is used by Enzenbacher (1992b) 'Tourists are defined as visitors who are not affiliated in an official capacity with an established National Antarctic Program' (p. 17). A broader definition, provided by an Australian parliamentary committee, is 'all existing human activities other than those directly involved in scientific research and the normal operations of Antarctic bases' (HRSCERA 1989, p. 3), which includes the recreational activities of government personnel. Hughes and Davis (1995) take a similar approach. Hall and Johnston (1995a) review a number of definitions and identify some definitional problems. Generally, most find it convenient to break all activity down into two groups—governmental activities (which are relatively easily dealt with by the ATS), and non-governmental activity, including commercial tourism and private expeditions (which are less easy for the ATS to deal with). When examining tourism management, a definition based on the non-governmental nature of activity may be unsatisfactory because of the non-touristic nature of some private expeditions (those conducted by Greenpeace, for example). Some distinguish between commercial and non-commercial tourism activity (Hall & Johnston 1995a).

Splettstoesser and Folks (1994) include private expeditions, private yacht visits, and overflights as forms of tourism (p. 232). P. Davis (1995b), while examining many of the same issues as other authors in the area, approaches the issue from a visitor management perspective, and explicitly rejects the term tourist 'because it carries with it the economic implications of the tourist industry instead of the considerations of conservation' (p. 3), instead framing the issue by defining Antarctic 'visitors'. Such an approach is clearly valid, with a number of advantages, not the least of which is the inclusiveness of the definition, incorporating private expeditions. While this research is concerned with many of the same issues as P. Davis, it is felt that the commercial and economic aspects of the tourism industry are fundamentally important for management. Tourism study, as an area of research, also has much to offer an understanding of Antarctic visitation, and rejection of a tourism perspective may limit the adoption of such insights. In addition, all visitation is motivated by values held by individuals for visiting Antarctica, and commercial tourism, rather than being distant from the considerations of conservation, is a direct expression of the values held by travellers.

Another element of the definition is the geographical area in question. Antarctic tourism is centred on the Antarctic continent. The concern is that of how far from the continent into the Southern Ocean should the definition be extended (which ultimately becomes a question of which islands are to be included in the definition). Fortunately, an arbitrary boundary, used for the purposes of the Antarctic Treaty (the Treaty) is suitable—that of 60° south latitude. This boundary roughly converges with areas that are 'Antarctic' in character, and encompasses much of the sea ice zone, the continent and nearby islands. This research distinguishes between the Antarctic and the subantarctic on the basis of sovereignty (some subantarctic islands are subject to sovereign control), and on the basis of the psychological and experiential differences available to tourists (while both the Antarctic and subantarctic islands may be visited in a single voyage, the visitor experiences available are different in a number of respects). The Antarctic Treaty boundary of 60° south latitude is therefore used in the definition of Antarctic tourism employed for this research.

Hall and Johnston (1995a) choose a definition based on intent of the individuals in question, that intent being pleasure or adventure (their definition is for polar tourism rather than Antarctic tourism, but can be readily applied). Their definition takes into account the question of the secondary leisure activities of government personnel, by specifically excluding those whose primary reason for travel is not pleasure related. The definition also concedes that some forms of adventure activity may not be strictly pleasurable. For this work, then, the definition of Antarctic tourism is that used by Hall and Johnston (1995a) limited to the Antarctic region (and excluding military and subsistence activities) as follows:

> all travel and associated activities conducted for pleasure or adventure within the Antarctic Treaty area (that is, south of latitude 60° south), exclusive of travel for primarily governmental, resource extraction, or scientific purposes.

i.3 INTRODUCTION TO ANTARCTIC TOURISM

Tourism is a well established activity in Antarctica. The numbers of visitors (presently around 10 000 people each season) are large in the context of Antarctic activity, and the range of places visited and experiences offered is diverse, and growing. Tourists have been visiting Antarctica for more than a century, although voyages for the sole purpose of tourism are more recent (Headland 1994b, Hall & Wouters 1995, Reich 1980). The majority of tourists travel to Antarctica by ship, normally ice strengthened passenger vessels, or on icebreaker class vessels. Ships provide accommodation, transport, and a vehicle for sightseeing, and obviate the need for shore based infrastructure. Ships are equipped with inflatable rubber boats (IRBs) with outboard motors to transport passengers to shore, or for use in sightseeing, and some ships also carry helicopters for the same purpose (Hall & Wouters 1995). A small minority of tourists travel by air, most carried by a single company that also supports many of the activities of those engaging in adventure activities such as ski traverses or mountaineering. Other airborne activity includes non-landing overflight sightseeing in large passenger jets, operating at present from Australia (Headland & Keage 1995). The industry generally involves a small number of operators. A rapid expansion of the industry has been seen in the past decade or so. Tourism is presently limited to a summer season of about 5 months (Hall & Wouters 1995). Attractions on cruises generally include penguin rookeries, seal colonies, sites of particular scenic value, sites of cultural value, general iceberg, glacier and mountain viewing, and scientific bases. The majority of tourism occurs in the region of the Antarctic Peninsula, as a result of a concentration of attractions, the shorter ship travel times from south American ports, and the relatively ice free waters (Hart 1988, Wace 1990, Enzenbacher 1992b, Cessford & Dingwall 1994, Hall & Wouters 1995).

The entire area south of the latitude of 60° south, which includes the Antarctic continent, ice shelves, and substantial areas of the Southern Ocean, is governed by the ATS, and is referred to here as the Treaty area. The *Antarctic Treaty* of 1959 (the Treaty) from the outset incorporated unusually progressive features, preserving Antarctica as a place of peace and science. The Treaty was negotiated by a number of nations with Antarctic interests, to agree on the disposition of the Antarctic, and the activities of nationals and states in the area. More recently, the major change in the ATS has been the development of an environmental concern, and eventually of mechanisms to provide environmental protection. The present regime includes the Treaty and associated Recommendations and Resolutions, and the recent, comprehensive Protocol, as well as other instruments relating to specific aspects of the region (collectively known as the Antarctic Treaty System or ATS). Treaty signatories are referred to as Antarctic Treaty Parties (ATPs). Full membership of the ATS (where a state becomes an Antarctic Treaty Consultative Party (ATCP) with rights to participate in consensus decision making) is earned by conducting scientific research activity in the Antarctic. Other parties may sign the Treaty and be bound by it, but do not have rights to participate in the consensus decision making carried out at ATCMs. As well as developing other agreements for specific issues, the ATCPs have passed Recommendations (referred to here as Rec.) and more recently Resolutions, which represent additional 'rules' of the ATS. All of the decisions and rules of the ATS are applied and enforced through state domestic processes. In a general sense, there are no discriminatory rules applying to tourism—tourism is subject to the same provisions of the Treaty and Protocol as any other activity, although specific Recommendations have been passed referring to tourism issues.

While the history of tourism and relevant ATS provisions are described in detail later, it is useful to provide an overview of important events at this stage. Table i.1 introduces some of the significant events relating to tourism, including ATS actions, the growth in tourist numbers, and developments in the industry and in tour operations.

Table i.1: Timeline of events relating to tourism in the Antarctic

Year	Event	Reference
1956	Tourist overflight of South Shetland Islands and Peninsula.	Headland 1994b
1957	Pan American Airways tourist aircraft lands at McMurdo, Ross Sea region.	Headland 1994b
1958	First Antarctic tourist cruise, to Peninsula region (*Les Eclaireurs*), 100 passengers.	Reich 1980, Headland 1994b
1959	Antarctic Treaty signed.	
1961	ATCM I, Rec. 9, sets up structure for designation of historic sites.	Lewis-Smith 1994
1964	Agreed Measures for the Conservation of Antarctic Flora and Fauna, including provision for the declaration of Specially Protected Areas, adopted at ATCM III.	Heap 1994
1966	Treaty meeting makes Rec. IV-27, regarding tourist visits to stations.	Heap 1994
1966	First cruise organised by Lindblad Travel, on *Lapataia*, success in this and subsequent seasons prompts the company to build the *Lindblad Explorer*. From 1966 tourist voyages run annually.	Headland 1994b
1968/69	Tourist numbers exceed 1000 in a season for the first time.	Enzenbacher 1992b
1968	South pole overflight, with landing at McMurdo, 70 tourists.	Headland 1994b
1968	ATCM V, Rec. IV provides for designation of historic monuments.	Lewis-Smith 1994
1968	Lindblad Travel tourist ship (*Magga Dan*), crosses Antarctic circle, visits Ross Sea area for the first time	Headland 1994b

Year	Event	Reference
1970	Treaty Rec. VI-7 concerning: station visits; prevention of disturbance of science activities; not entering Specially Protected Areas (SPAs); and respecting historic sites. States to ensure tourists abide by principles of Treaty.	Heap 1994
1970	First voyage of *Lindblad Explorer*, first purpose-built expedition cruising ship, built for Lars-Eric Lindblad.	Headland 1994b
1971	National expeditions (Chilean and Argentine) carrying tourists.	Headland 1994b
1972	Rec. VII-4. Moves towards drafting statement for tourists. Initial suggestion of Areas of Special Tourist Interest (ASTI).	Heap 1994
1972	Rec. III of ATCM VII permits designation of Sites of Special Scientific Interest (SSSI).	Lewis-Smith 1994
1973	Large passenger vessel operates in Peninsula region, no landings.	Headland 1994b
1974	Seaborne tourist numbers peak for the decade at 3644.	Enzenbacher 1992b
1975	ATCM VIII passes Rec. VIII-9, to include a *Statement of Accepted Practices and Relevant Provisions of the Antarctic Treaty* and *Guidance for Visitors to the Antarctic*. Sets up mechanism for ASTIs. Requires visit reporting.	Heap 1994
1977	Regular tourist overflights begin, with 40 flights during the next four years, carrying approximately 10000 people.	Headland & Keage 1995
1979	*Statement of Accepted Practices and Relevant Provisions of the Antarctic Treaty* and a practical *Guidance for Visitors to the Antarctic* finalised and added to Rec. VIII-9. Rec. X-8 encourages operators to use experienced guides. States to notify airlines that overflights exceed air traffic control, communications, and search and rescue capacities of national programs.	Heap 1994
1979	Air New Zealand DC-10 overflight crashes on Mt Erebus, Ross Island, with 257 deaths. Overflights end in February 1980.	Headland & Keage 1995
1983	Annual tourist flights to South Shetland Islands begin, bringing tourists to Hotel Estrella Polar by 1984, some transfers to and from ships occurring.	Headland 1994b
1985	Adventure Network International (ANI) formed to provide transport to climbing destinations. Flights to Vinson Massif, refuelling at Teniente Rodolfo Marsh and Carvajal stations, with fuel supplied by Fuerza Aérea de Chile (FACH), and a FACH fuel drop at Vinson Massif).	Swithinbank 1993a
1986/87	Shipborne tourist numbers jump to 1797 after remaining lower since the 1974/75 season. A trend of growth has continued since.	Enzenbacher 1992b
1987	ATCM acknowledges rapid increase in tourism and concentration in some sites, and the potential for impacts on science and the environment. A need for assessment and monitoring is noted. ATPs are urged to improve dissemination of existing tourism regulations. ANI landing of DC-4 on blue ice at Patriot Hills—the first landing by a heavy wheeled aircraft on an unprepared blue ice surface in Antarctica.	Heap 1994, Swithinbank 1993a
1988	Regular land based tourism flights begin, with ANI conducting 15 return flights in the 1988/89 season.	Swithinbank 1989
1989	Argentine government resupply vessel, with 81 tourists goes aground near Anvers Island. Significant oil pollution resulted. Passengers and crew taken to nearby Palmer Station, and transported to Teniente Rodolfo Marsh station and flown out. The ship later sank.	Antarctic 1989b
1989	Rec. XV-10 provides for Specially Reserved Areas (SRAs)—areas of outstanding geological, glaciological, geomorphological, aesthetic, scenic or wilderness value. Multiple-use Planning Areas (MPAs) also introduced, intended to ensure multinational activities will not result in combined or cumulative effects on the environment, or in interference with other activities.	Lewis-Smith 1994

Year	Event	Reference
1989	ATCM explicitly recognises tourism as a legitimate use. ATCM agrees that a comprehensive review of tourism provisions was needed, and should be conducted by the special ATCM 1990.	Heap 1994
1991	Working group II, Madrid session of the special consultative meeting initiates a review of tourism issues, agreeing that it would be continued at ATCM XVI.	Heap 1994
1991	International Association of Antarctica Tour Operators (IAATO) formed by seven operators. Operational practices and guidelines produced.	Stonehouse 1992b
1991	Sub-working group of ATCM XVI conducts review of tourism provisions and arranges a meeting of states and others to address tourism regulation issues (Rec. XVI-13).	Heap 1994
1991	*Protocol on Environmental Protection to the Antarctic Treaty* approved at XI Antarctic Treaty Special Consultative Meeting. Collapse of Soviet Union begins the process of making more ice strengthened ships available.	Heap 1994
1991/92	Shipborne tourist numbers reach 6318.	Enzenbacher 1993a
1992	Meeting (from Rec. XVI-13) advises ATCM XI that tourism regulation issues were considered without any conclusions. Some had stressed that tourism is adequately regulated through the Protocol. Submissions relating to a draft tourism annex to the Protocol are considered.	Heap 1994
1992/93	Chilean flights of tourists to South Shetland Islands cease.	Headland 1994b
1993/94	Tourist overflights resumed (Qantas), with 6 flights. First landing of a wheeled Hercules at Patriot Hills by ANI, landings also by C-130 of the US National Science Foundation (NSF).	Headland & Keage 1995, Swithinbank 1994
1994	Rec. XVIII-1 relating to tourism passed, including a *Guidance for Visitors to the Antarctic*, and a *Guidance for those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic.*	ATCM 1994
1995	Resolution 3 (1995) outlines reporting requirements. Private climbing expedition, Transantarctic mountains supported by ANI.	ATCM 1995, Swithinbank 1995
1996	Decision by ATCM XX to use a standardised advance notification and post activity report form for a trial period of one year. ANI extends operations to Dronning Maud Land.	ATCM 1996, Swithinbank 1997a
1996/97	Ship-borne tourist numbers 9212.	NSF 1997
1996/97	First complete circumnavigation of Antarctica by tourist ship, *Kapitan Khlebnikov* for Quark Expeditions.	Splettstoesser, Headland & Todd 1997
1997/98	Shipborne tourist numbers 9604.	NSF 1998
1998	Protocol enters into force.	Richardson 1998

A preliminary review of the issues surrounding Antarctic tourism identified a range of important features. The broad geopolitical context is characterised by:

- the absence of a single governmental / administrative authority. Instead, a system exists where nations signatory to a multilateral treaty reach consensus during regular meetings;
- a geopolitical environment that lacks clear and recognised sovereignty, with resultant legal implications;
- regulation based on an international treaty, expressed through enabling legislation in countries party to the treaty;
- political implications of tourism activity for different state actors—tourism has emerged as an issue for states within the ATS, and state involvement (through citizen participation, through companies based in Treaty states, or through a desire to benefit directly or indirectly from tourism activities) may influence new relationships and motivations within the ATS;

- the development of self regulation measures by the tourism industry, and a high level of responsibility demonstrated by operators; and
- the prominence given in the ATS to science and research, and the resultant need for tourism to co-exist with these uses.

Much of the Antarctic region is remote from developed infrastructure and population centres. Conditions imposed by this remoteness are that:
- monitoring, enforcement or assessment of tourist behaviour is very difficult;
- monitoring impacts and effects is difficult;
- safe tourism operations are logistically complicated;
- activities occur over a vast continental area;
- the visitor experience often involves substantial sea travel in rough waters; and
- operations in many cases need to be autonomous, and include a capacity for self rescue.

Antarctic tourist operations are:
- predominantly ship based (supplying transport and accommodation);
- dependent on landings and cruising in small inflatable motor boats (or on the use of helicopters); and
- relatively high cost.

Climatic and physical conditions are also unusual. Conditions include:
- adverse climate, including potentially life threatening extreme cold, and high winds;
- cold climate vessel operating hazards, such as sea ice and icebergs;
- a short operating season dictated by sea ice and climatic conditions;
- potentially dangerous terrain, including crevassed ice surfaces and other glacial hazards;
- poor charting and mapping, increasing risks of navigation; and
- unstable near shore ice conditions, including wind affected sea ice and unstable icebergs.

The physical and environmental features of the Antarctic region:
- include unique floral and faunal assemblages;
- mean that the region is sensitive to potential impacts;
- are a source of very important symbolic, non-use, and existence values of global importance;
- are a dominant component of the visitor experience;
- include unique scenic values;
- provide important data for scientific activities; and
- are an important source of biodiversity.

Very significantly, no local people or permanent inhabitants are present in the Antarctic, a feature unusual in tourism situations.

Two features stand out. First, Antarctic tourism operates in an environment that is highly valued for natural and scientific reasons, which imposes constraints on activities and on management. The region is laden with symbolic value, representing for many the 'last great wilderness'. These values are generally regarded as being of extreme importance. In addition, geography and climate create challenging conditions not equalled even in Arctic regions, conditions that are a dominant factor in shaping tourism. Second, Antarctic tourism operates in a unique international relations context. Antarctica, governed according to the provisions of the ATS, is unique in that it lacks clear and undisputed sovereignty. Tourism operates within a multinational legal regime. These two factors dominate and direct the form and management of Antarctic tourism, and serve to differentiate it from other tourism situations.

A feature common in tourism management and resource management is also apparent. The issues and problems related to Antarctic tourism span the physical, and the social realms.

Antarctic tourism relies on and affects the physical environment, while remaining a human and therefore social pursuit. For this reason, neither social nor physical science approaches alone are sufficient for understanding and managing Antarctic tourism, and a multidisciplinary approach is necessary.

i.4 RESEARCH AIMS AND METHODOLOGY

i.4.1 AIMS AND OBJECTIVES

The research aims and objectives were developed after a literature review (section 1.1) and a preliminary review of the tourism industry and management system. The literature review identified a number of important areas of research that require attention, as well as issues that need to be taken into account when considering Antarctic tourism management. As part of the literature review, recent and ongoing Antarctic tourism research was examined.

The central question surrounding Antarctic tourism relates to the need for a more comprehensive regulatory regime. While the ATS agreed to the present system in the mid 1990s, there was significant support for a more comprehensive tourism regulation regime prior to that time, and many argue that such a regime will eventually be necessary.

This research therefore aimed to examine the need for a more comprehensive tourism management regime within the ATS.

Central propositions were selected to focus the research. These were:

- that the present Antarctic tourism management system is deficient in some respects, when judged against nature tourism management theory, and against the examples provided by tourism management in other areas;

- that many of the problems encountered, and likely to be encountered in Antarctic tourism management are not unique, and that methods for coping with these problems have been developed and tested, and can be applied to Antarctic tourism management; and

- that the present form of the tourism management system is not the only form that could exist under the ATS.

The following objectives intended to satisfy the main aim of the research, and were derived from the literature review and from the preliminary review of Antarctic tourism. The objectives of the research were to:

- conduct a comprehensive analysis of Antarctic tourism, including physical, environmental, operational, geographical, social, economic, and industry aspects;
- conduct a comprehensive and up to date (post-Protocol) analysis of the management system that applies to Antarctic tourism, including ATS components, those outside the ATS, self regulation, and implementation issues;
- clarify the values surrounding Antarctic tourism;
- examine and analyse tourism management in case study areas with similar characteristics to those pertaining in the Antarctic;
- examine tourism theory, especially destination development theory to help understand likely developmental trends in Antarctic tourism;
- examine management planning theory to identify important concepts and elements that may have application to the management of Antarctic tourism;
- identify goals, aims and objectives for tourism management implied in the present regulatory system;
- critically assess the present system of management in light of these assessments and analyses, and determine the coverage and adequacy of the present system with reference

to the implied management goals, aims and objectives, case study management findings, and management planning theory;
- examine alternatives to the present management system, and propose options and alternatives that would provide better outcomes for environmental protection, the industry, and ATS needs.

The research structure and process was designed to accommodate these objectives and ensure the appropriate data for addressing the propositions would be obtained.

i.4.2 JUSTIFICATION FOR THE RESEARCH

The numbers of people visiting Antarctica represent a very small portion of global travel, yet Antarctic tourism receives considerable attention from environmentalists, politicians, NGOs, members of the public, scientists, and social researchers. This level of attention is indicative of the importance of Antarctic tourism. Any study of Antarctic tourism management must recognise the underlying reasons for this importance. These include:
- the potential for important Antarctic values to be affected by tourism;
- the symbolic importance of Antarctic tourism;
- the status of tourism as one of the largest uses of the continent;
- the recent and continuing rapid growth of tourism; and
- political perceptions of tourism.

There are some powerful and compelling values associated with the southern continent. Some of these values may be affected by tourism. Section 1.2 describes a typology of values, including use and non-use values. Scientific values, by virtue of the unique geographical, biological, geological, and climatological characteristics of Antarctica, are very high. Environmental values (including values for living resources) are clearly significant, as is shown by support for Antarctic conservation in a variety of forums. Wilderness values are very significant, and probably represent the most important value associated with Antarctica for the global public. Tourism is widely perceived to have the potential to impact on these values.

Antarctic tourism also plays a symbolic role. It represents human economic use of the last substantially unmodified continent, and is symbolic of the relationship between humans and the environment and human desires to 'conquer' all frontiers. This symbolism is highlighted by the fact that travel and tourism are represented by some as a non-essential, frivolous, unnecessary and privileged activity, in contrast to the other major use of Antarctica, science, which is generally represented as an important and valid use of Antarctica.

Tourism is the second substantial use of the continent itself, exceeded only by the activities of governments. Annual tourist numbers have for some time exceeded those of scientists and support staff. As a result, a significant proportion of the attention focused on Antarctic issues is directed toward tourism.

In the last fifteen years or so, Antarctic tourism has grown very rapidly. While future trends are uncertain, the possibility of continued growth must be entertained. The potential for continued growth increases the stakes in tourism management, and increases the possibility of unforeseen problems.

It is also suggested that Antarctic tourism has importance beyond the Antarctic region. Initiatives in Antarctic tourism, developed as a result of environmental concerns, may have wider application in tourism in natural areas in other parts of the world (Smith 1994).

Finally, Antarctic tourism is no less worthy of examination in its own right than any other Antarctic phenomenon. It is interesting as:
- it has the potential to further our understanding of tourism in natural areas and the relationship between people and natural areas;

- it provides employment, generates income and wealth, and services the wants of people;
- an activity in Antarctica that interacts with other uses and with the natural environment;
- a significant and problematic part of the international governance experiment of the ATS;
- one of the few internationally cooperative activities on a continent dedicated to such values; and
- part of a wider phenomenon of expedition cruising and cruise tourism.

All of these reasons validate further study and analysis of Antarctic tourism management.

i.4.3 LIMITATIONS OF THE RESEARCH

There were a number of limitations to the research. First, despite the lengthy treatment of the material, it is not completely comprehensive. Constraints of time and access to information mean that some aspects of the research are less detailed than would be ideal. Case study analysis, for example, was directed at the most appropriate and comparable cases, but it is acknowledged that additional useful cases remain unexamined.

A second constraint related to the need to rely on the goodwill of other parties to provide documentation for many aspects of the research. Responses to requests for material were without exception generous and useful, but there are limits to the information that can be obtained using such methods. Personal visits to access management information, and to interview key people were not possible. The relationship between management intent (as expressed in planning and management documents) and management outcomes is not always certain. It would be desirable to have assessed the actual effectiveness of the management systems for the case studies.

Similarly, the research is limited by the fact that the author was unable to participate in a commercial tourism visit to Antarctica. While the author has previous Antarctic experience, direct observation of the industry would have been beneficial, although anything other than a limited exposure to one or a few operations would be difficult to achieve.

The research has not included a full historical analysis of the positions and policies of different ATPs. While such a review would be interesting, limitations of time precluded it, and the research was therefore restricted to considering broad factional positions and general ATS responses. Similarly, a comprehensive analysis of the positions of different stakeholders was not possible.

The analysis of most aspects of the industry includes information up to and including 1997/98. While by the time of completion of the thesis more information had become available, incorporation of it was not possible. Similarly, developments at ATCMs after 1998 were not considered, although no developments are known to have occurred that alter the arguments or conclusions of this thesis.

i.5 THE RESEARCH APPROACH

Information was obtained to complete the objectives identified in section i.4.1. Information sources included academic papers and critiques, government policy statements and reports, submissions to ATCMs, non-governmental organisation (NGO) documents, formal outcomes of ATCMs, scientific reports on aspects of tourism, published descriptions of tourism operations and logistics, industry documents, advertising and promotional material, and other sources. Information from similar sources, and from management planning documents for the protected areas of the northern latitudes and southern oceanic islands was used for the comparative case studies. In addition to information dealing directly with tourism and tourism management, background information on the environment in which tourism operates—the physical, biological, political and social context of tourism—was also obtained.

Hall and Johnston (1995a) discuss the value of comparing the two polar regions. They contend that 'there is much to be gained by considering the two polar regions, despite their differences. The major issues are the same: regulation of tourists, protection of the environmental and cultural heritage, management of transnational space, and effects on local populations' (p. 3). Shared problems and experiences can be demonstrated through analysis of tourism development, management and policy (Hall & Johnston 1995a). These authors also provide a broad comparison between Antarctic and Arctic tourism as a whole (Hall & Johnston 1995a, p. 4). The two most important differences identified by Hall and Johnston are sovereignty (the lack of it in the Antarctic, and the presence of it in the Arctic) and the presence of local and especially indigenous people in the Arctic. The Government of Norway felt that the development an appropriate management regime and codes of conduct for operators and visitors might benefit from the comparative study of polar tourism (cited in Johnston & Hall 1995). It is also clear from the preliminary review (section i.3) that the international relations environment in which Antarctic tourism is managed has had some effect on the way the management system has evolved. It is reasonable to assume that cases where the complicated international relations effects are not present may provide useful data about managing tourism in natural areas.

i.5.1 CASE STUDY DESIGN

There is merit in the analysis of Antarctic tourism management in its own right. Additional information can be provided, however, using comparative case studies. The basic principle behind the use of additional cases is that Antarctic tourism management can benefit from the experience available worldwide in nature tourism management. This assumes that these experiences are applicable, and that they have relevance for the Antarctic tourism situation. This research investigates this possibility, as well as the alternative—that Antarctic tourism is so different that other management experiences have nothing to contribute. Based on the preliminary review it was considered likely that other cases would provide useful examples. Given this, the case study method used in the research needs to be briefly described. The method followed here is as described by Yin (1991). This approach is adopted for reasons of simplicity, clarity, rigour and practicality of application. In general terms, comparative case methods are widely used and accepted in research of this nature. Sufficient information is presented here to validate the theoretical basis for the use of the case study methodology. According to Yin, a case study is an empirical enquiry that:

> Investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. (1991, p. 23)

The research design involves a single case (Antarctic tourism) set beside a multiple case study of other tourism cases. The research does not intend to achieve parity between the Antarctic case and the other cases in terms of depth of analysis and detail. The case study method is useful for examining what Yin characterises as 'how' and 'why' questions, as it can deal with 'operational links needing to be traced over time, rather than mere frequencies or incidence' (Yin 1991, p. 18).

One difficulty with Antarctic tourism (and to some extent with any similar question) is the extent to which other experiences or situations can be considered comparable. Sartori argues that 'to compare is both to assimilate and to differentiate *to a point*', and that 'the comparisons in which we sensibly and actually engage are thus the ones between entities whose attributes are in part shared (similar) and in part non-shared' (1991, p. 246). This point forms the rationale for the multiple case approach of this research. While it may be argued that Antarctic tourism has unique characteristics and is therefore incomparable with any other situation, the reality is that it also shares many important characteristics with other situations, and that a comparative approach is therefore valid. As Sartori (1991, p. 246) points out, 'if two entities are similar in everything, in all their characteristics, then they are a same entity—and that is that.'

i.5.2 CHOOSING THE CASE STUDIES

The use of case studies offers a number of advantages, allowing the examination of the following:

- best practice for polar tourism management;
- management of forms of tourism similar to those of the Antarctic, uncomplicated by the collective governance and sovereignty problems prevailing in Antarctica;
- prediction of tourism growth and future development, looking at places with a longer destination history (including diversification of activities and market differentiation);
- management examples in areas of much higher visitation;
- relevant management practice for remote areas, cold climate areas, and ecologically sensitive areas;
- management experiences relevant to dealing with the cruise ship sector;
- management of important and varied values;
- management of the visitor experience.

With these advantages in mind, criteria for the selection of case studies were defined. First, it was decided to restrict case studies to examination of cruise tourism management rather than the management of all tourism activity. Attributes desired for individual cases, and across the range of cases were defined. The criteria also incorporate similarities and differences. Cases with physical, environmental and tourist motivation similarities were desired. Also desired were cases with different forms of government and management (different to each other and to the Antarctic example). It was not necessary (or possible) for all criteria to be satisfied for the selection of each case, although cases that met as many criteria as possible were selected.

Criteria related to a similar visitor experience to that of Antarctic tourism:

- remoteness (a characteristic that dictates logistical and travel options, constrains management, and is an important part of the visitor experience);
- polar region features (ice, cold climate, glaciation, polar ecology);
- natural values as a central rather than peripheral component of the tourism experience;
- similarity of motivations (cases where visitors travel for similar reasons to Antarctic tourists were desirable);
- cases where cruise tourism forms a significant part of the total visitation.

Practical criteria:

- availability of and access to information;
- availability of information in English;
- cases that could be geographically or politically enclosed (to avoid complexities introduced by cross jurisdictional issues).

Criteria related to management:

- a variety of government types and political systems across cases;
- a variety of management models across cases (to allow comparison of the workings of different management options);
- cases where high levels of tourism occur;
- cases where differentiation in the tourism market has lead to a diverse range of tourism opportunities.

Two groupings of cases were chosen on the basis of these criteria. One grouping is that of the southern oceanic islands. These islands meet the criteria of remoteness, difficulty of access and operations, and adverse climate, and natural values form a significant component of the tourism experience for these locations. Within the islands as a group, different islands and island groups are managed by different governments, providing a range of management approaches and administrative backgrounds. The southern oceanic island cases have the benefit of being tightly delimited—as islands, the managerial and geographical limits of the case areas are easily defined.

The second grouping is cases from the northern polar region. These cases satisfy several of the criteria related to similarities with the visitor experience in the Antarctic. The conduct of much high latitude northern cruise tourism is very similar in many respects to that of the Antarctic tourism industry. It is substantially based on natural values, and occurs in an area of adverse climate and challenging operational conditions. With the Arctic and sub-arctic the range of management contexts is broadened considerably, given the range of different governments involved, from the european and north American Arctic, and the concentration of population and tourism activity in the northern hemisphere. Cases are available that involve much larger numbers of tourists than in the Antarctic. More detail on the selection of case study areas is provided in chapters five and six.

i.5.3 UNITS OF ANALYSIS

The main unit of analysis of the case studies is the tourism management system. The system consists of the legal, bureaucratic, and voluntary rules and structures that apply to tourism activities. These may include national legislation, regulations, international law, management plans, policies, or a range of other strategies. Informal management techniques (such as codes of conduct) are considered part of the management system, when their use can be considered well established and widespread within the case boundaries. In addition, elements of management as a process are also considered part of the system (such as feedback and review mechanisms), in cases where management is treated as a process rather than a static set of regulations. Johnston (1998) defines visitor management strategies as the overall collected group of management measures, and defines measures as the individual elements, such as codes of conduct or education campaigns. Johnston provides support for the notion that measures, even when adopted in isolation from one another, can be considered as a system. Johnston argues that this view is supported by the fact that the visitor experience occurs within the framework of these different measures. A second argument is that the measures evolve as a result of existing regulation or the absence of such regulation, and fill real or apparent gaps in regulation or respond to changes in tourism activities (Johnston 1997, 1998). As a result, the collection of measures applying to tourism can be examined as a system regardless of whether that system is the result of planning or evolution of measures, and whether the measures are compatible or not.

The values of the various actors involved, the pressures influencing the development and operation of the system, and the physical, environmental, economic and social context within which tourism is managed are considered to be outside the system. They form the context within which the management system operates—the secondary units of analysis. Understanding of this context is essential, especially when considering alternative systems, and so is a dominant concern of the case study design.

Elements of the main unit of analysis (the tourism management system) identified as requiring consideration for the cases included the following.

Legal and jurisdictional:

- law applied to tourism or conservation management and other applicable legislation;
- relationship between international and national legal levels of regulation;
- land tenure and protected area category if applicable.

Bureaucratic:

- management authority:
- management planning and tourism planning procedures;
- management policy.

Procedural and physical:

- management plans or other instruments applying to tourism;
- management actions (including those in place in the absence of a plan);
- management procedures, including permit systems and other requirements;
- physical management presence and enforcement—on-ground structures, observers, site staff;
- monitoring, feedback and review mechanisms.

Informal or external to management authority:

- industry self regulation procedures, operational plans or other constraints.

In addition to the main unit of analysis as described above, the context surrounding the management system for each case was examined as follows.

Physical and environmental resource:

- geographical scope of industry;
- environmental features—floral, faunal, biogeographic, geologic, non-living, scenic, landscape, sea and ice features;
- sensitivity to disturbance, and knowledge of tourism impacts on environment;
- scientifically important resources;
- values derived from the environmental resource by tourists and others.

Tourism experience:

- visitor activities and components of the visitor experience;
- social research results relating to the tourism experience, expectations, motivations, and perceptions;
- visitor demographics;
- educative components, opportunities for learning, and realisation of these opportunities;
- attractions and activities;
- time commitments and comfort levels including disincentives to travel.

Economic considerations:

- need for profitability in operations, costs of operating, revenue;
- public resource use issues, including royalties, entry fees, and permit fees;
- benefits and benefit flows;
- equity and access issues for users, including high costs of participation.

Industry and operational characteristics:

- modes of operation (ship based, ship/air hybrid, air/land based);
- shore operations;
- operating procedures and contingency plans;
- history of tourism, industry maturity, destination and product development;
- industry structure;
- changes in the visitor experience over time;
- technological change including changes to transport and different modes of transport, changed access to sites because of technological development, and changes to the visitor experience.

Stakeholders:

- public;
- local and indigenous people;
- non-governmental organisations;
- other industries;
- scientists and researchers.

Growth and forecasting:
- rate of growth or decline of industry, factors constraining growth;
- growth forecasts.

Other uses of area:
- local people including indigenous people and their relationship with tourism;
- science and research activities and the potential for tourism to impact on them;
- other industries.

The research process followed to obtain the data in the above categories for each case broadly involved: determining the boundaries of each case (geographical, environmental, operational or political); collating published material and background material; identification of managing authorities; identification of significant issues; identification of sources of data (including academic research publications, legislation, management plans, policy documents, working papers and documents, environmental impact statements, direct comment, and other sources); obtaining data through libraries, contact with managers, and other means; analysis of data and identification of further data needs; and follow up and obtaining of additional data where necessary.

i.6 THE STRUCTURE OF THE THESIS

This introduction provides a summary of the research, introduces the research topic, defines Antarctic tourism, describes the state of play of Antarctic tourism and Antarctic tourism management, and reports on the research aims and objectives, the justification for the research, and the methodology used to conduct the research.

Chapter one provides a review of Antarctic tourism management literature and an examination of Antarctic values. Issues are identified and examined through an examination of the literature. Problems with the present management system, debate about the need for change, and the management suggestions of various authors are reviewed. Antarctic values were categorised according to an environmental economics framework, to provide a structure for describing and managing competing values deriving from Antarctica. This approach provides a way of reconciling ongoing tension between how human values and intrinsic values should be regarded, and provides a theoretical framework for understanding Antarctic values, underpinning later descriptive and analytical aspects of the thesis.

The physical, biotic and cultural characteristics of the Antarctic operating environment are described in chapter two. A review of the historical development of the tourism industry is included, and a numerical forecast of tourist numbers provided. An analysis of the operational characteristics of the ship based and air based tourism industry, with an emphasis on environmental performance and risk factors is included. A geographic analysis of site use by the shipborne sector of the industry is made. Site use across nine seasons (1989/90 to 1997/98) in the Peninsula region is analysed to establish geographical and temporal change. Measures of site use including rate of introduction of new sites are also examined. Maps are included for the Peninsula region showing temporal and geographical change in site use over the 9 seasons. Site use for areas other than the Peninsula region is also analysed. This analysis provides support for more comprehensive regulation, but also shows that levels of site use need to be considered in their overall context, and that concern about site use may be overstated or misdirected. Tourism use of sites is shown to have increased substantially, and spread considerably over the 9 seasons examined. The analysis provides insight into the geographical development of a relatively new destination area during a rapid-growth phase of its life cycle. The state of knowledge about the impacts (both positive and negative) of tourism on Antarctic values is assessed. Documented (observed) and predicted impacts are discussed using results from environmental assessments of tourism operations, and research conducted by other authors. Issues relating to impact assessment and to levels of impact (magnitude, likelihood, and duration) were also examined, as were the issues of cumulative impacts, and operational practices to minimise impacts. This research represents the most comprehensive documentation and analysis of the workings of the Antarctic tourism industry to date.

Chapter three examines the social and economic dimensions of Antarctic tourism, and describes an analysis of Antarctic tourism, referring to theoretical material on the development of destinations. The place of Antarctic tourism within the broader expedition cruising industry and the global cruise tourism industry is examined. Important developments including the use of large vessels and the recent involvement of very large cruise companies are also scrutinised. The social characteristics of visitors are reviewed, drawing on the survey research results of other researchers. This information is analysed according to tourism and recreation motivation theory. The tourism experience, including different activities and educational measures, is examined. An estimate of the economic size (net revenue) of the industry is made (for the 1996/97 season) for the ship based, overflight, and airborne components of the industry. The estimate was derived from information on prices, vessel occupancies, and numbers of voyages. The market economic value of the Antarctic tourism industry was estimated to be approximately US$55 000 000 for that season. This result provides an important measure of the industry, and contributes to the debate on the size and importance of the industry. Finally, chapter three examines the activities and views of different groups of stakeholders with an interest in Antarctic tourism issues. These factors are brought together in an analysis of the industry that includes discussion of likely directions.

The management system applying to Antarctic tourism is examined in chapter four. Background details on the structure and function of the ATS, including the Protocol, are provided in appendix one. Chapter four proper examines more specific elements of the tourism management system. A historical examination of tourism regulation within the ATS is provided, with details of the existing ATS tourism management measures, and identifying key issues, alliances, and the background to these measures. The Protocol enabling legislation of 10 nations is compared, to provide insight into variations in how the Protocol has been expressed through national law. The role of international maritime regimes as they apply to Antarctic tourism is reviewed. Other elements of the management system are analysed, including the use of the protected area system, inspection and observer programs, and environmental assessment processes. The crucial voluntary or self regulatory aspects of the management system are examined.

The management of cruise tourism in southern oceanic island locations is examined in chapter five. Information on physical and environmental characteristics, historical use and resources, tourist use, and tourism management are examined for New Zealand's subantarctic islands, Macquarie Island, Heard Island and McDonald Islands, Gough Island, and South Georgia. The management measures for these locations are summarised and compared with each other and with the Antarctic tourism management system.

Comparative case study research on tourism management for Svalbard, Glacier Bay National Park and Preserve, the Canadian Arctic, and the Russian Arctic and north pole is detailed in chapter six. As with chapter five, the management systems in the case study areas are compared to that used in the Antarctic.

The case study areas exhibited, without exception, more comprehensive management of tourism than in the Antarctic. Management measures common to many or all case studies were identified, that by comparison are lacking in the Antarctic. The examination of other case study areas also served to locate Antarctic tourism within the global cruise tourism industry. This perspective that should not be neglected, as developments and changes in cruise tourism as a whole will increasingly influence the Antarctic situation. Finally, the case studies, in combination with the Antarctic case analysis, provide an understanding of a significant sector of the expedition cruising industry, a little studied but important tourism phenomena in its own right.

The Antarctic tourism management system is evaluated in chapter seven. Three areas of standards are used for evaluation of the system: the implied goals, aims and objectives of the system; best practice protected area management as established from protected area management theory; and the examples of tourism management from the case study analyses. The goals, aims and objectives implied in the system are identified. Management planning theory is briefly examined, and dominant management models described, in order to assess the state of the art of management planning and to provide a basis for examining potential management directions in chapter eight. Based on these three areas of standards, the analyses of the industry and its operations, and the analysis of the tourism management system in chapter four, the system is evaluated. The coverage provided by elements of the system is considered, and the adequacy of the system is discussed.

The final chapter, chapter eight, examines options for tourism management, referring to the findings of the research, and provides recommendations on future management directions. The satisfaction of the research objectives is discussed, and the central propositions are examined in light of the findings of the research. A general discussion of key management issues is provided. Factors influencing and constraining the tourism management system are discussed with an emphasis on how these factors will affect future management options. The need for change to the present management system is asserted. Management options suggested by other authors, including specific strategies and actions, and more comprehensive management systems, are examined in light of the findings of the research. Management recommendations are made. First, key needs of any comprehensive management system are identified. Second, a number of management strategies and actions are suggested for consideration in a strategic management planning process, to supplement those identified by other authors. Third, a framework for proceeding is proposed, based on a management planning approach. Finally, issues of implementing a more comprehensive tourism management system within the ATS are discussed in light of the research findings. The general conclusions of the thesis complete the chapter.

Chapter 1: Management literature and Antarctic values

1.1 Issues from the Antarctic tourism management literature

A number of authors have addressed the management of Antarctic tourism. This review helps direct the research by identifying areas of concern, issues that remain unresolved, management constraints, historical factors (relating to both the industry and the management regime), and proposed solutions. The review is restricted to questions of tourism management. Pertinent information from the literature relating to other aspects of Antarctic tourism is included in the relevant sections of the thesis. The regime as it presently stands is examined in detail in chapter four, and therefore will not be addressed here.

Along with the industry, the ATS and tourism management itself, the literature on management has developed considerably in the last decade. In 1990 Beck noted that 'the ATCP's relative neglect of this topic has been paralleled in the sphere of academic publications, although there a few notable exceptions' (ATCPs are Antarctic Treaty Consultative Parties) (1990a, p. 354). The 1990s saw an increase in the academic attention paid to tourism issues, although the literature remains relatively limited and generalised, with few areas of tourism research receiving specific attention. For the purposes of this review it is assumed that the reader is familiar with the basic elements of the present management system (refer to chapter four). This review is arranged in four sections. First, broad issues constraining and affecting the management system are examined. Second, issues and problems with the current system are investigated. Third, debate about the need for change is examined. Fourth, management systems that have been proposed are examined. A summary concludes the section, identifying issues of importance for this research. Ongoing or recent research programs of note are also reviewed.

Tourism management within the ATS has evolved from a simplistic set of hortatory statements and appeals (with little attention paid to implementation), to a more comprehensive sub-regime of the ATS, with some aspects being legally enforceable (see section 4.1). This evolution is reflected in the literature, which has turned its attention to a range of different issues over time. The academic debate has contributed to change in the ATS's treatment of tourism issues, and a number of concerns expressed in the early literature have now been addressed by the ATS.

Much of the effort being exerted on tourism management policy is expressed through the ATS in the form of information papers, working papers, and diplomatic exchange. This material is not examined here, with much of it covered in more detail in chapter four. This section examines material in academic journals, conference proceedings, theses, dissertations and other forums. Particular attention is paid to proposed management provisions and systems, and to justifications for different forms of management. Generally speaking, supporters of the status quo have not needed to argue their case as strongly as those advocating change, as a result of the inbuilt resistance of the ATS regime to change (arising from the requirement for consensus), and this is reflected in the literature.

At the outset, it should be mentioned that there have at times been doubts expressed about whether the ATS should be involved in tourism regulation at all. In the early years of the ATS there were Argentine and Chilean objections to ATS consideration of tourism issues. It is generally accepted now that tourism management is an appropriate topic for ATS attention (Beck 1990a, Herr 1996a, 1996b). Similarly, the debate has turned from the issue of whether tourism should be regulated, to the issues of how comprehensively tourism should be regulated, and how effective the present system of management is proving. Pressure from third states has also been an influence. The rejection of the *Convention for the Regulation of Antarctic Mineral Resource Activities* (CRAMRA), and the subsequent negotiation of the Protocol at the beginning of the 1990s turned the focus of environmentalists from the 'threat of mining' to other concerns, including tourism. At present, while some believe the Protocol is sufficient to prevent undesirable effects from tourism, others feel that tourism management and regulation is not adequate and requires attention. Apart from legal and illegal fishing activity in the Treaty area and adjacent oceans, tourism is generally seen as the most pressing unresolved management issue in Antarctic conservation.

When examining the tourism literature, a number of collations are of particular value. Most notable are the 1994 special issue of *Annals of Tourism Research*, and the *Polar Tourism* text (edited by Hall & Johnston 1995b), that includes tourism research from both polar regions. The *Annals of Tourism Research* special issue served to bring Antarctic tourism to the notice of mainstream tourism researchers, with previous publishing largely limited to specialist polar journals. The *Polar Tourism* collection heralded a comparative approach to polar tourism issues, looking at development, management and policy in Antarctic and Arctic regions, and firmly established the study of polar tourism issues as a distinct subset of tourism management issues and experiences.

The functioning of the industry is examined in some detail in chapter two, and as such will not be examined here. These issues are addressed by many authors (Reich 1980, Codling 1982, Nicholson 1986, Boczek 1987, Hall 1990, Stonehouse 1992a, 1994, Enzenbacher 1992a, Enzenbacher 1994a, Plimmer 1994, Smith 1994, White 1994, Hall & Wouters 1995, Stonehouse & Crosbie 1995, P. Davis 1995b, Cessford 1998).

A description and analysis of the extant tourism management system, the background and development of that system, and key issues in tourism management negotiations is provided in chapter four. These issues are also addressed by most authors in the field, including Codling 1982, Nicholson 1986, HRSCERA 1989, Beck 1990a, Stonehouse 1992a, 1994, Enzenbacher 1992a, 1992b, Pineschi 1992, Herr 1993, Beck 1994, Headland 1994b, Hall and Wouters 1995, Hall and Johnston 1995b, Hall 1990, Naveen 1996, Vidas 1996, and B. Davis 1996.

1.1.a Legal issues: sovereignty, jurisdiction and third parties

Perhaps the most fundamentally challenging issues relating to Antarctic tourism management are those surrounding sovereignty and jurisdiction. While issues relating to the lack of sovereignty in the Treaty area are not restricted to tourism, it is with tourism that they present a number of practical challenges. There are four dimensions to these issues. First, it is unclear in some cases who has legal jurisdiction over tourists, tourist operators, or vessels involved in tourism. Second, the suspension of claims under the Treaty and the resultant lack of clear sovereignty mean that tourism regulation cannot be confidently undertaken by any single country, and therefore devolves to the ATPs and the ATS. Third, states that have not signed the Treaty are not bound by its provisions, meaning that tourism operations and citizens from such states are legally entirely free of any ATS requirements. Fourth, the legal status of some elements of the ATS are unclear, especially the status of Recommendations, and therefore potential regulatory loopholes exist—this issue is discussed in section 1.1.f. In an influential and oft-quoted symposium paper, Boczek (1987) examined the legal status of visitors including tourists under the ATS. This paper remains the authoritative source on these issues. As Boczek states:

> The jurisdictional tangle of all kinds of legal permutations in the Antarctic situation is already notorious, but its uncertainties can be particularly vexing with regard to visitors and non-governmental expeditions (1987, p. 466).

Boczek explains that 'the discussion of the legal status of visitors and non-governmental expeditions is inseparable from the issue of jurisdiction in Antarctica, which is itself in turn intimately tied to the issue of sovereignty' (p. 466). Sovereignty in Antarctica is unsolved, and in abeyance under Article IV of the Treaty (Boczek 1987). Therefore, jurisdiction (the exercise of authority by governments over individuals and other legal persons) is unclear (Beck 1990a). The Treaty itself avoids the issue of jurisdiction over certain entities, including tourists and members of non-governmental expeditions, and the matter is unresolved (Boczek 1987, Beck 1990a).

In searching for clarification, Boczek examines a range of international law as it applies to jurisdiction, including the concepts of territorial jurisdiction and the nationality principle. Territorial jurisdiction in Antarctica involves a state asserting jurisdiction over all persons in the claimed territory. This position can be contested based on non-recognition of the territorial claim, and on the international law requirement for effectiveness (as enforcement of the law may be impossible). The nationality principle is where states exert jurisdiction over their own nationals regardless of location. Nationality may also apply to legal entities and to vessels, with corporations normally subject to the law of the state in which they are incorporated. In the Antarctic context, this may conflict with the assertion of jurisdiction based on territorial claims (Boczek 1987). Jurisdiction may also be asserted on the basis of where an activity is organised, or where an expedition proceeds from, and include individuals participating in these activities even if they are not nationals of that state (Boczek 1987). The nationality of ships is also an issue. The Treaty area waters are for most purposes high seas and as such all persons on board are under the jurisdiction of the flag state (Boczek 1987). A similar principle applies to aircraft. Some parties assert jurisdiction over ships under their control (Boczek 1987). Boczek notes that concurrent jurisdiction can apply (for example, a state may exert jurisdiction over their nationals on a foreign flagged vessel). Similar issues apply to stations and their occupants. Boczek notes that no major problems had arisen relating to jurisdiction with tourist vessels (1987, p. 475).

Other authors also examine these issues. Enzenbacher (1995b) briefly examines issues relating to the area of applicability of the Treaty and Protocol, and resultant enforcement issues. Parties to the Treaty and the Protocol abide by them in all waters below 60° south latitude as far as they do not affect high seas rights. Hall and Wouters (1995) point out that the provisions of the Treaty do not abrogate the high seas rights of any state, leading to implications for regulation of cruise shipping, as most vessels are flagged in non-treaty nations.

Hall and Wouters (1995) address jurisdiction, noting that no formal approach to the issue exists within the ATS, other than an unwritten understanding that flag jurisdiction will be recognised. Hall and Wouters state that 'in theory, each nation is responsible for the actions of its nationals in Antarctica, but the practical position is rather different. Heavy-handed enforcement by a claimant state of territorial jurisdiction or application of national laws might prompt complications with non-claimants' (Hall & Wouters 1995, p. 159). A similar problem is noted by HRSCERA (1989) who cited advice from the Australian Department of Foreign Affairs and Trade to the effect that 'it is well accepted in international law that the enactment of legislation and regulation of activities in claimed territory amounts to assertions of sovereignty' (p. 37). Beck (1994) also examines the question of jurisdiction, while White (1994), provides an extra dimension by citing examples of law in the courts that addressed the issue of (US) jurisdiction over Antarctica in relation to air traffic control and the Air New Zealand overflight disaster.

Enzenbacher (1995b), in describing the limitations of current tourism regulation, notes that the issues of jurisdiction, sovereignty, enforcement, liability, and implementation were side stepped in the Treaty agreement, but may affect the ability of the ATS to regulate tourism. Hall and Johnston (1995a) assert that the lack of clear sovereignty represents a most fundamental and immediate problem for environmental and tourism management in the Antarctic. Nicholson (1986) regarded the question of jurisdiction as being responsible for the hortatory nature of the measures applying to tourism. Nicholson highlighted the complexity of jurisdiction with an example, subsequently quoted often, where the concept of flag state jurisdiction is insufficient in the case of 'an incident involving, say, a Panamanian registered vessel, with a Greek captain, a Philippine crew, carrying an international party of tourists on a charter tour organised by a travel agent in the United States' (p. 6). A similarly complex situation arising from a real occurrence is described by Vidas (1996), where a Russian vessel, leaving from disputed British / Argentine territory visited a Norwegian claimed territory. The operation was organised in the US, and involved nationals of Treaty and non-treaty nations. Beck (1990a, 1994) argues the case in a similar fashion, drawing on Nicholson, and Boczek, but also notes that Greenpeace expeditions posed legal questions 'too complex to even contemplate' according to legal advice (Wolfrum 1988 in Beck 1994).

An additional dimension of sovereignty issues is the potential for tourism to be used as a means to support territorial claims. Hall and Johnston (1995a) assert that the primary reason for the support for tourism activity provided by Chile and Argentina is to bolster their territorial claims. These authors also link the development of an Australian Antarctic tourism policy through the late 1980s (see HRSCERA 1989) to the assertion of sovereignty.

Alongside jurisdiction, the question of third parties is of concern when examining the legal status of tourists (Enzenbacher 1995a, 1995b, Boczek 1987, Vidas 1996). The concept is of application when considering tourist activities involving nationals or vessels of a country not party to the Treaty. The relationship between the Antarctic Treaty regime and third states (states not party to the Treaty) is examined by Boczek. While some commentators differ, it is generally agreed (according to Boczek 1987) that the rules of the ATS cannot be enforced against third parties. After examining issues relating to the status of third parties arising from the Treaty and ATS Recommendations, Boczek concludes that there is no basis on which ATS provisions can be applied to expeditions of third parties, including tourist expeditions. Beck (1994) and Hall and Wouters (1995) also examine the issue of third parties, drawing on the work of Boczek and of Nicholson. Pineschi (1992) explains that Article 13 of the Protocol provides for ATCMs to bring any action contrary to the Protocol to the attention of the responsible state if that state is not party to the Protocol. This collective reminder constitutes the main recourse of the ATS to activity contrary to the Protocol where jurisdiction of an ATP does not apply.

In addressing these legal dimensions of tourism management, Boczek makes a number of conclusions and recommendations. These included that a consolidated set of regulatory concepts was required, to 'define, sharpen and harmonize the relevant concepts and use them in a consistent way, perhaps in one Recommendation like the Agreed Measures' (p. 489). This has largely been achieved through more recent developments in the ATS, including the Protocol and Rec. XVIII-1. Boczek also concludes that the status of visitors and members of non-governmental expeditions is also unresolved within the ATS, and therefore that the 'adoption of the *nationality principle* is the only reasonable way out of the jurisdictional tangle in Antarctica' (p. 489). Boczek argues that the question of jurisdiction would need to be resolved in a way that balances the interests of all ATPs against the interests of claimant states. Boczek suggests that the ATS should determine that if a state waives territorial jurisdiction (to allow national jurisdiction to prevail) it would not constitute a renunciation of a claim. The adoption of the Protocol and the promulgation of enabling legislation has clarified the legal status of visitors, as legislation enacting the Protocol is ATS derived and therefore does not cause conflict with the requirement of the Treaty to not make further assertions of sovereignty.

1.1.b Enforcement

The difficulty of enforcement of elements of the existing system (and any new system) is recognised as being a major constraint. While compliance with some aspects of regulation (such as the need to complete an environmental assessment) can be enforced, the on-ground aspects of the regulatory system (such as they are) are a different matter, due to the distances involved, the very large area, and the lack of suitable personnel in most locations. Enzenbacher (1995b) notes that enforcement problems limit the ability of ATPs or the ATS to effectively apply regulation. Cessford (1998) notes that the lack of on-site management presence, and the vast distances involved pose great difficulties. Naveen (1996) cites examples where enforcement of existing regulations has not been possible, noting that a number of yachts and non-US tour vessels were believed to have visited Sites of Special Scientific Interest (SSSIs) and Specially Protected Areas (SPAs) in recent years.

A second issue is implementation of existing regulations. Failure of ATPs and operators to comply with tourism reporting requirements is cited by many as an example of the difficulty of enforcing measures (Johnston & Hall 1995). Considerable variation exists in the quality and amount of information reported (Enzenbacher 1995a, 1995b). Beck (1994) stressed the difficulty of implementation and enforcement, as opposed to the ease of passing regulations, and notes than ATPs 'have relied on persuasion and exhortation rather than compulsion' (p. 379, also Beck 1990a).

1.1.c Growth of tourism

Growth of tourism has been discussed by many authors (Nicholson 1986, IUCN 1991, Plimmer 1994, Smith 1994, P. Davis 1995b, Hall & Johnston 1995, Johnston & Hall 1995, Snyder & Stonehouse 1998, Cessford 1998). Growth is used as an argument for regulation, where it is suggested that growth means that more comprehensive regulation will eventually be required, and that such regulation should be in place before numbers are too high. Almost invariably, authors have predicted continued growth—and have been correct to date (section 2.2). Most authors link increased visitor numbers to increased impacts on the environment, on science, and on other users of Antarctica. A consistent theme has been the difficulty of predicting future trends, due to uncertainties in the industry. In addition, a number of authors have discussed the factors constraining growth, and the difficulty of managing growth. Alongside growth is the question of scale of tourism. Some argue that Antarctic tourism is simply too small in scale to warrant concern solely on that basis. Headland (1994b) provides a calculation comparing the number of person days on the continent each year for tourism and for governmental activity, estimating that tourism represents 0.52% of the total time spent ashore. Herr (1996b) argues that scale is an insufficient explanation for the attention tourism has received. Other measures that reinforce the importance of tourism are examined by Herr, including the fact that tourists outnumber scientists, and that tourism is the second largest commercial use of Antarctic resources. He notes that actual levels of impact from tourism as compared to science are minimal, and that it would be almost impossible for tourism to rank other than first or second. Herr also argues that tourism 'is not, and never has been a commercially substantial industry' and that it can be made to look extremely modest when compared with visitor numbers to other locations (p. 206).

1.1.d ATS responses

The ATCPs have been criticised by some authors for their slow response to the need for tourism regulation, and for the absence of a more comprehensive regime. Enzenbacher (1995b) notes that many have questioned the effectiveness of the ATCPs' response. Enzenbacher identifies constraints on the ATS response, including political, cultural, and economic differences between ATPs. An additional constraint identified by Enzenbacher (1995a, 1995b), and Davis (1999) is the lack of an administrative centre such as a permanent secretariat. As an example of ATS ineffectiveness, Enzenbacher cites the informal meeting preceding the ATCM XVII (section 4.1) that in her view did not result in any meaningful outcome. Enzenbacher acknowledges the actual ATCM did show evidence of renewed interest in tourism issues, including the tabling of the draft Protocol annex on tourism (Enzenbacher 1994a, 1995b, section 4.1). Enzenbacher points out that while the ATS as a whole has been slow to react, tourism issues have been addressed in some depth by some ATPs, demonstrated by an increase in the number of tourism papers at ATCMs, meetings with operators, and observer programs. Similarly, Hall and Wouters (1995) hoped that the comprehensive review of tourism by the ATS proposed at the time was a sign that the ATS was beginning a discussion on current forms and levels of tourism.

Other authors analyse the response of ATCMs to tourism issues with regard to the constraints imposed by the nature of the ATS. Herr (1996b) and Vidas (1996) analyse tourism regulation using regime theory, and provide considerable insight into the roles or different ATPs and the restrictions and limitations acting to constrain their decisions.

1.1.e Protected areas and ASTIs

Some attention has been paid in the literature to elements of the system that have been proposed but never fully implemented or supported. The provision for Areas of Special Tourist Interest (ASTIs) and the fact that none have been declared is commented on regularly. Enzenbacher (1995b) notes that ASTIs have never been designated, and points out that it is still uncertain whether concentration of impacts or spread of impacts would be preferable. Stonehouse (1992a) also discusses the concept of ASTIs, and notes that the protected area system in general had been used in some cases to exclude tourism from certain areas, without provision for input or appeal from the tourism industry. Vidas (1996) briefly discusses ASTIs, noting that there were serious reservations about the designation of such areas. P. Davis (1995b), Enzenbacher (1992a), and Pineschi (1992) briefly describe the adoption and effective abandonment of ASTIs. B. Davis (1996) noted that while some protected areas exist in, or close to, areas used for tourism, it was unclear as to how aware operators are of such sites and how they are identified and avoided. Boczek (1987) suggested that the matter of ASTIs needed to be resolved finally within a framework of an overall system of managing the Antarctic environment. This was achieved with the adoption of the Protocol, although possibly not in the way that Boczek had envisaged.

1.1.f Status of Recommendations

Problems may arise as a result of the unclear legal status of Recommendations and other measures, or when ATPs translate them into domestic rules in different ways. Because the decision making system of the Treaty and Protocol is one of consensus, Recommendations passed by Treaty meetings are agreed to by all ATCPs. Hall and Wouters (1995) note however that 'it is unclear whether Recommendations under the Treaty are legally binding, even when approved by governments' (p. 156). Vidas (1996, p. 307) stated that 'the exact legal nature of ATS Recommendations remains unclear, and their enforceability is, admittedly, a lasting dilemma for commentators on the ATS'. Boczek concludes that any of the rules of the ATS apply only to nationals of states that have specifically approved the rule—in the case of ATS Recommendations, states are not obliged to formally approve them, and in such cases they remain hortatory (Boczek 1987). Implementation of Recommendations is uncertain, as there is no requirement for Recommendations to be passed into legislation or regulations. As a result, there are no means of enforcing ATS decisions based on Recommendations (Hall & Wouters 1995, Enzenbacher 1994a, 1995a, 1995b). Enzenbacher (1994a) discusses an incident where tourists unwittingly entered a SSSI, contravening a Recommendation. The Recommendation had not become effective, as a number of states had not formally approved it, raising the issue of the extent to which a state is bound by such a Recommendation even where that state has approved it. Recommendations aimed at regulating and managing tourism and non-government activity are of uncertain status, unevenly implemented, patchily enforced, and, as a result, of limited value. This is of particular significance as significant elements of the tourism management system are in the form of Recommendations.

1.1.g Enabling legislation

The translation of rules from the international forum of the ATS to the domestic arena occurs through legislation, regulations, or other mechanisms. Many authors express concern that the potential exists for the rules decided by the ATCPs to vary in their expression at the domestic level, as a result of different legislative structures and methods, or different interpretations of the ATS rules into domestic law. Situations may arise where requirements differ for tourism operators in different countries. Enzenbacher (1995b) points out that to assess the effectiveness of environmental and tourism regulations, implementing legislation needs to be examined. This was difficult in 1995 due to the low number of instruments of ratification deposited. Enzenbacher briefly examines the US ratification process, highlighting the influence domestic politics has in the final legislation. In addition, Enzenbacher highlights the very long time frames required for the adoption of implementing legislation, regarding them as a serious constraint in implementing tourism measures agreed in the ATS (1995a, 1995b). Kriwoken and Rootes (1996) describe the environmental assessment process put in place under the Protocol, and briefly examine domestic enabling legislation. They note that 'the different national legal systems have, by necessity, resulted in a variety of interpretations of the Protocol. These interpretations have led to different requirements for, or levels of, environmental assessment' (p. 3). One particular difference is the need or otherwise for permits. The potential for variability in enabling legislation is also noted by Enzenbacher (1995a, 1995b), Dingwall (1998), and Smith (1994). Splettstoesser and Folks (1994) make the point that the process of Protocol ratification through implementing legislation will provide detailed procedures and regulations which in themselves may prove to be cumbersome and time consuming for operators to comply with.

1.1.h Role of states and national law

An issue related to the question of enabling legislation is that of the role of states and general domestic law in tourism issues. Herr (1993) examined the role of national laws in regulating tourism. He notes that Chile and Argentina provided a generally supportive regime during the early years of industry development, and that the national laws of other gateway states are of particular importance as regulatory instruments. The importance of the US legislation was also noted, given the numbers of tourists originating in the US and the number of operating companies based there. Herr also pointed out that while there was a shift to the ATS as a forum for regulating tourism, the importance of national policy and laws should not be underestimated. Beck (1990a) examined the role of legislation adopted by individual ATPs for regulation of tourism. Beck asserted that the national dimension might be more important in the future, noting the formation of embryonic national policies on tourism, including those of Australia and NZ. Davis and Herr (1992) discussed the role of Australia in tourism regulation, including within the ATS. Many of the issues discussed by these authors have been resolved by later events, but the paper remains a valuable record of policy development issues and processes during a very important stage in the evolution of the management system. Hall and Wouters (1995) describe the problems with regulation of tourism under domestic law that arise from Article IV of the Treaty, relating to the exercise of sovereignty. They argue that any unilateral attempt to regulate tourism beyond the level agreed by the ATCPs would amount to an exercise of sovereignty and would be challenged by the other ATPs. Some evidence of unilateral policy development was noted by Beck (1994) who discussed the requirements for prior notice of visits and for expert guides and observers imposed by NZ, and the activist policy approach called for by the Australian House of Representatives Standing Committee on the Environment, Recreation and the Arts (HRSCERA 1989) in this light.

1.1.i Need for tourism research, monitoring and evaluation

Many authors have identified a need for research into tourism impacts, monitoring of tourism impacts, and evaluation of impact mitigation strategies. A general view is that too little is known about the impacts tourism will have on the Antarctic environment, and that in the absence of such knowledge management cannot be effective. It is also felt that without monitoring, it is impossible to know whether tourism activities comply with the principles of the Protocol. Some call for comprehensive monitoring and research programs, including long term projects aimed at understanding natural variation and human induced change. They suggest that 'until such factors can be clearly differentiated it will be difficult to draw any conclusions about environmental impacts caused by tourist activity or properly inform future policy making' (Enzenbacher 1995b, p. 193).

Apart from generalised calls for research and monitoring aimed at improving management (Cessford 1998, Enzenbacher 1995b, Kriwoken 1995, Acero & Aguirre 1994, Plimmer 1994, Splettstoesser & Folks 1994), calls for monitoring and research can be separated into a number of areas:

- systematic, long-term and comprehensive research on environmental impacts (establishing baseline conditions, and understanding relationships between tourism and impacts);
- ongoing monitoring of environmental impacts;
- monitoring of compliance and on-site behaviour;
- research on visitor behaviour, satisfaction and characteristics; and
- monitoring of numbers and activities.

Research aimed at establishing the baseline conditions of sites used for tourism and understanding the relationship between tourism use and environmental impacts is advocated by many. The most basic site information has generally been unavailable for even regularly used sites. Stonehouse (1994a) writes that 'there have been few systematic attempts to measure Antarctic tourism, to examine it, describe it, assess with any accuracy its environmental impacts and prescribe sensible remedies' (pp. 207–208). Stonehouse describes a project aimed at partly remedying this deficiency (section 1.1.4), and asserts that 'the long-term monitoring that will be needed to detect such effects should start now, and those concerned should make plans to continue for as long as tourism itself continues' (1994a, p. 209). Hall and Wouters (1995) support such research. One issue is the lack of baseline information. In many cases it is unclear what the initial conditions were at sites used for tourism, and many newly used sites are previously unstudied. Beck (1990a) felt that further baseline study was required before monitoring and assessment of environmental impacts of tourism would be possible. These calls were later reiterated by Beck (1994), when he noted that that a key weakness is the inadequacy of environmental research, including the absence of baseline information, effective monitoring, or environmental assessment procedures. Enzenbacher (1992b, 1992a, 1994a) also called for a better understanding of tourism impacts, and noted that research on many aspects of Antarctic ecosystems was needed, to provide information to allow scientists to determine the extent of natural variation and trends in environmental change. Enzenbacher pointed out that baseline data were lacking for most sites regularly visited by tourists, and that such information was vital to an ecosystem approach to Antarctic tourism research.

Ongoing monitoring of tourism impacts is also raised as a management need. Johnston and Hall (1995, p. 301) state that 'it is apparent that tourism requires close monitoring and regulation if it is to be sustainable in polar regions', and suggest that continual monitoring of environmental impact is necessary. IUCN (1991, p. 56) stated that 'impacts of tourism need to be carefully monitored and destinations changed if impact levels become damaging'. Naveen (1996), Enzenbacher (1995b), and B. Davis (1996), among others, call for rapid implementation of monitoring, especially at sites where cumulative impacts are likely.

Many authors have made calls for monitoring of compliance with regulations, and monitoring of on-site behaviour. These issues are related to enforcement mechanisms, and are addressed in section 1.1.3, where the management suggestions of authors are considered.

Social research is also an issue. Some argue that visitor expectations and characteristics must be considered to ensure a successful management system. P. Davis (1995a, 1995b,

1998) supports further research into patterns of visitor use to provide data for developing informed management strategies, based on-site specific conditions and how they relate to recreational impacts. She also notes the need for research aimed at determining whether Antarctic visitors are urban-based tourists or experienced wilderness visitors. P. Davis stresses the fundamental need in visitor management for basic information on visitor characteristics and the effect that these characteristics have on the landscape. B. Davis (1996) suggests that further social research is required, including investigations of visitor expectations, behaviour of visitors on-site, and reactions to the Antarctic experience.

An important information need, and one that was sorely neglected for some time, was basic data on tourist numbers, locations, and activities (Naveen 1996, Enzenbacher 1995a, 1995b, 1992a, 1992b). Enzenbacher stressed the need for better information on tourism, including on mode of transport, length of stay, behaviour in relation to numbers, and operator policies.

A very important point was made by Codling (1982, p. 7), who posed the question 'is it always possible to measure human impact on the environment before considering its desirability?'. She suggested that an alternative way to manage impacts would be to determine what an acceptable level of change would be, before establishing a level of use that will not exceed that level. Codling supported the use of qualitative and quantitative measurement of activity, with systematic monitoring 'to provide a basis for balanced and workable decisions' (p. 8). In essence, Codling was proposing elements of the Limits of Acceptable Change (LAC) visitor management system, which at that point had not been developed (section 7.2.3.c). Codling questioned the usefulness (and practicality) of measuring human impacts in any absolute sense, arguing that the important issue is the level of change that we are willing to accept. Codling's point seems to have been lost to many subsequent authors who called for research into the impacts of tourism, until P. Davis (1995b, 1999) proposed the application of the LAC.

1.1.j Vessel safety, liability, and insurance

The related issues of vessel safety, liability for environmental damage, and insurance are at present unresolved, and these issues are largely unaddressed in the literature. The nature of tourism means that in some cases there is a higher risk of an incident than for the vessels of a national operator. Many (Pineschi 1992, Beck 1990a, HRSCERA 1989, IUCN 1991, B. Davis 1996, Vidas 1996, and Boczek 1987) argue that rules on vessel construction and operation in ice covered waters are needed to ensure safety and environmental protection.

A related issue is that of liability. The question of who is liable in the event of major incident is not restricted to tourism—the ATS has been grappling with the negotiation of a liability annex to the Protocol for some time (appendix one). Enzenbacher (1995b) briefly discusses liability issues as they pertain to tourism. Insurance has been suggested by some as a requirement for all operations. Boczek (1987) briefly examines the possibility of linking all forms of government support to proof of insurance and even to a permit system.

1.1.1 PROBLEMS WITH THE EXISTING SYSTEM

Most authors comment on shortcomings they identify in the existing management system. Some argue that the system is generally sound, but is failing at the implementation stage, and call for improved implementation. Others feel that the system is flawed at a more fundamental level, with systemic gaps, lack of comprehensiveness, and inadequacy of certain elements of the system. These authors call for a more comprehensive management system.

A fundamental of the debate about tourism regulation is the appropriateness of treating tourism differently to science or other uses of the continent. The ATS has so far decided that all activities should be treated equally. A number of authors differ. Pineschi (1992) charges that the present system, in treating tourism in the same way as all other activities, fails to recognise the peculiarity of tourism and has therefore not provided appropriate answers to problems posed by tourism—'the tourist is a *dilletante* and exercises less caution because he is often inexpert' (Pineschi 1992, p. 199). Enzenbacher (1995a, 1995b) calls for recognition of the unique aspects of tourism. She asserts that because the ATS opted to regulate tourism under the same regime as all other activities, the specific problems and issues associated with tourism have not been addressed. Vidas (1996) argues the same point.

Beck (1990a) noted that the regulation of tourism had never been systematically addressed by the ATS, and highlighted the lack of an overall, comprehensive mechanism for tourism activity. He suggested the problem areas were:
- supervision of tourists on land;
- registration and licensing of shipping;
- provision of air navigation arrangements;
- emergency and rescue services;
- the need to educate all involved in tourism;
- the creation of protected areas; and
- the integration of existing and new Recommendations in a single code (Beck 1990a).

Beck concluded that while a tourism regime remained an ATCM agenda topic, it was not a matter of high priority. He also noted that even proponents of a tourism regime regarded it as a non-urgent matter.

Shortcomings of the regulatory system identified by Enzenbacher (1995a) included:
- difficulties bridging the gap between international and national levels of regulation;
- gaps and inadequacies in existing regulation, rather than imperfect implementation of current regulation; and
- lack of specificity or clarity of intent in Protocol provisions.

Enzenbacher concluded that the regulatory regime in place (including the Protocol) was inadequate. The lack of clarity about how environmental assessment procedures will be applied to tourism, and the lack of a mechanism for cumulative impact assessment are, in Enzenbacher's view, fundamental flaws. In addition, Enzenbacher adds that the lack of compliance with present regulations renders them ineffective.

On-ground compliance with voluntary guidelines was examined by P. Davis (1995a, 1995b). She asserts that the guidelines are inadequate in preventing adverse impacts to flora and fauna, noting that such guidelines should form part of a broader management strategy. Issues included different understandings of the guidelines, different degrees of compliance (influenced by the characteristics of visitors), and differences in the ability of supervisory staff. P. Davis identifies many questions that the present system has not answered, including:
- where do visitors want to go? Are all sites suitable?;
- are all activities suitable and appropriate?;
- what is being managed—recreation, wilderness values or both?
- can the conditions of the area be maintained?;
- how will conditions be monitored—by use, by numbers, by activities?;
- how is the management message communicated, and how can effectiveness be determined?;
- if change occurs, what should be done?;
- are visitors satisfied—do the values of the area and the expectations of the visitors mesh? (1995a).

Vidas (1996) examined the regulation of tourism through ATCM Recommendations, prior to the 1991 adoption of the Protocol. He asserted that the dispersed regulation, spread across various Recommendations of uncertain legal nature, was unsystematic, incomplete, and not the most appropriate solution the ATS could have offered. Vidas cites a number of authors who argue that the tourism regime is inadequate, and fails to recognise the peculiar and specific nature of tourism problems. Vidas argues that gaps in the regime include the questions of liability, insurance, jurisdiction, third party activities, and enforcement. There are also questions relating to the implementation of the existing measures, including environmental assessment processes. Vidas concludes that the tourism management regime is far from comprehensive. Acceptance of regulation was only possible by the sacrifice of thoroughness, and as Vidas puts it 'at the end of the day everybody was content that no new regulation was adopted' (1996, p. 319).

According to Johnston and Hall (1995), the constraints of the ATS (including a fragmented decision making process) mean measures evolve in a piecemeal fashion, take several years to implement, and are often regarded as inadequate. They also noted a number of other problems. ATS information is not readily accessible, and there are difficulties with exchange of tourism information. Tourism and non-governmental activities are not defined in the Protocol, and liability issues remain unresolved. The ad hoc nature of development of tourism regulation, the resultant disjointed and inconsistent accumulation of agreements, and the lack of a systematic and comprehensive regime or a coherent tourism management system are highlighted (Johnston & Hall 1995). The present system does not require companies to meet any defined environmental or safety standards, or provide emergency backup. Johnston and Hall conclude that 'it is essential that appropriate management regimes are put in place to regulate tourist activity... regulatory frameworks also need to be implemented to ensure that there is a complementary system of compliance' (p. 310). Cessford (1998) argues that the lack of a clear mandate for making binding management decisions is a fundamental problem.

Environmental assessment processes are a primary management mechanism applying to tourism. Kriwoken and Rootes (1996) examine these processes, describing the involvement of the International Association of Antarctica Tour Operators (IAATO) and IAATO companies in the production of environmental assessments. They note that some companies have produced environmental audits as well as environmental assessments. They also report on criticisms of the environmental assessment process, including that:

- some are prepared by people with little environmental assessment experience;
- discussion of alternatives is limited;
- predictive requirements are lacking;
- there is little or no consideration given to monitoring;
- they may be completed in-house and not reviewed externally;
- the level of assessment may not be appropriate;
- not all assessments are tabled at ATCMs;
- some IAATO members had not initiated environmental assessment processes; and
- requirements for industry-wide cumulative impact assessment remain unresolved.

Kriwoken and Rootes highlight some problems with the use of what they refer to as traditional project style environmental assessment. A significant issue is that prediction of tourism impacts must be made from an already impacted state, as tourism is an ongoing rather than new activity. Kriwoken (1995) reported on results of two environmental assessments, listing a number of issues and problems, including the need for monitoring, the need for a proper cumulative impact assessment of tourism, and the need for completion of environmental assessments (including for non-IAATO companies).

A number of management issues were raised by Stonehouse (1994a). He questioned the openness of all sites to visitation. In light of the possibility that rates of tourism may rise to as many as 20 000 to 30 000 people each year, Stonehouse revisits the notion of ASTIs, asking: will operators be permitted to land visitors at any undesignated site?, has the ASTI concept again become relevant?, and if so what makes an area attractive for such designation? Stonehouse and Crosbie (1995, p. 229) also discuss protected areas in the Antarctic, noting that even after the Protocol the requirements for protected area management plans express 'little more than a sparse framework for the bureaucratic regulation of human activities that may damage the environment' and that management plans do not approach the level of detail required in other areas where wilderness is managed for human use.

A workshop examining aspects of environmental management in Antarctica is reported by Snyder and Stonehouse (1998). They note that 'Antarctica lacks environmental management plans and policies of the kind that are considered essential for management of recreation areas in environmentally sensitive regions elsewhere in the world' (1998, p. 343). They report that a number of challenges arise from the multiple uses of Antarctic coastal land. These challenges are significant in light of the absence of 'management structures charged with defining objectives and policies' and the lack of 'mandatory strategic management planning' (p. 343). The workshop also examined the possible application of other models of multiple-use management systems for ecologically sensitive environments.

An important element of the tourism management system is self regulation. IAATO, representing part of the industry, imposes conditions on members. A number of authors comment on the prominent place of self regulation within the Antarctic tourism management system. They argue that, on the basis of the self-interest of companies, the lack of capacity of the industry, and the lack of a strategic approach, self regulation may not be appropriate for certain elements of the system. Countering such arguments is the recognition that, because of the difficulty of enforcement, self regulation will remain important. Enzenbacher argues that, when it comes to compliance with the Protocol, self regulation is neither adequate nor appropriate, and that enforcement is therefore a crucial issue (1995b, 1992a). In discussing the role of IAATO, Enzenbacher asserts that self regulation may not sufficiently address all tourism issues, especially given the absence of a neutral regulatory authority. Enzenbacher notes that infractions of IAATO guidelines have been observed (1995b). Enzenbacher concludes that

> Given the weakness of the current regulatory framework for Antarctic tourism, trusting voluntary compliance with current guidelines to protect Antarctica's environment from the real and potential adverse effects of tourist activity would not be adequate or responsible (1995b, p. 196).

Johnston and Hall (1995) note that, with increases in numbers of tourists, the role of self regulation is increasingly challenged. They acknowledge that IAATO invites new operators to become members, and recognise the need for operators to have an input into the policy making process—'tourist operators must be encouraged to feel a degree of 'ownership' over polar resources in order to assist their resolve to manage and protect them' (1995, p. 304). Splettstoesser and Folks (1994), in support of self regulation, felt that an honour system would prevail, and that 'individual concerns for the environmental fragility of the continent will override any need for formal regulations and their enforcement' (p. 241).

Codes of conduct and guidelines have, in the absence of strong regulation, represented the main practical environmental management tool for the industry—indeed Beck (1994) noted that the development of the original industry code was prompted by the regulatory vacuum within the ATS. Codes of conduct and guidelines are discussed in more detail in section 4.9.2. Until 1994 there was no systematic review and consolidation of the numerous codes and guidelines, and it is arguable that the 1994 Rec. XVIII-1 represents only a partial response. Enzenbacher (1995b) identified many problems with these instruments, including their proliferation, a lack of congruence between different codes and guidelines, and the lack of availability of some. Enzenbacher suggested that the multitude of codes of conduct may have caused confusion, and identified language problems, access problems, lack of comprehensiveness, and unsuitable layouts as issues of concern. Enzenbacher acknowledged that Rec. XVIII-1 might alleviate some of these difficulties.

The need for evaluation of the effectiveness of the system is also an issue. Many authors, in calling for a comprehensive management plan, imply that evaluation would be included.

Johnston (1998) examines methods for evaluating the effectiveness for visitor management strategies. Johnston suggests that a goal-achievement approach can be used to assess individual strategies, but that a conceptual analysis is also required. Johnston concludes that comparative studies are appropriate, examining how different strategies work in the Arctic and the Antarctic, and identifying the effectiveness of different measures according to setting.

Problems are identifiable with the overall system as well as with components of the system. Despite different views expressed by different authors there are a number of commonly identified problems. The problems identified range from the philosophical to the pragmatic, and from the international scale to the individual tourist site.

Broad scale (or regime scale) issues include:
- lack of legal certainty (status of Recommendations, liability, sovereignty and jurisdiction, third parties);
- uncertainty about growth and modes of tourism;
- geographical limits to enforcement and oversight;
- slow response times of the ATS to tourism issues;
- poor understanding of human impacts on Antarctic ecosystems;
- poorly developed and ad hoc Antarctic protected area system;
- tension between national and international (ATS) regulatory roles;
- variation in implementation of ATS rules in domestic law;
- lack of cohesion with other international agreements;
- lack of appropriate maritime regulation for Antarctic ice covered waters;
- lack of recognition of the unique management needs arising from tourism;
- lack of a comprehensive, systematic tourism management regime; and
- unclear allocation of responsibility or mandate for managing tourism.

The literature review has also highlighted a number of issues with the management system in general and individual components in particular. In listing here it should be noted that some of these issues have been addressed (either in total or in part) since they were raised. They include:
- inappropriate reliance on self regulation (arguments that the industry is self-interested, lacks capacity, and lacks a long term approach);
- absence of management planning as would be used elsewhere;
- lack of a management philosophy;
- dispersal of regulation through various mandatory and voluntary instruments;
- no site controls—new sites and possibly unsuitable sites are visited;
- no activities are restricted;
- problems with supervision of tourists on land;
- lack of licensing or a permit system for operators and vessels;
- lack of a practicable cumulative impact assessment mechanism;
- guidelines are only partially adequate for managing on-ground impacts;
- there is diversity of guidelines and codes aimed at the same activities;
- regulatory measures are not evaluated;
- compliance with existing regulations is patchy, especially compliance with Recommendation based regulations;
- the protected area system is not well integrated with tourism management;
- the Protocol is not specifically applied to tourism;
- there is a lack of objectives for tourism management;
- it is not clear what visitors want;
- not all tourism operations have completed environmental assessments;
- some environmental assessments are of poor quality; and
- there is a lack of insurance or safety guarantee.

1.1.2 DEBATE OVER THE NEED FOR CHANGE

While problems can be identified with the current system, it is not universally accepted that major change is required. A debate (in both academic and ATS forums) has proceeded for some time over whether a tourism regulation instrument is required. This debate is closely linked with broader questions including philosophical positions on self regulation, the argument for equality of activities in the Treaty area, and possible derogation of national rights. The progress of this debate in the ATS arena, especially the events surrounding the proposed Protocol Annex on tourism regulation, is detailed in section 4.1. The parallel academic treatment is examined here.

In 1994 Beck discussed the broad issues of Antarctic tourism management, in light of the events of the early 1990s. Beck noted the divergence of national positions on tourism, dividing ATCPs into three groups—those who wanted an additional Protocol annex dealing with tourism, those who felt that regulation was adequate and implementation was a priority, and those who wanted some additional measures to strengthen existing regulations. Beck described the increasing importance of tourism as an issue through the 1980s. Beck concluded that a unified view on tourism may eventually emerge from the ATS, but that ATCPs

> must be prepared *and seen to be prepared,* to manage tourism in a manner capable of respecting environmental priorities, other legitimate uses of the region, and the interests of the wider international community (Beck 1994, p. 384).

Vidas (1996) showed that prior to 1991 the issue of Antarctic tourism was granted only marginal attention from ATCPs and was only fragmentarily addressed, and tracked the modes and extent of ATS adaptation to the challenges of Antarctic tourism after 1989. Herr (1996b) provided a more reasoned approach to the situation that other authors have interpreted as a glacially slow response to pressing tourism issues. Herr described the tourism regulatory system as a sub-regime (although it only recently became sufficiently coherent to be described as such). Herr asserted that ATS attention to tourism is associated with the need to protect the central objectives of the ATS regime and the international image of the ATS. He argued that rather than being a regime responsibility per se, Antarctic tourism impacted on identifiable regime interests, and provoked a regime response. The issue was of long standing, and of sufficient gravity to eventually prompt the regime to include it as a responsibility. The attention of the ATS to tourism reflects the degree to which tourism affected core regime interests—from the start of ATS attention to the beginning of the 1980s, tourism measures of the ATS were predominantly concerned with the impact of tourism on science. It was not until protection of the environment became the third core value of the regime in the 1980s that

> in the gathering together of issues to ensure 'comprehensive' environmental protection, the ATS policy-makers turned serious attention to the development of a direct regulatory mechanism for Antarctic tourism as a sub-regime in its own right (1996b, p. 215).

Herr (1996b) described the debate about a minimalist sub-regime for tourism (based on the provisions of the Protocol) and a more comprehensive sub-regime (based on a tourism annex to the Protocol). Factors making a comprehensive approach less likely included the low likelihood of states abandoning their interests and regulatory mechanisms, and the emergence of industry organisations with the capacity to influence regime regulations. Herr concluded that the regime has been effective as regards tourism regulation as far as was intended, and it is only if additional objectives are ascribed to the regime that it can be said to have failed—in essence, 'the regime's limited objectives for nearly thirty years scarcely could have failed to be met' (p. 222). Herr argued that while the ATS members have accepted a greater degree of responsibility for tourism, it is premature to conclude that regime objectives have changed, and therefore, despite the failure of the ATCPs to agree on how to proceed with regulation, it should not be concluded that the regime has failed in its objectives. Herr concluded his analysis by acknowledging that 'the older *laissez faire* approach to tourism is raising qualms with an increasing number of ATS members' (1996b, p. 223), and asserted that the trend of the ATS accepting more responsibility for tourism regulation would continue.

This view is supported by other authors. Johnston and Hall (1995, p. 310) suggested that the ATS as a regime was 'slowly reaching a point at which regulation of tourist activities is becoming possible through formal enforcement mechanisms' but that the development of appropriate regimes 'will fundamentally depend on the political will of stakeholders, and of governmental authorities in particular'. Enzenbacher (1995b, p. 186) described the debate surrounding the proposed Protocol annex on tourism, noting that those opposing the annex 'claim a convincing case to further regulate tourism has yet to be made'. Enzenbacher (1995a, 1995b) suggested that while a tourism annex might not be appropriate for current levels of tourism, regulation of vessels or operators through a permit system may be required.

Herr (1993, p. 104) argued that 'there is much to be done in interpreting and implementing the existing provisions of the Protocol and its annexes'. Herr argued that a more comprehensive approach to regulation would present considerable difficulties with regard to jurisdiction, demarcation, surveillance, enforcement, liability and sanctions, and that, given the time needed to sort out these issues, self regulation would need to continue.

Any attempt to develop a truly international tourism regulatory regime would require claimant states to derogate some rights (Wouters & Hall 1995a, Beck 1990a, Herr 1996b). Herr placed considerable emphasis on the role of states in regulating tourism, suggesting that state interests would cause states to resist moves to devolve regulatory capacity to the regime. This may be overstating the case—it could be argued that state responsibility for tourism regulation has evolved by default, in the absence of direction from the ATS, and that states may welcome the opportunity to centralise responsibility. Beck (1990a) argued that the establishment of an international tourism regime would minimise difficulties associated with competing national and territorial jurisdictions by removing uncertainty. Hall and Wouters also argued that the procedures and legislation used by ATPs to manage tourism vary widely, and that a 'more coherent and universal tourism management regime' is required. Such a regime would include an agreed set of guidelines for setting performance standards to be applied to all tourism activities, with these guidelines taking into account Antarctic experience and experience from other locations. Ultimately, they felt an international convention might be required (Hall & Wouters 1995).

B. Davis (1996) questioned the effectiveness of reliance on self regulation, and described two general positions on the issue. The first is that the management system in place is adequate, supported by the argument that the Protocol was negotiated relatively recently, and it would therefore be unreasonable to expect implementation to be complete. The absence of major incidents and the general impression that the tourism is reasonably well managed also support this position. The second position is that problems continue, with disruption of science, inexperienced companies and unsuitable vessels, visits to new areas, high numbers of visits to some sites, and incidents that could have been serious accidents. B. Davis asserted that, while elements of tourism management are being addressed, the approach is far from comprehensive or holistic.

The position of the industry itself on regulation is important. Whichever form of regulatory system prevails will have implications for the existing Antarctic tourism operators and prospective operators. Herr (1996b) noted that the tourism industry acknowledges the advantages of the Protocol for tourism interests (especially the Protocol's formal recognition of aesthetic values), and the benefits to the industry of the basic environmental protection function. The industry position is expressed by Herr—the 'legitimate interests of industry should be incorporated into an ATS regulatory process which acknowledges a substantial degree of self regulation by the industry' (1996b, p. 222). Herr (1993) recognised the industry's willingness to cooperate and offer expertise and experience in resolving practical issues facing the Antarctic community. Herr also felt that the formation of IAATO and the involvement of PATA contributed to the development of an industry commitment to standards in Antarctic tourism. Herr (1993) identified three areas of concern for the industry: the possibility of a separate tourism annex to the Protocol, seen by the industry as potentially discriminatory; the chance that the existing annexes (especially the protected areas annex) may be used to discriminate against tourism; and the possibility that the industry may be excluded from decision making processes. Herr notes that the third issue has been substantially addressed with the formal recognition of IAATO as a participant at ATCMs.

1.1.3 SUGGESTED MANAGEMENT OPTIONS

A range of management alternatives has been suggested by different authors. Proposals predating the Protocol and Rec. XVIII-1 have been included as they help to illustrate the climate in which these instruments were formulated, and because in many cases the proposed changes have not been satisfied by these instruments. Some authors, while sure that a more comprehensive regime would eventually be required, felt that that time had not yet been reached. Calls for further regulation range from minor changes to complete restructuring of the system.

At the minimum, most authors support improved implementation of existing measures. Prior to the agreement of Rec. XVIII-1, and the signing of the Protocol many authors called for rationalisation of the existing ATS Recommendations. Boczek argued that, while there was no urgent need to negotiate a convention on tourism and non-governmental expeditions, 'it would still be useful to improve the existing situation by integrating all the rules and regulations in one act' (1987, p. 489)—this was fulfilled somewhat with Rec. XVIII-1. Beck (1994) also discussed the scattered nature of the existing measures.

Codling (1982) discussed zoning options for the management of tourism activity. She recognised the difficulty of measuring human impacts, and the dilemma of management in the absence of guidance about what amount of change is acceptable. Codling felt that decisions were required what an acceptable amount of change, before management could proceed. Codling discussed zoning as a management tool, including the potential for concentration of pressures on certain sites, and boundary effects. Codling comments on the development of the ASTI concept, noting that it was based on a negative approach of exclusion from all other areas. Codling felt that zoning should only be used where there is evidence that it can control environmental degradation, and saw no need for such measures at that time.

In 1986 Nicholson examined the tourism management regime, and discussed whether there was a need for further action at the international level (while recognising that there were problems with implementation at the domestic level). Among the suggestions Nicholson discussed were:

- improved reporting of tourism voyages and activities;
- registration and licensing of commercial tour bodies operating tours, linked to operational planning and a financial guarantee for costs of any assistance;
- requirements for operators to have insurance to cover costs of search and rescue;
- application of environmental assessment to tourist activities;
- use of the protected area system to identify and manage geographic features for multiple land uses;
- encouraging operators to seek assistance in the planning stages of activities to ensure adequate preparation;
- more detailed provisions on liability, compliance, and enforcement; and
- a means of resolving conflict between jurisdictions, or creation of a new jurisdiction.

Nicholson was sure 'that a separate legal regime, in the form of an international convention, will eventually be required to draw together, in a coherent fashion, the rules and guidelines necessary for the effective control of tourist activity', although he felt that it was not necessary at that time (1986, p. 7). He suggested that the ATCPs had made a good start with the extant rules and guidelines, and that it would be important to see how tourist activity developed, to take into account new forms of activity.

The Australian House of Representatives Standing Committee on Environment, Recreation and the Arts (HRSCERA 1989) was requested to inquire into and report on tourism in the Antarctic. The committee held hearings and interviewed expert witnesses including operators, prospective operators, conservationists, academics, and government departments with Antarctic responsibilities. The exercise represented a detailed and systematic process of review and recommendation, prior to the commencement of tourism in the Australian Antarctic Territory (AAT). The committee examined Australia's Antarctic and Antarctic tourism policies at that time, which were described as generally neutral. A focus of the report was the lack of background environmental information required to make informed management decisions about tourism. Recommendations included that:

- a conservation strategy for the AAT be developed, and funds provided for such a strategy;
- guidelines for visits to Mawson's Huts be developed, covering numbers of visitors, prohibited areas, and access to buildings and artefacts;
- visits to Mawson's Huts site be accompanied by a government official;
- Mawson's Huts be the subject of conservation and management program, and that tourism impacts at Mawson's Huts be assessed;
- management regimes be developed for environmental protection and assessment for tourism activities in the AAT, and that adequate funds be provided for such purposes;
- Australia, at the next ATCM, initiate discussions for a tourism convention for Antarctica;
- Australia apply domestic legislation to environment and conservation aspects of the AAT;
- a register of shipping, and a shipping convention for Antarctic and subantarctic waters be developed;
- Australia should identify sites suitable or unsuitable for tourism visits in the AAT, and have them declared as ASTIs and SPAs, respectively;
- any tourism activity in the AAT be subject to environmental and technical assessment;
- parts of the AAT requiring immediate protection be considered for declaration as national parks or reserves under existing legislation, and that this legislation be considered as a management mechanism;
- tourism activity close to stations be actively monitored and directly supervised;
- government officials accompany larger seaborne tourism activities; and
- approval not be given for tourist proposals involving construction of airstrips or shore accommodation, until a conservation strategy for the AAT is developed.

Unlike academic calls for tourism regulation, which can be largely ignored by governments, the HRSCERA (1989) report required an official response. The Australian government responded to the report in 1992 (through the Minister for Arts, Sport, Environment and Territories) to the effect that the Protocol addressed the issues adequately. The call for a shipping convention was dismissed, referring to Annex IV of the Protocol. Calls for a comprehensive tourism regulation convention were regarded as being addressed by the Protocol, and by the ongoing review and consolidation of tourism Recommendations. The unilateral management of tourism in the AAT was rejected with the argument that the Protocol was satisfactory, and that the low level of tourism in the AAT would not justify the cost. The government acknowledged the need for a conservation strategy. The government also decided that guidelines and procedures for visits to Mawson's Hut site would continue to be determined on a case by case basis through negotiation with operators. The call to declare parts of the AAT a national park or reserve were rejected on the basis that Antarctica had the status of a natural reserve under the Protocol (Kelly & Griffiths 1992).

IUCN (1991) identified a range of issues relating to tourism management. They urged a complete revision of tourism regulations under the ATS, asserting that existing measures were inadequate. They supported the moves by ATCPs to review tourism measures with respect to the Protocol, and the development of self-regulatory instruments by the industry. IUCN felt that management guidelines were needed to encourage responsible and safe tourism, and avoid conflicts between tourism and other uses. IUCN supported the designation and use of ASTIs to allow an appropriate visitor experience and protect sensitive locations and wildlife. They also called for guidelines to manage station visit approvals, prior notification of itineraries, codes of conduct, safety standards for vessels and operations, insurance, liability, monitoring and reporting, environmental impact assessment and suitability of educational materials.

A number of interesting points are argued by Pineschi (1992), who examined the provisions of the Protocol. First, Pineschi suggested that the logistic aspects of tourism would require at least an Initial Environmental Evaluation (IEE) (rather than a Preliminary Assessment (PA))—indeed, Pineschi stated that 'it can be reasonably assumed that these activities cannot have merely a minor or transitory impact on the Antarctic environment', suggesting a Comprehensive Environmental Evaluation (CEE) would be required. Pineschi also suggested that, as tourism is not a stated core aim of the ATS, that while it is justifiable to construct infrastructure for science, it is not for tourism, and that tourism should therefore be restricted to ships (even excluding temporary land infrastructure). As regulatory measures, Pineschi suggested:

- state sponsorship of tourist activities;
- use of tradeable quotas, open and closed areas, and open and closed seasons; and
- payment of resource access fees to be held in a fund by the Committee for Environmental Protection (CEP), for use in contingency planning, incident response, and repair of environmental damage.

Historic sites and monuments are a neglected area of tourism management debate. Hughes and Davis (1995) discussed a range of management issues relating to tourism at historic sites and monuments (and undeclared but potentially significant sites). They described New Zealand's long history of active management and on-site presence at the Ross Sea huts, and stressed the need for a better understanding of visitor expectations to provide a basis for interpretation and management. Hughes and Davis proposed an integrated management strategy for historic sites and monuments, with:

- accurate documentation of sites to explain significance, and regulation of visits to minimise impacts;
- monitoring of visits to improve practices, assess carrying capacities, and verify effectiveness of conservation measures; and
- a systematic approach to the wider issues of identification and conservation of historic sites and monuments.

As well as these principal needs, Hughes and Davis also examined questions of sustainability, carrying capacity, and sources of funding, and provided an action plan for Antarctic tourism at historic sites and monuments. They concluded that while operators had demonstrated a high degree of responsibility, there was a need to raise the priority of cultural resource management in the ATS. Hughes (1994) discussed tourism to historic sites, with a focus on visitor use, enjoyment, and materials conservation aspects of tourism. A description of the most significant historic sites was included.

The need for regulations that provide for current levels and forms of tourism, but that remain flexible enough to respond to future issues was discussed by Enzenbacher (1994a). Enzenbacher expressed concern about unrestrained site use and use of previously unvisited sites. Enzenbacher advocated ratification of the Protocol, continuation of the National Science Foundation (NSF) observer program, and support for research into effects of tourism on marine and terrestrial ecosystems (1994a), as well as suggesting a staff certification scheme, and a tourism management plan (1992a). Such a plan would coordinate tourist traffic to various sites, and recommend levels of visitation. Enzenbacher (1995a, 1995b) expressed optimism that the CEP would provide a forum for the debate of tourism issues. More recently, Enzenbacher offered a number of possible actions, centring on a coordinated ATS response to tourism issues. The actions include: improved information exchange; registration or licensing of operators to encourage reporting and control; a Treaty-wide meeting between ATPs and operators to address information gaps and improve cooperation; better information on tourist demographics; and centralised administration to aid collection, organisation and exchange of tourism information. Enzenbacher also suggests:

- an ATS observer program to cover all operators based in ATPs, with costs shared between ATPs, operators, and tourists;
- standardisation of education provided to tourists;
- cooperation between IAATO members to gather data on environmental effects of tourism;
- Scientific Committee on Antarctic Research (SCAR) involvement in tour operators meetings to provide advice on the direction of Antarctic tourism research and the coordination of findings;
- A coordinated and long-term approach to monitoring tourism activity and environmental change
- development of more comprehensive guidelines for tourists and tour operators;
- improved communication between ATPs and operators through an annual ATS tourism meeting;
- improved reporting procedures using standardised forms;
- certification and accreditation schemes for personnel;
- local and regional management plans for Antarctic tourism; and
- coordinated Antarctic tourism research (1995a, 1995b).

In addition, Enzenbacher felt that a regular ATS review of tourism activity was required. Enzenbacher noted concern about regulating an industry before scientific data are collected, but asserted that a conservative approach based on available information is needed.

Hall and Johnston (1995a, p. 23) stated that 'appropriate and sustainable tourism management regimes must be put in place which simultaneously provide satisfactory visitor experiences and the requisite environmental, cultural and economic returns which will sustain the conservation and attractiveness of the polar regions for future generations'. The same authors discuss the possibility of restricting visits to a number of 'sacrificial' sites, where impacts can be more readily controlled, while other sites are spared from impact. They suggest that 'to prevent environmental degradation and to maintain a high standard of tourist operation in Antarctica there must be a comprehensive set of enforceable regulations for tour operations and visitor activities which runs parallel to the existing operator and visitor codes of conduct' (Johnston & Hall 1995, p. 301).

Project Antarctic Conservation (PAC) (section 1.1.4) was drafting management plans for several sites in the Peninsula region for consideration by the ATS (Stonehouse 1994a). PAC was considering legal and practical implications of a shipborne inspectorate, and was investigating the idea of park areas, with research, information and resource centres, at sites where large numbers can visit with little prospect of environmental damage. Stonehouse and Crosbie (1995) discussed the concept of Antarctic 'parks', reserved for protection and recreation purposes, noting that the ATS has not been convinced of the need for such parks. The world park concept was also briefly discussed, and they raised a number of issues against the practicality of such a notion, including maintenance needs, funding, and the designation of park-keepers, suggesting that Antarctica is no place to experiment with a unique international park concept. They assert, however, that smaller areas may be candidates for park status, similar to Arctic parks, but suggest that parks require day to day management, for which the ATS does not have the capacity. They also question what a park would consist of—would they include recreational facilities, designated camping areas, and information centres, or would they be limited to protection of scientific values and ecosystems? They conclude that given the diversity of management models available in the parks, reserves and sanctuaries, the provisions of the Protocol seem restricted (Stonehouse and Crosbie 1995, p. 231).

Kriwoken and Rootes (1996) examined the impact assessment system in light of ecologically sustainable development principles. They suggested that there is a need for strategic environmental assessment, which they defined as 'application of the techniques of the project-specific EIA process to policies, plans and programmes which may have sectoral, regional or indirect impact' (1996, p. 8). Strategic assessment would be a cooperative function of IAATO and the ATS. They acknowledged that there is little prospect of such a development at this stage. They also advocated the use of cumulative impact assessment, where environmental assessment is extended beyond single projects. They noted that the CEE level of assessment under the Protocol requires consideration of cumulative and second order effects, and they consider the possibility of a CEE for the overall tourism industry, on a regional basis.

'First-round' regulation was proposed by Naveen (1996, p. 89). Naveen suggested 'it may be best to bypass an observer scheme and place caps on overall numbers in a 'first-round' of regulation under the Protocol and its Annexes'. Naveen suggested a revision of codes of guidance for Antarctic visitors, and provided an example. This draft code included requirements for operators to provide improved information including status of flora and fauna at landing sites. Potential management uses for the information included:

- generation of proposals for Antarctic Specially Managed Area (ASMA) designation, with management plans that may include restrictions on tourist use;
- information indicating that certain landing sites may be unsuitable for use by large groups;
- information indicating that visits may need to be distributed over time, or that sites may require closure at certain times.

Elements of the proposed revised code provided by Naveen are apparent in the guidance documents adopted through Rec. XVIII-1. Naveen also proposed a *Handbook of Antarctic Visitor Sites* that could be used in training observers and guides, as an educational tool for national Antarctic programs, and that would be useful to individual expedition leaders, government personnel, and tourists. Naveen proceeded to provide such a guide, for the Antarctic Peninsula region, in 1997 (Oceanites 1997).

Cessford (1998) asserted that management solutions to tourism issues lie largely with the tourists themselves. Cessford stressed the difficulties of managing tourism, given the scale of the continent and dispersion of sites, lack of on-site management, commercial pressures driving tourism operators, and 'the lack of a clear mandate to make binding management decisions' (Cessford 1998, p. 27). Cessford noted that visitors have high expectations, and are highly motivated, that there is a high degree of acceptance of regulations imposed, and little demand for shore facilities. In general, Cessford regarded visitors as particularly receptive to the need for regulation. Cessford felt the focus of management should be on impact assessment and site management, which would require a more specific understanding of the interactions between humans and the environment. Cessford advocated the development of site management guidelines (1998, p. 30).

1.1.3.a Comprehensive approaches

The approaches of P. Davis, B. Davis, and Vidas, stand out in that they offer a comprehensive management review and potential frameworks for a more comprehensive management system. They are worthy of closer examination.

P. Davis's work provides perhaps the most complete treatment of tourism management issues (1995a, 1995b, 1998, 1999). P. Davis approached the issue from the perspective of wilderness management. Her work represents a departure from the approach adopted by many other authors, in that it examines the philosophical and value oriented basis for management of Antarctic visitation. P. Davis advocated an ecocentric approach to wilderness visitor management, arguing that any other approach leaves the potential for a reduction in wilderness values through inappropriate uses—

> *the danger from tourism in Antarctica is not that visitors may intentionally harm the wildlife or disrupt the environment but that, little by little, the marketing of tourism will take over and Antarctica will become a backdrop for all kinds of activities not in keeping with its value as a wilderness* (P. Davis 1995b, p. 4, emphasis Davis's).

P. Davis also saw a danger that, if Antarctica is regarded as a park, and the purpose of parks is use, 'the area will be wilderness only by definition and everything within its boundaries will be changed to fit whatever definition is convenient, including wilderness hotels, wilderness shops, and wilderness airports' (1999, p. 523). P. Davis's argument in her PhD (1995b) and more recent work (1999) was that more comprehensive management is needed, and that an appropriate model exists and can be applied within the ATS. P. Davis aimed to develop 'a methodology to prevent and correct impacts at sites visited and a philosophical approach to management that determines how the continent is to be protected and according to what precepts', and stressed the need for a management philosophy to direct more specific management policies (1999, p. 3).

The current approach to management ignores the available research relating to visitor management in wilderness areas and protected areas (P. Davis 1995b, 1999). P. Davis examined concepts of wilderness and visitor use in detail, and proposed several arguments to justify the adoption of an ecocentric management approach:

> The case for Antarctica's uniqueness must be made: it is the last continent that has not been made over for human purposes;
> Antarctica must not be thought of only as a tourist destination. Any activities permitted are strictly limited to those in keeping with its wilderness qualities, and all recreational activities will not be encouraged; and
> If there is any human use of Antarctica at all, it is to provide an opportunity to learn self-realisation (P. Davis 1995b, p. 48).

P. Davis (1995a, 1995b, 1998, 1999) also argued that visitor management measures and methods are required to effectively manage Antarctic tourism, advocating a recreation management approach. P. Davis reviewed wilderness visitor management models, noting that the usefulness of carrying capacity was questioned. She noted that information about the numbers of visitors ashore and the time spent ashore has been used to provide a rough estimation of impact but argues that a better knowledge about visitor use is required to develop preventative management strategies (1998).

The issue of visitor site designation (to protect pristine sites from use) was discussed by P. Davis (1995b). Site selection criteria were proposed. P. Davis suggested that elements of the LAC model (section 7.2.3) should be applied, including selection of indicators of physical, biological and social resource conditions, selection of site standards to measure change, determination of management prescriptions aimed at maintaining site standards, and monitoring systems. P. Davis also considered interpretation and enforcement needs. In P. Davis's view the immediate priorities of a management plan were

> '(i) designating visitor sites and restricting visitors to these sites; (ii) identifying a cost-effective way to inventory and monitor sites; and (iii) placing a moratorium on the development of land-based tourism operations until specific areas and goals can be established' (1995b, p. 215).

In later work, P. Davis argued that 'it is preferable to decide what activities are acceptable based on a philosophy of use, than to endlessly regulate and treat all activities equally' (1999, p. 520). P. Davis argued for a tourism management plan, and proposed goals and objectives for tourism management, goals being: to conserve the Antarctic environment (including wilderness values); to declare Antarctica a heritage landscape; and to promote awareness of the value and significance of the continent beyond satisfaction of human benefit (1999). Objectives proposed by P. Davis include: to permit visits under strictly controlled conditions to allow visitors to experience natural values without compromising them; and to permit tourists to engage only in wilderness dependent activities at designated sites that do not require permanent land based facilities or motorised transport (1999, see also 1995b). The lessons from wilderness and natural areas elsewhere, asserted P. Davis, suggest that the minimum actions required are to:

> designate Antarctica as a wilderness and formulate a management plan;
> decide on a management philosophy and specify visitor activities;
> select specific tourist areas that can be maintained and monitored to preserve naturalness;
> develop visitor management plans and objectives for these areas; and
> use a planning framework that recognises that impact/use inter-relationships are based on more than carrying capacity (1995b, p. 63).

In 1999 P. Davis elaborated on the application of the LAC model to Antarctic tourism management (section 7.2.3 describes this model). Step one of the model involves identifying area issues and concerns. P. Davis asserted that this has largely been achieved through the management planning processes for present Antarctic protected areas, but also stated that 'it is imperative that non-designated areas be set aside or that visits be limited to the Antarctic Specially Managed Areas' (1999, p. 524). P. Davis also argued that the individual values of each site must be considered to determine how recreation fits with those values.

Step two of the LAC model involves the definition and description of recreational opportunity classes (applying the Recreation Opportunity Spectrum (ROS) (see section 7.2.3). P. Davis suggested that designated tourism sites be inventoried and classed using the ROS, using four opportunity classes. The first, 'urban site within wilderness' would involve: access by ship or air (using national program runways); use for scientific studies from nearby bases; visitor numbers being controlled by base personnel, but generally higher than other sites; on-site management may be by base personnel; tourism facilities may exist, and buildings may be in evidence for science use. The second, 'semi-urban site within wilderness' would involve: access by ship or air to inland sites; uses including science, skiing, climbing, and inland hiking; some on-site management by base personnel; numbers of visitors restricted by aircraft capacity; blue ice landing strip and facilities provided for tourists; and regimentation by tour operator staff. The third class, 'semi-wilderness' would involve: access by ship or inflatable rubber boat (IRB) only; uses of the area including science from temporary field camps, and visits to historic sites; on-site management may include base personnel, and ship based observers; numbers ashore at some sites less than 100 and no more than 160 in a 24 hour period. The fourth class, 'pristine wilderness', would have access by ship or IRB only; no other resource use would be allowed; on-site management would be limited to ship based observers; no more than 100 people would be allowed onshore at a time; visitor activities would be confined to walking, observing, and photography; and no buildings would be evident.

Step three of the LAC model as proposed by P. Davis involved selection of indicators of resource and social conditions, derived from the area issues identified in step one. P. Davis suggested that visitor perceptions of crowding, adverse environmental impacts, and wildlife disturbance are issues of concern, and proposed a number of indicators to measure these effects. Step four involves inventory of conditions, based on indicators developed in step three. Step five involves setting standards for the indicators selected in step three, appropriate to the different opportunity classes. P. Davis notes that standards may not differ greatly from one class to another in the Antarctic, as there is a generally low level of development. Step six is the distribution of opportunity classes geographically. Based on inventoried conditions, and issues and concerns, decisions can be made about what opportunity class each site should be. P. Davis noted that this should occur with input from tour operators, scientists, and tourists. P. Davis suggested that examples of 'urban site within wilderness' would be sites on King George Island, 'semi-urban site within wilderness' would include the Dry Valleys and Patriot Hills blue ice runway, 'Semi-wilderness' sites would include Deception Island, Torgersen Island, Port Lockroy, and Scott Base, and 'pristine wilderness' would include Hannah Point and Paradise Harbour.

LAC steps seven, eight and nine (see section 7.2.3), are described by P. Davis but she did not note any particular Antarctic implementation issues in these steps. P. Davis (1999) concluded that the LAC could be applied in the Antarctic region, and that it represents a way to unify environmental and recreational concerns. In her conclusions, P. Davis focused on the appropriateness of different tourism activities, and on the designation of tourist sites, and highlighted the lack of definition of what constitutes unwanted change. P. Davis also acknowledged that the unique governance of Antarctica requires a circumspect approach.

In related work, P. Davis (1998) provided a range of practical management strategies based on research on visitor behaviour and site characteristics. She suggested that site selection criteria be developed, to allow the selection of sites that will permit visitors to easily comply with guidelines and enhance supervision and shore management. These criteria would offer a management strategy to help prevent potential impacts while avoiding a more restrictive on-site regime, and assist in easing the transition of largely urban visitors to a wilderness setting. P. Davis suggested criteria aimed at ensuring sites are more user-friendly with regard to voluntary guidelines, but acknowledges that other criteria apply, including logistical and operational constraints, weather conditions, presence of other ships, and attractions. P. Davis's suggested site criteria include choosing places: where landings can be made more than 25m from aggregations of wildlife; where landings do not require visitors to immediately traverse areas of vegetation; where wildlife access to and from the water is not restricted by people or small boats; where visitors can avoid walking through or close to aggregations of animals; and where 100 visitors can be accommodated without surrounding animals. She further suggested that sites might need to be restricted according to the vulnerability of species present.

The significance of different values was discussed at some length by P. Davis (1995b). She argued that there are important intrinsic values as well as recreational and economic values, and points out that 'nature and its components do not have to be useful to humans to be valuable' (p. 184). Her consideration of economic values was restricted, however, to those expressed in a monetary sense, which, as section 1.2 shows, is unnecessarily limiting. P. Davis argued that approaches to visitor management have been 'anthropocentric, encouraging and facilitating human use' (1995b, p. iii). P. Davis specifically rejected the term 'tourist' because it connotes the economic aspects of the tourism industry rather than conservation.

The issue of 'appropriateness' of different activities was also discussed by P. Davis (1995b). She noted that conflict can occur when visitors want to participate in dissimilar recreation, and that there can be a mismatch between activities permitted and the stated values of an area. P. Davis asserted that the types of activities being undertaken are being directed by tourist operators, rather than the ATS, and pointed out that the present system allows any activity to proceed if it passes an environmental test. P. Davis argued that rather than being based on an environmental standard, activities should be assessed according to whether they are in keeping with the intrinsic values of Antarctica.

Taking a different approach, B. Davis (1996) advocated a structure and a process to more broadly address problems associated with tourism management. B. Davis concentrated on means for advancing management needs, which is particularly valuable in light of the history of the regulation debate, where many options have been raised, but little attention has been paid to how they may be achieved. B. Davis presented a checklist, for development and implementation by SCAR and Council of Managers of National Antarctic Programs (COMNAP) subgroups, IAATO, and other operators. Needs, according to B. Davis, included deeper consideration of some issues, circulation of academic research findings, and the establishment of an Antarctic Tourism Network for centralised data exchange. The process would identify elements of an integrated tourism management strategy, to be collectively agreed and endorsed by ATPs, and implemented at the national level. The purposes of the approach were to:

- clarify responsibilities and points of contact on tourism matters;
- ensure codes of conduct and legal provisions meet Protocol requirements;
- establish procedures and codes of conduct which are consistent, integrated, feasible, and properly promulgated;
- ensure monitoring, evaluation and compliance are in place to minimise human impacts;
- establish databases to manage information and experiences; and
- work to uniform standards across the ATS.

The aims of such a process included:

- clear aims and performance measurement;
- a tourism database and information exchange system;
- a pre-visit code of practice including prior notice, a registration and permit system, and operator briefings about field requirements;
- operator accreditation;
- field supervision of visits to bases, science sites, and historic sites;
- site visit controls;
- tourism impact assessments;
- inspections and reporting of site behaviour;
- contingency planning and operational safety;
- consideration of private expeditions, air operations, overflights, and interactions with science;
- interaction with other regimes such as *The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978* (MARPOL 73/78);
- translation of guidelines into domestic law and administration.

The actual checklist of items for consideration proposed by B. Davis was as follows.

a) Pre-visit: registration and permit system; 'best practice' visitor guidelines and interpretation briefings; research to discover visitor expectations, motivations, and knowledge of expected behaviour; management guidelines and briefings for national expeditioners, station leaders, and scientific personnel; and communication and safety procedures.
b) Ship-board training and interpretation: environmental safeguards and the ATS; required conduct in landings and site visits, stressing safety aspects; conduct near wildlife; conduct at stations; conduct at historic sites and monuments; other interpretive briefings; and group leader, guide and observer briefings.
c) Site visits: guidelines, codes of practice; discipline; hazard avoidance and contingency plans; observations of practice; impacts (including cumulative); waste minimisation and removal; and Specially protected and restricted areas (no-go zones).
d) Reportage and evaluation: visitor comment; reaction to management arrangements; other reports; monitoring data; and review procedures.

e) Contingency planning: base and field site provisions; risk assessment / scale / severity categorisation; procedures and responsibilities; training (base and field); international cooperation; and reportage and evaluation of incidents.
f) Other aspects: small private expeditions; overflights; scientific tourism; other needs and opportunities; ASTIs; liaison with the tourism industry; and strengthened Treaty provisions, through learning experience (B. Davis 1996).

A number of other issues were also commented on by B. Davis. These included standardisation of reporting and responsibility for information exchange, ship reporting systems, port state control of ship standards, environmental monitoring at key tourism sites, the need for behavioural research, the need to ensure operators are aware of protected areas, the vexed issue of historic sites and monuments and responsibility for management of them, sufficiency of contingency plans, and the need for consistency of quality in environmental assessments.

Vidas (1996) discussed the legitimacy of tourism regulation from a regime analysis perspective. With the starting point that any regime would need to accord with the normative principles of the ATS, and would also need to take into account the peculiarities of Antarctic tourism, Vidas suggested the following elements as necessary for comprehensive coverage.

1. Regulation relating to science: prior notification system; means of prevention of interference with science activities; means for avoiding rescue and need for operations to be self-sufficient, adequately trained, and planned safely; and adequate insurance cover for operations.
2. Regulation relating to the environment: means for preventing environmental impact including information and licensing systems, environmental assessments, prevention of marine pollution including ship design and safety, training and education requirements, and contingency plans; means for regulating behaviour including monitoring, waste disposal regulation, protection of flora and fauna, protected area system, reporting systems, jurisdictional solutions or allocation of responsibility, and control of third party activities; and means of reparation, including liability rules and insurance.

Vidas noted that such a regime would accord with the normative principles of the ATS—peace, science, and environmental protection. He did maintain that the issues of jurisdiction, liability, and insurance have the potential to disrupt the sensitive balance achieved on issues of sovereignty. Vidas also questioned whether the compromises involved in tailoring a system for this particular form of tourism, as well as for the peculiarities of the ATS, would make it unacceptable to ATCPs and others.

The management schemes outlined above are comprehensive in scope, and all provide a suite of measures directed at addressing the critical needs of tourism management. They are important in their strategic approach, and their broad coverage.

1.1.3.b Summary of proposed management solutions

A wide range of management measures for Antarctic tourism have been proposed. The most meaningful contributions have been the comprehensive systems proposed by P. Davis, B. Davis, and Vidas respectively. Important contributions are, however, also made by others.

The issues raised most regularly in the literature reviewed include:

- a need for a comprehensive, strategic tourism management scheme;
- a need to restrict tourism to certain sites and prevent unrestrained new site access, using zoning mechanisms, or revival of the ASTI concept;
- restriction of visitor numbers to sites;
- a better system of enforcement;
- a mechanism for cumulative impact assessment;

- need for management planning including goal and objective setting and evaluation of effectiveness;
- monitoring schemes including environmental impact monitoring, and monitoring of operations including ATS observer systems;
- improved compliance with existing Recommendations;
- a requirement for all operators to complete environmental assessments;

- ship standards, ship position reporting, and management of vessels in ice-covered waters; and
- insurance, a bond, or other financial guarantee to cover search and rescue or other assistance.

Other issues include.

1. Enhancement of existing measures and better implementation of existing measures:
- improved implementation (including Protocol ratification);
- improved compliance with all aspects of the system, including reporting requirements and information exchange requirements;
- tourism to operate within an overall conservation strategy;
- rationalisation of existing Recommendations;
- more comprehensive guidelines;
- enforcement (as opposed to voluntary compliance) of current guidelines;
- control of educational / interpretive material;
- application of environmental assessment to tourist activities;
- use of the protected area system to control site use; and
- contingency planning and operational safety.

2. Implementation and institutional mechanisms for tourism regulation:
- a full scale international convention on tourism;
- a tourism annex to the Protocol;
- a more comprehensive regime, implemented in stages or all at once;
- application of domestic law to manage Antarctic tourism;
- integration with other regimes (maritime);
- centralised administration (such as through an ATS secretariat, or through the CEP);
- an ATS wide meeting between operators and ATCPs;
- resolution of liability issues;
- resolution of jurisdiction, or allocation of responsibility;
- state sponsorship of operators;
- mechanisms for control of third parties;
- SCAR involvement in directing Antarctic tourism research; and
- technical assessment of tourism operations.

3. Management philosophy issues:
- need to recognise wilderness status of Antarctica;
- an ecocentric approach to visitor management (recognising primacy of intrinsic values);
- determination of which activities are appropriate for Antarctic wilderness; and
- adoption of wilderness visitor management model.

4. Management actions or strategies:
- strategic environmental assessment;
- staff certification schemes, training and education standards;
- use of tradeable quotas for visitor numbers;
- open and closed seasons;
- restriction of tourism to ship based modes;
- port state control of ship standards;

- operator accreditation, registration or licensing systems;
- use of site selection criteria to determine site suitability;
- designation of park areas with information and research centres, recreational facilities, camp areas;
- assessment of carrying capacity;
- explicit rejection of carrying capacity and support for LAC approach;
- management approach based on acceptable level of change;
- site specific guidelines where necessary; and
- levying of fees.

1.1.4 RECENT AND ONGOING TOURISM RESEARCH

A number of major research and monitoring programs on Antarctic tourism have been conducted. The results, conclusions, and recommendations of some of these programs have been discussed in the above review, or are otherwise referred to in different sections. It is important to examine recent or ongoing work to determine directions for this research.

Researchers associated with the *Scott Polar Research Institute* in the UK, the *Instituto Antartico Argentino* and *Instituto Antartico Chileno* began a six year program of research called *Project Antarctic Conservation* (PAC) (see Stonehouse 1992a, 1993, 1994, 1999, Stonehouse & Crosbie 1995, Acero & Aguirre 1994, Splettstoesser & Folks 1994, Enzenbacher 1992a, 1992b, 1993b, 1994a, 1995a, 1995b, Davis 1995a, 1995b, 1998). Stonehouse (1992a) described the research as a response to the recommendations of *A Strategy for Antarctic Conservation* (IUCN 1991). The initial research on Half Moon Island in the South Shetland group intended to monitor visitor activities, categorise visited sites, draw up specifications for a combined research and visitor information centre, examine ways of conducting non-intrusive research into animal human interactions, and survey the island botanically and archaeologically (Stonehouse 1992a). Researchers from four nations were involved. Ship visits were observed and details of operations noted, and visitor behaviour recorded on video. Basic behavioural and physiological research techniques for seabirds were also investigated, and vegetation survey techniques tested. Members of the team conducted social research, with visitor surveys distributed on ships. A scheme of assessment for landing sites was developed, using physical, operational and visitor experience criteria (Stonehouse 1992a). Stonehouse described proposals for a research and visitor information centre, determining that Half Moon Island was unsuitable, and suggesting Harmony Cove. The group were considering the use of a SSSI, or the declaration of a study site as a SSSI 'to protect it against intrusions that are not associated with its research' (1992, p. 217).

In 1992/93 the project opearted on Cuverville Island, closer to the Antarctic Peninsula, with the objectives of topographical and ecological survey, establishment of baseline studies of birds, examination of visitor use, developing ways of measuring visitor impacts on penguins, identification of suitable control areas, and development of preliminary management plans for the broader area (Stonehouse 1993). Visitor dispersion and adherence to guidelines on-site was quantified through observation. Impacts on vegetation were assessed through mapping and controlled trampling experiments. Interactions between wildlife and humans were assessed via observation of behaviour and examination of breeding success. As a result of the two season's research, a number of draft management documents were submitted to the UK Foreign and Commonwealth Office (Stonehouse 1993).

More recently, Stonehouse and Crosbie (1995) reported that the United States Office of Polar Programs, the NSF, and the *International Centre for Antarctic Information and Research in New Zealand* (ICAIR) had become involved in PAC. The objectives were expanded to:

- document the growth and development of Antarctic tourism;
- maintain a database covering both shipborne and airborne forms of the industry;
- enquire into the motivations and expectations of Antarctic tourists;

- study the methods used by operators in the field;
- establish a geographical and ecological database of landing sites;
- study impacts of tourism on wildlife;
- study tourism impacts on vegetation;
- test the validity of current regulation, and model and test new regulatory methods;
- examine the effectiveness of legislation covering tourism; and
- predict future industry development and assess needs for future legislation (Stonehouse & Crosbie 1995).

Acero and Aguirre (1994) also described aspects of PAC, noting it was a program to obtain empirical information to be used for the development of tourism management policies. Desired outcomes included 'a clearly defined set of guidelines, including authorized sites, permitted group size and visitor activities, and appropriate times for visits' in the form of management plans for sites (1994, p. 296). A monitoring plan is described, which included geomorphological, climatic, hydrological and biological data. The research was designed to allow environmental sensitivity to be assessed and zones of ecological importance to be identified.

Enzenbacher conducted PhD research as part of PAC. Her thesis (1995b) provided considerable information on all aspects of Antarctic tourism. Enzenbacher aimed to: collect data on Antarctic tourist activity to gauge industry size and developments; consider the instruments regulating tourism; monitor tourist activity at a site to document behaviour; compare management practices of different operators; collect social information on visitors; assess adequacy of and compliance with regulations; and determine what policy options are available to improve visitor management. Enzenbacher's methodology included field monitoring, travel aboard cruise vessels, and survey design and implementation. Enzenbacher's results provide one of the most comprehensive analyses of actual management practices of tourist operators, and the first comprehensive collection of social information on tourists themselves. In terms of shore management of visitors, Enzenbacher concluded that IAATO tour operator and visitor guidelines were transgressed frequently. Problems were noted in limiting the number of people ashore to 100, having at least one guide to 25 visitors, and requiring 75% of staff to have Antarctic experience. Enzenbacher noted violations of distance guidelines, visitors wandering from the group, visitors deliberately disturbing wildlife, and surrounding of wildlife. Problems with staff adherence to guidelines were also noted. Enzenbacher identified inefficiencies in IRB operations, variable standards of safety briefings, problems with adequacy of staffing for shore management, variable standards of education and information provision, and problems with waste management. Enzenbacher felt many of these issues to be the result of poor communication or poor awareness on the part of passengers and staff, and as such avoidable. The results of Enzenbacher's social survey work are discussed in chapter three.

P. Davis (1995a) conducted research in 1993/94 as part of PAC, using observational and survey methodologies to examine aspects of tourist self-reported behaviour relating to the guidelines, among other things. A summary of P. Davis' conclusions are presented in chapter three. P. Davis examined on-ground passenger compliance with voluntary guidelines and found that guidelines are only partially successful in achieving their objectives (P. Davis 1995a, 1995b). Problems with the ability of some visitors to adapt to natural areas, to recognise natural features and boundaries, and to understand animal behaviour were identified (P. Davis 1995a, 1995b, 1998). In later work P. Davis (1998) provided a detailed analysis of visitor use of sites, based on research in 1993/94 at Hannah Point on Livingston Island in the South Shetland Islands. The research examined spatial distribution of visitors during visits to a site, by sampling the number of visitors in different areas every five minutes. In addition to examining visitor movement and time spent in different zones, the supervisory style of the accompanying staff was also examined. Results indicated that within the site examined, visitor use was concentrated at the point of entry (the landing beach). The role of staff in leading people into different areas, and staff interpretation of guidelines had a greater effect on the distances travelled and the time spent ashore than did weather or site conditions.

Stonehouse (1999) reported that PAC had been completed, with results being written up. He described preliminary developments at Arctowski station to develop visitor management strategies, including a visitor information centre, and to continue the research begun in PAC. A five year program of tourism related research was planned, using the station area and other locations. The visitor management strategies in development at the station were to be monitored, including numbers and timing of visits and use of facilities and trails. The research may be extended to include other, less visited sites.

Bauer (1994) reported on the results of a delphi survey examining issues facing the industry. The survey was sent to ATPs, environmental organisations, academics, Antarctic adventurers, scientists, and tour operators. Thirty four responses were received. He found that the general opinion was that the most appropriate form of tourism was ship based activity, and 60% regarded ship based tourism as being the most common form in future. Respondents regarded impacts as being very small. They felt that impacts on wildlife, vegetation and soil, science and scientific work were the main issues. Adventure activities were thought likely to increase. Air tourism would be restricted to blue ice sites, and an increased use of helicopters. The emphasis on visits to stations would lessen. Limits to the development of the industry included regulation, high costs of operation, and cumulative impacts. Bauer produced a PhD thesis in 1997 entitled *Commercial tourism in the Antarctic: trends, opportunities, constraints, and regulation* (Monash University). Access to this document is restricted until February 2001 (as advised by the holding library) and has therefore not been examined by this author.

NSF funded research on tourism impacts as part of the Long Term Ecological Research Program on Torgerson Island, near Palmer Station, Anvers Island in the Peninsula region, beginning in 1993 (Enzenbacher 1994a, 1995b). This research represented the first tourism research funded by a national program (Enzenbacher 1995a). Preliminary results (from 1993/94) were reported by Enzenbacher (1995a) as showing that the negative impacts of tourism and research may be negligible compared to effects from long term environmental changes, although Enzenbacher expressed concern regarding the research design. More recently, results were reported by Fraser and Patterson (1997, see section 2.7.1.b).

The Antarctic Site Inventory Project has, since 1994, been operated by Oceanites, a charitable organisation. This project represents the most comprehensive attempt at a medium to long term Antarctic tourism impact monitoring program. The project has been supported by the US Environmental Protection Agency, and the UK Foreign and Commonwealth Office among others—but it is a privately instigated project, rather than an ATS project. Naveen (1997) and Germany, UK & USA (1998, IP27 ATCM XXII) provide detailed information on the project. In summary, the project aimed to document and record visitor sites in the Peninsula region. 51 different sites were visited from 1994 through to 1997, and 290 census sites were established. 60 of these sites were prospective control sites (some of them difficult to reach), to remain unvisited by tourists to allow comparison with visited sites. Most of the heavily used sites (excluding stations) are included in the inventory. The inventory collected a number of different types of information. Basic site information included physical and topographical characteristics, distribution of flora, seal haul out and wallow locations, and groups of breeding penguins and flying birds. Variable site information included weather and environmental conditions such as sea ice extent, cloud cover, snow cover, temperature, wind direction and speed, and biological conditions (number of breeding birds, nest counts, numbers and ages of chicks), and visitor impacts (footprints, paths, litter). The variable site information and data were collected according to the standard methods for monitoring studies developed for the *Convention on the Conservation of Antarctic Marine Living Resources* (CCAMLR) Ecosystem Monitoring Program (CEMP) (see Germany, UK & USA 1998, IP27 ATCM XXII). Maps and photo-documentation portray the major features of each site, including locations of colonies, and flora and faunal assemblages.

This project has the potential to establish baseline information for Peninsula sites, and to contribute to an understanding of tourism impacts on a broader range of values than have been examined previously. By assessing each site according to nine factors, a measure of site sensitivity was developed by the inventory project (Germany, UK & USA 1998, IP27 ATCM XXII, p. 7). The nine factors used were: unusually high science values that could be easily disturbed; a high species diversity; the presence of easily disturbed geological or physical features; proximity to a SSSI or SPA with poorly defined or easily encroached boundaries; presence of environmental elements interesting to visitors but subject to disruption; proximity to nests of southern giant petrels; potential for disturbance of flying bird nests; restricted visitor space at a landing site; and presence of moss and lichens which may be easily trampled. Based on these measures of sensitivity, two sites were identified that had five or more of these sensitivities—Hannah Point (Livingston Island) and Penguin Island (off King George Island). Nine sites were identified with at least two sensitivities. Recommendations presented by the Oceanites project for the ATS included that

> Treaty Parties should ensure that a range of visitor sites are censused at 3–5 year intervals; Treaty Parties should ensure that potentially vulnerable sites are assessed and monitored annually; tour operators and organisers should use accurate names of visitor sites in site visit reports; Treaty Parties should ensure that annual compilations and analyses of site visit reports include the dates and times when visits were made (Germany, UK & USA 1998, IP27 ATCM XXII, pp. 7–8).

The other monitoring program of note is the CCAMLR Ecosystem Monitoring Programme (CEMP). This program is not aimed at tourism, rather it is a scientific monitoring program aimed at detecting changes in the condition, abundance and distribution of the animals within the CCAMLR area (CCAMLR 1999). Under the CEMP program, started in 1984, species and parameters likely to be particularly sensitive to changes in food availability are identified and monitored (rather then attempting to monitor all variables). The program primarily monitors predators (as dependent species) as well as harvest levels and environmental parameters. Comparability of data from different sites and seasons is ensured through the use of standard methods used at all sites by all participants (CCAMLR 1999). Entry to CEMP sites requires a permit, and sites have a management plan that must be complied with (BAS 1999b).

1.1.5 SUMMARY OF THE MANAGEMENT LITERATURE

This review of Antarctic tourism management literature has served to identify broad issues surrounding the development and implementation of tourism regulations, specific issues relating to the present management system, and solutions that various authors have proposed both for the enhancement of the existing system, and as alternatives to the existing system.

The literature review identifies many constraints to tourism regulation, both within and outside the ambit of the ATS itself. Some of these problems are intractable, but others can be solved if the stakeholders in the ATS so desire. There is a strong faction arguing that the present system of management is inadequate to ensure safe and environmentally sustainable tourism. They argue that the fact that tourism has to this stage been relatively benign appears not to be due to good management but rather to goodwill on the part of operators, and good fortune. There is less agreement about what should be done to address the issue. There is also considerable weight behind the argument that the present management system is sufficient. This is not as well expressed in the literature, as there is less incentive to argue for the continuation of the status quo (especially given the ATSs tendency to inertia) than there is to argue for change. It is generally accepted that the tourism industry will continue to grow, and that the diversification of activities and tourism products will continue. Issues relating to the shortcomings, effectiveness, and practicality of the present management system and proposed options will be set aside for the time being, and re-visited in the final two chapters of this thesis. The following points are drawn from the literature review and provide direction for the aims of this research (described in the aims and objectives of the research, section i.4).

While many authors have discussed tourism issues, few have conducted comprehensive analyses of the state of management, and there has been little work on the implementation of the Protocol as it applies to tourism. P. Davis (1995b) and Enzenbacher (1995a) provide the most comprehensive examinations. It is clear that sufficient information about Antarctic tourism now exists for decisions to be made about its regulation. This thesis draws together information on all aspects of the industry and its management from a variety of sources to add weight to the argument for a more comprehensive regulatory mechanism. The analysis in this thesis provides a basis for the development of a system acceptable to the member nations of the ATS and tourists, while meeting environmental protection and safety objectives.

The major works on Antarctic tourism management date from the mid-1990s. Since that time, considerable progress has been made on the implementation of the Protocol, and the industry has continued to grow and change in character. This thesis therefore examines the implementation of the Protocol as it relates to tourism issues.

Some have argued that tourism, because of the small numbers involved, is a minor industry. The attention the industry receives, and the prices paid for Antarctic tourism experiences tend to belie this position. This thesis examines the economics of the Antarctic tourism industry, to provide an alternative measure of industry size and importance.

Concern is expressed by some authors about the philosophical foundation of the present management system. P. Davis in particular argues that an ecocentric approach is required, and criticises the economic focus of the industry and the present focus on human utility when values are discussed. It may be very difficult to achieve consensus on a fully ecocentric management approach. It must also be recognised that Antarctica is valued for a variety of reasons, and not all of these involve direct use. It is possible that a clearer conception of economic value theory as it applies to Antarctic values will enable a middle-ground approach to be developed for tourism regulation. This thesis therefore reviews value theory, from environmental economics, and uses it to analyse the values surrounding Antarctic tourism and clarify the diverse values that need to be managed.

A number of authors have suggested that management models used for tourism management in other locations may be of benefit. This research therefore examines case studies of the management of cruise tourism in southern oceanic island locations, and in northern polar (Arctic and sub-Arctic) locations. The management systems in place in the case study locations are compared to the present Antarctic tourism management system, and assessed with reference to their application in the Antarctic.

The review of the literature also makes it clear that, in addition to the present suite of regulatory measures, the history of regulation needs to be taken into account. Precedent is important, as is an understanding of what has already been proposed or attempted, and the workings of the ATS with reference to tourism regulation issues needs to be understood. This thesis will therefore include an examination of the development of the present system of regulation applying to tourism. The history of tourism regulation will also help to clarify the historical positions of different ATPs.

The practical aspects of the tourism industry are also of importance. Some authors provide descriptions of the operations of industry members, but there is little in the way of a comprehensive review of the industry, its structure, functioning, and operational patterns. This thesis therefore examines the structure, function, and geographic aspects of the industry to provide a basis for management.

Antarctic tourism is generally regarded as a unique form of tourism. This is true to an extent, but it can equally be regarded as a sub-set of the expedition cruising industry, and of the broader cruise tourism industry. An understanding of these industry sectors is important, as it places Antarctic tourism in the broader cruise tourism context and permits a more realistic assessment of likely developments.

Management planning issues are raised by many authors. Tourism and visitor management for protected areas is examined in this thesis to assess the practicability of applying different management models. Tourism theory, particularly as applied to tourism destinations, is largely neglected in the Antarctic tourism literature. This thesis therefore examines some of the basic concepts in tourism theory that apply to the Antarctic, and provide insight into the likely developmental pattern that the Antarctic as a destination is experiencing.

The literature shows that Antarctic tourism management is at present a sub-set of ATS environmental protection measures (the Protocol and annexes), although additional issues, particularly safety and contingency planning are not solely environmental. This is not surprising, given the status of environmental protection as a core value of the ATS, and the very high conservation values associated with Antarctica. The environmental management systems in place under the ATS are therefore considered in some detail.

Many authors identify a need to address the needs and wants of visitors, the visitor experience, and expectations and levels of satisfaction. These aspects need to be understood to ensure that management can ensure that experiences are able to match expectations without compromising other values of Antarctica. Social aspects of tourism are therefore reviewed. The characteristics of the Antarctic tourism products on offer, and different market segments are examined, in examining the needs of tourists and in understanding the development of the Antarctic as a destination.

1.2 ANTARCTIC VALUES

The literature review reveals that some authors have concerns about the unclear philosophical basis for tourism management (and indeed environmental management) within the ATS. There is certainly a lack of clarity in the basic intent of the elements of the tourism management system (see chapter four), and it is not always clear what values the ATS is intending to manage when management provisions for tourism are discussed or adopted. The main aims of the management provisions thus far relate to environmental protection and prevention of disturbance to scientific research and national operations, but there are other priorities implied in the management system (section 7.1).

The Antarctic as a natural area can be considered a resource, from which people derive value. The area also has intrinsic values (that are not related to the human preference system). There are a number of interrelated components of the resource, broadly categorised as physical (including geological, hydrological, glaciological, climatological, and oceanographic), biological (plants, animals, and ecosystems), chemical, and cultural (including historical remains and symbolic relationships attached to places). These basic components, and especially their largely undisturbed interactions in the form of physical, biological and chemical systems, are the source of the values that humans derive from Antarctica.

One of the objectives of the research is to clarify the values surrounding Antarctic tourism. The need to do so is highlighted by the confusion surrounding values evident in the Protocol, where wilderness and aesthetic values are described as intrinsic values, which, according to most value theory, they are not. This section of the thesis examines Antarctic values from the perspective of environmental economics, in an effort to clarify the values and the relationships between tourism and different values of the Antarctic. This scheme is an alternative to P. Davis's proposed ecocentric management philosophy, where she argues that the intrinsic values of the Antarctic are being neglected in the pursuit of utilitarian values (1999, 1998, 1995b). While there is a firm theoretical foundation for P. Davis's arguments, it is felt by this author that the realities of the ATS, the existing tourism industry, and the varied political and economic perspectives of stakeholders involved including ATCPs preclude the adoption of an ecocentric philosophical basis for management. In particular, the scheme developed here makes it clear that while many of the values of the Antarctic are not related to direct human use, they are part of human preference systems. In questions of management, the weighing of values becomes crucial. In a mode of 'rational' decision making or planning, values need to be identified, relative magnitudes and importance ascertained, and plans put in place to manage actions or systems in order to protect, promote, or enhance certain values, sometimes to the detriment of other values. A scheme based on economic value recognises the importance of all forms of value (including non-use values, non-market economic values, and market values) and provides what may be a more realistic and inclusive framework for understanding relationships and implementing management of tourism.

A very brief introduction to the concepts of value is important. Economists, environmental economists and cognitive psychologists have developed, over time, theories of value that account for different kinds of value. Some of these values are expressed in market systems as prices, while others are less tangible. In deciding what choices or management options are best for society, it is important to take into account all values. Market values, while relatively easily assessed, are not the only values that need to be taken into account. Non-market values (those values not expressed in the form of prices) are often very considerable, and in the case of Antarctica, are likely to far outweigh any market values. While the magnitude of Antarctic non-market values is, to the knowledge of the author, unmeasured, supplementary evidence supports this position. In the case of Antarctic tourism the activity in question has a significant market economic component (see section 3.4), and many of the effects and consequences of tourism activity may affect non-market values. In such situations, prices, as tangible representations of value, may unduly dominate decision making and planning. In the context of natural areas generally, and in the Antarctic in particular, this is most important, as the most significant values involved are often unpriced.

In discussing values, it is important to recognise that economics is not solely concerned with money or monetary transactions. 'Economics is the study of how people make choices in using scarce resources and in distributing goods and services among relatively unlimited wants' (Sinden & Worrell 1979), or as Robbins (cited in Tisdell 1990, p. 19) stated 'economics is the science concerned with the management of scarce resources in order to satisfy human desires for commodities to the maximum extent possible'. Economics, therefore, is an appropriate tool for studying things other than monetary transactions, as it applies to all human values and the choices people and societies make about and between values. It is also important to remember that action and inaction are all part of the human preference system—each is a choice that has some value effect, whether in providing some satisfaction to the individual, or perhaps forgoing or postponing the opportunity to derive satisfaction. As such, choices made by individuals, governments and other groups within society entail complex economic valuations, whether these are consciously conducted or not.

The basic conception of the value of a thing is that it has the capacity to satisfy some human need or desire. This is known as instrumental value—the value derived from something by a person. In contrast to instrumental value, intrinsic values (discussed below) are recognised by many as separate from instrumental value. Economics encompasses all instrumental values, and the terms economic and instrumental value are synonymous (Pearce & Turner, 1990, p. 10).

The distinction between market and nonmarket values is important when it comes to ascertaining, measuring and making decisions about values. Market values, through transactions, are quantified. Productive uses of natural areas, such as the production of timber, are easily valued in this manner. Non-market values, on the other hand, are not exchanged through markets and there is therefore no price indication of value. Intangible values such as existence value, or the values derived from seeing a wilderness area, are therefore much more difficult to quantify. Market economic values related to natural areas are of course the most easily assessed. In many cases these values dominate analysis, discussion and decision making, because of their tangible nature and the fact that they accrue to identifiable individuals or groups (as opposed to other types of value which may accrue to a broader base of individuals or the public).

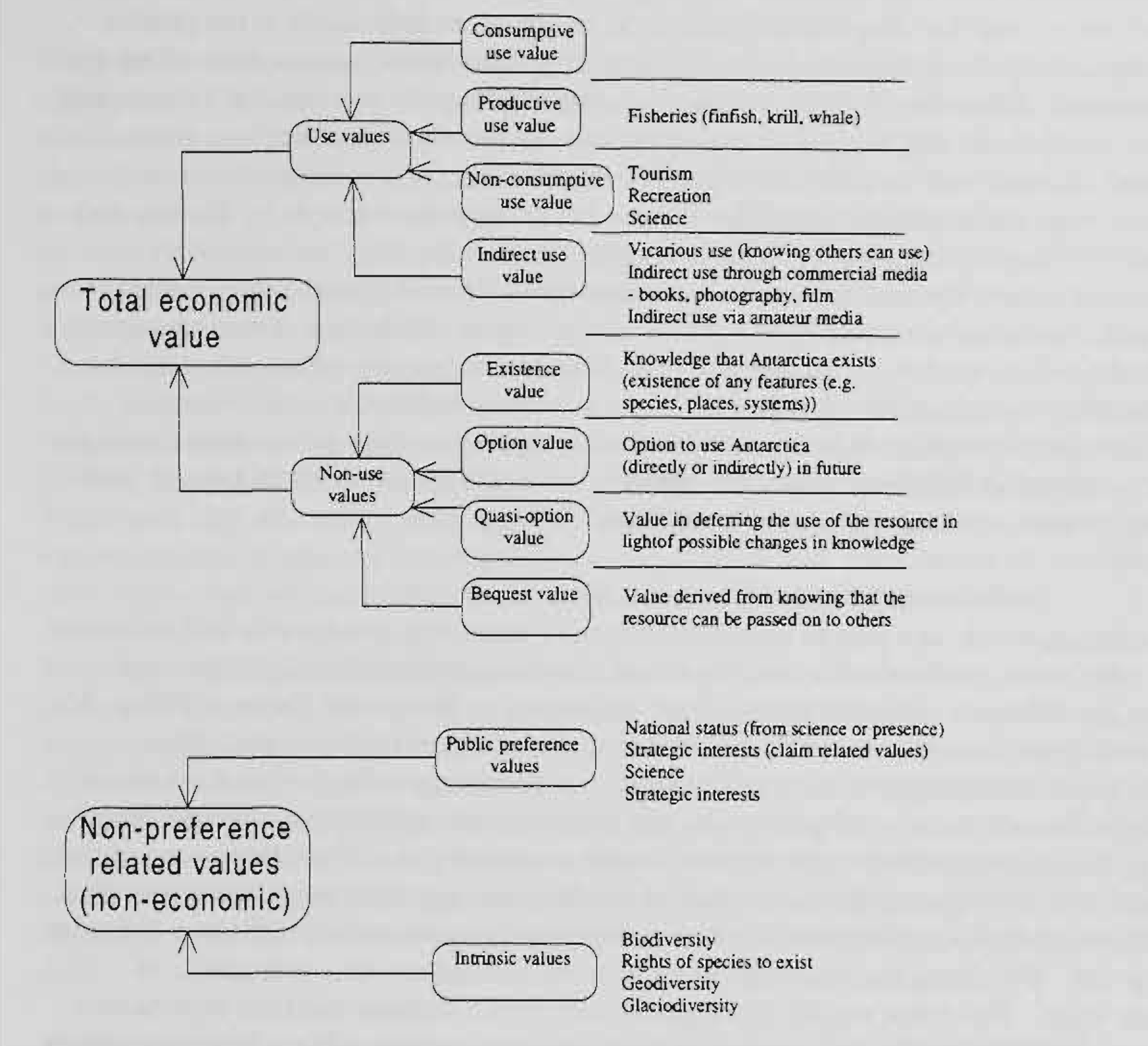
Over time, 'economists came to recognize the importance of a number of nonmaterialistic values associated with nature' Tisdell (1990, p. 18). The existence of values that are not expressed in financial transactions is now generally accepted. Non-market values are legitimate economic values derived from a resource without any monetary transaction taking place (Randall & Stoll 1982). Resources that produce non-market values are described as nonmarket goods, extra-market goods, environmental goods, or unpriced goods (Sinden & Worrell, 1979). A taxonomy or classification system of environmental values as they relate to natural environments has been developed by environmental economists (Pearce, Markandaya & Barbier 1989). Figure 1.1 presents such a classification system based on the work of a variety of authors (Barrett 1998, Diamond & Hausman 1993, Bennett 1992, Blamey & Common 1992, Tisdell 1991, World Resources Institute 1991, Dixon & Sherman 1990, Pearce & Turner 1990, Pearce, Markandaya and Barbier 1989, Bishop 1987). The system represents the total economic value of the Antarctic resource, showing the pathways whereby value is derived from the Antarctic resource. The right hand column describes how values are derived from the resource, and the remaining columns classify the value types. An explanation of the different categories of value follows.

1.2.1 USE VALUES

Use values are simply values derived from an activity associated with a resource (Randall & Stoll 1982). Based on the work of a number of authors (Bennett 1992, Blamey & Common 1992, Dixon & Sherman 1990, Barrett 1998, Bishop 1987), use values can be subdivided into consumptive, productive and non-consumptive use values. In addition, use values can be market or non-market (as described above). Consumptive use values are derived from the direct consumption of 'products' from a resource, such as the use of firewood from a forest, or of meat from an animal (Dixon & Sherman 1990, World Resources Institute 1991). By this definition, these values are non-market. Productive use values relate to products which pass through markets before consumption, or provide the raw materials for production of other products (World Resources Institute 1991, Tisdell 1991). Other use values are non-consumptive. Examples of these include the values related to visiting natural areas, or the viewing of wildlife or scenery. Some such values are partially captured in market prices (for example those involved in commercial tourism) but market values only capture or express a certain proportion of the use value related to a visit—in the case of a park entry fee, a user may be charged a certain amount, but be willing to pay much more. Some use values are not expressed in market prices at all.

Indirect use values involve the benefit derived from indirect uses of a resource such as a natural area. These may include the enjoyment obtained through a variety of media—photographs, films and so on (Dixon & Sherman 1990, Randall & Stoll 1982, Barrett 1988). A second form of indirect use value is that of vicarious use. Vicarious use values are those values derived from satisfaction in the knowledge that others may use a resource. The place of these values in the taxonomy of total value is indistinct—some class vicarious benefits in the class of option values (see below) (Pearce, Markandaya & Barbier 1989, p. 61).

Figure 1.1: Value categories and Antarctic values



1.2.2 NON-USE VALUES

It is generally recognised that people hold values for things and places even where no direct use is involved. A number of different non-use values are identified in the literature. The following provides a definition of each basic type of value, and in some cases the place of such value in varying value taxonomies is discussed.

Existence value is a concept introduced by Krutilla in 1967 (Diamond & Hausman 1993, p. 5, Tisdell 1990, p. 18), that has received considerable attention. Empirical tests for the existence and measurement of existence values have been developed and used in policy contexts. Existence value is described by Tisdell (1990, p. 18) as follows: 'Individuals who do not visit a site or view a species or intend to do so nevertheless value its continued existence and would be prepared to pay for it'. Other authors (Randall & Stoll 1982, Pearce, Markandaya & Barbier 1989, Barrett 1988) discuss existence value, and the literature indicates that not only do existence values exist but that they can be measured. One often cited example of the validity of existence values is the practice whereby individuals donate money to a charitable cause to 'protect resources they have little or no intention of using' (Diamond & Hausman 1993, p. 8). The strong public pressure (and donation of substantial funds) exerted in attempts to protect environments like rainforest habitat, or indeed the Antarctic region, are expressions of existence values. Option value is the value placed on preserving a resource because of uncertainty about the future (Barrett 1988, Tisdell 1991, Pearce, Markandaya & Barbier 1989, Dixon & Sherman 1990). Individuals place value on the knowledge that an option for the use is retained in the future (and these potential future uses may include all the types of use value). Expressed in economic terms, 'option value is the amount that individuals would pay to preserve the opportunity of using the site in the future, in addition to the expected value to them of their uses of the site' (Diamond & Hausman 1993, p. 7). Pearce, Markandaya & Barbier (1989, p. 62) define option value as:

the value held by an individual in reserving the option to use a resource in the future (standard option value); the value held relating to the option for others to use in the future (bequest value); and the value held relating to the use by other individuals in the present (vicarious use value). In addition to the existence of option values, quasi-option values are also discussed. According to Diamond and Hausman (1993, p. 7) quasi-option value 'arises from the fact that one may learn over time about the desired use of a facility'—a value specifically related to uncertainty about possible future uses. This value is of course important when considering irreversible change. Put perhaps more simply by Blamey and Common (1992, p. 6) quasi-option value is the value held in avoiding 'an irreversible commitment to development now, given the expectation of future growth in knowledge'. Individuals may also value the opportunity for others to gain satisfaction from a resource in the future (such as visiting a natural area). This is known as bequest value—allowing for the probability that people in the future will want to use it. As Diamond and Hausman describe it, 'bequest value, when restricted to, for example, a couple's descendants, is simply the recognition that benefits conferred by the future use of a resource extend beyond their own enjoyment to the enjoyment of their children' (1993, p. 7).

1.2.3 NON-ECONOMIC VALUES

Does value exist only as a human construct (that is, is value only conceivable with reference to the satisfaction provided to humans by a thing) or are there intrinsic values that hold without any reference to human satisfaction? According to Pearce and Turner (1990, p. 22) 'deep ecologists place primary emphasis on a distinction between instrumental value (expressed via human-held values) and intrinsic, non-preference related values'. Without delving into the environmental philosophy and environmental ethics characterising deep ecology which, while relevant, are of considerable complexity and beyond the scope of this research, the general perspective on values of the deep ecology movement can be described. Environmental literature identifies a 'functional physical ecosystem value' (Pearce & Turner 1990, p. 22). 'Functions and potentials of ecosystems themselves are a rich source of intrinsic value. This value would, it is argued, exist even if humans and their experiences were extinct' (1990, p. 22). Such values as these are not economic values. It is important to note that while such values may not be derived from or related to human preferences, human activity retains the ability to compromise or destroy intrinsic values. This presents a moral concern for many, in a position characterised as bioethics (Pearce & Turner 1990). Smith expresses such views strongly—'many cultures other than our own, and many people within our own society, do indeed have genuine *moral* concerns for our non-human environment. We see the destruction of whales and forests as an evil comparable with crimes against humanity' (1995, p. 52).

1.2.4 PUBLIC PREFERENCE VALUES

In addition to values expressed though the preferences of individuals, some values find expression via social norms (Pearce & Turner 1990). These values are referred to as public preference values. These values, like intrinsic values, do not correspond directly to the individual preference system and as such are not considered economic values. Pearce and Turner (1990, p. 22) attribute to 'ecocentric ideologies' the desire to 'base policy on social norms that individuals accept as members of a community (public preferences) and that are operationalised via 'social' legislation.' Public preferences may bear some relationship to values such as the claim to sovereignty of nations, strategic interests, and scientific credibility in Antarctica. These appear to be significant in the understanding of Antarctic tourism, given the particular emphasis placed, if indirectly, by many nations on such values.

1.2.5 WILDERNESS AND AESTHETIC VALUES

Wilderness and aesthetic values are specifically mentioned in the environmental principles of the Protocol as primary values that must be protected. As such, they are an important recognition within the ATS of values beyond those associated with science or other human use. HRSCERA stated that most witnesses to the hearings held by an Australian parliamentary committee investigating Antarctic tourism 'agreed that the wilderness value of

Antarctica is likely to be its most important value to the peoples of the World in the foreseeable future' (1989, p. 8).

Wilderness values derive from a wilderness resource, and cross into a number of value categories. Wilderness is a concept primarily of wildness, naturalness, and the lack of modification—'wilderness is distinguished by its relatively undisturbed condition, naturalness, and solitude' (Hendee, Stankey & Lucas 1990, p. 182). The values derived from a wilderness resource can be non-consumptive use values, through visitation of the resource. The fact that it is a wilderness confers a non-consumptive use value on the visitor above and beyond that which would be obtained from visiting the area if it were not wilderness. Indirect use values can also be derived from wilderness resources. Understanding that the place one is seeing (for example) in a documentary, or in a picture book is a true wilderness, confers a value beyond that which would be obtained otherwise. A closely related value, the existence value for wilderness, is derived from the knowledge (without any intention of use, or without any indirect use) that the wilderness exists. Wilderness may also contribute to option, quasi-option, and bequest values. Wilderness values, by their nature, can be compromised very readily, with the presence of structures or other signs of people (including people themselves) affecting wilderness values.

Wilderness, while it may be associated with the concept of intrinsic values in human preference structures, does not have any bearing on intrinsic values (as these are hypothesised to exist outside human preferences, while wilderness is a concept entirely within the human preference system). The Protocol (appendix one) groups wilderness and aesthetic values under the label intrinsic value, which represents a serious misunderstanding of the concepts. Wilderness and aesthetic values are both sets of human values. Intrinsic values are by definition outside human value systems. The erroneous conception of value, enshrined in the Protocol, is evidence that Antarctic values are poorly understood within the ATS.

Aesthetic values are also highlighted in the environmental principles underlying the Protocol. The intent is perhaps less clear than that associated with wilderness values. It can be presumed, however, that scenic and artistic qualities are components of these aesthetic values. Such values could be use values (non-consumptive and indirect), option and quasi-option values, and bequest values—people may have some value for passing on scenic or otherwise aesthetic resources—and possibly existence values.

1.2.6 PHYSICAL, CHEMICAL AND BIOLOGICAL SYSTEMS VALUES

The physical and biological components of the Antarctic are an important source of value in their own right, in addition to being the basis for other values. Globally important weather, climate, and oceanographic functions are provided by Antarctic systems. Values associated with the living components of the system can be referred to as biodiversity, similarly the important physical features of the Antarctic can be termed geodiversity and glaciodiversity (in the absence of better terms). While not a separate value category, the values associated with biodiversity are a convenient collection and label for a conglomeration of other types of value. Biodiversity refers to the values associated with maintaining a diversity of living things, and generally includes genetic, species, and ecosystem diversity. As such, biodiversity values, for example, may include scientific, consumptive and productive use values, as well as existence and bequest non-use values, and intrinsic values as well. Threats to biological components of the system therefore have the potential to affect a wide range of values. In a direct sense Antarctic tourism has the potential to affect biological components at certain levels, and through this indirectly affect the component values associated with biodiversity. In addition to biological components of Antarctica, important physical environment features have significant value. Geological values (which can be described as geodiversity) may, like biodiversity related values, comprise scientific, consumptive and productive use values, as well as existence and bequest non-use values, and intrinsic values. Components of the geological environment, such as rock, soil, gravels, fossil deposits, minerals, and so on have special importance in Antarctica. Similarly, ice features—sea ice, glaciers, ice shelves, ice bergs, and the ice sheet itself, are the source of important values, including scientific values, and extremely important values in the case of global physical systems such as climate. Geodiversity values are subject to human influences (physical disturbance, removal, or contamination), and glaciodiversity values may also be affected by human activity (through contamination of pristine inland icefields, for example).

1.2.7 TOURISM RELATED VALUES

Antarctica is extremely highly valued by people. Most of these values are wilderness related, conservation related, biodiversity related, aesthetic, or scientific. Very significant values derive from Antarctica's functions in global climate, ocean and weather systems. Other important values are extractive, such as fisheries. Different Antarctic values are included in figure 1.1. Specific Antarctic tourism related values are laid out in table 1.1, according to whether they are dependent on tourism, whether they exist independent of tourism, and whether they may be affected by tourism. This figure acts as a general scheme, and serves to describe the probable relationships of tourism with different value categories. Tourism allows for the satisfaction of certain otherwise unobtainable values. Tourism has the capacity to affect values, and conversely, other activities can affect the values tourism relies upon.

Table 1.1: Tourism related values

Values dependent on tourism for realisation	Values exist in absence of tourism	Values potentially affected by tourism
Non-consumptive use values (tourism, recreation, adventure)	Indirect use values (enjoyment through indirect media)	Existence values
Tourism related option values (option to visit depends on tourism existing in future)	Existence values	Scientific values
Tourism related vicarious use values (indirect use)	Option values (tourism use in future does not depend on present use)	Biodiversity and ecosystem health
Wilderness values (components that require visits)	Quasi-option value	Bequest values
	Bequest value	Wilderness values
	Scientific values	Physical, chemical and biological system values (biodiversity, geodiversity, glaciodiversity)
	Physical and biological system values	Public preference values
	Consumptive use values (fisheries, mineral extraction, ice harvest)	Cultural heritage values
	Wilderness values	

1.2.8 SUMMARY

This framework provides a way of understanding how different Antarctic values relate to each other, and how different actions may affect certain values. The framework allows any tourism management system to be developed and assessed according to what values are being managed and affected. It is argued that a more explicit recognition of different values would reduce conflict and improve any management system.

Elements of the Antarctic resource contribute to different types of value—for example, intact Antarctic ecosystems may contribute to existence values, physical, chemical and biological system values, wilderness values, scientific values and others. Any impacts on the Antarctic resource therefore have wide ranging effects of the values derived by individuals and society, which, while difficult to quantify, must be taken into account in decision making.

The values framework helps in understanding the positions of different stakeholders. Importantly, the framework makes clear that values unrelated to use of the Antarctic exist (non-use values), and that these values have the potential to be the most significant values associated with the continent. Any management regime for Antarctic tourism must take into account the full range of values involved, explicitly and systematically.

Chapter 2: Physical, environmental, operational and geographical aspects of Antarctic tourism

This chapter provides the background for understanding the Antarctic tourism industry. It describes the physical, environmental, operational and geographical aspects of Antarctic tourism, drawing on a wide range of source material. The characteristics of the environment in which tourism operates are described first, including the physical characteristics of the non-living environment. Tourism and recreational activities suited to different landform classes are described. The biological characteristics of the area are described briefly, and cultural resources, important as tourism attractions in their own right, are examined.

Historical levels of tourist visitation are described. A numerical forecast of visitor numbers (a simple trendline) was carried out, and is reported along with forecasts provided made by others. The historical and forecast numbers of operators, vessels, and voyages are described.

Ship based tourism operations are described in some detail. The ship based tourism experience, and the reasons for the dominance of ship travel are examined. Vessel characteristics are examined, and the proportions of different vessel types in the industry discussed. Passenger capacity of vessels, standards of accommodation and service, ship origin, registration and flag states, ship ownership, ship availability, chartering and sub-chartering arrangements, and the impact of possible technological developments are described. Ship and ship to shore operations, including navigation in ice, small boat operations, helicopter use, and communications are examined. Voyage and landing management, including command and responsibility structures, crew and passenger briefings, and management of tourists ashore is detailed. Environmental aspects of operations including prevention of oil pollution, waste management, and preventing the introduction of alien species are reviewed. Additional operating procedures applying to visits to sites in East Antarctica and the Ross Sea region are briefly examined.

Airborne tourism is described. Historical and contemporary operations landing tourists, attempts at fly / cruise hybrid operations, and a range of other tourism related aviation activity is detailed. The operations of Adventure Network International (ANI) are of considerable importance. ANI is the only company operating airborne tourism and the only company with land based facilities, therefore the genesis, history and growth of the company, its operations, safety and environmental policies, and the tourism experience offered are described. Ongoing and past overflight activity is also examined, including the general operation of flights, the experiences of passengers, and safety and environmental issues. The potential for developments in airborne tourism is assessed, as the ramifications of large scale air tourism in Antarctica are considerable, and it is important to obtain a realistic understanding of the feasibility of different developments. The growing use of yachts to provide tourist or charter visits to Antarctica is also examined briefly.

An analysis of site use was conducted. Site use issues, including use of new sites, and increases in use of individual sites and areas, are of concern to many, and while some basic statistics have been presented at ATCMs, a comprehensive geographical analysis has not been undertaken to the knowledge of this author. This analysis helps provide a clearer understanding and visualisation of site usage, useful in validating or dismissing commonly raised concerns, understanding general site usage patterns, concentration of impacts, and spread of tourism activity. The analysis also provides insight into the geographical development of a destination area during a rapid-growth phase of its life cycle. A geographical and temporal analysis of site use was carried out. Site use across nine seasons (1989/90 to 1997/98) in the Peninsula region was analysed using mapping, to describe geographical and temporal change. Site use for areas other than the Peninsula region was also analysed.

A review of tourism impacts concludes the chapter. Types of impact are examined, including impacts on science, the environment, cultural heritage, and wilderness values. Positive impacts (benefits) are examined. A table of identified or possible impacts is presented, with impacts categorised according to extent, duration, intensity, probability of occurrence, and significance. Finally, monitoring of impacts is discussed.

This research represents the most comprehensive documentation and analysis of the workings of the Antarctic tourism industry to date.

2.1 PHYSICAL, BIOLOGICAL AND CULTURAL CHARACTERISTICS

2.1.1 PHYSICAL RESOURCE

A common (and cliched) statement describes Antarctica as the 'coldest, highest, driest, and windiest' continent. The words pristine, lonely, inaccessible, hostile, and remote are commonly employed. Antarctica is all these things, but these descriptors understate the complexity and variability that is inevitable in such a large area.

The physical characteristics of Antarctica are well documented. Many books provide detailed information about the continent, surrounding oceans, history, and scientific and other human activity, see for example Readers Digest (1990), May (1988), Rubin (1996), and IUCN (1991). A brief description will be provided here by way of introduction. More detailed information will be provided as it relates to tourism.

The vastness of the continent (roughly 13 900 000 km^{2}), and the variation in geographic character makes generalisation difficult. Maps 2.11 to 2.13 depict the Antarctic continent with major geographical divisions and features of the continent. Geographically, Antarctica can be divided into East Antarctica and West (or lesser) Antarctica, separated by the Ross and Weddell seas and the Transantarctic mountain range. The Transantarctic mountain range, around 4800km long, is a dominant feature of the continent (May 1988). Mountain ranges dominate the Antarctic Peninsula, and occur around the fringe of the continent, some exposed only as collections of dramatic nunataks emerging from the ice cap. The dominant feature is the ice cap, the surface of which rises to altitudes of 3800m, with ice thicknesses of up to 4645m. May (1988, p. 20) describes it as 'A vast, interlocking mass of grounded ice sheets and floating ice shelves' which 'contains 90% of the world's ice and most of the planet's fresh water reserves'. Snow deposition is very low, and Antarctica is the driest of earth's continents.

Rock and soil are uncommon, and limited mainly to the fringe of the continent where mountains and exposed rock areas emerge from the ice. The amount of exposed rock or land amounts to as little as 0.4% of the continental area, although some authors regard 1% to 2% of the surface area to be ice free (IUCN 1991, HRSCERA 1989). Also of significance are the massive floating ice shelves formed by ice flow onto the sea surface, that fringe many parts of the continent and calve vast tabular icebergs. The largest are the Ross and Ronne ice shelves. Sea ice is formed during winter, surrounding the continent for a distance of up to 1000km. Sea ice concentrations are influenced by a range of factors, and some areas are much more accessible by ship than others.

Climate is extremely cold, due to latitude, altitude, and reflectivity of the ice (Rubin 1996, IUCN 1991). The lowest temperature recorded in Antarctica (and on earth) was -89.6°, while averages in the interior are -40° to -70° in the coldest month and -15° to -35° in the warmest. Coastal temperatures vary, with averages of -15° to -35° in winter and -5° to 5° in summer, with the Peninsula region being warmest (Rubin 1996). Winds can also be extreme, particularly the katabatic winds (where cold air flows downslope from the ice cap), with speeds recorded over 300kmh.

The continent can be subdivided into units to aid description. IUCN (1991) used eight classes (derived from Holdgate 1977): open rocky coastal; open rocky coastal with some ice shelf; rocky ice shelf margins; ice shelf and ice coast; rocky inland valley and mountain; lower level of ice cap less than 500km from sea; and high interior more than 500km from sea. A simple approach adopted here is based on dominant physical characteristics of different land and iceforms. Six different landforms can be readily identified: the polar plateau; coastal ice areas; coastal ice free areas; ice shelves; the Transantarctic mountains, other mountains, nunataks and massifs; and the sea ice zone. Each will be described briefly with particular reference to their relevance to tourism activity.

The polar plateau is the most extensive of the landform classes in the region, and includes the majority of the interior of the continent, rising to high altitudes. Generally featureless, the plateau surface varies according to the climate and wind regime, from thick snow through to blue ice, with a smooth or corrugated surface, or wind sculpted sastrugi (snow ridges). The polar plateau is seldom visited by tourists, and is generally the domain of the adventure traveller. A small number of tourists experience the polar plateau through visits to the South Pole with ANI.

Coastal ice free areas (including coastal islands) are generally limited in extent, with a few being large. Such areas are free of ice for topographic reasons or because of glacial retreat. Many of these areas have freshwater, saline or hypersaline lakes including lakes with permanently frozen surfaces, and some have small streams or rivers. Biological activity is concentrated in these areas, with wildlife breeding (mammals and birds) and the presence of flora (mosses, lichens, and in some areas of the Peninsula, grass and cushion plants). Large concentrations of wildlife occur in coastal ice free areas, including penguin species, other nesting seabirds, and moulting seals. Gravels, sands, and basic soils are present in some locations. Geological values are high, and fossils are found in some locations. Tourist use of some ice free areas is high, due to the conjunction of attractions such as stations, wildlife, and flora in such areas (Cessford 1998). Most areas are close to coasts, and access is relatively easy, using IRBs or helicopters, if sea ice permits a ship to approach closely.

The edges of the ice cap, glaciers and ice tongues experience higher snow accumulation (due to the influx of moist air from the oceans), more severe winds, and warmer temperatures than the inland ice plateau. Where the ice cap meets the ocean, cliffs are common. Tourism activity on coastal ice areas and glaciers is limited but viewing is more common, and IRB cruising and landings occur. Activity on the ice itself is problematic, with heavy crevassing in glacier areas making travel difficult and dangerous, although some areas are considerably safer for activity.

The ice shelves are generally flat, high snow accumulation areas, with dramatic fronts where they join ocean or fast ice. Ice shelf fronts can calve large or extremely large tabular icebergs. Semi-permanent features such as the Bay of Whales on the Ross Ice Shelf, or the Atka Iceport on the Ekstrom Ice Shelf are possible, caused by features underlying or penetrating the ice shelves. Crevassing is not uncommon. Tourist use appears to be confined at present to the occasional landing by helicopter on the surface of an ice shelf, or adventure traverses.

The Transantarctic mountain range spans the continent from Victoria land on the Ross Sea coast, through to the Weddell Sea region. The mountains separate the two main ice masses of West Antarctica and East Antarctica, and are the site of numerous massive glaciers (May 1988). There is more exposed rock at the Ross Sea end of the range, and only exposed mountain tops (nunataks) through the central section between the Ross Sea and Weddell Sea. The range is the site of some existing tourism experiences, with visits to areas in the Ross Sea region from ships (including helicopter landings) and support of adventure activities offered by ANI. Overflights from Australia exploit the scenic values of the range, as do Ross Sea ship voyages.

Other mountain ranges, massifs, and isolated nunataks are scattered around the continent, located relatively near the coast where the ice cap does not cover mountains completely. The Ellesworth Mountains include Vinson Massif, the continent's highest peak at 5140m. Many ranges are not close enough to the coast for practical tourism access from ships. Some of these ranges are extremely spectacular, and considerable potential exists for adventure activities. Some species of petrel breed well inland on isolated nunataks. Visits to mountain ranges and nunataks are not common. ANI offers access to the Holtedahl Mountains in Dronning Maud Land, and some ship based operators offer limited climbing experiences in the Peninsula region.

The Southern Ocean, summer and winter, includes open water, sea ice, fast ice, and icebergs. Ice area is 20 million km^2 in winter and around 3 million km^2 in summer (IUCN 1991). Fast ice is ice that is still attached to the shoreline, and can persist in bays or protected waters partway or all through summer in some areas. As this ice normally has not been broken up by sea swell, it exists in the form of flat sheets, and may have a very flat surface unless sastrugi have formed. Motor vehicle, foot, ski and other forms of travel are possible on fast ice. Emperor penguins breed and brood chicks in winter on fast ice, and in summer, seals haul out to pup on fast ice. Pack ice is the general term used for ice that is floating free on the sea surface (not attached to land, normally composed of ice floes ranging in size from very large (kilometres in width) to small fragments. Pack can be categorised according to trafficability, and amount of open water. Ridges of ice, many times thicker than the ice floes themselves, can buckle above and below the sea surface due to the pressure of floes colliding. Leads, areas of clear water that may offer passage to ships, are often present. Surface travel on foot or skis is possible on closed pack, but pressure ridges, leads and the potential for pack to open up through swell or wind changes make such travel difficult and very dangerous in most locations. The Southern Ocean is susceptible to very large and long swell, and very strong gales, making ship travel uncomfortable. Icebergs calved from glaciers, ice tongues, or ice shelves are common, some grounded in coastal waters, or floating free through sea ice (which does not generally impede them) or open ocean. Marine life is an attraction of travel in the sea ice zone and surrounding oceans, and includes penguins, seals, whales, and seabirds. Travel in the sea ice zone is picturesque, and some tourism experiences include actual icebreaking. In the Peninsula region, sea ice is much less extensive than other areas, with parts of the region completely ice free for some parts of the year, where it is possible to travel in conventional vessels, but conservative operations are essential. An icebreaking vessel is necessary in some areas and desirable in others to broaden itinerary options, and ice strengthened vessels are needed in most other areas. Ice conditions represent a major constraint on operations.

Table 2.1 relates actual and potential activities to these different landforms as a guide to present tourism operations and future developments. It should be noted that not all of these activities currently take place, and that no approval or otherwise is implied as to the appropriateness of these activities in different areas. The information in the table is based on this research, the characteristics of the various landforms, and general understanding of the requirements of the different activities.

Table 2.1: Potential and actual activities by landform

	Activities (potential and actual)
Polar plateau	Nordic skiing, ice walking, sledging, camping, adventure traverses / trekking, traction kite activities, motorised travel (snowmobile, motorcycle, quad bike, tracked vehicle).
Coastal ice areas and glaciers	Skiing and snowboarding (nordic and alpine), ice walking, sledging, camping, adventure traverses / trekking, glacier travel, crevassing, glacier caving, motorised travel.
Ice Shelves	Nordic skiing, ice walking, camping, adventure traverses, glacier travel, motorised travel, ice climbing.
Transantarctic Mountains	Mountaineering (including first ascents), rockclimbing, ice-climbing, ski mountaineering, snowboarding, alpine skiing, trekking.
Mountains and nunataks	Mountaineering, rockclimbing, iceclimbing, nordic and alpine skiing and snowboarding, camping.
Sea ice zone	Nordic skiing, wildlife observation, diving / snorkelling (coastal areas), IRB cruising (coastal, offshore and island areas), yachting, sea kayaking, ship travel and icebreaking, wildlife viewing (marine, avifaunal, fish, plankton, krill etc), iceclimbing (icebergs).
Ice free land areas	Walking / trekking, camping, wildlife viewing, flora viewing, visiting features of ice free areas (lakes, streams, patterned ground etc), motorised travel.
Stations and historic sites	Observation of historic and contemporary living conditions, visiting the location or physical evidence of historic events, interaction with scientists and government personnel, viewing scientific experiments and interpretation of research activities, sending mail from Antarctica, souvenir purchase.
Activities possible in all zones	Viewing and sightseeing, photography, environmental / scientific interpretation and educative activities, overflights in helicopter or fixed wing aircraft.

2.1.2 BIOLOGICAL RESOURCE

The faunal species present in Antarctica are a major attraction. Opportunities for viewing of wildlife, especially charismatic species such as penguins, are a dominant motivation for travel. A variety of species is present, some in very large breeding colonies, others breeding in smaller numbers or not at all. May (1988) and Cooper (in Rubin 1996), list the animals and plants occurring in the Treaty Area, many of which act as attractions or incidental features for tourist viewing. Specific information on the likelihood of seeing different species as a tourist is provided by Rubin (1996).

In brief, marine mammals include true seals (leopard seal, crabeater seal, ross seal, weddell seal, southern elephant seal), Antarctic fur seal, baleen whales (blue whale, southern right whale, fin whale, humpback whale, minke whale, sei whale) and toothed whales (orca, southern bottlenose whale, sperm whale).

Bird species include penguins (Adélie, chinstrap, gentoo, macaroni, rockhopper, emperor, and king), albatross (wandering, black-browed, grey-headed, yellow-nosed, sooty, and light-mantled sooty), petrels (northern giant, southern giant, Antarctic, snow, cape, greatwinged, whiteheaded, Atlantic, South Georgian diving, softplumaged, Kerguelen, blue, grey, whitechinned, common diving), storm petrels (whitebellied, blackbellied, whitefaced, greybacked, Wilson's), Antarctic Fulmar, shearwater (little, sooty, and great), skuas (Antarctic and brown), terns (Antarctic, Kerguelen, and Arctic), sheathbills (snowy and black-faced), kelp gull, prions (up to six species, including broadbilled, fairy, and thinbilled), and cormorants (blue-eyed, and king).

In addition to these birds and mammals, a variety of marine fishes occur in the region. Benthic (bottom dwelling) species are diverse and little studied. Plankton and krill are common. Terrestrial fauna is limited, and all species are small invertebrates, mainly mites, springtails, and midges. Microorganisms including bacteria, fungi, and viruses occur in many areas of ice, snow, rock and soil. Study of microorganism populations and ecology is still developing (Vincent 1989). Endemic microbial species are present in the Antarctic region, although research using modern molecular biology techniques is only beginning to provide an understanding of microbial diversity. The potential for change to microbial communities through species introductions or modifications to the physical or chemical environment exists.

Flowering plants are limited to two species in the Peninsula region, the Antarctic hair grass and Antarctic pearlwort (cushion plant). Mosses and lichens are more widespread, with extensive moss beds found in many ice free areas, and around 350 species of lichen and 100 species of moss. Algae are found in ice free areas with supplies of water, as well as in snow surfaces, with hundreds of species present overall (Rubin 1996, IUCN 1991, May 1988).

2.1.3 CULTURAL RESOURCE

The history of human activity in Antarctica inspires a great deal of interest. Antarctic exploration has something of an iconic status, possibly due to the fact that the heroic age of exploration occurred in the relatively recent past, high levels of publicity, and the epic stories of endurance against the odds, or noble failure. Physical remains of early exploration still exist, in relatively good condition in many cases. More recent human activities have also left a legacy of buildings and other fabric, which are considered to have historic value, some of which are relatively recent, dating from the modern era of Antarctic science (Hughes 1994, Hughes & Davis 1995). Places also have historic value by association with events of significance, regardless of whether physical evidence remains. At present, a variety of sites exist with physical remains, representing living conditions, means of survival, activities, and fashions of the early visitors, and providing insight into the human qualities of people involved. Some sites include huts, some of which can be entered.

Extremities of wind, snow, and ice threaten the physical fabric of some sites. Hughes and Davis (1995) provide a comprehensive overview of tourism issues for historic sites and monuments. Tourism occurs at a range of sites, including those with physical fabric and those without. Since the entry into force of the Protocol, historic sites can be included or listed as Antarctic Specially Protected Areas (ASPAs) or ASMAs (section 4.7), although sites can still be listed without being either. Hughes and Davis (1995) point out the lack of criteria for declaring historic sites and monuments, and highlight the absence of ATS conservation, restoration, removal, or interpretation policies for such sites.

For listings of sites with recognised or possible historic or cultural value, see Headland (1994a), Hughes (1994) or Hughes and Davis (1995). Headland (1994a) identifies sites with generally accepted international importance, and regards many others as having national significance. Headland noted that 60 historic sites and monuments were listed.

The more complex sites, and those with perhaps the greatest degree of international significance, are the huts and hut complexes associated with major expeditions of the heroic era. The hut complexes of Borchgrevink (Cape Adare, Ross Sea Region), Nordenskjöld (Snow Hill Island, Peninsula Region), Bruce (Laurie Island, South Orkneys), Scott (Hut Point and Cape Evans, Ross Island), Shackleton (Cape Royds, Ross Island) and Mawson (Commonwealth Bay, Adelie Land), are of particular significance (Headland 1994a, Hughes 1994). The huts on Ross Island, associated with expeditions of Scott and Shackleton (Cape Royds, Cape Evans, and Hut Point) are popular sites for visits, with whaling era sites on Deception Island in the Peninsula region also visited frequently (Hughes & Davis 1995, Hughes 1994). The huts and surrounding area at Cape Denison on Commonwealth Bay are visited less regularly, as are those at Cape Adare at the entrance to the Ross Sea (Hughes & Davis 1995). Hughes (1994) provides good details on the accessibility and features of the Cape Adare, Ross Island, and Cape Denison huts. A number of historic sites are visited in the Antarctic Peninsula region.

Hughes (1994) highlighted the potential for post-heroic era sites, including International Geophysical Year (1956/57) buildings and stations to be used for tourism, and suggested that many remains and artefacts require significance assessments and conservation management plans rather than ad hoc 'clean up' work. The importance of historical resources in motivating tourism was discussed, whose observations from a 1993 voyage found that historic sites were an important motivator, following only wildlife. Hughes also noted a range of materials conservation issues associated with tourism, detailed in section 2.7.1.

An important development for tourism was the renovation and development in 1996 of the Port Lockroy British 'Base A' in the Antarctic Peninsula region (National Environment Research Council, 1997, 1998, 1999). Established in 1944, the base was occupied until 1962, and is important as the earliest example of a British scientific station. The site was listed as a historic site at the 1995 ATCM, and a conservation team was deployed in 1996 to restore the main building and clean up the site. The site is in one of the most heavily visited parts of the Peninsula region (near Wiencke Island, see section 2.6.2), and the UK Antarctic Heritage Trust (UKAHT) who have responsibility for conserving and managing the base have opened the base to visitors. The base includes a post office, merchandise sales, historic artefacts, and displays on current BAS research, and is staffed by UKAHT personnel, who conduct conservation, maintenance, mapping, and wildlife monitoring duties as well as visitor interpretation and supervision (National Environment Research Council 1998, 1999). The site was the most popular visitor site in 1997/98 and 1998/99 (section 2.6.2, National Environment Research Council 1999). BAS has provided interpretive signs describing the history, occupation and science undertaken at a number of other abandoned UK bases, as well as conducting clean up and repair work (National Environment Research Council 1997, 1998, 1999).

2.2 TOURISM HISTORY AND GROWTH

Two significant papers form the basis for any history of Antarctic tourism. Reich (1980) provided the first substantial effort relating to the tourism industry, including an examination of numbers and operations. Headland (1994b) provides a more recent summary. These papers, together with other sources provide a chronology of tourism activity. Table i.1 includes much of this information. Headland (1994b) provides a comprehensive and descriptive chronology of Antarctic tourism, dividing the industry into the 'modern period' and prior times. Headland regards 1970 as the start of the modern period, with the first purpose built ice strengthened vessel (*Lindblad Explorer*) commencing operations. Prior activities used chartered vessels, less well suited to tourism purposes. The difficulty of obtaining accurate historical material pertinent to tourism is noted, given that for a long period there was no imperative to publish records (Hall & Johnston 1995). Headland (1994b) also describes recent developments in ship and air based tourism, and mentions the important role played by the development of IRBs in making possible a satisfactory visitor experience. Section i.3 and table i.1 summarises key events in the historical development of the industry. Reference can be made to Reich (1980), Codling (1982), Headland (1994a), Headland (1994b), Stonehouse (1992a, 1994a), and Stonehouse and Crosbie (1995) for details of the beginnings of the industry, while the various publications of Enzenbacher (1992b, 1993b, 1994a) and a variety of other authors provide details of the more recent past.

Antarctic tourism has been underway for more than a century, although since the middle 1980s a rapid increase in tourism has occurred (Headland 1994b, Enzenbacher 1992b, Stonehouse 1992a). Enzenbacher (1992b, 1993a, 1993b, 1994a) details the numbers of operators, ships and tourists involved, and more recently, compilations by the NSF of industry activity provides annual figures including total numbers of passengers. Other authors (Hall & Johnston 1995 for example) also discuss visitor numbers, but most reporting is based on the work of Enzenbacher. Figure 2.1 summarises the numbers of ship based tourists over time, using data from Enzenbacher 1992b (1957–1991 data), Enzenbacher 1993b (1991/92 data), IAATO 1997, IP75 ATCM XXI (1992–1997 data), and IAATO 1998, IP86 ATCM XXII (1997/98 data, 1998/99 pre-season estimate). In general, numbers of travellers were low (below 400) through the 1950s and early 1960s. Numbers jumped to more than 1000 in 1968/69 austral summer, remained above 700 through the 1970s, and dropped to a low of 544 in 1984/85 and 631 the following season. The period since then has seen a spectacular and steady growth, with numbers climbing to 4698 in 1990/91, to 9212 in 1995/96, and 9604 in 1997/98. Numbers travelling by air at present are in the region of 100 each season (Swithinbank 1997b, 1996, 1995, 1994, 1993b, 1993a).

Some problems exist in assessing numbers of visitors. Enzenbacher (1992b, 1992a, 1994a, 1994c) and Reich (1980) give an indication of the difficulties involved, including lack of reporting procedures in the past, incomplete and non-uniform reporting, unreported visits by small expeditions and non-commercial groups, and continuing problems with information exchange. Enzenbacher (1992b) describes the data as fragmentary. Enzenbacher (1992b, 1993b, 1994a) and others have argued with some success for improved reporting of visits, with the present situation providing reasonably accurate, timely and reliable statistics. Enzenbacher (1994a) details the means by which she has obtained best estimates from a number of sources.

Figure 2.1: Seaborne tourist numbers
(from Enzenbacher 1992b, Enzenbacher 1993b, IAATO 1997, IP75 ATCM XXI, IAATO 1998, IP86 ATCM XXII)

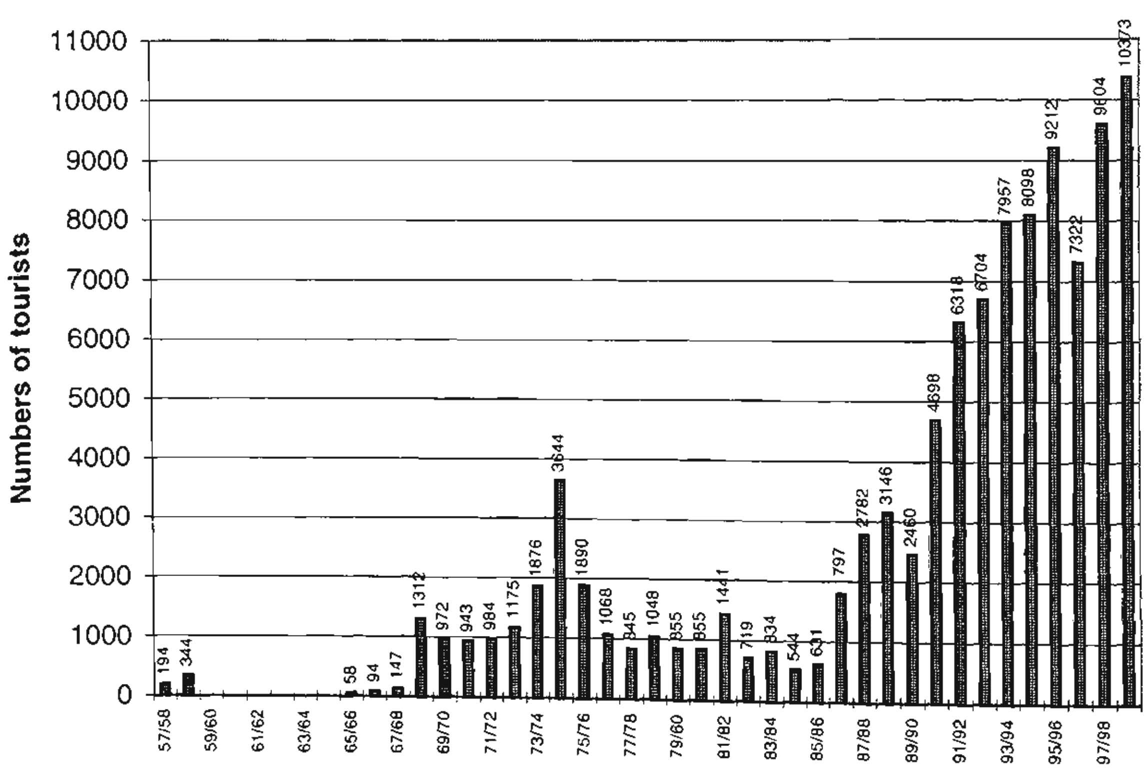
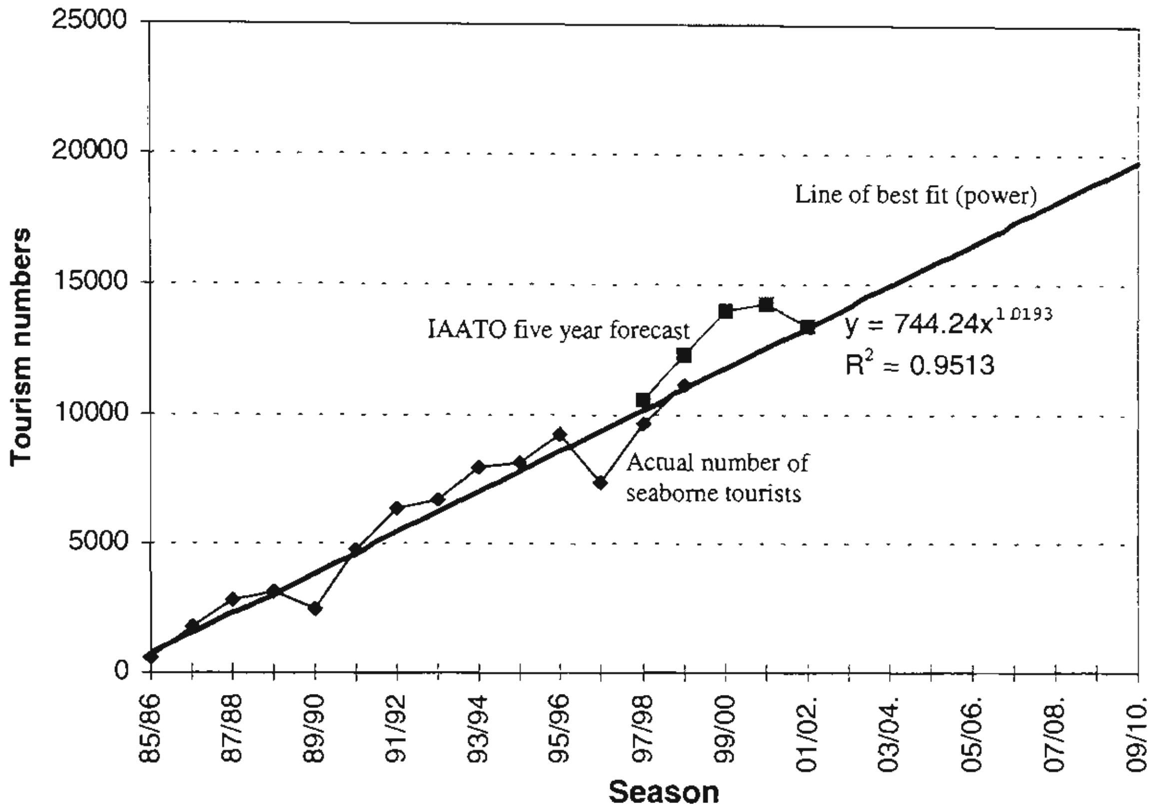


Figure 2.2 displays numbers of seaborne tourists from 1985/86 to 1998/99, the forecast numbers provided by IAATO in 1997 (IAATO 1997, IP75 ATCM XXI), and a line of best fit based on the actual numbers from 1985/86 to 1998/99, the period from which a consistent trend of growth is apparent. The total included for the 1998/99 season, while estimated by IAATO prior to the season, is treated as an actual figure rather than a forecast for the purposes of the calculation. The IAATO forecast, made in 1997 for the following five seasons, was 'based on a survey of planned activities by existing and known prospective

Antarctic tour operators' and 'assumes that appropriate Russian-flagged vessels will continue to be available to operators at a favourable charter rate, that the regulatory environment will remain largely unchanged, and that large cruise lines will not enter the market' (IAATO 1997, IP75 ATCM XXI, n.p.).

Figure 2.2: Forecast seaborne tourist numbers, IAATO forecast, and line of best fit based on 1985/86 to 1998/99 figures
(from IAATO 1997, IP75 ATCM XXI, figure 2.1)



The line of best fit trendline forecast was calculated using a least squares fit using the equation $y=cx^b$ where c and b are constants (the standard trendline equation (Power) function in *Microsoft Excel* software). In a general sense the trendline concurs with the IAATO forecast. IAATO is able to take into account special considerations such as the popularity of Antarctica as a destination to see in the new millennium at new year 1999/2000, and other factors not reflected in a simple statistical trendline. The industry is structured in such a way that the presence or absence of a single ship or operator can make a substantial difference to the overall total, meaning that fluctuations in numbers are likely. Despite these limitations, the trendline forecast can provide some indication of likely future numbers. Based on the trendline, the total number in 2004/2005 would be around 16 000 visitors, with 2009/2010 seeing around 20 000, assuming the rate of growth remains constant. As discussed in section 3.6, models of tourism destination life cycles indicate that rates of growth will vary. At this stage there is no indication that a levelling off has started.

Another way to look at change in the industry is through the number of operators, ships and voyages. Table 2.2 provides this information, including forecasts through to 2001/02. The figures and the forecast are from IAATO (1997, IP75 ATCM XXI), apart from the data for 1997/98 which are based on actual reporting (IAATO 1998, IP86 ATCM XXII). The original forecast for 1997/98 predicted more voyages, which smoothed the rather abrupt increase in voyages apparent moving into the turn of the century. These forecasts and the historical trend support the analysis based on total visitor numbers, and again indicate strong growth.

Table 2.2: Number (actual and forecast) of operators, ships, and voyages 1992/93 to 2001/02 IAATO
(from IAATO 1997,IP75 ATCM XXI, IAATO 1998, IP86 ATCM XXII)

Year	Number of operators	Number of ships	Number of voyages
92/93	10	12	59
93/94	9	11	65
94/95	9	14	93
95/96	10	15	113
96/97	11	13	104
97/98	12	14	106
Forecast:			
98/99	15	17	145
99/00	16	16	150
00/01	15	17	155
01/02.	16	17	154

2.3 Ship based tourism operations

The Antarctic tourism industry (excepting air travel) uses ships for accommodation and transport, with IRBs and, less frequently, helicopters for transport to shore attractions or for sightseeing. Ship based tourism is the largest sector of the industry. The actual sea travel experience forms a significant component of some travel experiences, with travel in ice covered waters and the opportunity to view marine life important to many travellers. This option is enhanced by the fact that the coastal fringe of the continent (with the majority of the ice free land area) hosts most of the attraction features of the continent, including wildlife concentrations, research stations, and scenic features. The flexibility, access to attractions, and accommodation and transport that ships offer, and the present expense of air transport contribute to the continued popularity and viability of ship operations.

Most Antarctic ship based tourism is conducted according to a model referred to as expedition cruising, pioneered by Lars Eric Lindblad who was the first Antarctic tourism entrepreneur (Stonehouse & Crosbie 1995, Stonehouse 1992a, 1994a, Splettstoesser & Folks 1994). Stonehouse (1994a) and Stonehouse and Crosbie (1995) describe the Lindblad model as using vessels of up to 140 passengers, and providing experienced guides, lectures, briefings, and shore visits in an 'expedition' mode of operation. Stonehouse and Crosbie (1995) attribute the fact that there have so far been few obvious impacts of tourism to the prevalence of the Lindblad model. Stonehouse and Crosbie wrote 'the Lindblad pattern of tourist management has ensured high standards of behaviour among tour operators and tourists alike, and far less environmental damage than might have been expected had Antarctic tourism developed without it' (1995, p. 222). The expedition cruising model of operations includes the freedom to choose sites opportunistically, according to local conditions, the abilities and interests of passengers, and the judgement of the management personnel of the voyage.

General descriptions of ship based operations are provided by Wace (1990), Stonehouse and Crosbie (1995), Reich (1980), Codling (1982), Nicholson (1986), Boczek (1987), Hall (1990), Stonehouse (1992a), Enzenbacher (1992a, 1994a), Smith (1994), White (1994), Hall and Wouters (1995), Stonehouse and Crosbie (1995), P. Davis (1995b), and Cessford (1998). Stonehouse (1994a) in particular provides a detailed description of the way that cruises and shore visits operate, including passenger behaviour, staffing, activities ashore, and general operational details.

Ship based tourism imposes a time commitment on travellers that is uncommon in modern travel. Visits to locations more distant than the Peninsula region require a considerable amount of time, and are much more expensive. The Peninsula region (especially the western side) is the closest part of Antarctica to a departure point with an airport, it is largely ice free for a long period, and includes a wide range of attractions, with most of the main icon attractions present (Enzenbacher 1992b, Cessford 1998, Wace 1990, Stonehouse & Crosbie 1995).

The benefits of ships for tour operations are described in the 1997 IEE for US based operators:

> The vessels provide a platform for wildlife and scenic observation, enhanced by educational lectures, briefings and discussion by experienced guides and naturalists, and documentary videos. A tour vessel functions as a floating hotel and conference facility, enabling visitors to make brief, opportunistic landings ashore (Five U.S. Organizers 1997).

For shipping, the tourism season spans the austral summer, from late October through to early March. The main factor limiting operations is the restriction on passage imposed by sea ice conditions. Other factors include the lack of wildlife on shore outside the breeding season, and the lack of daylight hours.

2.3.1 THE SHIPS

The ships used in the Antarctic tourism industry exhibit a wide range of ages, levels of luxury, sizes, and origins. Most of the ships in use are dedicated passenger cruising vessels. Some operate in the Arctic or sub-arctic through the northern summer and relocate to the Antarctic for the southern summer, with polar operations their primary role. Others are used more generally for expedition cruising, but employ their capacity for polar operations to extend the range of itineraries. Section 2.6.2 provides more detailed analysis of the geographic scope of the sites visited, and changing patterns of visitation over time. Operational aspects of the industry will be discussed here, including the procedures used to minimise risks and environmental impacts.

Enzenbacher (1995a) provides a comprehensive list of ships used in the Antarctic for tourism purposes, since the beginning of the industry, with further details in Enzenbacher (1994a, 1992b and 1992a). Based on the 1995 list, and including ships listed by IAATO and NSF since then, 42 ships that have been used were categorised by this author (the category descriptions are relative to expedition cruising rather than mainstream cruising where most vessels are much larger). Of these, 13 were small (0–50 passengers), 6 were medium (51–100 passengers), 8 were medium large (101–150 passengers), 2 were large (151–200 passengers), and 13 were extra large (more than 201 passengers). A number of mainstream cruise vessels have operated (with up to 800 passengers) and one was reported by Quigg (in Enzenbacher 1992b) to have carried 1250 people during the 1970s. Such operations recommenced in the 1999/00 season. Comparison can be made of the overall historic vessel size distribution with the contemporary situation. Table 2.3 compares the 1996/97 season and the 1997/98 seasons with the industry historical breakdown of ship sizes. It can be seen that, compared to the historical average, the present industry has roughly the same proportion of small ships, more medium, medium large, and large ships, and fewer extra large ships. This analysis does not imply anything about the number of passengers travelling on ships of different sizes. The mainstream cruise vessels, carrying up to 800 passengers were used for only a few seasons in the 1970s (Enzenbacher 1994a, 1995a), a time when other ships around the 400 passenger mark were also popular. The present industry structure, with its preference for smaller vessels, may be the result of the availability of suitable smaller ships, as well as the difficulties of managing passengers and landings when larger numbers of people are on board.

Table 2.3: Industry structure—ship passenger capacities

Ship passenger capacity	Overall	1996/97	1997/98
0–50 (S)	13 (31%)	5 (33%)	4 (31%)
51–100 (M)	6 (14%)	4 (27%)	3 (23%)
101–150 (M/L)	8 (19%)	3 (20%)	2 (15%)
151–200 (L)	2 (5%)	2 (13%)	2 (15%)
201+ (XL)	13 (31%)	1 (7%)	2 (15%)
Total	42	15	13

The turn of the millennium and the year 2000 was marketed heavily in the cruise industry. Antarctica is seen as something of an icon—a 'one off' cruising destination that some companies are interested in visiting not as regular expedition cruising operations, but as part of a wider sightseeing voyage. The Antarctica Project, a conservation Non-governmental Organisation (NGO), described the plans of Holland America Line (a US company) to take the *Rotterdam* with around 1600 people on board to Peninsula destinations including the Lemaire Channel and Deception Island (The Antarctica Project 1999). The *Rotterdam* is a premium level cruise ship (below luxury but above mass market) according to Fielding's *Worldwide Cruises 1998* (Slater & Basch 1997). The vessel visited Antarctica on the *'2000 South America Exploration World Voyage'* in late January 2000 (Australian Antarctic Division 1999a). Intended destinations included Esperanza Station (Hope Bay, Antarctic Peninsula), the Deception Island caldera, Lemaire Channel, and Paradise Bay. The Antarctica Project (1999) noted that the company had originally planned landings, and that the company was working with the Environment Protection Agency (EPA) to ensure regulatory requirements were met. The Antarctica Project was concerned that, as the voyage was the first large scale, mainstream tourism intrusion into the Antarctic by a company with no Antarctic specialisation, it may herald an era where large companies will reduce the price of tickets and tourism will become commonplace. The company website description of the voyage itinerary noted that the Antarctic cruising component of the voyage was subject to regulatory approval (Holland America Line 1999). The Antarctica Project newsletter (1999) also identified a December 1999 expedition by a Canadian operator with a vessel of 850 passengers, and while it would be 'the largest passenger vessel to take part in Antarctic tourism thus far, the operator is not required under Canadian law to prepare or circulate an EIA for review by the Canadian authorities' (n.p). This company proceeded to use two standard cruise vessels in the 1999/00 season with around 630 and 480 passengers respectively (Australian Antarctic Division 1999a).

Orient Lines, the operator of the largest vessel regularly visiting the Antarctic (800 passenger capacity, limited on Antarctic voyages to around 500) discussed some issues relating to larger ships. While some impacts relate to ship size, other impacts are not proportionally related to ship size:

> for example, the chance of running aground would be similar whether the ship carries 100 or 500 passengers. But a 100 passenger ship would need to make five separate cruises in order to transport 500 passengers to Antarctica compared with a single journey for the Marco Polo. Thus the smaller vessel would need to cover five times the distance, as well as spending more than five times the time (because of a slower speed) in Antarctic waters (Orient Lines 1997 p. 25).

Orient Lines also note that Marco Polo makes fewer landings, so an individual passenger has a lower impact than one on a smaller vessel.

Ships also have different standards of accommodation, service, food, entertainment, facilities, and general comfort. Some vessels were originally designed for scientific research, and have been converted for passenger cruising, and these vessels tend to be more basic than others. A number ice-strengthened passenger vessels have had full re-fits, others are purpose built expedition cruising ships of varying levels of luxury. Newbuilds, wholesale conversions, or refitting of vessels, while expensive, allow companies to select cabin arrangements, standards of fitting out, and other features, allowing a ship to be tailored to the market that the company intends servicing. Taking the 1996/97 season as an example, the fleet can be categorised by standards of accommodation, as shown in table 2.4, showing the range of different levels of accommodation available and ship sizes. Standards are somewhat arbitrary and are intended as a guide only. For some vessels they are based on the rating given in Fielding's *Worldwide Cruises 1998* (Slater & Basch 1997), others are based on descriptions given in promotional literature or elsewhere.

Table 2.4: Antarctic tourism fleet vessel characterisation (1996/97)

Passengers	Luxury (L): 4 or more stars in Fielding's	Cruise (C): cruise standard, 3 or less stars	Basic (B): converted research vessel
0–50 (S)	0	0	5
51–100 (M)	0	1	3
101–150 (M/L)	0	1	2
151–200 (L)	2	0	0
201+ (XL)	1	0	0

This shows the distribution of vessel sizes and standards across the industry. It is also important to know what proportions of passengers are carried on the different vessel types. Using the vessel characterisations described in table 2.4, passengers carried on different vessel types can be summarised (table 2.5), using the 1996/97 season as an example.

Table 2.5: Passengers carried by vessel type 1996/97

Ship capacity and standard	Passengers	% of total
S B	1494	20.4
M B	1834	25
M C	707	9.7
M/L B	1201	16.4
M/L C	1017	13.9
L L	1069	14.6

Small ships carried 1494 (20.4%) people, medium ships carried 2541 people (30.7%), medium / large carried the most people, with 2218 (30.3%), and large ships carried 1069 people (14.6%). Basic standard ships carried 4529 (61.8%), cruise standard ships carried 1724 (23.5%), and luxury standard ships carried 1069 (14.6%).

The availability or otherwise of suitable ships is often discussed as a possible limiting factor on the continued growth of the industry. This idea is worthy of some examination. The reform and eventual collapse of the Soviet Union in 1991 was indirectly responsible for a variety of ice-strengthened research vessels and icebreakers, even nuclear icebreakers, becoming available for charter (Headland 1994b, P. Davis 1995b). The various Russian agencies that owned the vessels, quite apart from having limited funding for research, found it necessary to use ships to generate income. The Soviet Union had a large ice-capable shipping fleet. Much of the present Antarctic tourism fleet (and Arctic tourism tonnage also) is Russian as a result, and the presence of these vessels has been a major determinant of the character of the Antarctic tourism industry (Smith 1994). In addition to the Russian vessels, a number of ships have been specially built as expedition cruising vessels. This is an option for satisfying future demand, but of course capital and a confidence in the stability and future profitability of the industry is necessary. The opinion of Santos-Pedro is that the expedition cruising market will support constructions and conversions:

> new ventures in the North and South will fill order books for specialized ships despite the surplus of ice-capable ships in Russia... The popularity of passenger ship excursions to exotic places is seeing construction of new purpose built vessels and conversions (Santos-Pedro n.d. p. 2).

The high demand for vessels is supported by the re-entry into the market of a number of vessels after major or minor refits. Many of the ex-Soviet research vessels have been converted to passenger use in the 1990s, including large icebreakers. The former *Alla Tarasova* underwent a major conversion and modernisation in 1997 to become the *Clipper Adventurer* (Slater & Basch 1997, Clipper Cruise Line 1997). Supporting the argument that there are sufficient vessels is the large list of past vessels used. At least 42 vessels have been used for tourism in the Antarctic (section 2.3.1) and while some are no longer exist or are regarded as suitable, some are likely to still be available.

Some Antarctic tourism ships are owned by the operating companies or by associated companies. Others are chartered from owners (such as most Russian vessels presently in use). In some cases, a ship operating company exists between the ship owner and the tourism operator, responsible for the operations of the vessel (see Quark Expeditions 1997, p. 6 for example).

Flag states are an important issue. As discussed in the literature review, the flag state of a ship has implications for any regulatory system in Antarctica. Many ships use a flag state other than the home country of the operator or owner, because such flag states offer terms more favourable to ship owners than other nations. The issue of 'flags of convenience' is a complex one in international maritime law, beyond the ambit of this research. International cruise vessels commonly use a flag state other than the country of origin of their operating company. Popular flag states are Panama, Honduras, Liberia and the Bahamas (Vidas 1996). The Russian vessels in the Antarctic tourism fleet are registered in Russia, while the majority of other vessels are registered in Panama, Liberia or the Bahamas.

Sub-chartering arrangements are used in many cases, where an original chartering company deals with a second tourism company, allowing them to sub-charter a vessel for a voyage. Berths may also be sold or booked by one company on the voyages of another companies' vessel. This may be done for individual berths or as a block (where the second company will commit to selling a proportion of all berths on the vessel). These arrangements (subcharters and cross-booking of berths) are reported in the IAATO / NSF compilations of information (NSF 1997, for example).

Another issue relating to ships is that of technological change. The use of icebreakers proper has significantly changed access to sites and entire regions of the Antarctic. Ice capable and icebreaking ship design is still progressing. The shipyards responsible for construction of much of the Soviet arctic fleet, Kvaerner Masa-Yards (formerly Wärtsilä) in Finland, have developed new technologies for icebreakers and ice strengthened vessels that could enhance safety, passenger comfort, and vessel efficiency, and increase access to a range of areas (Kvaerner Masa-Yards 1998). Newly built expedition cruising vessels, if it is economically sensible to take advantage of these developments, may have a range of enhanced capabilities that could alter the practices of Antarctic cruising.

2.3.2 SHIP AND SHIP TO SHORE OPERATIONS

2.3.2.a Ice navigation

Ice navigation is an important consideration in Antarctic tourism. Regular calls for operators to use vessels appropriate to ice conditions have been made within the ATS. Most operators use ice strengthened vessels. Smith (1994) notes that while some vessels are not ice strengthened, passenger (and vessel) risk was minimal as such vessels stay out of the ice. It should be noted that there is no present regulation for ice navigation.

Ships are surveyed and classified by classification societies (IACS 1999). These societies (there are ten) each have an ice classification system, which rates the capability of vessels to operate in sea ice. An in-depth examination of classification requirements is not appropriate here, but in brief, ice classes are based on the distance between structural frames, thickness of plates and frames, grade of steel, engine power, and strength of shaft, propeller and rudder (Brune 1992). Other measures to provide greater safety and environmental protection for ships in ice include propeller and rudder protection, tank placement, and double hulls (these measures are not at present included in the classification systems) (Brune 1992). Some ships in the industry have higher level ice classifications, including full icebreaker class.

Ice navigation regulation systems exist in the Arctic—the Baltic, Russian Arctic coastal waters, and Canadian Arctic waters (Santos-Pedro n.d.). This is not the case in the Antarctic. In the Treaty area 'there are no requirements regarding ship structural capability or crew training. The ships themselves will have an oil spill response plan but there is no indication of matching shore emergency response facilities' (Santos-Pedro n.d., p. 5). The regime applying to shipping (with respect to pollution) in the Antarctic is described in more detail in section 4.2.

Canada uses a table of equivalencies that compare the ice classes of the 10 different societies, used to administer a system of Shipping Safety Control Zones. The Canadian system defines 10 classes of icebreaker (Arctic class 1 through to10), and five types of ice strengthened vessels (Type A through to E, the strongest being A). The fleet of vessels involved in the Antarctic tourism industry is largely composed of ice strengthened vessels. Most regularly used ships appear to be Type A or Type B under the Canadian table of equivalencies. At present only one ship in regular use in the Antarctic tourism industry is an icebreaker proper.

Brune (1992) proposed an Antarctic ice traffic system with zones defined on maps, and dates, specifying where different classes of ships should be allowed to operate. Brune's scheme has no standing in the ATS or in maritime regulation, and is used here as a guide to general ice conditions. The present use of the western side of the Antarctic Peninsula by the tourism industry is consistent with Brune's system. The Ross Sea region is not recommended by Brune for ships less than Canadian Type A, B or C. The vessels known to regularly visit this area are within Brune's recommendations, although one regular visitor may be of Type D. Other more remote locations in East Antarctica and Dronning Maud Land are visited by the sole icebreaking vessel, again within the recommendations of Brune's scheme.

Antarctic operations are remote, and operations are essentially unsupported (unlike the Arctic). Ships can of course be built more strongly or with extra features for ice operations than the highest ice classifications of the societies require, without necessarily being icebreakers. The same applies to the classifications for icebreakers—features beyond those required for a certain class can be included in ship designs. Brune (1992) asserts that ships operating successfully in the Antarctic over long periods are generally built more strongly and with more safety features than the classification societies require.

2.3.2.b Ship to shore operations

The use of IRBs (often of the Zodiac brand name) with outboard motors has dramatically enhanced the visitor experience and changed the practices of the entire industry. Headland (1994b) attributes some of the increase in passenger numbers to the use of these craft, and Enzenbacher (1992a) notes that they have opened previously inaccessible areas to tourism. IRBs are fast, manoeuvrable, and powerful (generally using a 40–50 horsepower outboard), and capable of operating safely in a wide range of conditions. Depending on size they can hold 12 or more passengers and have permitted 'relatively safe and comfortable approaches and landings by tourists (including some relatively elderly ones) on otherwise inaccessible beaches' (Headland 1994b, p. 276). These craft are also suitable for close-up viewing of wildlife and for general sightseeing. Standard Operational Procedures for IRB operations are used by IAATO companies (IAATO 1997, IP108 ATCM XXI), and include aspects such as driving, operating in fog, operating around wildlife, operating in ice, operating near the ship landing platform, and beach landings (Five U.S. Organisers 1997). IAATO members also acknowledge the requirements of Rec. XVIII-1 that prohibit operation of transport in ways that disturb wildlife. Generally an IRB is used to check a landing area, before transfer of passengers begins. Passengers are loaded into IRBs from a water level platform, assisted by staff or crew, with up to 12 or 14 passengers in an IRB depending on size, water conditions and operational procedures. The landing site may have assistants to help in landing passengers. IRBs are equipped with communications and navigation equipment, radar reflectors, and first aid kits (Orient Lines 1998). One company, Orient Lines (1998) specifies the measures taken to limit disturbance to marine mammals. 50m distance is maintained from marine mammals, no chasing is allowed, and engines are slowed or shut down if mammals come closer (Orient Lines 1998, p. 25).

Helicopters are also used regularly in the industry. Some ships carry one helicopter, occasionally two are carried. Many landings in areas other than the Peninsula region are conducted using helicopters (section 2.6.3). They are used for ice reconnaissance on some voyages, finding routes through pack ice, and for passenger overflights. Often the helicopters used are provided with aircrew and support personnel on a contract basis by a specialist company. Companies generally have their own guidelines on helicopter use, Orient Lines for example does not allow its helicopter to fly below 500 feet, or within one mile of wildlife areas such as rookeries (1998, p. 25).

IAATO collates and publishes vessel call data, to assist in radio communications with tourist vessels each season. A radio schedule between ships operating in the same region is used to ensure that vessels do not arrive at sites simultaneously, in order to avoid crowding, enhance the visitor experience and perceptions of solitude, and for safety purposes (IAATO 1997, IP108 ATCM XXI, p. 2). An Emergency and Medical Evacuation Response plan has been in place since 1996, where coordination of a medical evacuation is available 24 hours each day through an office in Punta Arenas (IAATO 1996, IP76 XX ATCM, IAATO 1998, IP104 ATCM XXII).

2.3.3 MANAGEMENT OF VOYAGES AND LANDINGS

As Hall and Wouters state, 'visitor impact is greatly influenced by tour operators policies' (1995, p. 154). The practices of different operators are of great importance—Hall and Wouters refer to incidents in the past where some operators failed to provide guides, lectures, or behavioural guidelines to passengers. This section examines the situation as it has evolved since the signing of the Protocol, and describes the present manner in which operations are managed.

Much of the information for this section is sourced from IAATO contributions to ATCM meetings. Another main source are the IEEs submitted by companies to the EPA, as required by the Protocol (Five U.S. Organizers 1997, Orient Lines 1998, Quark Expeditions 1997). Some operational information is included in the IAATO bylaws for member companies (IAATO 1999, section 3.7.2). One of the objectives of IAATO is to 'coordinate activities so that no more than 100 people are ashore at any one time in any one place'. IAATO members agree to carry not more than 400 passengers per trip. The IAATO membership registration information (appended to Five U.S. Organizers 1997) informs members that they are required to have a minimum staff to passenger ratio of 1:20, and that at least 75% of the expedition staff need to have previous Antarctic experience. IAATO operating companies use field manuals, expedition leaders notebooks, or other procedural documents to ensure staff have access to information on safe operations. These documents constitute Standard Operational Procedures, and IAATO is moving to standardise procedures across its member companies (Five U.S. Organizers 1997).

Passenger activities on board ship are dependent on the facilities available, ship size, and lecture program. One regularly used vessel has a casino and regular entertainment, but most are less extravagant, with organised entertainment limited to the lecture program or occasional small musical act. Generally, while ships are in transit or cruising, passengers will attend lectures, read (most ships have libraries with Antarctic or polar subject matter), view the scenery, and observe the ocean and wildlife. The bridge is open on many ships, enhancing the feeling of participating in an expedition, providing passengers with an additional area of interest, and a warm and comfortable place for good viewing.

2.3.3.a Crew and passenger briefings

Ships have a variety of different non-passengers on board. Crew and officers have duties in operating the vessel. They are not generally involved with passengers on the larger vessels, but may be more involved in operations on some smaller vessels. Crew members are often of a different nationality to the officers, the flag state of the vessel, or the home state of the tourism operator. In some cases this means that crew are not subject to any Protocol enabling legislation, although disciplinary measures can be applied by the ship captain (Orient Lines 1997). Crew members of IAATO member companies receive mandatory conservation briefings in their own languages, as well as copies of Rec. XVIII-1. Officers, staff, crew and passengers are also given specific and formal information on the obligations imposed by the ATS (Five U.S. Organizers 1997). Vessels also have staff operating the accommodation and food services on board the ship, sometimes referred to as hotel staff. In some cases, most crew members and hotel staff do not go ashore (Orient Lines 1997, p. 11). For some operations aircrew may be present. Operating staff of the voyage or expedition, include expedition leaders and deputies, lecturing staff, guides, and IRB drivers. Multi-skilling is common, and many staff fill several of these roles. Generally, the expedition leader is responsible for management of all operations, although ship captains are ultimately responsible for ship use and ship safety. Normally expedition staff answer to the expedition leader, while crew and officers answer to the ship captain. On some occasions observers are placed on board by ATPs (section 4.8). They are generally treated as expedition staff, and often are involved in lecturing and guiding duties.

Passengers are given formal briefings on the requirements of domestic law and the ATS, and provided with copies of ATS Rec. XVIII-1 (Five U.S. Organizers 1997). Passenger packages used by IAATO members include information on safety and conservation, and an Antarctic Primer. A slide presentation reinforces Rec. XVIII-1, and an NSF video is used to brief passengers. A mandatory safety and conservation briefing is attended at the beginning of the voyage. The lecture programs also reinforce sound environmental practices (Five U.S. Organizers 1997).

2.3.3.b Landing management

Landing management practices outlined here are as used by IAATO companies (from Five U.S. Organizers 1997). The operator Orient Lines follows similar management practices (Orient Lines 1997, 1998)—where they differ significantly, they will be specified.

Prior to a landing, a reconnaissance is made to check conditions for landing passengers, to examine environmental conditions, such as wildlife presence, that may affect landings, and to determine if landings can be made safely and with a minimal environmental impact. Expedition staff are landed to help incoming passengers, and to guide, monitor and police passenger activity on shore. Passengers are briefed on the specifics of the landing site and any things they need to do or avoid. Before leaving, passengers turn a tag or use an electronic card to show they have left the ship, and use a boot washing station (Five U.S. Organizers 1997).

On landing, passengers are given a shore briefing, including suggested routes and areas to avoid (Five U.S. Organizers 1997). On shore, passengers observe and photograph wildlife and scenery, and other features. Passengers observe buildings if present, but do not enter unless invited to do so. Staff conduct supervised walks, or are positioned to provide interpretation or ensure passengers avoid sensitive features. Numbers are managed so that there are no more than 100 people on shore at any one time (Five U.S. Organizers 1997). IRB drivers continue to deliver and remove passengers if larger numbers are involved, or stand by to remove passengers. Typical landings for 90 passengers last for around 3 hours if good conditions prevail, with most passengers spending an hour or less ashore, with some remaining for the maximum length of time (Five U.S. Organizers 1997). Enzenbacher (1995a) found the average landing duration to be 3¼ hours. Staff to passenger ratios ashore are maintained at 1:15–20 (Five U.S. Organizers 1997). *Marco Polo*, operated by Orient Lines, not an IAATO member, lands around 500 passengers, but chooses sites where they consider this acceptable, and never has more than 100 people ashore at once (Orient Lines 1997).

Passengers remain in sight of staff while on shore. Special precautions may be used, such as limiting the numbers of passengers on shore at particular sites if the site lacks sufficient space to readily avoid wildlife or vegetation areas. According to IAATO, some passenger groups may require more supervision than others, which is taken into account in managing landings (Five U.S. Organizers 1997).

Both IAATO member companies and Orient Lines participate in the Expedition Record and Site Visit Record processes being developed by the ATS and industry, in accordance with Rec. 3 of ATCM XXI, 1997. A post visit report is completed for each site visit, and site visit reports with sketch maps and preliminary environmental surveys are carried out, with IAATO reporting that it was developing a standard site survey report (1997, IP108 ATCM XXI).

Operators provide stations with advance notice of a visit. Visits are re-confirmed at least 72 hours before the visit is to take place by direct contact with the station. Some stations limit the number of visits allowed during the season, and ensure that tourist ships do not arrive during a re-supply visit or other critical time. The NSF arranges a timetable of US station visits with the industry through the IAATO / NSF annual meetings (IAATO 1998).

A number of special operational practices are described by Orient Lines for the larger vessel in regular use. Sites that are too constricted for landings, or where the larger vessel is unable to approach closely are avoided. Areas visited are familiar to ships officers and well charted. New areas (previously unvisited by *Marco Polo*) are not visited (to minimise the risk of running aground)—a departure from the expedition cruising model. Some cruise staff (in addition to expedition staff) are used on shore to assist expedition staff, or are positioned to ensure passengers do not go beyond particular points. On shore, a staff to passenger ratio of 1:15 is maintained. Passengers are kept within defined boundaries for each landing site, and behaviour around wildlife is monitored by staff. Orient Lines generally limits the time spent ashore by passengers to around 45 minutes or an hour. Breeding birds other than penguins are noted by staff, and passengers are supervised to ensure that 'passengers treat these species with the same respect that they accord the penguins' (Orient Lines 1998, p. 26). Expedition staff act as 'policemen', ensuring compliance with Rec. XVIII-1, act as guides, conduct interpretation activities, monitor passengers to prevent souveniring, and collect litter if any is left (Orient Lines 1998).

Landings and shore management practices of operators have been the subject of study by Enzenbacher (1995a) and P. Davis (1995b). Both noted some contraventions of visitor guidelines (see section 3.1 for a brief summary).

2.3.4 ENVIRONMENTAL ASPECTS OF OPERATIONS

2.3.4.a Prevention of oil pollution

Antarctic tourism vessels do not need to refuel or transfer fuel in the Treaty area. The Protocol requires ATPs to ensure ships travelling into the Treaty area are equipped with sufficient tank capacity to store sludge, dirty ballast water, tank washing water and oil residues and mixtures. All vessels are required by MARPOL 73/78 Annex 1 to have a Shipboard Oil Pollution Emergency Plan (SOPEP). The SOPEPs of IAATO vessels are being tailored to suit the requirements of the Protocol Annex IV (IAATO 1997, IP108 ATCM XXI). IAATO has a sub-committee on Oil Spill Prevention and Response which is examining issues such as: standard use of light, non-persistent fuels (which many vessels already use); and standardising requirements for navigation experience of ship officers. The sub-committee is considering a draft 'Special Antarctic Appendix' for IAATO ship SOPEPs that will cover planning, practical response actions, reporting, and post-spill monitoring (IAATO 1997, IP108 ATCM XXI). The sub-committee was also considering absorbent mats suitable for refuelling purposes; coordination of a multi-vessel response to a spill, pooling equipment and support, use of a central coordinating office; recommendations for additional ship-board response equipment, and the possibility of storing supplementary equipment (either at an agreed Antarctic location or in Punta Arenas ready for air delivery). Personnel training and emergency preparedness training, reporting of incidents to relevant and affected parties, and legal issues relating to marine pollution were being examined (IAATO 1998, IP104 ATCM XXII).

2.3.4.b Waste management

Compliance with the Protocol and MARPOL 73/78 waste management provisions (section 4.2) are described by operators in their environmental assessments. Generally speaking, solid garbage is stored for return to port. Incineration of dry garbage is permitted and is carried out by some tourist ships, with ash returned to port (Quark Expeditions 1997, Orient Lines 1998). Plastics and hazardous wastes are collected and returned to port. Disposal of organic wastes and sewage is in accordance with the Protocol.

2.3.4.c Preventing the introduction of alien species

Vessels of IAATO member companies and Orient Lines do not discharge in the Treaty area ballast water taken on north of 60° S, and IAATO vessels follow the '*International Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ship's Ballast Water and Sediment Discharges*' (Five U.S. Operators 1997, Orient Lines 1998). Boot washing stations are used on all IAATO vessels, with passengers required to clean boots before and after each landing. This is intended to remove soils and seeds from footwear, and thus prevent transfer between Antarctic locations, or to Antarctic locations (IAATO 1997, IP108 ATCM XXI).

2.3.5 INCIDENTS AND ACCIDENTS

The ship based Antarctic tourism industry has been largely free from accidents or incidents. Known incidents can provide an indication of the likelihood and nature of future incidents. Blame for the infamous *Bahia Paraiso* incident is regularly attributed to tourism, and an examination of this incident is therefore instructive.

In January 1989, the *Bahia Paraiso*, an Argentine naval ship carrying 81 paying passengers (mostly American and European), in addition to crew and station personnel, ran aground (Antarctic 1989a, 1989b, *Polar Record* 1989, Stonehouse & Crosbie 1995, Stonehouse 1992a, Enzenbacher 1992a, Smith 1994, Headland 1994b). The vessel was on a resupply voyage of Argentina's Esperanza station, as well as providing a tourism experience. The vessel had made an unscheduled visit to Palmer Station (US) on Anvers Island, in the Peninsula region, and ran aground on shoals or reefs sustaining severe damage (Antarctic 1989a, 1989b, *Polar Record* 1989, Stonehouse 1992a, 1994a). Pineschi (1992) states that the accident was directly caused by the ship going too close to the coast, in order to give tourists a better view of wildlife (p. 180), although this is not referred to in other documents examined. Passengers and crew were evacuated and taken to Palmer Station, where they were collected by two tourist vessels (*Society Explorer* and *Illyria*) and other ships being used by national operators, to relieve the situation at Palmer. They were then taken to Teniente Rodolfo Marsh Station (Chile) in the South Shetland Islands and flown to Punta Arenas by the Chilean airforce (Antarctic 1989a, Stonehouse 1992a). Remaining crew were evacuated by another ship after five days. Currents and tides refloated the ship, which drifted to a location close to the station, and sank in shallow water with some of the port side of the vessel remaining visible above sea level, and significant leakage of oil occurring (Antarctic 1989a). Pollutants on board included 200 000 US gallons of diesel, 21 000 gallons of aviation fuel, 18 000 gallons of lubricating oil, drummed fuel and compressed gases (Antarctic 1989a). Oil-spill control equipment from various sources was brought to the scene by Argentine vessels (*Polar Record* 1989, Antarctic 1989a), and 1000 gallons of fuel was skimmed from the surface, with around 16 000 gallons removed from the vessel, and 67 000 gallons remaining. The total spill was between 125 000 and 150 000 gallons, with much evaporating, dissolving, dispersing or being photo-oxidised (although some reports disagree on this point) (Antarctic 1989a). According to *Polar Record* (1990), oil evaporated, was diluted, or drifted from the area, with limited microbial oxidation, photo-oxidation or biological uptake. A slick of oil around 100km² covered the sea near the station (*Polar Record* 1990). The intertidal zone was contaminated for several weeks, and algal and limpet populations were drastically reduced, penguins and cormorants suffered oiling, and skuas and cormorants suffered breeding losses.

Other incidents have occurred with tourism vessels, all minor in nature. Enzenbacher (1995a) provides a list of air and ship incidents from 1967 through to 1993. White (1994) reports on two groundings of the same tourist vessel, and media reports occasionally mention damage due to ice or grounding. Rubin (1996) reports on a grounding of a passenger vessel in 1972, with 90 passengers evacuated by the Chilean Navy, and the ship refloated with the help of a tug 18 days later. Headland (1994b) notes that, while no tourism ship accidents have been fatal, they occur every few years, and have done so since 1967. Reich (1980) also provides brief details of ship incidents, including cases of passengers being stranded ashore.

2.3.6 OPERATIONS OUTSIDE THE PENINSULA REGION

The operations of the icebreaker *Kapitan Khlebnikov* by Quark Expeditions in the East Antarctic region (the only tourist vessel at present to have visited areas of East Antarctica other than the Commonwealth Bay region) deserve special consideration. The vessel allows tourists to visit emperor penguin rookeries, not normally accessible. Helicopters are used more frequently for landings, and attraction areas are generally different to those in the Peninsula region. The normal operational procedures of IAATO companies are followed (Quark Expeditions 1997). While IRB landings are preferred, helicopters are used for ice reconnaissance, passenger flightseeing, and landings. As with other equipment, helicopters are inspected and cleaned to prevent biotic contamination. Detailed helicopter guidelines cover cleaning, passenger management, flights over water or pack ice, and operations around wildlife (Quark Expeditions 1997). According to the 1997 document, helicopters fly above 500m, do not overfly bird colonies or other wildlife concentrations under 500m, and side approach distances of more than 1 km maintained (Quark Expeditions 1997). Landings at emperor penguin rookeries are made no less than 1km from the site of the rookery. Direct walking from the vessel onto sea ice is also possible with the *Kapitan Khlebnikov*, and occurs in ideal conditions.

A small number of vessels also visit the Ross Sea area. Of particular interest in this area are the historic sites associated with the early 20th century expeditions. Visits to historic huts and sites in the Ross Sea region are overseen by observers from Antarctica NZ according to the *Guidelines and procedures for visitors to the Ross Sea Region* (Ministry of Foreign Affairs and Trade 1997). Four historic sites have been declared Specially Protected Areas (numbers 27, 28, 25 and 29), with management plans approved by the XXIst and XXIInd ATCMs. Numerical limits have been placed on the number of visitors allowed inside the huts at any one time, and on the total number of visitors annually to these huts. The management plans for these areas are discussed in more detail in section 4.7. Another area visited by tourists more recently (beginning in 1993) is the Dry Valleys cold desert region in the Transantarctic Mountains, near McMurdo Sound. These three valleys, left by retreating glaciers, are unique geologically and biologically, and have very high scientific values. Visits have all been from the *Kapitan Khlebnikov*, using helicopters and are conducted in accordance with an *'Environmental code of conduct in the McMurdo Dry Valleys'*. NSF provides maps and recommends landing sites. Landings are made after an extensive briefing, and landings are of 1–4 hour duration (Quark Expeditions 1997).

2.4 AIRBORNE TOURISM

The major proportion of Antarctic tourism is ship based. Airborne tourism has occurred since the beginning of tourist activity, although only overflights have occurred on a large scale. An examination of airborne activity is important because of the nature of the operations undertaken, the precedent it represents, the peculiarities of impact and regulation it raises, and the potential that this form of tourism has for future developments.

The progress of airborne tourism in Antarctica has been chronicled by Swithinbank in a number of articles and notes, and by Stonehouse and Crosbie (1995), Enzenbacher (1992b), Reich (1980), Headland (1994b), Wace (1990), Kriwoken (1995). General Antarctic aviation is described by Mellor (1993) and Mellor and Swithinbank (1989). While ships offer certain advantages there are significant disadvantages, including time required and discomfort for passengers. Air transport facilitates entirely different experiences, and has significant implications for tourism regulation. If operators choose to develop more substantial air links the ATS will be faced with a scenario that it has, at present, no plan for dealing with and little capacity for managing. It is therefore important to assess the feasibility and likelihood of air transport opening more tourism options.

2.4.1 OPERATIONS LANDING TOURISTS

The operations of ANI form the major component of airborne tourism currently operating, and are discussed separately in section 2.4.2. Reich (1980) provides details of early flights landing tourists. The first was in 1957, when a Pan American Stratocruiser landed at McMurdo Sound, on a commercial tourism visit. No flights were approved for the next 11 years despite requests to the US government, and the next tourist flight landed at McMurdo and then flew over the south geographic pole in 1968 (Reich 1980).

Apart from these early flights to McMurdo, the only conventional runway that has been open to private or commercial use is the one at Presidente Frei Station (also known as Teniente Rodolfo Marsh) (Swithinbank 1993a). Tourists have been carried there by Fuerza Aérea de Chile (FACH) on an irregular basis, starting in 1982 with a fly cruise connection, aborted after two weeks of operation because of the need for reliable timing of flights, which was considered impossible (Swithinbank 1993a). P. Davis (1995b) also provides some information on this episode, and Headland (1994b) notes that in addition to the Chilean attempt, Argentina also had used aircraft to transfer tourists to vessels. Air New Zealand investigated the possibility of landing flights at McMurdo to transfer passengers to a floating hotel or ship but plans were shelved (Reich 1980, Stonehouse 1994a). Flights landing tourists for a short stay (a few hours to a few days) at Presidente Frei began in 1983 with Linea Aérea Aéropetrel and continued with FACH in 1984 (200 passengers during the season). The visitors stayed at the base in a Chilean Government military barracks converted and operated as a hotel, called the Hotel Estrella Polar (Polar Star Hotel), and helicopters were used to ferry tourists to ships and other sites in the South Shetland Islands (Swithinbank 1993a, Wace 1990, Stonehouse 1994a, Enzenbacher 1992b, 1994a, Smith 1994, Headland 1994b, White 1994). The hotel was capable of accommodating up to 80 people (HRSCERA 1989). Such flights continued intermittently (Swithinbank 1993a), but in 1992 Chile halted the practice of carrying passengers on its official flights, and the hotel is no longer used (Rubin 1996, Headland 1994b). Headland (1994b) reports that a similar program of flights and accommodation was operated by the Argentine air force using the facilities of Vicecomodoro Marambio station, Seymour Island (near the tip of the Peninsula).

Other commercial air activity has occurred, not always with a tourism component. FACH has operated C-130 flights into the Patriot Hills blue ice runway (Swithinbank 1995). The Chilean company, Aérovias DAP, based in Punta Arenas, flies Twin Otter and King Air aircraft to Presidente Frei Station on a small scale but regular charter basis (Swithinbank 1997b, 1996, 1995, 1994, 1993a, 1993b, 1992b). LAN Chile made a proving flight in 1989/90 between Punta Arenas and Marsh Station on King George Island (Swithinbank 1990a). At regular intervals there are discussions of other proposed air tourism operations. An example is the 'East Antarctic Airways' proposal, involving a consortium of companies with support from national operations flying from South Africa and Australia, to supply cargo and passenger services, as well as tourist services (including transfer to vessels) (*Sunday Tasmanian* 15 March 1998, p. 1).

Some incidents have occurred with tourism and commercial operations in support of private expedition, including the crash of a DC-6B nine miles from Patriot Hills in 1993 (Kriwoken 1995, Swithinbank 1994, Rubin 1996, Enzenbacher 1994a). Swithinbank (1994) reported that there were no serious injuries, but Rubin (1996, p. 195) and Enzenbacher (1994a) stated that the crash badly injured one of the four team members on board. ANI supplied rescue services (Swithinbank 1994, Rubin 1996). In 1985 a Chilean tourist flight crashed in the South Shetland group, killing 10 people (Enzenbacher 1995a, Wace 1990). Headland (1994b) and P. Davis (1995b) place the crash on Nelson Island. Enzenbacher (1995a) and Merin (1992), in discussing Antarctic tourism incidents, report a 1991 accident where a chartered Chilean airliner (of LAN Chile) with 65 passengers on board overshot a runway at Puerto Williams, killing 20. Puerto Williams is in Chile and the link between this incident and Antarctic tourism is not clear.

2.4.2 Adventure Network International

The most significant element of airborne tourism is conducted by Adventure Network International (ANI). ANI is a Canadian company with a significant Antarctic air presence. The initial impetus for the development of private air services by ANI was the demand for climbing on Vinson Massif, the highest peak in Antarctica (4897m). In mountaineering circles, a prestigious challenge involves climbing the highest peaks on all seven continents, known as the 'seven summits' (Porzak 1995). Vinson Massif has become a desirable destination for the small group of climbers with the ability, persistence and wealth to pursue the seven summits, and remains the most popular of ANI's trips with over 450 people having reached the summit since the first visit (ANI 1998, Headland 1994b). A flight in 1983, piloted by Giles Kershaw (a famous Antarctic aviator) took six climbers from Punta Arenas to Vinson Massif, staging at Rothera, using a modified ski-wheel Douglas DC-3, in support of the first people to climb all seven summits (Swithinbank 1993a, Porzak 1995). ANI was formed after this experience, taking groups to the mountain in 1985 with a Twin Otter (DHC-6) aircraft. In order to achieve these flights, refuelling at Presidente Frei and Teniente Luis Carvajal stations was necessary, purchasing fuel from the Chilean airforce FACH and using a fuel drop placed by FACH at the destination landing site (Swithinbank 1993a, Monteath 1996, Smith 1994).

Giles Kershaw and Charles Swithinbank (a UK glaciologist) knew of blue ice areas nearby, and were contracted by ANI in 1986 to examine areas for airfield use (Swithinbank 1993a, Mellor & Swithinbank 1989, ANI 1998). The areas of interest had first been noted in 1975 by a BAS aircrew (ANI 1998). In 1986 a Twin Otter was landed at two sites, and one was surveyed for surface slope and roughness. This site was at Patriot Hills, in the Heritage

Range (80°19'S, 81°16'W, 100m altitude) (Swithinbank 1993a, Mellor & Swithinbank 1989). In 1987, two Twin Otters were flown to the site to provide support and for use between Patriot Hills and Vinson Massif, and a Douglas DC-4 was flown from Punta Arenas and made the first landing of a conventional wheeled aircraft on an unprepared blue ice runway. Operations have grown since then. The use of DC-6B aircraft commenced in 1989, then a Hercules L-382G in 1993. The Hercules, being pressurised, allows higher altitude flying, above poor weather, and therefore offers more predicability of schedule (as well as having a greater payload) (Monteath 1996). At present, ANI uses leased aircraft (Hercules from South African companies, and Twin Otters from Canadian companies) and owns a ski-wheel Cessna 185 that is permanently based at Patriot Hills.

An independent subsidiary of ANI called Polar Logistics recently began to operate a Hercules service from South Africa to a blue ice runway (Blue One) at Holtedahlfjella in Dronning Maud Land. Images of this spectacular area appeared in National Geographic Magazine article documenting a climb supported by ANI (Krakauer 1998) and it would seem likely that the area will grow in popularity. The main intention of the link is to service the seven stations in the area, as well as provide tourism and expedition support (Swithinbank 1997a). Flights from Cape Town to Holtedahlfjella do not have any intermediate landing sites, and the round trip is 8500km, meaning that the Hercules aircraft must land to refuel (being unable to return to Cape Town). Three alternative landing sites in the area have been surveyed to allow flight diversions in the case of poor weather (Swithinbank 1997a). ANI has used tourist vessels to place fuel depots in areas around the continental margin, developing the capacity to reach areas further afield (Monteath 1996).

2.4.2.a Development of ANI

Table 2.6 summarises the development of ANI, and chronicles the growth of their Antarctic operations from the small scale climbing support in the 1980s through to the relatively large numbers and comprehensive scope of operations at present.

2.4.2.b Land based facilities

ANI uses a tent camp on snow at Patriot Hills near the blue ice runway (IAATO 1994, IP23, ATCM XVIII). The camp can accommodate 70 people, and is the only regularly used nongovernmental land based facility on the continent (ANI 1998). The camp consists of a kitchen and dining area, and accommodation tents. Showers are not provided. Power is provided by a wind generator and solar panels, with three backup generators. Communications include radio satellite telephone and fax. A doctor is on-site all season and basic medical facilities are available (ANI 1989). The camp is closed, dismantled and cached at the end of each season (Swithinbank 1992b). A hanger / storeroom excavated from the snow shelters the Cessna over winter (Swithinbank 1993b).

A climbing base camp at the foot of Vinson Massif is maintained by ANI (Swithinbank 1993b, 1995). On the other side of the continent, Polar Logistics maintains a camp at Holtedahlfjella for reception of visitors, weather reporting, and flight following. It includes a doctor, and a Twin Otter is based there for the season to provide local transport (Swithinbank 1997a).

Table 2.6: ANI and Polar Logistics activities and other use of Patriot Hills
(from Swithinbank 1993b, 1994, 1995, 1996, 1997a, 1997b, 1998)

1985	ANI formed. Flights to Vinson Massif.
1986	Potential blue ice landing sites near Vinson Massif, Patriot Hills surveyed.
1987	Landing of DC-4 on blue ice at Patriot Hills, the first landing of a conventional wheeled aircraft on Antarctic blue ice.
1988/89	15 intercontinental flights with 66 passengers, 32 passengers to south pole via Twin Otter, support of south pole ski traverse.
1989/90	9 month flying season, 12 DC-6 intercontinental flights, 100 passengers, use of ski-wheel Cessna 185, support of 2 private expeditions.
1990/91	11 intercontinental flights, 105 passengers, 29 climbers to Vinson Massif, support of 1 private and 1 scientific expedition.
1991/92	10 intercontinental flights, 88 passengers. Support of 2 private and 1 scientific expedition. 26 climbers to Vinson Massif, 11 to pole, first visit to Dawson-Lambton Glacier emperor penguin rookery. Formation of Polar Logistics.
1992/93	Snow hanger excavated, 12 intercontinental flights, 84 passengers, 12 skied to pole, 15 flew to pole, 16 to emperor rookery, 49 climbers to Vinson Massif. Damaged Turbine Otter from 1991/92 crashed on take off, wreckage dismantled and removed at ANI expense. Support of 4 private expeditions.
1993/94	First landing of Hercules, 11 intercontinental flights, 69 people, 30 climbers, 29 flew to pole, 5 to emperor colony. Three landings at Patriot Hills by NSF LC-130. DC-6B crash near Patriot Hills. ANI rescue and return to Punta Arenas. Support for 1 private and 1 scientific expedition.
1994/95	13 intercontinental flights, 104 passengers, 24 to south pole, six to emperor colony, 35 climbers. Support for 5 private expeditions. Five FACH C-130 landings at Patriot Hills. ANI support of climbing expedition to Transantarctic mountains.
1995/96	10 intercontinental flights with 169 passengers, 11 with fuel. Support of 9 private expeditions. 15 to Patriot Hills, 58 to the south pole, 6 to the emperor colony, and 53 climbers. Twin Otter to Dronning Maud Land finds potential blue ice runway.
1996/97	11 intercontinental flights with 110 passengers, 5 with fuel. Support of 7 private expeditions. 16 to pole, 6 to emperor colony, 43 climbers. Polar Logistics conducted a Proving flight by Polar Logistics to Holtedahlfjella blue ice site ('Blue One'), supporting 2 private expeditions in Dronning Maud Land, with cargo, mail and passengers for government stations.
1997/98	8 intercontinental flights with 131 passengers, 10 with fuel. Support of 4 private expeditions. 29 to pole, 3 to emperor colony, 69 climbers, and 23 to Patriot Hills. 34 national operation personnel to 'Blue One' in 2 flights from Cape Town.

2.4.2.c *Safety and Environmental Policy*

The small numbers involved, and the mobility and cargo handling capacity of their operation allows ANI to remove all waste from the continent. The transport of aviation fuel for Twin Otter and Cessna aircraft means that significant cargo capacity is available on return flights. ANI provides an environmental policy and operational guidelines to clients, and makes clear client responsibilities. The environmental policy is as follows:

1. All human waste (i.e. solid and liquid sewage) is removed from Antarctica;
2. All putrescible organic waste (i.e. domestic solid kitchen waste) is removed from Antarctica;
3. Sullage (i.e. grey water from the kitchen, and shower) is disposed of in Antarctica;
4. All solid waste (i.e. cans, bottles, aluminium, plastic) is removed from Antarctica;
5. All hazardous domestic waste (i.e. batteries, aerosol cans, paints and solvents) is removed from Antarctica;
6. Other hazardous waste (i.e. fuel and gas bottles) is removed from Antarctica;
7. No incineration takes place;
8. Fuel drums (i.e. all fuel drums are inventoried to avoid loss and either re-used or removed from Antarctica);
9. Spill kits are used at all times by aircraft and vehicles while refuelling is in progress (ANI 1998).

The same policy is maintained on the ANI guided climbs on Vinson Massif, including the removal of human waste. The ANI policy and operational guidelines (which apply to ANI and to their contractors) are also publicly available. These can be summarised as follows:

1. Understand the relevant provisions of the Protocol and comply with these wherever practicable, regardless of whether their own country has issued enabling legislation. Ensure staff and clients are briefed on those provisions affecting them.
2. Operate in such a way that maximum safety and minimum environmental impact is assured.
3. Establish policies and emergency procedures applying to all reasonably foreseeable incidents and unplanned events.
4. Provide pilots, guides and support personnel with adequate training and experience in Antarctica to cope with conditions, problems and foreseeable emergencies.
5. Arrange back-up aircraft to be available for all activities.
6. Verify all participants are physically capable for physiological, topographic and climatic rigours to be encountered.
7. Maintain regular radio contact with aircraft, parties, and field bases (including a listening watch while aircraft are airborne), and between the field base and outside world.
8. Provide all aircraft with survival equipment and emergency supplies to support crew and passengers for at least 2 weeks.
9. Establish and maintain sufficient fuel in caches to allow medical evacuation of personnel.
10. Establish and maintain caches of camping equipment, food, cooking fuel and medical supplies to allow all to survive in the field for at least 30 days without resupply.
11. Maintain a close working relationship with aeronautical civil and military authorities, search and rescue, meteorological reports, and contact with other air operators.
12. Keep all aircraft available at all times to respond to an emergency in Antarctica.
13. Operate aircraft such that populations of birds and seals are not subjected to stress, including not landing, taking off, low flying or air dropping within 1500m of breeding colonies.
14. Taking all reasonable precautions that fuel does not leak from caches or spill during re-fuelling, and marking fuel caches in areas of accumulation or glacier movement to ensure they can be recovered.
15. Remove from Antarctica for sanitary disposal all refuse. Wherever feasible and consistent with associated environmental impact, collect and remove refuse generated by field parties including empty fuel drums etc. (ANI 1998)

ANI also commissioned an independent IEE, which was presented to ATCM XVIII (ANI 1998, IAATO 1994, IP23 ATCM XVIII, Kriwoken 1995). The IEE (prepared by Poles Apart consultants) describes the known and predicted environmental impacts of the operations of ANI, including impacts from their camps, air operations (including fuel spill likelihood and emissions) and impacts on wilderness and aesthetic values. Table 2.7 lists predicted impacts of operations both those that are mitigated by operational practices, and those that are unavoidable. Table 2.7 condenses information from the IEE and should be regarded as a guide only to the types of impacts likely to be involved in air based tourism operations. ANI complies with the mitigation measures in the IEE, and as the IEE is dated, changes to operations may have occurred. A preliminary environmental evaluation was conducted for the Dronning Maud Land operations of Polar Logistics (IAATO 1997, IP75 ATCM XXI).

ANI acts as the emergency contact station for IAATO member vessels in the Antarctic Peninsula region, coordinating medical evacuations (IAATO 1997, IP75 ATCM XXI). ANI was also a founding member of IAATO, but is no longer listed as a member on the IAATO website and appears to have withdrawn from the organisation.

Table 2.7: Predicted or potential impacts of ANI activities
(from IAATO 1994, IP23 ATCM XVIII)

Nature of impact	Possible causes	Significance	Mitigation
Fuel spill	Refuelling, fuel storage	Medium	use of spill containers and mats
Disturbance or compaction of ice and snow	Ice hanger, snowmobile and sled use, snow caves	low / medium	concentrate area affected, remove on decommissioning
Change of ice/snow composition	Camp sullage (grey water) Patriot Hills and Vinson Massif	medium / low	use of grease trap
Reduction of wilderness value	Operation of Patriot Hills and Vinson Massif camps, aircraft operation, visits to sites	negligible / low / medium	concentrate camp areas, concentration of visits, no mitigation possible for aircraft operation
Introduction of non-indigenous species to ice-free areas	Access to ice free areas near patriot Hills, Access to emperor colony	low / unknown	cleaning of equipment, limiting access, banning poultry products on visits to bird colonies
Emissions	Generators at camps, aircraft operations	low	None

The importance of the ANI landings and subsequent activities should not be underestimated, for as Swithinbank stated 'it was clear that no government would commit transport aircraft to landing on icefields until the concept was proven' (Krakauer 1998, p. 61). The blue ice runway at Patriot Hills has been operated for more than a decade with minimal maintenance requirements (IAATO 1994, IP23 ATCM XVIII, p. 4). Importantly, 'construction and maintenance costs are almost nil' (Swithinbank 1993a).

2.4.2.d ANI tourist experience

ANI offers a range of tourism experiences, from what can be characterised as soft adventure, through guided mountaineering to support of self-reliant expeditions. Using Patriot Hills as a base, ANI markets a number of programs, divided into general Antarctic experiences, climbing programs, emperor penguin colony visits, south pole visits, and expedition support (ANI 1998—the following descriptions of programs are derived from this reference, and prices are as at 1998).

The general Antarctic programs have two options. The 'Heart of Antarctica' program offers visitors the chance to travel to Patriot Hills and participate in guided activities in the local area, including overnight camping, and walking and climbing treks, and local flights in the Cessna ($US11 750). The 'Ellesworth Mountains' option includes cross country skiing and investigating the Ellesworth Mountains area ($US14 500). Climbing programs include the popular Vinson Massif climb, with climbing support, base camp, and communications ($US25 750). The second area of climbing operations, Dronning Maud Land, is well described by Krakauer (1998), and by ANI, where 'mighty rock pillars and jagged spires rise from the smooth white landscape' (ANI 1998). The cost of the Dronning Maud Land program in 1998 was $US22 750. The other area of climbing operations being developed by ANI is in the Transantarctic mountain range, with support for first ascents in the Queen Maud section of the Transantarctic Mountains, and other peaks unclimbed and unnamed. All of the climbing programs require quite high levels of experience from clients. Emperor penguin visits were commenced in 1990, to a colony on the Dawson-Lambton glacier on the Weddell Sea (4000–5000 breeding pairs). The visits are aimed at photographers and enthusiasts, and offer an alternative to the long voyages required to see similar colonies from ships. The visits involve a number of days at the colony in a tent camp, include the services of an ornithologist, and cost $US21 750. South pole programs involve flights to Patriot Hills with onward flights to the pole in a Twin Otter or Cessna ($US22 750). ANI also supports most of the private expeditions in Antarctica, and acts as a safety backup for many private expeditions. Since 1989 most private expeditions have used aircraft rather than ships to access the continent. White (1994) noted that the average cost per person for expedition support was around US$100 000.

From table 2.8, it can be seen that the Vinson Massif climbs are consistently popular. The emperor colony visits, with 16 in 1992/93 have remained significantly lower (six or less) since then. The advantages of airborne visits (more time at the colony, less travel time, and potentially less travel discomfort) may be outweighed by the attractions of shore cruising, multiple site visits, and personal comfort available on ship tours that visit similar colonies. The number of south pole visitors has fluctuated, with a high of 58 and a low of 15, but is generally high. Where reported, reasonably large numbers of people appear content to experience Antarctica from the Patriot Hills area, without feeling it necessary to visit the pole or other destinations.

Table 2.8: Reported ANI client numbers participating in different Patriot Hills programs over six seasons

(from Swithinbank 1993b, 1994, 1995, 1996, 1997b, 1998, IAATO 1994, IP23 ATCM XVIII).

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Total	**84**	**69**	**104**	**169**	**110**	**131**
South pole	15	29	24	58	16	29
Emperor Colony	16	5	6	6	6	3
Vinson Massif	49	30	35	53	43	69
Patriot Hills	12	n/a	n/a	15	n/a	23
Private expeditioners (manhauling, skiing etc.)	10	n/a	36	18	15	9

2.4.2.e *Incidents*

ANI has a very good operational and safety record. In 1998 more than 100 intercontinental flights had been completed, carrying more than 800 passengers to Antarctica. There have been more than 3000 hours logged in Twin Otter aircraft, and 400 hours for the Cessna, with a total distance over Antarctica of more than one million miles, without significant accidents (ANI 1998). Some incidents have occurred that highlight the dangers of such operations. In 1991/92 a leased Turbine Otter being used by ANI was damaged, and subsequently crashed on takeoff from Patriot Hills in 1992/93 when being flown out under an insurance salvage contract. No one was injured and ANI dismantled and returned the wreckage to Punta Arenas at their expense (Swithinbank 1993b).

In December 1997 a skydiving accident killed three people at the south pole. ANI had flown the skydivers to the pole and they had jumped from an ANI Twin Otter. Reports in the media and from sources at the South Pole base reported that the jump occurred from 18 000 feet, with the pole at an altitude of 9500 feet, making the jump 8000 feet above the surface. Three of four skydivers were killed. ANI, with the help of personnel from South Pole station recovered the bodies and flew them and the survivors to Patriot Hills and then to Punta Arenas. Conditions for jumping were reportedly good. IAATO (IAATO 1998, IP86 ATCM XXII) reported that the Chilean authorities and ANI were preparing an incident report.

A report in *The Sydney Morning Herald* (Hills 1991), described problems in 1991 with air transport to Patriot Hills of media crews covering the International Trans-Antarctic Expedition, including stranding media crews at Patriot Hills for 17 days. The article also indicated that the International Trans-Antarctic Expedition was forced to buy fuel from a Russian fuel dump to allow the expedition support activities to continue, although Monteath (1996, p. 193) describes the incident in more positive terms, stating that 'by providing aircraft fuel at the South Pole, the Soviets made it possible for an ANI Twin Otter to bring in supplies at the crucial mid-point of the expedition'. *The Sydney Morning Herald* report, while sensationalised, suggests that the realities of Antarctic private aviation include incidents that are generally unreported in the tourism (and ATS) literature.

2.4.3 OVERFLIGHTS

Overflights (sightseeing flights with no landings), provide passengers with the opportunity to see Antarctica from the air at relatively low expense. Overflights provide spectacular viewing of mountains, ice shelves, sea ice, icebergs and research stations. At present, Qantas (an Australian airline) provides the only regular overflight service, although Swithinbank (1993a) reports rare flights by Boeing 737 aircraft operated by the Chilean LADECO airline since 1984, Stonehouse and Crosbie (1995) described flights from Chile over the Peninsula, and Wace (1990) referred to occasional flights over the Peninsula region from Punta Arenas, and more regular flights have resumed from south America (Australian Antarctic Division 1999a).

Overflights began in 1956 with a LAN Chile flight in the Peninsula area (Reich 1980), and regular overflights began in 1977 with Qantas and Air New Zealand from Australia and NZ respectively (Reich 1980, Swithinbank 1993a, Enzenbacher 1992b). Qantas Boeing 747 aircraft were first chartered by Dick Smith, an Australian entrepreneur, and Air New Zealand used Douglas DC-10 aircraft. Destinations ranged from Commonwealth Bay through to Victoria Land, and the Ross Island area. Around 40 overflights were conducted between 1977 and 1980 with a total of about 11 145 passengers carried (Reich 1980, Swithinbank 1995, Wace 1990, Stonehouse 1994a, Enzenbacher 1992b, Splettstoesser & Folks 1994). In November 1979 an Air New Zealand DC-10 flight crashed at 1467 feet (447m) on the slopes of Mt Erebus, Ross Island, with all 257 people on board killed (Reich 1980, Swithinbank 1995, Wace 1990, Stonehouse 1992a, 1994a, Stonehouse & Crosbie 1995, Enzenbacher 1992b, Splettstoesser & Folks 1994, Headland 1994b). The accident was initially ascribed to pilot error in poor visibility (Reich 1980), but subsequent accounts, most importantly that of Mahon, the coroner investigating the accident, suggest that a communication breakdown in the airline and clear air whiteout, a phenomenon generally restricted to polar regions, were to blame rather than pilot error (Mahon 1984, White 1994). Pineschi (1992) claims that the accident was directly caused by the attempt to offer tourists the closest possible sight of attractions, on the basis that the practice of descending to a low altitude was the main factor contributing to the accident. White (1994) provides details of the ensuing litigation actions, and search and rescue costs. This accident highlighted a variety of issues relating to non-government activity in Antarctica, including the lack of capacity for search and rescue and issues of allocation of responsibility (and liability) for air traffic control. Flights continued with two in December 1980, before ceasing (Codling 1992, Enzenbacher 1992b). HRSCERA (1989) reported testimony that 'interest in the overflights was already declining before the Mt Erebus air disaster' (p. 4) and 'overflights had ceased... not because of the Erebus disaster but because they became uneconomical' (p. 5).

Overflights resumed in 1994/95. Six flights were conducted in the 1994/95 season, 10 were scheduled for 1995/96, eight for 1996/97, 10 for 1997/98, and 10 for the 1998/99 season (Croydon Travel 1995, 1996, 1998, Qantas 1997). At present, Croydon Travel, using Qantas, provides the only overflights. Aircraft used have been Boeing 747-300 or 747-400, leaving from Sydney, Melbourne and Perth. Some staff involved in the resumed flights were experienced in the earlier flights (Headland & Keage 1995).

The flights as operated at present use Boeing 747-400 or 747-300 aircraft. In the first season seating was limited to 299 (from 386) to allow adequate viewing opportunities for passengers (Headland & Keage 1995). According to the 1998/99 seating plan (Croydon Travel 1998), 364 seats were available for purchase. The original approach of limiting seating to enhance viewing may therefore have changed. Flights last more than 12 hours, with up to four hours over Antarctica. For most classes, seating is rotated to place passengers closer to a window for some of the flight, and before arrival over Antarctica, lectures from Antarctic specialists, and documentary films are presented (Croydon Travel 1995). Aircraft are fitted with closed circuit cameras displaying pictures from a cockpit camera, and information is broadcast during the flight (Headland & Keage 1995). In addition, the aircraft fly 'figure eights' above features of interest to provide viewing for all passengers (Croydon Travel 1996).

There are 17 different routes plotted and approved to permit pilots to choose a route (prior to take off) that will offer the best viewing according to weather conditions (Croydon Travel 1996, Qantas 1997). The routes generally offer a combination including points of interest (such as the south magnetic pole, Australian or French stations, Commonwealth Bay) and scenic coastal areas. Flights leave Sydney, Melbourne or Perth. The general route passes over the South Magnetic Pole (at sea), over Dumont d'Urville (a French station), and follow the coast over Commonwealth Bay (the site of Mawson's Hut), then cuts inland over the Transantarctic mountains to the coast of the Ross Sea near the Ross Ice Shelf, then to Cape Adare before returning to Australia, covering about 2000km of coast each time (Headland & Keage 1995, Croydon Travel 1996). Features of interest listed by Headland and Keage (1995) included Dumont d'Urville, Leningradskaya, and Terra Nova Bay stations, Cape Adare and Commonwealth Bay historic sites, Mount Minto (first climbed by an Australian team), and islands including Macquarie Island, the Balleny Islands, the Possession Islands, and Coulman Island. Marketing material emphasises the viewing of icebergs, the polar icecap, Mawson's Hut, large glaciers, and the Trans-Antarctic and Admiralty mountain ranges (Croydon Travel 1996).

The Australian Department of Civil Aviation was responsible for approving safety and technical aspects of the 1994/95 season flights (Headland & Keage 1995). A minimum altitude of 10 000 feet (3077m) above sea level or 2000 feet (615m) above the highest ground within 180km is maintained (Qantas 1997). Qantas (1997, p. 20) stress that the operations are conducted with 'uncompromising safety and operational integrity, based on Qantas Standard Operating Procedures', which 'incorporate lessons learned from the 1979 Mt. Erebus disaster and previous overflight programs conducted by the airline'. The Australian Antarctic Division was involved in the development of the flight program and places an observer on board all flights (Australia 1995, IP34 ATCM XIX). Total self-sufficiency was considered unachievable for flights, and for the Qantas program the following factors were considered to constitute self-sufficiency:

- pre-flight planning and full consideration of safety aspects;
- appropriate plans to deal with in-flight incidents including cabin depressurisation or engine failure (including the carrying of a full fuel load to allow return to airports in the event of such an emergency);
- prohibition of smoking, and not carrying any cargo, to minimise fire risk;
- ensuring of appropriate plans to deal with emergencies which could significantly disrupt national programs;
- not calling for assistance unless it was agreed that this was acceptable in advance (Australia 1995, IP34 ATCM XIX).

Qantas also carries insurance and (at least for the 1994/95 season) 'agreed to a 'user-pays' arrangement with the US Antarctic Program providing for payment of the costs of any Antarctic search and rescue assistance called upon', and extra crew training and additional emergency equipment is also provided (Australia 1995, IP34 ATCM XIX, p. 3).

A number of operational features contribute to minimising impacts. These include the minimum altitude, operating the aircraft at 28% power to reduce speed and emissions, and choosing routes that ensure side separation of at least one nautical mile from known penguin colonies (Qantas 1997). The environmental impacts are discussed by Qantas (1997) in the PA document. Considerable attention is given to the issue of noise. In order to reduce noise, the aircraft fly at 28% power during the viewing part of the flight. Qantas also cites

Australian Antarctic Division reports that suggest that noise levels will result in no significant disturbance to penguin colonies (1997, p. 13). Emissions are considered, concluding that 'there is a very high probability that the effect of these emissions will be negligible or undetectable due to dilution and wind dispersal' (Qantas 1997, p. 17). In the event of extreme emergency, fuel dumping may be necessary, although the required altitude and speed cause the fuel to atomise as it is jettisoned, leading Qantas to regard this occurrence as likely to have a negligible impact.

Disturbance to wildlife is discussed briefly in the preliminary assessment. The section on noise levels gives some information on the effect of overflights on penguin colonies. Qantas cites communications with French officials who reported that overflights of Dumont d'Urville station caused no impact or disturbance, and with observers at Casey station who reported that 'overflights caused no discernible increase in noise levels at penguin colonies and had no discernible effect on the birds' and that 'the overflights would have gone unnoticed had there been cloud cover' (Qantas 1997). Qantas does not foresee any impacts on flora and fauna, ice, water or soil, or heritage/wilderness, nor does it foresee any negative cumulative impacts (Qantas 1997, p. 18). Qantas briefly mentions the positive cumulative impact of increasing 'public awareness of Antarctica as a place deserving of special protection' (Qantas 1997). The conclusion of the Qantas preliminary assessment is that the activity complies with all relevant legislation and provides people with the chance to 'physically appreciate the unspoiled and pristine characteristics of the region. This is achieved with an unmeasurable impact on the Antarctic's environment' (Qantas 1997, p. 21).

Antarctic and Southern Ocean Coalition (ASOC), a consortium of environmental groups with an interest in Antarctica, submitted an information paper on the overflight program to the 1995 ATCM (ASOC 1995, IP38 ATCM XIX). Concerns were expressed relating to the environmental messages conveyed through the overflight program (to clients and to the wider community), the degree to which the overflights will stimulate demand for more overflights (from both QANTAS and other operators), and the degree to which the overflights will stimulate demand for other forms of Antarctic tourism (ASOC 1995, IP38 ATCM XIX, p. 1).

2.4.4 POTENTIAL DEVELOPMENTS IN AIRBORNE TOURISM

Air transport has the potential to radically change the character and impacts of Antarctic tourism, and a realistic assessment of possible directions is required. The availability or otherwise of suitable landing sites (suitable in terms of location, cost to operate, and environmental impact) will determine the extent of possible operations, and the degree to which intercontinental and continental networks can form. Other factors include the size of the market for airborne operations, and constraints placed by the ATS on operations.

2.4.4.a Airfield availability

Mellor (1993) discusses 10 different airfield types for Antarctica. It seems unlikely that private operators would attempt construction of a runway on anything other than ice or snow, given the very high costs of other options, the difficulties that may arise in the environmental evaluation process, their vulnerability to pressure from environmental groups, and the advantages of offering a tourism product that is 'environmentally friendly'. The options for airborne tourism are therefore the use of snow or ice based airfields (operated and maintained privately), or cooperative use of airfields with government operators.

The use of naturally ablated, snow free glacier ice (blue ice) sites is attractive because they are, in their unmodified state suitable for conventional wheeled aircraft, which are more readily available. cheaper to buy, cheaper to operate, and have better range than ski-wheel or ski equipped aircraft (Mellor 1993). Blue ice is formed through natural ablation of the ice surface, exposing very hard and dense ice (Mellor & Swithinbank 1989). The role of wind in ablation means that blue ice areas tend to form near mountain ranges that disrupt the wind flow, or near the coast in areas of very strong katabatic winds (Mellor & Swithinbank 1989). For blue ice to be suitable for use as runways, there must be no obstructions (crevasses, rocks, ice hummocks), approach and climbout obstructions, or steep gradients (Mellor 1993).

A range of airfields are present in Antarctica, and a number of potential blue ice sites have been identified, listed below (Mellor 1993, Australian Antarctic Division 1999a, National Environmental Research Council 1997, Mellor & Swithinbank 1989, Headland 1994b, Swithinbank 1992a, ANI 1998). There are conventional gravel runways in the Peninsula region (Marambio, Presidente Frei, and Rothera stations), prepared compressed snow runways and skiways at McMurdo Station, and blue ice sites in use at Patriot Hills, Holtedahlfjella ('Blue One') and at 'Sky Blu' 450 miles south of Rothera in the Peninsula region. Compressed snow or snow over glacier ice runways have been maintained at other stations around Antarctica. Other blue ice sites (used or potential) include Mount Howe in the southern Transantarctic mountains, the Bunger Hills near Casey Station in East Antarctica, Mill Glacier in the Queen Maud Range, locations near Mawson Station in East Antarctica, sites near the Ronne Ice Shelf, and sites in the region of the Prince Charles Mountains in East Antarctica. Lake ice is also suitable for landing heavy wheeled aircraft, with potential sites in the Bunger Hills and at Beaver Lake in the Amery Ice Shelf region of East Antarctica. Ski equipped aircraft can land in almost any snow or ice location.

A number of requirements specific to tourism use would apply. On-ground facilities, sufficient for accommodation of all staff and tourists (including both incoming and outgoing groups) would be needed. Proximity to attractions and activity sites is also important, although the use of internal flight networks from a central landing site may be effective. Proximity to the coastal region would be desirable, to provide the option for hybrid ship/air operations, and to reduce costs by allowing fuel delivery by ship. The ability to operate in an environmentally benign manner is also important if operations are targeted at the environmentally aware component of the tourism market. An environmentally damaging operation would receive less support from tourism clients.

The question of which aircraft are suitable for tourism use is open-ended. Servicing a large market, in greater comfort than that offered by the rough field aircraft such as Hercules and Ilyushin-76, would require the use of aircraft presently untried in the Antarctic context. Experts suggest that there is no reason why operators could not use large passenger jets on blue ice (Swithinbank 1993a). In an obituary for Giles Kershaw, the founder of ANI, Swithinbank notes that 'It was his intention to use jet aircraft in due course and there is no doubt that someone will do it' (Swithinbank 1990b). Standard passenger jets, up to and including Boeing 747s, are considered by Swithinbank to be suitable for landing on some blue ice airfields, and offer a far greater range than specialised cargo and rough field aircraft. This would allow aircraft to fly to Antarctic destinations and return without on-ground refuelling, permitting safe return if landing is not possible for some reason.

Cooperative use of airfields for tourism is possible. ANI cooperated with the Chilean government and contractors to use the airfield at Marsh (now Presidente Frei) station in the early years of operations (Swithinbank 1993a). Cooperation between Chile and ANI is important, with Chile using Patriot Hills for Twin Otter and Hercules flights on occasion (Swithinbank 1995). In using both south pole station and Presidente Frei Station runways, ANI provides advance notice and uses existing air traffic control services (IAATO 1994, IP23 ATCM XVIII, p. 7).

2.4.4.b Summary and implications

The attractions of passenger services, with the economies of scale offered by large aircraft, is something that should not be dismissed lightly. ANI has proven the potential of naturally occurring blue ice, and has provided an example of how activities can be carried out in an environmentally sensitive manner, with a minimal infrastructure, safely and efficiently. In supplying services to different national operators, the company has demonstrated that cooperation in logistics is economically viable, achieving something that has been called for for many years within the ATS but never acted on in a meaningful way. The search and rescue and evacuation cover supplied by ANI is of considerable significance for national operators as well as for tourism and private expeditions. Overall, the company has made a substantial contribution to changing the face of government, private and commercial activity on the continent. ANI provides a reliable support system for the many private expeditions that wish to carry out adventure activities in Antarctica. In the absence of the company such activities would arguably involve higher risks of loss of life, disturbance to national programs, or environmental damage.

The potential for blue ice to be used for large passenger jets is of concern. Logistically (and possibly economically) there is no barrier to the development of a high volume tourism operation using a blue ice site. Considerably more would be required in the way of infrastructure and equipment, but it is not an inconceivable development. The market that such an operation would be targeted at would be very different to that currently serviced. As will be seen in chapter seven, the ATS is not well placed to react to such developments.

2.5 COMMERCIAL YACHT OPERATIONS

Small numbers of people visit the Peninsula region (and occasionally other areas) in yachts. In some cases, the crew are paying for the privilege, or passengers are carried. This type of tourism is more difficult to assess, monitor and control than other forms. Wace (1990) notes that small vessel adventure tourism, with an independent mode of operations and ability to reach inaccessible areas, raises unique regulatory issues, including the difficulty of monitoring and enforcement. Enzenbacher (1995a) provides details of some informal interviews with yacht owners in Ushuaia, and raises issues of safety, self-sufficiency, appropriate equipment, waste management, souveniring, and wildlife disturbance. Enzenbacher also provides some information on the participation in the industry of charter yachts (1992a, 1992b, 1994a). Splettstoesser and Folks (1994) provide some background on yacht tourism. The UK provided an information paper to ATCM XXII, detailing yacht visits known to have occurred between 1970 and 1998, including some information on which yachts carried tourist or charter groups (United Kingdom 1998, IP1 ATCM XXII). Rubin (1996) provides information on tourism on yachts, including 28 day voyages to the Peninsula region and 43 day voyages that include South Georgia. Rubin lists four companies operating such visits. IAATO has one member company operating yacht voyages (IAATO 1998, IP88 ATCM XXII, p. 2). This form of tourism is not well documented.

2.6 SITE USE

It is important to know how the ship based tourism industry uses landing sites. This section describes site use in different regions of Antarctica, and reports an analysis of site use. Of particular interest are the geographical and temporal changes in site use, as they provide insight into the growth and development of the industry over time. Most recent research has examined total numbers of tourists and numbers at high use sites. This research examined changes in numbers using sites over a nine season period in the Antarctic Peninsula region. The analysis helps provide a clearer understanding and visualisation of site usage. Such information is useful in validating or dismissing commonly raised concerns, understanding general site usage patterns, concentration of impacts, and spread of the industry. It also provides insight into the geographical development of a relatively new destination area during a rapid-growth phase of its life cycle.

The majority of shipborne tourism is concentrated in the Antarctic Peninsula region (Cessford 1998, Wace 1990, Stonehouse & Crosbie 1995, Stonehouse 1992a). Advantages to operators and tourists of the Peninsula region include: the short travel time from south

American ports to the Peninsula (2–3 days sailing); the relatively warm climate; presence and concentration of attractions including wildlife, dramatic scenery, and scientific stations; and the lack of difficult pack ice (Enzenbacher 1992b, Enzenbacher 1992a, Cessford 1998, Wace 1990, Stonehouse & Crosbie 1995, HRSCERA 1989). Wace (1990) compared the potential for tourism between south America, NZ, and Australia. Stonehouse and Crosbie (1995) point out that while tours from NZ offer visits to historic sites associated with pivotal events in the heroic era exploration of Antarctica, they involve long voyages on very rough oceans.

Stonehouse (1994a) pointed out that, except in protected areas and the immediate environs of active stations, tourist operators are free to land tourists anywhere. Stonehouse noted that 70 sites were used in the Peninsula region and the Scotia Arc, and 20 sites in the Ross Sea region. Some sites had been used for tourism for more than 30 years (Stonehouse 1994a).

While the majority of activity occurs in the Peninsula region, tourists are also able to visit other areas, including the Ross Sea region, the Weddell Sea, and areas of East Antarctica. One operator is based in NZ, and offers trips to the Ross Sea area and East Antarctic locations including Commonwealth Bay and Mertz Glacier (Cessford 1998, Stonehouse 1992a). Other operators visit the region regularly, sometimes as part of a semi-circumnavigation voyage. In the 1996/97 season, the first complete circumnavigation of the continent by a tourist vessel was made by the Russian icebreaker *Kapitan Khlebnikov*, chartered by Quark Expeditions (Splettstoesser, Headland & Todd 1997). Overall, the geographical spread of the industry is continent-wide. The appeal of 'unique' 'first ever by tourists', or even 'rarely visited' destinations is a powerful selling point, and it can be expected that operators will continue to seek new attractions and areas to visit. The use of icebreakers proper means that many remote areas, normally inaccessible due to difficult ice conditions, are more accessible, although such operations will remain expensive.

The industry uses a broad range of sites for landing passengers, for IRB cruising, and for helicopter overflights. This analysis is divided into the Peninsula region, and continental Antarctica region. Since 1987, information on site use has been collected by the NSF, IAATO, and operators, (IAATO 1998, IP88 ATCM XXII, p. 3) with moves to more standardised forms of reporting developing over that time (section 4.1). Information tables on site use are provided at IAATO / NSF meetings, and more recently on the IAATO website. Information includes site names, number of landings per season, number of passengers landed per season, numbers of IRB cruising or helicopter overflight visits and numbers of participants. Details of the most popular sites, summaries of information, and more detailed information for the most recent season is also provided. The more detailed information includes maximum, minimum and average days between visits for sites. Some problems with the information include lack of specificity in the location of landings, and the lack of standardisation of place names. Enzenbacher notes that site use by non-US operators went unreported for some time. Stonehouse and Crosbie (1995) and Enzenbacher (1994a) report that some operators have admitted to falsifying reports to keep favoured sites secret. In addition, Enzenbacher (1994a) stated that the field research of PAC noted discrepancies between the reported numbers of visitors landing at certain sites and the numbers counted by researchers, and actual numbers may therefore be higher than reported. These considerations limit the accuracy of statistics somewhat, but it is not felt that large variations would result from these sources of error.

For this analysis, site use information for the period 1989/90 to 1997/98, from NSF 1998, was entered into a Microsoft Excel spreadsheet for analysis (this was completed before spreadsheet data became available on the IAATO website). Using this basic information, analysis of the type, frequency, geographical spread, and change over time of site usage was conducted. Base maps for four different regions were developed: the Peninsula region (at a large scale to better display the site use information in this more intensively used area); Dronning Maud Land, Weddell region and western portion of East Antarctica; Ross Sea, Oates Land and West Antarctica; and East Antarctica. These maps have been used to display site use information geographically. Base maps were developed using digital data from the SCAR Antarctic Digital Database (BAS, SPRI & WCMC 1998). Site locations, based on site names provided in the NSF information, were located on maps using the Antarctic Pilot (Great Britain Hydrographic Department 1974) and a range of maps at different scales.

189 sites were used in the Peninsula region over the nine seasons examined (1989/90 to 1997/98), with a further 66 sites described for the remainder of the continent. Different patterns of site use result from the popularity of the Peninsula region (4477 landings, an average of 497 each season) as opposed to the continental sites (241 landings, an average of 40 each season), and the following description is therefore divided between the Peninsula region and the Continental region.

2.6.1 SITE SELECTION AND ITINERARY PLANNING

Initial ship itineraries are planned very early (often more than 18 months) in advance. This allows advance notification of plans to the relevant national authority for each operator, in accordance with Rec. XVIII-1 and Resolution XIX-3. Early planning is also necessary to allow marketing and sales to proceed. IAATO members share itineraries before each season to assist captains and expedition leaders (Five U.S. Organizers 1997). A set of draft criteria used for itinerary planning (and site selection) has been produced by Kim Crosbie of Scott Polar Research Institute, University of Cambridge, and IAATO (Five U.S. Organizers 1997). Factors taken into account in itinerary planning include vessel speeds, numbers of passengers, days to be spent in the Antarctic region, and marketing emphasis of different voyages. Certain sites are normally part of an itinerary, and include visits to renowned sites (Deception Island, Paradise Bay, Lemaire Channel); key aspects of natural history (specific bird or mammal species, geologically important sites); a landing on the Antarctic continent; sites of historic interest; and a visit to a scientific station (Five U.S. Organizers 1997). A number of other principles are also used in planning itineraries. These include starting with landings that are simple (sheltered at anchorage and at landing, have ample space near the landing point, and are safe and easy to move around), and to manage expeditions so that each day is more enjoyable than the day before by progressively visiting sites which are perceived as more exciting (higher species diversity, more spectacular scenery) (Five U.S. Organizers 1997, n.p.).

Shorter term adjustments to itineraries are made, based on weather and ice conditions, and the schedules of other ships. Expedition leaders are responsible for choice of landing sites (Stonehouse & Crosbie 1995). They point out that the more adventurous cruise directors seek new places to land, claiming to their passengers that few or no landings have been made there before, and in the process expose additional sites to impacts (Stonehouse & Crosbie 1995). The industry is keen to maintain the right to 'expedition cruise', which equates to the unimpeded (by regulation) freedom to choose landing sites opportunistically. Stonehouse (1992a) also details some criteria for assessing the qualities of landing sites. These include such factors as safe approaches, good anchoring or sea room for vessels to stand off while landings are made, landing site accessibility in different weather, access to features of interest from the landing beach, and snowfields or other obstacles impeding access to attractions. Stonehouse also lists elements of sites that constitute attractions for visitors, including different species of nesting penguins and other birds, marine mammals, vegetation and soils, scenic quality, and human use or evidence of past use (1992a). These elements were proposed by Stonehouse as criteria for determining site suitability, and as a guide to site assessment.

2.6.2 PENINSULA REGION

The Antarctic Peninsula region (refer to map 2.1) is the focus of tourism activity. For the purposes of this description and analysis, the Peninsula region includes the Peninsula and nearby islands, and the South Orkney and South Shetland Island groups. While included in the NSF information tables, sites on South Georgia, the South Sandwich Islands, and in the Weddell Sea and Queen Maud Land regions are not included. A distinction is made between landing sites and places where offshore cruising in IRBs, or helicopter overflights are conducted. In the Peninsula region, 161 sites were used over the nine seasons examined (1989/90—1997/98) for actual landing of passengers (both IRB and helicopter). The total number of landings over this period was 4477, with 7 (0.15%) of these being carried out by helicopter.

2.6.2.a Frequency of site use across seasons

Not all sites were used in every season. Knowledge of how often sites are used (from season to season) is important. The number of sites used for different numbers of seasons was calculated. Table 2.9 describes the number of sites that were used for different numbers of seasons.

Table 2.9: Number of seasons sites were used (Peninsula region)

Number of seasons used (of 9)	Number of sites
9	18 (11 %)
8	4 (2 %)
7	11 (7 %)
6	6 (4 %)
5	9 (6 %)
4	5 (3 %)
3	17 (10 %)
2	28 (18 %)
1	63 (39 %)

Note that this table includes all site landings, including where visit numbers were small, and cannot be regarded as an indication of site visitor load.

Table 2.9 demonstrates that quite a small proportion of sites are used regularly or every season. A number of sites are clearly very popular, being used every season of the nine seasons examined (11% of sites). 67% of sites were used in three or fewer seasons of the nine seasons examined. Numbers of sites used for 4, 5, 6, 7 or 8 of the nine seasons examined were low. This indicates that while tourism uses a large number of sites overall, in any one season a considerably smaller number of sites are in use. Maps 2.2 to 2.10 give a clearer indication of geographic and temporal use patterns of different sites.

2.6.2.b Frequency of landings across seasons

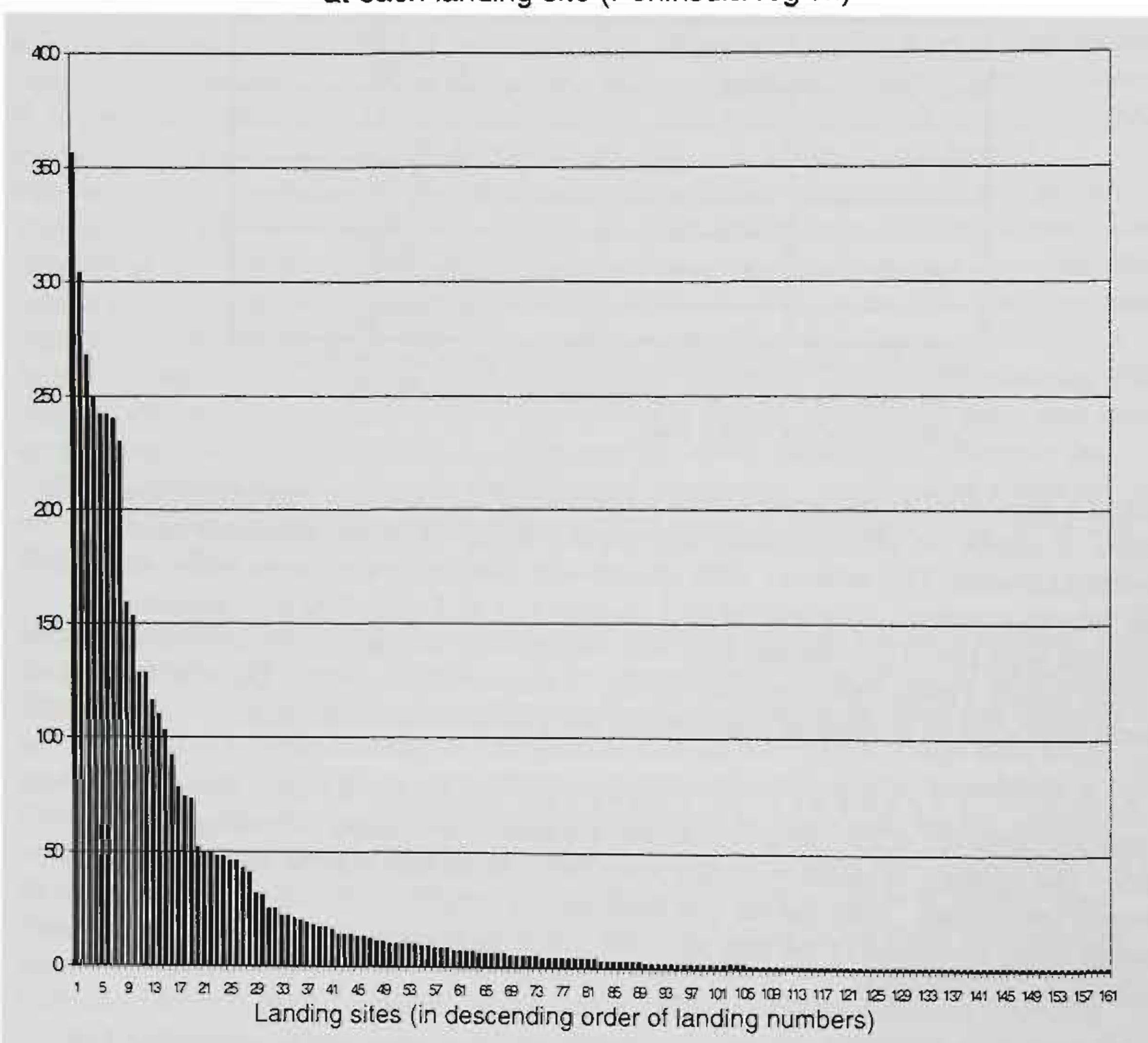
A different measure of the rate at which sites are used is the number of landings that are made. The numbers of landings made at each site over the nine seasons examined were grouped into classes. Note that the first three classes are different in size to the remainder to provide better resolution of the sites receiving low numbers of visits. Table 2.10 shows the distribution of visit totals.

This table demonstrates that a substantial proportion of sites are seldom used—58.8% of sites have received five visits or less over the nine seasons, an average of less than one visit each season. Very small numbers of sites have many visits (only 12% have had more than 50 visits in nine years). Figure 2.3 shows this same distribution (with the total number of landings for each site shown). The point that clearly emerges is that the vast majority of sites are visited very infrequently, on an average basis.

Table 2.10: Total visits over 9 seasons (Peninsula region)

Total visits over 9 seasons	Number of sites
1	***56 (34.8%)***
2	***16 (9.9%)***
5 or less	***93 (58.8%)***
50 or less	141 (87.6%)
51–100	5 (3.1%)
101–150	5 (3.1%)
151–200	2 (1.2%)
201–250	5 (3.1%)
251–300	1 (0.6%)
301–350	1 (0.6%)
351–400	1 (0.6%)

Figure 2.3: Total number of landings over nine seasons at each landing site (Peninsula region)



2.6.2.c Visitor numbers to sites

The number of visitors landing at sites in each season was also investigated. Average numbers of visits to sites each season provide an indication of the level of site use. Table 2.11 shows the proportions of sites receiving different average visitor numbers. It should be noted that some averages are based on fewer seasons of use than others, and that the number classes used in the table are in increments of 500 visits, excepting the first class, where a category of 0–100 has been included to demonstrate the large number of sites with low average usage.

Table 2.11: Average visitor numbers by number of sites (Peninsula region)

Average number of visitors each season	Number of sites
0–100	*62 (39%)*
101–500	72 (45%)
501–1000	11 (7%)
1001–1500	4 (5%)
1501–2000	3 (2%)
2001–2500	5 (3%)
2501–3000	3 (2%)
3001–3500	1 (1%)

This table shows that a small number of sites receive high average numbers of visitors (as would be expected from the distribution of total landing numbers across sites). A large proportion of sites (39%) receive an average of less than 100 visitors each season. Less than 10% of sites receive more than 1000 visitors on average each season.

Another indication of site load can be provided by examining the most visited sites. Table 2.12 provides details of the average visitor numbers, number of seasons used, and the average days between visits in the last season, for sites where average annual visitation was more than 1000. The figures for the average days between visits are provided in the NSF documentation for 1997/98 season (NSF 1998).

Table 2.12: Details of sites where average annual visitation is more than 1000 (Peninsula region)

Site	Region	Average visitors	Seasons used (of 9)	Visits in 1997/98	Average days between visits 1997/98
Whalers Bay	Deception Island, South Shetlands	3322	9	60	0.9
Port Lockroy	Wienke Island, Gerlache Strait region	2894	9	58	1.4
Half Moon Island	Livingston Island, South Shetlands	2734	9	33	1.8
Cuverville Island	Ererra Channel, Gerlache Strait region	2635	9	53	1.3
Pendulum Cove	Deception Island, South Shetlands	2373	9	31	1.8
Petermann Islands	Lemaire Channel, Gerlache Strait region	2309	9	42	1.8
Almirante Brown Station	Paradise Bay, Gerlache Strait region	2308	9	34	2.5
Hannah Point	Livingston Island, South Shetlands	2273	9	39	1.9
Waterboat Point	Paradise Bay, Gerlache Strait region	2039	9	12	4.4
Paradise Bay	Paradise Bay, Gerlache Strait region	1817	3	15	3.8
Paulet Island	Erebus & Terror Gulf	1676	9	8	3.9
Arctowski Station	King George Island, South Shetlands	1516	9	11	10.1
Baily Head	Deception Island, South Shetlands	1118	9	19	4.6
Palmer Station	Anvers Island / Gerlache Strait region	1088	9	14	7.6
Aitcho Islands	Between Robert & Greenwich Islands, South Shetlands	1087	8	31	2.6
Neko Harbor	Andvord Bay, Gerlache Strait region	1040	6	27	3.4

Table 2.12 provides an indication of the levels of use that the most visited sites are receiving. Some sites receive very regular visits. There are 16 sites that have received 1000 visitors or more on average per season.

Table 2.13 details the visitation over the past nine seasons, of sites ranking in the five most visited sites for three or more of the past nine seasons (directly from NSF 1998). This table demonstrates that while there is clearly a trend towards growth in visitation, sites vary in popularity from season to season.

Table 2.13: Peninsula sites ranking top five most visited for three or more of nine seasons (from NSF 1998)

	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98
Port Lockroy	796	1067	2615	**2139**	**4274**	1769	3851	3110	**6429**
Whalers Bay	**1682**	1496	2899	1711	3480	**5241**	5033	3012	5344
Half Moon Island	1191	1011	**2984**	1585	2961	3017	**5221**	2258	4382
Cuverville Island	883	936	2565	1589	2174	3367	4343	**3714**	4143
Almirante Brown Station	1191	1471	2899	1659	3515	1307	2244	2504	3991
Petermann Islands	761	1084	1376	1376	2828	3406	3504	2576	3866
Pendulum Cove	587	1215	2011	1936	3159	2803	3492	2725	3426
Hannah Point	419	192	1632	1542	2740	4010	3048	3480	3399
Waterboat Point (Gonzalez Videla Station)	1038	**1965**	2398	1671	3248	1559	2384	1095	2998

(Bold numbers indicate most visited site for that season)

P. Davis (1995b) also discussed site use, calculating that the frequency of visits to the ten most popular sites increased from 0.7 to 2.8 visits each week in the period between 1989/90 and 1993/94, assuming a 12 week season. Using the same assumption, for the ten most popular sites in 1997/98, the average number of visits per week was calculated, with a result of 3.4, a substantial increase over P. Davis's 1993/94 figure.

2.6.2.d Summary of landing site use

Overall, the analysis shows that while a large number of sites are used, many are used infrequently. The majority of sites receive few landings and low average numbers of visitors. A small proportion of sites show higher levels of usage. The use of average values when the overall trend is one of growth needs to be kept in mind—the earlier seasons with lower numbers of visitors bring the averages down. Examination of the absolute visitor numbers in table 2.12 provides an indication of current visitation levels. The analyses of section 2.6.2.f examine growth over time, and across geographical space.

2.6.2.e IRB cruising and helicopter overflights

In addition to landings, a number of sites are used for IRB cruising or helicopter overflights. Information on helicopter overflights (which are uncommon) and IRB cruising at different sites is provided in NSF (1998) for seven seasons (1991/92 to 1997/98). There are two reasons why these activities may be used—because landings were not practical or safe at a particular site, or because they may be the best or only way to see or appreciate the attraction of that particular site. In the seven seasons examined 83 sites were used for IRB cruising or helicopter overflights. 28 sites were used for IRB cruising or helicopter overflights only (no landings recorded at these sites in any season of the seven examined). In some seasons additional (to the 28 referred to above) sites may have been used for cruising or overflights only, with landings occurring in other seasons. Map 2.1 portrays the use of different sites in the Peninsula region for IRB cruising or helicopter overflights, using the average numbers of participants over the seven seasons examined, with areas used for mapping pooled as described in section 2.6.2.g. The map shows that such activities occur across the whole of the Peninsula region, and involve low numbers of visitors. The Wiencke Island region receives particular attention, as does the region around the tip of the Peninsula. There is little activity around King George Island and the South Shetland Islands generally, perhaps reflecting better opportunities for landing in poor conditions in those locations. Table 2.14 shows the numbers of sites used for IRB cruising or helicopter overflights for different numbers of seasons, of the seven seasons examined.

Table 2.14: Regularity of site use for IRB cruising or helicopter overflights (Peninsula region)

Seasons used (of 7)	No. of sites
7	1 (1%)
6	3 (4%)
5	4 (5%)
4	5 (6%)
3	5 (6%)
2	15 (18%)
1	50 (60%)

The table shows that only around 16% of sites used for these activities were used in four or more out of seven seasons. A majority of sites were used for these activities for only one or two seasons of the seven examined, perhaps indicating that landings were preferred wherever possible—it is clear that the majority of sites are not used preferentially for these activities, although there are a small number where these activities appear to be preferred. This is supported by table 2.15, which shows the total number of IRB cruise or helicopter overflight visits over the seven seasons. A small proportion of sites receive higher numbers of these visits, and a large proportion receive very few visits in total (84% of sites had an average of less than one visit per season).

Table 2.15: Total visits over seven seasons for IRB cruising or helicopter overflights (Peninsula region)

No. of visits over 7 seasons	No. of sites
28	2 (2.5%)
26	1 (1.3%)
19	1 (1.3%)
14	1 (1.3%)
12	2 (2.5%)
11	1 (1.3%)
10	2 (2.5%)
9	1 (1.3%)
8	2 (2.5%)
6	2 (2.5%)
5	1 (1.3%)
4	3 (3.8%)
3	5 (6.3%)
2	9 (11.4%)
1	46 (58.2%)

2.6.2.f Change in site use over time

An important aspect of site use is change over time, including the introduction of new landing sites, and changes in site loads. An indication of the growth and spread of site use can be given by assessing the introduction of new sites. New site use was examined by determining which of the sites used in each season had not been previously used in any season. Table 2.16 details the introduction of new sites each season and the number of sites used in each season. The information is based on the nine year summary of sites provided in NSF 1998. Some of these sites may have been used prior to the 1989/90 season. The accuracy of site reporting may also introduce some uncertainty into these figures, given that some new sites may be sites previously visited but reported less specifically or not at all. The number of sites used each season shows a clear trend of growth. The number of new sites coming into use each season is remarkably consistent, comprising between 20 and 30 percent of the sites used that season, with the exception of 1997/1998, which was the lowest noted at 16%. A downward trend is possible over the last 4 seasons, but examination of more seasons would be required to establish if this is actually occurring.

Table 2.16: Total landing sites and introduction of new landing sites

Season	Number of landing sites used	Number of these sites previously unused in the nine year period	New sites as a percentage of total used each season
89/90	35		
90/91	32	7	22 %
91/92	44	12	27 %
92/93	50	14	28 %
93/94	64	14	22 %
94/95	77	23	30 %
95/96	73	20	27 %
96/97	84	21	25 %
97/98	79	13	16 %

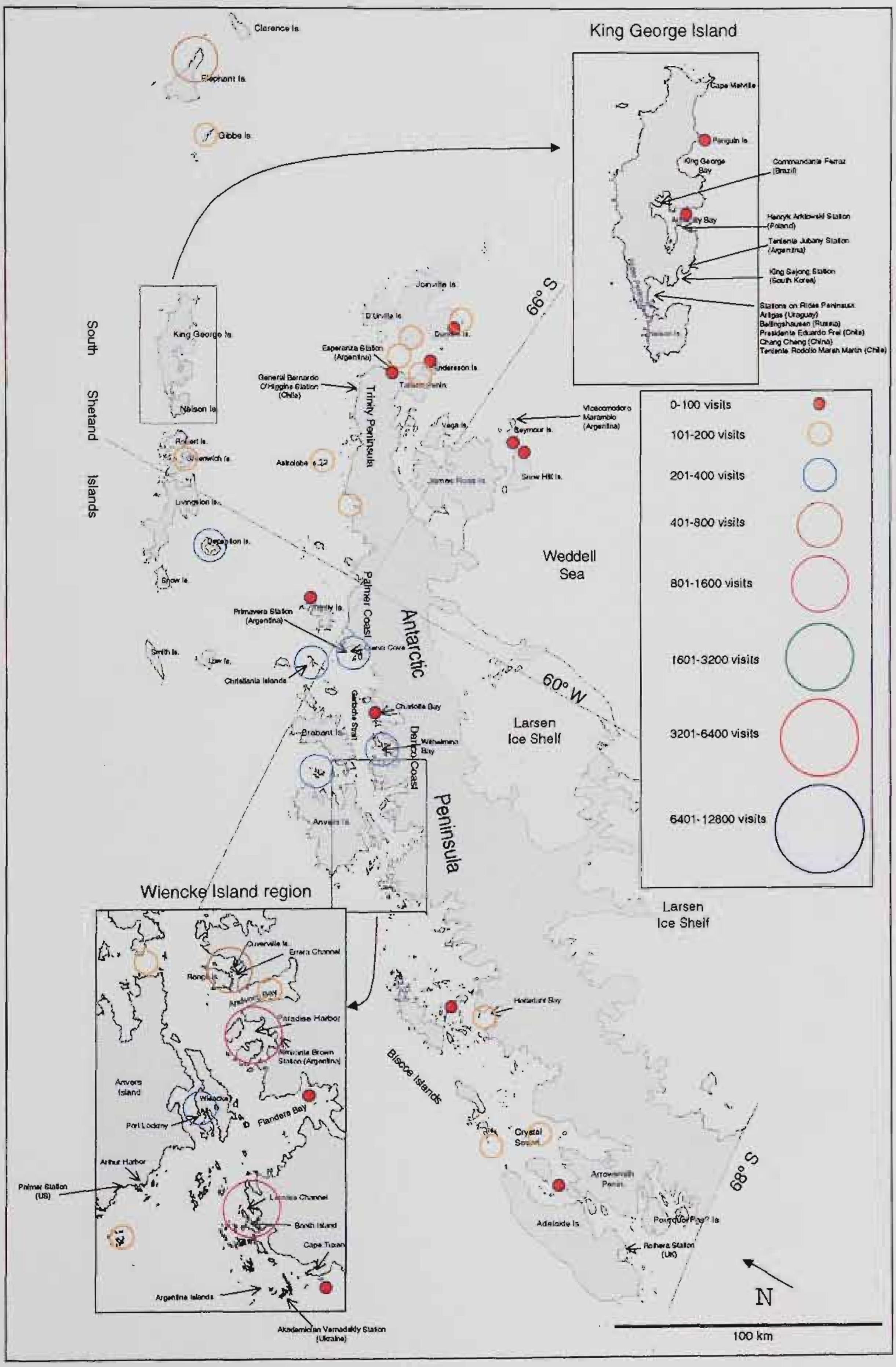
2.6.2.g Seasonal site use mapping

The above analyses provide information on levels and frequencies of site use without reference to geographical patterns of site use. In order to assess changes in the numbers of visitors landing in different areas, a map of the Peninsula region showing levels of site use, for each season of the nine seasons examined, was prepared. This series of maps shows growth in visitor numbers geographically, charting the growth and spread of the industry.

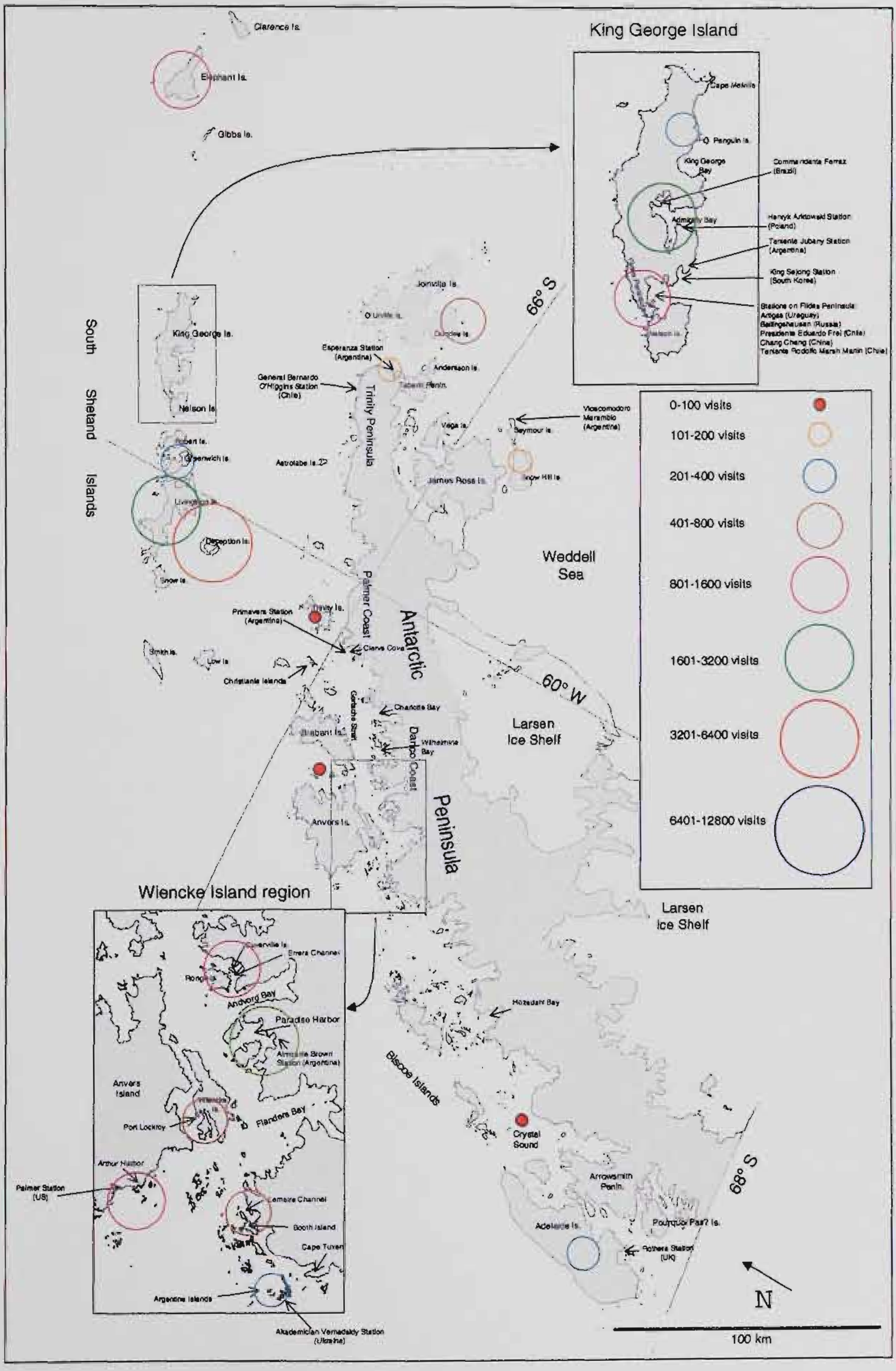
The number of different sites used over the nine seasons, and limitations on map size, precluded mapping of visitor numbers at every single site. In addition, some broadly defined sites contain (in a geographical sense) other sites. Numbers of visitors to sites in close geographic proximity to each other were therefore pooled, providing visitor numbers to different general areas. These areas are described in table 2.17, grouped by region for convenience. The map does not include the South Orkney Islands, although some sites are listed for this group, and the islands are within the Antarctic Treaty area.

For these areas, visitor numbers for each season were calculated. Coloured circles representing annual visitation to the different areas were mapped to produce nine seasonal maps of the Peninsula (maps 2.2 to 2.10). The circles are symbols representing different number classes.

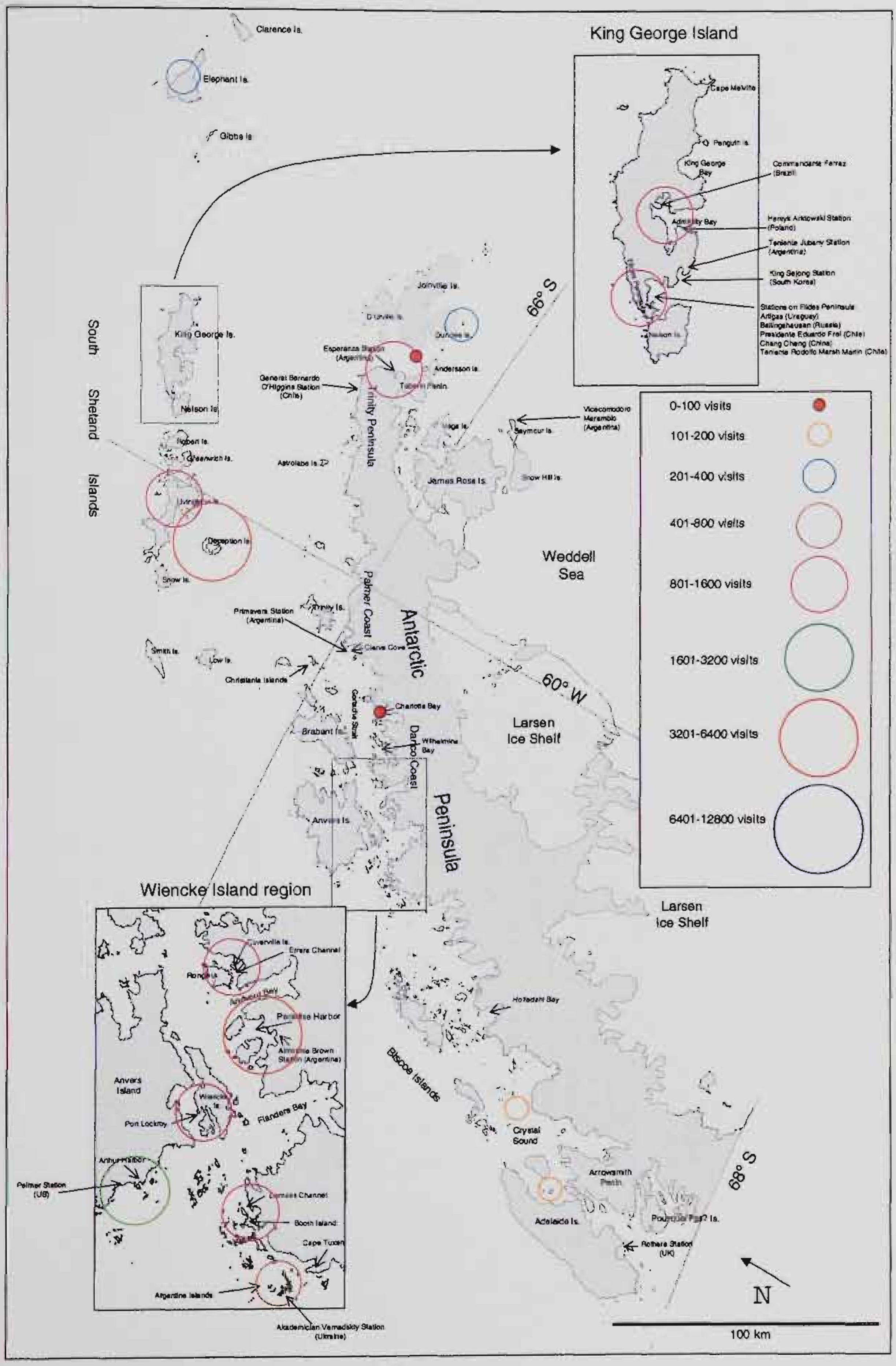
Map 2.1: Inflatable rubber boat (IRB) cruising or overflights - Peninsula Sites



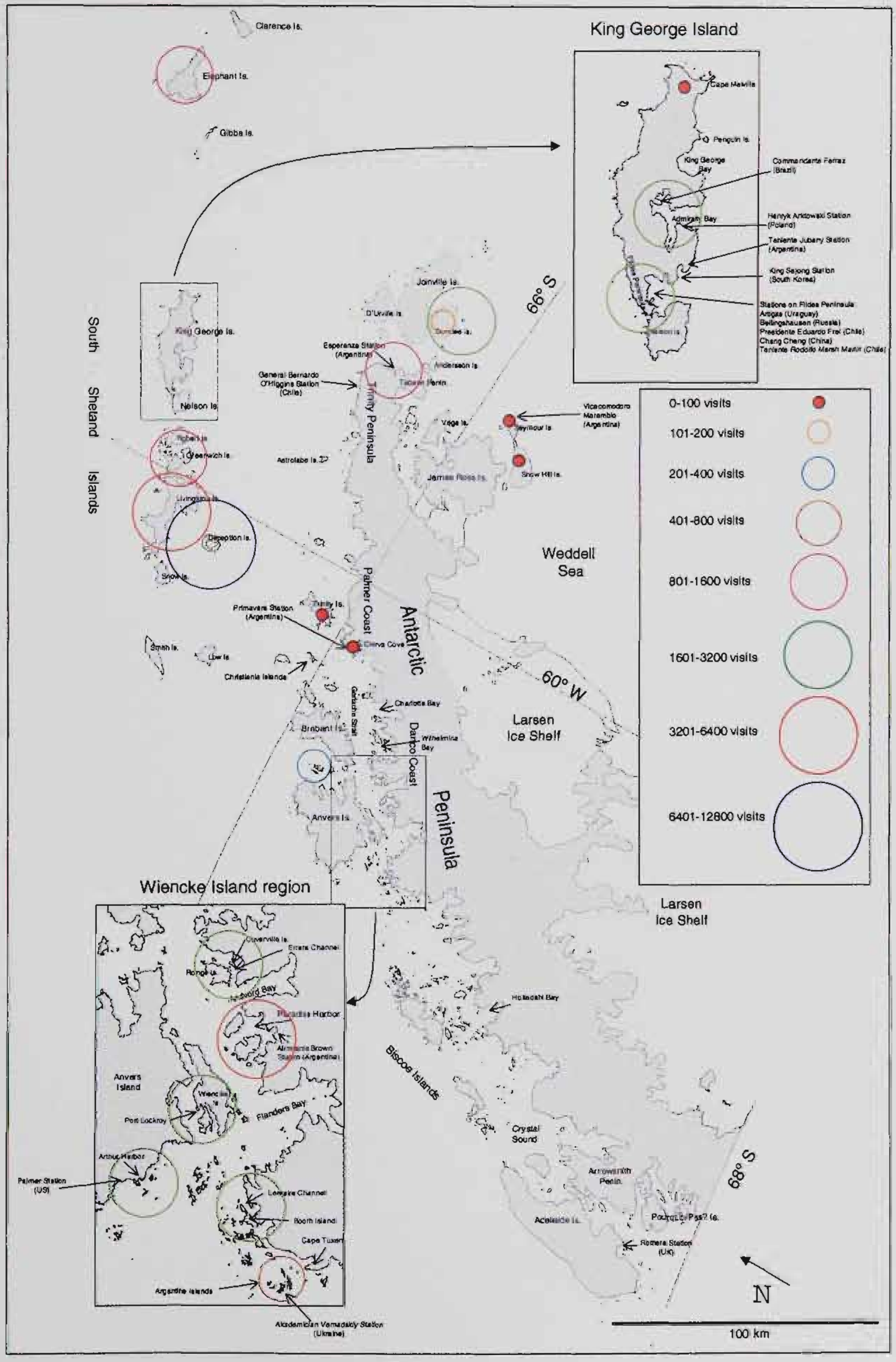
Map 2.2: Peninsula site use change series - 89/90 season



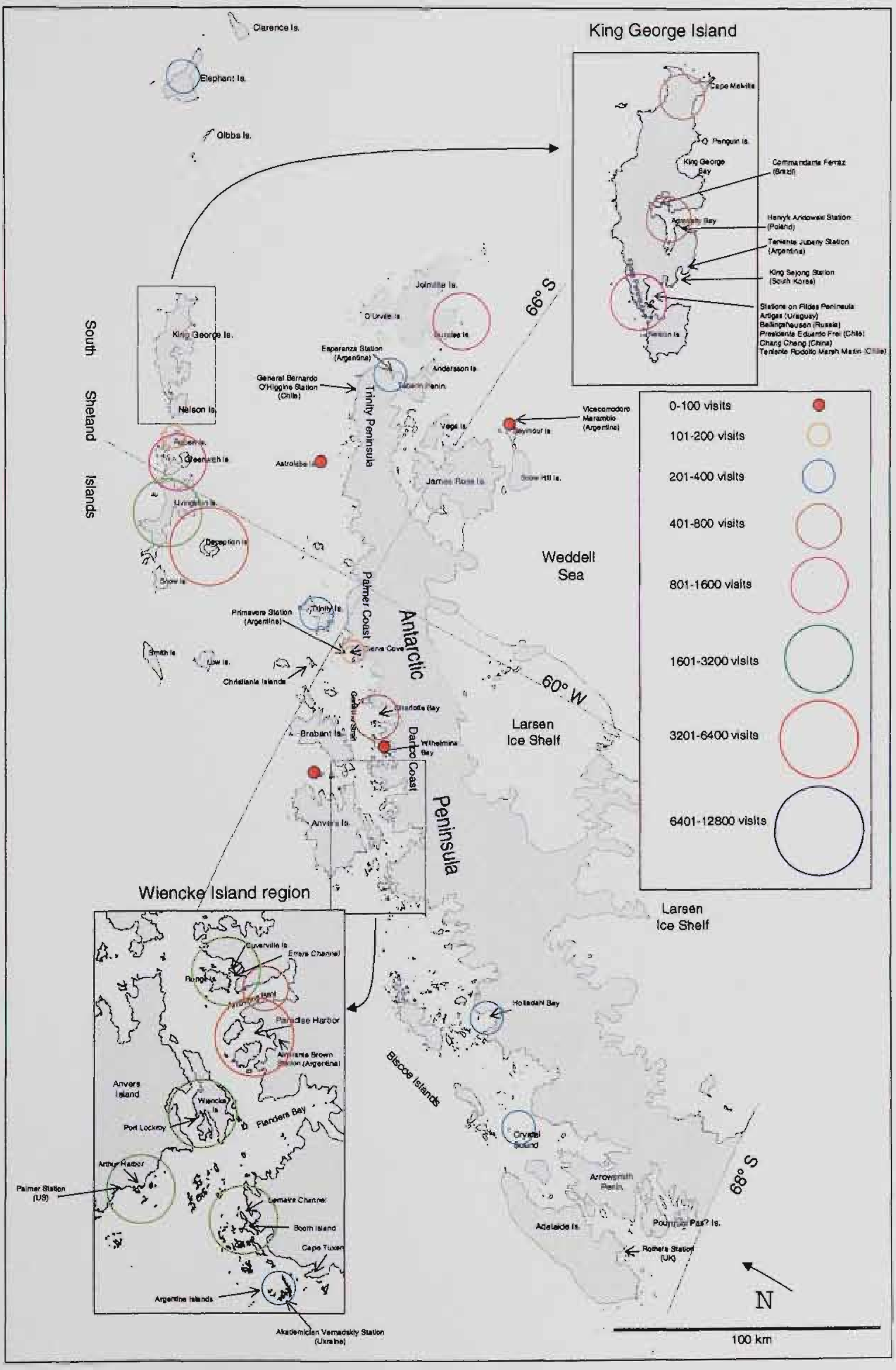
Map 2.3: Peninsula site use change series - 90/91 season



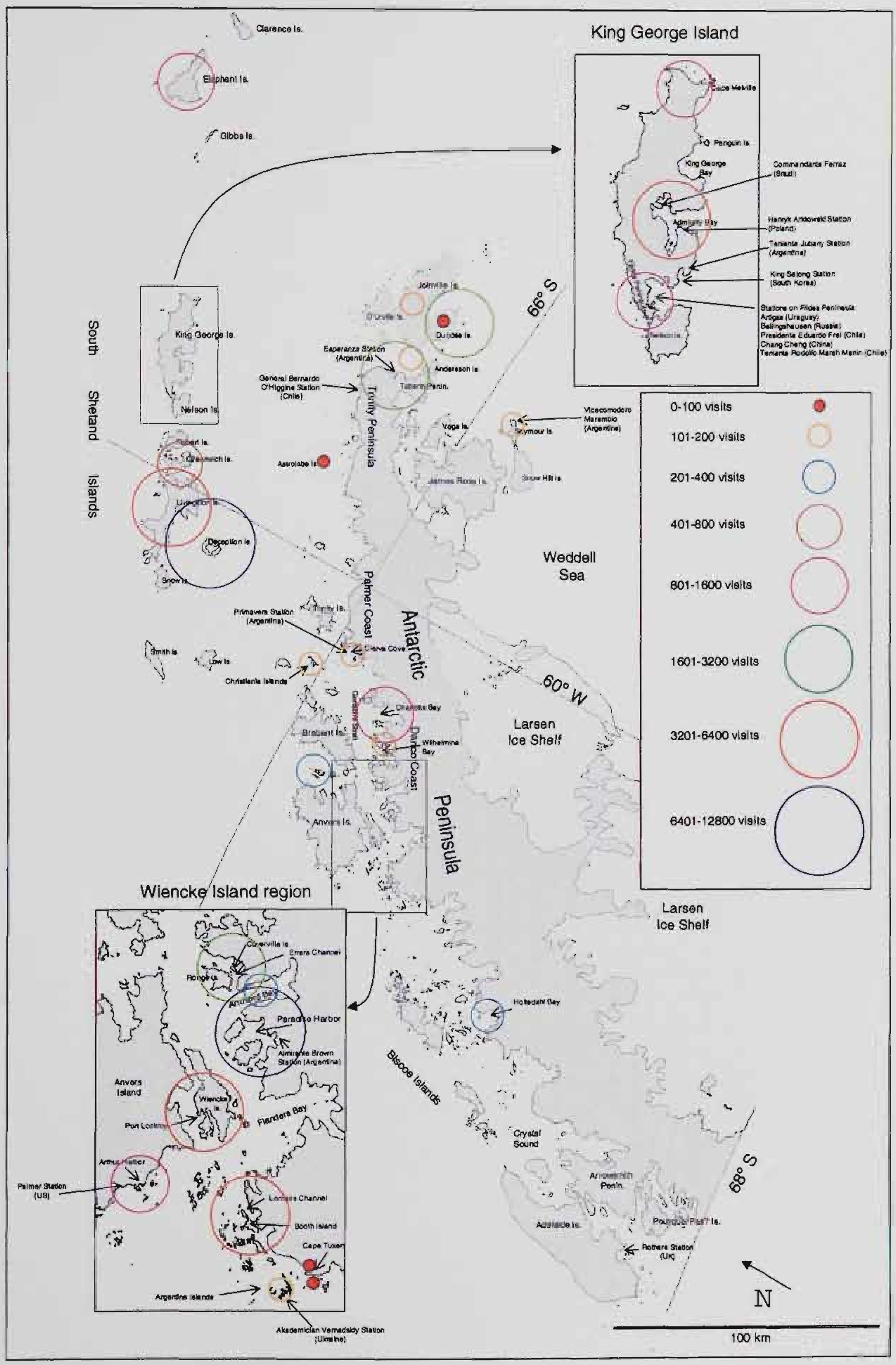
Map 2.4: Peninsula site use change series - 91/92 season



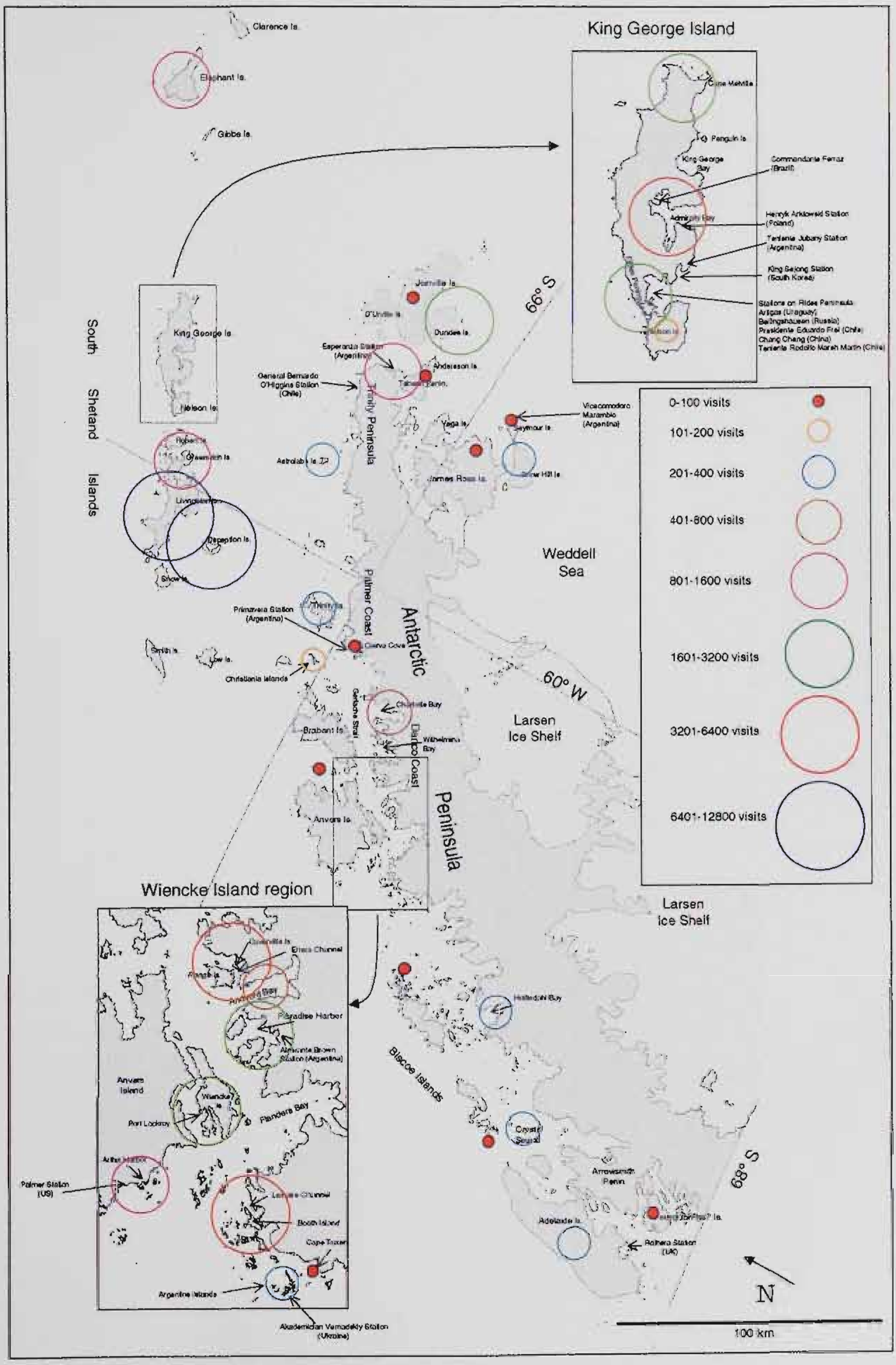
Map 2.5: Peninsula site use change series - 92/93 season



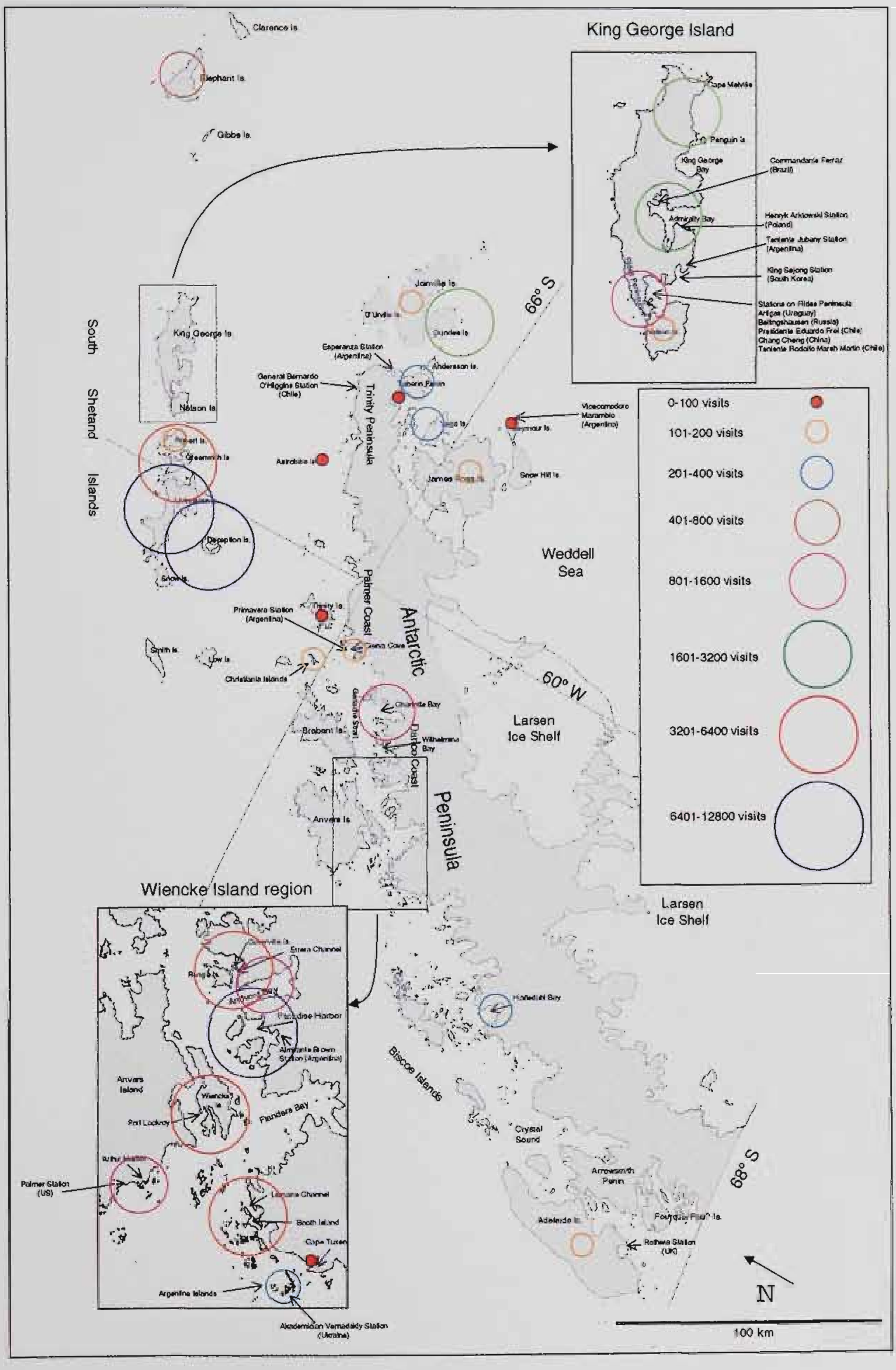
Map 2.6: Peninsula site use change series - 93/94 season



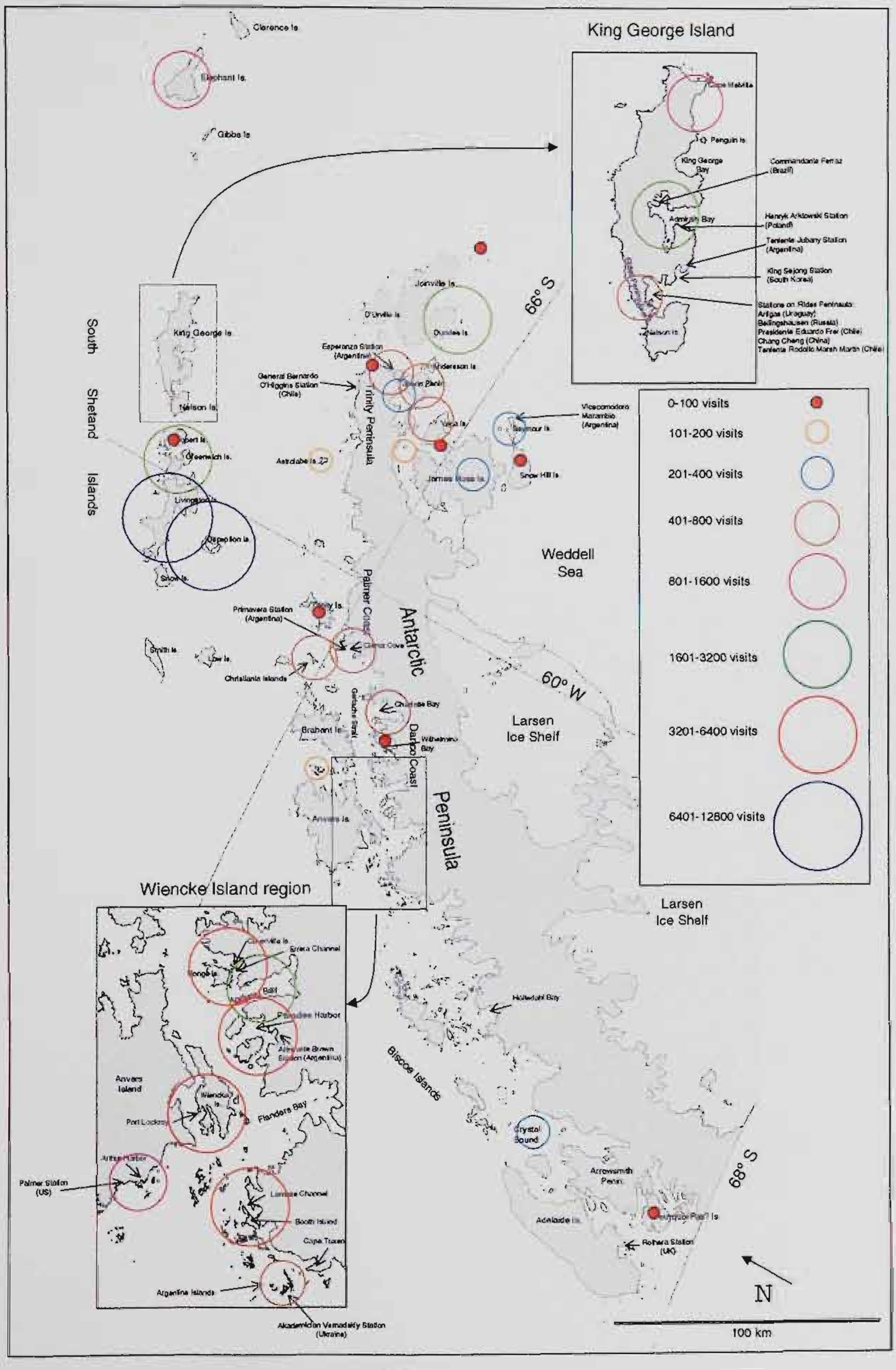
Map 2.7: Peninsula site use change series - 94/95 season



Map 2.8: Peninsula site use change series - 95/96 season



Map 2.9: Peninsula site use change series - 96/97 season



Map 2.10: Peninsula site use change series - 97/98 season

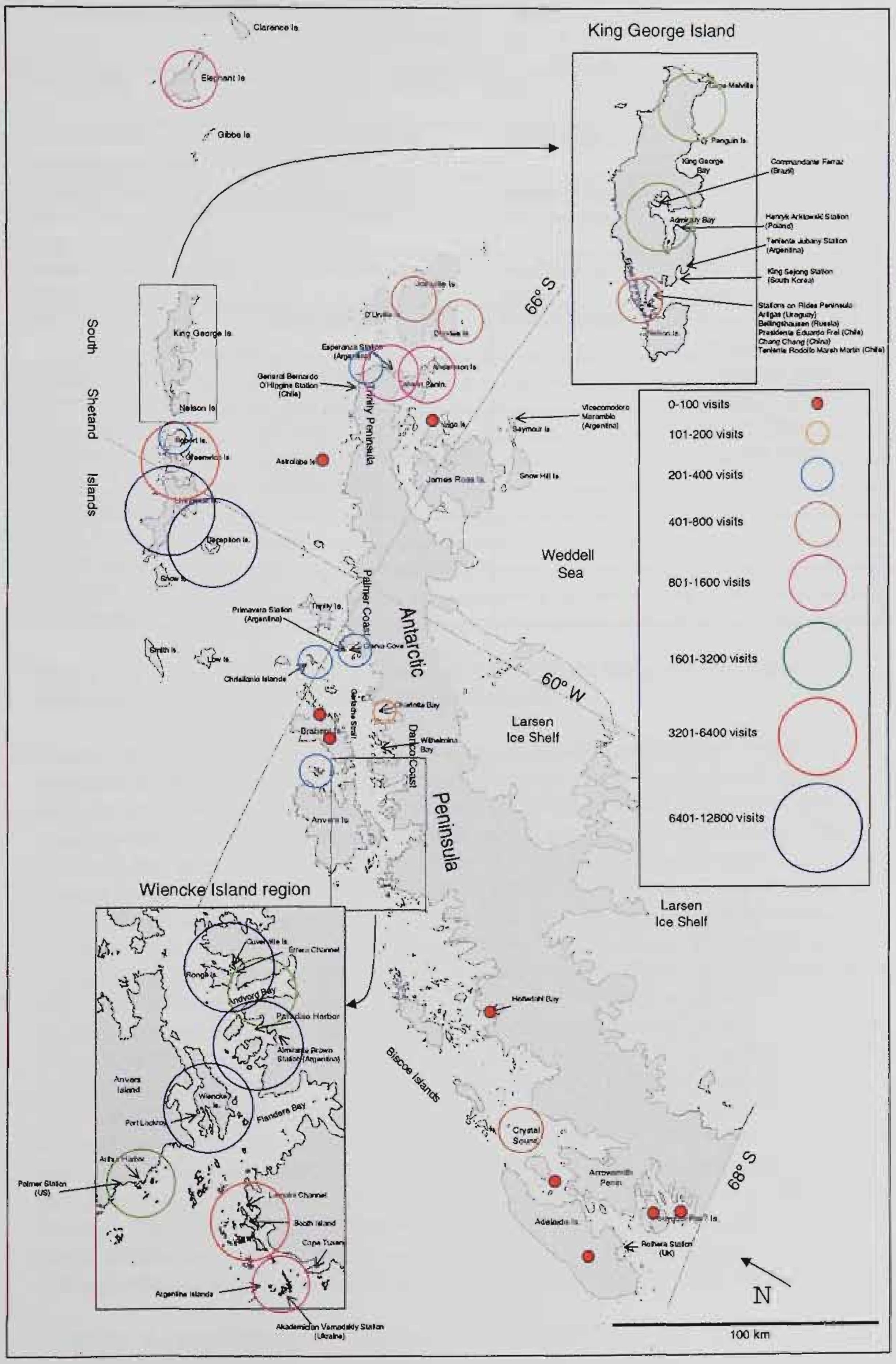


Table 2.17: Areas used for visit mapping (Peninsula region)

Gerlache Strait Region:	Erebus & Terror Gulf / Trinity Peninsula Region	Southern region, Biscoe / Adelaide Islands:	South Shetland Islands:
Andvord Bay	Prince Gustav Channel / Pitt Point	Pitt Islands	Deception Island
Anvers Island / Wauwermans Islands	James Ross Island	Holtedahl Bay	Elephant Island
Wiencke Island	Duse Bay	Adelaide Island	Greenwich Island
Errera Channel / Ronge Island	Seymour Island	Hanusse Bay	King George Island (Central)
Lemaire Channel / Booth Island	Snow Hill Island	Pourquoi Pas? Island	King George Island (East)
Cape Tuxen	Devil Island	Crystal Sound	King George Island (West)
Paradise Harbor	Nelson Island		Livingston Island
Argentine Islands	Hope Bay		Astrolabe Island
Mount Mill	Tabarin Peninsula		Robert Island
Melchior Islands	Antarctic Sound (south)		Joinville Island
Charlotte Bay	Paulet Island		
Cierva Cove Region			
Trinity Island			
Brabant Island			
Christiania Island region			
Wilhelmina Bay			

Maps 2.2 to 2.10 depict the growth in popularity of different areas, and give a good indication of the distribution of visits through the region.

Starting with the South Shetland Islands, outlying Elephant Island exhibits a relatively consistent moderate level of visitation across the seasons. King George Island locations have also remained relatively stable. The southern islands of the South Shetlands group, including Deception Island, show fairly steady growth to high levels after the mid 1990s. The tip of the Trinity Peninsula, and the islands to the east, as a general region, have seen an increase in use, with more areas used, as well as higher visitor numbers. Paulet Island in this region was consistently popular, and other areas in the region received increasing attention. Areas on the eastern side of the Peninsula, including James Ross Island and nearby islands also saw increases, with few visits early in the period and considerably more visits later, although numbers remain relatively low. The Gerlache strait region north of Anvers island, with Brabant Island and Trinity Island began the period with very few visits and with small numbers of people, followed by a gradual increase in the density of the areas used and numbers of visitors. The region of Wiencke Island (Anvers Island, Wiencke Island, and Ronge Island then south to the Lemaire Channel and Argentine Islands) shows a concentration of use. The region began the period with relatively high levels in a number of areas, with an increase in numbers of visitors and in numbers of areas being used. By the end of the period this area was receiving the most attention (followed by the South Shetland Islands). The region from the Argentine Islands south to Adelaide Island, including the Biscoe Islands, showed a generally low usage (both of different areas and of numbers visiting) with two widely spaced seasons showing more activity, but still with low numbers.

Generally, the maps highlight the popularity of the South Shetland Islands, and the region around Anvers Island and the Gerlache Strait. These areas were popular from the start of the period examined, but use of different areas increased as did numbers of visitors (although increase in the number of sites used may reflect more detailed reporting. A general trend of growth is evident in the region of the Joinville Island group (including

Paulet Island) the extremity of the Trinity Peninsula (which includes Hope Bay and two stations), and the western side of the Peninsula. This area stands out as an increasingly popular area over the period examined. As well as increases in these popular areas, there is a gradual infilling of visits to regions away from the popular regions. The early seasons show a relatively sparse distribution of visits, and large regions with very few visits, and the later seasons show a more even spread of visits across these regions.

This analysis shows how site use has developed geographically, and demonstrates the tendency of the industry to seek out new areas and regions, possibly in response to higher use of other areas. Visits, while concentrated in three regions (South Shetlands, Wiencke Island region, and the tip of the Peninsula and surrounding islands) occur across most areas of the Peninsula in at least low numbers.

2.6.3 CONTINENTAL SITES

In areas other than the Peninsula region, 65 sites are recorded as having been used over the six seasons for which information is available (1992/93 through to 1997/98). Across these 65 sites, 242 landings were recorded, with 66 (27%) of these being helicopter landings. This is a significantly higher proportion of helicopter landings than in the Peninsula region, reflecting the different character of tourism activity and the different capacity of the operators using these regions.

Maps 2.11 to 2.13 depict the usage levels of different sites in areas other than the Peninsula region, using average annual visitation over the six seasons examined. Maps were developed as described above, and coloured circle symbols used as for the Peninsula maps. It is important to remember that these maps display averages, and do not take into account the fact that some sites may not have been used in some seasons. The dramatically lower levels of visitation in comparison with Peninsula region sites can readily be seen. The Ross Sea region, especially Ross Island and the Dry Valleys receive the most attention, although numbers are relatively low. Next most popular is the coast of Prydz Bay to both sides of the Amery Ice Shelf, although this attention is in the form of a higher concentration of visits rather than high numbers. Overall, and excepting the Ross Sea region, numbers visiting sites on average remain very low.

Table 2.18 shows the seasonal frequency of site use (for landings). Relatively low numbers of sites were visited in each season, with a high proportion having been visited only during one season of the six examined.

Table 2.18: Landing site use seasonal distribution (Continental region)

Number of seasons used (of 6)	Number of sites
6	3 (5%)
5	5 (8%)
4	5 (8%)
3	9 (15%)
2	13 (22%)
1	25 (40%)

Table 2.19 provides an indication of site load, with average visitor numbers arranged by numbers of sites. The striking feature of this table is the very low average annual visitation at all sites, with only a small proportion (21%) of sites receiving more than an average of 200 people per season.

Table 2.19: Average visitor numbers by number of sites (Continental region)

Average number of visitors per season	Number of sites
51–100	20 (33%)
101–150	19 (32%)
151–200	8 (13%)
201–250	5 (8%)
251–300	1 (2%)
301–350	5 (8%)
351–400	1 (2%)
401–450	0
451–500	1 (2%)

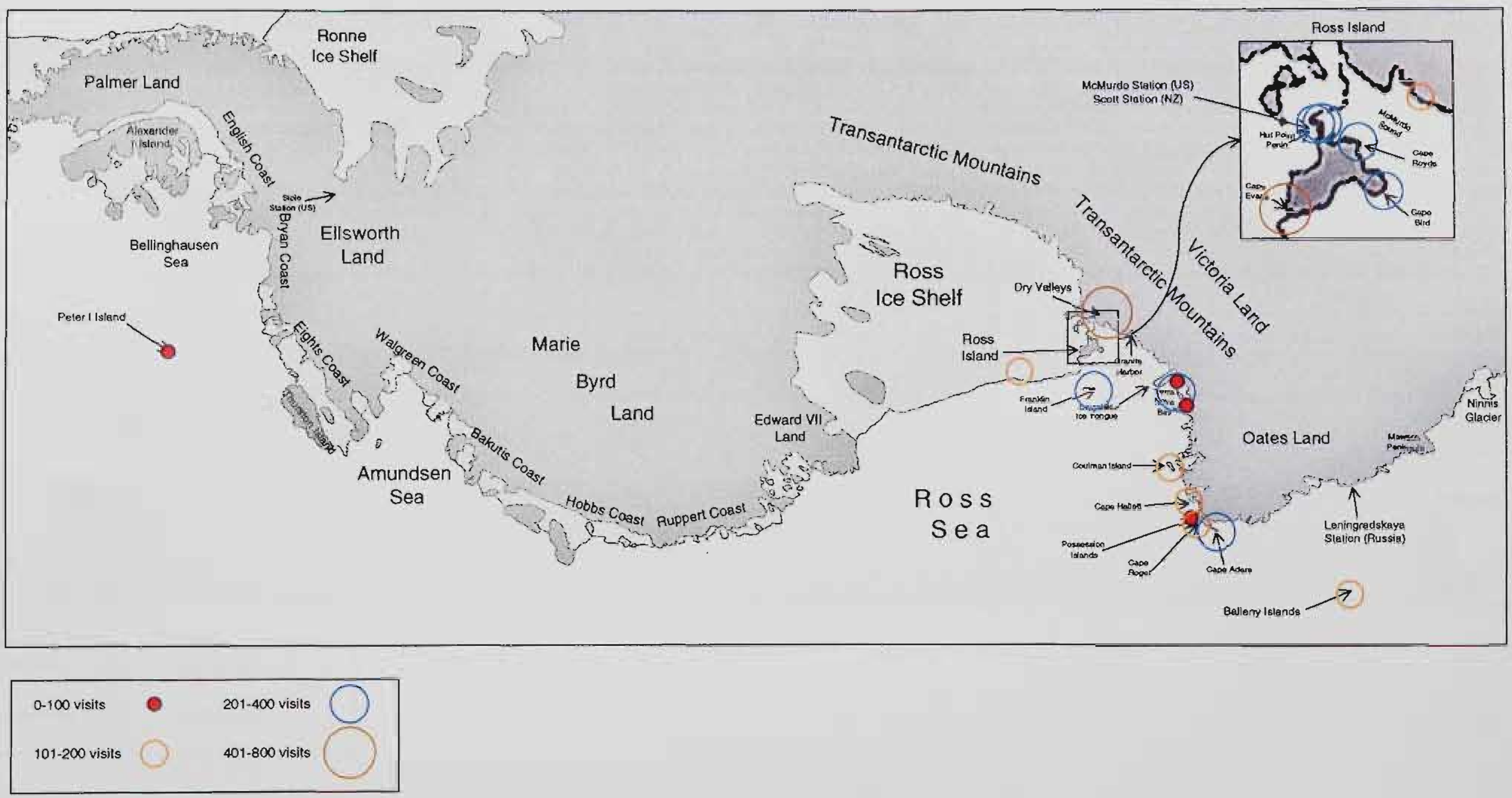
Table 2.20: Continental region sites where average annual visitation is more than 150

Site	Region	Average visitors	No. of seasons used (of 6)	Visits in 1997/98	Average days between visits in 1997/98
Cape Evans	Ross Sea, Ross Island	455	6	4	11.5
McDonald Beach / Caughley Beach / Cape Bird	Ross Sea, Ross Island	418	4	3	11.5
McMurdo Station	Ross Sea, Ross Island	375	6	3	11
Cape Royds	Ross Sea, Ross Island	343	6	2	5.3
Cape Adare	Ross Sea	314	5	3	7
Scott Base	Ross Sea, Ross Island	314	5	2	7
Terra Nova Bay	Ross Sea	300	5	3	8.5
Taylor Valley	Ross Sea	232	4	2	21
Franklin Island	Ross Sea	223	4	2	22
Cape Hallett	Ross Sea	206	5	1	n/a
Davis Station	East Antarctica	169	3	2	31
Ross Ice Shelf	Ross Sea	169	4	2	n/a
Atka Iceport	Dronning Maud Land	158	4	n/a	n/a

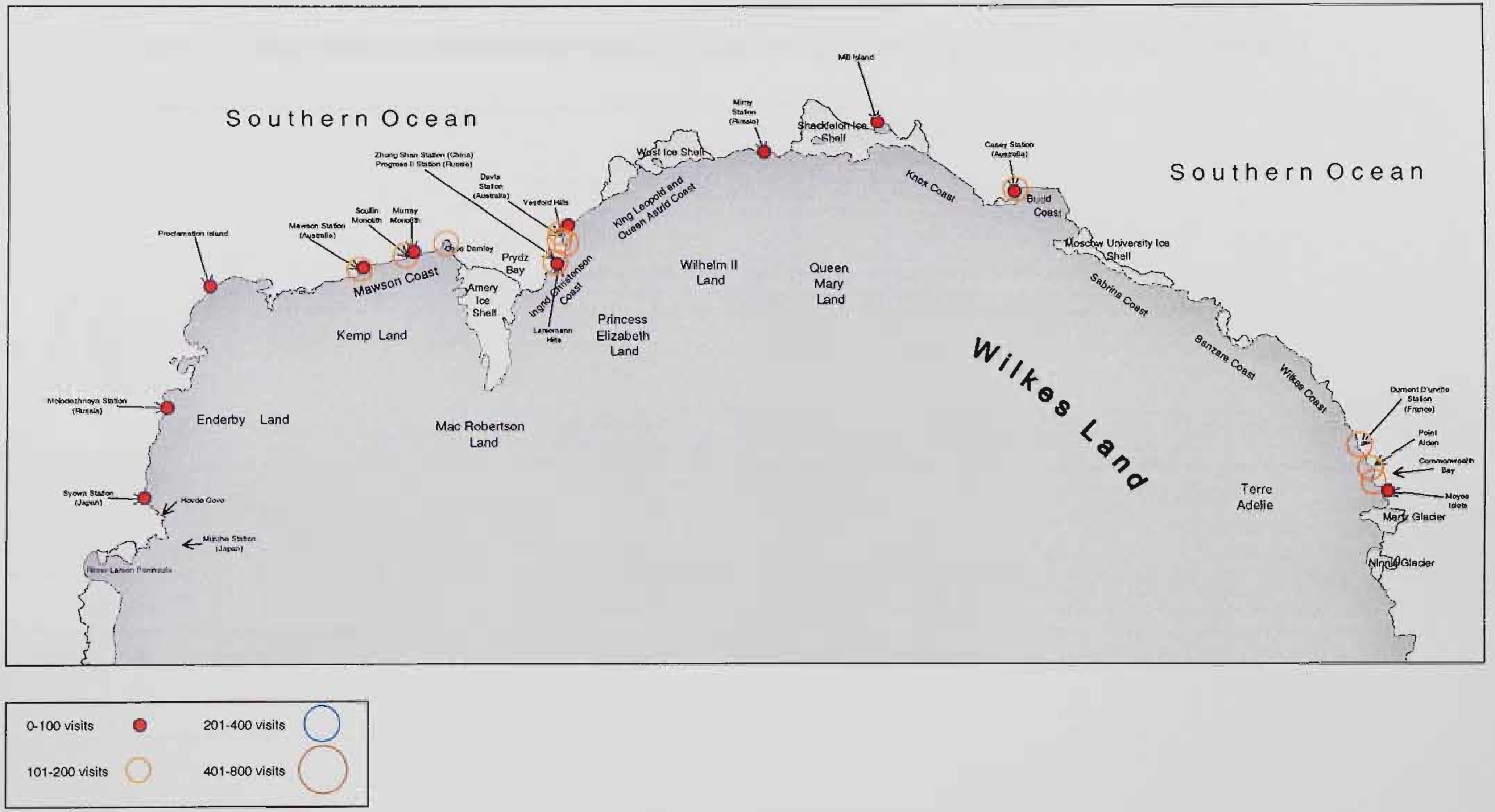
Table 2.20 show sites, used in more than half of the seasons examined, with average annual visitations of more than 150. This provides a further indication of the site use loads of continental sites. The number of visits in the last season examined is very low, and average visitor numbers are similarly low. The distribution of visitation across sites is relatively even, with no sites standing out as receiving substantially more visitation than others. This is probably a function of the fact that once ships reach the Ross Sea region, visits to most of the popular sites would be made. The Ross Sea is clearly the most popular region for visits outside the Peninsula region, as is also demonstrated the site use maps for the continental region (maps 2.11 to 2.13).

Very low incidences of helicopter overflights (five sites used) and of IRB cruising (nine sites used) are reported. Six sites reported had no landings in any season (being used for IRB cruising or helicopter overflights only).

Map 2.11: Major features and tourist sites (Ross Sea region, Oates Land and West Antarctica)



Map 2.12: Major features and tourist sites (East Antarctica, Enderby Land to Terre Adelie)



Map 2.13: Major features and tourist sites (Dronning Maud Land, Weddell Region and western East Antarctica)

2.6.4 SUMMARY

This research provides the first comprehensive analysis of the use of sites for tourism. While a relatively large number of sites have been used in the Peninsula region for tourism, far fewer are used on a regular basis, and the majority of sites have experienced relatively low numbers of landings. A substantial majority of sites in the Peninsula region were visited only once in the nine seasons examined. Visitor numbers are similarly distributed across sites, with a large proportion of sites having less than 100 visitors on average per season, and a small proportion of sites receiving high average visitor numbers each season. A number of sites emerge as having consistently high levels of visitation. The number of new sites coming into use each season was relatively consistent, in the region of 20% to 30% of the total number of sites used each season, an indication of the active seeking of new sites. This result also tends to indicate that at this stage no limit to the finding of new sites has been reached—the industry still has the capacity to extend to new sites.

With the increase in visits and visitor numbers to certain sites, the frequency of visits within the season has increased. The analyses also show the patterns of use of IRB cruising and helicopter overflights, and indicate that while there are some sites where such activities are preferred, they appear to be more commonly used where actual landings are not possible but the site is still worth seeing. Geographical analysis reveals that visitation is concentrated in a number of key regions, although use of areas in other regions has gradually spread, to the point where most of the geographic area of the Peninsula is visited.

In the remainder of the Antarctic, site use is much lower in absolute terms. Fewer sites are used, and visit numbers are low on average. Activity is concentrated in the Ross Sea region, especially around Ross Island and the Dry Valleys area. Low numbers of tourists visit the remainder of the sites around the continental margin.

2.7 IMPACTS OF TOURISM

This section examines the actual and predicted impacts of Antarctic tourism on Antarctic values. Positive and negative impacts are considered. The impacts of tourism on the values of Antarctica are a primary concern for environmental NGOs, ATPs, other governments, members of the public, and tourists and tour operators. Historically, the impacts of tourism on scientific research and national operations have been a focus for ATPs, with the impacts of tourism on environmental values receiving increasing attention from an early time. In this section, some basic tourism impact issues are discussed first, followed by a description of the ways that tourism can impact on different components of the Antarctic resource. Impacts that have been identified or predicted are then outlined. Finally, the issues of measuring and monitoring impacts are examined.

Many authors discuss impacts in a general sense (Beck 1990a, Beck 1994, Cessford 1998, Codling 1982, Enzenbacher 1992a, Enzenbacher 1995a, Hall & Johnston 1995a, Hall & Wouters 1995, HRSCERA 1989, IUCN 1991, Johnston 1998, Johnston & Hall 1995, Naveen 1996, Nicholson 1986, Pineschi 1992, Smith 1994, Stokke & Vidas 1996, Wace 1990). The positive impacts of tourism include the increased appreciation of the global importance of Antarctica and the need for conservation, and fulfilment to participants. Benefits to science derive from direct observations provided by some expeditions, linking of isolated scientific communities to the outside world through visits, logistic support for science, and political support for science as a result of visits. Negative impacts are also recognised and discussed by almost all authors examining tourism issues. Actual or possible impacts raised by one or more authors have included: disturbance of breeding or other wildlife; impacts on flora such as trampling; damage to sites of heritage or cultural significance; impacts on science programs through disruption of stations or camps, damage to scientific values, or the need for search and rescue or other support; habitat destruction or reduction through infrastructure development; reduction in wilderness values; souveniring; littering; introduction of diseases; encroachment on protected areas; and pollution.

It is fair to say that at this stage, knowledge of many impacts is mainly predictive. Few research programs with rigorous experimental designs have been completed, or are even underway, monitoring is practically non-existent, and empirical data sets are few. A number of authors have argued that the evidence suggests tourism is not causing adverse impacts. Naveen (1996, p. 87) states that 'to date, there is no objective and convincing evidence to suggest that Antarctic tourists and visitors have caused any immediate or cumulative damage to the Antarctic environment'. Splettstoesser and Folks (1994, p. 242) state that 'it is probably safe to say that no one yet knows whether human activity (when properly conducted, with established and acceptable environmental procedures in mind) is harmful to the wildlife and vegetation'. In addition, attribution of impacts is a difficult issue. Stonehouse and Crosbie (1995) note that natural fluctuations are considerable, and that population and breeding success may not be good indicators of detrimental human impact.

Given that major short term impacts are not apparent, the issue of cumulative impacts comes to the fore. The impacts of a single tourist visit, or a single season's use of site may be minimal. Repeated use of a site by one or more operators within a season or over a number of seasons may result in additive or cumulative effects, where impacts that are minimal in their own right accumulate to cause more significant negative impacts. It is these types of impact that are least well understood in the Antarctic tourism context (although there is ample evidence of these types of impact in other locations), and they cause major concern (refer to section 3.7.1 for ASOC and IUCN concerns). Research and monitoring schemes aimed at detecting cumulative impacts are underway (sections 1.1.4 and 2.71). In addition, impacts that may well be deleterious in the longer term (such as increased stress levels in breeding birds) have been shown to be possible. The other important aspect of cumulative impact is a management concern, where the cumulative effects of activities with different operators (including governmental and non-governmental activities) need to be considered collectively, rather than the individual effects of each activity in isolation. At this stage no realistic, reliable or workable mechanism to consider cumulative effects of different activities is in place. The management implications of these concerns are examined in chapter seven.

The relative impact of tourism is often raised in defence of the tourism industry. The general argument is along the lines that the impacts from national programs are considerably greater than those from tourism. Headland (1994b) provides a calculation comparing the number of person days on the continent each year for the tourism industry and for governmental activity including science, estimating that tourism represents 0.52% of the total time spent ashore. While the calculation is simplistic it is nevertheless instructive. Riffenberg (1998) strongly asserts that there are continuing problems with impacts caused by research station personnel being far greater then most tourist operations.

Pineschi (1992) summarises the counter-argument, noting that while numbers of tourists have been generally small and the time spent in the area is short, activities are concentrated spatially on sites of particular interest. Temporal concentration of impacts is also an issue. The short summer season means that visits are concentrated over a short period, and the limited number of sites suitable for landing in IRBs leads to a concentration on certain sites. As Johnston and Hall (1995, p. 300) note with reference to polar tourism in general 'this spatial concentration is particularly a problem where access is by air or sea'. They also cite Hemmings and others to the effect that it is characteristic of Antarctic tourism to place large numbers of people in environmentally sensitive areas for short periods. Such visits are localised, repetitive, and usually occur at breeding grounds for different wildlife species (Manheim in Johnston & Hall 1995).

Growth of tourism is commonly linked to impacts, with the assumption being that as more people visit, impacts will manifest themselves or increase. Nicholson (1986, p. 2) states that the problems of preventing harmful interference with the environment are more likely to become acute as tourist activity increases'. Naveen (1996, p. 87) notes that 'the increasing number of Antarctic tourists continues to provoke heated discussions about potentially negative impacts'.

Distribution of impacts is another important factor. As demonstrated in section 2.6.2, a number of sites receive high levels of visitation in a relatively short operating season. Cumulative impacts are likely to be expressed earliest and most at these sites. Distribution of impacts beyond these often visited sites should not be neglected either. Visits to previously unvisited sites have the potential to significantly affect values, in a way that additional visits do not. The first visit to a site, especially if that site has never previously been visited by anyone, while clearly not an issue of cumulative impact, has its own distinct impact on scientific, wilderness and aesthetic, and possibly biotic values (if biological contamination were to occur). Site sensitivity is also important. Sites can be regarded as a composite of biotic, physical, and cultural or social features. Each site is unique, but clearly some sites will be far more sensitive than others due to their particular features.

2.7.1 TYPES OF IMPACT

Section 1.2 discusses the Antarctic resource and values derived from it. The impacts discussed here are grouped according to impacts on science and scientific values, impacts on the biological, physical and chemical components of the environment, impacts on cultural heritage, and impacts on wilderness and related values.

2.7.1.a Impacts on science

Scientific values are, like wilderness values, complex and composite, deriving from the basic environmental, geological, climatic and oceanographic features and relationships of the area. Human impacts on science values can occur through disruption of the conduct of science (directly via disturbance of scientists or science programs, or indirectly by the diversion of resources from science activity) or through direct impacts on the resource base utilised by science (disturbance or destruction of physical or biological features for example). Tourism has the potential to impact on science values in all of these ways.

The impacts tourism can have on the conduct of science receive considerable emphasis. Beck discussed the *Bahia Paraiso* incident (where personnel from the US Palmer Station were involved in rescuing passengers and crew) and the Air New Zealand Mt Erebus disaster (which severely disrupted US and NZ programs) as examples of the problems caused for science when national programs are required to assist tourists (1990a, 1994). Beck (1990a) also used the example of 1986/87, where 1600 visitors to Palmer Station (US) caused the loss of 40 working days, leading to restrictions on visits.

Less extreme examples are offered by some authors, whereby the day to day activities of tourists can disrupt science. Cessford (1998, p. 27) states that 'the most pervasive impact from tourism has actually been on the operation of the stations themselves. Tourists display a particular interest in science visits, and these are usually seen as an integral part of the Antarctic experience'. Nicholson discussed the impact on the conduct of science of larger numbers of tourists, suggesting larger numbers, even if well behaved and well-equipped, may cause significant strain (1986, p. 2). Hall and Johnston (1995a) discuss the relationship between science and tourism in polar regions. They acknowledge the potential for disruption of science activity, and describe the possibility of social stresses.

Enzenbacher (1994c) provided a summary of advantages and disadvantages of tourist visits to scientific stations. Advantages included: social benefits to station personnel; delivery of mail, food or supplies; the chance for tourists to see how government funds are spent; creation of ambassadors for Antarctic research; tourism 'monitoring' of government operation environmental performance; promotion of good international relations; and the chance for people other than scientists to learn about Antarctica. Disadvantages included: disruption of research or station activity; inadvertent disturbance of scientific projects; diversion of emergency services; tension between station personnel as a result of visits; diversion of science personnel from science; dissatisfaction with science as an attraction; and long term disruption to science programs.

The impact of tourism on the scientific resource is often raised as a problem. Tourism has the potential to affect the suitability of the resource for future scientific research. An example might be microbial contamination as the result of a shore visit to a site previously unvisited, which may destroy the potential for some forms of science at that site. Beck (1994a) cites encroachment on protected areas (which are in many cases unmarked) as an example of impact on the scientific resource. These forms of impact are similar to those that would result from any similar activity, although the geographic spread of tourism and the large number of sites, including new sites, are of concern in this respect.

There is considerable potential to minimise the impacts of normal tourism on the conduct of science. Splettstoesser and Folks (1994) felt that while many national operators were concerned with the potential for tourism to disrupt research, they regard tourism and research activities as being generally compatible, when advance notice is given and appropriate permission is obtained. Positive impacts on science, including beneficial social effects of tourist visits to isolated stations, and the actual conduct of science by non-governmental and tourist groups are also described by Hall and Johnston (1995a).

2.7.1.b Impacts on the environment

Impacts of tourism on the biological components of the resource receive the most attention, and have been the subject of some research. These types of impact are not limited to tourism but are possible with any human activities, although the characteristics of tourism mean some types of impact are more likely than others.

Impacts of human activity on snow-free surfaces in Antarctica were examined by Campbell, Claridge and Balks (1998). They examined the rate of track formation from trampling on Antarctic vegetation free soils, using experimental sites near Scott Base on Ross Island and in the Dry Valleys, Ross Sea region. Three different surface types were examined, and three parameters were measured intervals along a transect—the number of pebbles and stones, the percentage area of lighter coloured subsurface soil exposed, and the width of track that had formed. These parameters were measured after 20, 50 and 200 foot traffic passes. The results indicated that obvious track formation occurred after only a few foot passes, and gradual change continued with more passes. The effects of foot traffic depended on the ground type. They also determined that disturbances to the surfaces were very long lived (by examining sites known to have been disturbed in the past). The authors concluded that 'for most Antarctic soils, the threshold at which very obvious and probably permanent damage occurs is clearly very low' (Campbell, Claridge & Balks 1998, p. 21). They suggest that the development of tracks can be avoided by carefully choosing routes that are more stony or bouldery, and if repeated visits are required to a place, that a defined track be used to keep the disturbed area to a minimum.

Impacts on wildlife species are the most obvious and most examined form of tourism impact, reflecting the magnitude and importance of the values derived from wildlife. The vulnerability of Antarctic wildlife, in combination with its attractiveness to visitors, makes the potential for impact considerable. Bird species and seal species are generally regarded as being most likely to suffer impacts, but vegetation, microbial communities, and other marine mammals are also vulnerable to impact. Disturbance related impacts have been the subject of some study. Disturbance impacts in themselves can be short term, but it is thought by many that long term deleterious effects may result (such as reduced breeding success or increased susceptibility to disease). Five U.S. Organizers (1997) provides an annotated bibliography of human impact studies. The majority rely on either contrived intervention as a proxy for human interference, or on indirect measures of impact such as breeding success or rookery abandonment. A small number of projects have attempted to replicate the forms of disturbance associated with tourism. Importantly, most studies have used Adelie penguins as subject species, highlighting the relatively poor state of knowledge of visitation on other species.

In addition to knowledge of impacts from research, the sensitivity of different species to impact can be predicted from ecological research, based on life cycle and breeding knowledge, and behavioural research. To a greater or lesser degree, such information is available for most species of birds and mammals, and similar predictive processes can be carried out for plant species. Five US Organizers (1997) describes potential impacts on all nesting bird species (penguins and flying birds), marine mammals, and terrestrial flora and fauna. In addition, the actions that can be taken to avoid potential impacts are also described.

A number of projects examine the effects of human activity in and around breeding bird colonies. Some of these projects did not include actual tourist visits to study sites, but rather experimental designs developed to test bird responses to human or vehicular presence or approach. A small number of these studies are reviewed here. It is not possible to conduct a full review of human impact on wildlife research, but several of the more important papers can be briefly examined. Generally, these studies have examined indicators of stress in animals subject to simulated visits. These studies show that certain types of human activity, including those common in tourism, can contribute to stress in birds. Other studies have examined the possible consequences of stress or disturbance on breeding success.

Nimon, Schroter, and Stonehouse (1995) examined the responses of gentoo penguins to walking visitors, using an artificial egg heartbeat sensor. The artificial egg was placed in a normally incubated nest, and the bird was marked with paint using a long handled brush. The treatment involved a person appearing at a distance of 15-20m, and approaching to within three metres, pausing every five metres (taking about three minutes overall). The person sat for five minutes then stood and left. Other types of approach patterns were tested also, including approaches to one metre. For the standard slow approach, mean heartbeat rates did not differ significantly from the non-disturbed rate, although heart rates varied during the approach, sometimes rapidly. Closer and rapid approaches caused much increased rates, elevating rates by as much as 110% with a rapid approach to one metre. They concluded that 'the reactions of nesting penguins to visiting humans depend on the visitor's behaviour, and the presence of a well-behaved visitor changes, only momentarily if at all, the awareness of a penguin with no prior, adverse experience of humans' (1995, p. 415). Culik and Wilson (1995) responded to these results, stating that a re-analysis of Nimon, Schroter, and Stonehouse's data indicated that the maximum heart rates were on average 19% higher than resting values of undisturbed birds. They also noted that variations in the response to disturbance within the species are considerable, meaning that generalisation of the findings to other colonies and to other penguin species were therefore not supportable.

Wilson et al. (1991) provided important information on the response of Adélie penguin individuals and colonies to a variety of disturbance regimes. Behavioural responses and physiological responses to disturbance were examined. Heart rate measurements were taken using heart rate monitors, implanted surgically, to allow remote recording. Behaviour was observed directly, and indirectly through video monitoring. Behaviour of birds commuting between colony and sea, and of birds in the colony itself was observed. The disturbance experiments included approach by a single human, human activity 20–50m from birds, and a variety of different aircraft activities. Results showed that the penguins exhibited both physiological and behavioural change in response to disturbance. Human approach caused elevated heart rate, changes to penguin walkway routes (by up to 70m extra distance, and lasting for many hours after disturbance had ceased), and fleeing of nests. Aircraft approaches and passes caused considerable behavioural change, varying with aircraft type and distance. It is important to note that significant concerns have been expressed about the results of this research, the main issue being the invasive nature of the research design and the effect that may have on results (Nimon, Schroter & Stonehouse 1995).

Giese (1998) reported on research conducted in an Adélie penguin rookery in the Vestfold Hills during the 1993/94 season. The research design used controlled disturbance stimuli and objective quantification of behavioural and physiological responses, features not present in earlier research according to Giese. The sample size used was larger than in other studies (Giese 1998). Behavioural responses were recorded on video from hides placed in the area 2–3 weeks before the study. Heart rates were measured using externally fitted heart rate transmitters. In order to control for possible effects of handling birds to fit these transmitters, and of wearing them, artificial egg heart rate recorders were used in a control experiment. Disturbances included slow approach by a single person to 5m, 15m and 30m, with one minute of standing at the minimum distance, and one minute of kneeling. Behaviour and heart rate before, during and after the disturbance were recorded. For comparison, behaviour and heart rate were measured during approach by south polar skuas both opportunistically and by enticing skuas with a dummy penguin egg placed nearby.

Results of Giese's work showed that, on approach to 5m, 68% of birds stood from the prone incubating position, taking an average of around 50 seconds to return to that position. Such behaviour exposes eggs to increased risk of predation, accidental damage or egg cooling (Giese 1998). Approaches of 15m and 30m did not prompt this type of behaviour. Similarly, other forms of behavioural change increased in frequency with approaches to 5m, but not with 15m or 30m approaches. Heart rates rose from a resting rate of 82 beats per minute (bpm), to 96 bpm for a 15m approach and to 126 bpm for a 5m approach. Approaches of 30m did not raise heart rates. Heart rates for a 'natural' disturbance (such as a 5m approach by a predator) were less than those for the 5m approach by a human. The behaviour of the approaching human (standing or kneeling) affected heart rate, with higher rates with the person standing than when kneeling.

Most of the bird research to date relies on heart rate as an indicator of stress. Some have suggested that the relationship between heart rate and detrimental stress in birds is not well established. Wilson et al. (1991) argue that heart rate is indeed a good indication of stress levels. One problem with disturbance impacts on wildlife is that Antarctic flightless birds may not exhibit outward signs of stress. Wilson et al. explain that in the case of Adélie penguins there is 'no selective advantage for a flightless bird on land in the absence of experience of predators to show alarm reactions' (1991, p. 368), meaning that the lack of visible reaction to people does not mean that they are not stressed.

In addition to work on the reactions of individuals and colonies to short term disturbances, breeding success has been examined as an indicator of impact of human activities. A monitoring program is underway at Port Lockroy, the most visited Antarctic site in recent seasons (section 2.6.2). The conservation and opening to visitors of an abandoned British base at the site has encouraged visits to the site and to nearby wildlife sites. The effects of visitors on breeding Gentoo penguins are being examined by BAS (National Environment Research Council 1998, 1999), comparing visited sites to control locations where visitors were excluded. Cobley and Shears (1999) reported on the findings of this research. They examined two measures. Breeding success was compared in visited colonies and in unvisited colonies in one season (1996/97), with the finding that there were no adverse effects indicated from tourist visits. Long term population trends at heavily visited colonies were examined, with the finding that the colonies are growing despite high levels of tourism use. They concluded that 'these data suggest that the effects of disturbance from tourists are unlikely to have been major determinants of gentoo penguin population change at Port Lockroy' (Cobley & Shears 1999, p. 360).

Fraser and Patterson (1997) report on results of a study of long term population data on Adélie penguin colonies near Palmer Station in the Peninsula region. A number of islands with penguin colonies formed a set of experimental sites. The declaration of an SPA on one island in the area in 1978 effectively ceased tourism and scientific activity to that island, and other islands were closed to such activity by agreement with the NSF. As a comparison, one island continued to receive tourism visits (as well as scientific activity and station recreational visits). Changes in penguin populations on different islands were assessed. The island with SPA status, receiving no tourism activity and very little science activity, saw a reduction in the total breeding population of Adélie penguins of 43% between 1975 and 1992, while the population on the island receiving tourism visits decreased by only 19%. Fraser and Patterson concluded that the data suggest that 'the potentially adverse effects of tourism and research may be negligible relative to the effects imposed by long-term changes in other environmental variables' (1997, p. 445).

The breeding success of Adélie penguins in the Vestfold Hills, East Antarctica, was examined by Giese (1996). Two different disturbance treatments (nest checking, and recreational visits) and a control were used, for both small (around 44 nest) colonies and larger (around 70 nest) colonies. Nest checking entailed visits every second day, with one person standing 10m from the colony and a second person moving around or into the colony, lifting birds slightly with a pole if necessary to check nests. Recreational visits involved between two and four visits of 10 minutes duration each day, with two people walking slowly around the colony, 5m from its edge, talking quietly, crouching or kneeling and taking photographs. Hatching success and chick survival were measured. Giese found hatching success and chick survival were highest at control colonies and lowest at colonies subjected to disturbance treatments in the smaller colonies. There was no significant difference found between nest checking and recreational visits in either size of colony. Giese concluded that 'the breeding success of Adélie penguins in smaller colonies can be significantly affected by human disturbance in the form of regular nest checking and recreational visits' (Giese 1996, p. 161). Giese also concluded that larger sample sizes would need to be used to provide an opportunity to detect small or subtle effects.

Thomson (1977) examined human impacts on the Cape Royds, Ross Island Adélie penguin colony. The research tracked a decline in colony size attributed to disturbance caused by helicopter visits and other human activity. The population size of the colony decreased rapidly from around 1956, when McMurdo Station (US) was established and Cape Royds became a popular site for visits of station personnel and VIPs. Thomson reported that in 1961 helicopter landings near the colony were routine, occurring almost every fine day and often with more than one flight each day. Helicopters landing very close to the colony 'scattered scores of penguins, breaking the breeding routine, exposing eggs and chicks to predation by skuas, and unsettling the young non-breeding birds which prospect for nest sites' (Stonehouse in Thomson 1977). Visitors walked through the colony itself and handled birds (Thomson 1977, p. 1178). From an estimated 2000 breeding pairs up until 1956, numbers declined to around 1000 breeding pairs in 1963, when the US and NZ Antarctic programs (those active in the area) agreed to control visits (at this stage involving only VIPs and station personnel). Restrictions included flying well away from the colony, and landing at a new site further away. Entering the colony or handling birds was prohibited. In 1968 caretakers were placed at the Cape to oversee visits, and a walkway was marked out to ensure approaches were no closer then 3m. Some tourist visits had occurred to the site by the time Thomson reported, but he noted low tourist numbers and a decline in VIP and station personnel visits. Populations of breeding pairs had increased since 1963, with Thomson stating 'evidence suggests almost conclusively that the sharp decline in penguin numbers can be attributed to the nearly constant interference by visitors on foot and more significantly to helicopters flying low over the rookery and landing within 100m' (1977, p. 1180). Thomson's paper suggests that significant impacts can be caused by disturbance. It is interesting to compare the level of disturbance involved at Cape Royds prior to 1963 with the forms of disturbance being tested in the research of Giese, Nimon Schroter and Stonehouse, and of Wilson et al. described above.

These studies indicate that substantial levels of human activity (as in the case of Cape Royds) can have a deleterious effect. Conclusive evidence of substantial levels of harm as a result of less intrusive human activity, akin to that imposed by tourism, has yet to be established.

The understanding of disturbance impacts of tourism activities on seals and other marine mammals is largely predictive. Impacts of shore based viewing of hauled out, moulting or breeding seals may be of concern. Impacts of vessel and small boat operations on whales, birds, and seals in the water are largely unknown. Similarly, while it is generally acknowledged that tourism use of sites can cause impacts on vegetation species through trampling, little in the way of research has been reported.

Other impacts on the biological components of the environment can be predicted based on knowledge of tourism activities. Table 2.21 includes some predicted impacts, both of routine operations and of incidents or accidents.

2.7.1.c Impacts on cultural heritage

An important component of the Antarctic resource is cultural, including historic sites, artefacts, and buildings (section 2.1.3). Sites associated with events, even where physical fabric is not present, can have cultural meaning. Symbolically important places are also part of the cultural resource, such as the south geographic pole. Values can be derived from locations without physical remains, or from buildings, artefacts, or monuments. The range of value categories discussed in section 1.2 (use values, existence values and so on) apply to historic sites, in the same way as they do to environmental features. Tourist visits have the potential to impact sites with physical components. Historic huts and associated artefacts can suffer, as a result of visits, changes to internal climate (including humidity), souveniring of artefacts, and disturbance (deliberate or inadvertent) of artefacts inside or outside huts (Hughes & Davis 1995). Other impacts include transport of materials into huts on boots and handling of objects (Hughes 1994). The indirect impacts of tourism include pressure to 'clean up' sites, or pressure to take certain preservation works such as the removal of ice from buildings. These actions may affect the cultural values derived from such places. Hall and Johnston (1995a) discuss the potential for sites and artefacts to be damaged or destroyed by souveniring, vandalism, or accidental fire, with consequent impacts on heritage values. The IEE prepared for East Antarctic operations by Quark Expeditions for 1997/98 activities (Quark Expeditions 1997, p. 34) details potential impacts of tourism on historic buildings and includes 'degradation of historic buildings and artifacts through abrasion, increased humidity, physical defacement or removal of objects'.

2.7.1.d Impacts on wilderness and other values

Wilderness and aesthetic values are considerable, and when non-use components are taken into account, are some of the most significant values associated with Antarctica. The Protocol specifically acknowledges the importance of and need to protect wilderness and aesthetic values. Wilderness values (as discussed in section 1.2) are complex, composite, and difficult to define, but it is clear that vast areas of the Antarctic are wilderness of high quality, and that wilderness qualities dominate the public perceptions of Antarctica. Wilderness and aesthetic values are by their nature subject to modification by the presence of people, vehicles, equipment or infrastructure. Such impacts can be transitory, or more permanent, in the case of major infrastructure or permanent modification to natural systems. Non-use wilderness values can be affected by human activity, even if no visitors are present to observe. Importantly, use-related components of wilderness value (derived when people visit) can be impacted by the presence of other visitors.

Similarly, tourism as a human activity can have impacts on aesthetic values, by the presence of people or equipment, or by a more lasting reduction in aesthetic quality caused by modification of the environment in some way.

The impacts of tourism on these values are recognised but are largely unquantified. It is likely that use-related components of wilderness value are being impacted to a certain degree by perceptions of crowding. Non-use components of wilderness values may also be affected by the knowledge that visitation is relatively common. These impacts are likely to be minor in comparison with the reduction in wilderness and aesthetic values caused by permanent infrastructure and similarly pervasive impacts resulting from national operations.

2.7.1.e Positive impacts

Positive environmental impacts of tourism also occur. In some locations, they involve the substitution of tourism (as a source of income) for resource extraction activities or other activities that may be more harmful to the environment. In the case of Antarctica, without local populations and without the pressures of national development and exploitation, tourism cannot be considered a substitution for more harmful activities. It is clear, however, that positive impacts occur. One benefit is simply the satisfaction of demand, the fulfilment of the desire of people to see the region, which provides value to participants (Nicholson 1986). This is the primary driving factor in all tourism, and it can be argued that people have a right to visit places. Another benefit often cited is that of 'creating ambassadors for Antarctic conservation'. At a meeting of tour operators in 1996, IAATO members described the positive environmental benefits:

> Providing a first-hand Antarctic experience to tourists educates them to the ecological sensitivity of the Antarctic environment and promotes a greater understanding of the earth's resources and the important role of Antarctica in the global environment. Controlled visitation by well informed, well prepared travellers in small groups, led by experts in the field, helps ensure ecologically sustainable activities and the continued protection of Antarctica as well as support for science (Quark Expeditions 1997, p. 15).

IUCN listed a range of benefits of tourism to Antarctic conservation in *A Strategy for Antarctic Conservation*:

> On the one hand, all who experience its magnificent scenery and wildlife gain a greatly enhanced appreciation of Antarctica's global importance and of the requirements for its conservation. Such visits also bring fulfilment to those seeking personal challenge and wilderness adventure. Moreover, scientific activities may also benefit, since tourist visits can provide a useful link with the outside world and strengthen political support for Antarctic science, and small, independent expeditions to remote areas often make valuable scientific observations (1991, p. 55)

Beck (1990a, p. 345) summarised positive impacts as 'benefits in the form of either commercial rewards or an enhanced public awareness of the nature and special needs of Antarctica, including the merits of environmental and scientific research'. Beck also cites the Australian Antarctic Science Advisory Committee (ASAC) as believing 'that limited, controlled tourism would be invaluable in sensitising the Australian and, indeed, the world community to the uniqueness and great beauty of the Antarctic environment... and would ensure greater support, both nationally and internationally, for responsible moves to protect the environment from irreparable damage by existing and possible future activities in Antarctica' (ASAC 1988 in Beck 1990, p. 345). In the 1980s tourists played a role in forcing governments to be more environmentally responsible in their operations. Results of pressure from tourists included cleaning up of government bases, and providing better training of government personnel (De Poorter in Rubin 1996, Stonehouse & Crosbie 1995). Nicholson recognised the benefits of tourism in helping 'create public appreciation of the need for stringent environmental protection measures in the Antarctic and for further scientific research' (1986, p. 7). Smith described support for the view that tourism will save Antarctica, by creating a 'substantial number of well-educated travellers who are familiar with its resources and whose voices would be heard in defence of conservation policies' (1994, p. 222). Johnston and Hall (1995) also recognised the benefits of tourism, concluding that it is nature-based tourism that will be responsible for the continued protection of Antarctica from other forms of economic exploitation such as mining or whaling.

Logistic support for science is provided in many cases by tourist ships and by air operators. Wace (1990) noted that while tourism is often perceived as a threat to the role of Antarctica as a continent for science, there are potential ways in which tourism can assist science, including systematic observations, and photo documentation. Benefits also derive from the presence of shipping in the region in the case of accidents—when the *Bahia Paraiso* sank, tourist vessels were instrumental in evacuating passengers (Rubin 1996, Stonehouse 1992a)—and the continued presence of ships offers a level of safety and security for the tourist industry and other users (Stonehouse 1994a). The establishment of what is effectively a continent-wide air travel system also offers additional safety benefits for tourism and for national operators.

Finally, tourism can be seen as leading the way in developing modes of operation that are minimally damaging. Because of the pressure placed on tourism to be environmentally benign by ATPs, NGOs, media and by the tourists themselves, tourism has developed ways of operating with minimum impact. By showing that it is possible for people to visit the Antarctic with minimal infrastructure and impact, tourism provides a very good example to national operators who may follow suit. The operations of Polar Logistics in Dronning Maud Land (section 2.4.2) are an example where, building on experience and capacity developed in the service of tourism, a company is offering an efficient transport and cargo operation to five different nations, an achievement that nations operating in Antarctica have never achieved despite the benefits offered by a cooperative approach to logistical needs. ANI has also pioneered the use of blue ice runways for wheeled aircraft, an option now being used by national operators on a regular basis, and being actively considered by a number of other nations.

IAATO (Five U.S. Organizers 1997, p. 40) summarises the benefits of tourism thus:

> the benefits derived from responsible tourism, such as better knowledge and appreciation of the region, have been great. The snow-covered mountains, glaciated landscapes, and extreme weather of this physically remote part of the world lend this region remarkable wilderness and aesthetic value for the adventurous traveller.

2.7.2 IDENTIFIED OR POSTULATED IMPACTS

A range of postulated or predicted impacts relating to tourism were identified by examining the literature and the findings of environmental assessments undertaken since various countries began implementing the Protocol. Table 2.21 lists these impacts and categorises them according to extent, duration, intensity, probability and significance. The levels assigned within these categories are based on the judgement of this author, on activities as they occur under present management conditions, and serve as a general indication only. It should be kept in mind that many of these impacts have a low probability of occurring. Impacts are possible, not always inevitable, and in many cases operational techniques are in place to mitigate, minimise or negate them entirely, as discussed in section 2.3.4.

Impacts will clearly vary according to the form that tourism takes. HRSCERA (1989) provide a general discussion of the different types of impacts likely to be associated with the different forms of tourism, including permanent land based facilities. Table 2.21 provides some information on impacts according to the type of activity, but does not examine impacts of activities that do not exist at present, for example permanent infrastructure in an ice-free area.

Table 2.21: Summary of predicted and actual tourism impacts

Impact	Extent (of individual operations)	Duration (of impact)	Intensity	Probability of occurrence	Significance
Ship related					
fuel spills (accidental release)	local / regional	medium	high	low	high
marine incidents/accidents resulting in fuel or refuse spills	local / regional	medium	high	low	high
shallow water turbidity, propeller wash disturbance	local	short	medium	medium	low
physical damage to benthos through grounding, anchoring	local	short	medium	medium	low
air pollution (engine)	regional	short	low	high	low
air pollution (incinerator operation)	local	short	low	high	low
breaking ice	local	short	low	high	low
ballast water organism introduction	regional	long	medium	low	high
impacts on marine animals (vessel presence, noise, water turbulence, pollutant discharge, strike)	local	short	medium	medium	low
Small boat operations:					
fuelling spills	local	short	low	low	low
point source air pollution	local	short	low	high	low
cooling water petrol pollution	local	short	low	high	low
disturbance of near shore habitats (presence, noise)	local	short	low	low	low
impacts on marine flora and fauna—habitat disruption, interference with behaviour, noise, water turbulence, pollution discharge, strike	local	short	medium	medium	low
Landings and shore operations					
habitat disruption, disturbance: bird colonies, seal colonies, other fauna and flora	local	short	medium	medium	medium
disruption / stress of individual animals	local	short	medium	medium	medium
Introduction of alien species (flora, fauna, microbial)	local	long	medium	medium	high
trampling (nesting sites / plant communities / historic sites)	local	long	medium	low	medium
noise impacts on shore animals	local	short	low	medium	low
littering / waste	local	medium / long	low	low	medium
Souveniring of items	local	long	low	low	medium
soil erosion and compaction, track formation	local	long	medium	medium	medium

Table 2.21 (continued): Summary of predicted and actual tourism impacts

Impact	Extent (of individual operations)	Duration (of impact)	Intensity	Probability of occurrence	Significance
Helicopter activities					
fuelling spills	local	short	low	low	low
emissions	regional	short	low	high	low
disturbance of breeding species by noise	local	short	medium	medium	low
effects on wilderness values by noise	local	short	low	medium	low
soil or rock impact of landing / mechanical disturbance / rotor disturbance	local	short	low	medium	low
introduction of alien species on skids/wheels	local	long	medium	low	high
helicopter accident	local	medium	low	low	low
Impact on historic sites					
change to internal climate of buildings	local	medium	medium	medium	medium
physical damage / abrasion	local	long	low	medium	medium
intentional or unintentional disruption of site, fabric or artefacts	local	long	high	medium	high
removal of objects	local	long	high	low	high
All activities					
presence in area impacting on wilderness and aesthetic values	regional	short	low	high	low
presence of land based facilities impacting on wilderness and aesthetic values	regional	medium / long	high	medium	medium
Impacts of inland activities					
fuel spill (refuelling, fuel storage)	local	medium	medium	low	medium
disturbance or compaction of ice and snow	local	medium	low	high	low
change of ice/snow composition (sullage)	local	long	low	high	low
reduction of wilderness value	regional	short	low	high	vary
introduction of non-indigenous species to ice-free areas	regional	long	medium	low	low / unknown
emissions from vehicles and generators	local	short	low	high	low
Impacts on science					
need for major support (search and rescue, medical response, icebreaker assistance, accommodation, environmental response)	regional / continental	medium / long	high	medium	medium
need for minor support (fuel, food, weather forecasts, minor medical needs)	local	short	low	high	low
disruption associated with station visits	local	short	low/high	low/high	low
damage to science research sites or basic resource	local	long	high	low/medium	high

2.7.3 MEASURING AND MONITORING IMPACTS

Measurement is in itself relatively simple for some impacts. Disregarding cost or logistics for the time being, many parameters can be identified that may indicate level of impact of tourism activity. Difficulties arise when it comes to the attribution of any observed change to a cause. The breeding success or size of penguin colonies is measurable, for example, but attributing any change to tourism impact is difficult in light of the large number of other variables that may be acting at the same time, such as food source variation, or ice conditions. Careful experimental design including use of experimental controls can help, but the relatively subtle influences and impacts likely to be associated with tourism may be difficult to detect when the influences of measurement itself on controls is taken into account. In short, natural variability in Antarctic ecosystems is poorly understood, and it may be difficult to detect anything other than the grossest impacts (which tourism impacts are not likely to be). Design of research programs capable of attributing change to a cause or group of causes may be possible, and the research programs operated by PAC and Oceanites (section 1.1.4) may achieve these ends. The results of this type of research may provide useful guidance for minimising impacts of operations. For many sites, determining the baseline conditions that pertain in the absence of human activity will be difficult. It may be impossible in some places to decide what the 'normal' environment was prior to human use.

Site use patterns, as discussed in section 2.6, also complicate the issue of impact measurement and monitoring. The large number of sites used make it impractical to consider monitoring each site used for tourism. The regular use of new sites also makes the planning of such monitoring difficult. To some extent the freedom of operators to do as they choose contributes to the difficulty in monitoring.

At present, monitoring is catered for in the environmental assessment system of the Protocol. The Protocol states that for activities that are to have a no more than minor or transitory impact, activities may proceed 'provided that appropriate procedures, which may include monitoring, are put in place to assess and verify the impact of the activity' (Article 2(2)). For activities likely to have more than a minor or transitory impact, the CEE is required to identify 'measures, including monitoring programmes, that could be taken to minimise or mitigate impacts of the proposed activity and to detect unforeseen impacts and that could provide early warning of any adverse effects' (Article 3(2)(g)). This implies discretion as to whether monitoring is necessary. A question also arises as to what the Protocol means by monitoring. As in Article 2(2) quoted above, monitoring is intended to 'assess and verify the impact'. This implies that one-off measurement or observation of the activity could be considered monitoring. Article 3(2)(g) includes monitoring among measures to 'detect unforeseen impacts and that could provide early warning of any adverse effects'. This implies a more systematic and longer term (as would be appropriate for any activity requiring a CEE) program of measurement and monitoring.

2.7.4 SUMMARY

Some research has been conducted to provide basic information on human impacts, some are known to occur, and some are predicted. Broadly speaking it would seem that there is no significant deleterious impact occurring, although there is little in the way of ongoing monitoring to detect impacts or verify their absence, and there is no consensus on the level of impact of tourism. Knowledge of and prediction of impacts arising from other research and from environmental assessment processes suggests that there are a number of mechanisms by which impacts can occur. The most likely impacts are also those that are less obvious, or are likely to take longer to be expressed, and this is an issue of concern. It is fair to say that uncertainty about the impacts of tourism is high, especially when it comes to cumulative or long term impacts. This uncertainty leads to caution about tourism especially in the face of continued growth. The impacts most often cited as being of concern are those that apply to wildlife. It is suggested in much of the tourism management literature examined that disturbance of wildlife by tourist visits, during the short summer period, on a repeated basis, could compromise the long term viability of wildlife populations. Field research suggests that approaches to wildlife can indeed cause stress in animals, but the implications of these stresses for breeding success and long term viability of populations is not well known.

Prudently operated ship and air based tourism, at present levels, on the basis of present levels of knowledge, appears to have a minimal impact on the Antarctic environment, although longer term effects may make themselves known eventually. There is sufficient concern about cumulative impacts to justify research into the understanding of likely cumulative effects, and to lend urgency to calls for management mechanisms capable of taking into account the impacts of different activities.

2.8 CONCLUSIONS

This chapter shows that Antarctic tourism is a complex, well organised, and significant activity in the Antarctic region. The research comprehensively analyses aspects of the tourism industry, its use of the Antarctic environment, the use of sites for tourism, and change in the use of the resource area over time.

The industry has undergone considerable expansion. Ship based tourism operations are the dominant mode of operation within the industry. An understanding of the operational characteristics of the industry including vessel operations, small craft use, and the management of landings is fundamentally important to planning and management. Airborne tourism, while small in numbers of visitors, is of considerable importance in terms of geographical coverage, innovation in operational technology, precedent for land based tourism activity, and the potential for expansion.

The analysis of the way that industry uses sites shows a number of important features. First, while many sites are used, small numbers of sites are used regularly or intensively. Many sites are used seldom, with low levels of visitation. Second, the industry has expanded geographically over time. Third, certain areas have emerged as popular for visitation. Fourth, new sites are coming into use at a consistent and relatively high rate. Finally, the use of the areas of the Antarctic outside the Peninsula is of a different character, magnitude and intensity than areas in the Peninsula region.

Tourism can impact on all aspects of the Antarctic resource, with consequences for most Antarctic values. Our understanding of most forms of tourism impact is limited. Research aimed at minimising impacts on certain components of the Antarctic resource has been carried out, but many questions remain. In particular, longer term impacts of recurrent disturbance is largely a matter for conjecture. Identified and postulated impacts are many. In many cases, means exist to minimise, mitigate or eliminate impacts. At present, it would appear that tourism is not resulting in anything other than minimal levels of negative impact as a result of normal operational procedures. Incidents and accidents have the potential to cause more significant impacts.

Chapter three will examine social aspects of the Antarctic tourism industry. The material from this chapter will be considered in conjunction with those findings, before further conclusions as to the state and future of the industry are drawn.

Chapter 3: Social, economic and industry aspects of Antarctic tourism

This chapter examines the social, economic and industry aspects of Antarctic tourism, and draws together the information in chapters two and three to describe the present state of the industry and conduct an analysis of likely future developments.

It is important to understand the characteristics of visitors when planning for or managing any form of visitor use. Such information can be useful in determining future directions of the industry, by identifying sub-groups that may be targeted with specific experiences in future. Analysis of the social characteristics and motivations of the present participants of the industry can provide insight into future industry directions. The social and demographic characteristics, interests, motivations, and expectations of visitors largely dictate the directions management should take. The levels of satisfaction being obtained by visitors are also important, as management plays an important role in whether visitors are satisfied. Demographic characteristics, attitudes and expectations, and levels of satisfaction are therefore examined, drawing on the work of other researchers who have conducted survey research. The motivations of Antarctic visitors are examined, using the findings of other research. Different groups of visitors are identified.

Economic aspects of Antarctic tourism have been little studied, and even basic information about the industry is lacking. The problems with resource allocation in a common property resource are discussed. It is concluded that market forces, in the absence of restraints, could act to encourage overexploitation of the Antarctic tourism resource. An analysis of Antarctic tourism economics in the 1996/97 season was conducted. The market value of ship based, airborne, and overflight tourism was calculated. The analysis also provides important information on the structure of the industry. The market economic value of the Antarctic tourism industry was estimated to be approximately US$55 000 000 for the 1996/97 season.

Elements of the commercial tourism experience are identified. Attractions are discussed, educational and interpretive activities are examined, and other activities, including relatively new activities like camping or diving, are described.

The place of Antarctic tourism in global tourism, cruise tourism, and the expedition cruising sector is examined. Concepts of the destination life cycle are examined, and the application of these concepts to the Antarctic destination and implications for future development are examined. Antarctic tourism is analysed from the perspective of ecotourism, and shown to align with commonly accepted definitions of ecotourism. Growth in the global tourism industry and the cruise tourism sector, which is a major influence on Antarctic tourism, is examined. The broader expedition cruising sector is also examined, and the important role that Antarctic tourism plays in this sector is described.

Stakeholders in Antarctic tourism and its management are examined in some detail. The positions, structure, and role of different organisations are described. Non-government conservation organisations are discussed. Non-governmental industry organisations are also examined, the main one being IAATO, an organisation with a pivotal role in the industry, in regulation, and in the conservation of Antarctic resources. The influences, interactions and involvement with tourism issues of science organisations are examined.

The chapter then analyses potential future developments and directions for Antarctic tourism, based on chapters two and three. Growth and change in ship based and airborne tourism, factors limiting growth, changes in tourism products, experiences and markets, the use of larger vessels, geographic change, and land based tourism issues are discussed. A summary concludes the chapter.

3.1 DEMOGRAPHIC AND ATTITUDINAL CHARACTERISTICS OF ANTARCTIC TOURISTS

It is becoming accepted that information on visitor characteristics, satisfaction, perceptions, motivations, expectations, or attitudes to management is necessary for management (Cessford & Dingwall 1994). As a result of a number of research projects carried out in the past decade, sufficient information is available to provide a basic understanding of Antarctic tourists themselves, including their demographic characteristics, and their motivations, satisfaction and perceptions of the Antarctic tourism experience.

The most detailed information on Antarctic tourist characteristics and behaviour comes from work conducted by P. Davis in the 1993/94 season (P. Davis 1995a, 1995b, 1998), and Enzenbacher in the 1991/92 season (1995a).

P. Davis has reported on a survey of Antarctic cruise tourists in the Peninsula region during the 1993/94 season (1995a, 1995b, 1998). A questionnaire elicited information on demographics, motivations, prior knowledge of Antarctica, educational activities during the cruise, and desired activities and facilities. Questions also related to behaviour, and responses to controls on behaviour. P. Davis achieved an overall response rate of 49.9% (667 questionnaires returned), with variability in response rates across the five cruises on which the questionnaires were administered.

Enzenbacher conducted a survey of cruise passengers in the Peninsula region in the 1991/92 season. The survey was designed with two components, one applied before the first landing on a cruise, and a second to be completed after all landings. The questionnaires were distributed by seven different tour operators, with 1126 respondents. 587 respondents completed both the before and after sections, with additional respondents completing one or the other section only. Methodological details can be found in Enzenbacher (1995a). Enzenbacher used open-ended questions in many cases, and her answer category descriptions are relatively broad, so full descriptions of the response classes are used when reporting Enzenbacher's results.

Despite limitations imposed by logistics, costs, and the difficulties of conducting survey research in the Antarctic context, the results of both Enzenbacher and P. Davis are very useful, and act as the main source of information on Antarctic visitor characteristics. A number of other authors have provided other information, which is cited where relevant.

3.1.1 GENDER, AGE, WORK STATUS, OCCUPATION AND PREVIOUS VISITS

Table 3.1 summarises the results of P. Davis and of Enzenbacher with relation to gender, age, and work status of respondents to their surveys. Results show a slight majority of women. Similarly, Smith (1994) reported on a 1991 trip where the gender balance was 46% male and 54% female. Table 3.1 shows that a very high proportion of respondents was over 55, and roughly half were over 65. Smith (1994) recorded that more than half of the passengers on the voyage he observed were over 61. In P. Davis's results, 89% were first time visitors, 7% had been once before, and 4% had visited more than once before (P. Davis 1995b, p. 102). In Enzenbachers 1991 study, 97% were first time visitors, 3% had visited once before, and less than 1% had visited more than once before (Enzenbacher 1995a, p. 185). This suggests that between the two surveys the proportions of people visiting previously, and more than once before may have increased, which is conceivable given the levels of growth in the industry. It is also possible that for people visiting multiple times, it would be likely that repeat visits would occur sooner rather than later, if motivations are higher sooner after a visit. Smith (1994) found that 70% of passengers had visited Antarctica before.

Table 3.1: Gender, age, work status and previous visits of Antarctic tourists

		1991/92 Enzenbacher (1995a)	1993/94 P. Davis (1995b)
Gender	Male	44 %	44 %
	Female	56 %	56 %
Age	44 or younger	10 %	12 %
	45–54	12 %	13 %
	55–64	23 %	25 %
	65–74	39 %	36 %
	75 or older	17 %	14 %
Work status	Retired	65 %	52 %
	Working	33 %	44 %
Previous visits to Antarctica	Yes	3 %	11 %
	No	97 %	89 %

Results of both surveys suggest a slight majority of retired people, high proportions of professional or managerial workers, and generally high levels of education, with P. Davis (1995b) noting 27% of respondents with postgraduate education and 32% with other university qualifications.

Ledingham (1993) described the passengers on voyages for which he had acted as a guide. His assessment concurs with that of other authors as to age, wealth, travel experience, and interest in the Antarctic. Interestingly, he notes a smaller category of tourists, generally younger and less wealthy, who had a very strong desire to visit the Antarctic and had to save for a long time to afford the required fare.

3.1.2 NATIONALITY OF VISITORS

Wace (1990) noted that most tourists come from the northern hemisphere. Good data is now available on the nationalities of travellers as reported by operators and compiled by NSF (1997). This information is in the form of a census rather than a sample. Table 3.2 lists the nationalities of travellers as a percentage of the total for four seasons, 1994/95 to 1997/98.

Table 3.2: Nationalities of travellers (% of total) 1994/95 to 1997/98 (from NSF 1997)

Nationality	1994/95	1995/96	1996/97	1997/98
US	36	37	48	43
Germany	18	12	11	13
UK	5	9	7	10
Australia	4	5	9	10
Japan	3	7	7	5
Argentina	7	1	0	0

In P. Davis's results, five countries of birth accounted for 92% of passengers—US, UK, Germany, South Africa, and Canada) (1995b). The respondents were from 25 different countries. In Enzenbachers 1991/92 survey, the majority of respondents were from the US (66%) or the UK (17%) (1995a). Hall and Wouters (1995) note that while Americans generally comprise the highest proportion of tourists on a vessel, individual carriers vary. The range of nationalities has implications for communication on vessel and on shore, and may in some cases cause difficulties associated with cultural differences (Smith 1994, Cooper in Hall & Wouters 1995).

3.1.3 ATTITUDES, BEHAVIOUR AND ETHICS

P. Davis investigated the environmental awareness of visitors, using a number of questions about ethical standards of respondents, their understanding of environmental issues, and the effect of the tourism experience on their attitudes to environmental issues (1995a, 1995b, 1998). Little change was noted in responses before or after the cruise to a question about the impacts of tourism. 94% of respondents believed tourism to have some impact.

Two questions assessed respondents' perceptions of their own behaviour (P. Davis 1995b). One related to the accidental infringement of guidelines. 28% admitted finding themselves between a seal and the water, 3% admitted finding themselves between a seal and its young, 33% found themselves inside a penguin colony, 6% found themselves inside a seal colony, and 34% found themselves walking on vegetation. A second question asked if respondents had observed other passengers infringing guidelines. 74% witnessed a person closer then 5 feet to wildlife, 9% observed a person touching wildlife, 22% saw someone cause an animal to move for a photograph, 15% observed someone collect a natural object or artefact, and 13% observed a person smoking or eating on shore (P. Davis 1995b).

Scenarios were posed, and respondents were asked how they would react. In the words of P. Davis, 'a small number of passengers admitted that, in a special situation, they might be tempted to contravene one or more of the guidelines' (1995b, p. 125, also P. Davis 1998). While the results suggest incidences of people contravening some guidelines, P. Davis urges caution in the interpretation of the results.

3.1.4 SATISFACTION, HIGHLIGHTS AND DESIRE TO RETURN

Enzenbacher, in the 1991/92 study, asked a number of questions relating to satisfaction. An open-ended question asked respondents to provide their impressions of Antarctica. Enzenbacher (1992a, p. 190) classed 52% of responses as 'emotional / spiritual superlatives', 43% as 'beautiful / scenery mentioned', 31% as 'physical description (vast, huge, remote, desolate, rugged, inhospitable, extreme weather, ever-changing, unique, etc.)', 17% as 'wilderness / pristine / unspoiled (clean air / vulnerable / tranquil / serene / peaceful)', 16% as 'interesting wildlife or marine life / more wildlife than expected / wildlife unafraid', 13% as 'fragile / needs to be protected / conservation important / place is important'. A small percentage (4%) responded about 'some pollution noted from humans, science or tourism / crowded / danger of pollution'.

Enzenbacher also asked respondents what the highlight of their trip was. For 47%, wildlife was cited. For 41%, 'landings, a particular landing or site, boat trips or to land on the 7th continent' were noted. For 28%, 'ice, snow, icebergs, mountains or other physical features' were cited. 26% cited 'nature, scenery or environment / being there (aesthetic reply / beauty / peace / quiet)', and 7% noted the 'lectures, lecturer(s), shipboard activity, staff, crew, passengers or ship'. Some indicated the whole trip was the highlight (12%) and a small proportion of other responses were recorded (1995a, p. 192).

Summarising, this suggests that the total experience, physical grandeur, scenery, wilderness and undisturbed nature, wildlife, and fragility were important impressions. Highlights were wildlife, landing experiences, physical features, and natural and environmental qualities.

Enzenbacher also noted correlations between passenger characteristics and their opinions and satisfaction, although only a small proportion of respondents were unsatisfied in any way. Interestingly, passengers having made fewer landings or having spent fewer days in the Treaty Area (including those who spent the fewest days or had the fewest landings) were satisfied with their trip, indicating that satisfaction is not directly proportional to time spent or landings made (Enzenbacher 1995a, p. 203). Younger respondents were found to be less satisfied with their trip than older passengers, with comments relating to older passengers holding back younger passengers at landings (Enzenbacher 1995a. Other passengers who were dissatisfied said there were too few shore guides for the passengers, insufficient shipboard education programs, or there was too little time allowed ashore. Passengers on larger ships were also more likely to express dissatisfaction than those on smaller ships. US and UK nationals were more likely to express satisfaction than other nationals, with Enzenbacher suggesting that this may be related to the english language focus of operations (1995a).

Enzenbacher also asked respondents if they would like to return to Antarctica. 60% said yes, 22% said no. Those who said yes, were asked why, with 29% wishing 'to see or do more or see new places / curious / spend more time', 18% responding that they 'enjoy the scenery / love its wildness / repeat experience', 17% said 'to see more wildlife / spend more time with animals'. These results suggest that the Antarctic experience makes people aware of additional, desirable experiences that can be obtained (Enzenbacher 1995a, p. 192).

Respondents were asked where they would like to visit next in Antarctica—25% indicated the Ross sea region, 22% indicated they would visit the same area as the present trip but with different landings, 17% indicated the same trip. 17% wished to go further south and cross the Antarctic circle, and 17% wished to see the interior and/or the south pole.

P. Davis (1995b) found that Antarctica met or exceeded the expectations of 95% of respondents. Enzenbacher found that 72% of respondents felt the trip met their expectations, with a further 16% saying it exceeded them. 6% gave a qualified yes, and 3% said no.

3.1.5 Passenger education

Participation in educational activities aboard ship was examined by P. Davis (1995b). 36% of respondents had attended all shipboard lectures, 46% had attended most lectures, 17% had attended some lectures, and 1% had attended none. 78% of respondents recalled exposure to IAATO guidelines, 80% recalled information on the Antarctic Treaty, 97% recalled information on wildlife they would be likely to see, 47% on mining and/or commercial activity, 75% on guidelines other than the IAATO guidelines, 77% on protected areas, and 83% on science.

Enzenbacher (1995a) asked respondents what they had learned from their visits. An open-ended question was used and multiple responses were permitted. 40% learned 'about wildlife, flora and fauna, marine life, nature or physical environment / vastness of area', 34% learned of the 'importance of place and preserving it / appreciation for it / do not exploit it balance of nature important / keep it pristine / protect it / don't change it / respect for it', 33% learned 'a great deal / greater general knowledge (of natural history, history, politics, geology, biology, Antarctic science, ice, icebergs, environment etc.)', 11% learned that 'it's fragile, vulnerable, beautiful or unique / humility'. 9% were classed as learning 'tourism should be limited, controlled or regulated / tourists cause impacts, but tourism need not harm the environment / strict enforcement needed', and 7% noted 'man / science causes impacts or spoils it / too many bases / need to clean it up' (Enzenbacher 1995a, p. 191).

3.2 Tourist motivation

It is important to understand what motivates visitors to go to Antarctica. Motivations are the basic starting point of all tourist activity, direct the products developed by the industry, and influence the behaviour of tourists when they are participating in a visitor experience. Management measures need to ensure that they do not conflict with the fundamental reasons tourists have for visiting Antarctica, by taking motivations into account. Management actions may also be required to modify or maintain the experience so that it matches certain motivations, or be aware of motivations that may generate problems between users. Motivations uncovered by survey research also serve as an indication of how and why people value Antarctica, and can serve to define different groups of users or market segments.

3.2.1 MOTIVATIONS AND EXPECTATIONS

Smith (1994) in a opportunistic survey of a voyage in 1991, reported that motivations were, in order, interest in historic explorations, interest in natural sciences, interest in political aspects, interest in adventure cruising to little-known areas, and love of Antarctica from previous visits.

P. Davis (1995a, 1995b, 1998) collected information on motivations for visiting Antarctica. Seven choices were nominated and more than one reason was allowed. An interest in polar regions was chosen by 60% of respondents. Being a nature lover was cited by 66%. Visiting their 7th continent was chosen by 27%. Accompanying a travel partner was chosen by 22%. Prior visit to the Arctic was chosen by 28%. An interest in photography and film making was chosen by 27%, and the desire to see a new place was chosen by 79%. P. Davis noted a difference between younger and older respondents, finding that the 44 and under age groups responded to the love of nature question, while the older age groups responded to the goal oriented motivations such as seeing the 7th continent or because they have visited the Arctic.

Enzenbacher (1995a, p. 186) asked respondents why they chose Antarctica as a destination, using an open-ended question format. Enzenbacher groups the answers into categories. 39% of respondents cited reasons in the category 'new place / been most places / different / unique / curious / like travel / to see it firsthand / because it's there'. Unfortunately Enzenbacher does not break this category down further, as these motivations span a number of different concepts. 21% cited reasons in the category 'wildlife / marine life', 17% cited reasons in the category 'last frontier / unspoiled / wilderness (remote, polar, snow, ice or liked Arctic), 14% cited reasons in the category 'nature / beauty / scenery', 14% cited reasons in the category 'always wanted to / opportunity / timing / dream come true', 14% cited reasons in the category '7th continent (counting continents), and 12% were classed 'adventure, excitement / challenge / pleasure / desire / impulse'.

P. Davis examined the pre-visit preparation of respondents, which has some bearing on the question of motivations. One question referred to the amount of reading carried out before travel. 10% of respondents had done no reading, 34% had read for 1 to 5 hours, 20% had read for 6–10 hours, and 36% had read for more than 10 hours. No questions were asked relating to other media. Of those who had conducted some reading, 80% had read about wildlife, 77% had read about exploration, 49% about geology and glaciers, 47% about science, and 33% about wildlife photography (with categories nominated by the questionnaire).

Enzenbacher (1995a, 187) asked respondents about how they became interested in Antarctica, another possible insight into motivations. Again Enzenbacher used an open-ended question. 26% became interested through 'reading / books', 20% through 'media (tv, radio, news, wildlife program, documentaries, film, slide show, photos or video)', 19% 'contacted / recommended (family, spouse, friend, associate or word-of-mouth)', 15% 'likes travel / previous travel / new place / 7th continent / adventure', 13% 'always have been interested / lifelong dream or ambition / previously impossible or too expensive / intellectual curiosity / drawn to it', 11% 'newspaper / magazine (National Geographic)'.

Expectations were examined by Enzenbacher (1995a, p. 189) who asked respondents what they hoped to gain from their visit. 46% of respondents hoped to gain 'knowledge / information / education', 34% hoped to gain 'memories / experience wildlife or scenery / physical environment / new sights / 7th continent', 23% hoped to gain an 'appreciation for the place or wildlife / importance of ecology / conservation / need to preserve it'. 21% hoped to gain 'aesthetics / beauty / pleasure / adventure / relaxation / satisfaction / life-long dream fulfilled', 19% cited 'understanding / awareness / philosophical / new outlook on life', 6% said 'photos', and 4% said 'friends / family sharing / meeting people / share with others'.

3.2.2 MOTIVATIONAL SUMMARY

Drawing on the above results, motivations can be summarised. While the surveys and anecdotal results described above were not collected or reported in such a way as to allow direct comparison, some general conclusions can be drawn out. The reason for visiting the Antarctic can be used as one expression of underlying motivation. Table 3.3 lists the reasons for visiting Antarctica as uncovered by the surveys of P. Davis and of Enzenbacher.

Table 3.3: Why people visit Antarctica (response categories are not directly comparable)

Response category (P. Davis 1995b)	
Desire to see a new place	79%
Being a nature lover	66%
Interest in polar regions	60%
Prior visit to the Arctic	28%
Accompanying a travel partner	22%
Interest in photography and film making	27%
Visiting their 7th continent	27%

Response category (Enzenbacher 1995a)	
new place, been most places, different, unique, curious, like travel, to see it firsthand, because it's there'	39%
wildlife / marine life	21%
last frontier, unspoiled, wilderness, (remote, polar, snow, ice, or liked Arctic)	17%
nature, beauty, scenery	14%
always wanted to, opportunity, timing, dream come true	14%
adventure, excitement, challenge, pleasure, desire, impulse	12%
7th continent (counting continents)	14%

P. Davis provided categories for respondents to choose from, while Enzenbacher used an open-ended question where respondents had to think of and nominate their own reasons. It can be seen that motivations related to going to a new place rate highly. Motivations related to seeing nature also rate highly, as do specific wildlife related motivations. Visiting the 7th continent was a reason for 27% of P. Davis's respondents and for 14% of Enzenbacher's.

It would be simplistic to suggest that many or even any travellers are motivated by single needs or motivations. It is likely that a complex of different reasons contributes to the desire to travel to a particular destination, and that these motivations have an impact on the perception and enjoyment of the visitor experience. Questions relating to post-visit satisfaction also have a bearing on the relationship between motivations for visiting and the visitor experience itself.

The information on the motivations derived from surveys described above casts some light on the relative importance of these different themes to tourists. More detailed research would be needed to fully explicate the components of motivation. Additional information on motivations can be obtained from an understanding of the experiences being supplied. Supply of the visitor experience can be regarded as a proxy for the types of experience desired by the tourist, especially where supply has evolved over time to serve the tourist market. Supply is not of course an indicator of latent or unidentified demand.

Based on the motivational and demographic information presented above, a number of groups of travellers can be hypothesised, divided on the basis of motivation. Simple descriptive names for each of these segments are suggested.

- A portion of Antarctic tourists may have a special interest in the Antarctic, or an aspect of the Antarctic, such as its history, geography or wildlife (Antarctica enthusiasts).
- Some travellers may have a particular interest or hobby that is not specifically related to the Antarctic, but that can be pursued in the region, such as photography, wildlife viewing, or climbing, that has brought them to the area (pursuing a special interest in a special place).

- Others may be motivated primarily by the desire for a destination out of the ordinary or that they have not previously visited, and may be counting continents or countries (seeking exotic locations).
- A small group may be motivated by the desire to travel with a partner or friend who has had the choice of destination for reasons of their own (passive participants).
- A proportion of passengers may be less sensitive to the actual destination, with no particular long standing interest in the Antarctic region, who may enjoy travel with a particular ship or cruise line, or have decided on an Antarctic trip on the basis of advertising or word of mouth (loyal cruisers).

An attempt to define the market groups based on demographics can also be made.
- Wealthy, elderly, educated, well travelled (icon travellers), some may be activity or interest oriented.
- Highly motivated travellers, often less wealthy, but very committed to participating, more likely to be younger.
- Middle market travellers, moderately wealthy, curious, open to new ideas and destinations.

This is supported by observations in the literature—Stonehouse and Crosbie (1995), for example, note that as well as wealthy visitors, many less wealthy people including young professionals, public servants, and older retired schoolteachers and nurses participate, often by forfeiting a number of more orthodox holidays to be able to pay for the Antarctic experience. They suggest that with larger vessels, voyages will become cheaper, and the average age of passengers will fall. Products will lean towards the more active and adventurous. They point out that there are no facilities for different forms of tourism in Antarctica. The lack of provision for camping, staying in huts, taking long backpacking walks, climbing, studying, or spending time in one location observing wildlife is raised and contrasted with the situation in Arctic locations (Stonehouse and Crosbie 1995, p. 224).

3.3 Economic Considerations

This section describes economic aspects of Antarctic tourism. The existing literature is briefly reviewed. Economic theory as applied to public goods and natural resource areas is examined. It is argued here that the Antarctic tourism resource is a common property resource and as such is vulnerable to overexploitation as a result of unrestrained market forces. An analysis of the market economic value and structure of the industry is then described.

3.3.1 Literature on Antarctic Tourism Economics

There is a very limited literature on the Antarctic economy in general, and only one specific work on the place of tourism in the Antarctic economy was located by this author. White (1994) provided an economic history of Antarctica, cataloguing five waves of economic activity (the sealing period, the whaling period, the scientific period, the new fishing period, and the tourism period), some of these waves occurring concurrently. In discussing the future, White asserted that tourism would grow to comprise the primary form of non-scientific economic activity in the 21st century. White couched his discussions in an analysis of the economic geography and political economy of tourism. Tourism and the political economy were described with reference to the claimant and non-claimant nations, again in general terms. White described the components of the tourism industry and the costs of some activities. White's work served to place Antarctic tourism in the context of an overall economic description of the activities surrounding the continent.

Other than the common reference to Antarctic tourism being very expensive, only brief mentions of economic aspects of tourism are made by a few authors. Beck (1994) noted that tourism is directly subject to economic forces, citing Naveen to the effect that economic recession in the US was threatening the ability of US based operators to provide environmentally friendly operations. This highlights the importance of developing an understanding of the economic basis of the Antarctic tourism industry. Hall and Johnston (1995a) discussed the economic dimensions of polar tourism. The role of tourism in community economic development is discussed for the Arctic regions, but the importance of tourism revenue in the Antarctic context is noted. Herr (1996b) briefly addressed the economic size of the tourism industry, pointing out that, while tourism is the second largest commercial use of Antarctic resources, it could scarcely be otherwise, given the limited number of economic activities in the area. Many authors discuss the cost of Antarctic tourism experiences. As an example, Stonehouse and Crosbie (1995) describe tours as ranging from US$8000 to US$12 500 each for a 15 day trip, airfares included. They characterise these as expensive in comparison to tours of similar duration in other parts of the world, and note that they are likely to remain expensive. They point out that while there are as yet no cut-price tours being offered, operators compete to provide cheaper alternatives. They also provide details of the cost of the airborne visits offered by ANI.

3.3.2 TOURISM AND ECONOMIC ISSUES

Speaking from an economic perspective, tourism can take a number of forms. Most commonly, tourism is a profit generating activity, driven primarily by the desire of an operator to generate wealth. More recently, however, forms of tourism have been advocated that have a different primary consideration. Environmental or social/economic development objectives are in some cases the driving force behind tourism operations (Hall & Johnston 1995a). Environmental benefits can be derived through the education of tourists (creating advocates for conservation and making people aware of conservation issues), by using tourism revenues to directly benefit conservation activities, or by using tourism as an alternative to environmentally harmful activities. Social and economic benefits can be derived from employment, injection of money into local areas, and in some cases by allowing the maintenance of traditional lifestyles through preservation of the natural environment. Structuring of the tourist industry so that these socially and economically desirable outcomes are possible is a primary concern of those involved in alternative forms of tourism. In the case of the Antarctic, there are no local people (apart from itinerant government personnel). Tourism activities are independent while in the Antarctic region, and any economic and social impacts are concentrated in the nearest departure states.

In many places, tourism is used to raise revenue for conservation activities (or for maintenance of the visitor management system for that location). This is facilitated by administrative and regulatory structures and works well in the context of national parks or other protected areas where entry fees can be charged. In some cases these charges are regarded as part of a user pays system, directly levied for the maintenance of visitor facilities, but they can also be seen as a form of royalty payed for access to a public resource, regardless of whether facilities are provided or not, or payments in recompense for any diminishments of the resource that occurs as a result of the tourism activity.

Much of the value of the continent lies in its substantially unmodified state, which provides use benefits (science, or tourism, for example) and non-use values to many people across the globe (Herber 1992). Antarctica is also an international common property resource, 'part and parcel of the global commons' (Herber 1992, p. 297) and subject to all of the problems of common property resources (Herber 1991, and Kindleberger 1986). Public goods and common property resources have particular implications for conservation and management. One issue is the right of access to such resources. By definition, as common property, all have a right of access. The question of how tourism, as a commercial operation, should be viewed is not clear-cut. On one hand, access is being facilitated by tourism operators to a public resource. On the other, it can be argued that operators are generating personal or corporate wealth from a public resource.

The question of whether Antarctic tourism should be seen as the provision of access to a public resource, or as the commercial exploitation of a public resource, is one of viewpoint. In a sovereign environment, such issues are resolved by government, managing resources for maximum public benefit. The Antarctic, where sovereign rights do not apply, is close to a true unmanaged common property resource, with the ATS representing the only regulatory authority.

Many of the arguments that support development of tourism activities are economic. The economic benefits of tourism for local communities, and tourism as an alternative to destructive or damaging extractive or consumptive uses of natural resources are used as support for 'ecotourism' development. In the Antarctic case, the benefits accrue to regions beyond the resource in question, there being no local populations, thus complicating matters.

3.3.3 ANTARCTICA AS A COMMON PROPERTY RESOURCE

Tourism as an economic activity uses the Antarctic as a resource. The use of the resource is driven by market forces, and economic theory can therefore provide some insight into the situation that prevails in Antarctica.

The market system, through market forces acting without government intervention, can efficiently allocate resources only under certain conditions. These conditions include, among others, clear property rights—where the entitlements to the resource are clearly specified, and where benefits and costs associated with use of the resource accrue to the owner (Tietenberg 1988). Where such property rights do not exist the market system is incapable of allocating the resource in an efficient manner. Clearly, in the Antarctic case, market forces will not lead to the efficient allocation of the Antarctic tourism resource.

Another important concept is that of a public good (also known as an open access resource). Public goods are those where 'if more is provided for one member of a group of people, more is necessarily provided for all people' (Sugden & Williams 1978, p. 159, also Daly & Cobb 1989). Public goods have the characteristics of non-rivalry and non-excludability (Tietenberg 1988, Dixon & Sherman 1990, Thampapillai 1991). Non-rivalry means that use of a resource does not reduce the potential of the resource to provide utility for others. Non-excludability means that preventing others from using the resource is inefficient, as there is no cost to present users in allowing other users to partake (because of non-rivalry) and markets therefore cannot efficiently allocate the resource. The resource base used for tourism is what is known as a mixed good, a partial good, or a quasi-public good. National parks, protected areas, and recreation resources are generally mixed goods. They are described as mixed goods because, while they are publicly owned and provided to all, overcrowding or other impacts represent a degree of rivalry. The common ownership of these mixed goods, and the cost-free nature of exploitation, means that people are able to exploit them in an unrestricted (at least by market forces) manner.

'Market forces, while marvellously efficient in allocating owned resources, work to damage or destroy common property resources' (Kneese 1977, p. 28). This occurs because, as deterioration is caused by overuse, for example, economic rationality dictates that each individual using the resource is prompted to greater use of the resource as, if they do not do so, others will consume it. The path of most benefit to the individual is to continue exploitation. Thampapillai (1991) states it as a pricing problem, noting that the market solution in the case of these goods is zero price and that the zero price condition prompts excessive use. This situation is often referred to as 'the tragedy of the commons' (for a more detailed explanation, see Hardin's article extracted in Dobson 1991). An Antarctic precedent exists for the misuse of common property resources—as IUCN (1991, p. 5) noted, whale stocks were a classic example of an open access resource, belonging to no-one. This resource was exploited, unrestricted (or actively encouraged) by market forces to the point of population collapse.

The use of the Antarctic is not subject to prices for access to the resource, and no ownership of the resource prevails. Market forces are therefore not capable of efficient allocation of the resource. The area is a mixed good, as ownership is vested with the global public, exploitation is costless, and overuse can lead to the deterioration of the resource. Left unrestricted, as in the case of Antarctic tourism, market forces will act to encourage overexploitation of the Antarctic resource. It is not inevitable that overexploitation will occur. It may be avoided through good fortune, because of a small market size, high cost of providing the Antarctic tourism experience, or logistical limitations such as insufficient shipping. It may also be avoided through regulatory intervention, with limitations imposed through the ATS being the obvious possibility.

3.4 A PRELIMINARY ANALYSIS OF ANTARCTIC TOURISM ECONOMICS

To date, measures of Antarctic tourism industry size have been in numbers of people, operators or ships. A simple analysis of the economics of the tourism industry can help to illustrate a number of important factors, beyond the intrinsic interest of an estimate in its own right. First and most importantly, it can provide an indication the value that tourists place on the Antarctic tourism experience. While it is not possible to determine the proportion of total value that the market component of Antarctic tourism represents, the total industry turnover at least represents a minimum value derived by tourists. Second, the economic impact of the tourism industry on different nations and areas may be significant. Departure ports, being generally the southernmost ports of the nearby landmasses, may be otherwise lacking in tourism or industrial activity because of their relative remoteness. The flow of tourism revenue in these areas, and tourism related activities may be an important component in the regional economies of such areas. While insignificant on the global scale, the impact of tourism activity in small regional ports may be substantial in terms of regional economic development. Third, the economic benefits derived from tourism by both departure states and states home to operators may influence these states in their behaviour in the ATS. The way that these states respond to different issues in the ATS may be influenced by the fact that they derive economic benefit from the industry, and their citizens are employed in the industry. Fourth, an understanding of industry economics is important in examining industry trends, namely growth, structural change (attractiveness of the Antarctic as a destination for more mainstream cruise operators for example), profit levels, and potential for lower priced products.

With these factors in mind, an assessment was made of the total market economic value of Antarctic tourism for the 1996/97 season. The analysis rests on the assumption that the prices paid by participants in tourism activities can be estimated and summed to provide an estimate of the total revenue earned by the tourism industry. Based on publicly available material, information about prices, numbers of visitors, and voyages and flights was compiled and analysed to provide estimates of the total revenue of the tourism industry.

Information sources were limited to those documents publicly available, and those tabled in meetings of the ATS. This discussion does not make any conclusions about the profits of companies involved, or make any judgement about individual companies. The objectives of the analysis were: to gain an understanding of the amount that tourists are willing to pay for their Antarctic tourism experiences; to develop an estimate of the total market value of the Antarctic tourism industry as represented by market prices; and to examine the economic structure of the industry. Limited information, the single season nature of the analysis, and limitations of the methodology used for calculating estimates mean that conclusions from this analysis cannot be regarded as definitive, but rather as a guide, an overview, or a preliminary analysis.

Tourism experiences are a manifestation of use value. The tourism industry captures part of this value through the market transactions involved. In some cases, however, the amount paid by the user will be less than the amount they would have been willing to pay for the use or experience. Additionally, these prices do not include all costs to the visitor in obtaining the experience (for example travel to departure port and accommodation ashore). For these reasons, estimates based on market transactions underestimate the likely total willingness to pay for a particular experience.

The analysis takes into account the three forms of Antarctic tourism—airborne, ship based, and overflights, for a single season, 1996/97. A number of operations are excluded from the analysis, namely those that may have been operated or sponsored by governments in the season in question. The analysis of ship based tourism is more complex than for the other forms, and rests on a range of assumptions (outlined below).

The 1996/97 season was selected because information for all three forms of tourism was available for this season, especially the more complex shipborne component. Prices and voyages detailed by Rubin (1996) applied to this season, and a breakdown of numbers of passengers and numbers of voyages for each vessel operating in that season was available—*Overview of actual seaborne Antarctic tourism 1996–1997* (IP 75 XXI ATCM 1997).

3.4.1 METHODOLOGY

3.4.1.a Calculation of airborne tourism estimate

The estimate for the airborne tourism component used prices for different packages from Rubin (1996) and ANI (1998). Swithinbank (1997b) described the numbers of passengers participating in the various ANI packages with sufficient detail to permit calculation. Passengers carried for private expeditions were not included in the analysis, as the prices paid for various different private expeditions were unavailable. The activities included in the analysis include Vinson Massif climbs, and visits to the south pole, emperor penguin rookery, and Patriot Hills (see section 2.4.2). The calculations simply involved the sum of the numbers of passengers participating in the various packages multiplied by the cost of that option.

3.4.1.b Calculation of overflight estimate

The estimated total revenue generated by overflights was based on information on prices, number of seats in each class, and number of flights, provided in Croydon Travel (1996). Total revenue for each of the five different seating classes was obtained by multiplying the number of seats per class by the cost of a seat in that class. The sum of the class totals represents a maximum revenue for each flight. Additional revenue generated by surcharges for special flights (New Years Eve, and Perth departure) were calculated. Two estimates were made, assuming full occupancy and 80% occupancy. The sum of the estimated revenue for all flights represents the total revenue for the season of the overflight program.

3.4.1.c Calculation of minimum estimate for shipborne tourism

For shipborne tourism, two estimates were calculated. The first was a minimum estimate, assuming that the cheapest double occupancy prices advertised for a cruise were paid by all participants regardless of the cabin option. The second was an enhanced estimate, where a factor representing the additional revenue obtained from higher priced cabin options was calculated and applied to the minimum estimate.

Information used for the minimum estimate included company, pricing, voyage and ship information from Rubin (1996), pricing and ship information from Slater and Basch (1997), and ship, company, voyage, and passenger information from *Overview of actual seaborne Antarctic tourism 1996–1997* (IAATO 1997, IP75 ATCM XXI). In addition, information from other sources such as Splettstoesser, Headland and Todd (1997) was used to clarify some voyage details. Generally, prices and voyage lengths were taken from Rubin, and actual vessel, company, voyage and passenger information came from the *Overview of actual seaborne Antarctic tourism 1996–1997* (IAATO 1997, IP75 ATCM XXI).

The base units of analysis were vessel / company combinations. Many vessels are chartered by more than one company in the season, and different companies may charge different amounts to passengers for travel in the same vessel. Each group of voyages on a particular vessel operated by one company comprises a vessel / company combination. Other voyages on the same vessel operated by another company are calculated as a separate vessel /

company combination. The object was to estimate the revenue each vessel earned through the season (r_{vc}), which could be summed to provide an overall total. To achieve this, vessel passenger capacity (c_v), occupancy (the percentage of the vessels total passenger capacity actually sailing) (x_v), average price per night per passenger (p_p), and the number of nights at sea over the season for each vessel / company combination (n_{vc}) were required. The prices per night per passenger were based on the lowest fares cited in Rubin (1996), and the calculation of the minimum estimate assumes that all passengers payed this lower price. The seasonal revenue for each vessel / company combination was calculated as follows:

$$r_{vc} = n_{vc} \times p_p \times c_v \times (x_v/100)$$

The number of nights at sea for each vessel / company combination (n_{vc}) was taken from planned voyage information (in Rubin 1996). In cases where the number of voyages described by Rubin for each vessel / company combination did not match the actual number of voyages described in IAATO (1997, IP75 ATCM XXI) (due to changes in scheduling or greater demand), or where voyage details were not attributed by Rubin to each ship operated by a company (this was the case in one instance) average voyage lengths were calculated and used. This was derived by multiplying total voyage nights from Rubin, by number of voyages from IAATO (1997, IP75 ATCM XXI). Two exceptional voyages of the *Kapitan Khlebnikov* were calculated separately (as two vessel / company combinations rather than as one) as both were very long, one was a full circumnavigation of Antarctica, and one had a low occupancy (Splettstoesser, Headland & Todd 1997).

Price per passenger per night for each vessel / company combination (p_p) was calculated by taking the price for each voyage offered for that vessel / company (cited in Rubin), dividing each by voyage days, and averaged across all voyages for that vessel / company. For one company, different voyages were not attributed (by Rubin) to the various ships used by that company, and an average price per passenger per night across all voyages and ships for that company was calculated and used. In this case, IAATO 1997, IP75 ATCM XXI provided enough information to ensure the average (p_p) could be applied to actual vessel / company combinations.

Capacity of vessels (c_v) was taken from Rubin. Percentage occupancy of vessel / company combinations over the season (x_v) was calculated using the number of passengers and voyages given in IAATO 1997, IP75 ATCM XXI, and vessel capacities. In some cases this resulted in an occupancy of more than 100 percent. This inconsistency could be for one of two reasons. First, vessel capacities can change through major or minor refits. Second, some capacities cited in the cruise industry assume double occupancy of all cabins, even though some cabins may be able to accommodate three or more passengers. The calculations of revenue ignored this inconsistency, and included all passengers carried for each vessel / company combination.

3.4.1.d Calculation of enhanced revenue for shipborne tourism

The above calculations were based on Rubin's quoted starting prices which were the minimum multiple occupancy prices available for each vessel / company combination—they assume that all passengers on the vessel were paying the lowest fare. Most ships offer a range of cabin options, and single occupancy rates, meaning that the actual revenue per vessel / company combination would be more than the minimum estimate. An enhanced revenue calculation can be performed for selected vessels to give some indication of how much more revenue may actually be generated. To achieve this, enhanced per passenger per night rates were substituted into the calculations, for vessel / company combinations where more detailed pricing of various cabin options could be obtained. A range of vessels was examined in this fashion, including luxury expedition vessels, medium sized basic vessels, and small sized basic vessels. Rates for the different cabin options were obtained from

1996/97 sales brochures and from Slater and Basch (1997). Slater and Basch provide figures per passenger per day for Antarctic voyages for each cabin type in 1998 US dollars, and so there will be some overestimation in comparison to 1996/97 prices due to inflation. Prices for two vessels operated by one company also included some airfares, but the base prices used in the minimum estimate for this company do so also, and therefore the degree to which the enhanced revenue differs should remain consistent.

Calculation of the enhanced rates involved generating a weighted average price per day, taking into account the different cabin types, rates for each type, and the number of cabins of each type for the vessel. The results for each cabin type were summed, to obtain a total possible revenue per night for the vessel at those rates. The factor by which the seasonal enhanced and minimum estimates for vessel / company combinations differed was calculated, to enable comparison.

3.4.1.e Assumptions and limitations of shipborne tourism calculations

In calculating the estimates, it was necessary to make a number of assumptions due to a lack of certain detailed information. Information was not available about the number of passengers on individual voyages and the actual lengths (in nights) of those voyages. For each vessel / company combination, averages across the operating season were used for voyage length and passenger numbers.

The rates cited by Rubin (1996) used for the calculations may have been changed after publication, and discounting of fares is also common in the cruise industry, meaning that some passengers may have paid less than the calculations accounted for.

One difficulty was matching actual voyages to planned voyages. For most vessel / company combinations, planned voyages (from Rubin) could be matched to actual voyages (reported in IAATO 1997, IP75 ATCM XXI). In a small number of cases, more voyages occurred for a vessel / company combination than were planned. It was assumed for these calculations that additional voyages were at the same rates and of the same lengths (using an average) as those planned. In two cases, planned voyages were to have taken place on one ship, but took place on a different ship. In one of these cases the ships are sister ships (identical in all important respects) and it was assumed that rates and voyages were as planned, and in the other case it was assumed that the same voyage and rates applied to the different ship.

For the purposes of the calculations, nights on board ship were used for the voyage length. This was necessary as some packages cited by Rubin included land components outside Antarctica. Rubin consistently identified voyages with shore components, and where he did not specify the number of nights aboard ship, the number of days cited minus one were used.

In the cases of two companies, some airfares were included. This will result in some overestimation of the price per passenger per night for these vessel / company combinations compared to others.

A small number of passengers were booked onto vessel / company voyages by second companies (125 passengers over the season). In these cases, it was assumed that rates were identical to those charged by the organising company. Some voyages (10 in the season) operated as subcharters (where a different company takes on responsibility for filling an entire voyage) and again it is assumed for these voyages that rates are the same as those charged by the original chartering company. For one voyage (the only voyage operated by that company) no pricing details were available. The prices and voyage details used by the other operator of that ship were used as a proxy.

3.4.2 RESULTS

3.4.2.a Results for airborne tourism component

Table 3.4 shows the prices, number of participants and revenue assumed for the operations of ANI (the sole airborne tourism operator) in the 1996/97 season. Prices for ANI packages range from US$11 750 for a basic visit to the Patriot Hills region with a variety of local activities, through to US$25 750 for the Vinson Massif package, with an average of US$17 919. The estimated total revenue is close to US$ two million. It is important to keep in mind that this figure does not include revenue from private expeditions, which would be considerable given the number of participants and the type of logistic support provided to such individuals and groups. In 1994 White estimated the cost of expedition support, per person, to be US$100 000, and if that figure were correct the 1996/97 season revenue for 15 people would exceed US$1 500 000, with some inflation.

Table 3.4: Total revenue calculation for airborne tourism (ANI)

Package	Passengers	Package cost (US$)	sub-total (US$)
South pole	16	21 000	336 000
Emperor penguin colony	6	21 000	126 000
Vinson Massif climb	43	25 750	1 107 250
Remainder—Patriot Hills (assuming Heart of Antarctica package rates)	22	11 750	258 500
Private expeditioners (manhauling, skiing etc.)	15	various, unknown	n/a
Total	**102**	**n/a**	**1 827 750**

3.4.2.b Results for overflights

Table 3.5 shows the calculation of revenue for each basic overflight operated during the 1996/97 season, based on prices, classes and seating as detailed in Croydon Travel (1996). Maximum prices are those for first class seating at AU$2999 (US$2432). The lowest price, for economy seating, was AU$799 (US$648) (assuming no discounting or specials were offered).

Given the total of AU$538 236 per flight, the seasonal total of eight flights generates AU$4 305 888. Surcharges apply to two flights—a New Years Eve flight (AU$200 per passenger), and a departure from Perth (AU$100 per passenger), which total an additional AU$109 200, giving an overall seasonal total of AU$4 415 088. These totals assume full occupancy of the aircraft across the season (2912 passengers). 80% occupancy, with 2330 passengers, gives a revenue of AU$3 532 070. Converting the full occupancy total to US$ using the exchange rate of 0.811 (*The Australian Financial Review* 2 December 1996) gives a total revenue of US$3 580 636.

Table 3.5: Overflight revenue per flight (AU$)

From 747-400 seating plan	No. of seats in class	AU$ per seat	Total per class (AU$)
First class	16	2999	47 984
Business class	56	2499	139 944
Economy premium	114	1499	170 886
Economy standard	124	1099	136 276
Economy centre	54	799	43 146
Total	**364**	**n/a**	**538 236**

3.4.2.c Results for shipborne tourism

Calculations used to derive the minimum and enhanced estimates of revenue for the shipborne component of Antarctic tourism are described above. 13 vessels and 10 companies operated, with 22 vessel / company combinations. 104 voyages were carried out, with 7322 passengers (IAATO 1997, IP75 ATCM XXI).

Prices per voyage depend of course on duration and cabin category. As an example of a very high price, US$55 000 was reported for the occupancy of a corner suite on the very long circumnavigation voyage of the *Kapitan Khlebnikov*, with the minimum triple occupancy price cited as US$29 990 (Splettstoesser, Headland & Todd 1997). By way of contrast, a berth in a four person cabin, on an eight night voyage offered by one company cost as little as US$2890, or US$3390 for a berth in a two person cabin for an 11 night voyage with another company.

More meaningful are prices per person per day. Using the basic prices cited by Rubin for occupancy of a double cabin, prices per person per day range from US$311 through to around US$539, with an average of US$421. Better cabins (more spacious, private facilities, better views and so on) cost considerably more. More expensive single occupancy rates are also available.

Estimated minimum revenue totals for vessel / company combinations across the season vary according to ship size, number of voyages, occupancy and rates. For illustration, however, a maximum of US$5 088 866 for one vessel of 129 passenger capacity with eight voyages was calculated, and a minimum for a vessel of 38 passenger capacity and one voyage was US$94 365. The average revenue per vessel / company combination across the season was US$1 759 930. Table 3.6 summarises the information for all vessel / company combinations operating in the 1996/97 season.

Table 3.6: Summary of minimum vessel / company calculations

Vessel / company combination	Capacity	Vessel type (after table 2.4)	Voyages	Pass. carried	Nights at sea	Price per day (US$)	Revenue / day (US$)	Revenue / season (US$)
1	100	M C	9	707	107	516	40 530	4 336 706
2	36	S B	1	36	9	388	13 980	125 820
3	38	S B	7	305	44	383	16 696	734 614
4	180	L L	5	781	62.5	430	67 088	4 192 994
5	164	L L	1	125	12.5	430	53 688	671 094
6	46	S B	4	147	48	463	17 029	817 379
7	46	S B	6	227	53.8	462	17 482	939 826
8	46	S B	10	383	89.6	462	17 698	1 585 698
9	80	M B	10	731	89.6	462	33 778	3 026 489
10	118	M/L B	9	759	80.6	462	38 968	3 142 415
11	80	M B	13	879	116	462	31 244	3 639 239
12	38	S B	1	27	9	388	10 485	94 365
13	80	M B	3	224	49	279	20 818	1 020 084
14	118	M/L B	2	189	22	305	28780	633 150
15	36	S B	7	260	63	388	14 424	908 700
16	120	M/L B	1	99	29	445	44 038	1 277 100
17	164	L L	1	163	23	387	63 003	1 449 070
18	120	M/L B	1	66	65	461	30 451	1 979 340
19	129	M/L C	8	888	133	344	38 182	5 088 867
20	36	S B	3	109	73	365	13 266	968 381
21	129	M/L C	1	129	17	471	60 706	1 032 000
22	120	M/L B	1	88	24	500	43 963	1 055 120
Total								38 718 452

3.4.2.d *Enhanced revenue results*

Calculations were performed to estimate the difference between minimum revenue (discussed above), and an enhanced revenue estimate that takes into account the variety of cabin options that attract different rates on tourist vessels. Sufficient information was available to perform these calculations for seven different vessel / company combinations. The vessels represent a range of different ship types, sizes and comfort levels. Table 3.7 shows the results of these calculations.

Table 3.7: Comparison between minimum revenue and enhanced revenue estimates

Vessel / company combination	Vessel type (after table 2.4)	Minimum price per day (US$)	Enhanced price per day (US$)	Difference factor
1	M C	516	704	1.364
3	S B	383	399	1.041
4	L L	430	558	1.298
5	L L	430	682	1.588
9	M B	462	534	1.155
16	M/L B	445	561	1.26
21	M/L C	344	416	1.211
Average				1.281

Variations in the difference factor between the minimum and enhanced price per day are evident for different vessel / company combinations. It is reasonable to assume that larger vessels offer more scope for varied cabin categories given their greater capacity, while smaller vessels are unable to offer the same range of cabin options. This is borne out in the proportions of cabin options available, where smaller vessels tend to have only one of a few 'suites' (generally corner cabins) and a remainder of standard cabins. The results of the enhanced revenue calculations bear this out, with the larger ships having a greater difference between minimum and enhanced prices per day. This may also be a reflection of the degree to which these ships are purpose built or converted specifically for tourism (as opposed to research vessels with minor refits for passenger carrying). The calculations for the less luxurious ex-research vessels give a low difference factor. A major refit, representing a long term commitment to tourism operations by an owner or operator, offers the chance of developing higher yield cabin options.

Taking the average difference factor as a very rough estimate for the entire industry, and applying it to the minimum revenue total of US$38 718 452, gives a total of US$49 584 365. These two figures represent a minimum and a best guess estimate of the total size of the shipborne component of the Antarctic tourism industry.

3.4.3 SUMMARY OF RESULTS AND CONCLUSIONS

Summarising and compiling the above results, we have values of US$1 827 750 for the airborne component, US$3 580 636 for the overflights, and US$38 718 452—US$49 584 365 for the shipborne component. The market economic value of Antarctic tourism (note that this does not represent total economic value) can therefore be estimated at US$44 126 838 (using the minimum estimate for the shipborne component) and US$54 992 751 (using the enhanced estimate) for the 1996/97 tourism season.

For airborne tourism, an average of US$21 009 per person can be inferred. For the Qantas overflights, a per person average of US$1230 (based on full occupancy calculations) is the result. For ship based tourism, the average based on the enhanced estimate gives an average per person of US$6772, while based on the lower estimate the average is US$5288.

The analysis was limited to a single season for reasons of simplicity, and because of difficulties with obtaining full information for other seasons. The 1996/97 season was chosen for reasons discussed above. It is important to note that since that date, considerable growth (or variation) has occurred in the number of passengers travelling (by ship especially)—in fact, the 1996/97 season, with 7322 shipborne passengers stands out in figure 2.1 as a deviation from an otherwise upward trend. Section 2.2 discusses the trend of growth and provides figures for the seasons preceding and following 1996/97. In 1997/98, for example the total number of passengers carried was 9 604, while the estimate for 1998/99 was 10 373. The estimated total economic value for these years would vary accordingly. Using the lower 1996/97 estimate as a basis, the 1997/98 seasonal total would be US$50 785 952, and US$54 852 424 for the 1998/99 seasonal estimate. The enhanced estimate of US$6772 per person, multiplied by the 1998/99 estimated total number of visitors gives a total revenue of $US70 245 956, without accounting for inflation.

These estimates do not include any of the expenditures that would be included in the total amount that individuals paid for an Antarctic tourism experience. Airfares from home, tips, taxes, purchase of clothing, souvenirs, accommodation in departure ports, and other expenditures generally associated with an Antarctic tourism experience are likely to be considerable. It can be seen from this analysis, however, that the industry, while small in terms of passengers carried, is of a considerable size economically. The results imply nothing about profitability of the companies involved, as details of the costs involved in operating tourism of this nature are unavailable. Most of the companies are involved in tourism activities,(cruise or otherwise) beyond the Antarctic region, and Antarctic tourism for these companies composes only a proportion of their total business (varying from a small proportion to the majority). At least one company operates solely in the Antarctic region.

The results also shed light on the economic structure of the industry. In an industry with 10 operators, one company captured 32% of the total estimated revenue (while carrying 41% of the total passenger load), 50.9% was captured by the top two companies, 64% was accounted for by only three companies, and four companies combined earned more than three quarters of the estimated revenue. It is also worth noting that there were 6 companies which each earn less than 12% of the total revenue.

Table 3.8: Industry structure: revenue and passengers by company

Company	Estimated minimum revenue (US$)	% of total revenue	% of total passengers	Passengers carried	Vessels	Voyages
I	125 820	0.3	0.5	36	1	1
II	734 614	1.9	4.2	305	1	7
III	817 379	2.1	2	147	1	4
IV	968 381	2.5	1.5	109	1	3
V	2 087 120	5.4	3	217	2	2
VI	4 336 706	11.2	9.7	707	1	9
VII	4 864 088	12.6	12.4	906	2	6
VIII	5 088 866	13.1	12.1	888	1	8
IX	7 361 809	19	14	1028	6	16
X	12 333 669	31.9	40.7	2979	5	48
Total	**38 718 452**	**n/a**	**n/a**	**7322**	**n/a**	**104**

Antarctic tourism is clearly of economic significance. While not enormous in world terms the economic size of the industry is significant in itself, in the Antarctic region, and in the context of neighbouring economies. The results on the pricing of Antarctic tourism products given here show that access to the continent through tourism, while often depicted as exorbitantly expensive in media and academic reports, is possible through moderately priced products (compared to other forms of international tourism, especially cruise tourism—clearly such issues are relative).

It would be a mistake to compare Antarctic cruising costs to costs of other nature and adventure tourism products, given the fact these are normally air and land based. It is more sensible to compare prices of Antarctic tourism to other prices in the cruise industry. On this basis, using prices from Slater and Basch (1997) and from general promotional material of different cruise lines, it can be ascertained that Antarctic cruises are broadly comparable to prices for cruise tourism experiences. There are prices that compare well to the low, middle and upper (but not extreme) price range of the mainstream cruise industry.

The distribution of economic benefits, including flow on effects, is difficult to ascertain. A certain proportion of revenue is likely to be re-spent in the departure states. Fuels and lubricants, fresh produce, and service provision (including accommodation accompanying packages) may be purchased locally by some companies, especially for those ships operating in the region for a full season. Revenue flowing locally (that is not captured by non-local operators but contributed directly by tour participants) is likely to include extended accommodation in the departure ports, local and regional transport, souvenirs, local tourism products, and so on. While not empirically examined, it is likely that leakage of economic value from the departure states would be considerable, given that few of the operating companies are based in the departure states.

A number of issues raised earlier have no easy solution. They include the philosophical and ethical, relating to the private use of a global common property, and rights of access, and the pragmatic, such as whether tourists should contribute to management costs or environmental protection measures. The extent to which departure states are entitled to benefit from tourism revenue is also interesting. Acting as access points, departure states are in the enviable position of attracting the economic activities relating to tourism. On the other hand, member states of the ATS that are spatially remote from the continent are no less deserving of support for their efforts in conserving and managing Antarctica, and indeed their citizens may form significant proportions of the tourists visiting. The costs of accessing the Antarctic are also important. There are equity implications associated with any measures that may increase access costs, such as user or visitor fees, given that the already high cost places Antarctica out of reach for many people.

3.5 THE TOURISM EXPERIENCE

A range of different elements contributes to the total tourism experience. Central components of the experience are important, such as attractions and activities, but peripheral factors also contribute to the experience (interpersonal encounters, service, or personal comfort issues, for example). The experience is the sum total of all input related to the tourism experience, some internal to the tourist, such as likes, prejudices, expectations and knowledge, and others external, such as the tourism service and activities offered, and the relationships the tourist has with guides, operators, and local people.

This research only examined components of the tourism experience unique to the Antarctic tourism experience. Other components, such as service and hospitality issues, or comfort and standards of accommodation, were not examined. The important components of the Antarctic tourism experience include the types of attractions contributing to the experience, the range of activities offered, and the educative components of the experience.

The natural environment is a dominant component of the tourism experience for Antarctic tourism. As Johnston and Hall note, even heavily used areas need to meet the expectations that visitors have of 'polar wilderness', as the image and reality must match for a positive experience to occur. Obvious environmental damage can cause a gap between the expected and the actual, and negatively affect the tourism experience and the industry (Johnston & Hall 1995).

Many authors treat Antarctic and subantarctic tourism operations as a single unit, because many voyages in the Peninsula region and most voyages in the Ross Sea and East Antarctic regions include visits to subantactic island groups. This thesis examines the management of tourism on subantarctic islands in a separate chapter, but it is important to recognise that for many passengers, the visits to subantarctic locations are part of the same tourism experience. The distinction between Antarctic and subantarctic in this research is based on physical and geopolitical factors, not based on the tourism experience. These issues are examined further in chapter five.

3.5.1 TOURISM ATTRACTIONS AND THE TOURISM EXPERIENCE

Site attractions are described by Mill and Morrison (1985). Such attractions are tied to the physical resource base. In nature tourism, other forms of attraction are also possible, with some natural phenomena ephemeral or semi-permanent, while others occur only on a seasonal basis. Congregations of breeding wildlife are a good example of a nature tourism attraction that is not entirely site related.

Using the information on motivations, the contributions of other authors, and with a knowledge of the supply of tourism experiences, Antarctic tourism attractions can be identified. These are divided into a number of groups or themes. Some of the attractions involve physical features, such as mountains, glaciers or ice shelves. Others may involve sites where important events have occurred. Some attractions involve the nexus between a location and an activity, and others may be more abstract, such as the opportunity to empathise with the hardship experienced by early explorers, or the experience of wilderness.

Orient Lines (1997) provide a good summary of what their passengers do while ashore—

> passengers will observe and photograph the wildlife, including penguins and other birds, and occasionally marine mammals. They will also look at Antarctica's relatively sparse flora (at the sites visited by Marco Polo this is likely to be confined to lichens and mosses), geological features, and scenery. They will look at huts and other man-made structures, whether currently occupied or not, but will not enter these unless specifically invited to do so by the residents (p. 14).

IUCN (1991) describes the perception of Antarctica that underlies much tourist interest:

> The Antarctic is a vast wilderness of great natural beauty, laid out on a grand scale, with its tall mountains, massive glaciers and iceshelves, huge floating icebergs and great profusion of seabirds, penguins and seals. It has the added association of the heroism of pioneer explorers (p. 55).

Wace (1990) noted that a wide range of things attract people to visit Antarctica, including the scenic qualities of a pristine wilderness, ice scenery, wildlife, sites of historic significance, and scientific stations. He points out that while sightseeing is the major activity, many tourists have an active interest in the history, science or natural history of Antarctica. Splettstoesser and Folks (1994) briefly discuss attractions of Antarctic visits, including wildlife, solitude and pristine environment, wilderness, absence of crowds, the status of Antarctica as the 'last continent', and scenery. The effect of tourism growth on the quality and form of the tourism experience is discussed by Stonehouse and Crosbie (1995). They note that the 'intrepid', 'expedition', and 'exploration' aspects of the experience are less convincing when larger numbers of people and vessels are present. Problems also occur with visual contact between vessels, which has an impact on the tourism experience (Stonehouse & Crosbie 1995). These authors also discuss the perception (and marketing) of the destination as pristine or virgin, noting that the reality is not necessarily congruent with such images. An interesting aspect of the tourism experience is also identified by Stonehouse and Crosbie, who noted that a number of tourists, believing their visit to be almost unique, felt guilt and concern that their presence would ruin the environment in some way. These visitors reportedly felt reassured to know that the qualities of the places they were visiting persisted despite being subject to far larger numbers of visitors than they were aware of. Table 3.9 lists elements of the commercial tourism experience. The information is based on the characteristics of the resource area, on reported motivations and attractions, and on the range of experiences offered to tourists by operators.

Table 3.9: Elements of commercial tourism experiences

Wilderness factors	remoteness, solitude, pristine nature, lack of infrastructure, uniqueness.
Scenic grandeur / aesthetic	seascapes, icebergs, ice cap, glaciers, ice shelves, sea ice, mountains, extended daylight, scale
Climatic / physical	extreme cold, extreme wind, ocean travel, presence of sea ice, peacefulness, solitude, uniqueness of landscape, ice free areas, lakes and islands.
Activity oriented	ship travel in sea ice, walking, photography, ice climbing, mountaineering, nature observation, IRB cruising, adventure, challenge, diving, kayaking, skiing
Biotic	penguins, seals, whales, mosses, lichens and flowering plants, biology lectures, nature in action (breeding, feeding), environmental awareness, krill, plankton, aquatic species
Scientific / educational	geologic features, biotic features and systems, science in ice free areas, lakes, islands, climatologic features, glaciological features, lectures
Research / human living	station visits, internationalism, interpretation of science activities, lectures, survival, challenge, hardship, achievement, adventure
Heroic / historic	historic huts, sites, cairns, and monuments, places of cultural significance, empathy with historical hardship

3.5.2 EDUCATION AS PART OF THE TOURISM EXPERIENCE

Antarctic travel is often marketed as having a significant educative component. One of the justifications for conducting tourism is that travellers will emerge from the experience with a knowledge of and love for Antarctica, and will become advocates for its conservation. Most tour operators provide, as part of ship based tours, a regular series of lectures (Splettstoesser 1996, IUCN 1991, Enzenbacher 1992a). The use of shipboard lectures and briefings is part of a pattern for Antarctic cruising initiated by Lindblad in the 1960s (Stonehouse 1994a, Splettstoesser 1996, section 3.6.5) which has been used by most operators since.

Splettstoesser notes that 'a key ingredient of any tour-ship cruise to Antarctica is an educational program that is designed to inform passengers as fully as possible of the abundance and vulnerability of wildlife and other physical aspects', and 'all visitors to Antarctica should receive some kind of background information in order to appreciate what will be experienced. This should cover wildlife, research programs, exploration history, rules of the Antarctic Treaty, and so on' (1996, p. 75). The educational program generally includes lecture programs, and background material sent before travel or provided on the ship (Splettstoesser 1996). The value of onboard educational lectures was highlighted by IUCN (1991, p. 56), who stated that 'tourists thus become generally well-informed and supportive of conservation requirements. They have behaved with care and respect for environment and wildlife'.

Topics of lectures vary according to the focus of the operator including the market being serviced, attractions being visited, theme of the trip if any, and the expertise of the guiding and lecturing staff on board. Enzenbacher (1992b) includes topics of Antarctic history, geology, wildlife, marine biology, politics, and scientific research. Thomas (1994) describes lecture topics including Antarctic geography, climatology, geology, glaciology, and the history of exploration. Information about science and research, and present human activity is generally included. Conservation issues are a common topic. The experience and profile of the lecturers on board may vary by company and season. High profile lecturers with considerable experience in Antarctica are often employed, including explorers, scientists, or adventurers. Rubin points out that 'many eminent scientists are poor lecturers' (1996, p. 62). Rubin suggests passengers should consider the quality and suitability of lecture facilities when choosing a voyage. Some companies use the profile or experience of their lecturers as a marketing feature to differentiate their product, while others concentrate more on destinations, landings, ship comfort, or value.

Results from survey work also shed some light on lecture programs. In a survey in 1993/94 (P. Davis 1995b), respondents were asked to recall what information lecturers had provided. 78% of respondents had exposure to IAATO guidelines, 80% recalled information on the Treaty, 97% recalled information on wildlife they would be likely to see, 47% on mining and/or commercial activity, 75% on guidelines other than the IAATO guidelines, 77% on protected areas, and 83% on science. Attendance at educational activities aboard ship was also examined by P. Davis (1995b). In relation to the shipboard lectures, 36% of respondents had attended all lectures, 46% had attended most lectures, 17% had attended some lectures, and 1% had attended none.

The role of the naturalist-guide in Antarctic tourism was examined by Thomas (1994). Thomas analysed the various tasks of the naturalist-guide and examined training and teaching aids and techniques. Thomas noted the need for guides to be available for up to 18 hours each day, providing lectures, guiding on landings and cruising, and answering questions. Guides are also responsible for making sure passengers know the practical conservation measures, including guidelines, and ensuring observance of guidelines while ashore. Thomas describes voyages as having three stages—the first involving introductory lectures on the outward voyage, including human history, geography, and natural history. The second stage involves interpretation of things observed during the ocean voyage and landings, placing them in the context of the scientific endeavour required to obtain the knowledge. The third stage is the return journey, where Thomas used lighter educational material, videos, slides and narrative to describe social and aesthetic aspects of station life.

The use of educational lectures on board ship is not compulsory. Companies could choose to offer cruises without extensive lecture programs, perhaps in servicing a different target market, or as part of a cruise focusing on the pursuit of a particular activity. The tedium of a sea voyage without intermediate attractions means that some form of entertainment for passengers is necessary, and lectures dealing with the destination are an obvious choice. Stonehouse (1994a) noted that the broader Lindblad pattern of operations (section 2.3) (including lectures, landing management, a conservation ethic, and so on) will be subject to change as a wider range of ships come into use. Stonehouse (1994a, p. 204) saw problems with larger ships, due to large, more heterogeneous groups of tourists with a wider range of interests, 'not all of them enthusiastically receptive to the conservation ethic', and a range of other entertainment that would compete with lectures.

Johnston and Hall (1995. p. 301) attributed much of the support for polar conservation exhibited by visitors to the effect of the rigorous education programs undertaken by many operators, and the visitor guidelines in place. They too cautioned that environmental education may become less important as the number of operators rise and larger vessels are used.

3.5.3 Other activities

In addition to the normal site visits and IRB cruising, a number of other activities are also available. For some time, overnight camping on land or ice areas in the Peninsula region has been possible. Credit for the first overnight lightweight camping (in 1993/94) was claimed by the Australian company GMMS Polar Journeys (now Aurora Expeditions). Rubin (1996) noted that the company was the only one to offer this activity. Enzenbacher (1994a) reported on overnight camping by 16 passengers and four crew in 1993. The 1997/98 season summary of visits to Peninsula sites compiled by the NSF lists two visits that included camping, being Pleneau Island, with 101 people camping, and Damoy Point, Wiencke Island, with 40 people camping (NSF 1998). Peregrine, another Australian company, offered overnight camping on two of its 11 day voyages. More recently, Aurora Expeditions has begun offering sea kayaking options on some of its voyages (Aurora Expeditions 1999).

Enzenbacher (1995a) provides some details on developments including camping, helicopter use, and shorter, cheaper trips.

A number of operators have proposed or conducted diving (SCUBA) activities in the Antarctic region. Rubin (1996) listed Southern Heritage Expeditions and GMMS Polar Journeys (now Aurora Expeditions) as planning to include diving on their trips to the Ross Sea and Peninsula regions respectively. An article by Richardson (1999) described aspects of the first dive organised by Aurora Expeditions, which took place in 1998, but did not detail the location, or provide specifics about the divers or management of the dive.

Aurora Expeditions also pioneered regular climbing trips in the Peninsula region for amateur and novice mountaineers. Marketed as expeditions for climbers and photographers, such trips involve short ascents of peaks (including first ascents), and glacier travel. The first of these voyages was in the 1995/96 season. In a voyage of 12 days, two one day alpine style ascents are normally programmed (Greg Mortimer Mountain Services 1996). Hall (1996) describes one of these climbs, in his biography of the manager of the company, Greg Mortimer, an acclaimed Australian mountaineer, guide, and experienced cruise leader. The climbing on these trips differs considerably from the type of mountaineering available through the air tourism company ANI. The Aurora Expeditions climbing trips offer short climbing and glacier travel experiences to relatively inexperienced climbers, an opportunity to explore in a more intimate way some of the spectacular areas of the Peninsula region, at comparatively low cost, and with little physical discomfort (given that the ship is used for overnight accommodation). The ANI supported or organised mountaineering trips involve, on the whole, more difficult, extended climbs at high cost, and less comfortable living conditions.

Most operators take photography into account in designing voyages, but a number of companies market special voyages highlighting photographic opportunities. The climbing trips of Aurora Expeditions are also marketed to photographers, with time allowed for detailed photography (Greg Mortimer Management Services 1996).

Additional activities are likely to become available as companies compete and markets diversify. It is possible that considerable latent (un-met) demand exists for activities, itineraries, or experiences. P. Davis (1995b) investigated the demand for a number of specified activities. 43% desired day hikes, 17% climbing (interpreted liberally as hill climbing or rock scrambling), 13% snowmobiling, 13% scuba diving, 12% camping, 9% skiing, and 7% fishing. These results indicate that for the participants in P. Davis' survey, a moderately large proportion would be keen for an extended range of activities. It is worth noting that a number of these activities are already offered by some companies, but not necessarily by the companies or on the voyages which P. Davis surveyed. P. Davis also investigated demand for facilities. 24% thought a visitor centre in the Peninsula region would be useful, 27% felt an on-site interpreter would be useful, 20% felt visitor rest facilities on-site would be useful, 15% desired small huts for overnight use, 12% desired an airport, and 8% a chalet or guest house.

The most likely new activities would be those with high participation rates in the target market groups, activities that are particularly suited to the Antarctic environment, or those that extend the range of the experience beyond that available through present activities.

3.6 ANTARCTIC TOURISM IN THE BROADER TOURISM INDUSTRY

In addition to the characteristics of Antarctic tourism as a stand-alone industry, it is important to understand the place and functioning of Antarctic tourism in the broader tourism industry. The concept of a tourism destination is examined first, and Antarctica as a tourism destination is examined. The destination life cycle model is briefly examined, and the Antarctic destination is compared with this model. If the destination life cycle model has validity, then Antarctica can be tentatively located in the early phase of development, moving into a phase characterised by larger market sizes and increased numbers, more differentiation in tourism products, and participants who are less intrepid and less interested in challenging themselves or their views. Concepts of ecotourism are then examined, and Antarctic tourism is compared with ecotourism definitions. Antarctic tourism is found to accord closely with definitions of ecotourism. The global tourism context is examined, and the large and rapidly growing cruise tourism sector is described. The geographic spread of cruise tourism, the development of new destinations, the characteristics of vessels, cruise prices, and structural characteristics of the cruise industry are described. The expedition cruising sector, in which much Antarctic tourism resides, is defined and examined. The important role of Antarctic cruising in the development of the expedition cruising model, and the implications of the model for Antarctic tourism are discussed.

3.6.1 ANTARCTICA AS A TOURISM DESTINATION

A destination is a geographic concept, a place that people visit. According to Mill and Morrison (1985, p. 201), a destination will involve a collection of elements, namely attractions, facilities, infrastructure, transportation, and hospitality. Dickman (1989) lists the elements of a destination as attractions, access, accommodation, amenities, and activities. Regardless of the categorisation, it is clear that a destination is composed of the necessities for a complete tourism experience. A destination area generally has boundaries—geographical, climatological, regional, or experiential, defined primarily through marketing (in order to clearly identify the destination in the mind of the consumer). A destination area may have many attractions. Destinations are sometimes also categorised as primary and secondary—primary being one that provides the primary motivation for a visit, while a secondary one is used to break a trip, a place that in itself is not sufficient to motivate travel, but is attractive enough to provide interest *en route* to a primary destination (or indeed it may be a necessary stopover) (Mill & Morrison 1985). Given these explanations, it is clear that the Antarctic is a well defined destination, although most of the elements of the destination are portable (supplied aboard ship) with the exception of attractions. The iconic nature of the continent, its natural features and it surrounds, serve to make it immediately identifiable to most people.

One important concept is that of the destination life cycle. The concept comes from a marketing perspective, originating in concepts of a product life cycle. The destination life cycle model proposes that a destination area will pass through stages, characterised by variations in the numbers of tourists, types of tourist personality, involvement of local people, level of travel organisation, development of infrastructure and facilities, and marketing and advertising of the destination and attractions (Butler 1980, Jones 1998, Cooper & Jackson 1989, Haywood 1991).

It is not intended to consider in detail here the strengths and weaknesses of the life cycle model, rather to describe destination life cycle models in general and some implications for the development of the Antarctic destination based on the model proposed by Butler (1980). Butler's model, while preceded by others, is the foundation for recent analysis of the concept (see Cooper & Jackson 1989, Haywood 1991, Jones 1998, Getz 1992 for example).

In brief, Butler (1980) provides a tourist destination life cycle curve, derived from Plog's model (figure 3.1). Butler's model suggests that a destination evolves along a curve from introduction, involvement, growth, maturity or stagnation, and then decline or rejuvenation. Plog's destination life cycle relates personality profiles of consumers to the stages of growth of the destination area—a psychographic approach (figure 3.1). Initially, 'allocentric' personalities (outward looking, or seeking differences), are attracted to a new destination. Allocentrics seek novelty, and avoid familiarity (Hall & Weiler 1992). As the destination becomes more widely known, the more numerous 'mid-centric' personalities (those less adventurous) are attracted to visit. This phase relates to the maturity phase of Lazer's product life cycle, where sales volumes grow and eventually peak, in what is normally a mass tourism market phenomenon (Mill & Morrison 1985). After a time, the 'mid-centric' personalities are replaced by the smaller numbers of 'psychocentrics' (inward looking people). Hall and Weiler (1992) suggest that most special interest travellers correspond to the 'allocentric' category.

The value of the destination life cycle model and destination life cycle analysis as a tool for the planning, management and marketing of destinations is debated (Cooper 1997, Haywood 1991). According to Cooper (1997, p.82), Butler's 1980 paper implied that the model should serve as an explanatory framework, with no intention that it be a tool for strategic planning. Cooper & Jackson (1989) state that the life cycle concept can be viewed in two ways—as a guide for strategic decision making and as a forecasting tool (p.380). Haywood noted that destination life cycle can serve as a descriptive model of market acceptance, with some using it 'to explain the rise and fall of a variety of tourist destinations' (Haywood 1991, p.31, see also Getz 1992). Getz reviewed the application of the model as an explanatory framework to a number of case studies, reporting that many authors found destination specific social, environmental and economic factors rendered the model less than effective in that role. Other cases reviewed by Getz found that the model is not useful as a forecasting tool or a tool for strategic management (Getz 1992). Getz's own case study research found that the model did not fit the development of the case study (Niagara Falls) closely and that tourism planning in the case area could make little use of the model (1992, p.767).

Haywood criticises the conception of life cycle as described by tourist numbers in an s-shaped curve (what he calls a 'biological life-cycle') (1991, p.34). Haywood states that:

> it can be argued that the tourist-area life-cycle model, as it is currently viewed, i.e. as a biological life cycle, provides insufficient insight into the development of policy and planning for tourism areas. It does not consider how the tourist area or competing areas can affect the shape of the curve; and if the life cycle is taken as a given, whether an undesirable self-fulfilling prophecy is likely to occur (1991, p.37).

Haywood argues that, because tourism is influenced by economic and social forces, it is not possible to analyse tourist area evolution without consideration of these forces, as any variation in these forces will vary the development of the tourist area (see also Cooper & Jackson 1989). Haywood argues that to operationalise the model in a planning and management sense a broader range of conceptual and management issues need to be considered.

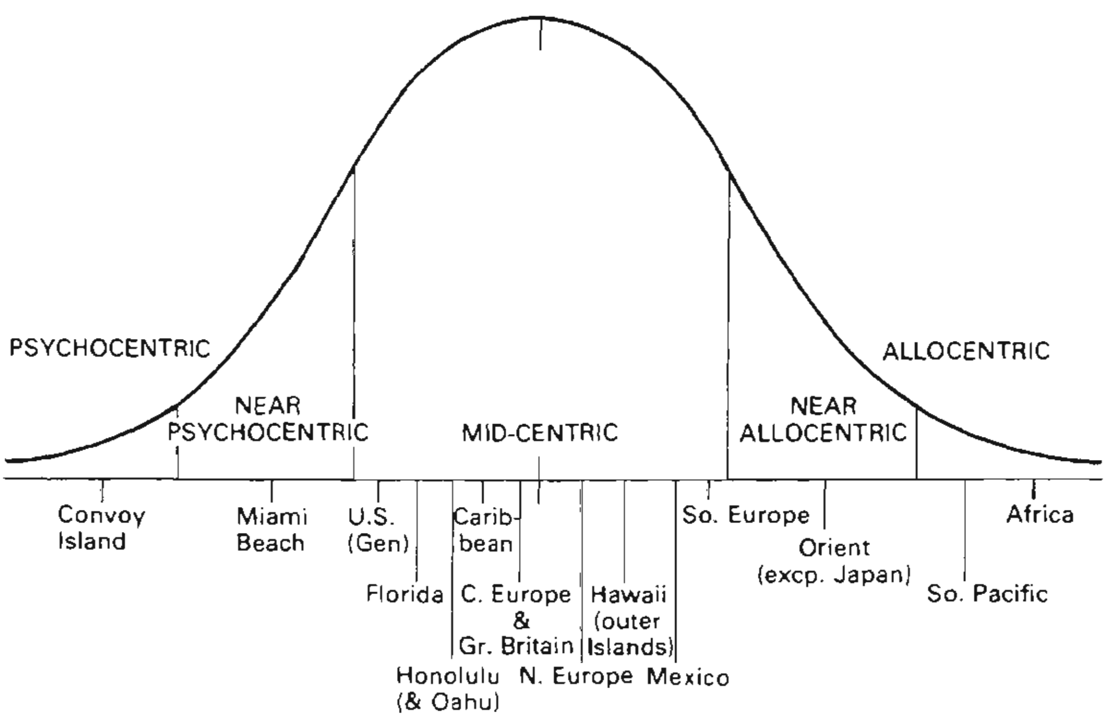
Cooper & Jackson argue that the model is not useful as a prescriptive tool—'the life cycle does not provide sufficient insight into the development of planning or policy for tourism areas. First, the cycle simply reflects policy decisions. Second, the cycle is destination specific with stages and turning points only evident with hindsight' (1989, p.382). On the other hand, the model 'provides an enlightening descriptive tool for understanding how destinations and their markets change' (Cooper & Jackson 1989, p.383).

Cooper considers the integration of tourist area life cycle analysis and strategic planning (1997) with specific reference to sustainable tourism, concluding that there is potential for achieving elements of sustainable tourism at the destination level by analysing strategic options at each stage in the life cycle.

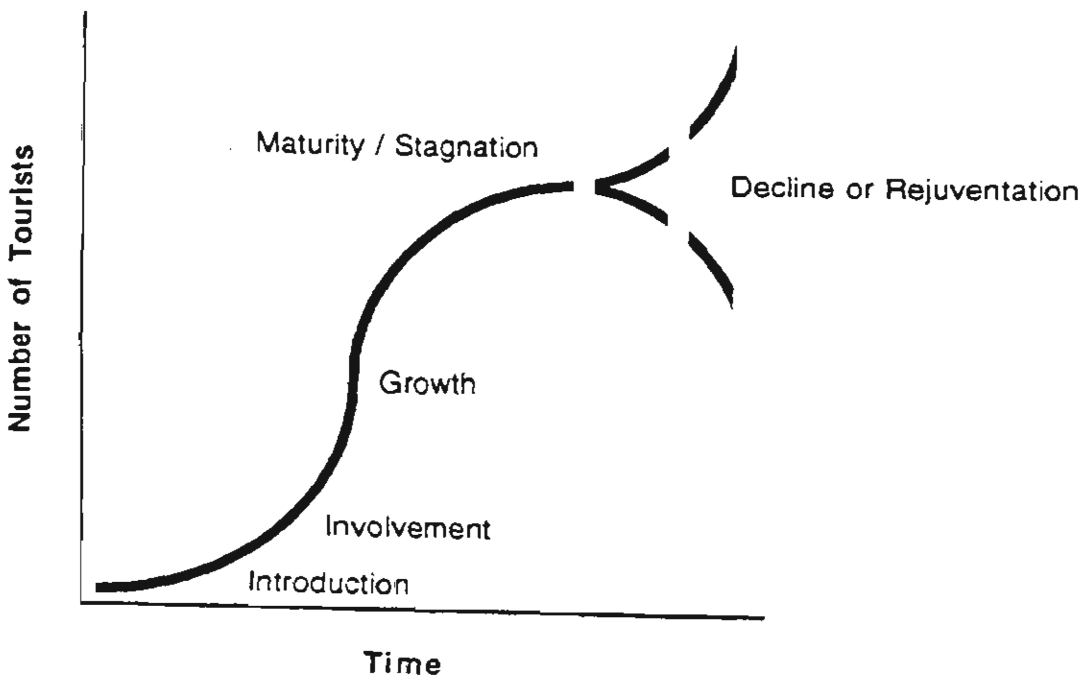
One paper examines the application of life cycle models to polar tourism. Jones (1998) discusses a descriptive destination life cycle model, from Gordon and Goodall, that combines components of the models of Butler, Plog, and others. Jones examined Arctic shipborne tourism to determine if it were developing in accordance with the model of Butler and that of Plog, and found that the models matched the characteristics of Arctic shipborne tourism well. Jones placed Arctic shipborne tourism in the 'allocentric' section of Plog's model, and suggested that some ship tourism in ice free areas of the Arctic was in the 'growth' phase of Butler's model, although most was in the 'involvement' phase. Jones also noted that Plog had placed Antarctic tourism (in 1991) in the 'allocentric' phase of his model. Jones also pointed out that destination models predict increasing market definition, with specialisation in certain areas, markets, or experiences. Jones concludes that such models can be useful in understanding and predicting polar tourism trends. Jones considered that an understanding of destination life cycle models is important when considering the future progress of the Antarctic destination (Jones 1998).

Many of these criticisms relate to the application of the model as a prescriptive, planning tool. As a descriptive tool, the model appears to have greater utility. As such, it is considered useful to keep in mind the destination life cycle model when considering aspects of Antarctic tourism.

Figure 3.1: Product and destination life cycles



Plog's destination life cycle (reproduced from Mill & Morrison 1985)



Butler's destination lifecycle (reproduced from Jones 1998)

3.6.2 ANTARCTICA IN THE DESTINATION LIFE-CYCLE

While there is debate about the use of the destination life cycle model, it may be useful to speculate as to the position of the Antarctic destination in the life cycle. Identification of Antarctica's stage in the life cycle model could have implications for management actions, aimed at arresting or extending the product life cycle, or avoiding progression to a phase of 'mass tourism', if that were one of the objectives of management.

Starting with the psychographic model of Plog, and using the descriptions of the different personality profiles from Hall & Weiler (1992) the descriptions of visitor motivations from section 3.2 can be considered. Information on operational characteristics of the industry can also be taken into account, including the use of larger ships, the philosophy of expedition cruising, and the range of new types of activity being offered. Taking all of these factors into account, Antarctica, as a destination, would be located on the 'near allocentric' part of Plog's model. The bulk of Antarctic tourism involves expedition cruising, which is likely to be catering to 'near allocentric' personalities, given that it combines familiar comforts of ship based travel with the novelty of the Antarctic attractions and environment. The examination of tourist motivations (section 3.2) found many people were motivated by the out of the ordinary nature of the destination, supporting the 'near-allocentric' categorisation. The relatively comfortable nature of most Antarctic ship based tourism is unlikely to appeal to true 'allocentric' personalities, although it is likely that such people participate because of the absence of alternatives. It also appears clear that some parts of the Antarctic tourism industry cater more directly to 'allocentric' personalities, specifically ship based adventure activities (camping, skiing, extended shore walks, and mountaineering) and the air based tourism options offered by ANI. Similarly, larger ship offerings may overlap into the 'mid-centric' personality section of Plog's model. The more conventional ship-based attractions and comforts, the fewer shore landings undertaken, and the larger numbers of people involved all suggest a more 'mid-centric' personality is being targeted. Comparing Butler's tourism destination life cycle curve with what is known of Antarctic tourism, it would appear, on the basis of the shape of the curve (and acknowledging the concerns of many authors as to the validity of the model curve) that Antarctic tourism is centred on the 'involvement' phase, with some indications of moving into the growth phase.

Life cycle models indicate rate of growth in tourist numbers, based on the assumption that as the destination progresses through life cycle stages, larger markets become available. Given that Antarctic tourism appears to be in the early (but not very early) phase of the life cycle of a destination (according to the models examined), some generalised prediction can be attempted, keeping in mind the limited usefulness of the destination life cycle concept as an accurate predictive tool. Somewhat ominously, the models predict that as the character of the destination changes, the size of the market increases dramatically. This suggests that, if the assumptions about the location of Antarctic tourism in the destination life cycle are correct, the growth exhibited in the past will continue. Interest in the destination from larger, established tourism companies (as opposed to small specialist operators) is an indication that this may be happening. There is also evidence of clearer product definition, and more defined target marketing (compared to the earlier years of Antarctic tourism) which also supports the notion that these processes are occurring.

It can be postulated, albeit tenuously, based on destination life cycle models, that Antarctic tourism may be entering a phase of continued growth, and greater product diversification and definition. This needs to be kept in mind in the development of management measures for Antarctic tourism.

3.6.3 ANTARCTIC TOURISM AS ECOTOURISM

No discussion of tourism and nature can be complete without reference to the recent and very rapid rise in concern with ecotourism. As an activity, as a marketing and product placement tool, and as an area of theory and discourse, ecotourism is a considerable phenomenon. It is clear that many people see Antarctic tourism as ecotourism. Some authors describe it as such (Hall 1993, Stonehouse 1994a, Sanson 1994 for example). The concept of ecotourism will be briefly examined here, and the relationship of Antarctic tourism with notions of ecotourism will be examined.

While many definitions of ecotourism exist, there are a number of features associated with the concept that are important, and that represent new directions in tourism. Some subversion of the term occurs for marketing purposes, in an attempt to make a product sound like an environmentally responsible one when it may in fact not be so—in effect a 'repackaging' of more traditional forms of tourism, with no change in content. As Hall states 'different concepts of 'ecotourism' meaning different things have led to a substantial loss in the explanatory power of the term and its potential to be a rallying point for those wanting to ensure that tourism can contribute to sustainable development' (Hall 1994, p. 153). An alternative term, sustainable tourism, is used by some to differentiate tourism concepts and activities from ecotourism. Sustainable tourism has been defined by Johnston and Hall (1995, p. 309) as 'conserving the productive basis of the physical environment by preserving the integrity of the biota, ecological processes and cultural values, and at the same time, producing tourism commodities without destroying other aspects of land use such as indigenous peoples' activities'.

There is a much criticism of ecotourism. To many it represents the final push, under the guise of concern and conservation, into the last pristine places on earth by wealthy western consumers. It may commodify natural values to their detriment. It has been characterised as ecological imperialism, the forcing of western values on other people (Hall 1994).

Recognising that debate surrounds ecotourism, a number of basic defining concepts are described here. The natural environment is a basis for marketable tourism products or commodities (Buckley 1994). This is not new—natural environments have served as attractions as long as people have been travelling. Ecotourism, however, extends this. There are four generally accepted components to ecotourism— nature based tourism experiences, economic or material contribution of tourism to conservation, managing tourism sustainably, and environmental education as part of tourism (Buckley 1994). These things are present in most definitions of ecotourism (especially those promulgated by environmental organisations), and it is safe to say that if present in a tourism product it could be described as ecotourism. There is an additional consideration surrounding much of the ecotourism debate, concerning the relationship between tourism and local people (especially indigenous people), that is largely absent in consideration of Antarctic tourism.

Examining Antarctic tourism with reference to the four components of ecotourism definitions, the first element is a focus on nature, or at a minimum a nature based setting. Antarctic tourism is more clearly focused on nature than most tourism products. The motivations discussed in section 3.2 show that natural features are a significant element of the Antarctic tourism experience. In fact, it is one of the few situations where many other attractions (interaction with foreign cultures, or shopping, for example) are absent, although cultural attractions relating to present and past human use are important.

The second element of most definitions suggests that tourism, to be considered ecotourism, should contribute in some form to the conservation of the area being visited. It has been argued that the main conservation benefit of Antarctic tourism is the creation of ambassadors for Antarctic conservation (section 2.7.1). If this is indeed what occurs, an indirect benefit to conservation would result. The proposition is however largely untested. Many questions can be posed as to the extent of this benefit—how many people become active in lobbying for Antarctic conservation as the result of a trip (especially as many may have been sufficiently motivated to do so prior to any travel)? To what extent can motivated people influence Antarctic conservation? Butler's examination of ecotourism seems to indicate a more specific form of conservation benefit is in order—economic or material contribution towards conservation (Butler 1994). Most Antarctic tourism would not satisfy this component of a definition. Antarctic tour operators pay no access fees or levies which could be earmarked for conservation purposes— of course, without any managing authority or even an office to receive and use funds, such contributions are impossible. At present, tourism continues to be perceived as a threat to the natural values of the Antarctic. Benefits are largely unexplored and unquantified. Some more direct means of allowing tourism to contribute to the conservation of Antarctic values would allow Antarctic tourism to be more readily classified as ecotourism.

The third component involves sustainability and minimisation of impact. The mechanisms in place to minimise the impacts of Antarctic tourism are described elsewhere. This element of the ecotourism definition is complex and indistinct (as notions of sustainability tend to be), and it should not be expected that Antarctic tourism would be any different to other forms of tourism in its ability to meet indistinct and unclear standards. On the whole, Antarctic tourism appears to cause little impact of major concern. Given the lack of obvious impacts, it is likely that present levels of Antarctic tourism can be considered largely sustainable in an environmental sense, although this must be qualified by the lack of monitoring or research to confirm impact levels.

Fourth, Antarctic tourism, as presently practiced, involves a significant educative component. Operators employ well qualified lecturer/guides and have significant lecture programs on board ship. To some extent this serves to enhance the tourism product (although it should be noted that it is possible to have an Antarctic tourism experience without any formal educative component). The processes of seeing and exploring places of interest, with a guide or even alone, are also educative in themselves—many operations considered to be ecotourism are educative only in the sense that people see the environment in question. Antarctic tourism as presently practiced readily meets this criterion.

Antarctic tourism can therefore be seen to include most of the components of 'ecotourism' definitions, but could, however, do better in providing benefits to conservation. The purpose here is not to judge Antarctic tourism by ecotourism criteria (or even to assume that ecotourism as defined here is necessarily desirable). It is important to recognise, however, that Antarctic tourism is seen by many as ecotourism, marketed as ecotourism, and perceived as such by consumers.

3.6.4 GLOBAL TOURISM AND CRUISE TOURISM

The context in which Antarctic tourism (and the other tourism case studies) operates is also important. Antarctic tourism and each of the case studies can be characterised in a variety of ways, but it is important to understand their place in the broader tourism industry, and more specifically, the cruise tourism sector. This rapidly growing sub-set of global tourism is important in that much of the case material lies within its ambit, and trends in the sector as a whole are pertinent. Within cruise tourism, the expedition cruising sector will be discussed, as Antarctic tourism lies within and largely defines this sector.

Tourism is the world's largest industry. More than 101 million people worldwide are employed in tourism, and total sales gross more than US$ 2 trillion (Go & Frechtling 1991). Over the period of the 1980s, growth in international tourism arrivals was 42% (Go & Frechtling 1991). These statistics serve to underline the scope and importance of the tourism industry, in terms of economies, employment, and as an activity pursued by large numbers of people. Growth trends in tourism are not evenly spread through the sector—certain destination areas and tourism products have been growing at a faster rate than others. Bently, of the World Tourism Organisation, 1991, mentioned four particular growth market areas for the 1990s, one of which was adventure travel (Go & Frechtling 1991).

Cruise tourism is defined by mode of travel, but spans a very broad spectrum of experiences. The shipboard experience in itself is an important element in all cruise tourism. As a mode of travel it has the capacity for considerable specialisation of tourist products. Cruise tourism retains the sun and fun image, with tropical destinations dominating the industry, but this is rapidly changing. Experiences range from massive 'floating city' resort ships, with little reason for passengers to disembark, through special interest tours with exotic ports of call, to theme cruises based on music, sports, or lifestyles (Slater & Basch 1997). The cruise industry is broadening beyond traditional modes into 'itineraries that are exotic, educational and adventuresome' (CLIA 1997).

The cruise industry grew rapidly over the past two decades. In the 1980s the cruise tourism sector saw 11% annual growth in passengers carried (Go & Frechtling 1991). This growth continued in the 1990s, with a growth rate of 10% in 1994 (Parker 1994). In economic terms, this business was worth US$12 billion (Parker 1994). In 1994, over 4 million grt of passenger ships were afloat, with orders for 16 newly built ships over the subsequent four years, and 27 000 extra berths becoming available (Parker 1994). Forecasts for the growth of passenger capacity of the world fleet were 7.43% in 1995, 12.6% in 1996, and 9.65% in 1997 (Parker 1995). According to Parker, Cruise Lines International Association's (CLIA) best estimate of existing market potential is 'at least US$50 billion over the next five years with as many as 8 million passengers a year cruising by 2000' (Parker 1994, p. 26). In a report on the 1997 performance of the North American cruise market, CLIA said 5.05 million passengers travelled, with an 8.6% increase for that year (CLIA 1998). New ship building reported by CLIA (1998) represents an increase in capacity of 51% for the North American market, suggesting further strong growth in the industry. Pelton, in the foreword to Slater and Basch's *Fielding's Worldwide Cruises*, stated that in 1998 alone 31 new ships were under construction, with some costing up to half a billion dollars (Slater & Basch 1997, p. iv). These factors indicate very strong growth in the cruise tourism industry.

The industry has a global geographic spread. A range of destinations is currently popular, and new destinations are being sought constantly. 'Markets are being explored whether for different locations, different people profiles or different activities, such as adventure cruises in Alaska' (Parker 1994, p. 26). In addition, Parker notes that the short cruise (six days) sector is growing. Because of the proximity to the substantial American cruising market, the Caribbean has always been a popular cruise destination, and remains the principal cruising region (Parker 1994). To gain an impression of the relative place of Antarctic expedition cruising in the global cruise industry, the numbers of ships operating in different regions and can be summarised (from Slater & Basch 1997). Ship size and time spent in a region vary and so the following is not indicative of passenger capacity. The destination areas receiving the most attention (in terms of ship numbers operating) are the Caribbean (80 ships), Mediterranean (40 ships), Alaska (32), Scandinavia/Baltic/UK (28), and Asia (22). Less popular areas include eastern and southern Africa (six ships), west Africa and the Canary islands (nine ships), Canada and New England (14 ships), Mexico's west coast (11 ships), South America (15 ships), the Greek Islands and Turkey (28 ships), and the South Pacific (nine ships). In this context, expedition cruising including Antarctic cruising (with 12 or more ships) is a minor component of the cruise tourism market, but comparable in number of ships to other significant destinations such as South America, Mexico's west coast, or African destinations.

Prices in cruise tourism can vary considerably, with the very luxurious ships costing between US$500 and US$1000 per person per day at standard rates (as opposed to full suite cabins, which are more expensive) (Slater & Basch 1997). Prices for less exclusive vessels go below $US200 per person per day for the cheapest cabins in large 'fun' oriented ships, or less than US$120 per person per day for the cheapest berths in older or less salubrious vessels. In light of these prices, the costs of Antarctic shipborne experiences do not appear particularly high.

The cruise tourism industry has a number of important characteristics that differentiate it from other areas of the travel trade, and that influence the character of the cruise experience in Antarctica. First, cruise tourism provides operators almost complete control over the tourism experience. The integration of the accommodation, travel, food, and entertainment functions of travel experiences within a single ship-based package allows the operator to govern the quality and character of the tourism experience. The operator also has the ability to minimise leakage of revenue from the company, in comparison with a normal holiday experience, which has a variety of suppliers, although this is not an issue in Antarctica. Market segmentation can be applied in a very specific way, given the clear boundaries of a cruise ship experience. If a target market is of sufficient size, whole cruises can be booked out to members of certain market segments, and an operator can assure passengers of an experience with like minded passengers and minimal contact with others. Cruises specifically for minority groups who may otherwise find it difficult to have a holiday experience with peers can be offered, such as for people who are gay, or nudists. Similarly, special interests in nature or history can be served, with cruises specifically for birders (twitchers, birdwatchers or ornithologists) or for those interested in historical destinations.

A second advantage of the cruise industry is its minimal dependence on shore based infrastructure. While ports of call are generally required to have a certain level of facilities, destinations need not have the significant developments of accommodation, transport and other facilities that are necessary for more traditional forms of tourism. Indeed, the lack of infrastructure is desirable for the cruising that operates on the premise that exotic or remote places are the attractions. This feature of the industry confers a significant advantage. Operators are able to change destinations and routes very easily, and can respond rapidly to changing political or economic situations, trends and fashions (and makes prediction of future use of a location very difficult). While this ability is desirable for the operators, the potential for the industry to rapidly withdraw from a destination or region is of concern for local economies and for shore based services that develop in response to the presence of cruise passengers.

An important aspect of cruise ship operation is the filling of capacity. The perishable nature of the tourism product means that if a cruise sails with empty berths, the operator is generating supply with no prospect of revenue in return. Last minute discounting is one strategy used to ensure capacity is filled, although Parker points out that 'heavy discounting—distress marketing—to fill berths at the last minute is now being replaced by advance purchase rewards' (Parker 1994, p. 26). For 1997, capacity utilisation for the industry was a record 90.8% (CLIA 1988).

3.6.5 Expedition cruising

Expedition cruising and adventure cruising are marketing and descriptive terms used to identify a sub-set of destination cruising (as opposed to 'floating resort' cruising), where the areas being visited are the focus of the trip, rather than the ship experience itself. The tourism experience being offered to passengers is significantly different to mainstream destination cruising on the basis of the style of ships being used, ship size, and the choice of destination (Martin & Martin 1996). Expedition cruising involves self-contained trips to unusual, remote or exotic locations, and the capacity to operate without port towns or cities. Such itineraries utilise small boats (and in some cases helicopters) for landing passengers. Ships tend to be smaller (up to 150 passengers), and often have a shallower draft than standard cruise vessels, allowing access to difficult (in a navigational sense) locations. Such cruises are generally expensive, relatively exclusive, and concerned with motivations associated with nature, intrepidness, adventure, and uniqueness rather than traditional cruise tourism motivations. Characterisation of itineraries as 'expedition cruising' seems to be based on the remoteness of the destination, and the requirement for total self-containment of functions on board the vessel. As it is used as a marketing term, there is no fixed definition, and it is applied in some cases where an appearance of intrepidness is desired for marketing purposes. Primary 'expedition' destination areas include the Antarctic, Arctic, and the Galapagos Islands. This type of itinerary is alternatively marketed as 'adventure' cruising' (see Martin and Martin 1996).

The terms 'expedition cruising' or 'adventure cruising' imply a number of things about the tourism experience: that the level of luxury will not be as great as that on a traditional cruise; that the experience will be adventurous and may be challenging; and that lectures and educational activities will be included. The terms also imply intrepidness, exploration, and adventure, images that are strongly desirable for the marketing of the tourism experience. They also convey the impression that the experience is different to tourism—that the passenger is participating in an expedition, rather than an organised tour, catering to the need for some tourists to feel that they are different to 'normal' mass tourists (servicing 'allocentric' or 'near-allocentric' personalities as discussed in section 3.6.2). This need to feel different can be effectively exploited in the marketing of Antarctic tourism. In the case of the Antarctic, it is necessary to distinguish the experience from mainstream destination cruising because ships are smaller, generally less luxurious, the seas traversed can be rough, and the experience is focused on viewing and landing at destination sites.

Not all of the companies involved in the Antarctic tourism industry focus on this aspect of marketing. It is conceivable that the expedition cruising model of travel could be ignored completely by an operator, and substituted with a more traditional 'destination cruising' model. Such a move might be more important for companies whose passengers are experienced cruisers, and whose expectations of cruising may be based on very different experiences.

3.7 STAKEHOLDERS

A range of nations, populations, organisations and individuals have an interest in Antarctic tourism. This section identifies the main organisations and bodies, and briefly examines their position on issues of concern. It is taken as a given that individuals, through the value system described in section 1.2 may have an interest, and that tour operators have a clear interest. This section deals with higher level organisations that represent such interests collectively—IAATO represents the collective interests of operators, while conservation NGOs represent (at least in terms of conservation) the collective interests of the public.

Non-governmental conservation organisations are examined first. The role of conservation NGOs in the ATS is examined, with particular reference to Antarctic and Southern Ocean Coalition (ASOC). The involvement and views of IUCN are considered. The role and interests of non-governmental industry organisations are examined. Most important of these is IAATO, the main industry representative body. Other bodies which have had limited involvement are discussed. The roles and interests in tourism issues of science and science support organisations, namely SCAR and COMNAP are briefly examined. Finally, the range of other users of Antarctica and their relationships with tourism are touched on.

Some consideration of the changing status of non-state actors in the ATS is necessary as background to this section. The place of NGOs in the ATS and the role of NGO representatives at ATCMs has changed over time from non-acceptance to official status as invited experts. Revised rules of procedure for ATCMs, adopted in 1987, permitted the invitation of international organisations having a scientific or technical interest in the Antarctic. ATCM XVII saw the invitation of ASOC, International Maritime Organisation (IMO), IUCN, and the World Tourism Organisation (WTO) among others. IAATO and the Pacific Asia Travel Organisation (PATA) representatives attended as experts designated by WTO. By ATCM XVIII in 1994, PATA and IAATO were being invited to send experts in their own right (ATCM 1993). Herr (1996a) provided a comprehensive analysis of the changing role of NGOs in the ATS. He suggested that they have played much the same role as they do at the domestic level—helping to legitimatise processes and outcomes, contribute to regime maintenance, and representing interests and advocating reform.

3.7.1 NON-GOVERNMENTAL CONSERVATION ORGANISATIONS

The general position of environmental NGOs has been one of support for limited and controlled tourism. Beck (1994, p. 381) summarises the position of NGOs on tourism: 'even NGOs, albeit very active in pressing a World Park approach for the region, have generally regarded limited tourism, alongside fishing and science, as acceptable subject to being conducted in a responsible and controlled manner. Unlike mining, there have been few calls for a ban on tourism'.

3.7.1.a Antarctic and Southern Ocean Coalition

The Antarctic and Southern Ocean Coalition (ASOC) is composed of around 230 organisations in 49 countries, including national branches of Greenpeace, WWF, wildlife groups, nature protection groups, and marine conservation groups. ASOC was formed in 1977 'to coordinate the environmental viewpoint and to present a united environmental front to both delegates to the Antarctic Treaty System meetings and to the public' (The Antarctica Project 1998a, n.p.). Herr (1996a, p. 101) stated that the initial strategy of ASOC was 'to bring together a large number of environmental protection groups under a single umbrella to mobilise more effectively public opinion', but noted that it has increasingly used its membership as a source of expertise to gain acceptance within the ATS. Since formation, ASOC activities have included the 'World Park Antarctica' campaign, agitation for the development and adoption of CCAMLR, opposing CRAMRA, and supporting the idea of a mining ban and an environmental protection regime. ASOC pressured ATCMs to allow public input to the ATS through NGOs, initially being excluded from involvement, but ultimately contributing to the opening of the ATS to scrutiny. ASOC claims credit for the present degree of public involvement in the ATS forum (The Antarctic Project 1998a). ASOC has 'played a critical role by articulating and promoting environmental values, instigating the negotiation of new agreements, ensuring their effective implementation, and increasing the public accountability of governments concerning Antarctic decisions' (The Antarctic Project 1998a, n.p.). ASOC represents a large and active section of the public of many countries, and is the main means of conservation NGO input into the ATS. ASOC has been involved in Protocol implementation issues, primarily environmental assessment for tourism operations, mainly for the US domestic situation. ASOC noted that the interpretation of the Protocol is contentious as regards whether or not the EPA (or any other regulatory agency) is able (under the Protocol) to say no to an activity proceeding, or force it to be modified if the assessment process indicates that unacceptable impacts might result. ASOC contended that the purpose of the assessment process is to evaluate the various ways to proceed, including the option of not going forward with an activity, or to choose the least impacting alternative (The Antarctic Project 1998a).

Closely related to ASOC is The Antarctica Project (TAP), formed in 1982 to 'coordinate the domestic and international environmental community's effort to affect policy in the Antarctic region'. TAP, a not-for profit NGO based in the US, is the secretariat for ASOC (as well as being a member), and provides intellectual and financial support. The collective activities of TAP and ASOC are listed in TAPs annual report, and include: analysis of national activities in Antarctica; attendance at ATS meetings; maintenance of the NGO Antarctic coalition; gaining access to political leaders and opinion makers; working with research scientists and others to ensure activities do not have inadvertent impacts; and educating the public, governments, and scientists about relevant environmental issues (The Antarctic Project 1998a).

ASOC's policy on tourism is outlined in the report to the XXII ATCM (ASOC 1998, IP84 ATCM XXII). ASOC noted the rapid increase in Antarctic tourism, and reiterated the 'urgent need for adequate prior EIAs by operators and ATPs and their review by the CEP. One particular concern is the possible cumulative impact of such activities' (ASOC 1998, IP84 ATCM XXII, p. 3). ASOC noted that 'since the country with the largest tour operator has not yet ratified or implemented the Protocol, a large proportion of tourist expeditions still proceed to Antarctica without any EIA' (p. 3). Concern was expressed at the continued high numbers of tourists, and the presence of several large vessels. The use of icebreakers to make new areas available for tourism, and the ability of helicopters to make inland site visits possible were also concerns of ASOC (The Antarctic Project 1998a). ASOC laid out what it considered to be minimum requirements for tourism management—the completion of an environmental assessment, including evaluation of all possible alternatives, predicting no more than a minor or transitory impact on the environment; inclusion of time and duration of site visits on pre- and post- activity and site visit report forms. ASOC also felt that tour operators should be required to carry liability insurance commensurate with the scale and riskiness of their Antarctic operations (ASOC 1998, IP84 ATCM XXII).

ASOC outlined policy on other tourism issues in 1991 (ASOC 1991, IP77 ATCM XVI). ASOC did not believe a Protocol annex specifically for tourism was required, given that all human activities were covered by the Protocol. ASOC called for monitoring programs to be set up to examine short and long term impacts. ASOC strongly recommended that ASMAs be used to regulate tourism activity with area specific management plans. ASOC stated that it did not support the establishment of ASTIs, and was opposed to any land based tourist facilities. The need to treat tourism liability issues separately within the proposed liability annex to the Protocol was also stressed. ASOC also expressed concern about uncertainty over tourism impacts—'our major concern is that by the time we understand if this huge increase in visitors is having an impact on Antarctica's environment or wildlife, it could be too late to reverse' (The Antarctica Project 1997).

3.7.1.b Other NGOs with Antarctic policies

NGOs that are members of ASOC have in many cases developed Antarctic policies of their own, and some are detailed here. De Poorter, a senior Greenpeace and ASOC adviser stated in Rubin (1996):

> some environmental groups are opposed to all tourism in Antarctica, but many environmental NGOs, including Greenpeace, the Worldwide Fund for Nature (WWF) and the Antarctic and Southern Ocean Coalition (ASOC) are not opposed to most ship-based, yacht based or small adventure tourism groups per se, provided their environmental management is, as a minimum, in accordance with the Protocol (p. 156).

According to Diggins (*Habitat Australia* 1994) Australian NGOs The Wilderness Society and the Australian Conservation Foundation support a total ban on tourism of any sort. Greenpeace has had substantial involvement in Antarctic conservation issues. Greenpeace remains involved in all aspects of Antarctic conservation including tourism, but has not been able to obtain formal involvement in the ATS at any level, due to the antagonism of a number of ATCPs (Herr 1996a). The US based Sierra Club, although its focus is on the conservation of America's environment, has an Antarctic policy. This includes a policy for tourism, supporting 'limited tourism and its careful management so as to avoid pollution and damage to the Antarctic environment', as well as a range of policies on protected areas and other conservation issues (Sierra Club 1995, n.p.).

3.7.1.c World Conservation Union

The World Conservation Union (IUCN, formerly International Union for the Conservation of Nature) is a partnership of states, government agencies and NGOs with 880 members. IUCN aims include the conservation of the integrity and diversity of nature and to ensure use is equitable and ecologically sustainable (IUCN 1998, IP52 ATCM XXII). Herr (1996a) includes IUCN as one of the two most important environmental NGOs to become involved (the other being ASOC). IUCN is very influential in the international and domestic arenas, with considerable expertise and resources. IUCN has six Commissions (bodies of experts) two (the Protected Areas commission and the Environmental Law commission) having input into IUCN's Antarctic program (IUCN 1998, IP52 ATCM XXII, p. 4). IUCN has been involved in Antarctic conservation issues for more than 36 years, and developed a strategy for Antarctic conservation in 1991, elements of which were subsequently included in the Protocol. IUCN obtained 'invited expert' status at ATCM XIV 1987, which has continued since (Herr 1996a). IUCN has also organised workshops on: conservation management and research in subantactic islands; protected area policy and management in Antarctica; Antarctic environmental education and training; and cumulative environmental impact minimisation and management. IUCN has an Antarctic Advisory Committee consisting of 12 members with expertise in Antarctic, subantarctic and southern ocean conservation, including academics, government conservation agency employees, NGO employees and private consultants (IUCN 1998, IP52 ATCM XXII). IUCN is involved in a range of

Antarctic conservation issues, including implementation of the Protocol, the development of a liability annex to the Protocol, development of effective environmental assessments processes, and input to CCAMLR. IUCN also aims to strengthen the system for establishing and managing protected areas in the Antarctic and subantarctic (IUCN 1998, IP52 ATCM XXII).

IUCN described its position on tourism at the 1998 ATCM (IUCN 1998, IP52 ATCM XXII, p. 4). IUCN noted the rapid increase in tourism and submitted that 'the absence of proper overall management is a problem which must be addressed. ASMAs may be one way to manage tourism as there would be the ability to control numbers and access'. IUCN also expressed concern about the lack of knowledge of whether repeated visits of large groups of people 'can negatively impact Antarctica's flora and fauna'. IUCN expressed concern with the numbers of visitors and cumulative impacts. IUCN suggested a cap on visitor numbers until a better understanding of cumulative impacts can be developed.

Another area of concern was the 'expansion of tourism into new "pristine" areas' and IUCN suggested that a limit or moratorium on visits to new areas be agreed (IUCN 1998, IP52 ATCM XXII). IUCN also suggested the development of a list of sensitive sites, including sites that tourists generally visit, to serve as the basis for new ASMAs to be designated by the appropriate authority. IUCN's *A Strategy for Antarctic Conservation* (IUCN 1991) expressed the opinion that professionally led, educated and managed groups are acceptable—'individual parties, in the right places, pose no problems under such circumstances' (p. 56). Concern was expressed however about the possible effect of greater numbers of tourists concentrated at sites, concluding 'impacts of tourism need to be carefully monitored and destinations changed if impact levels become damaging' (p. 56). IUCN at that point had concluded that tourism, scientific research, and special environmental protection needed to be kept apart, and advocated the use of ASTIs. Most other issues relating to tourism raised by the strategy have subsequently been addressed through the adoption of the Protocol. IUCN presented a tourism policy discussion paper in 1992 (IUCN 1992, IP18 ATCM XVII, n.p.), which included six key points:

1. Tourism is regarded as a legitimate human activity in Antarctica and an acceptable use of Antarctic resources.
2. Antarctic tourism requires regulation and careful management to minimise environmental impacts and avoid disruption of other Antarctic activities.
3. There should be a comprehensive review of regulations currently applying to Antarctic tourism, an evaluation of their adequacy and identification of further requirements.
4. Regulation of tourism should give due weight to the development, use and enforcement of practical management policies and guidelines, applied universally in the region and based on conservation principles.
5. Tourism development and regulation in the Antarctic should be accompanied by adequate research, monitoring, reporting and exchange of information on tourist activities.
6. Sufficient information should be provided to those organising, conducting and participating in tourist visits to the Antarctic, to encourage compliance with regulations governing environmental protection.

As will become evident, several of the requirements identified by IUCN have been met, while others remain outstanding.

3.7.1.d Oceanites foundation

Oceanites Inc. was founded in the US in 1987 to support education and science projects that increase public interest in and awareness of the world's oceans and islands, and their wildlife. The organisation is a charitible foundation. Oceanites has had a major focus on Antarctica, distributing the first Antarctic Travellers' Code for Visitors and Tour Companies, sponsoring Antarctic books, and publishing a regular newsletter. With respect to the ATS, Oceanites is 'committed to distributing relevant, useful, and rigorously collected information about Antarctica as widely as possible within the Antarctic Treaty community' (Naveen 1997).

Oceanites sponsors and operates the very important *Antarctic Site Inventory Project.* This project examines sites subject to frequent tourist visits, and describes the flora, fauna and other features, and compiles baseline data to enable changes in flora, fauna and other features to be detected and assessed (Oceanites 1997).

3.7.2 NON-GOVERNMENTAL INDUSTRY ORGANISATIONS

3.7.2.a International Association of Antarctica Tour Operators

The International Association of Antarctica Tour Operators (IAATO) is an Antarctic tourism industry representative body representing most Antarctic tour operators. IAATO is very important to the management of Antarctic tourism, and a detailed discussion of IAATO's structure, membership, policies, and role is warranted. IAATO membership confers a number of rights on members, not least of which is the right to highlight membership (by using the IAATO logo) as an indication of the company's commitment to responsible Antarctic tourism. IAATO also offers a means by which companies can participate in the processes of the ATS and other issues that can affect the industry.

Splettstoesser and Folks (1994), Splettstoesser (1996), Enzenbacher (1994a, 1992b, 1992a, 1995b), and Stonehouse (1992a, 1992b) provide details of the general background and history of IAATO. In 1989, three operators wrote and issued joint environmental guidelines addressing 'conduct around wildlife, respect of historic relics and sites, and the unauthorised removal of keepsakes', as well as the responsibilities of passengers under US legislation (Splettstoesser & Folks 1994, p. 234). In 1991 six US tour ship operators and the sole airborne tourism operator founded IAATO (Enzenbacher 1991, Splettstoesser & Folks 1994). The objectives, according to Splettstoesser and Folks, were the pooling of resources and the promotion of thoughtful legislation in keeping with the history of responsible tourism exhibited by the operators. The members agreed to abide by the US Antarctic Conservation Act 1978, and to adhere to the industry guidelines. Membership increased to 12 by 1993 (Splettstoesser & Folks 1994), and 16 by January 1995 (Splettstoesser 1996).

IAATO has four categories of member (IAATO 1999). Full members (provisional and probationary members), agree: to abide by IAATO by-laws; not to carry more than 400 passengers per trip; and not to have more than 100 passengers ashore at any one site at the same time. Full members are experienced, for-profit companies, agreeing to the above, that have been formally accepted by two-thirds of the standing members after review. Full membership also depends on demonstrated willingness to adhere to and support IAATO objectives, to use appropriate vessels and aircraft, hiring sufficient qualified and experienced staff, and operating in accordance with Rec. XVIII-1. Provisional (new) members are for-profit companies requesting membership for the first time who, in addition to the above requirements, are accepted by two-thirds of standing members and agree to carry an IAATO approved observer on board on a voyage during the season, and to forward a full observer report to the secretariat. Probationary members are past or current full members who have not complied with by-laws, or have been voted as not being of good standing by two-thirds of members. Probationary members have to agree to the above conditions, and carry an IAATO approved observer on board for a voyage. Associate members are organisations and individuals interested in or promoting travel to the Antarctic that wish to support IAATO objectives and whose application has been formally accepted by two-thirds of standing members. IAATO also lists member vessels in its information, although these are not referred to in the by-laws (IAATO 1999). Fees apply to members, including annual fees and an initiation fee for full members, and per passenger fees apply. The organisation has annual meetings. IAATO also convenes standing committees (an executive committee, membership committee, and finance committee). Decision making (including changes to the by-laws) is by agreement of two-thirds of full members.

IAATO has around 16 full and 14 associate member companies. Companies are from Argentina, Australia, Canada, Chile, Germany, Japan, The Netherlands, NZ, the UK, and the US. 14 member vessels are also listed (IAATO 1999). The first yacht operator joined IAATO recently, described as 'a significant step in outreach to the charter yacht community' (IAATO 1998, IP88 ATCM XXII, p. 2). Two former member companies (one a founding member), while still active in Antarctic tourism, are no longer listed as members of IAATO. Some newer operators involved in large vessel tourism are not able to join IAATO because of the by-law that restricts the number of passengers that may be carried. The operator offering air access to the continent is not listed as an IAATO member (IAATO 1999).

IAATO also fills two elected and paid positions, that of executive secretary, and spokesperson. The executive secretary has a wide range of responsibilities including representing IAATO in various forums. The IAATO Spokesperson: represents IAATO at Treaty and other meetings, hearings and workshops; promotes IAATO's objectives; drafts reports and working papers for ATCMs; and provides an 'aggressive and supportive stance' at meetings (IAATO 1999).

IAATO objectives are:

- To represent Antarctic tour operators and others organising and conducting travel to the Antarctic to the Antarctic Treaty Parties, the international conservation community and the public at large.
- To advocate, promote and practice safe and environmentally responsible travel to the Antarctic.
- To circulate, promote and follow the Guidance for Visitors to the Antarctic and Guidance for Those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic, as adopted by the Antarctic Treaty System (Recommendation XVIII-1).
- To operate within the parameters of the Antarctic Treaty System, including the Antarctic Treaty and the Protocol on the Environment and Annexes, along with MARPOL, SOLAS and similar international and national laws and agreements.
- To foster continued cooperation among its members and to monitor IAATO programs, including the pattern and frequency of visits to specific sites within the Antarctic, and to coordinate itineraries so that no more than 100 people are ashore at any one time in any one place.
- To provide a forum for the international, private-sector travel industry to share expertise and opinions and to uphold the highest standards among members.
- To enhance public awareness and concern for the conservation of the Antarctic environment and its associated ecosystems and to better inform the media, governments and environmental organisations about private-sector travel to these regions.
- To create a corps of ambassadors for the continued protection of Antarctica by offering the opportunity to experience the continent first hand.
- To support science in Antarctica through cooperation with national Antarctic programs, including logistical support and research.
- To foster cooperation between private sector travel and the international scientific community in the Antarctic.
- To ensure that the best qualified staff and field personnel are employed by IAATO members through continued training and education, and to encourage and develop international acceptance of evaluation, certification and accreditation programs for Antarctic personnel. (IAATO 1999).

IAATO participated in the XVI ATCM under the umbrella of the World Tourism Organisation. Herr (1993, 1996a) described the context of this involvement, including the relationship between PATA, IAATO and the WTO, and the positions of the different ATPs. Herr described the involvement of the WTO at the behest of the ATCPs as a 'ploy' (p. 102), with the subsequent formal recognition of IAATO representing capitulation by the ATCPs on the issue of industry NGO participation. As Herr stated,

> the experiment with WTO was recognised as inadequate and at the subsequent Consultative Meeting, in Venice 1992, both IAATO and PATA were included in the

informal Special Meeting on Antarctic tourism which preceded the formal meeting. Significantly but unexpectedly, IAATO was invited to remain after the informal meeting to attend the formal session (1996a, p. 221).

Factors contributing to the inclusion of IAATO included the expertise made available, the legitimacy of the issue area they represented, and the willingness of the industry NGOs to accept the ATS regime and work within it (Herr 1996a).

PATA and IAATO submitted a statement to ATCM XVI that represented the initial policy position of the industry. The statement, titled *Responsible Tourism in Antarctica* stated the position and needs of the industry as follows:

1. The industry is committed to environmentally sound tourism and is prepared and willing to work cooperatively with the Antarctic Treaty System (ATS) to achieve this goal.
2. To achieve this goal it is desirable that an agreed policy framework for tourism be in place. The tourism industry believes that such a framework exists in the Environmental Protocol and its Annexes, together with existing regulations.
3. It is desirable that the policy and regulatory framework be accessible and readily understood. The industry supports moves to consolidate, systematize, and interpret this.
4. Rules and regulations, in whatever form, applying to tourism should be the same as those applying to other human activities in Antarctica, as stated in the Environmental Protocol. The industry supports the concept that such rules should relate to the potential impact of activities, and therefore be nondiscriminatory.
5. The tourism industry believes it has relevant knowledge and experience which should be recognized on a continuing basis by the consultative mechanisms of the ATS. PATA and IAATO propose an invitational status as observers at future ATCMs and related meetings on tourism, such as that accorded to the WTO.
6. The industry can make a significant contribution in the implementation of rules, monitoring of activities, and gathering and dissemination of information.
7. Additionally, the industry notes the following specific points:
   a. It would be useful for the ATS, at the earliest opportunity, to designate an organ of the System to receive and disseminate detailed and comprehensive information on tourist activities in Antarctica, which IAATO now compiles. An example of one such instrument, a provisional list of tourism ship contacts for the Austral 1992–93 season, is attached:
   b. Commonly agreed guidelines for visitor conduct in the Antarctic Treaty Area are important to the effective implementation of the Protocol and its Annexes. A version initiated by IAATO and in current use is attached:
   c. As part of its objectives, IAATO and PATA can and will assist in preparing Environmental Impact Assessments that pertain to its members' activities, starting with a model such as that recently adopted by COMNAP;
   d. Recognising the combined experience of IAATO in managing tourists in Antarctica and the experience of PATA in tourism management, the industry is prepared and willing to comment on management plans for areas visited by tourists;
   e. IAATO welcomes a voluntary observer program on tourist visits, and requests that the ATS designate an appropriate body to coordinate this task and to receive resulting reports for dissemination. This program could be modelled on the present program implemented by the U.S. National Science Foundation;
   f. Recognising the lack of authenticated studies regarding potential environmental impacts that may result from tourist activities in Antarctica, IAATO and PATA endorse appropriate research studies.
8. Finally, the Consultative Parties are urged to recognise IAATO as the entity currently representing most Antarctic tourist activities in Antarctica and to

> encourage relevant companies and others with tourism related activities in Antarctica to join IAATO. (Plimmer 1994, pp. 12–13).

IAATO participates in ATCMs, normally providing a report of activities, an overview of tourism activities (a summary of the past seasons tourism as well as forecasts and other information), and information papers on topics relating to tourism and IAATO activities, including post-visit reporting, environmental impact assessment and audits, education and training of passengers and crew, oil spill contingency planning, and cooperation with science organisations. Tour operators and NSF have, since 1988, developed a relationship allowing constructive dialogue between government and the industry—IAATO being involved since formation (Herr 1996a). NSF hosts an annual meeting between NSF and IAATO, attended by operators, US government representatives, conservation organisations, representatives from other nations, and the media (IAATO 1998, IP88 ATCM XXII, Enzenbacher 1994a). This meeting allows operators to coordinate visits to US bases (which impose limits on visitor numbers), and to exchange information. Through cooperation with IAATO, NSF also acts as a compiler and clearing house for information on tourist numbers, nationalities, site visits, and general information.

In addition to information collection and management, advocacy, and involvement in the ATS and domestic spheres, IAATO has a range of research, member support, outreach, and coordination roles. IAATO attends relevant meetings, conferences, and workshops relating to Antarctic conservation, policy, and tourism, and initiates meetings where appropriate—in 1996/97 for example, in addition to the annual meeting and the joint meeting with NSF, IAATO was involved in the Conference on Arctic Guidelines (WWF), a Conference on Polar Tourism: environmental implications and management (held at SPRI), the COMNAP annual meeting, an IUCN Workshop on cumulative environmental impacts in Antarctica, an IAATO workshop on Antarctic Environmental Impact Assessment, a Workshop on how to implement guidelines for Arctic tourism, and a COMNAP / IAATO Issues of common interest and concern meeting (IAATO 1997, IP108 ATCM XXI).

IAATO offers a communications coordination role across the industry, compiling and distributing vessel call data to members and others. Ship itineraries are circulated between vessels, with regular contact maintained through the season, to allow coordination of site visits. An Emergency and Medical Evacuation Response plan, with an office operated by ANI is also maintained by IAATO. Medical equipment, physician qualifications, and medical supplies of operators were being reviewed by a consultant, in order to develop industry wide standards. Standard Operating Procedures of IAATO members also require IRB safety kits and helicopter equipment inventories to ensure adequate emergency equipment is available if needed (IAATO 1997, IP108 ATCM XXI, IAATO 1998, IP88 ATCM XXII).

IAATO assists members in meeting regulatory requirements. A workshop was organised and hosted by IAATO in 1996 on environmental assessment, with EPA, NSF, IAATO members, and independent consultants represented, which examined environmental assessment for tourism, and developed the idea of collective environmental assessments, where a single environmental assessment applies to a number of different IAATO member companies (from the US) with similar operations. The 1997/98 season saw the resultant IEE (Five U.S. Organizers 1997) submitted to EPA. IAATO continues to make input to the development of the EPA regulations (IAATO 1997, IP108 ATCM XXI). IAATO has supported the streamlining and standardising of post-visit reporting (of voyages and site visits), and supports the collection of site visit information (which has occurred since 1987) by operators, the NSF, and IAATO. IAATO member companies use the standard reporting form that resulted from ATCM XXI 1997 (Resolution 3), and were investigating a database version to simplify reporting (IAATO 1998, IP88 ATCM XXII). The results of the 1997/98 trial of the forms were provided in IAATO 1998, IP105 ATCM XXII. An education and training survey (developed by COMNAP) was distributed by IAATO, with results reported in 1998 (IAATO 1998, IP87 ATCM XXII). Results found that most IAATO companies used a similar system to train passengers and staff, relying on written materials, lectures, and tutoring by experienced staff. IAATO has also developed a standardised table of contents for expedition leader handbooks and manuals, and a slide show on Rec. XVIII-1 (IAATO 1998, IP87 ATCM XXII). IAATO is assisting member companies to tailor shipboard SOPEPs to comply with the requirements of the Protocol. A sub-committee on Oil Spill Prevention and Response is developing a Special Antarctic Appendix for SOPEPs, and is aiming for a multi-operator plan for oil spill response including equipment standardisation and possible caching of equipment, as well as other policies relating to oil spill contingency planning. The sub-committee reported to the 1998 ATCM (IAATO 1998, IP104 ATCM XXII).

IAATO also supports a range of science activities by providing logistic support, offering a 'cost effective and regular platform-of-opportunity for science and logistics' (IAATO 1997, IP108 ATCM XXI, p. 6). In 1996/97 season, for example, member companies transported 34 scientists to or from stations, and provided icebreaker assistance to a re-supply vessel. Support is also provided in carrying supplies and equipment. Passengers and staff participate in a Humpback Whale Catalog by providing fluke identification photographs to scientists. Member companies also support the work of the Oceanites Antarctic Site Inventory Project (IAATO 1997, IP108 ATCM XXI). Passengers and staff make financial contributions to research and heritage conservation organisations (IAATO 1998, IP88 ATCM XXII).

The role of IAATO is highlighted by Enzenbacher (1994a, 1995b). She wrote that, as IAATO members carried large proportions of tourists their influence was considerable. IAATO's own assessment of its role was similar, with Enzenbacher quoting Claus to the effect that IAATO has played a leading role in protecting the Antarctic environment.

3.7.2.b Other bodies

A number of other bodies have been spasmodically involved in Antarctic tourism issues. The World Tourism Organisation (WTO) has a membership consisting of nations, NGOs, and industry representatives. WTO provided a short Information Paper to ATCM XVI in 1991 (WTO 1991, IP87 ATCM XVI), emphasising the need for sustainable tourism planning, and stressing that Antarctic tourism depends on the environmental protection of the Antarctic. WTO's involvement in the ATS was linked to the attempts by PATA and IAATO to gain access, as described earlier. WTO has since ceased active involvement.

PATA, founded in 1951 has a membership of 38 national governments, 50 state and local tourism bodies, 65 airlines and cruise lines, and more than 2000 travel industry companies. PATA was involved in the early industry responses to the developing Protocol. Beginning in 1991, PATA noted the developing Protocol and environmental regime, and the fact that the tourism industry itself had little opportunity for input. A meeting between PATA, IAATO, operators, government officials, and academics concluded that there was a need for higher level representation of tourism at ATCMs, and identified areas of the Protocol where industry should have a strong say in the implementing details (Plimmer 1994). PATA also noted that, although Antarctic tourism was small by world or regional standards, it might be significant in terms of a test of the ability of tourism to adhere to conservation values (Plimmer 1994). PATA saw its role as broader policy development to ensure the industry is fully involved in debates of importance to it, to ensure that that no unduly restrictive regime was imposed on tourism activities, to encourage the highest levels of tourism responsibility to the environment, and to influence member governments to support objectives (Plimmer 1994). PATA has also ceased active involvement in ATS forums.

3.7.3 SCIENCE AND SCIENCE SUPPORT ORGANISATIONS

The interaction of tourism with science activities in the Antarctic has concerned the ATS, governments, and the agencies conducting research for as long as tourism has occurred. Government agencies responsible for conducting science have expressed concern about tourism, and in some cases actively opposed it, because of the potential for disruption, inconvenience or at worst, a major impost on the science infrastructure in the event of a tourism disaster.

The peak body for Antarctic science is the Scientific Committee on Antarctic Research (SCAR). SCAR is an interdisciplinary committee of the International Council for Science, is responsible for the initiation, promotion and coordination of scientific research in Antarctica, and provides scientific advice to the ATS (Heap 1990). Heap, and Herr (1996a) provide information on the role and mechanisms of SCAR participation in the ATS. SCAR's interest in tourism issues has been increasing over time (Beck 1990a). At present, SCAR's main influence on tourism issues is through a SCAR Group of Specialists on Environmental Affairs and Conservation (GOSEAC). This body is involved in the protected area system and other conservation issues, including discussions on tourism (Enzenbacher 1995a, 1995b). SCAR also has a Working Group on Logistics, which contributed in the past to the ATS Working Group on Tourism (at ATCM X, 1979, see section 4.1). SCAR produced *A visitor's introduction to the Antarctic and its environment*, which included 'points of conduct', which represent the first published guidelines on visitor behaviour (Enzenbacher 1995a, Hall & Wouters 1995). Naveen (1996) noted that this document received only limited distribution. Enzenbacher (1995b, p. 188) regarded one of the most important roles of SCAR as the provision to the ATS of informed advice from a neutral body 'largely unbound by the politics influencing ATCM delegations'.

The Council of Managers of National Antarctic Programs (COMNAP) brings together the managers of national Antarctic programs. COMNAP holds annual meetings of national representatives, symposia on operations and logistics, technical workshops, and working groups. COMNAP has a permanent Standing Committee on Antarctic Logistics and Operations (SCALOP) (COMNAP 1999). COMNAP's prime interests are in operational and logistical matters including communication and coordination between different national programs. COMNAP provides input to ATCMs in IPs and WPs, and is an invited observer at ATCMs under the ATCM revised rules of procedure (ATCM 1997).

The potential for disruptions to operations caused by tourism, as well as concerns about the safety or environmental impact of tourism operations themselves justify COMNAP's interest. Enzenbacher (1995a, 1995b) noted that COMNAP's interest in tourism issues has continued to increase. COMNAP developed a *Visitor's Guide to the Antarctic* (Hall & Wouters 1995), and made a submission on operational concerns about tourism (COMNAP 1996, IP39 ATCM XX). COMNAP has a working group on tourism and non-governmental expeditions (TANGO) with the role of maintaining a cooperative relationship with IAATO (COMNAP 1999, Enzenbacher 1995a). IAATO enjoys a 'constructive and ongoing dialogue with COMNAP (IAATO 1997, IP108 XXI ATCM). In addition to TANGO, COMNAP operates an Antarctic Environment Officers Network (AEON), which helps the environment officers of national operators to exchange information, provide advice on environmental issues, and promote a mutual understanding and application of the Protocol (COMNAP 1999). COMNAP asked the International Centre for Antarctic Information and Research (ICAIR) to develop a prototype tourism database (Enzenbacher 1994a, 1995a). COMNAP is involved in the implementation of the Protocol, and organised a workshop on Environmental Impact Assessment in 1991, publishing *The Antarctic Environmental Assessment Process: Practical Guidelines*, used by IAATO member companies (IAATO 1995, IP108 ATCM XIX, for example). Other activities of relevance to tourism include oil spill contingency planning, and guidelines for reporting oil spill incidents (COMNAP 1999).

3.7.4 GOVERNMENT AGENCIES

An organisation of some interest is The Antarctic Unit of the Tourism Board of Tierra del Fuego formed in 1991 by the local government of Tierra del Fuego (Galimberti 1996). The Unit surveys tourist voyages departing from Ushuaia, with the aim of 'strengthening the international cooperation and offering a direct contribution, through common interest data, to the organization of an Antarctic environmental preservation plan' (Tourism Board of Tierra del Fuego 1997, Enzenbacher 1994a). The survey program aims to: study the flow of ships and passengers involved in Antarctic tourism that called at the port of Ushuaia; to carry out a comparative analysis of the Antarctic tourist activity with previous seasons and world figures; to analyse the characteristics of the journeys and the ships, and to study the Antarctic routes of ships departing from the local port and to establish the most visited tourist places (Tourism Board of Tierra del Fuego 1997, p. 4). Additionally, the Unit aims to improve Ushuaia port and airport services and infrastructure, and enhance Ushuaia's role as a gateway to Antarctica (Tourism Board of Tierra del Fuego 1997). The results of surveys are published in regular reports (Tourism Board of Tierra del Fuego 1998). In addition to the surveys, the unit maintains an information and resource centre for tourists in Ushuaia, providing general information about Antarctica and Antarctic tourism, specialised support and information for tourism staff, brochures and printed information, chart, book, and souvenir sales, and a library (Galimberti 1996). The unit also intended a review of adequacy of facilities, infrastructure and services for Antarctic tourism, and an education and awareness program about the importance of Antarctic affairs aimed at the local community (Galimberti 1996, Enzenbacher 1994a, Enzenbacher 1995a).

3.7.5 Domestic stakeholders

Domestic stakeholders including cities, states (in the cases of federated nations), regions, and private or commercial groups also have an influence on Antarctic tourism. As noted in section 3.4, while the economic size of the industry is relatively small, the economic benefits accruing to a city or region may be significant at the local scale. It can be argued that the dominant constraint on the development of the industry has been geographical, as there are few locations suitable for access to the Antarctic continent. In all areas other than southern South America, there is only one choice of gateway nation for that region, and in most cases one choice of port or city. Despite the dominance of geographical factors, it is likely that local and regional government have some influence on national policy on Antarctic tourism, including possible business development incentives or other support. The Antarctic Unit of the Tourism Board of Tierra del Fuego (section 3.7.4) is one example of a domestic actor aiming to influence Antarctic tourism development and regulation. The degree to which gateway cities and nations (primarily Punta Arenas, Chile and Ushuaia, Argentina) have competed to attract tourism business and have influenced national policy in support of this goal would be of considerable interest. Similarly, it would be valuable to investigate the extent to which regions and cities positioned as gateways have influenced national governments towards particular policies on Antarctic tourism regulation. These questions are however considered to be outside the scope of this research.

3.7.6 Other uses of Antarctica

The Antarctic area is unusual in the limited range of other uses that the resource supports. The absence of many activities normally present in natural areas affects the form that the tourism industry takes, as operators have little need to consider interference with other users. The dominant other use is that of the Treaty area for science and research purposes. While other motivations may underlie national Antarctic programs (the maintenance of a presence in the region for geopolitical purposes, for example), the ostensible reason is science. Since the heroic era of exploration, science has been the most important Antarctic activity. Any measure used to assess the relative importance of activities, such as impact, cost, effort, and value to nations and the global community, clearly ranks science as the most significant activity. The primacy of science is enshrined in the Treaty, and only relatively recently have other activities and values been recognised as important. The interaction of science and tourism is discussed in sections 3.7.2 and 2.7.1.

Other uses of Antarctica take place relating to information, conservation, and natural resource exploitation. The occasional journalistic or documentary endeavour is undertaken. These information activities are spasmodic, and minor in the context of other Antarctic activities, but they clearly have a substantial impact in raising awareness and levels of knowledge in the general public regarding all aspects of the Antarctic. The role of information activities in generating demand for Antarctic tourism may be significant, but at this stage such a proposition is largely untested. Many information activities utilise the tourism industry for logistic support.

Conservation activities also occur in the region. Greenpeace operated a station (World Park Base) on Ross Island (Ross Sea region) for a number of seasons, supported by Greenpeace vessels. The Greenpeace station, with wintering personnel, conducted science activities (including pollution and human impact studies) and was used as a base for inspections of other stations. A program of inspections was also operated in the Peninsula region. Voyages also supported a direct action protest at the construction site for an airstrip at Dumont d'Urville, inspections of other stations in the area, and direct action to disrupt the Japanese scientific whaling effort (May 1988). Clean-up activities at Peninsula stations have also been undertaken by conservation volunteer organisations, supported in a substantial way by the tourism industry (IAATO 1997, IP108 ATCM XXI).

Natural resource exploitation is the only other significant activity that occurs in the Treaty area. The krill fishery and, with legal and illegal fin-fisheries, comprises the majority of activity. Whaling in general is under a moratorium imposed by the countries of the International Whaling Commission (IWC), with the waters around Antarctica declared a 'Southern Ocean Whaling Sanctuary'. At present, a relatively small whaling effort continues as part of a Japanese 'scientific whaling' program. These forms of living resource extraction appear to have minimal interaction with tourism activities.

3.8 FUTURE DIRECTIONS FOR ANTARCTIC TOURISM

This section assesses the future of Antarctic tourism. Chapters two and three provide a detailed analysis of the state of the industry, its operations, and the characteristics of its participants. While any attempt at forecasting is difficult, and exposes the forecaster to the risk of being wrong, it is important to attempt to understand what the situation may be in the medium and long terms, and a realistic assessment of possibilities is important when considering management options. Reference to Bauer (1994, and section 1.1.4) for other forecasts is useful. The discussions in this section are predicated on the assumption that there will be no management intervention to prevent growth or change in the experiences.

A range of possibilities are discussed in this section. Growth in the ship based sector is examined. The impact of larger vessels on growth in tourist numbers, and the effects of changes to the general structure of the industry are examined. Next, prospects for growth in the airborne tourism sector are examined, including the potential for large scale airborne tourism, hybrid ship / air operations, and gradual growth within the ANI model. Limits to the growth of Antarctic tourism are then examined including cost, accessibility, climate, the time commitments, the reliance on ships, the effects of potential crowding, and ship availability. Potential changes to tourism products and experiences, and to the market groups being serviced are then discussed. Diversification and definition of products in the expedition cruising market are considered. Potential new markets are examined. The potential impacts associated with servicing the large mid-centric market group, and movement away from expedition cruising are examined. Issues associated with larger vessels, including environmental risks, safety, and emergency response considerations are considered. Potential changes to the geographic range of visitor sites are discussed. Finally, issues associated with potential land based infrastructure and activities are examined.

3.8.1 GROWTH AND CHANGE IN SHIPBORNE TOURISM

As noted in section 1.1.c most authors have predicted growth in tourism, and have been correct to date. There are a number of factors indicative of continued growth. The analysis of Antarctica using the destination life cycle model suggests that Antarctica is in the early stages of the life cycle, moving into a more central phase. If this is the case, the destination may increasingly appeal to a much larger market segment. If the Antarctic destination (or more likely, certain regions and products) becomes accessible to these much larger markets, considerable growth is possible. The interest exhibited by large, globally operating cruise companies is in itself a sign that Antarctic tourism is changing, and clearly, if even one such company were to become involved on a regular basis numbers of tourists would increase. Large companies are less likely to be interested in small vessel expedition style cruising, rather, they have a more traditional focus, using larger vessels. Most importantly, their regular passengers are likely to be representative of the very large mid-centric market segment.

Based on the trendline analysis conducted in chapter two, the total number in 2004/2005 would be around 16 000 visitors, with 2009/2010 seeing around 20 000. This of course assumes the rate of growth remained constant. There is a reasonably high probability that, given the models of destination life cycle, and the potential impacts that even a few larger vessels would have on numbers, the rate of growth will exceed that indicated in the trendline analysis. For example, two voyages per season of the *Rotterdam* (section 2.3.1) could carry around 2600 passengers. It is likely that economies of scale would make the use of larger vessels more attractive to operators, and allow cheaper products to be offered.

Growth through the addition of, or increased use of smaller vessels is also possible. Specialist expedition cruising companies with established operations, client bases, and experience, not presently operating in the region, may seek to expand their range of destinations. There is also considerable potential for specialisation in products and activities, which will be the realm of the smaller vessels, and which may lead to expansion as new 'special interest' markets are tapped. General expansion is likely to include new geographical markets, with the substantial Asian market a candidate for growth.

3.8.2 GROWTH AND CHANGE IN AIRBORNE TOURISM

Airborne tourism is at present a very small component of Antarctic tourism. This small size, however, should not be taken as an indication of limited potential. Airborne tourism (including land based facilities) has more potential than any other development in tourism to place stress on the ATS, which is at present wholly unprepared to deal with the major changes that could occur. Having agreed that tourism is an acceptable and appropriate use of the continent, and having accepted (if tacitly) the operations of ANI, the ATS is in a difficult position as regards airborne tourism. It would be difficult to argue against new or extended airborne tourism proposals if they comply with the requirements of the Protocol, given that a precedent for such activities now exists. It is likely that a number of nations, and certainly conservation NGOs would be concerned about large scale airborne tourism even were it to comply with the provisions of the Protocol as they presently stand.

This section summarises the potential of airborne tourism, and the opinions of some experts in the field as regards the feasibility of extended and diversified operations. If it were clear that new or greatly extended airborne operations were impossible, impractical or uneconomic, it would not be an issue worthy of ATS attention. It can be argued convincingly, however, that considerable potential exists for such operations.

Wace (1990) concluded that land based airborne tourism from South America was likely to continue, and that overflights were likely to re-appear in the South American sector. Wace also discussed the potential for hybrid options, with aircraft delivering tourists to vessels to save time and avoid the discomfort of the sea voyage. Stonehouse (1994a) pointed out that virtually the whole of Antarctica had been opened up to airborne tourism. Noted tourism researcher and analyst, Valene Smith (1994) suggested that the industry would change primarily through air access. Nicholson (1986, p. 2) regarded it as inevitable that tourism activity would grow, because of heightened interest in Antarctica, and predicted the resumption of day flights. He also noted that large scale air transport, and land based accommodation options were less than fanciful.

Swithinbank (1993a), an important player in the development of airborne tourism, asserted that there was no reason large passenger jets could not be used to land on (and take off from) blue ice runways. There would be some technical problems to be overcome, but from an aviation point of view there are few impediments to larger scale operations with standard passenger jets. Indeed, the range offered by such aircraft permits many locations to be considered while retaining capacity for return to the point of departure. Perhaps the most difficult issues would be the management and safety of larger numbers of people on the ground, provision of an acceptable visitor experience, and development of environmentally acceptable methods of operating. Considerable infrastructure and equipment would be required, but it is not an inconceivable development. The market that such an operation would be targeted at would be very different to that currently serviced by any sector of the industry. Large new markets would become accessible if lower cost airborne operations were available. Less time consuming itineraries with no sea travel would be possible.

Another factor may be financial pressure on governments to offset costs of their Antarctic operations by using commercial air services (which may include tourism in their operations). Governments may also provide tourist places on government air services, or open government airfields and facilities to private operators.

A number of scenarios can be posed to illustrate the possible courses the airborne sector may take. Scenarios include: hybrid ship/airborne operations; gradual growth within the ANI model; extension of adventure tourism opportunities (geographical and experiential) within the ANI model; mass tourism; and no change.

Addressing the first, the transfer of passengers from aircraft to ship in the Peninsula region was attempted briefly in January 1982 by FACH, but abandoned because weather problems meant that regular transfers could not be guaranteed (Swithinbank 1993a). Proposals of this nature have been raised since (*Sunday Tasmanian* 1998, HRSCERA 1989) but none seem to have been attempted. The desirability (from an operators perspective) of hybrid operations is that they offer the best of both worlds—the advantages of speed and lower cost offered by air travel, with the convenience of self-contained accommodation and local transport to attractions offered by ships. Development of suitable facilities with poor weather operational capacity (landing, support and accommodation) combined with faster aircraft, mean that these types of operations are not out of the question in the future, and would seem to offer considerable advantages.

Second, gradual growth while maintaining the ANI model of operations is possible. Growth could be in the number of companies operating, and/or the number of passengers carried. This scenario is likely, given the trend over the lifetime of ANIs operations towards larger aircraft and larger numbers of people, but numbers would remain relatively small in overall Antarctic tourism terms.

Third, an extension of the geographic range of activities and the range of different experiences along the lines of present ANI activity is also likely. The increasing popularity of adventure tourism, and commercialisation of adventure activities indicates the existence of a market for such experiences, despite very high prices. The point has been reached where most areas of the continent, and certainly many of the more attractive areas (in tourism terms) can be reached via a commercial service. There is also the possibility of the development of one or more new 'gateway' landing areas for intercontinental flights. For regions such as East Antarctica, where there has been a relatively small amount of tourism activity to date, the development of a regional gateway area could have considerable impact. Airborne tourism also offers access to areas beyond the immediate coastal fringe—indeed, it is possible that landing of intercontinental flights would occur at areas well away from coasts. The attractions and activities available in the interior are significantly different than those offered from ships.

The fourth scenario, one of large scale airborne tourism, is less likely. Resistance from within the ATS is likely, and pressure from environmental groups would be considerable. Larger numbers of people could be moved to and from Antarctica quickly if large passenger jets were used, with corresponding changes in the quality and form of the tourism experience. Marketing large scale tourism activities in the face of a concerted negative campaign from environmental groups would be difficult, but the commercial gains to be made by the first company to offer lower cost, convenient access to Antarctica would be a considerable incentive. Large scale tourism could take one of a number of forms. Short trips (day or overnight) would be conceivable, using high speed aircraft and offering a brief experience focused on 'setting foot on the continent' and seeing a very limited range of attractions. Longer stays would also be entirely possible, but would entail greater commitment of resources to facilities, transport on land or ice, supply of food and fuel, and waste management. The long stay large scale tourism option would require facilities similar to some of the more sophisticated stations operated by governments. Short stay mass tourism would in any case require sufficient facilities for short to medium term survival of both incoming and outgoing parties in case of serious delays or emergency. It is worth noting that HRSCERA (1989) reported hearing evidence that a market existed to justify the provision of an air serviced, land based tourism facility in the Australian Antarctic Territory.

Finally, a situation of no change can be considered. A no change scenario is relatively unlikely. It seems probable that the range of locations and activities still unexploited will continue to attract attention from the present airborne operator and from others. Development of a more comprehensive support network for adventure activities is likely to continue, and the increasing range of adventure activities would provide a ready market.

Overflights are a relatively benign way of permitting larger numbers of people to see Antarctic scenery. It would seem unlikely that overflight activity would increase massively, although currently operating flights appear successful. The market for such experiences is likely to be relatively large, but the cost of coming to a gateway nation from the larger wealthy northern hemisphere population centres of Europe, the US, and Asia reduce the market size. South America is already a gateway for some overflight activity, and South Africa is a possible gateway, although more distant and with arguably less spectacular viewing. Overall, while overflights have to capacity to carry large numbers of people, it seems unlikely that such operations will grow substantially, and the bulk of activity will remain limited to servicing Australian domestic markets and international visitors coming to Australia for other reasons.

3.8.3 FACTORS LIMITING GROWTH

It is important to take into account factors that may serve to limit growth. Normal Antarctic operating conditions, including poor weather, discomfort associated with rough seas, and the general inaccessibility of the region will of course always apply (Hall & Johnston 1995a), but to some extent such factors can be ameliorated or overcome.

It is clear that the cost of providing Antarctic tourism experiences will remain one of the primary limiting factors. Potential exists for reduction of costs to some extent, taking advantage of economies of scale using larger vessels, or offering shorter, simpler trips, but ship based experiences will always be relatively expensive compared to destinations with land access. Some capacity may exist for budget ship operations with very basic standards of service, but it would be very difficult to reduce costs to an acceptable level for those willing to travel in that style of vessel. Airborne tourism options will also remain costly to provide. The use of larger jets with more people would reduce costs, but the cost of providing the capacity to manage larger numbers of people would be considerable. Pricing of any larger scale airborne and land based tourism experiences would likely remain at a premium level for some time.

A second limitation to growth is that of time. In ship based tourism, it appears difficult to offer a worthwhile Antarctic experience in less than 10 days, and most voyages on offer are considerably longer. When travel to and from the port of departure is included, a considerable minimum time commitment is required. The use of faster vessels (many larger ships are considerably faster than expedition cruising ships) may have an impact on reducing the overall time. Trips with fewer landings and fewer areas visited may also be marketable. Airborne tourism has considerable potential for reducing the time commitment required for an Antarctic experience.

The reliance on ship based tourism is also a constraint. Many people will not consider ship travel, especially on smaller vessels in seas that can be very rough. To some extent these disadvantages can be overcome with the use of larger, more comfortable vessels that have better sea keeping capabilities, but a proportion of potential travellers who otherwise may be attracted to the destination will remain uninterested.

The extent to which attractions and landing sites experience noticeable crowding will also limit the growth of the industry. Perceived crowding will deter some visitors, although in some cases crowding may instead result in a change in expectations of visitors and a shift in the characteristics of visitors. It is clear from the analysis of motivations (section 3.2) that perceptions of wilderness and solitude are important to present visitors. These motivations may be less prevalent in other visitors. If the character of the destination changes through crowding, it may appeal to people for whom wilderness and solitude motivations are less important.

Availability of suitable ships is a potential limiting factor. If no ships are available for charter, demand will remain unsatisfied, unless there is sufficient demand in the higher price end of the market to justify building new vessels. Section 2.3.1 discusses the availability of suitable ships, concluding that this is unlikely to be a major constraint for some time. If operations with non-ice strengthened ships are included, an almost unlimited supply of vessels is assured.

The most likely limit to growth in the Antarctic tourism industry is management intervention, although Johnston and Hall (1995) assert that it would be almost impossible to halt the growth in tourism visits to these regions.

3.8.4 CHANGES IN TOURISM PRODUCTS, EXPERIENCES AND MARKETS

Increased growth in all sectors of the industry, and the progression of the destination through its life cycle to a different stage, is likely to result in changes to the tourism products being offered. Expedition cruising is likely to remain the dominant form of operation in the short to medium term, and is likely to continue to expand. The expedition cruising model is well proven, and provides high quality experiences for participants. Diversification within the model, and extension of the model is also likely to occur. Destination life cycle models predict that, as destinations mature, more specialisation in products occurs. In efforts to target niche areas of the core expedition cruising market, operators may develop more specific products aimed at particular interests or activities. There would also seem to be potential for operators to target smaller segments of the market. There is some evidence that a number of operators (particularly two Australian companies) are targeting younger, more active markets, by developing products that include active components such as extended shore walking, camping, climbing, diving, and sea kayaking. The wide range of activities possible in Antarctica, and the large global market of activity oriented travellers would suggest that these forms of tourism are likely to grow substantially. The dominance of the 'standard' expedition cruising market by a small number of companies would also suggest that smaller companies will seek to differentiate their products to compete, leading to continued innovation.

Substantial markets remain largely untapped. The US and Europe presently dominate the list of nationalities of tourists. The large travelling markets of Asia are poorly represented in present visitation, and it would seem likely that products directed towards these markets will develop. The motivations of these travellers may be different, and may stimulate the development of different itineraries, activities, and even modes of operation. In addition to the large Asian market, there is probably considerable scope for developing products and marketing more directly to other nationalities worldwide.

The most significant change that may occur would be the development of products aimed at the larger, less innovative market segment (the mid-centric consumers identified in destination life cycle models). Such people would be motivated less by special interest in the Antarctic or aspects thereof, and more by general curiosity, and the knowledge that Antarctica is spectacular, different, and inspiring. The interest and involvement of mainstream cruise companies, using larger vessels, indicates that some in the industry feel that these markets can be successfully exploited. It also indicates that the Antarctic destination is viewed by large companies as an exotic addition to already comprehensive itineraries. Accessing these markets would require different modes of operation. The discomforts sometimes associated with expedition cruising, as well as the focus on educative and interpretive activities is less likely to appeal to participants with different motivations. A shift away from regular landings, lectures, and interpretation of science, natural history, and other aspects would be likely for these experiences. A focus on scenic experiences, with a smaller number of 'generic' landings, probably representing the main icons of Antarctica (penguins, seals, a scientific station, and possibly close-up iceberg viewing) would be probable. It is likely that time spent in the Antarctic region would be shorter. In conjunction with the shift away from expedition cruising, the use of larger vessels is likely to characterise this market. The experiences offered by the larger vessel that has operated for some time, the *Marco Polo*, are an indication of what these experiences may be like. Larger vessels, on shorter itineraries, with fewer landings, may be able to offer cheaper experiences (and thus access larger markets). This may also have an influence on the market share of the expedition cruising sector of the industry. At present these companies probably carry a proportion of people who, while motivated to visit Antarctica, would prefer a less adventurous, more comfortable, or cheaper experience.

A final consideration is a possible change in the focus of operating companies. In the past, the Antarctic has been for many operators a major component of their operations. Newer companies, with substantial operations in other parts of the world, may have less commitment to the Antarctic, regarding it as part of a suite of destinations rather than their primary operating area. This may result in a different level of involvement in environmental protection activities, or a lower likelihood of being involved in Antarctic tourism self regulation. In short, some companies using Antarctica as one of many destination areas may be inclined to put less effort into the protection and management functions than has been evident to date.

3.8.5 USE OF LARGER VESSELS

The use of large vessels is not a new development (Enzenbacher 1995a, Reich 1980). Very large ships, carrying up to 800 passengers were used for only a few seasons in the 1970s (Enzenbacher 1994a, 1995a), a time when other ships around the 400 passenger mark were also popular. Regular operations with large vessels have not eventuated. The largest vessel to be used on a regular basis in the last decade is the *Marco Polo* which has a passenger capacity of 800, although it voluntarily limits the number of passengers to 500 when operating in Antarctica. Recent interest in Antarctica by companies wishing to operate larger vessels has caused concern (section 2.3.1).

Large vessels offer a range of advantages for the passenger and operator. Economies of scale may apply, reducing prices per passenger. As Orient Lines (operator of the *Marco Polo*) pointed out, some environmental benefits can be identified, as more passengers obtain an Antarctic experience per voyage, while some risks of environmental impact are not multiplied—the risk of running aground remains the same, for example (Orient Lines 1997). Smith (1994) discussed the advantages of larger vessels in terms of the tourism experience, including cost. Smith highlighted the fact that the vessels offer the opportunity to participate in an Antarctic experience while avoiding the adventurous nature of the smaller vessels and their itineraries.

Considerable concern with larger vessels relates to safety, environmental risk, the ability of others to provide emergency assistance, and the difficulties of managing people ashore if landings are attempted. It is likely that, given a very prudent approach to ship operations, and complete avoidance of ice, large non-ice strengthened vessels can operate safely in certain areas of the Peninsula region at certain times of the season. The regular operation of similar passenger vessels in parts of the Svalbard Archipelago is roughly analogous to this type of operation. There would be, however, a total reliance on maintenance of correct operational procedure, with very little margin for error in the presence of ice.

A number of authors have considered the issues of large vessel use. Hall and Wouters (1995) commented on the impact potential of larger vessels. They pointed out that larger vessels have visited and have not limited themselves to sightseeing, and that such vessels place less emphasis on educational aspects (also see Johnston & Hall 1995). They cited Johnson to the effect that some vessels have landed up to 1000 people at a time. They also cited others who assert that the environmental impact of large vessels would be minimal if ship-based sightseeing was the only activity undertaken, but that if large numbers are put ashore without proper briefing and supervision then damage could easily be done. Stonehouse (1994a) notes that the broader Lindblad pattern of operations (section 2.3) is subject to change as a wider range of ships come into use, and suggests that a serious challenge is presented when ships with more than 150 passengers are used. Stonehouse and Crosbie (1995) asserted that if the mode of tourism operations changes from the Lindblad model, adequate means of coping with different activities would be necessary. Codling (1982) felt that 130 passengers would be the maximum manageable. Vidas (1996) noted that a maximum of 300 people have been recommended, but also identified a trend towards larger ships. Enzenbacher (1994a) pointed out that larger vessels, excluded from IAATO membership, would not have access to important information about how to conduct environmentally sensitive tours.

Stonehouse (1992a) made the important and often overlooked point that as well as the use of larger ships, trends also toward smaller ships have occurred. Significant implications flow from such a change in the structure of the industry. P. Davis (1995a) reported that the NZ Department of Conservation found smaller vessels to be problematic as a result of their greater mobility.

Environmental concerns associated with larger vessels are two-fold. The operation of large vessels could increase the severity of certain (low likelihood) types of impact. Larger quantities of bunker fuel, lubricants, and wastes are carried by such vessels, and damage to or loss of a vessel could result in substantial hydrocarbon or other forms of pollution. Other impacts are also likely to be greater, including emissions, vessel noise, and impacts associated with vessel presence. The second form of impact relates to landing of passengers, in the event that large numbers are landed at sites (together or serially). There is a potential for increased levels of disturbance to wildlife. Large numbers on shore at some sites would make supervision difficult, and crowd sites, making it difficult for people to maintain separation distances from animals or avoid trampling vegetation. If passengers on larger ships have different interests and knowledge levels, as is likely, and educational and interpretive activities are less of a focus, management of visitors on shore could more problematic.

In the event of any accident, the logistical difficulties of evacuating large numbers of people firstly from a vessel to a safe location (land, ice, boats, or another vessel) and then from the region back to civilisation, would be considerable. An accident involving a large ship would require transport for many passengers, very likely exceeding the ability of nearby shipping to cope. In addition to these concerns, a range of operational challenges would need to be overcome. Most larger, more conventional cruise vessels are not normally equipped with IRBs, and their tenders are much less suitable for landings on rough beaches, or for operations in ice or in difficult conditions. These vessels, unless they equipped themselves with sufficient IRBs to move large numbers of people, would be restricted to landing in locations with very sheltered landing sites or with basic dock or jetty facilities.

Despite these concerns, the potential financial advantages of operating such vessels appear to be considerable, given the interest expressed by some operators. It is likely that the use of large vessels will grow as Antarctica becomes a more mainstream destination in the eyes of visitors and operating companies. Such operations will largely service different markets than those presently visiting.

3.8.6 Geographic Change

Section 2.6.2 demonstrates the extent and rate of geographic change that has occurred in ship based tourism in the past, and describes the geographic range of the industry. Generally speaking, most regions of the continent have been visited at one time or another, although long stretches of coastline have only been touched on in widely spaced locations. The coast of Marie Byrd Land from Edward VII Land across to the base of the Peninsula in Ellesworth land is unvisited by ship based tourism to the knowledge of this author. Similarly, much of the eastern side of the Antarctic Peninsula, and the Ronne Ice Shelf are not accessed by tourist vessels. Both of these regions are very difficult to reach due to ice conditions.

While the ANI air transport network has the capability to cover a continent-wide range of locations, there is very little in the way of commercial tourist activity anywhere other than the Patriot Hills region (including the Weddell Sea region), and the south pole. Adventure activity support is more widespread but involves fewer people. Airborne tourism is restricted in its geographic range by the enormous cost of transporting fuel to distant locations in support of extended operations using specialist ski equipped aircraft. Time also constrains airborne tourism operations, as the time taken to fly long distances, in relatively small, slow aircraft, from an intercontinental landing site may be considerable when weather delays are taken into account.

The present areas used regularly for tourism are the Peninsula region and the Ross Sea region (see sections 2.6.2 and 2.6.3). Geographical growth outwards in these areas is not unlikely, with the gradual expansion of operations shown in the map series (2.2 to 2.10) likely to continue. Gradual additions of sites on coasts that up to now have been sparsely visited is also likely. Relatively accessible areas, like the Prydz Bay region in East Antarctica, and the Ross Sea region also have the potential for increased use. On the whole, it is unlikely that significant growth will occur outside the geographical areas presently favoured, for the same reasons that they are popular at present. Areas most likely to develop as new regions, if any, would be those closest to other continents—the areas south of Tasmania, NZ, and South Africa. Anything other than very low levels of use of these locations (at least by ship based tourism) is however unlikely. A potential factor in geographical change is change to the ice regime, resulting in increased geographical or seasonal accessibility for certain areas, as a result of global climate change or other influences.

3.8.7 Land Based Tourism

Speculation about land based tourism has been common. Proposals have ranged from the simple to the grandiose, and include the feasible and the foolish. Hall and Wouters (1995) discussed the potential construction of tourist facilities such as wharves, airstrips and hotels. They note the hotel operated by Chile on King George Island, and proposals by developers to construct substantial facilities including the '*Project Oasis*' facility mooted for the Australian Antarctic Territory (also HRSCERA 1989). White (1994, p. 258) noted that 'hotel rumours have always been a persistent part of Antarctic folklore'. Hall and Wouters noted that any tourism development would need to be on ice free area, would pose problems in food and water supply and waste disposal, and result in constant visitation of wildlife sites, causing habitat change and behavioural change (1995). Stonehouse and Crosbie (1995) discussed the present lack of provision for alternative forms of tourism use, including the use of huts, and the lack of visitor or resource centers or other facilities.

While previous attempts to operate land based tourism or ship and land hybrid operations have failed, and others have failed to eventuate, the issue should be taken very seriously. The potential financial benefits of such an operation, if it could be developed and marketed, will continue to attract interest, speculation, and proposals. While proposals for large scale land based tourism have attracted considerable attention, the operations of ANI, which include land (or ice) facilities have gone on for over a decade. Rather than confirming predictions of environmental damage, ANI has provided a commendable example of best practice operations, and has operated with more environmental sensitivity than most national programs. A full summer station is run by ANI with minimal energy (fuel) consumption on-site, and with all waste removed apart from grey water. The facilities are comfortable, safe, and readily removable. If all national programs adopted a similar operational philosophy environmental benefits would be considerable.

Considerable opposition to land based tourism has been expressed. Stonehouse and Crosbie (1995) pointed out that suggestions for the development of tourist facilities would not be well received by authorities, suggesting that the need to accord priority to science is used to deter potential developers. They pointed out that facilities can be proposed that do not compromise science. There is no question that long term land based facilities have a higher potential for environmental harm, and their very presence causes impact. To a large degree, impacts are a function of the type of facilities in place, and the way that they are operated. ANI has shown that land based facilities per se do not necessarily cause anything more than minor impacts. On the other hand, high standard hotel style accommodation with ancillary transport infrastructure would have considerable potential for deleterious impacts—it is difficult to envisage such an operation being able to keep impacts to a very low level. Land based operations will not necessarily have major impacts (just as ship based tourism is not guaranteed to have minimal impacts). It is a question of the type of facilities in place and the way they are operated.

One potential means by which land based tourism might operate is through the purchase or the shared use of an existing scientific station. Such an approach could provide advantages to an operator in negotiating regulatory processes and community concern. There are a number of abandoned bases on the continent, and others may become available. Some ATPs might even see tourism as a way of continuing the operation of a station, thereby avoiding the very expensive requirement under the Protocol to remove abandoned facilities.

As will be seen in chapter four, the principle of equality of treatment for all Antarctic activities means that at present there is no regulatory reason why land based tourism could not occur. Opposition from environmental NGOs would probably be intense, and considerable pressure might also be applied by ATPs and from within the tourism industry. Logistical and operational challenges would be difficult to overcome, and the development of competitive tourism products and experiences would be difficult. Despite this, it is likely that entrepreneurs will continue to pursue such ideas.

3.9 SUMMARY

This section summarises the material presented in chapters two and three. The industry relies on a resource characterised by very high wilderness and conservation values. Natural systems, wildlife, scenic qualities, wilderness qualities, natural features including dramatic icescapes and landscapes, and unique climatic conditions are all important elements of the resource area. Scientific stations and cultural and historical sites are also important.

The Antarctic tourism industry is limited to the austral summer season, with ship based operations from late October through to early March. Ship based travel is concentrated in the area of the Antarctic Peninsula, mostly on the western side. Ship based tourism has exhibited strong growth over more than a decade, and numbers are presently in the realm of 10 000 each season. Ships also visit the Ross Sea region each season, but on a much smaller scale. Areas around the rest of the continent are visited by tourist voyages, but infrequently. Ship operations use the vessel for accommodation, transport, and some activities and entertainment. Landings form the other main component of ship based tourism. Sites of interest on shore are visited, using smaller boats to land passengers, who then view wildlife or other features, or participate in other activities. Boats are also used for scenic cruising. Around 160 sites are recorded as being used for landings in the Peninsula region. The analyses show that only a small proportion of sites are used frequently, or have high levels of visitation. The majority of sites receive few landings and have low levels of visitation, with many sites used very infrequently. Areas in the Ross Sea region receive low numbers of visitors on a fairly regular basis, and other parts of the continent have very low levels of visitation.

One company operates airborne tourism as well as providing support for small private adventure expeditions and government logistic support. This company has a continent-wide logistical capacity, but most visitors remain in the region of west Antarctica. The company provides light weight temporary land based accommodation, and low numbers (less than 200 people) are carried each season. Overflights in passenger jets, between six and ten flights per season, carrying roughly between 2000 to 3600 people, operate from Australia to provide scenic viewing. Small numbers of people visit Antarctica on charter yachts, generally from South America.

Tourism impacts on the Antarctic environment, on scientific values, and on other values of the area were examined. Present levels of tourism do not appear to have any substantial deleterious impacts on Antarctic values. A high level of uncertainty prevails about certain impacts, especially those that may result from low level repeated disturbance of wildlife. Research into mechanisms by which impacts may occur was examined, and research aimed at development of methods to minimise impacts was reviewed. Cumulative impacts are not well understood, and are a cause for concern because of this uncertainty. A range of impacts were identified, including some that are not avoidable, many that have a low likelihood of occurrence, and some that, while unlikely, could have significant deleterious impacts on important Antarctic values.

Based on research conducted by others, good information is available about the characteristics of ship based tourists. It is known that visitors are likely to be older, retired, highly educated, and experienced travellers. The largest proportion are from the US, with Germany and the UK well represented, followed by Australia, Japan and other nations. Most passengers express high levels of satisfaction, including those who made fewer landings than others. Highlights of voyages included the general physical grandeur of Antarctica, scenic beauty, wildlife, undisturbed nature, wilderness qualities, and the prestige of visiting a unique or different place that not many people reach. Many visitors expressed a wish to return. A number of possible market groups were identified. These included market groups based on motivations: Antarctic enthusiasts; those pursuing special interests in a special place; those seeking exotic locations; passive participants (accompanying someone else); and loyal cruisers (who regularly use a company or vessel). Market groups based on demographic characteristics were identified as: older, wealthy, educated and well travelled people; less wealthy but highly motivated people; and middle market people, moderately wealthy, open to new experiences.

The nature of Antarctica as a common property resource, and the way that market forces operate to over-exploit such resources was examined. It is asserted that there is a danger that unrestrained access to the Antarctic resource area for tourism purposes may result in overexploitation through the 'tragedy of the commons'. The economic size and composition of the Antarctic tourism industry for one season (1996/97) was examined. Economically speaking, the industry is not inconsiderable, with the total market economic value estimated to be approximately US$55 000 000. The analysis also shed light on the estimated distribution of revenue among different companies, an important indication of industry structure.

The tourism experience was examined. The role of education in Antarctic tourism was seen to be very important, although not necessarily an essential part of the tourism product from a marketing or visitor satisfaction perspective. New activities, including camping, scuba diving, and short climbing and mountaineering activities from tourist vessels were examined.

Antarctica as a destination was also examined. The destination life cycle model, if accepted, suggests that the Antarctic lies in the early phase of development. Antarctic tourism was found to closely match common definitions of ecotourism. Global tourism, and the growth in cruise tourism were examined briefly. The very healthy outlook for tourism generally and cruise tourism in particular is a strong indicator for the continued growth of Antarctic tourism. Expedition cruising, the sub-sector most Antarctic tourism is part of, was also examined.

Finally, the range of stakeholders interested in Antarctic tourism was examined. Non-government conservation organisations were seen to be generally supportive of properly controlled tourism. An opposition to land based tourism, concern about large vessels, and concern about cumulative impacts are features of conservation NGO positions. The structure and role of the main tourism industry representative body was examined in detail. IAATO rules for members include some substantive measures that exceed any provisions the ATS has introduced. The interests of SCAR, COMNAP, and others were examined. Finally, tourism interactions with other uses of Antarctica (other than science and government programs) were found to be generally insignificant.

Based on the physical, environmental, operational, geographical, social, economic and industrial examinations and analyses, future prospects were examined. The general conclusion was that expansion, diversification, and changes to the experiences offered and markets serviced are likely. Growth in the ship based tourism sector is likely, through expansion of the expedition cruising sector, and involvement of operators with a destination cruising focus, probably using larger vessels.

Airborne tourism is by far the smallest sector of Antarctic tourism, but this has the potential to change rapidly. Extended and diversified operations, including forms of hybrid ship-air tourism, and larger scale airborne tourism appear to be technically feasible. The potential markets for such operations would be considerable. Gradual growth of existing air operations is considered likely. Expansion of geographical range and of the types of experiences offered is also likely. Larger scale airborne tourism is considered feasible, but includes significant operational challenges.

Factors limiting growth of Antarctic tourism were considered. None of them appear to be major impediments, and are unlikely to restrict growth or keep numbers of visitors low indefinitely. High cost will remain a barrier to some. The use of ships makes activity inherently expensive. Moderately high cost places no real limit on visitor numbers given the global market of wealthy or highly motivated travellers. Time is also a constraint, although some options to reduce the time commitment required of visitors are available. Perceptions of crowding at sites have the potential to limit further growth. As visitor types change, tolerances to crowding impacts may also change, negating this effect.

Changes in the tourism products, experiences, and markets being serviced are also likely. Expedition cruising is likely to continue and expand, with a diversification and specialisation of the products being offered. More specific market groups will probably be targeted. Significant markets remain unexploited, and are likely to be targeted. Products aimed at less adventurous, less innovative consumers are likely to develop. Large global cruise companies are likely to show continuing interest in adding the Antarctic destination to their itineraries. Such products are aimed at a very large target market, and would have significant ramifications for Antarctic tourism management. Cheaper, shorter, and more comfortable experiences are likely to dominate in these operations, with a shift away from the educational and interpretive focus of present activities.

The use of larger vessels was examined. There are ramifications for safety, environmental impacts, and the visitor experience, but such vessels are likely to be attractive to some operators. The challenges of safe and environmentally appropriate operations are considerable but not necessarily insurmountable, although concern will remain about levels of risk and magnitude of potential impacts.

Geographically, the gradual expansion of activities in the main centres of activity is likely to continue, as is the infilling of sites within these areas. In other areas growth is likely to be limited.

Some land based tourism has occurred in the past, and one operation using aircraft and a land facility has been operating for almost a decade. Some forms of land based tourism can be operated with very low levels of impact, while others have potential for considerable impact. There appear to be no technical reasons why land based tourism could not occur, although the development of competitively priced products would be difficult.

In summary, the future of Antarctic tourism (assuming for the purposes of this exercise that no regulatory intervention occurs) is likely to include:

- further growth in expedition cruising activity;
- further specialisation and diversification of choices offered to visitors;
- niche marketing and more focussed target marketing;
- the entry of established large operators seeking to diversify their destination offerings;
- exploitation of previously untapped market segments (with a much larger target group);
- use of larger vessels;
- more mainstream destination cruising products;
- marketing to passengers with less direct or detailed interest in the Antarctic;
- offering of less adventurous itineraries with fewer or no landings;
- a reduced focus on natural history and an increased reliance on scenic attractions;
- some growth in airborne tourism;
- possible development of new airborne tourism modes of operation; and
- possible increased use of land based facilities.

Chapter 4: The Antarctic tourism management system

This chapter describes and analyses the Antarctic tourism management system. The system consists of measures arising from the ATS, measures outside the ATS that apply to Antarctic tourism, and self regulatory measures.

Appendix one describes the basic components of the ATS, while provisions and measures specific to tourism are included in this chapter. Appendix one summarises the provisions of the Antarctic Treaty, and examines the functioning of the ATS. A brief review of other components of the ATS is included. The development of the Protocol is examined, and its provisions and annexes are summarised, and the proposed liability annex to the Protocol is discussed.

In this chapter, tourism specific measures within the ATS are examined in detail. The historical development of tourism regulation is analysed. The pivotal events surrounding the agreement of the Protocol, the debate about tourism management, the tabling of a draft tourism management annex to the Protocol, and the eventual adoption of Rec. XVIII-1 are described in detail.

International agreements separate to the Protocol also constitute part of the tourism management system. Maritime agreements including MARPOL 73/78 and SOLAS are reviewed. General maritime regulatory issues are also considered, including compliance and re-flagging issues, and ship classification systems. Initiatives for the development of an ice navigation regime to apply to shipping in Antarctic ice covered waters are discussed.

The application of the Protocol through domestic legislation is examined. A number of authors argued (section 1.1.g) that variations were likely to arise from the different ways that states interpret and legislate to put the Protocol into effect. The legislative approaches of Australia, Chile, Finland, Japan, NZ, Norway, Russia, South Africa, and the US were therefore analysed, and variations were identified. The situation of a non-consultative party, that has important tourism management responsibilities but so far has failed to implement the Protocol is discussed.

Self regulatory and voluntary management mechanisms are examined in some detail, because of their importance in the overall management system. Membership of the industry representative body, and the development, contents and application of guidelines and codes of conduct are discussed. The role of ATS guidance documents is examined. The relationship between tourism and science activity, and the management of tourism visits to stations is also described.

4.1 Tourism-specific ATS measures

The ATS is a complex collection of instruments and arrangements. In addition to the primary instruments described in appendix one, decisions made over time by ATCMs in the form of Recommendations and Resolutions relating to tourism form part of the tourism management system.

The management of tourism under the ATS is closely related to environmental management within the ATS. Many concerns with tourism relate to environmental issues and the potential for tourism to cause environmental harm. Blay (1992) provides a comprehensive account of the development of the environmental components of the ATS. In addition to these instruments, Recommendations passed at ATCMs add to the complex of environmental regulations within the system, in what Blay has described as 'a hodgepodge of measures, codes of conduct, recommendations and different conventions' (1992, p. 385). The Protocol rationalised several of these provisions.

It is fair to say that the development of measures for the management of tourism has been a slow, reactive and ad hoc process. The tourism industry, however, has gone from strength to strength (see figure 2.1). Other authors provide partial summaries of ATS responses to tourism (Herr 1993, Heap 1994, Enzenbacher 1992b, Nicholson 1986, Beck 1990a, Beck 1994, Hall & Wouters 1995, Enzenbacher 1994a, 1995a, 1995b, Naveen 1996, Hall & Johnston 1995a, Stonehouse 1994a).

A summary of measures affecting tourism and a number of key incidents is provided in table 4.1. More detail will be provided here on aspects of the deliberations and the substantive aspects of the Recommendations. The important Rec. XVIII-1 and Rec. VIII-9 are reproduced in appendix three. The descriptions of meetings and deliberations, measures and ATCM deliberations and discussions are derived from Heap (1994), up until 1992, after which meeting report extracts are from Australian Antarctic Division (1999a). Commentary on the significance of these extracts, deliberations and measures is contributed by the author.

4.1.1 FROM CONCERN TO GRUDGING ACCEPTANCE: 1966-1970

1966 was the beginning of the modern Antarctic expedition tourism industry. In the same year, ATCM IV passed the first Recommendation relating specifically to tourism. Rec. IV-27 asserted 'the effects of tourist activities may prejudice the conduct of scientific research, conservation of fauna and flora and the operation of Antarctic stations' (Heap 1994, p. 2288). It was therefore clear at the outset that the ATS's concern with tourism was primarily with the potential for impacts on science and governmental operations (see also Herr 1993). Rec. IV-27 responded to these concerns by requiring parties to inform other parties of planned visits to their stations. ATPs were also to make available any conditions for station visits, and to deny permission for station visits to tourist expeditions not able to give reasonable assurances of compliance with the Treaty, Recommendations, or station visit conditions.

ATCM VI in 1970 revisited tourism issues. Rec. VI-7 resulted. The preamble noted the increase in tourism in recent years and an increase in visitors not sponsored by ATCPs (referring to non-government expeditions). The preamble stated that the activities of visitors can have 'lasting and harmful effects on scientific programmes, on the Antarctic environment... and on historic monuments' (Heap 1994, p. 2288). The ATCPs wished to ensure visitors 'are afforded the best view of stations in the Antarctic compatible with the research programs being undertaken'. ATPs were to try to ensure that tourists and visitors did not do anything contrary to principles and purposes of the Treaty. ATPs were also to inform expeditions under their jurisdiction to: finalise station visits between 24 and 72 hours prior to a visit; comply with conditions imposed by station managers; not enter SPAs, and respect historic monuments. ATPs were also to give advance notice of tourist expeditions to other parties (including information required by Rec. I-VI, which relates to general exchange of information). This Recommendation conveyed the impression that tourism was to be tolerated. The desire to provide a good view of stations was close to an admission that the experience of tourists is important and valid. The Recommendation maintained an attitude of tolerance rather than encouragement or acceptance.

Table 4.1: Summary timeline of ATS measures relating to tourism, with key events

Year	Event
1958	First recorded tourist cruise to Peninsula, 100 passengers.
1959	Antarctic Treaty Signed.
1961	ATCM I, Rec. 9, set up structure for designation of historic sites.
1964	Agreed Measures for the Conservation of Antarctic Flora and Fauna ATCM III. These measures included provision for the declaration of SPAs.
1966	ATCM Rec. IV-27, required operators to give advance notification of tourist visits to stations, and required States to advise conditions operators needed to meet to get permission for station visits.
1968	ATCM V, Rec. IV set up means for designating historic monuments.
1970	ATCM Rec. VI-7 related to station visits and prevention of disturbance of science activities (time limits for final notice between 24 and 72 hours notice), tourists not entering SPAs, and respecting historic sites. States to ensure principles of Treaty are observed. States to notify other ATPs about tourist expeditions.
1972	Rec. VII-4. Moves towards drafting statement for tourists. Initial suggestion of ASTIs. States again called on to ensure the provisions of the ATS are met with.
1972	Rec. III of ATCM VII introduced to allow designation of SSSIs.
1975	ATCM Rec. VIII-9, which was to include a *Statement of Accepted Practices and Relevant Provisions of the Antarctic Treaty* and a practical *Guidance for Visitors to the Antarctic*. Organisers to visit stations only with advance notice, and tourists to land only in ASTIs (none of which were designated when the Rec. was made). ATPs were to require reports from tourist expeditions. Set up mechanism for ASTIs.
1979	*Statement of Accepted Practices and Relevant Provisions of the Antarctic Treaty* and a practical *Guidance for Visitors to the Antarctic* finalised. In Rec. X-8, operators were encouraged to use experienced guides. Airlines were to be notified that the present level of overflights exceeds air traffic control, communications, and search and rescue capabilities of Antarctic expeditions.
1979	Air New Zealand DC 10 overflight crashed on slopes of Mt Erebus, Ross Island, killing all 257 people on board. The program of Air New Zealand overflights ended in February 1980.
1981	ATCM Rec. XI-3 declared Air New Zealand accident site a tomb, with the area to be left in peace. Doubts about ASTIs emerged. Problems with non-government expeditions seeking help from ATPs were noted, with the question of a common response to such requests referred to ATCM XII.
1983	ATCM XII discussed tourism increase, and noted the expense, disruption and hazard caused by any need for ATPs to assist tourism and non-government expeditions. Insurance and some form of guarantee discussed. Possibility raised of placing responsibility for compliance on states where expeditions were organised, but draft Recommendation to make states responsible was withdrawn.
1985	ATCM XIII discussed the provisions for tourism. It was noted that Recommendations had developed in a reactive fashion. Codification of provisions was suggested, these issues referred to ATCM XIV.
1987	ATCM XIV noted rapid increase in tourism and larger numbers involved, and acknowledged the potential for science and environmental impacts given the numbers and concentration. A review of provisions was made by the meeting, with concerns raised that the measures were complex, with some inadequacies.
1989	ATCM XV, Rec. 10 allowed designation of Specially Reserved Areas, for areas of geological, glaciological, geomorphological, aesthetic, scenic or wilderness value. Multiple-use Planning Areas also proposed at this ATCM.
1989	ATCM expressed the acceptance of tourism as a legitimate use. Agreed that a comprehensive review was needed, and should be conducted by the Special Consultative Meeting in 1990.
1991	Formation of IAATO by seven operators, operational practices and guidelines set down.
1991	IAATO and PATA attend XVI ATCM under the umbrella of the WTO.
1991	Working group II, Madrid session of the Special Consultative Meeting initiated a review of tourism issues, agreeing that it would be continued at ATCM XVI.
1991	Sub-working group of XVI ATCM conducted review, and meeting adopted Rec. XVI-13. This Recommendation arranged an informal meeting of states and interested parties to address tourism regulation issues.
1991	*Protocol on Environmental Protection to the Antarctic Treaty* (the Madrid Protocol) approved at Antarctic Treaty Special Consultative Meeting.
1992	XVII ATCM received report advising that tourism regulation issues had been considered as required by Rec. XVI-13, without conclusion. The ATCM examined proposals for a draft tourism annex to the Protocol. No agreement was reached regarding a draft annex or other measures.
1994	ATCM passed Rec. XVIII-1. This included a *Guidance for Visitors to the Antarctic*, and a *Guidance for those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic*, representing practical consolidations of responsibilities.
1995	Resolution XIX-3 (1995) passed by ATCM XIX outlines post-activity reporting requirements.
1996	Decision by ATCM XX to use a standardised advance notification and post activity report form for a trial period of one year.
1997	ATCM Resolution XXI-3 (1997), required use of a standard form for advance notification and post-visit reporting to obtain consistent information to facilitate analysis of scope, frequency and intensity of activities.
1998	Protocol enters into force.

4.1.2 THE BEGINNING OF REGULATION: 1972–1979

The 1972 ATCM set in motion a process that would take almost a decade to complete. Rec. VII-4 again noted an increase in visits. It was agreed that a statement of practices and provisions would benefit visitors and parties. Such a statement would list accepted practices in the Treaty area (including the need for self-sufficiency and advance notice of station visits), and the relevant provisions of the ATS. The preamble also noted that unnecessary interference with natural ecological systems needed to be avoided. The Recommendation called on parties: to review the effects of tourists and other visitors; to consider drawing up at ATCM VIII a statement of practices and provisions for visitors; to consult each other prior to the next ATCM about designation of areas that tourists would be encouraged to visit, and principles for identifying such areas; and to try to ensure that tourists and other visitors are subjected to the provisions of the Treaty and Recommendations. This Recommendation further recognised the validity of tourism, by adopting measures to benefit both tourists and parties. The proposal for ASTIs represented tacit acceptance of tourism as an activity in the Treaty area, and acceptance of the need to manage tourism activities in a more direct way. The ASTI concept, while well-intentioned, represented an unsophisticated, incomplete and impractical way of managing tourism impacts, without objectives or a clear rationale. The environmental outcomes, and impacts on the tourism experience appear not to have been considered in detail. ASTIs could have had made operating tourism profitably more difficult, and might have significantly reduced the values derived by visitors from the visitor experience if sufficient sites were made available for tourism use.

1975 saw the first substantial effort to address tourism issues. Rec. VIII-9 (appendix three) recognised increasing numbers of tourists and other visitors, and acknowledged that tourism was a natural development requiring regulation. The need to avoid interference with natural ecological systems was re-stated. Most importantly, the Recommendation asserted 'the necessity to restrict the number of places where large numbers of tourists may land so that the ecological effects may be monitored' (Heap 1994, p. 2289). This is important both for the strong wording, and for the focus on monitoring—the intent of the proposed ASTIs was to allow monitoring of effects, rather than selecting sites where visitors could do no harm. The concept of ASTIs encompassed a notion of the undesirability of tourism in other areas. This Recommendation is also significant in that it represents the first admission that tourism is a 'natural development'—not an admission that it is acceptable or appropriate, but that it is inevitable. The acknowledgment that tourism requires regulation is also significant. The Recommendation included a number of new requirements. As required by the previous ATCM, the Recommendation provided a structure for a statement of practices and provisions, and for the designation of ASTIs. First, ATPs were to ensure that all people entering the Treaty area were made aware of the *Statement of Accepted Practices and the Relevant Provisions of the Antarctic Treaty*. Second, parties were to request all tourist organisers to land only at ASTIs, and visit stations only when permission had been given. Third, in granting permission for station visits, parties were to require reports from organisers, for tabling at the next ATCM. Finally, parties were to keep under review the annexes to the Recommendation. Three annexes were included, and a very brief description is warranted.

Annex A holds the *Statement of accepted practices and the relevant provisions of the Antarctic Treaty,* and a *Guidance for visitors to the Antarctic* (included by ATCM X after being referred from ATCM IX). The *Statement of accepted practices and the relevant provisions of the Antarctic Treaty* is a summary of the ATS and its requirements. The statement refers to the agreed measures, seals convention, waste disposal issues (derived from a code of conduct for operations), and SSSIs. The measures relating specifically to tourism were detailed, emphasising prior notification, and the principles of rendering assistance in an emergency. A number of requirements apply to station visits, including compliance with Treaty provisions and station visit conditions; adequate communications;

timing of arrangements for station visits; not entering SPAs; respecting historic monuments; and reporting to parties after the visit.

The *Guidance for visitors to the Antarctic* is a briefer practical guide to on-ground behaviour for tourists and organisers (appendix three). 10 points are included, providing guidance on: not disturbing wildlife or vegetation; keeping litter to a minimum; not using guns; not introducing plants or animals; not collecting eggs or fossils; not entering SPAs or SSSIs; avoiding interference with scientific work; not entering buildings except in emergency; not painting graffiti; not damaging historic monuments; and keeping with the party when ashore.

Annex B to Rec. VIII-9 provides for the listing of Areas of Special Tourist Interest. No such areas have ever been designated. Annex C lists matters that must be reported by operators. The list is brief, and includes: name and nationality of ship; name of captain; itinerary of each cruise; number of tourists per cruise; and places, dates and numbers of people landed for all landings.

In 1977 at ATCM IX, drafts of the *Guidance for Visitors to the Antarctic* and the *Statement of Accepted practices and provisions of the Antarctic Treaty* were tabled, but full discussion was referred to ATCM X. No action was taken on designation of any ASTIs. ATCM X in 1979 concluded Rec. VIII-9, completing and incorporating the *Guidance for visitors* and the *Statement of accepted practices* via Rec. X-8. Rec. X-8 raised issues of help and advice to organisers of private expeditions, and provision of emergency assistance to such expeditions. The benefits (conservation and visitor experience) of using qualified guides on tourist voyages were also recognised. Concerns were raised about Antarctic overflights as infrastructure was minimal, and there was little capacity to respond to an air emergency.

Rec. X-10 asked that if a non-governmental expedition requests help from an ATP, that ATP should inform the party with jurisdiction over the expedition. Non-governmental expeditions were urged to carry insurance to cover financial charges or material losses. ATPs were to encourage tour operators to carry guides experienced in Antarctic conditions who are aware of the relevant Treaty conservation measures. ATPs were to notify commercial air operators that overflight activities: exceeded capabilities for air traffic control, communications, and search and rescue; might interfere with operational flights of scientific expeditions; and exceeded the capacity of parties to respond adequately to an emergency landing.

4.1.3 SLOW PROGRESS AND THE NEED FOR REVIEW: 1981–1990

Tourism issues at the 1981 ATCM concerned the Mt Erebus air disaster (see section 2.4.3), the designation of ASTIs, and a common response to requests for assistance by private expedition organisers. Rec. XI-3 declared the site of the air accident a tomb. Some work was conducted on principles to be adopted for ASTIs but doubt as to whether it would be prudent to proceed with such designations was expressed, and the matter was referred to the next ATCM. The value of having a common response to enquires about private expeditions was recognised but not developed further.

At ATCM XII in 1983, discussion continued about the provision of emergency assistance to tourism or non-government expeditions. The meeting agreed that the provision of assistance was expensive, potentially hazardous, and disruptive to science. It was noted that careful planning and self-sufficiency were the best way of reducing the risks. The need for insurance or a guarantee was discussed again. The possibility of making states responsible for the actions of expeditions under their jurisdiction was raised, with a draft Recommendation tabled, but agreement was not reached and the Recommendation was withdrawn. These issues were passed forward to ATCM XIII for consideration.

Germany presented ATCM XIII (1985) with a summary of the obligations of member states relating to tourism and non-governmental expeditions, noting that the development of these measures had been reactive and had occurred over a long period. The UK suggested a codification of the existing Recommendations. The US outlined their policy towards non-governmental expeditions. Some parties noted that tourism was a legitimate use of Antarctica, and that regulations should harmonise tourism use with other peaceful uses and environmental protection.

ATCM XIV (1987) paid more attention to tourism issues, again noting the rapid increase in tourism and the larger numbers involved. The meeting acknowledged the potential for serious impacts on science and the environment. Concentration of tourist activities, waste disposal problems, possible impacts on historic structures, and evidence of violation of existing standards were issues of concern. The need for assessment and monitoring of the planning and conduct of tourism was noted. High numbers of station visits were raised as a problem, with some parties indicating they would need to restrict visits. Search and rescue concerns were discussed, in light of reported accidents. Insurance, questions of liability, and the need for ice capable vessels were discussed. The SCAR guide for visitors was noted (section 4.9.2). A draft consolidation of all previous provisions was tabled. A review of provisions indicated that the measures were complex, with some inadequacies. All of these issues were passed for further consideration to ATCM XV. ATPs were urged to renew efforts to disseminate information about existing tourism measures.

By 1989, the parties were in agreement about the need for a comprehensive review of tourism issues. ATCM XV made the now customary reference to increases in tourist numbers. Tourism and non-governmental activities were recognised as acceptable, in part for their value in broadening public awareness and appreciation. Concern about impacts of uncontrolled activity on scientific research and the environment remained. Control of activities, responsibility, insurance, liability, safety, search and rescue, and self-sufficiency were all raised. The meeting agreed that a comprehensive review was required, taking into account all previous measures, and some parties stressed the need for the review to lead to further regulatory measures. The meeting decided that the review should be carried out by the Special Consultative Meeting in 1990 within the context of work on comprehensive measures for environmental protection.

Vidas (1996, p. 307) stated that the period 1989 to 1991 showed a 'definitive change in the extent and intensity of the Consultative Parties' attention to Antarctic tourism'. Vidas attributed this change to the rise in tourist visits, the emergence of self-regulatory activity within the industry, and a concentration within the ATS on environmental protection.

4.1.4 EMERGING OPTIONS AND A MIDDLE PATH: 1991–1994

When tourism issues were re-visited in 1991 at ATCM XVI, the Protocol had just been adopted. A number of working and information papers were presented by parties, by conservation NGOs, and by tourism industry representative bodies. A sub-working group was established to make a detailed examination of tourism and relevant ATS measures. Proposals for a tourism annex to the Protocol were examined. Vidas (1996) notes that France in particular, supported by Chile, Germany and Italy advocated an annex for tourism, while the US opposed any regulation other than that established by the Protocol. Interestingly, ASOC argued that as the Protocol applied to all human activities, an annex for tourism was not required.

Rec. XVI-13 was adopted, acknowledging the mandate for a comprehensive review by the previous ATCM, the request to address tourism issues made by the special ATCM establishing the Protocol, and the fact that the Protocol applies to tourism. The Recommendation noted a need to regulate the presence of tourists and other visitors to limit adverse impacts. The Recommendation called an informal meeting of parties to develop proposals relating to comprehensive regulation of tourism and non-governmental activities, for consideration by ATCM XVII. Parties were to prepare proposals covering environmental issues and operational issues. Environmental issues were to include Protocol implementation; number of tourists and carrying capacity; homologation of vessel standards; permanent infrastructure for tourists; concentration and dispersal of tourist activities; and access to unexplored areas. Operational issues were to include notification and information exchange; station visit permission systems; self-sufficiency; insurance; information obligation of parties; preparation and training of tour guides; visitor's guides; need for specific controls and monitoring, and requirements for organisational procedures. The informal meeting was scheduled immediately before the XVIIth ATCM, with observers invited from tourism, conservation and operational bodies.

The informal meeting took place and reported to ATCM XVII in 1992. As well as ATCPs, participants included SCAR, ASOC, IUCN, WTO, COMNAP, IMO, PATA, and IAATO. The informal meeting had worked through the issues laid out in Rec. XVI-13, but did not arrive at any conclusions. ATCM XVII, in Venice 1992, proceeded to address the issues. Of particular importance was the tabling of a draft tourism annex to the Protocol.

4.1.5 THE ABANDONED DRAFT TOURISM ANNEX TO THE PROTOCOL—ATCM XVII

The preliminary draft tourism annex to the Protocol is an important document, despite the fact that it was not adopted. A summary of the provisions of the preliminary draft is provided in appendix two. The draft annex is worthy of discussion as an example of an alternate regulatory instrument, a possible future direction for the ATS, and an example of the way tourism management has been regarded by some ATPs. Chile, France, Germany, Italy and Spain submitted a working paper proposing the draft (Chile, France, Germany, Italy & Spain 1992, WP1 ATCM XVII). They identified legal, practical and political reasons for adopting a tourism annex to the Protocol.

Legally, the authors of the working paper argued that the provisions of the Protocol (excepting Annex 1) are too general and imprecise on the subject of tourism and non-governmental activities, with the possible consequences of inconsistencies between different national laws, or the potential for exploitation of loopholes. They asserted that other measures for tourism should not be vested in Recommendations, as many countries do not attach a legal obligation to Recommendations, whereas a Protocol annex would force states to enshrine such rules in law. They noted that Recommendations relating to prior notice and the adoption of ASTIs had been largely unsuccessful. They also argued that an annex would allow all state parties to the Protocol to be involved in regulation of tourism, instead of merely states with the largest numbers of nationals travelling to Antarctica as tourists or members of non-government expeditions. Politically, it was suggested that the annex would address public concern about potential tourism impacts. Practically, it was argued that an annex would be useful in allowing organisers and visitors to understand their responsibilities and obligations when planning trips. The annex would also serve as a reference before the entry into force of the Protocol for each state, and would remind operators that they are obliged to respect the scientific value of Antarctica. The author countries of the working paper concluded their introduction by stating that they were not attempting to add constraints to those of the Protocol, but to clarify the Protocol, without any intent to ban or restrict tourism.

4.1.5.a The debate over the draft annex

For a complete description of the events surrounding the discussion of the draft tourism annex see Vidas (1996), Beck (1994), Heap (1994), and Enzenbacher (1995a, 1994a). P. Davis (1995b) also provided information on the eventual outcome. Vidas (1996) reported that disagreement amongst ATCPs emerged at a basic level, with three groups evident. Some parties, including those providing the preliminary draft tourism annex (Chile, France, Germany, Italy and Spain), supported precise regulation having legally binding force. Other parties (mainly the US and NZ) felt the entry into force and implementation of the Protocol was the most important task for ensuring environmental protection, and better tourism regulation. IUCN supported the pro-annex group, while ASOC supported the US / NZ position. A third option was advocated by the UK and Australia. The UK pointed out that while there was agreement about the need for regulation, it was unclear how regulation should be applied. The UK therefore called for an assessment of the nature and scale of potential problems and impacts, and examination of existing ATS provisions, seeking to explain how the Protocol addresses tourism issues, and provide solutions to any shortcomings (Vidas 1996). Australia argued that existing regulations needed to be better explained and synthesised. Australia warned against over-regulation, noting that self regulation would always remain critical. Australia felt that the Protocol provided a framework, but acknowledged that applying Protocol provisions to tourism was complex (Vidas 1996).

Enzenbacher (1992a, 1995a) summarised views for and against a Protocol annex on tourism, derived from a US Department of State citation. In support, the views were that:

- activities unique to tourism have not been addressed—a tourism annex would allow comprehensive regulations for Antarctic tourism;
- a tourism annex would allow tourism issues to be addressed in a consistent, coherent and legally binding manner;
- a tourism annex could consolidate existing Recommendations and provide for easier understanding and promulgation;
- current provisions for tourism are not specific enough and may be exploited by operators or private expeditions;
- it is better to err on the side of caution and regulate tourism before irreversible damage is caused. Regulations can be relaxed if found to be too stringent;
- a tourism annex would allow all Treaty parties to participate in tourism regulation.

Views raised against a tourism annex included:

- the Protocol already covers all human activity and renders a tourism annex redundant;
- means exist within the ATS, including the Protocol, to address tourism issues;
- a two-tiered system of regulation is inappropriate—state operators should be required to have the same operational and behavioural standards as tour operators;
- a Protocol annex, as a legal instrument, would be hard to amend once it had entered into force;
- over regulation of the industry may force some operators to go outside the ATS;
- Antarctic tour operators should be encouraged to self-regulate.

The ATCM also discussed the negative impacts large numbers of tourists might have on science activities. Some parties (including those providing the preliminary draft annex) suggested a meeting to examine the pending issues laid out in Rec. XVI-13, while others felt that these issues had been adequately discussed and that a meeting was not required. Some parties would agree to an inter-sessional meeting only if it were properly prepared and if there was some chance of progress. Consensus was clearly not possible (Vidas 1996). Herr (1993) noted that the organisations representing the Antarctic tourism industry at the informal meeting in Venice were relieved that the XVII ATCM did not endorse the proposal to develop a tourism annex.

4.1.6 ATCM XVIII, Kyoto 1994

The failure of both the informal meeting and ATCM XVII to come to any firm conclusion about a tourism annex or a special meeting to resolve tourism issues left something of a vacuum. ATCM XVIII (Kyoto 1994) tackled the issue again, with agreement that it was time for action. Vidas (1996) suggested that between the ATCMs parties had had time to reconsider their positions. Vidas described the events in detail. The idea of an annex was abandoned, and Chile and France proposed agreed measures on tourism. They argued that while some industry self regulation existed, ATCPs still had responsibility for management of tourism. Australia suggested addressing tourism at three levels—visitors, organisers, and ATCPs. The meeting agreed to provide guidance (rather than new rules) to tourists and to organisers. The third level, that of the ATCPs, was deferred to later ATCMs (and to date has not been addressed). A small drafting group (Australia, Chile, France, and the UK, with occasional participation of the US, Germany, Italy, the Netherlands, and NZ) developed a 'Guidance for visitors', and a 'Guidance for organisers' (Vidas 1996). These were adopted in the form of a Rec. XVIII-1 (appendix three).

In effect, the meeting opted for the third of the options advocated at the previous ATCM, rejecting additional precise, binding regulations. The decision could be considered a win for the countries opposing a tourism annex to the Protocol, and for those who wanted the ATS to concentrate on Protocol implementation. The legal status of the guidance documents was discussed, with agreement that governments would circulate them widely, and urge tourists and organisers to act in accordance (Vidas 1996). This was because of the reluctance of some parties to provide legal force to the guidance documents (Vidas 1996).

The meeting also contemplated the tourism obligations of parties. Some argued the need for formal consultation and coordination between parties, especially with regard to environmental assessment procedures. Others felt the Protocol was adequate. The parties also agreed that ASMAs could be used in some cases to ensure that tourism and non-governmental activities do not have adverse impacts on research or on the environment. The need to consider this in ASMA management plans was raised. Vidas (1996) also reported that the issue of declaring ASTIs was raised again, but wide concern prevented any consideration.

The full text of Rec. XVIII-1 is included in appendix three, while a summary is provided here (figure 4.1). This Recommendation was the culmination of a long period of debate about the treatment and regulation of tourism in the ATS. Some of the issues regarding tourism that had been raised over the period of debate are not resolved by XVIII-1, and parties that supported a more detailed binding set of regulations directed specifically at tourism may remain unsatisfied.

4.1.7 Fine-tuning and regrouping: 1995–1998

ATCM XIX in 1995 discussed environmental impacts of tourism, environmental education and training issues, and standard forms for pre- and post-activity reporting. Concerns were raised about the level of reporting detail required and the reporting burden, and about the emphasis on environmental impacts as opposed to impacts on science activities. The meeting agreed that there would be an advantage to standardising reporting. Information would aid in evaluation of measures to avoid or minimise impacts and development of new measures. No changes to advance notice requirements were made. Post-visit reporting was revised through Resolution XIX-3 (1995), to include: vessel name, details, and flag state; name of captain of vessel; details of government observer or representative; actual itinerary; number and nationalities of passengers, staff and crew; places, dates, duration and numbers of people involved for landings, small boat cruises, flights; whether a World Meteorological Report was provided; any emergency actions taken; and comments.

Differing information requirements for different types of tourism, the possible expansion of NSF / IAATO meetings; and compliance enforcement by departure states were discussed.

The environmental effects of tourism were discussed. It was agreed that that present information was insufficient to act as a baseline or to predict impacts. Parties were urged to support research: to identify sites affected by tourism and unaffected control sites; to survey sites and identify indicator variables sensitive to tourism activities; and to evaluate effectiveness of impact minimisation measures. Site inventories were also discussed, with parties urged to identify sites affected by tourism and ensure information on tourism visits is collected. Existing site inventory projects were noted and the meeting considered their expansion, and urged parties to cooperate in developing site inventories. An urgent need to consider cumulative impacts and develop protocols and programmes to detect cumulative impacts was identified. The need for procedures to address cumulative impacts under Annex I of the Protocol was acknowledged. The meeting acknowledged the need for monitoring to distinguish tourism impacts from natural change. SCAR was asked to provide advice on baseline assessment and monitoring programmes.

Meeting XX passed no Recommendations relating to tourism. Discussion included concern about station visits disrupting science. Limitations on visits were being considered by some parties in cooperation with tour operators. Draft advance and post-visit reporting forms were circulated, and the meeting agreed to a one year trial of the forms. The meeting noted the increase in tourist numbers, and predicted numbers. The trend to include new sites in tour itineraries was also noted. ASOC urged operators not to visit new sites until studies had been carried out regarding the impact of visits. The need for insurance or guarantees for expeditions was also highlighted. The meeting noted that complete regulation of tourism was impossible while some operators remained outside the jurisdiction of the ATS. Industry self regulation was seen by the meeting as one answer to these problems. IAATO was urged to produce and disseminate further guidelines and codes of conduct where necessary, ensure members obey the provisions of the Protocol, and encourage all operators to become IAATO members. The meeting discussed the problem of non-consultative parties that have not yet ratified the Protocol, but who have jurisdiction over tourism. Such parties were called on to pass legislation. Concerns about the standards of environmental assessments for tourism were raised.

ATCM XXI was in Christchurch in 1997. Results of the trial of reporting forms were presented, and changes noted. Issues included the need or otherwise for information on nationalities, and data management issues. Resolution XXI-3 (1997) agreed on a standard reporting form, and a trial form for the next season was included. The contents of the trial form are based on the required matters outlined in Rec. XVIII-1 and Resolution XIX-3 (1995). Reports on the Antarctic Site Inventory Project (section 1.1.4), and on tourism trends were presented. The IMO Polar Code and tourism vessel safety were discussed.

ATCM XXII in 1998 discussed tourism issues but did not pass any resolutions. Commercial and private yacht operations were discussed, with IAATO encouraged to continue efforts to have yacht owners join IAATO. Preliminary results of the Antarctic Visitor Site Inventory project were presented. Documents resulting from the project (*Compendium of Antarctic Visitor Sites: a Report to the Governments of the United States and the United Kingdom*, and the *Oceanites Site Guide to the Antarctic Peninsula*) were introduced to the meeting. Some parties commented that the project was providing valuable information. IAATO commented that the information compiled by the inventory assists efforts to meet the obligations of the Protocol. The need to use accurate place names in site visit reports was noted. The call for non-consultative parties with jurisdiction over tourism operations to ratify the Protocol was repeated. IAATO reported on their experiences with the trial standard reporting form, suggested some changes, and described efforts towards development of a computer database entry form to facilitate compilation and analysis of visit reports.

Figure 4.1: A summary of Rec. XVIII-1

Parties are to circulate the *Guidance for Visitors to the Antarctic*, and the *Guidance for those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic*. Those intending to visit or organise and conduct tourism should do so in accordance with the guidelines, and national law. The two guidance documents consolidate prior Recommendations, measures and sections of the Protocol.

Guidance for Visitors to the Antarctic

The ATS, the Protocol, and the application of the Protocol to all activities are described. Section A, *Protect Antarctic Wildlife*, describes the illegality of taking or interfering with wildlife. Visitors are not to interfere with wildlife or vegetation and must not: use transport inappropriately; feed, touch, or handle animals or fail to take care near them; damage plants (by walking, driving or landing on moss beds or lichen); use guns or explosives or make undue noise; or introduce plants or animals.

Section B, *Respect Protected Areas*, describes protected areas, where entry may be prohibited and activities may be restricted. Visitors should know locations of protected areas, be aware of and observe any restrictions, and not interfere with historic sites, monuments or artifacts.

Section C, *Respect Scientific Research*, requires visitors not to interfere with scientific research, facilities or equipment. Station visit requirements are described. Equipment should not be interfered with.

Section D, *Be Safe*, highlights the severe and changeable weather. Visitors should: plan and act with their capabilities and the dangers involved in mind; keep a safe distance from wildlife; obey group leaders; avoid glaciers or ice fields unless prepared; understand rescue is unavailable; ensure self sufficiency through quality equipment and trained personnel; use emergency refuges only in emergency; and respect fire restrictions.

Section E, *Keep Antarctica Pristine* advises that visitors should not: dispose of litter on land or burn it; pollute or disturb lakes or streams; discard materials at sea inappropriately; make graffiti; collect biological, geological or man-made specimens; or vandalise buildings.

Guidance for those Organizing and Conducting Tourism and Non-governmental Activities in the Antarctic

Antarctica and the ATS are described. The obligation of operators and organisers to obey the Protocol is described. The need to comply with national implementing legislation is stressed. *Key obligations on organisers and operators* include the need to: provide prior notification, and report on activities; conduct an impact assessment; be capable of responding to an environmental emergency; ensure self-sufficiency and safe operations; respect research and the environment; and prevent discharge of prohibited waste. Specific actions under *Procedures to be followed by organisers and operators* include the need to:

- notify authorities of planned activities;
- conduct environmental assessments;
- obtain permission for station visits and reconfirm arrangements before arrival;
- provide information to help prepare contingency plans for response and marine pollution, and waste management plans;
- ensure all are aware of protected areas and their management plans, and historic sites and monuments;
- obtain permits to enter any protected areas;
- arrange activities to be fully self-sufficient;
- employ and use trained and experienced guides and personnel in sufficient numbers;
- use vehicles appropriate to Antarctic conditions;
- understand communications, navigation, air traffic control and emergency procedures;
- obtain the best maps and charts, and recognise that many areas are not fully surveyed;
- consider the question of insurance;
- conduct education programs relating to provisions of the ATS for personnel and visitors;
- provide visitors with a copy of the *Guidance for Visitors to the Antarctic*;
- comply with all requirements of the ATS and national law;
- monitor environmental impacts of activities and inform Treaty parties of unforeseen impacts;
- operate transport safely and in accordance with ATS requirements;
- dispose of waste material in accordance with Annexes III and IV to the Protocol;
- cooperate with observers designated under the Treaty or the Protocol;
- cooperate in monitoring programs undertaken in accordance with the Protocol;
- maintain a complete record of activities undertaken.

After a visit, operators and organisers are to report on the conduct of the visit, including basic operational information, and any significant changes in activities and their impacts. The Recommendation refers to ATS documents and other information. *Information to be provided in advance notice* is specified.

4.2 NON-ATS AGREEMENTS

A number of other international agreements apply within the Treaty area, as the Treaty does not derogate from the rights of states on the seas surrounding Antarctica. A simple description of the international maritime regulatory regime is important in explaining the responsibilities of tourism ship operators and of Treaty and non-treaty parties. There are three elements in maritime regulation: international agreements and the IMO; states (flag states and port states); and the classification societies.

There are a number of international agreements (conventions and protocols), concerned with maritime safety and environmental protection, negotiated and administered by the International Maritime Organization (IMO). IMO is responsible for safety and pollution control aspects of maritime trade, including liability and compensation for oil pollution (IMO 1999). States may be party to IMO conventions, which cover design, stability, loading, navigation, fire protection, communications, lifesaving equipment and appliances, pollution prevention, standards of training, certification and watchkeeping, safety management, and port state control (Smith 1999). Under the IMO conventions, ships are surveyed during construction and then annually to ensure certain standards are met (Smith 1999). IMO conventions do not provide detailed regulation of ship design issues, but recognise that ships must be adequate for the purpose intended. To ensure ships are adequate, IMO member states recognise classification societies, who develop detailed requirements and conduct inspections. Smith states that 'for total compliance with the ship safety and marine pollution prevention standards as envisaged by IMO member states, it is necessary for ships to comply with the rules of a Classification Society or equivalent, as well as with the requirements of the IMO Conventions' (Smith 1999, p. 14). These include a requirement for passenger vessels to have a *Passenger Ship Safety Certificate*, issued according to the rules of the classification societies under the *International Convention for the Safety of Life at Sea, 1974* (SOLAS) (Smith 1999). In short, IMO states desire safe ships, but safe design and operation is not codified in the IMO conventions or assessed by states, instead states recognise classification societies, who then survey and certify ships using their specialist knowledge.

4.2.1 COMPLIANCE AND RE-FLAGGING ISSUES

The problem of compliance is difficult in maritime regulation. There is a long-standing problem of re-flagging, where ship owners register their ship in a flag state with less stringent standards or enforcement systems than other states. Control by flag states has traditionally been the means of maritime safety administration 'but a gulf has opened between responsible Flag States and those less insistent on compliant fleets. Some Flag States have therefore enabled sub-standard ships and their operators to survive and profit' (IACS 1999, n.p.). This problem can to some extent be addressed through port state control whereby port states conduct inspections of ships in their ports and detain ships if safety or environmental protection defects (under the various IMO agreements) are found—'by acting in concert, port state control regimes have the capability to penalise the ships of under-performing flags' (IACS 1999, n.p.). With respect to the Protocol, in the opinion of the German delegation to ATCM XXI, port state control can not apply (Germany 1997, WP16 ATCM XXI). This is because the Protocol does not contain specific regulations on port state control (as MARPOL 73/78 and SOLAS agreements do, for example) (Germany 1997, WP16 ATCM XXI). Port state control can however be applied to the provisions in the MARPOL 73/78 agreement on Antarctica as a special area. The option exists to include port state control provisions in the Protocol.

4.2.2 AGREEMENTS APPLYING TO ANTARCTICA

In addition to regulation derived from the Protocol, IMO conventions apply in the high seas of the Treaty area. The IMO conventions have a wider coverage of states than the ATS. Membership of MARPOL 73/78, for example, is wide, with more than 90% of the world's merchant marine represented (IMO 1999). For Antarctic shipborne tourism, two important considerations are safety and marine pollution control. The conventions that apply to these areas are the *International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978* (MARPOL 73/78), and the *International Convention for the Safety of Life at Sea, 1974* (SOLAS).

SOLAS applies to all ships registered in states party to the agreement. The convention deals with all aspects of ship safety including safety of navigation, communications, fire prevention and suppression, meteorological services, and search and rescue, and covers hardware as well as operational requirements. These requirements do not have any particular Antarctic implication or focus. In 1998 an International Safety Management Code was adopted under SOLAS, applying to all passenger ships (among others) (Smith 1999). This code requires each operator to apply a Safety Management System to its ships, prompting operators to focus more effectively on safety, resulting in 'more efficient operation and satisfactory maintenance of ships, their safety systems and environment protection systems' (Smith 1999, p. 26).

The responsibilities of operators and parties under MARPOL 73/78 are included in table 4.2 based on the summary available on the IMO web pages (IMO 1999). MARPOL 73/78 covers prevention of pollution from ships, with annexes for five substance groups: oil; noxious liquid substances carried in bulk; harmful substances carried in bulk; sewage; and garbage. Under MARPOL 73/78 Annex 1, ships are obliged to maintain an oil operations record book. MARPOL 73/78 also has the more general effect of governing the activities of a wide range of states, and removes the need for the ATS to involve itself to any great degree in such issues, except where more stringent rules than those MARPOL 73/78 provides are felt necessary. One important measure was the 1992 declaration of the Antarctic as a Special Area under MARPOL 73/78 Annexes I and V, meaning oily mixtures and oil wastes cannot be discharged (IMO 1999). ATPs (via the Protocol) and MARPOL 73/78 parties are therefore prohibited from such activity. MARPOL 73/78 provisions cover prevention of pollution by oil, and by garbage, and will eventually include sewage (Smith 1999).

4.2.3 ICE NAVIGATION–A REGIME GAP

There is a significant regulatory gap relating to Antarctic shipping. No international agreement makes provisions for the construction and operation of ships in polar regions, despite the obvious hazards. Canada, Russia, and the Baltic states have ice navigation regulation in place for territorial waters, but high seas are not covered. Article 10 of the Protocol requires ATPs to take into account Protocol Annex IV (Prevention of Marine Pollution) in the design, construction, staffing and equipment of ships involved in Antarctic operations. This represents a minimal commitment to addressing issues of ship safety and pollution prevention. No guidance is provided as to what standards are appropriate. Article 10 is of limited value for regulating Antarctic tourism shipping. For example, Australia's sole advice to mariners is a Marine Notice strongly recommending that masters and owners of ships proceeding to the Antarctic Treaty area are appropriately prepared (with training and experience, a suitable ship, and so on) (Australian Maritime Safety Authority 1994). The hortatory wording, and the lack of guidelines or rules determining acceptable equipment or operational practices highlight the lack of regulation.

Tourism shipping forms a considerable proportion of Antarctic shipping, and a state of affairs where an insufficiently prepared ship carrying passengers is able to proceed to the Treaty area is undesirable. At the very least, the operational and safety standards of ships operating in ice covered waters, as imposed by flag states, are unclear and unreported. No mechanism exists within the ATS for detailed reporting of operational and safety standards in the Antarctic tourism industry. The Protocol ensures operators describe environmental aspects of ship operation and contingency planning, but more general ship operation, ice navigation, safety, and survival issues are not included.

A process is underway for the development of an international agreement, the *International Code of Safety for Ships in Polar Waters* (Polar Code) (Brigham 1997, IMO 1998). The code is in the early stages of negotiation. If the Polar Code does come into effect, it will provide substantial advantages in safety and environmental protection in the Treaty area, and impose new requirements on ATPs and Antarctic tourism operators. As the Polar Code has yet to be taken beyond draft stage, it would be premature to go into detail, however the essential points can however be outlined. The code aims to ensure the safety of navigation and prevent pollution from ship operations in Polar Waters, through design and outfitting, use of sufficient adequately trained crew, prudent operations, and adequate liability provisions. The draft code has four key provisions:

i. the combination of design, systems and equipment should be adequate to reduce risks of casualties, pollution, or ship losses to acceptably low levels of probability when operated prudently;

ii. no pollutants should be carried directly against the shell in areas at risk of ice impact;

iii. key safety, survival and pollution control equipment should be rated for temperatures and other conditions to be encountered;

iv. navigation and communications equipment should provide adequate performance at high latitudes, in areas with limited infrastructure, and with unique information transfer requirements (IMO 1998).

The draft Polar Code (IMO 1998) applies to ships operating in polar waters on international voyages. For the Antarctic, polar waters are defined as the waters south of 60° south. The code makes provision for existing ships, but develops a new ice class system with 7 levels (PC1 to PC7), PC1 capable of year round operation in polar waters, and PC7 capable of summer and autumn operation in thin first year ice with old ice inclusions. The code requires an ice navigator to be aboard, and continuous monitoring of ice conditions while underway. Considerable space is devoted to the structural and equipment requirements of new polar class ships. Particular requirements apply to life-saving equipment and survival arrangements. Personal and group survival kits are required. The code also provides for operational standards, and a section on additional operational provisions for passenger ships was under consideration. Crewing, emergency equipment, and environmental protection and damage control are also included (IMO 1998).

ATCM XXII considered the proposed Polar Code. COMNAP made a submission (1998, WP13 ATCM XXII), emphasising the differences between Arctic and Antarctic ice conditions and operations. The tenor of the paper was generally supportive of the initiative, but suggested a number of areas where the Polar Code needed to consider specific Antarctic issues. COMNAP expressed the concern that Antarctic conditions are sufficiently different from the Arctic (distances, ice regimes, governance, and commerce) to make it impossible to extrapolate from regulations written for the Arctic.

COMNAP offered to advise the ATCM on issues such as training, navigation and communication equipment, fuel transfer, and contingency planning, for consideration by IMO. Definitional issues relating to sovereignty were also raised (COMNAP 1998, WP13 ATCM XXII). Norway stressed the need for Antarctic input (Norway 1998, WP18 ATCM XXII). Norway identified three areas of concern. Technical concerns related to ice differences, difference in shipping types, the special protection already accorded Antarctica under MARPOL 73/78, and remoteness of ports, safe anchorages, and rescue facilities. Legal concerns included the need to consider the elements of the ATS. Environmentally, the Polar Code would need to reflect the ATS environmental protection provisions. The ATCM concluded that the IMO working group drafting the Polar Code had not 'fully taken cognisance of the environmental, operational, legal and political differences between the Arctic and the Antarctic' (ATCM 1998). It was agreed that COMNAP should develop guidelines on training and provide guidance on communications and navigation equipment, for ATCPs to contribute to IMO. The ATCPs were to consider the draft polar code in light of Antarctic operations, and provide input to IMO through their maritime organisations (Resolution 3 1998).

The polar code has significant implications for the tourism industry. More stringent rules may eventually apply to the operation of ships in polar waters, according to the capability and class of the vessel. In some cases, operations at present considered acceptable may be ruled out. Compliance costs may also be considerable for existing ships, with the need for new operational, administrative and inspection procedures, possible higher operating costs, and costs associated with additional lifesaving appliances and survival equipment as specified in the code.

4.3 RESPONSIBILITIES OF PARTIES

Table 4.2 summarises some of the important requirements of ATPs relating to tourism arising from the Protocol, other elements of the ATS, and other agreements.

Figure 4.2: Responsibilities of parties relating to tourism

Environmental principles and general requirements

- At the broadest level, parties are required to enact the Protocol into law in the domestic arena, with any necessary mechanisms to ensure that their nationals comply with all aspects of the Protocol. ATPs are to ensure the environmental principles of the Protocol are observed.

Cooperation

- ATPs are to cooperate with each other on programs relating to protection of the environment, assist each other in environmental assessments, provide information on potential risks, and provide assistance to each other to minimise impacts of accidents (all of which may relate to tourism activities in certain cases).

Environmental assessment

- ATPs are to administer environmental impact assessment procedures as defined in Annex I, and ensure that the procedures are applied in the planning process.
- If an IEE indicates that an activity is likely to have less than a minor or transitory impact, a party may allow that activity to proceed, with conditions if required. ATPs are to make IEEs available on request.
- ATPs are to receive draft CEEs, make them publicly available, circulate them to all parties and the CEP, and receive comments. A draft CEE must also be considered by the ATCM. ATPs must make a decision based on the final CEE and other relevant considerations. ATPs must distribute to all parties the final CEE, decisions, and a comparison between the predicted impacts and the advantages of the activity.
- ATPs are to make sure monitoring is in place to assess and verify any impacts (for activities requiring a CEE, or if appropriate for IEE level activities).

Protection of native fauna and flora

- ATPs may issue a permit to allow taking of or interference with fauna or flora—unlikely in the case of tourism, although the Protocol Annex II Article 3(2) does allow permits for 'other educational or cultural institutions or uses', which could include some tourism activities.
- ATPs are to ensure that operators comply with provisions for avoiding introduction of non-native species.

Prevention of marine pollution

- ATPs may require the use of garbage record books and sewage record books on ships.
- ATPs are to ensure that ships entitled to fly their flag, and those supporting their operations are fitted with sufficient tanks and storage areas for all substances which have to be removed from the Treaty area.
- ATPs are to ensure that ships have made arrangements for discharge of wastes at a reception facility. ATPs are to provide facilities for reception of all such wastes. Protocol parties are to cooperate to ensure that this requirement does not place an inequitable burden on states closest to the Treaty area.
- ATPs are to develop contingency plans for marine pollution incident response, including plans for cooperative responses.
- Under MARPOL 73/78 ships of 400 gross tons (grt) and above must be issued with an International Oil Pollution Prevention Certificate. They must have oily water separating equipment or a filtering system for bilge discharges, while vessels over 10 000 grt must have oil discharge monitoring and control systems. An oil record book is to be maintained.
- Annex V of MARPOL 73/78 prevents the dumping of plastic at sea.
- Under MARPOL 73/78, ships more than 400 grt must have a SOPEP approved by the flag state of the ship. SOPEPs detail the procedures to be followed in the event of an oil pollution incident including notification, actions to be taken, and procedures for coordinating shipboard actions with national and local authorities.

Area protection and management

- ATPs are to identify and include in the protected area system areas to be kept inviolate from human interference, representative examples of major terrestrial and marine ecosystems, areas with importance for species, areas important to ongoing or planned science, areas of outstanding geological, glaciological, or geomorphological features, or areas of outstanding aesthetic or wilderness value.
- Protected areas are subject to management plans, which allow management conditions to be placed on tourism. ATPs nominating areas must include management plans. ATPs are to review management plans at least every five years.
- ATPs are to administer permit systems to visit ASPAs.
- ATPs are to ensure that all visitors or prospective Antarctic visitors are aware of the provisions of Annex V, making sure than locations, maps, and management plans are available, that locations are shown on maps, and that boundaries are marked on-site where appropriate.

4.4 ATS Alternatives

Over the life of the ATS, a number of non-ATS management schemes have been proposed. Criticisms of the ATS revolve around the domination of ATS decision making by those parties with the wherewithal to conduct science in the area, to the exclusion of countries incapable of or unwilling to conduct Antarctic science. A debate about the role of the UN in Antarctic affairs has been ongoing for a long period—'in the early 1980s, a group of third parties, comprising mainly developing countries and including Malaysia, Antigua, and Barbuda, initiated discussions on the 'Question of Antarctica' in the UN General Assembly' (Stokke & Vidas 1996, p. 3). Tourism was raised in these UN discussions (Vidas 1996). Some parties regularly used tourism as a justification for their arguments, stating that tourism had resulted in noticeable impacts, including disruption of science, vandalism of historic sites, disturbance of wildlife breeding sites, and tramping of vegetation. They also pointed to growth in tourism, suggesting that irreparable damage would occur as a result (Vidas 1996).

Despite a report by the UN secretary general refuting the idea that tourism was having more than a minimal adverse impact, tourism issues continued to be used as ammunition in the UN debate. Beck (1989, 1990b, 1992) tracked the development of concerns in the UN, and the growing focus on environmental issues as opposed to the perceived problem of the exclusivity of the ATS. The UN sessions had passed 18 Resolutions on Antarctica by 1991, evidence of the interest being shown in Antarctic affairs (Beck 1992). Issues raised in the UN include the desirability of broader involvement, greater UN involvement, UN support for an Antarctic world park, reducing the number of stations through cooperative activities, the continued participation of South Africa in the ATS in the face of human rights concerns, perceptions of Antarctica as the common heritage of mankind, access by other states to unexploited resources, environmental protection, mineral exploitation issues, and the growth in tourism requiring regulation (Beck 1989, 1990b, 1992). The criticism of the ATS in the UN eventually faded. Beck described the 'increasingly sterile, ritualistic nature of the episodes' (Beck 1992, p. 308). Stokke and Vidas (1996) noted that the elevation of environmental values within the ATS weakened the basis for criticism in the UN general assembly, and in 1994 a consensus resolution was adopted expressly acknowledging the merits of the ATS in Antarctic governance.

The common heritage of mankind has been raised in connection with the management of Antarctica. Hall and Wouters (1995) discussed alternatives to the ATS as they apply to tourism management issues, including the common heritage concept. If Antarctica is part of common heritage, benefits derived from Antarctica should be shared by all states (Hall & Wouters 1995). Hall and Wouters argued that the common heritage of mankind approach puts exploitation ahead of preservation, and that if such a philosophy were adopted, all forms of utilisation including tourism would increase (1995). Hall and Wouters rejected the notion of common heritage of mankind on the basis of long-standing territorial claims, and the existence and effective operation of the ATS (1995).

A world park management model for Antarctica was advocated by many before the signing of the Protocol. Most NGOs regard the Protocol as conferring world park equivalent status on the Treaty area, and as such the world park push has subsided. Hall and Wouters (1995) provided a brief description of the world park proposals, including the positions of IUCN and Greenpeace, and opposition from the UK and the US to the concept. Combined with the related argument for the recognition of the common heritage of mankind status of Antarctica, these issues placed some pressure on the ATS, but concerns have now eased, with the signing of the Protocol, the abandonment of CRAMRA, and the broadening of ATS membership.

Proposed alternatives to the ATS raise significant issues for tourism. The potential for problems associated with tourist activities operating from non-ATS states would be lessened if a broader, more inclusive regime applied, and such a regime might simplify a more systematic, planning oriented approach to tourism management issues. The criticism of the ATS in the UN debates on the basis of its alleged failure to manage tourism is interesting in itself, and acts as an indicator of the perceptions of outsiders about tourism threats and responses. There appears to be no immediate prospect of the collapse of the ATS and its replacement with a UN based regime. It is not within the expertise of this author to consider such a likelihood in any detail, and while it is acknowledged that such an eventuality could represent one possible future, it is beyond the scope of this research to hypothesise about a management system for Antarctic tourism under the UN. Consideration in chapters seven and eight will be based on alternatives available without recourse to the possibility of UN control over Antarctica. Equally, other forms of international control or non-control will not be considered, given the low likelihood of ATS collapse.

4.5 ENABLING THE PROTOCOL—LEGISLATION, REGULATIONS, AND PROCEDURES

In order for the Protocol to enter into force, it was necessary for all ATCPs to ratify, accept or approve the Protocol domestically. For most countries, this entailed the passing of enabling legislation, giving the rules of the Protocol legal force for the subjects of each state. The enabling legislation is the law that tourism operators must abide by in practice (unless of course they are not subject to the laws of any ATPs). While a common document (the Protocol) underlies all domestic legislation passed by ATPs, methods of passing enabling legislation, and the internal processes and procedures for administering the Protocol result in a degree of variation in the actual practice of tourism management between countries. As Enzenbacher (1995b) and Dingwall (1998) have noted, the legislative approaches taken by the ATPs are a major determinant of regulation of Antarctic tourism. Dingwall stated 'it is to be expected that legal interpretations of the Protocol will vary when domestic legislation is enacted' (p. 143).

The instruments used by a number of countries to implement the Protocol are briefly described here, including legislation, decrees, and regulations. Full details for each ATP are not provided. The examination concentrates on requirements and mechanisms for carrying out environmental assessments. The countries were not selected strategically, as access to documentation from many ATPs was not readily available. A range of ATPs, including consultative parties, claimant states and non-claimant states are examined. The position of a non-consultative party that has not yet ratified the Protocol is examined.

The intent is to examine different ways that the Protocol has been enacted and the implications of these differences for tourism. The environmental assessment and permit systems used by different countries are of particular interest, as they represent the main regulatory tool applying to tourism. The application of the various instruments is also of interest, as some countries cast a wider net, applying (or at least asserting) their jurisdiction over a wider range of entities than other countries.

The review serves to introduce and illustrate the point that the international nature of the tourism management system, even though based on an agreed and relatively well-defined text (the Protocol), still leaves room in practice for a range of different requirements. The author is not legally trained, and so interpretation of legislation and regulations is that of a lay reader.

Tables 4.2 and 4.3 summarise the names and application of the instruments of the countries examined. Table 4.2 includes the agency responsible for administration of environmental assessment procedures in each country. A brief examination of the legislation and system of each country is provided.

4.5.1 AUSTRALIA

Australia is a consultative party and a claimant state. Under the Australian enabling legislation, the *Antarctic Treaty (Environment Protection) Act 1980* (Cwlth), (last amended 1996) responsibility for environmental assessment rests with the 'Minister'. The collection of statutes for which a ministerial portfolio is responsible is subject to change. The Act makes provision for regulations. Regulations have been passed for the environment assessment process—the Antarctic Treaty (Environment Protection) (Environmental Impact Assessment) Regulations.

A tourism operator who wishes to carry on an activity in Antarctica must begin by producing and submitting a preliminary environmental assessment. Based on this submission, the minister or the minister's delegate determines the level of impact the activity is likely to have. If the impact is likely to be 'no more than negligible' (note the avoidance of the term 'minor or transitory' used in the Protocol), the minister authorises the activity to proceed (with conditions if necessary). The actions relating to assessments at different levels are described similarly, with procedural details referred to the regulations. Any decision of the minister, based on the CEE and any other relevant considerations, is guided by the Act (Section 12L(1)) whereby the minister must be satisfied that the activity can be carried on in a manner consistent with the basic environmental principles. The Act also provides for the modification of an authorisation if requested in writing, or for the suspension of an authorisation if conditions are not being met or if it the activity is not complying with the basic environmental principles. If a person carries out an activity without an authorisation, or fails to comply with a condition, the penalty may be up to AU$100 000. Provision is made for offences to be heard in a court of summary jurisdiction.

A range of issues are referred by the Act to the regulations. These regulations define the items that need to be included in an IEE, and procedures for notifying the proponent and the public of the activity. Public comment periods for IEE and CEE level assessments are specified. The contents of CEEs and procedures for dealing with them are specified, including the international distribution of CEEs, notification of availability of draft and final CEEs within Australia, and processes for accepting comments. Waste management regulations, Antarctic Treaty (Environment Protection) (Waste Management) Regulations 1994, are also made under the Act, covering waste management issues as set out in the Protocol. The regulations do not require the use of waste record books.

4.5.2 CHILE

Chile outlines Protocol implementation measures in a short information paper presented to ATCM XXII. Chile is a consultative party and a claimant state. Chile enacted the Protocol and annexes by executive decree. This process declares the Protocol and annexes to be observed and enforced as an act, and publishes the text of the Treaty in the official Gazette (Chile 1998, IP43 ATCM XXII). While the decree and gazetting of the Protocol is sufficient to enact the Protocol into national law, the *General Law on the Environment (Law No. 19,300)* provides for punishment of infringements. A Special Statute applies the laws of Chile to the Chilean Antarctic Territory, and allocates courts of jurisdiction. Chile also describes its position on jurisdiction and the application of the Protocol, asserting that territorial jurisdiction prevails, while acknowledging that extraterritorial jurisdiction derives from its responsibilities as an ATP. Chile also points out that Chilean territorial jurisdiction does not prevail in 'such situations as tourists under the full responsibility of a foreign operator' (Chile 1998, IP43 ATCM XXII, n.p.). Chile concludes the information paper by stressing the need to avoid affecting the positions of parties as regards sovereignty, when implementing the Protocol. The need to be practical in claiming jurisdiction, with priority given to ensuring infringements of the Protocol are punished, is also stressed (Chile 1998, IP43 ATCM XXII).

4.5.3 FINLAND

Finland passed the *Act on the Environmental Protection of Antarctica (1996)* (entering into force on January 14 1998). Finland is a consultative party. The *Decree on the Environmental Protection of Antarctica*, dealing with environmental assessment and waste management was issued in February 1998. Some details of the act and the decree are supplied by Finland in information papers 110 and 114 (Finland 1998, IP110 ATCM XXII, Finland 1998, IP114 ATCM XXII). The law applies to Finnish citizens, legal persons, vessels, foreign citizens residing permanently in Finland, and foreign legal persons and vessels that participate in expeditions originating from or arranged in Finland. The act covers the Treaty area, and closely follows the provisions of the Protocol. Permits are required for tourism activities. The appropriate authority is the Ministry of the Environment. The practical aspects of environmental impact assessment, permits, waste management, and marine pollution from vessels are dealt with through the decree.

4.5.4 JAPAN

The national law applying the provisions of the Protocol in Japanese domestic law is the *Law relating to the protection of the Environment in Antarctica* (passed by the National Diet in May 1997) (Japan 1998, IP45 ATCM XXII). Japan is a consultative party. The law applies to Japanese nationals, juridical persons, foreign residents, and foreign juridical persons with offices in Japan whose employees are involved in Antarctic activities, or supervise activities (as part of that business). Japan only claims jurisdiction over nationals or those with certain relationships to Japan such as a permanent address (Japan 1998, IP45 ATCM XXII). Japan investigated the possibility of including activities organised in Japan, but rejected the concept on the basis that the words 'organised in' did not represent a clear enough concept in Japanese. The Environment Agency is the authority responsible for administering the law. Activities covered by the requirements of another Treaty party are not subject to the Japanese provisions as long as the Environmental Agency is notified of certain issues. Japan will not allow any CEE level activity under its jurisdiction to proceed if international scientific knowledge regards the impacts as being serious (determined through international circulation of the CEE and through the CEP). In recognition of the relatively large number of Japanese nationals visiting Antarctica, a pamphlet was being prepared outlining the importance of the Antarctic environment, the requirements of domestic law, and Rec. XVIII-1. This was to be made available through tour agents selling Antarctic tours, and through gateway port tourist information centres, in order to ensure all Japanese nationals are aware of provisions.

Table 4.2: Implementing the Protocol through legislation

	Name of Instrument(s)	Responsibility for overseeing environmental assessment and permit procedures:
Australia	*Antarctic Treaty (Environment Protection) Act 1980* (last amended 1996) (Cwlth). Antarctic Treaty (Environment Protection) (Environmental Impact Assessment) Regulations. Australian guidelines for preparation of initial and comprehensive environmental evaluations.	Responsibility lies with the minister (and relevant department) responsible for the act. At present, this is the Minister for the Environment, and the Australian Antarctic Division, Environment Australia.
Chile	*Executive Decree No. 396*, with publication of the Protocol in the official gazette (Annex V through Decree No. 583). Enforcement through *General Law on the Environment (no. 19,300)* applying to the Chilean Antarctic Territory (through a Special Statute of 1956, which applies all Chilean laws to the Territory).	Not specified in information in hand.
Finland	*Act on the Environmental Protection of Antarctica 1996*, and the *Decree on Environmental Protection of Antarctica*	Ministry of the Environment.
Japan	*Law relating to the protection of the environment in Antarctica (May 1997)*	Director General of the Environment Agency
New Zealand	Antarctica (Environmental Protection) Act 1994 119. Guidelines and procedures for visitors to the Ross Sea Region.	Minister of Foreign Affairs and Trade (specified in legislation).
The Netherlands	*Rules for the protection of the Antarctic environment implementing the Protocol on environmental protection to the Antarctic Treaty (Protection of Antarctica Act) by Decree January 1998.* Environmental assessment provisions largely derive from The *Environmental Management Act of 1993*, and the provisions of Annex IV of the Protocol are covered under the MARPOL 73/78 enabling legislation.	Minister of Housing, Spatial Planning & Environment, and the Minister of Agriculture, Nature Management & Fisheries.
Norway	Regulations laid down by Royal Decree of 5 May 1995, under existing *Act no. 3 of 27 February 1930* relating to Bouvetøya, Peter I Øy, and Dronning Maud Land.	Norwegian Polar Institute (responsible for regulations, practical procedures and guidelines).
Russia	Decree 'On the implementation of the principles of the Protocol on Environment Protection to the Antarctic Treaty'.	Federal Service for Hydrometeorology and Environment Monitoring (permits). Decisions made by State Environmental Committee, in coordination with Ministry of Natural Resources and Ministry of Foreign Affairs.
South Africa	*Antarctic Treaties Act, No. 60 of 1996.*	Minister of Environmental Affairs and Tourism (specified in legislation).
United States of America	Antarctic Science, Tourism, and Conservation Act of 1996 (Amending Antarctic Conservation Act of 1978 (US Code Title 16, Chapter 44 Antarctic Conservation). EPA Interim Final Rule 40 CFR Part: Environmental Impact Assessment of Nongovernmental Activities in Antarctica.	US Environmental Protection Agency (EPA) (and ultimately its administrator).

Table 4.3: Application of Protocol implementing legislation

Country	Application of instrument
Australia	Australian or foreign persons or property in the Australian Antarctic Territory. In other parts of the Treaty area the act applies to citizens; Australian expeditions and members thereof; Australian organisations; crew or those in charge of Australian owned transport; Australian property. Does not apply to observers or scientific personnel on exchange who are citizens of another Contracting Party to the Treaty. No departure state jurisdiction implied.
Chile	Not known. See text for Chilean position on jurisdiction.
Finland	Finnish citizens, legal persons, vessels, foreign citizens residing permanently in Finland, and foreign legal persons and vessels which participate in expeditions originating from or arranged in Finland.
Japan	Japanese nationals, juridical persons, foreign residents, and foreign juridical persons with offices in Japan whose employees are involved in Antarctic activities or supervise activities.
New Zealand	Any persons in Ross dependency. Citizens or residents. Members or organisers of expeditions organised in NZ or departing from NZ. Acts related to NZ ships or aircraft or to ships or aircraft departing from NZ. People aboard ships or aircraft operating in support of an official expedition of another contracting party are excepted from the act. Departure state jurisdiction applies.
The Netherlands	Dutch nationals in Antarctica. Persons or entities organising activities bear responsibility for compliance with a permit including responsibility for behaviour of participants in the activity.
Norway	Norwegian nationals, legal persons, ships and aircraft, resident foreigners, and, for expeditions organised in Norway, foreign members or organisers of such expeditions.
Russia	Not known.
South Africa (SA)	Citizens, residents (unless in service of another government expedition). Citizens of another party if that party has waived immunity. Organisers or members of expeditions organised in SA. No departure state jurisdiction implied.
United States of America (US)	Any person subject to jurisdiction of the US and any department, agency, or other government instrumentality of the US. Any vessel of the US, a vessel owned by a US citizen, or owned by a US corporation. Foreign persons organising within the US any expedition proceeding from the US to Antarctica. Some provisions of the act apply to 'a person who does business in the United States' (and also organises, sponsors, operates or promotes an expedition). Departure state jurisdiction is implied in EPA Interim Final Rule 40 CFR Part 8 'requirements of these interim final regulations apply to operators of nongovernmental expeditions organized in or proceeding from the territory of the United States to Antarctica'.

4.5.5 NEW ZEALAND

New Zealand is a consultative party and a claimant state. The NZ enabling legislation is the Antarctica (Environmental Protection) Act 1994 119. Information presented here is drawn from the text of the Act and the guidelines. Details of the NZ legislation are also provided by Dingwall (1998). Responsibility for the Act lies with the Minister of Foreign Affairs and Trade. The Act itself specifies most of the procedures and details required for the environment assessment process. Regulations can prescribe the content of applications and evaluations, and can prescribe fees for the submission and processing of environmental evaluations. The Act specifies the contents of the assessments, and procedures for public notification and comment. The Act makes provision for the submission of a joint environmental evaluation (for expeditions with a number of members). Activities covered by the environmental assessment procedures of another contracting party are exempted from the NZ Act. The Act includes provisions to enable the minister to ban an activity, to impose conditions, and provide a bond (among other powers). Penalties for contravention of the act include imprisonment for up to one year, or a fine up to NZ$100 000.

NZ has produced *'Guidelines & Procedures for visitors to the Ross Sea region'*. Dingwall (1998) notes that these are used to establish the policy framework and to guide implementation of the Act as it relates to tourism. This document provides a comprehensive and practical description of the processes involved in complying with the Act, requirements of the ATS and specific requirements that NZ has established. The document includes: background information about Antarctica, governance, and environmental assessment procedures; application forms and guidelines for visits to historic huts; details of the NZ observer program; a *'Guide to EIA methodology, definitions and criteria'*; and a sample page of contents for an environmental assessment. Flow charts showing environmental assessment requirements and procedures, and tables showing the timeline for contacting various authorities and for preparing draft and final CEEs are also provided. NZ requires notification of a visit and an environmental assessment to be supplied to the Ministry of Foreign Affairs and Trade not later than September 30 of the year of travel. Requests for access to historic sites or Scott Base, and provision of information required by Rec. XVIII-1 is required by October 30.

4.5.6 THE NETHERLANDS

The Netherlands is a consultative party. The Netherlands provided information on Protocol implementation in 1998 (The Netherlands 1998, IP31 & IP32 ATCM XXII). Details presented here are derived from these papers. The Dutch legislation is the *Protection of Antarctica Act (Rules for the protection of the Antarctic environment implementing the Protocol on environmental protection to the Antarctic Treaty) of 1998.* The law applies to Dutch nationals in Antarctica. The act is administered by the Minister of Housing, Spatial Planning and Environment, and the Minister of Agriculture, Nature Management and Fisheries.

The Act requires a single general permit for any activity organised from the Netherlands, with the organiser bearing responsibility for compliance with the permit, including the behaviour of participants in the activity. Permits cover all aspects of an activity, including entry into protected areas. A single person or entity must be designated as organiser for any activity. Organisers must take measures to ensure the conduct of participants in an activity, and must provide all participants with a copy of the permit. Grounds for withdrawal or denial of a permit include the occurrence or threat of adverse effects, reasonable fear that the permit-holder will not comply, or the issuing of a negative opinion by an ATCM on an assessment for the activity. Existing environmental assessment legislation (*The Environmental Management Act of 1993*) provides a basis for environmental assessment mechanisms. When applying for a permit, an IEE is required of the organiser regardless of whether the impact is likely to be less than minor or transitory or not—there is in effect no preliminary assessment level.

A provision is included in the Act requiring all individuals to take adequate care with regard to the environment, covering negligent conduct even if that conduct does not contravene a specific provision of the legislation or the permit. The legislation requires minimisation of waste, the use of environmentally benign substances, and recycling or re-use where possible. Food poultry disease inspections are required by the legislation. A financial security may be required under the legislation, for compliance with the permit, and to cover liability for damage. The state is empowered to recover clean-up or impact prevention costs.

4.5.7 NORWAY

Norway implements the provisions of the Protocol through regulations laid down by Royal Decree under a 1930 Act (Section 7, *Act No. 3 February 27 1930*) that relates to the Norwegian claims of Bouvetøya, Peter I Øy, and Dronning Maud Land (the latter two being in the Treaty area). Norway is a consultative party as well as claimant state. The details of Protocol implementation are derived from Norway 1997, IP38 ATCM XXI.

The regulations apply in the Treaty area to Norwegian nationals, legal persons, ships and aircraft, resident foreigners, and, for expeditions organised in Norway, foreign members or organisers of such expeditions. Foreign flagged vessels hired by Norwegian organisers must comply with the discharge of sewage requirements of the Protocol. The Regulations also apply to anyone staying in or responsible for activities in Dronning Maud Land and on Peter I Øy unless they are part of or organisers of 'an expedition organized by another State which has corresponding provisions and is a party to the Protocol' (Norway 1997, IP38 ATCM XXI, p. 5). The Norwegian Polar Institute (NPI) has the responsibility for administration of the Regulations. The Regulations cover the substantive aspects of the Protocol, including the environmental assessment requirements. Advance notice of activities or of changes to activities is required at least one year before commencement. An IEE is required at the same time. There is no preliminary level assessment although a distinction is maintained (for the purposes of information exchange in the ATS) between IEEs for activities with a less than minor or transitory impact and those with a minor or transitory impact. Only the latter are distributed in the ATS in English.

The NPI can order changes, postponement or prohibition of an activity 'if its implementation will or may result in impacts' contrary to the Regulations, or contrary to measures agreed by ATS members (*Regulations Relating to the Protection of the Antarctic Environment*, Section 12). The use of the word 'may' in the regulations offers considerable scope for the NPI to ban activities on the basis of risk or potential of impact. If activities are considered to result in more than minor or transitory impacts, a CEE is required or the activity is to be disallowed. Tourism assessment procedures are not described in detail. Norwegian nationals travelling with a tour organised in another Treaty nation are not required to provide any information under the regulations, nor are travel agencies required to undergo assessment if they are sub-chartering through an operator based in a Treaty nation. Norwegian nationals or entities (such as a travel agency) involved in an activity arranged in a non-treaty nation are obliged under the regulations to give advance notice and prepare an IEE, unless the tour organiser (while not legally obliged) has prepared one.

The regulations also include a requirement for responsible parties to clean up waste. A time limit is specified, beyond which the NPI can clean up and claim costs. Security deposits to cover clean-up costs can also be required from organisers. Waste management record books are required. A waste management person is appointed for each activity and trained in accordance with NPI requirements. Ships may be required to have contingency plans. A significant element of the Norwegian Regulations is the requirement for sufficient insurance (or other form of guarantee) for expenses incurred for search, rescue or medical evacuations, with the NPI determining the amount of insurance required. The insurance or guarantee must cover expenses regardless of whether negligence was involved. Penalties for violation of the regulations include imprisonment for up to one year, and fines. Norway is cooperating with Finland and Sweden on tourism issues, cooperative approaches to handling expeditions involving more than one of these countries, and forms for gathering information from tourists and travel agencies involved in activities organised in a non-treaty nation.

4.5.8 RUSSIA

Russia ratified the Protocol in May 1997 in federal law, and issued a decree in December 1997 *'On the implementation of the principles of the Protocol on Environment Protection to the Antarctic Treaty'* (Russia 1998, IP63 ATCM XXII). Russia is a consultative party. The decree covers provision of permits, based on a set of rules. Russian natural and juridical persons may carry out activities only after a permit is granted by the federal executive body responsible for Antarctic activities (appointed by the President of the Russian Federation). At present this is the Russian Federal Service for Hydrometeorology and Environment Monitoring. The rules for considering and granting a permit stipulate procedures, a list of documents, and controls over the progress of an activity. An environmental impact assessment is required under the rules (a copy of these rules has not been obtained). A flow chart detailing the decision making process for environmental assessment and permit procedures is provided in (Russia 1998, IP63 ATCM XXII). The State Environmental Committee examines all levels of assessment, with the Ministry of Natural Resources and the Ministry of Foreign Affairs involved later in the decision process.

4.5.9 SOUTH AFRICA

The South African legislation is the *Antarctic Treaties Act, No. 60 of 1996.* South Africa is a consultative party. The Act is administered by the Minister of Environmental Affairs and Tourism (who can delegate any powers except the power to make regulations). The Act lists the Antarctic Treaty, the Protocol, the Convention on the Conservation of Antarctic Seals, and the Convention on the Conservation of Antarctic Marine Living Resources as Schedule 1, and declares them to be part of the law of South Africa.

The Act empowers the minister to direct a person to cease or modify an activity that threatens to contravene any agreement in the schedule. The minister may direct a person to undertake repair or rehabilitative works for any damage caused to the Antarctic environment (at that persons expense) or the minister can recover expenses for such works from a person who fails to carry them out. The minister may make regulations. A penalty of up to five years imprisonment for contravention of the Act can be imposed. Penalties for offences are listed, although none appear to apply to failure to comply with environmental assessment procedures.

4.5.10 UNITED STATES

The US is a consultative party. The US passed the Antarctic Science, Tourism, and Conservation Act of 1996 (US Code Title 16, Chapter 44 Antarctic Conservation), modifying parts of the Antarctic Conservation Act of 1978 to incorporate the provisions of the Protocol. Under the Act, organisers, sponsors, operators or promoters of nongovernmental expeditions must notify participants in expeditions of the obligations of the Act and any actions needed to ensure compliance.

Responsibility for administration of environmental assessment processes is vested in the US Environmental Protection Agency (EPA). The application of the Protocol to research activities remains the responsibility of the NSF, through the National Environmental Policy Act of 1969 (42 U.S.C. 4321). Regulations were issued by the EPA in the form of an Interim Final Rule (40 CFR Part 8) covering environmental assessment through the 1998–1999 summer. The Interim Final Rule was extended (effective July 14, 1998) through the 2000/2001 season (EPA 1998). The interim rule will be replaced by a final rule. The text of the Interim Final Rule states that requirements apply to operators of nongovernmental expeditions organized in or proceeding from the US to Antarctica, but do not apply to individual citizens or groups participating in activities organised by another. The Interim Final Rule deals only with Annex I of the Protocol.

The interim final rule specifies deadlines for submission, assessment, and notification of environmental assessments. If an operator regards an activity as likely to have less than a minor or transitory impact, they must submit a Preliminary Environmental Review Memorandum (PERM) 180 days before departure. An operator may submit an IEE at the first stage, no less than 90 days before an expedition. The EPA can require a CEE after examining a final IEE. The processes for public comment on a draft CEE, and for government consideration of the CEE are specified.

More than one expedition by an operator may be included in one environmental document, and expeditions being carried out by more than one operator can be covered by one document. Incorporation by reference to material previously provided to EPA is also permitted (EPA 1998). In effect, this allows operators to submit multi-year environmental assessments by initially providing an IEE, and referring to that in subsequent seasons in a cover letter, with any supplemental information.

The Interim Final Rule also provides some guidance as to what activities may require a CEE. The EPA regards present activities as unlikely to have more than a minor or transitory impact, but an activity that represents a major departure from current activities may require a CEE, if the activity would result in a large increase in adverse environmental impact at a site, or if complex, cumulative, large scale or irreversible effects are likely. The EPA gives the example of construction of a new crushed rock airstrip as a CEE requiring activity (Interim Final Rule (40 CFR Part 8)).

The Interim Final Rule also describes what are considered satisfactory approaches to assessment and monitoring of impacts. At the level of an IEE, basic information relating to numbers of tourists landing at sites (in total and over the season), times of year of visits, descriptions of exceptions to landing guidelines, activities requiring mitigation, and so on, is considered sufficient. Penalties for violating the Interim Final Regulations include civil penalties of up to US$5000 (or US$10 000 if the offence was knowingly committed).

4.5.11 FEATURES OF THE LEGISLATIVE APPROACHES

A variety of different features are apparent in the legislative approaches taken by ATPs to the Protocol. Some countries enabled the Protocol by declaring the text of the Protocol to be part of national law, rather than drafting and enacting a specific piece of legislation, South Africa and Chile being examples. Bulgaria also used this approach (Bulgaria 1998, IP115 ATCM XXII) being examples). It may be that this minimalist approach to enacting the Protocol in domestic law limits the ability of such countries to regulate the tourism industry effectively—further analysis would be required to determine this.

Other examples of variation lie in the procedural requirements of different systems. The information for each country is not necessarily complete, and some countries may have in place a range of procedures that have not been examined. Nevertheless, it is valuable to look at some of the differences exhibited in the material examined.

The US requires preliminary environmental assessments to be submitted 180 days before travel (90 days if the proponent is submitting an IEE). NZ requires IEEs by September 30, while Norway specifies a lead time of at least one year. Norway and the Netherlands have eliminated the preliminary assessment stage, and require all activities to provide an IEE with the initial application. Other countries retain the preliminary assessment stage. Australia has avoided the issues surrounding the definition of minor or transitory impact by using the term negligible—if impacts are likely to be no more than negligible, a preliminary impact assessment is acceptable. Finland and the Netherlands require permits for tourism activities. Some approaches permit the relevant government to clean up any waste or environmental damage caused by an expedition and recover costs from the organiser (South Africa, Norway and the Netherlands being examples). Fees may, under the legislation of some countries, be levied to pay for the processing of applications (Australia and NZ). The US and NZ allow multiple operator assessments—an IEE may be submitted for more than one organiser. The Netherlands can require a financial bond to be paid by the organiser to ensure compliance with the conditions of a permit, and a similar provision is included in the NZ legislation. Norway goes further, requiring in all cases full insurance cover or an equivalent guarantee (of an amount determined by the authorities rather than the organiser). Significantly, both Japan and the Netherlands commit to accepting the advice of the ATCM or CEP on any activity requiring a CEE, rather than reserving their right (under the Protocol) to approve an activity even where unfavourable advice has been provided. Norway has provided the power to ban an activity on the basis of an IEE, without a CEE being prepared.

The US specifically allows a series of expeditions conducted by the same operator to be assessed under a single application and assessment (PA or IEE). The US separates the administration of the environmental assessment process for tourism and nongovernmental expeditions from that conducted for research activities. Norway requires its nationals to provide an IEE if they participate in an activity organised in a non-treaty nation (unless the organiser of that activity provides an IEE), and requires the keeping of waste management books. The size of financial penalties, and the length of imprisonment also vary between countries. Interestingly, Chile has recognised that assertion of jurisdiction over foreign expeditions is impractical, waiving jurisdiction specifically in cases where a tourism activity is operated by those under jurisdiction of another ATP.

The other area of interest is that of application and jurisdiction. Table 4.3 summarises the application of the various pieces of legislation. Different assertions are made about who is subject. Such assertions are related to territorial claims and sovereignty issues, and as section 1.1.a discussed, exerting jurisdiction is problematic. As an example, the UK pointed out that only 50% of vessels involved in the Antarctic tourist industry in 1995/96 were registered in ATPs (United Kingdom 1997, WP22 ATCM XXI). Jurisdiction is a key issue for tourism, as the ability of the ATS to 'capture' all organisers of and participants in tourist expeditions within the legislative net enforcing the Protocol is crucial to the success of the Protocol (and even to the relevance of the ATS itself). Most countries assert jurisdiction over foreign nationals for activities organised in that country. In addition, some claimant states assert jurisdiction over any person (including foreign persons) within their claimed Antarctic territory. Even further, the UK in 1997 suggested the use of measures taken outside Antarctica in areas under the jurisdiction of ATPs. The suggested mechanism was called 'departure state jurisdiction', and was explained thus:

> by voluntarily seeking admission to the port of a foreign State, a vessel impliedly accepts the jurisdiction of that State even in respect of matters arising outside its EEZ. States historically exercised restraint, but in recent years the need to extend jurisdiction, especially for the purpose of ensuring the safety of shipping and the prevention of marine pollution, has been recognised and developed, in particular by the Paris Memorandum of Understanding (MOU) on Port State Control of 1982. Under that the participant States undertake to maintain an effective system to ensure that vessels visiting their ports comply (United Kingdom 1997, WP22 ATCM XXI, p. 4).

Under the United Nations Law of the Sea Convention, states are empowered in some circumstances to take legal proceedings where foreign vessels have violated international rules and standards relating to seaworthiness and environmental pollution issues, even when outside the territorial waters of the port state (United Kingdom 1997, WP22 ATCM XXI). The UK argued that, although the present examples of port state control jurisdiction relate to previous conduct of a vessel, or present condition, it is possible to apply jurisdiction over future conduct outside state waters to force compliance with the Protocol. The UK also argued that the absence of complaint from third states about the Protocol or implementing legislation, the possible status of the ATS as an objective regime (an issue that will not be entered into here) and a growing general acceptance of the duty to cooperate with the ATS and the Protocol, support the contention that departure state jurisdiction can be applied. The UK suggested that if the ATS pursued departure state jurisdiction, an agreement or arrangement between all parties to the Protocol would be required.

A claim is also implied for the US (as expressed through the EPA Interim Final Rule 40 CFR Part 8): 'requirements of these interim final regulations apply to operators of nongovernmental expeditions organized in or proceeding from the territory of the United States to Antarctica'. The UK working paper noted that UK legislation and that of Finland (to some extent) also embody this concept. The Final Report of ATCM XXI noted that concern was expressed about the legality of such an assertion of jurisdiction (ATCM 1997, Section 15).

In contrast to the UK position, Germany argued that there is no legal basis for port state control implied in the Protocol and that it must therefore be concluded that the parties were content with flag state control (Germany 1997, WP16 ATCM XXI). It was further argued that the MARPOL 73/78 convention is subject to port state control and the status of Antarctica as a special area under MARPOL 73/78 allows a certain amount of control by port states party to MARPOL 73/78 as well as the Treaty and Protocol (and not all ATPs are

MARPOL 73/78 parties). The new international safety management code under the SOLAS convention is also subject to port state control (Germany 1997, WP16 ATCM XXI). The conclusion of Germany was that

> special port state controls cannot be agreed to within the context of the regulations of Annex IV on the Protocol of Environmental Protection to the Antarctic Treaty. The valid flag State controls should be applied. The possibilities for port state controls offered by the MARPOL and SOLAS Conventions (Chapter IX) should be exhausted (Germany 1997, WP16 ATCM XXI, p. 3).

As described in table 4.3, NZ asserts departure state jurisdiction, applying its legislation to 'any other ship, whether registered or not and of whatever nationality, which proceeds from NZ as its final point of departure for Antarctica' (Antarctica (Environmental Protection) Act 1994 119).

Another jurisdictional problem arises from the multinational nature of tourism operations (Orient Lines 1997, p. 11). Philippine crew members are, in the view of Orient Lines, not subject to any enabling legislation that can apply criminal proceedings and penalties, as the Philippines is not a party to the Treaty or Protocol. While the organisers are subject to the enabling legislation of the US, the crew are not personally exposed to sanction other than that which can be applied by the master of the ship.

Another issue relating to application of law is described by Clark (1997). In the US Act, the obligations of a 'person who does business in the United States' are described (Section 4 a (6)). Clark (1997, section 3, n.p.) argues that:

> at a minimum, this means that the EIA provisions of section 4a of the Act should be applied to nongovernmental expeditions which, even though based outside of the United States, advertize and promote participation by US citizens, (and) accept business here.

Clark asserts that 'any other interpretation would open a cavernous loophole in the application of the Final Rule' (1997, section 3, n.p.). The desirability of the US Act applying to those doing business in the US is clear, as otherwise the potential exists for companies presently based in the US to simply incorporate elsewhere to avoid being subject to the Act (Clark 1997). In the reading of this author, however, Section 4a of the Act refers to the responsibility of persons doing business in the US to inform participants of their legal responsibilities, and does not infer that the IEE provisions will apply to non-US organisers. It has the effect that a company could not market a voyage that did not comply with the Act, without telling clients that they would be breaking the law.

Finally, it is important to mention the situation of a non-consultative party to the Treaty and Protocol that has jurisdiction over the organisers of substantial tourism activity in the Antarctic. As a non-consultative party in the ATS, Canada was not required to ratify the Protocol for it to enter into force. Canada signed the Protocol in Madrid in 1991, but it has not to date ratified the Protocol by passing domestic legislation. Canada is an unusual case in that it does not conduct significant amounts of scientific research in Antarctica, yet it is home to a number of important tourism operators. Most other countries where tourism operators are based are consultative parties, and have passed enabling legislation. ATCM XX (1996) indirectly recognised the position of Canada in a statement in the final report:

> Furthermore, the Meeting called upon non-Consultative Parties with a particular interest in, or responsibility for, tourist companies operating in Antarctica to ratify the Protocol and its Annexes at the earliest opportunity and to introduce any necessary domestic legislation to ensure compliance.

Subsequent ATCMs have continued to exhort Canada to pass legislation. Moves are underway to pass legislation, although some time will be required for this, due to the peculiarities of Canada's federated system.

In conclusion, it is clear that there is considerable variation in the way that the Protocol has been passed into domestic legislation, and in how that legislation is administered. From the point of view of tourism operators, the same activity would be subject to considerably different rules and processes depending on the country in which it is organised. As a result, some tourism activities could proceed after a preliminary assessment, while others (similar in all respects) may have completed an IEE. Some operators would be required to provide bonds or insurance, while others would not. In the case of a tourism activity requiring a CEE, in some cases the ATS would effectively have a veto, while in others it would not. In some cases it is unclear how the provisions of the Protocol would be applied in the practical sense. The limited scope and depth of this comparison means that firm conclusions cannot be drawn. The material examined tends to confirm the assertions of the authors cited in section 1.1.g, that interpretation and implementation of the Protocol would result in variations. A closer comparison and analysis would be valuable in providing insight into many issues, including the possibility that operators could choose to operate from countries where compliance would be simpler than others.

4.6 THE ENVIRONMENTAL ASSESSMENT SYSTEM IN PRACTICE

As various ATPs passed legislation enabling the Protocol, operators under their jurisdiction were required to participate in environmental assessment processes. In the US, for instance, the relevant act was passed in January 1996, with the establishment of rules covering environmental assessment in place by April 30 1997. As of that date, operators were required to undergo the process defined by the EPA. Similarly, in Australia, the relevant amendments to the *Antarctic Treaty (Environment Protection) Act 1980* (Cwlth) entered into force on April 1 1994. Copies of all environmental assessments for tourism carried out under the requirements of the laws of different countries have not been obtained. The assessments and associated information processed by the EPA were obtained, along with a range of additional assessments. Together, these provide an overall impression of the type of documentation being submitted, and the functioning of the environmental assessment process in some jurisdictions.

The EPA (in the US) has processed environmental assessments for a large proportion of the tourism industry in recent seasons. The EPA permits multiple operator and multiple voyage submissions, as well as incorporation by reference, where a previously submitted assessment forms the basis for a subsequent assessment. In 1997/98 and 1998/99, IAATO organised and coordinated joint IEE documents for the US based members of IAATO for activities in the Antarctic Peninsula, South Shetland Islands, and South Orkney Islands. In the 1997/98 season, this joint IEE, for five US operators, represented 37% of the 92 planned ship voyages, and 28% of the estimated passengers. The joint IEE for 1998/99 included seven operators, and represented 43% of the planned 107 voyages, and 38% of the estimated total passengers. The 1998/99 IEE essentially involved each of the seven operators providing a letter of transmittal, advance notification details (number of voyages, itineraries, number of passengers), copies of advertising brochures, and incorporation by reference of the 1997/98 IEE (Five U.S. Organizers 1997). Activities of US IAATO members outside the Peninsula region are assessed separately. Activities by Quark Expeditions on the icebreaker *Kapitan Khlebnikov* outside of the Peninsula region were covered by a separate application to the EPA with a separate environmental assessment. This document also formed the basis for a 1998/99 season application, again involving a letter of transmittal from the company, details required in the advance notification, tour brochures, and incorporation by reference of the 1997/98 IEE. The activities of non-US IAATO members are assessed according to the requirements of their own country. In 1996/97 and 1997/98 Orient Lines, a non-IAATO US company submitted IEEs to the EPA.

The air-based operator, Adventure Network International, is a Canadian Company with offices in the UK and in Chile. The company policy states that ANI and all their contractors 'know and understand the relevant provisions of the Protocol on Environmental Protection to the Antarctic Treaty and Annexes, and shall wherever practicable, fully comply with those provisions, whether or not their own country has issued legislation to ensure compliance' (ANI 1998, n.p.).

The operator of the Australian based overflight program, Croydon Travel, is subject to the Australian process. They submitted a Preliminary Assessment of Environmental Impacts in 1997 (Qantas 1997). Marine Expeditions, the Canada based ship operator, who carry a substantial proportion of travellers, is not required to submit to the process established by the Protocol, as Canada has to date not ratified the Protocol, although they commissioned an IEE in 1995, and presented it to ATCM XIX through IAATO (IAATO 1995, IP108 ATCM XIX).

Environmental assessments for non-commercial non-governmental expeditions (generally adventure activities), and for yacht voyages (commercial or non-commercial) were not examined.

The IEEs examined generally follow the requirements specified in the Protocol. Considerable detail is provided about all aspects of activities and operational procedures and management of passengers ashore. On this basis, the assessment system is successful in prompting requires operators to consider in some detail the impacts of their activities (if they were not already doing so), and ensure that procedures and practices are considered and adopted to minimise adverse effects—a useful outcome. For the assessments examined, the Protocol and enabling legislation appears to be functioning as intended. As required, the assessments detail the activity and operational procedures of the vessels and aircraft, the potential impacts resulting from these actions, and the methods used to ensure these impacts are avoided or minimised as far as possible. Alternatives to the activities are also considered. The assessments conclude that, under normal operational circumstances, impacts are negligible, or no more than minor or transitory at most. It is recognised in most of the IEEs that in the event of a major problem (collision or grounding of a ship, for example), that impacts may be greater. In permitting activities to proceed based on IEE level assessments, government authorities concur with the assessment that impacts will be no more than minor or transitory.

In addressing cumulative impacts operators detail the place of their operations in the overall level of activity for sites, regions and the continent in general (and can probably be expected to do no more). The IEE for Orient Lines (1998), for example, acknowledges the possibility that the activities of all operators in combination may result in a more than minor or transitory impact, but states that in the absence of more detailed knowledge of tourism impacts, natural variability, and non-tourism human impacts, it is impossible to make an objective assessment of the contribution of their operations to cumulative impacts.

4.6.1 IMPACT ASSESSMENT ISSUES

A number of issues surround the environmental assessment aspects of the Protocol. Issues include the definition of 'minor or transitory', the way that impact assessments should be applied to activities, assessment of cumulative impacts, and issues associated with risk and magnitude of certain impacts.

A central issue in impact assessment under the Protocol is the level of impact. The Protocol, when defining the level of detail required in environmental assessments, introduced the concept of 'minor or transitory impact' (Annex 1, Article 1). Rather than listing activities that would automatically require a certain level of assessment, the Protocol has a tiered system of assessment, where higher level assessments are required according to the likely level of impacts, with the critical point being 'minor or transitory impact'. Blay (1992, p.

392) noted that the environmental assessment process presumes the existence of standards and procedures for determining what 'minor or transitory impact' is, and that neither the annex nor the Protocol proper indicate what those standards or procedures are. NZ provided a conceptual model for examining the definition of 'minor or transitory' (NZ 1995, WP35 ATCM XXI). The model separated the concepts 'minor' and 'transitory'. 'Minor' is related to magnitude, and 'transitory' relates to duration (of the impact, not of the activity that causes the impact). The NZ model classed 'less than a minor or transitory impact' as impact of very low magnitude and/or very short duration, a 'minor or transitory impact' as impact of low magnitude and/or short duration, and 'more than minor or transitory impact' as impact of appreciable magnitude and/or extended duration (NZ 1995, WP35 ATCM XXI, p. 3). To some extent this exposes the model to new definitional issues, but it does serve to separate and clarify the concepts involved.

An alternative viewpoint is provided by Russia. At the 1998 ATCM, Russia submitted an information paper discussing the 'minor or transitory impact' concept (Russia 1998, IP66 ATCM XXII). Russia considered it important to determine whether disturbance is similar to natural processes or not. The paper proposes the identification of three classes of area, according to their level of environmental transformation. Irreversibly transformed regions include, for example, territories of operating or abandoned stations. Assessment would only be required for these areas when an activity would result in impacts that exceed existing levels of impact. The second class is that of reversibly transformed regions, (field work sites, or areas of shipborne operations, for example). Activities in these zones would require a preliminary assessment. The third class, called 'conventionally intact' covers all other areas, and is characterised by pristine character and purity. For these regions, access should be strictly regulated. In summary, the paper concludes that:

> The notion "minor or transitory impact" is of a relative character and for determining its absolute value the following should be taken into account:
> - an individual recovery ability of natural systems and objects, including duration of the natural cycle of development and the range of natural fluctuations;
> - a character of anthropogenic influence regarding its similarity with the natural processes;
> - the impact background of the region (Russia 1998, IP66 ATCM XXII, pp. 6–7).

The differences between the approaches of NZ and Russia to the issue of determining impact and applying the environmental assessment highlight the potential for variations in the way tourism activities are assessed by different ATPs.

Given that some sites receive substantial and repeated visitation, cumulative impacts are likely to be significant compared to other impacts of tourism. Any of the impacts identified in section 2.7.2 as having more than a short duration may contribute to cumulative impacts. In addition, many short duration impacts could accumulate—regular brief disruptions of a breeding colony could, over a period of time, conceivably result in decreased breeding success of that colony, for example. The additive effects of ground compaction and track formation on soils or vegetated areas are another example. Regular site visits and use of the same movement corridors may form tracks and change soil structures. The repeated use of sites may also change the less tangible wilderness and aesthetic values of a locality.

Cumulative impacts are specifically mentioned in the Protocol in a number of places, in relation to environmental assessment processes and the approval of activities (Protocol, Article 3(2)(b), Annex 1, Articles 2 & 3). While recognising the importance of addressing cumulative impacts, the Protocol does not nominate a mechanism for assessing such impacts or dealing with activities that may contribute to cumulative impacts. Clearly the impacts of a single tourism visit need to be considered in light of how they may combine with the impacts of other visits by the same company or by other operators, or the impacts of government operations. As explained by IUCN, 'human activities, can well produce environmental activities that are considered insignificant by themselves, but the interaction and combination of these impacts over time and place may well be significant' (IP 61, XXI ATCM, 1997, p. 2).

Many authors have highlighted the need for consideration of the cumulative impacts of tourism. Enzenbacher (1995b) noted that cumulative effects of tourism are not understood, and that while methodologies such as joint assessments have been proposed for examining cumulative impacts, it is unclear how they would work. As seen in section 4.6, some joint assessments have been conducted, but they include only certain operators, and as such are unable to address the activities of the entire industry. Nicholson (1986) reported on signs of adverse cumulative impacts. Nicholson also discussed the concentration of impacts on relatively small numbers of sites, noting that additional environmental impact assessments may be required for such sites in the future. Cessford (1998) noted that tourism impacts add to the cumulative effects of stations and science programmes.

Addressing cumulative impact presents problems for the ATS. It is fair to assume that operators can be responsible for the impacts of their own operation, but coordinating the operations and impacts of different private entities, not to mention government operations presents difficulties that the ATS has yet to grapple with. Individual operators are required to examine cumulative impacts in environmental assessments, but with no formal monitoring system in place, and no coordination or future planning of tourism activity, it is unrealistic to expect operators to be able to adequately deal with the issue. Chapters seven and eight examine these issues further, and propose solutions.

An additional assessment issue relates to risk or likelihood of impact occurring. While normal operations are likely to have minimal impacts, many of the environmental assessments examined recognise that a major accident would have a much greater impact. According to most of the assessments examined, the risk of such an occurrence is low. The assessment system does not take into account in any meaningful way risk of major accidents occurring, nor the magnitude of the impact in the event of such an occurrence. The example of the use of large vessels is a case in point. Assuming that the risk of accident is roughly similar for large or small vessels, the magnitude of impact could be considerably greater. Similarly, in visits of tourists to little visited or pristine sites, a risk exists of irreversible impact—contamination, biological or otherwise, or other disturbance—to values dependent on the pristine quality of the site. There is a low probability of such an impact occurring, but in the event that it does, the magnitude of impact is considerable. The environmental assessment system in its present configuration does not deal well with risk and magnitude of impact.

4.7 PROTECTED AREAS

A protected area system has evolved within the ATS, and represents the only land management mechanism that places any restriction on where tourism can occur. The protected area system offers a possible mechanism for dealing with issues surrounding tourism, and for these reasons it is important to examine protected areas within the ATS. The environmental regime of the Protocol provides a modicum of protection for the continent. This level of protection is not considered sufficient, however, for some purposes, and areas within the ATS are afforded greater protection. Lewis-Smith et al. (1994) provide an excellent introduction to the protected area system.

A brief summary of the development of the protected area system is provided here based on Lewis-Smith (1994). In 1961, Rec. IX allowed the protection of Historic Sites, while in 1968, the category of Historic Monuments was created by ATCM V. 1964 saw the first Recommendation relating to protected areas for biological conservation. The Specially Protected Area (SPA) category (established in the *Agreed Measures for the Conservation of Antarctic Fauna and Flora)* was for areas of outstanding scientific interest which were to be given special protection to preserve their unique natural ecological systems. In 1966 15

SPAs were declared. In 1972 ATCM VII supported designation of more SPAs to ensure protection of representative samples of major ecological systems, unique species assemblages, areas of the only known habitat of plant or invertebrate species, specially interesting bird or mammal breeding colonies, and areas to be kept inviolate as reference areas (Lewis-Smith 1994). The ATCM also advised that the number of SPAs should be kept to the minimum necessary, and the size of each should be the minimum required to serve the purpose of designation. By 1994, there were 19 SPAs, with a total area of only 132.5km^2 (Lewis-Smith 1994). After the 1997 ATCM, there were 26 SPAs listed (Foreign and Commonwealth Office 1997, ATCM 1997). Most SPAs were declared for the protection of values associated with flora, fauna, geological or ecosystem features, and have little direct relationship with tourism other than to prevent these places from damage by visitation.

A second form of protected area, the self-explanatory Sites of Special Scientific Interest (SSSI) category, was adopted by ATCM VII in 1972. This category was needed because some SPAs were being designated more to protect scientific investigations rather than protect fauna, flora and ecosystems. By 1994 36 SSSIs were declared, with a total area of approximately 2685km^2 (Lewis-Smith 1994).

A number of other categories of area have been proposed. Specially Reserved Areas (SRAs) (ATCM XV, Rec. X) intended to protect representative areas of outstanding geological, glaciological, geomorphological, aesthetic, scenic or wilderness value. Only one such site was proposed, in the Pensacola Mountains (Lewis-Smith 1994, Heap 1994). Multiple-use Planning Areas (MPAs) were proposed (ATCM XV) to protect activities from the impacts of each other, and to ensure that activities were coordinated that in areas where cumulative impacts may occur. Only one such area was proposed, on Anvers island in the Peninsula region. This area is large (1535 square kilometres), and includes Palmer Station, island groups, SPA No.17 and SSSI No.20. The area was proposed on the grounds that the area will become increasingly important for long-term studies of natural variability, human impacts, and effects of global change (BAS 1999b, Lewis-Smith 1994). Formal designation of MPAs and SRAs has never occurred.

The ASTI category intended to focus tourist activity on certain areas where monitoring could be carried out—'recognizing the necessity to restrict the number of places where large numbers of tourists may land so that the ecological effects may be monitored' (Rec. VIII-9)—was created in 1975. No such areas have ever been proposed or declared. Section 4.1.2 discussed ASTIs further.

Other forms of protected area include three seal reserves declared under the Convention for the Conservation of Antarctic Seals, and CCAMLR Ecosystem Monitoring Programme (CEMP) sites, designated for monitoring purposes. At least two of these have been agreed, Seal Islands (South Shetland Islands), and Cape Shirreff and Telmo Island (South Shetland Islands). These sites have management plans, and permits are required for entry (Heap 1994).

The ATS has a long history of designation of historic sites and monuments. Heap (1990) and Headland (1994a) provided information on the evolution of the historic site designation system. ATCM I provided the basis for designation of historic sites, in Rec. IX, while later ATCMs established the list of sites and monuments (Headland 1994a). Annex V of the Protocol permits the designation of historic sites and monuments as ASPAs or ASMAs, or allows them to be included within such areas, although a site can be placed on the list of historic sites and monuments without being part of a protected area (Headland 1994a). Listing confers no particular protection apart from the general obligation not to damage or remove a historic site or monument (Protocol, Annex V, Article 8), and the obligations placed on visitors and visit organisers through Rec. XVIII-1. As Headland (1994a) noted, there are a wide variety of historic sites and monuments, some being recognised as internationally important, and others nationally important. Headland noted that there are a number of sites that could be considered to have high value that have not yet been nominated.

The Protocol provided an opportunity to rationalise the protected area system. The main success of the system to that point had been the protection of specific research sites. Appendix one provides a summary of the provisions of Annex V to the Protocol. Annex V creates two new types of area: the Antarctic Specially Protected Area (ASPA); and the Antarctic Specially Managed Area (ASMA). Existing SPAs and SSSIs are to be subsumed into the category of ASPA (Protocol Annex V, Article 3(3)). Annex V sets out the criteria for designation of these new areas, and details the requirements for the management plans required when proposing such areas. ASPAs are intended to protect 'outstanding environmental, scientific, historic, aesthetic, or wilderness values, any combination of those values, or ongoing or planned scientific research' (Protocol Annex V, Article 3). ASMAs are intended to 'assist in the planning and co-ordination of activities, avoid possible conflicts, improve co-operation between Parties or minimize environmental impacts' (Protocol Annex V, Article 4). These areas are not subject to the same restrictions on size that applied to earlier categories. Annex V was not in force at the time of writing, and the new protected area categories do not yet exist, although progress towards providing management plans for existing and new areas according to Annex V has been made.

One issue relating to protected areas is the marking of boundaries to prevent accidental incursion (Stonehouse & Crosbie 1995). Poorly marked boundaries are a problem in some areas, and many calls for a uniform agreed system of boundary marking have been made. The SCAR/IUCN workshop on Antarctic Protected Areas (cited in Lewis-Smith et al. 1994) recommended that 'clearly visible and standardized signs containing basic site information should be erected and maintained, as appropriate, by the ATCPs or their designated authorities' (p. 6). Other issues include the shape, size, and boundary design of protected areas, accurate boundary designation, and design issues such as buffer zones (Dingwall 1994).

Protected areas can be used as a constraint on the practice of tourism. Stonehouse noted that a number of areas being used by tourists were designated as SPAs or SSSIs 'as quickly as Antarctic Treaty processes allowed, to keep visitors, including tourists, out... with no voice or representation where such decisions are made, tour operators have had no remedy but to find more sites, as yet unclaimed by scientists as research sites' (1994b. p. 80). Stonehouse and Crosbie (1995) noted that the post-Protocol requirements for management plans remain minimal, providing little more than a framework for the bureaucratic regulation of potentially damaging human activities, with nothing like the level of detail that is required for most other wilderness areas.

From the point of view of the ATS, the protected area system provides an option for the management of tourism at sites or within specific regions of Antarctica. A number of recently adopted management plans for protected areas are evidence of this potential. Of particular interest are the management plans developed and adopted for Ross Sea historic sites, and the proposed ASMA No. 1, Admiralty Bay, King George Island (South Shetland Islands). These management plans are the first to take advantage of the provisions of Annex V of the Protocol with tourism specifically in mind, and are the first to make an attempt at managing tourism use. As Annex V is not in force, the SPAs examined here are adopted by Recommendation of the ATCM, with the recognition that their formats accord with Annex V of the Protocol.

SPA 25 includes Historic Sites No. 16 and 17 (*Terra Nova* hut of Captain R.F. Scott and the cross on Wind Vane Hill) on Cape Evans, Ross Island. The management plan was adopted by ATCM XXI under Measure 2 (1997). This area re-designates two historic sites, 16 and 17. The management plan describes the site as 'one of the principal sites of early human activity in Antarctica. It is an important symbol of the Heroic Age of Antarctic exploration, and as such, has considerable historical and cultural significance' (Management Plan for SPA 25, Section 1). The plan aims to protect the values of the area and its features. The objectives of the plan are to:

> avoid degradation of, or substantial risk to, the values of the Area; maintain the historic values of the Area through planned restoration and conservation work; allow management activities which support the protection of the values and features of the Area; prevent unnecessary human disturbance to the Area, its features and artefacts by means of managed access to the Terra Nova hut (SPA 25 Management Plan Section 2).

The plan makes provision for conservation of the historic structures and artefacts. Permits are required for all visits, and a report must be provided afterwards. The plan prohibits the landing of helicopters in the area (because of potential abrasion damage), and designates landing sites outside the area. Boat landings are permitted. Prohibited activities include the use of vehicles, the removal of historic structures or any object, living in the hut or camping in the area, smoking, or introduction of living animals, plants, or poultry products. Visitors must remove any wastes they produce. The plan allows for measures such as provision of information for visitors. Permits may be granted for a range of activities including tourism, educational or recreational activities and may be granted for multiple visits within a season.

The plan states that control within the area is necessary to prevent damage caused by crowding around vulnerable features, and sets a limit of 40 people within the area at any time. Similarly, to prevent damage from crowding within the hut a limit of 12 people inside the hut (including guides) is set. To avoid cumulative impact on the interior of the hut, an annual limit on visitor numbers is set at a maximum of 2000 people. This figure is derived from an assessment of the effects of the current visitor level of around 1000 people annually and the prediction that an increase of more than 100% could cause significant adverse impacts, and on advice from conservation advisory agencies. Permits require ATPs operating in the area to consult with other groups and organisations to ensure that the annual limit is not exceeded. An ongoing monitoring program is in place allowing future review.

The plan represented a move from passive control of visitors to a formally recognised system of visitor management. The setting of maximum numbers inside the area, inside the hut, and an annual maximum for the area, are all major steps for the ATS.

The management plans for SPAs 27, 28 and 29 are similar in that they all deal with historic sites with huts. These areas and plans were approved under Measure 1 (1998), ATCM XXII. These management plans include some refinements compared to the plan for SPA 25. These include: more detailed objectives of the plan relating to maintenance, monitoring, conservation of artefacts, and mapping and recording; inclusion of 'control of the number of visitors' as a specific management activity; a requirement for a copy of a valid permit to be carried in the area; and the addition of a statement to the effect that after monitoring and review, the annual maximum number of visitors may be changed.

SPA 27 contains the historic hut of Sir Ernest Shackleton at Backdoor Bay, Cape Royds (Ross Island). The area is designated to protect values associated with Shackleton's Hut, and associated structures and relics from the British Antarctic (*Nimrod*) Expedition of 1907–1909. The area has considerable historical and cultural significance, and significant scientific, technical, architectural, aesthetic and social values. Aims and objectives of the plan are similar to those for SPA 25. The reasons for limiting numbers in the area, the hut, and annual visitation are also similar. A maximum of 40 people are allowed into the area at any time. A maximum of 8 people are allowed inside the hut at any time. The annual visitation limit for the area is 2000 people, based on the same reasoning (and similar present visitation levels) as for SPA 25. Based on monitoring of the area and review of the plan, the annual maximum number of visitors may be changed. Restrictions on helicopter landings, camping, and other activities are as for SPA 25.

SPA 28 includes the *Discovery* hut of Captain R.F. Scott at Hut Point, Ross Island, built as part of the Antarctic Expedition of 1901–1904, and used in the 1910–1913 Scott expedition. The hut was used by Shackleton in the 1907–1909 British Antarctic Expedition, and by Shackleton's Ross Sea party during the Imperial Trans-Antarctic Expedition of 1914–1917. The area is a symbol of the heroic age of Antarctic exploration, and has considerable cultural and historical significance. Scientific work during the *'Discovery'* expedition also contributes to the significant scientific, technical, architectural, aesthetic and social values of the site. The aims and objectives of the plan are similar to those for the other areas, including managed access to the *Discovery* hut. The designated area for this SPA is limited to the actual structure of the hut. The number of people allowed in the hut at any one time is 8 people. The maximum annual visitation is limited to 2000 people (these limits are again based on the same reasoning as for other areas).

SPA 29 covers Carsten Borchgrevink's huts and Scott's northern party hut at Cape Adare. Two huts (a living hut and a stores hut) were built during the British Antarctic (*Southern Cross*) Expedition of 1898–1900 led by Borchgrevink. Another hut (now collapsing) was built and used for wintering in 1911 for the northern party of the British Antarctic (*Terra Nova*) Expedition of 1910–1913. The precincts include depots of stores, anchors, and a latrine. The site is one of the principal sites of early human activity in the Antarctic, and has significant cultural and historical significance, as well as technical, architectural, aesthetic and social values. The management plan is as outlined for SPAs 27 and 28. The limit for people within the area at any time is 40 people. The maximum number of people allowed in the hut at once is 4 people, and the annual maximum number of visitors is 2000 people. This annual limit, rather than being based on present visitation levels, is based on an assessment of the effects of visitors on other Ross Sea area historic huts, with the assumption that a similar limit should apply. The present level of visitation varies considerably from year to year.

An Antarctic Specially Managed Area was proposed jointly by Brazil and Poland, in coordination with Ecuador and Peru. The management plan was adopted voluntarily (as formal designation is not possible until Annex V enters into force) by ATCPs at ATCM XX. The area includes the glacial drainage basin of Admiralty Bay, King George Island, in the South Shetland Islands, and SSSI No.8 that lies on the western shore of the bay. The area contains Arktowski Station (Poland), Commandante Ferraz Station (Brazil), Macchu Picchu Station (Peru) and two summer field camps. An historic monument (a grave) is included in the area. The area was proposed for its outstanding environmental, scientific, scenic, and historic values, and the presence of a number of different Antarctic programmes as well as a large tourism presence each season, on the basis that improved cooperation and management of activities in the area will help to protect these values.

These areas and their management plans represent a significant departure from the previous management of visitors under the ATS. There are a number of possible problems with implementation of the SPA plans, including coordination of visitor access and limits on maximum visits. At present, the responsibility for issuing permits and coordinating visits is likely to lie with not more than two or three ATPs. Ensuring maximum numbers are not exceeded may become problematic if a greater number of ATPs became involved in issuing permits, in the absence of a centralised system of allocation. A second issue is that of allocation—if the limit on visitation were approached, equitable allocation of remaining places might be difficult, and the grounds for refusal of a permit to one applicant over another are not defined. Allocation between different nationalities, and between government personnel and tourists may be an issue. These issues might never arise, or might not arise for some time. Ideally, pre-season permit granting would allocate no more than the maximum number of places (across all permit-issuing ATPs) for an area, through cooperation between ATPs when granting permits, as specified in the management plan.

4.8 INSPECTIONS AND OBSERVER PROGRAMS

Under the Treaty (Article VII) and the Protocol (Article 14), inspections of stations, vessels, facilities, and installations of a party may be carried out by authorised observers from any party. Ships are open to inspection at 'points of discharging or embarking cargoes or personnel in Antarctica' (Treaty Article VII). Reports of inspections are to be sent to the party inspected, circulated to all ATPs, to the CEP, considered at the next ATCM, and made public. Tourism vessels and aircraft are therefore subject to inspection. Treaty Article VII inspections have only been made of tourist vessels on two occasions, with the second being the inspection of two vessels in the 1998/1999 season. The conclusion of the inspection was favourable (Germany & the UK 1999, WP23 ATCM XXIII). It may be that the use of such inspections may increase.

A second type of observer system, using observers placed on board a tourist vessel for a full voyage or section of a voyage, has been used for some time. Smith (1994), Enzenbacher (1995a), and Splettstoesser and Folks (1994) provide some details of the early stages of the observer systems used by the US and NZ. Arrangements are made in cooperation with the operator. The legal basis for placing observers on vessels of another nation is somewhat unclear. Cessford (1998) notes that the NZ requirement for observers on all vessels cannot be enforced in the Treaty area. Observers can however be required when the vessel is visiting sovereign territory (such as a sub-antarctic island). Observers may also act as guides and lecturers on a voyage. The Protocol includes no specific provision for requiring such observers, although the provisions relating to the verification of predicted impacts under Protocol Article 3(2d) and Annex I (Article 5) might be interpreted in such a way.

Two nations operate regular observer programs. NZ has, by agreement with operators, developed an established practice of placing national representatives on commercial tours (Cessford 1998, Dingwall 1998). Representatives of the Department of Conservation are required (legislatively) to accompany commercial voyages to the NZ subantarctic islands. As most Antarctic voyages travel to these islands before or after visiting the Treaty area, government representatives are already on board, and so the development of an observer program applying to the Ross Dependency was a natural progression. As described in the Ministry of Foreign Affairs and Trade guidelines document (Ministry of Foreign Affairs and Trade 1997), the responsibilities of observers include observing and reporting on: compliance with official policies; permit requirements; adherence to management plans and permits for protected areas; ministerial directions related to environmental assessment processes; compliance with ATCM Rec. XVIII-1 and Resolution 3; and conduct of the tour. Observers are also to inform operators about administration and management of Antarctica under the ATS, and assist in guiding where appropriate. Tour operators are expected to bear the costs of board and lodging, travel and subsistence costs incurred in getting the representative to and from embarkation points, and use of communications services for official purposes. National representatives provide a report to the minister after each voyage (Ministry of Foreign Affairs and Trade 1997). Cessford (1998) reports that the arrangement has worked well despite the costs to government and to operators. The program provides managers with a degree of oversight, and provides operators with a measure of official endorsement and sometimes the services of the observer as a guide or lecturer.

An observer program has been operated by the NSF. US observers initially reported on compliance with the 1978 Antarctic Conservation Act, as well as collecting information on other aspects of tourism operations, and applies only to operators based in the US. Information reported by observers includes basic site visit information, adherence to Antarctic Conservation Act and to conservation measures, coordination with other vessels, quality of briefings, and any problems noticed. Enzenbacher (1994a, 1995a) describes the third year of operation of the observer program in 1992/93, when five observers were employed, covering seven cruises on five different ships, operated by four different companies. The program was to be continued in 1993/94. The first year of operations was

1990/91, with two observers, and three in 1991/92 (Enzenbacher 1994a, Enzenbacher 1994b). Enzenbacher noted (1994b) that the NSF policy for the observer program was that observers would only be placed aboard vessels with 50% US passengers or more. The present status of the observer program (with the 1996 legislative change, and the allocation of some administrative responsibility to EPA) is not known.

Australia sends observers on vessels visiting Antarctica on an irregular basis (Australian Antarctic Division 1999a). France places observers on board vessels visiting the French subantarctic islands, with most of these voyages also visiting the continent. Observer reports are in some cases presented to ATCMs (see for example New Zealand 1996, IP14 ATCM XX, Australia 1995, IP33 ATCM XIX).

4.9 VOLUNTARY MANAGEMENT MECHANISMS

In addition to binding management regulation and restrictions placed on tourism operations through the ATS, the Protocol, legislation of ATPs, and other agreements, tourism operations are constrained in a number of other ways. The most important of these are the requirements that arise from industry self regulation, including membership of IAATO, and the use of guidelines and codes of conduct to govern behaviour.

4.9.1 MEMBERSHIP OF IAATO

IAATO imposes a number of restrictions on members (section 3.7.2.a). These include a limit on the number of passengers to be carried on any trip (a maximum of 400) and a limit on the number of passengers ashore at any one time (100). In addition to these limits, members are to use appropriate vessels and aircraft, hire sufficient numbers of qualified and experienced staff, comply with Rec. XVIII-1, and operate within the parameters of the ATS (including the Protocol).

Continued membership of IAATO therefore imposes a number of obligations on members. For members not subject to the provisions of the Protocol, (those from non-treaty state or from a party that has failed to ratify the Protocol) membership of IAATO requires compliance with the provisions of the Protocol. IAATO membership also involves participation in planning (such as contingency planning) and communication networks. IAATO provides a coordination function for activities in heavily used areas, although non-membership does not exclude operators from coordinating their activities with other operators.

The passenger limit per trip is somewhat controversial. One former member company now carries around 500 passengers on voyages, and is no longer listed as an IAATO member. The limits placed by IAATO on passenger capacity are more stringent than any practical measures of the ATS. IAATO has specified numerical limits (admittedly arbitrary), indicating a level that members consider to be acceptable. IAATO in this respect goes further than the ATS, which has failed to provide guidance as to what number of people it would consider acceptable. The limit on ship capacity also has the effect of excluding operators wishing to carry more people from joining IAATO, and consequently denies them the access to the ATS afforded by IAATO membership.

IAATO bylaws also establish a mechanism for verifying compliance. IAATO requires provisional members and probationary members applying for full membership to carry approved observers (generally a national observer) on certain voyages. Failure to comply with bylaws can result in reprimand, change in status of membership, or expulsion. Full or associate membership of IAATO also confers the right to use the IAATO logo, acting as an accreditation scheme that confers a marketing advantage in the absence of a more widely recognised scheme.

4.9.2 GUIDELINES AND CODES OF CONDUCT

Johnston and Hall (1995, p. 299) stated 'the development of continent-wide visitor guidelines and an operator code of ethics in the Antarctic by a group of tourism operators shows tremendous promise for control of tourism'. There is no question that such measures are important. This section examines industry based voluntary guidelines and codes of conduct.

There is some confusion regarding the differences between codes of conduct and guidelines (Johnston & Mason 1997). This is exacerbated by the use of the term 'guidelines' to refer both to Recommendations of the ATS, and to non-binding rules adopted by the industry. Guidelines or codes are in most instances a non-binding, voluntary measure—they do not 'embody the powers of formal regulations that are prescribed by a governing authority and are binding' (Johnston & Mason 1997, p. 151). According to Stonehouse (cited in Johnston & Mason 1997), guidelines indicate a course of action that should be followed, and indicate the reasoning behind prescribed courses of action. Codes of conduct provide sets of rules or methods for dealing with situations, or outline behaviour in situations (and do not necessarily stem directly from prescriptive statements). Johnston (1997) cites Mason and Mowforth to the effect that codes of conduct aim to educate and influence the attitudes and behaviour or operators and visitors. Mason (Johnston & Mason 1997) suggested that codes of conduct were sets of advice or instructions, were voluntary, and act as a form of self regulation. Stonehouse (1990, p. 58) noted that 'codes of practice supplement conservation legislation in the way that kerb-drills supplement Road Traffic Acts'. Johnston (1997) examines in detail the use of codes of conduct as regulatory strategies, noting that they can function as elements of part of an overall management plan. Given these definitions, we can examine the guidelines and codes of conduct that apply to Antarctic tourism.

Guidelines have been promulgated through ATS Recommendations for some time. As such, ATS derived guidelines are binding in some ways, but in most cases they have not entered hard law through the passing of domestic legislation—in effect, they are located between binding legal rules, and hortatory suggestions. Confusion may arise from the fact that the ATS has seen guidelines as representing a concise summary of the relevant provisions of the ATS, as well as an opportunity to include practical guidance to behaviour in certain circumstances. The attempt to merge the two has made some documents unwieldy and may hide the practical aspects of visitor behaviour amongst broader requirements derived from the ATS.

The ATS first passed guidelines for tourism in 1975 at ATCM VIII, through Rec. VIII-1, which included *'Guidance for visitors to the Antarctic'*. These guidelines provided practical ways of minimising the impact of visits:

GUIDANCE FOR VISITORS TO THE ANTARCTIC

Antarctica and its surrounding islands are one of the few places in the world which are still relatively unchanged by man's activities. Scientists still know very little about the ecological situation in the Antarctic. At the present early stage in research on these matters, some restrictions and precautions may seem unnecessarily harsh, but preliminary studies indicate the need for great caution. By following a few very simple requests, you can help preserve the unique environment of this region.

1. Avoid disturbing wildlife, in particular do not:
   - walk on vegetation;
   - touch or handle birds or seals;
   - startle or chase any bird from its nest;
   - wander indiscriminately through penguin or other bird colonies.
2. Litter of all types must be kept to a minimum. Retain all litter (film wrappers, tissue, food scraps, tins, lotion bottles, etc) in a bag or pocket to be disposed of on board your ship. Avoid throwing tin cans and other trash off the ship near land.
3. Do not use sporting guns.
4. Do not introduce plants or animals into the Antarctic.
5. Do not collect eggs or fossils.
6. Do not enter any of the Specially Protected Areas and avoid Sites of Special Scientific Interest.
7. In the vicinity of scientific stations avoid interference with scientific work and do not enter unoccupied buildings or refuges except in an emergency.
8. Do not paint names or graffiti on rocks or buildings.
9. Take care of Antarctic historic monuments.
10. When ashore, keep together with your party.
    (part of Treaty Rec. VIII-1, Heap 1994, p. 2293).

A number of similar documents appeared afterwards (United Kingdom 1992, WP3 ATCM XVII). SCAR contributed a document in 1980 titled '*A visitor's introduction to Antarctica and its environment*' (see International Centre for Antarctic Information and Research (ICAIR) 1999). This document described geological, biological, scientific, and political aspects of Antarctica, and moved on to a more detailed description of marine, terrestrial and freshwater ecosystems. The final section discussed conservation issues, noting that citizens of some countries might be legally bound by the *Agreed Measures for the Conservation of Antarctic Fauna and Flora*. The document concluded with a set of points that form, in effect, a code of conduct, as follows:

1. Remember that the vegetation is fragile and very slow growing. Avoid walking over moss-banks or lichen-covered scree slopes.
2. Do not collect conspicuous lichens or moss tufts. The best souvenirs to bring back from the Antarctic are memories and photographs.
3. Do not collect fossils, other interesting mineral specimens, or disturb patterned ground. Remember these features are irreplaceable on a human time scale.
4. Do not disturb nesting bird colonies. Stay outside the margins of a colony and observe from a distance.
5. Do not disturb sleeping seals and never attempt to handle seal pups.
6. Avoid marked sites where scientific experiments are going on. A close examination of a microclimate recorder for example could result in some very misleading data. Remember that these experiments represent somebody's professional work—and have cost some government (perhaps yours) a great deal of money. Respect the scientists' interests and careers.
7. Take all litter back with you. It takes decades for it to break down in the Antarctic environment.
8. Encourage your associates and comrades to follow your efforts at keeping Antarctica's wilderness conserved and unspoiled for future generations. (SCAR 1980 in ICAIR 1999, see also Enzenbacher 1995a).

COMNAP produced a '*Visitor's guide to the Antarctic*' in several languages, with a number of versions adopted by different nations (Hall & Wouters 1995). The tourism industry also moved through the late 1980s and early 1990s to develop guidelines and codes for the purposes of self regulation, in response to the failure of the ATS to provide specific guidelines, and disparities in visit procedures between tour operators (Stonehouse 1990, Beck 1990a, Beck 1994, Splettstoesser 1996, Splettstoesser & Folks 1994, Johnston & Hall 1995, Vidas 1996). An Antarctic Traveller's Code was proposed by four authors (Stonehouse 1990). The code was succinct, and included distance guides for approach to animals. The code was divided into incontrovertible provisions for visitors, and advisory provisions for companies, as follows:

Antarctic Traveller's Code

Antarctic visitors

- MUST NOT leave footprints in fragile mosses, lichens or grasses.
- MUST NOT dump plastic or other, non biodegradable garbage overboard or onto the Continent.
- MUST NOT violate the seals', penguins', or seabirds' *Personal Space*
  - start with a 'baseline' distance of 15 ft (5m) from penguins, seabirds, and true seals and 60 ft (18m) from fur seals
  - give animals the right-of-way
  - stay on the edge of, and don't walk through, animal groups
  - back-off if necessary
  - never touch the animals.
- MUST NOT interfere with protected areas or scientific research.
- MUST NOT take souvenirs.

Antarctic tour companies

- SHOULD apply the Antarctic Traveller's Code to all officers, crew, staff and passengers.
- SHOULD utilize one (1) guide or leader for every twenty (20) passengers.
- SHOULD employ experienced and sensitive on-board leadership.
- SHOULD use vessels that are safe for Antarctic ice conditions.
- SHOULD adopt a shipwide anti-dumping pledge.

(from Stonehouse 1990).

It is important to note that this code was developed before the formation of IAATO. The authors of the code based it on their personal experiences in tourism operations. In discussing the codes' lack of reference to the pre-existing guidelines and codes emerging from the ATS, Stonehouse (1990, p. 58) noted that the ATS measures 'to say the least lack the impact needed in codes of practice for visitors arriving on an Antarctic beach. Neither SCAR nor Treaty publications are readily accessible to the public; nor are they phrased for busy expeditioners or wondering tourists'.

4.9.2.a The IAATO guidelines

In 1989 guidelines for both tour operators and for visitors were developed by three companies in an initiative to formalise existing shipboard practices (see Splettstoesser & Folks 1994 for a 1992 revision). IAATO adopted (and revised in 1992) the 1989 guidelines developed by the three operators (Stonehouse 1992b, Splettstoesser & Folks 1994, Vidas 1996). These guidelines were more extensive, including a mixture of ATS requirements, references to national law (US law), procedural requirements imposed by different administrations, and operational guidelines. Three sections were included—tour operator guidelines, visitor guidelines, and conservation guidelines. The tour operator guidelines consisted of 18 points, summarised by Stonehouse (1992b) as follows:

1) to read and abide by the US Antarctic Conservation Act of 1978;
2) to be aware of and observe regulations affecting Sites of Special Scientific Interest and Specially Protected Areas;
3) to enforce the Visitor Guidelines (see below) in a consistent manner;
4) to hire professional teams of expedition leaders, cruise directors, officers, and crews (at least 75% with previous Antarctic experience), particularly lecturers

and naturalists, who will not only talk about wildlife, history and geology, but will guide passengers when ashore;
5) to hire Zodiac drivers with previous experience of ice work, and caution them not to take risks;
6) to educate and brief ships' crews on the Visitor Guidelines, Agreed Measures for the Conservation of Antarctic Fauna and Flora, and other legislation; to make sure that they are enforced; and to provide illustrated talks and guided tours ashore;
7) to ensure that there is at least one qualified guide naturalist/lecturer guide for every 20–25 passengers ashore;
8) to limit the number of passengers ashore to 100 at a time;
9) to brief all passengers thoroughly on the Visitor Guidelines and relevant legislation, and to ensure that they understand both the ethical and legal responsibilities outlined;
10) to use good judgement in approaching whales by ship or zodiac;
11) to communicate the voyage itinerary to other vessels, and to avoid over-visitation of sites;
12) to give proper notice (72 hours) of intending visits to research stations;
13) to respect numbers of visits allocated to research stations, and to comply with requests of station commanders;
14) to respect the work of scientists and avoid disturbance;
15) to ensure that no garbage or other evidence of visit is left ashore;
16) to follow Annex 5 of the MARPOL agreement concerning disposal of refuse at sea;
17) to refrain from dumping bilges or treated sewage within 12 nautical mile of land or ice shelves, or close to research stations;
18) to respect historic huts, scientific markers, and monitoring devices.

(Stonehouse 1992b, pp. 322–323)

The IAATO Antarctic visitor guidelines are essentially a code of conduct, according to the definitions examined above. They are summarised here from the reproduction in Splettstoesser and Folks (1994). The guidelines recognise human impacts, and include a rationale. The cooperation of visitors is requested, to ensure environmentally conscious expeditions that protect and preserve Antarctica for future generations. Visitors are asked to study and follow the guidelines in order to avoid harmful and long-lasting damage to the environment. Seven sections follow. Section 1 tells visitors not to disturb, harass, or interfere with wildlife. In dot point format, visitors are advised:

- Never touch the animals;
- maintain a distance of at least 15 ft (4.5m) from penguins, all nesting birds, and true seals, and 50 ft (15m) from fur seals;
- give animals the right of way;
- do not position yourself between a marine animal and its path to the water, nor between a parent and its young;
- always be aware of your surroundings; stay outside the periphery of bird rookeries and seal colonies;
- keep noise to a minimum;
- do not feed the animals, either ashore or from the ship (Splettstoesser & Folks 1994, p.237).

Visitors are reminded of the importance of the summer season in life cycle of the animals. They are advised that if an animal changes or stops activities in any way, they are too close. The consequences of disturbance of nesting birds (egg cooling or predation) are described. Visitors are also advised to keep a low profile. Possible aggression from disturbed animals is described. Section 2 advises visitors on how to avoid impacts on plants. Visitors are advised not to walk on or otherwise damage plants (lichens, mosses and grasses), and informed that growth and regeneration are very slow. The fragility of lichens, and the persistence of human damage to moss is highlighted. Section 3 covers littering and souveniring. Visitors are advised to leave nothing behind, and take only memories and photographs. No litter is to be left ashore, and souvenirs (examples are listed) are not to be taken. Section 4 requires visitors not to interfere with protected areas or research. Visitors are prohibited from entering buildings on station unless invited, banned from entering protected areas, and from disturbing scientific studies. Section 5 discusses historic huts, advising that they may only be entered when accompanied by an authorised escort, and that nothing may be removed from or disturbed within such huts. Section 6 prohibits smoking during shore excursions, advising that fire is a major danger. Section 7 advises on safety issues, requiring visitors to stay with the group or a leader when ashore. Visitors are advised to follow the directions of expedition staff, never to wander alone or out of sight of others, and not to hike onto glaciers or large snow fields due to the danger of crevasses.

As a final section in the IAATO guidelines (after the tour operator guidelines and the visitor guidelines) a set of 'conservation guidelines' is included, aimed at visitors. The conservation guidelines outline requirements under the Agreed Measures including: prohibition on killing or harming any native animal; the need to minimise harmful interference with mammals or birds; the need for a permit to enter SPAs; the ban on introducing animals and plants; and the need for precautions to prevent introduction of parasites and diseases. The provisions of the US Marine Mammal Protection Act of 1972 are also briefly described, including the ban on taking or importing marine mammals; and the need to avoid accidental or deliberate disturbance of marine mammals. The guidelines also describe the relevant provisions of the US Antarctic Conservation Act and the penalties for contravention of the Act. The guidelines conclude with an appeal to passengers to encourage other visitors to follow their good example to help ensure that Antarctica remains pristine for the enjoyment of future generations (Splettstoesser and Folks 1994).

4.9.2.b The ATS guidance documents

Through the same period there was recognition within the ATS of the need for a revision and re-writing of guidelines, with the eventual adoption of Rec. XVIII-1 at the 1994 ATCM. Section 4.1.6 provides a summary of the Recommendation, and the full text is provided in appendix three. The Recommendation included two guidance documents, one for operators, another for visitors. These replaced previous versions of guidelines and codes of conduct. The IAATO environmental assessments carried out for the 1997/98 and the 1998/99 seasons, in discussing the briefing and education of passengers, mention Rec. XVIII-1 as the guidelines being supplied to passengers. A slide show based on the Recommendation is also presented on IAATO member vessels (Five US Organizers 1997).

The Rec. XVIII-1 guidance documents take into account the Protocol, inform visitors of actual obligations, and provide advice as to desirable and sensible behaviour. The *Guidance for Visitors to the Antarctic* rationalised previous guidelines and codes in a reasonably succinct way, with five different sections (*'protect Antarctic wildlife'*, *'respect protected areas'*, *'respect scientific research'*, *'be safe'* and *'keep Antarctic pristine'*). Each section has a short introduction or explanatory section, followed by dot points for each particular aspect to be noted. This format makes for easy reading and comprehension, and ready reference in the field if supplied in pamphlet or brochure form. The visitor guidance is a blend of binding rules deriving from the Protocol, and non-binding advice (especially that in the safety section).

Some aspects of previous codes have been omitted, the most obvious being the approach distances for wildlife. Others include the lack of any specific advice on getting between animals and the water or parents and young, giving animals the right of way, maintaining a low profile, and remaining outside the boundaries of bird and seal breeding areas (although some of these things are implied). A ban on smoking ashore was included in the IAATO guidelines—Rec. XVIII-1 requires visitors to respect any smoking restrictions. The IAATO guidelines provided more specific advice on where lichens are found than does Rec. XVIII-1. Similarly, the *Guidance for those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic* also varies, with a lack of specificity in a number of key areas. Rec. XVIII-1 requires operators to employ trained and experienced guides in sufficient numbers, whereas the much earlier *Antarctic Traveller's Code* specified a ratio of one guide or leader for every twenty passengers. The IAATO guidelines recommended that 75% of the staff should have previous Antarctic experience, imposed a limit of 100 passengers on shore at a place at any time, and provided guidance on other operational questions such as safe and environmentally friendly use of IRBs. Some of these practices and rules still exist—for instance, the 100 passenger ashore rule of IAATO is included in the IAATO bylaws. Some operators may use their own codes of conduct and approach distance limits for animal viewing. De Poorter (1996) in describing the impacts of tourism noted that:

> in the past, Antarctic Treaty System (ATS) regulations included 'safe' distances to approach wildlife, but the 1991 Special Consultative Meeting decided to abandon these, because they were probably too liberal, and because it was very hard to agree on what they should be. Where tour companies have rules about approaching wildlife, the recommended distances tend to be based on the former ATS regulations (De Poorter 1996, p. 155).

Orient Lines, a non-IAATO company, provides passengers with Rec. XVIII-1, but mentions that during visits to penguin rookeries, passengers will be advised to keep a minimum distance of about 5 meters from individual penguins (Orient Lines 1998).

Rec. XVIII-1 was the culmination of a long period of argument about regulation of tourism. Comparison with other guidelines is useful. On one hand, Rec. XVIII-1 provides a succinct precis of the relevant ATS (and legislative) requirements, and can be easily comprehended. On the other hand, it avoids a number of issues, such as approach distances, and limits on passengers ashore, that it was ideally placed to address. This may be partly because the Rec. XVIII-1 guidelines aimed more to lay out the legal rules than grapple with the admittedly difficult issues relating to on-ground practices of tourists. Previous versions of guidelines adopted voluntarily by the private sector were in many ways more practical than the ATS derived ones in terms of actual on-ground practices. This reflects the broader picture, where the ATS is less willing or able to take a stand on some issues such as ship size or numbers ashore than the operators themselves.

From a pragmatic viewpoint, even the most environmentally aware traveller is not in a position to make judgements about animal behaviour and disturbance. It may be that an actual, specified approach distance would be more easily understood and obeyed by visitors, and enforced by staff and guides. Operators, in developing their own codes of practice, recognised this, based on their extensive experiences in managing people around wildlife.

4.9.2.c Effectiveness of voluntary guidance documents

The effectiveness of voluntary guidelines as a visitor management strategy is also important. Enzenbacher (1995b, p. 188) described the industry position—'tour operators maintain that current IAATO guidelines are adequate, noting tourists often serve as effective guardians of wildlife and the environment'. Johnston (1997) noted that the motivation and willingness of visitors to adhere to standards of behaviour is crucial to their effectiveness. Deliberate or inadvertent violations of guidelines have been noted in some cases. Johnston (1997, p. 15) stated that 'given the variation in motivation, awareness, and even opportunities to practise 'responsible' tourism, it cannot be assumed that all visitors to the polar regions are willing or able to adopt the behaviour that is expressed through codes and other forms of regulation' and stressed the importance of monitoring for effectiveness of such measures. Johnston (1998) also discussed methods for evaluating the effectiveness of visitor regulation strategies in polar regions, including the use of codes of conduct and guidelines.

P. Davis (1995b) reported on the effectiveness of voluntary guidelines in the Antarctic context. P. Davis used a questionnaire to investigate the perceptions of visitors, asking them to self-report events and their behaviour during their Antarctic visit. Questions related to aspects of the IAATO voluntary guidelines. Some results of P. Davis's research were described in section 3.1.

P. Davis, while expressing support for the work of IAATO and operators in developing and implementing guidelines, concluded that

> frequent adherence problems illustrate the inadequate nature of the guidelines to prevent adverse impacts to flora and fauna... unfortunately, the guidelines do not necessarily lend themselves to easy adherence. Passengers may not fully understand what the intent of the guidelines is; different users, as identified by age or educational level, may not, for their own reasons, follow them to the same degree; and supervision may vary considerably from ship to ship (P. Davis 1995b, p. 332).

P. Davis's research related to the situation prior to the 1994 adoption of Rec. XVIII-1, and it is interesting to speculate about the effectiveness of the less specific guidelines contained in Rec. XVIII-1, given P. Davis's findings on the more specific (and arguably more easily applied) IAATO guidelines.

Enzenbacher (1992a, p. 264) provided some details of early transgressions of guidelines, including smoking by staff, improper disposal of cigarette butts, passengers attempting to touch and feed penguins, passengers disturbing wildlife for photographs, littering, guides having no previous Antarctic experience, groups larger than 100 ashore, groups with too few guides (more than 25 passengers per guide), and inadvertent disposal of food waste from a vessel into a bay.

Research has progressed on appropriate approach distances for wildlife viewing, an important aspect of guidelines, although there is debate about such results. Giese, after experimental research on Adelie penguins (1998, section 2.7.1.b) recommended a minimum approach distance of 15m from the nearest nesting penguin, quiet movements, avoidance of sudden movements, and observing and photographing penguins from a kneeling position. Giese recommended briefing tourists on behaviours that indicate disturbance and on encouraging people to monitor these and modify their behaviour accordingly. Wilson et al. (1991) recommended approaching on foot no closer than 30m, and approaching colony-sea penguin routes no closer than 100m (on foot).

4.10 TOURISM AND SCIENCE

Tourism has long caused concern to those responsible for Antarctic science and national operations. Tourism and science interact in a number of ways, and over time the ATS and individual ATPs have developed mechanisms for managing the relationship. A brief review of concerns relating to the impacts of tourism on science is followed by details of some management measures. The uneasy relationship has its roots in the Treaty itself, which reserved the continent for peace and science, with no mention of visitation. For a long time national operations enjoyed nearly exclusive usage of the continent. The cost and logistical difficulty of commercial visits may have led some to suspect that tourism was not viable, or that the nature of the experience would not attract many people. Additionally, some national operations in the past had an interest in avoiding close scrutiny, given that certain operations were conducted in ways that would be completely unacceptable (environmentally speaking) on the home territory of the nations involved (De Poorter 1996). Section 2.7.1 describes the potential impacts of tourism on science activity.

While national operators are willing to accept the possibility of disruption where other national operators are concerned, they are less keen on the idea of significant disruption being brought about as the result of tourism. Perceptions of tourism operations as ill-conceived, ill-prepared and poorly equipped to deal with emergencies did nothing to alleviate concern.

White (1994) and Stonehouse (1994, 1992a) provide details of early distrust and hostility towards tourism shown by governments and scientific stations. While the relationship with tourism has been relatively poor in the case of some ATPs (for example, the US tried to ban tourist visits to some stations during the late 1980s (White 1994)) it should be pointed out that other countries have courted tourism and been actively involved in tourism operations (Headland 1994b, White 1994). Smith (1994) described the reception of tourist cruise vessels at national stations contrasting a welcoming station, a station that tolerated a visit, and one that refused to allow landing of passengers. The active involvement of some south American nations in tourism was also mentioned by Smith.

Donachie (1994) described the interaction between tourists and science personnel from Henryk Arktowski Station, on King George Island. This Polish station has been popular with tourists, providing 'legendary hospitality' (Donachie 1994). Donachie described the operation of tourist visits to the station and surrounding area, and some concerns about the effect of tourism on science activity, including lack of advance notice and too many visits. Donachie regarded the Arktowski experience with tourism as a success, but noted that there was clear evidence of impacts of human activity in the area. Stonehouse (1999) reported that since the time Donachie wrote, the department responsible for the operation of Arktowski Station has put in place additional policies to manage tourism visits. Rather than restricting numbers, the policies intend to relieve pressure on station facilities while enhancing the visitor's experience of an Antarctic station. Stonehouse reported on the development of site management strategies for Arctowski, including boundary markers for protected areas, marked routes around the station to help avoid vegetation damage, and identification of Zodiac cruising locations to act as alternative attractions. The development of an information centre was underway to provide a better understanding of the area and an appreciation of why Antarctica is important to the science community. A building was constructed in 1998, and interpretive materials and items to sell were being prepared. Stonehouse also reported on monitoring of visitors, and scientific research in the local area. A five-year program of tourism-related research was planned, using the station area and control locations, extending the work of PAC (section 1.1.4).

4.10.1 MANAGING TOURISM VISITS TO STATIONS

In addition to the ATS responses aimed at minimising disruption to science, a number of countries responded to tourism visits to stations by developing guidelines, codes of conduct, and procedures (White 1994, Enzenbacher 1994c). These documents tend to be a statement of policy and procedures, and form part of the rather confusing body of non-ATS documents that visitors and operators must contend with. There may be other similar national sets of codes or guidelines—the author has not attempted to compile a comprehensive set of such documents, and those described below may have been superseded. They have been included to illustrate the additional level of regulation that exists, in addition to the ATS provisions and formal domestic laws and regulations.

Enzenbacher (1994c) detailed a *Code of Conduct for Tourists and Non-Governmental Expeditions Requesting Permission to Visit British Antarctic Survey Research Stations*. The code stated that only IAATO members would be considered for station visits, and that IAATO should coordinate bids for visits. Unscheduled visits would not be permitted. Visits were limited to Rothera (two visits), Signy (four visits) and Faraday (four visits). The Rothera airstrip is not available for use except in an emergency. Operators (through IAATO) were to detail their objectives in visiting stations, among more general information. Restrictions may apply, including restrictions on numbers ashore or time ashore. Landing tourists was prohibited at some sites. Station personnel board ships, give presentations, and accompany visitors to a nearby site on Coronation Island. Visitors to other stations are shown around for around 30–45 minutes in groups of up to 30. BAS requires visitors to remain outside local scientific sites and designated protected areas. Enzenbacher concluded that the policy was a successful example of how well considered policies can promote co-existence of science and tourism. Enzenbacher attributed much of the success of the policy to its consistency over time.

Australia provides guidelines for station visits, *Non-government visits to Australian Stations* (Australian Antarctic Division 1999a). These guidelines are extensive and will not be detailed here, but in general they cover the areas of timing of visits, application processes, observers, legal liability issues, numbers ashore, site information, and environmental protection. Ships carrying more than 200 passengers, or those operated by non-IAATO companies, are not permitted to land visitors at Australian stations.

NZ has published a comprehensive booklet called *Guidelines & Procedures for Visitors to the Ross Sea region*, detailing New Zealand's policy and management procedures for tourism, and requirements deriving from the ATS and domestic legislation. The booklet includes information on legal obligations, Treaty measures, including Rec. XVII-1 and Resolution 3 (1995), procedures for organising Ross Sea visits (including visits to Ross Sea historic huts, and observers on voyages), and environmental impact processes (including procedures and examples). Also included are conditions for visits to Scott Base. Scott Base visits are guided by base staff. The base manager schedules visits and sets limits on group sizes, and can limit duration or cancel visits. Post office facilities are not provided, but phone calls can be made using public booths. The *Guidelines & Procedures for Visitors to the Ross Sea region* also contain visitor guidelines for the historic hut SPAs. These huts are locked and entry is controlled by the government representative who supervises visits. Landings must be during daylight, and access is denied if it requires encroaching on a protected area (Ministry of Foreign Affairs and Trade 1997).

The US attempted to ban tourists from visiting some stations (White 1994) but complaints from US citizens led instead to a rationing of visits. The US NSF allocates a limited number of places to different operators. This process is one of the reasons for the annual IAATO / NSF meeting (see NSF 1997).

4.11 CONCLUSIONS

In summary, the present management system consists of a range of ATS, international, and self regulatory agreements and measures. The nature of the ATS imposes a number of restrictions on administrative and decision making functions (applying to all aspects of governance, not only tourism). These include the slow pace of decision making that results from yearly meetings, the need for consensus on all decisions taken under the Treaty or Protocol, the lack of planning or decision making institutions for certain tasks, and the contrast between agreements that have legislative force and agreements promulgated as Recommendations or measures. The nature of the ATS limits full participation in decision making to those nations who conduct substantial science. Conservation and environmental protection were not included in the original Treaty but have gradually increased in prominence, to the point where they now form one of the core values of the ATS.

The ATS includes broad environmental protection provisions that apply to all activities including tourism, as well as measures that are specific to tourism. The Protocol and its annexes provide the main ATS components of the tourism management system, including the environmental assessment process. Provisions on waste management and prevention of marine pollution also apply to tourism, as do those for conservation of flora and fauna. The Annex on conservation of fauna and flora provides basic protection from threatening processes, but does not include specific advice on avoiding disturbance in the context of tourism activities. Annex V, revising the protected area system, is not yet in force, but it will rationalise the protected area system and enhance its potential as a tourism management mechanism. These provisions are implemented and given force through the domestic processes of each participant nation in the ATS. The revised protected area system, to enter into force when Annex V is ratified by all ATCPs, provides a less complex, more practical system, including changes allowing for larger areas. The capacity for regulation of tourism provided by the protected area system is demonstrated by the management plans applying to the historic hut sites of the Ross Sea region.

More specific tourism management provisions have been implemented through Recommendations and measures. The historical analysis of the response of the ATS to tourism management issues demonstrates how some of the problems of ATS debate and decision making apply in practice. The historical analysis reveals tensions, and provides information on the groupings and alliances of different parties on various issues. The development of the specific tourism management provisions of the ATS has been ad hoc and reactive, and has undergone only partial review and consolidation (in 1994). The measures specific to tourism are not generally enacted in domestic legislation, and as a result there has been variable success in their implementation by different ATPs. Several of these provisions, particularly those relating to communication of information on non-government expeditions between ATPs, have not been well observed in the past. Rec. XVIII-1 represents a consolidation of previous Recommendations, and as such is the definitive tourism specific instrument within the ATS. The guidance documents forming the body of Rec. XVIII-1, when compared with previous guidelines and codes of conduct are not as specific and arguably not as easily implemented or enforced.

Despite the hazardous nature of ship operation in ice covered waters, there is no ice navigation regime in place, although a process is under way to provide one. The management system includes inspections and observer programs. Such programs are not centrally managed by the ATS, and are applied unilaterally. They are limited in scope (with the exception of the observer program operated by NZ), and reporting is not in accordance with any standard format. The aims of observer programs are varied. A range of industry self regulation mechanisms apply. The only limits on passenger numbers on shore or on vessels, and the only guide to passenger ratios are self regulatory. These important measures exceed in stringency and in practicality any elements of the management system that derive from the ATS.

A number of national operators dictate the terms under which tourists can visit stations, including restricting the number of visits allowed, visit times, requirements for supervision, and provision of guidelines. More sophisticated station visit management is being developed in a number of cases, including site management strategies such as marked routes and provision of interpretive facilities.

The Antarctic tourism management system is a complex of binding and non-binding regulations of varying degrees of clarity, with poor integration between different elements. Many of the more restrictive and significant elements of the system originated from the industry and remain self regulatory, and there is a great deal of reliance on the tourism industry and operators to provide regulation. Important ATS measures are in place, providing a basic environmental protection framework. Environmental assessments are applied to tourism operations, without the benefit of an overall framework for assessment or integration. Specific ATS measures have developed over time, and are consolidated in the form of a Recommendation which is essentially non-binding.

Chapter seven evaluates the Antarctic tourism management system described in this chapter.

Chapter 5: Southern oceanic islands tourism management case studies

Southern oceanic islands support a small, specialised part of the expedition cruising industry, relying on natural attractions, remoteness, and wilderness character. Tourism activity to these islands is closely related to Antarctic tourism. The islands provide examples of the management of a form of tourism very similar to that occurring in the Antarctic, but where sovereignty applies. This chapter describes case study analyses of tourism activity and management for selected southern oceanic islands. An introduction describes the region, and the selection and presentation of the case studies. General cruise tourism activity to southern oceanic islands is reviewed, including a brief description of tourism on islands not included as case studies. Research applying to southern oceanic islands is also reviewed, including overview research, social research, and research into physical impacts. The case study areas examined in detail are the NZ subantarctic islands, Macquarie Island (Australia), Heard Island and McDonald Islands (Australia), Prince Edward Islands (South Africa), Gough Island (UK), and South Georgia (UK).

Information on the case study areas was obtained from a variety of sources. These included library resources, direct contact with officials and managers, secondary sources including published academic material, and Internet websites of managing authorities or other parties. Sources of information are acknowledged in the relevant areas of discussion.

For each of the cases, physical and environmental characteristics are described. Historical use, cultural resources, and the history of protection and management are reviewed. Information on tourism use is presented. The management system applying at each of the case study areas is examined in detail, including management planning, legislation, regulations, tourism policy, guidelines, codes of conduct, and any other components.

The analysis and discussion focuses on management planning, tourism policy, shore management provisions, administration of tourism management measures, and differences and similarities with the Antarctic situation. Comparison tables are presented to aid interpretation of the findings. The important findings of the cases relate to management planning as the dominant management mechanism. In all cases tourism is managed within the context of an overall conservation management strategy. Tourism is generally recognised as a valid use of such places. Management provisions are much more stringent and detailed than in the Antarctic case. Conclusions and implications for Antarctic tourism management are discussed.

5.1 SOUTHERN OCEANIC ISLANDS

Remote, high latitude island groups in the Southern Ocean provide an important comparison with Antarctic tourism and tourism management. The tourism experiences offered in these areas share many similarities with Antarctic tourism, including: remoteness; dominance of ship-based tourism activities; natural and cultural attractions; predominantly natural conditions; significant scientific, use and non-use conservation related values; wilderness qualities; and environmental sensitivity. Tourism to southern oceanic island destinations overlaps substantially with the Antarctic tourism industry, with many of the same operators involved, and many island visits packaged with Antarctic voyages. In addition to being destinations in their own right, many island groups act as a staging destination to break the long sea voyage to or from Antarctica. Similarities in the tourism experience are also clear: expedition cruising in small to medium vessels is the dominant activity, including use of IRBs for landings; discomfort associated with long sea voyages and small boat landings is experienced; tourism products are mainly nature based; there is an emphasis on wildlife viewing and education; and costs are relatively high.

5.1.1 THE CASE STUDY REGION

There are different ways of classifying the islands and island groups in the Southern Ocean. Schemes of classification can be biogeographic, latitudinal, climatic, political, or vegetational (Wouters & Hall 1995a). The biogeographical approach is commonly used, based on, among other features, the subtropical and Antarctic convergences (oceanographic boundaries where discrete water masses meet). Three different biogeographical classifications are used for the southern latitudes—subantarctic, cool temperate, and maritime Antarctic. To be classified as subantarctic, an island must be near the Antarctic convergence, have a mean annual temperature of 1–5°C and no trees. Islands well to the north of the convergence but below the sub-tropical convergence, with a mean annual temperature above 5°C, and well vegetated, are referred to as cool temperate, and islands well to the south of the convergence, with a mean annual temperature of less than 0°C are considered maritime Antarctic (Wouters & Hall 1995a, Department of Conservation 1995, Higham 1991).

The number of island groups in the region varies according to groupings and inclusiveness. Higham recognises 22 major oceanic islands or island groups south of the subtropical convergence, while Dingwall mentions 20 (Higham 1991, Dingwall 1995a). Other classifications include peri-Antarctic (used by Headland 1996), or insulantarctic (Clark & Dingwall 1985 cited in Wouters & Hall 1995). For the sake of simplicity the islands and island groups under discussion are here referred to as southern oceanic islands, after Clark and Dingwall (1985) cited in Wouters and Hall (1995a). Table 5.1 describes the different groups of islands and their locations, biogeographic region, area and glaciation, and their geopolitical status. Map 5.1 shows the island groups.

5.1.2 THE CASE STUDIES

Case studies were chosen from islands in the region north of 60°S (and therefore outside the Antarctic Treaty area) and south of the sub-tropical convergence (map 5.1). The region was chosen for three related reasons:

- the similarity of the tourism experience compared to Antarctic tourism;
- isolation, lack of infrastructure, and poor accessibility; and
- direct linkages with Antarctic tourism, both through voyages that visit both these islands and the Antarctic, and the considerable overlap of operators serving both destination areas.

The distinguishing factor between these islands and those within the Antarctic Treaty area is that of sovereignty. Clear sovereignty exists for most of the islands and groups considered (a number are claimed by more than one state). It is important to realise that to a large degree, the individuals and companies using subantarctic islands for tourism are identical to those visiting the Antarctic. The primary reason for separating the two destination areas is the assumption that the different management practices employed in the southern oceanic islands, taking advantage of clear sovereignty, are worthy of separate examination.

Case study islands were selected on the basis of a number of criteria. The existence of provisions for tourism management was a primary factor. Some islands and groups have been exposed to very little tourism, and therefore do not have any management in place. There are a number of important exceptions to this rule—some islands have, despite little or no tourism, a tourism management system in place or in development, in anticipation of tourism activity or of growth in existing activity.

Map 5.1: Southern oceanic islands

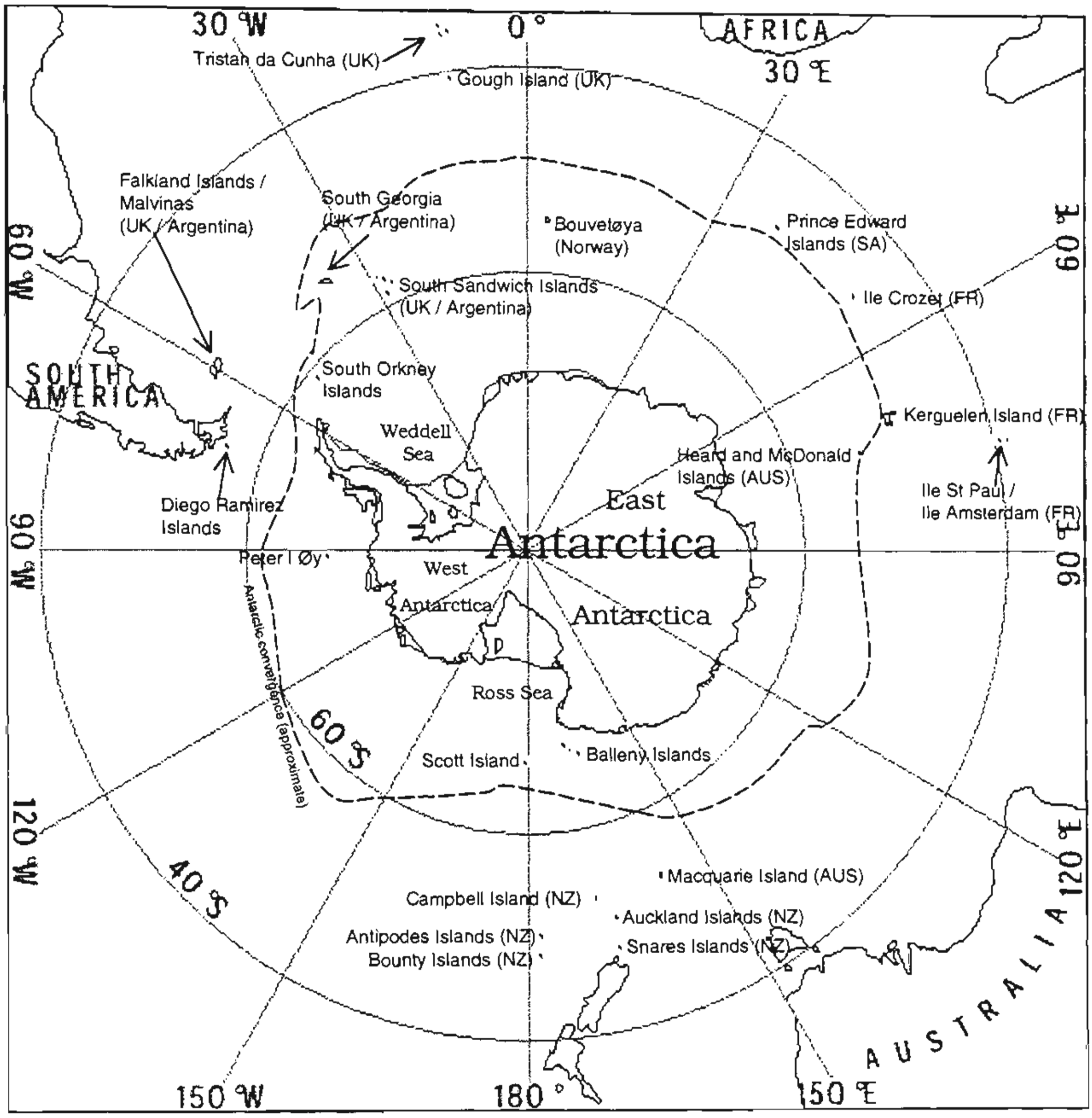


Table 5.1: Southern oceanic islands
(from Headland 1996, Wouters & Hall 1995a, Higham 1991, Dingwall 1995a, IUCN 1991)

Outside Antarctic Treaty area (sovereign territory)	Location (ocean / sector)	Biogeographic region	Area (km^2)	% ice cover
Gough Island (UK)	South Atlantic	cool temperate	65	0
Tristan da Cunha (UK)	South Atlantic	cool temperate	111	0
South Sandwich Islands (UK, also claimed by Argentina)	Southern Ocean (Atlantic)	maritime Antarctic	310	80
South Georgia (UK, also claimed by Argentina)	Southern Ocean (Atlantic)	subantarctic	3755	57
Shag Rocks (UK)	Southern Ocean (Atlantic)	subantarctic	0.2	0
Falkland (UK) / Malvinas Islands (Argentina)	South Atlantic	cool temperate	13000	0
Bounty Islands (NZ)	Southern Pacific	cool temperate	1.4	0
Antipodes Islands (NZ)	Southern Pacific	cool temperate	21	0
Campbell Island (NZ)	Southern Pacific	cool temperate	113	0
Snares Islands (NZ)	Southern Pacific	cool temperate	3.3	0
Auckland Islands (NZ)	Southern Pacific	cool temperate	626	0
Macquarie Island (Australia)	Southern Pacific	subantarctic	128	0
Ile Saint-Paul (France)	Indian Ocean	cool temperate	7	0
Ile Amsterdam (France)	Indian Ocean	cool temperate	85	0
Heard and McDonald Islands (Australia)	Southern Ocean (Pacific)	subantarctic	390	80
Kerguelen Island (France)	Indian Ocean	subantarctic	7215	10
Iles Crozet (France)	Indian Ocean	subantarctic	325	0
Prince Edward Islands (South Africa)	Indian Ocean	subantarctic	317	1
Bouvetøya (Norway)	Southern Ocean (Atlantic)	maritime Antarctic	54	93
In Antarctic Treaty area	**Location (ocean / sector)**	**Biogeographic region**	**Area (km^2)**	**% ice cover**
South Orkney Islands (claimed by UK/Argentina)	Southern Ocean (Atlantic)	maritime Antarctic	622	85
South Shetland Islands (Claimed by UK/ Argentina/Chile)	Southern Ocean (Pacific)	maritime Antarctic	3687	80
Peter 1 Øy (claimed by Norway)	Southern Ocean (Pacific)	maritime Antarctic	157	95
Scott Island (claimed by NZ)	Southern Ocean (Pacific)	maritime Antarctic	0.4	Most
Balleny Islands (claimed by NZ)	Southern Ocean (Pacific)	maritime Antarctic	400	95

The development of a tourism management system was in some cases prompted by legislative protection. The availability of information dictated the choice of cases. For some islands, information was readily available, while considerable effort would be required to obtain information for others. Management of tourism becomes more complex in cases where islands have permanent populations (other than scientists), and tourism represents a relatively small component of total human impact in those locations. Some of these islands are also subject to considerable land based tourism activity. Due to these complexities, island groups with permanent populations were not chosen as case studies (these islands include Tristan da Cunha and Falkland / Malvinas Islands). Finally, islands with significant tourism already occurring are likely to be instructive. The selection of case study islands was therefore directed towards islands with an existing tourism industry, and islands with an existing management system or steps underway to put one in place. The case study islands chosen on the basis of these criteria were: the NZ subantarctic islands; Macquarie Island; Heard Island and McDonald Islands; Prince Edward Islands (including Marion Island); Gough Island (Tristan da Cunha group); and South Georgia.

5.1.3 CASE STUDY PRESENTATION

The unit of analysis for this research is the tourism management system. Sufficient information about physical, environmental and cultural aspects is provided for an understanding of the context of tourism and tourism management, but the primary consideration is management. In presenting the case studies, a simple format is followed, covering the physical aspects, environmental features, historical uses and cultural resources, sovereignty, conservation status, and management. Information on tourist use is presented, followed by a description of management measures. Tables 5.6 to 5.9 compare these provisions across all case study areas.

5.1.4 GENERAL DESCRIPTION OF SOUTHERN OCEANIC ISLANDS

Southern oceanic islands share important characteristics that contribute to their high conservation values. Diversity is limited because of remoteness, cold summers, and limited areas available (Wouters & Hall 1995a). Ecological features are influenced by the isolation of the islands from other landmasses. The islands are important as sites for animal breeding, have high levels of endemism and many rare and endangered species, and have generally been less disturbed by humans than other areas (Hall & Wouters 1994, Wace & Holdgate 1976).

The environmental history of most islands and groups is similar in pattern. Large scale commercial exploitation of the seal and bird life of different islands occurred soon after discovery (Rubin 1996, Higham 1991), and islands also served as bases for whaling. High levels of exploitation led to massive population declines and local or total extinctions of some species (Higham 1991, Rubin 1996, DPWH 1991). Numerous shipwrecks occurred on subantarctic islands—Tristan da Cunha, for example, saw 19 shipwrecks in the 19th century alone (Rubin 1996), and the remains of these and other structures such as castaway's huts, camps, and graves, now have historic and cultural value (B. Davis 1995).

Other human disturbances, including farming and fires, have substantially modified large areas of some islands—Jouventin and Micol (1995, p. 37), for example, state that 'Ile Amsterdam and Ile St Paul may, for all practical conservation purposes, have reached the point of no return as a result of the series of catastrophes they have sustained during the last two centuries, all of which were caused by humans'. Settlements were established on some islands, some of which failed, while some still support permanent populations. Other islands have permanent scientific or meteorological stations, or periodic scientific or management visits (Department of Conservation 1995).

One of the main threats to island conservation values is the presence of non-native animal and plant pest species deliberately or accidentally introduced by humans. Reasons for deliberate introductions include provision of food (Higham 1991), for farming, or for control of other feral animals (Jouventin & Micol 1995). A number of islands have suffered considerable damage through the introduction of mammals. Introduced species of birds, fish and macroinvertebrates have also caused problems (Cooper 1995c). In some cases, the introduced species themselves have value as examples of rare domesticated varieties (Cooper 1995b). Some islands have substantial pest plant problems (Jouventin & Micol 1995). Microbiological introductions are also a possibility (Cooper 1995b). The islands that have remained free of pest species are extremely important, but are highly susceptible to change: 'experience has shown that plants and animals which have evolved on oceanic islands in the absence of terrestrial mammals are highly vulnerable and sensitive to disturbance. They are readily destroyed, but are virtually impossible to replace' (Department of Conservation 1995, p. 20).

Four of the island groups have such significant values that they have been inscribed on the World Heritage List as Natural World Heritage Properties—Macquarie Island, Gough Island, Heard Island and McDonald Islands, and the NZ Subantarctic Islands (World Conservation Monitoring Centre (WCMC) 1999). Macquarie Island is also a UNESCO Biosphere Reserve. A preliminary assessment of world heritage values of Southern Ocean islands, by a working group of the IUCN ranked South Georgia, Heard Island and McDonald Islands, and Prince Edward Island highest (Australian Antarctic Division 1995).

From the point of view of the tourism experience, islands in the southern latitudes are cool to cold, often wet or overcast, and windy (Department of Conservation 1995). Seas can be very rough. As with Antarctic tourism, ship based tourism dominates, and visitors have to endure sea voyages in rough conditions and discomfort during landings and on shore. The unique features of the islands contribute to a highly valued visitor experience. Wildlife congregations can be overwhelming in size, noise, activity, and diversity. The sense of wilderness and remoteness can be significant. Scenery and physical grandeur are extraordinary on some islands. Experiences of a historic or cultural nature, associated with physical sites, or through relationship to past occurrences, are also available to visitors. Cessford and Dingwall state that the islands 'provide unique experiences for people at wild, remote oceanic island settings, harbouring abundant wildlife of great interest for science and conservation' (1996, p. 99).

5.2 TOURISM ON SOUTHERN OCEANIC ISLANDS

A brief overview of the industry as it operates across the entire range of islands is useful. The modern industry is described by Hall and Wouters (1994), Rubin (1996), and Cessford and Dingwall (1998). Expedition cruising dominates (Cessford & Dingwall 1998). Some smaller cruise boat activity also occurs, as well as private and commercial yacht visits. As in the Antarctic tourism industry, a range of different vessel sizes and levels of comfort are available.

The industry has a number of components. The first and major component is tourism activity linked with Antarctic destinations, using the islands as a staging destination on the voyage to or from the Antarctic proper (Hall & Wouters 1994, Cessford & Dingwall 1998, Rubin 1996, Department of Conservation 1995). Island groups on or close to the voyage track between major departure ports receive the most visitation of this type— the NZ subantarctic islands, Macquarie Island, and the Atlantic sector islands being cases in point (Rubin 1996, Cessford & Dingwall 1998). These receive relatively regular visits each austral summer, and form part of the annual itineraries of operators drawing on an international market.

The second component of the industry is occasional visit tourism to more remote islands, usually associated with repositioning voyages of ships moving to or from the Antarctic, or with resupply voyages or mail services (Rubin 1996, Headland 1994b). This may be organised by the responsible authority, as in the case of visits to the French subantarctic islands (Terres Australes et Antarctiques Françaises 1999). Islands and island groups a long distance from ports, direct voyage routes, or Antarctic destinations are less attractive (in terms of visitor comfort, value for money, and commercial viability) than those on regular Antarctic routes, and as such receive fewer visits. They have special values because of their remoteness, with considerable status attached to having visited such places, meaning that occasional voyages can be filled in a commercially viable fashion.

The third component is that of (relatively) local island-only tourism. The islands are destinations in their own right, as Rubin points out: 'the subantarctic and Southern Ocean islands are in many ways more interesting than large sections of the continental coast. Most of them, for instance, have more wildlife than does Antarctica' (1996, p. 247), and Headland (1994a, p. 270) notes that 'the fauna is more varied, the weather better, and access easier than for the continent, and the scenery is comparable in many instances'. Cessford and Dingwall (1998) note that there is a recent increase in specific island-only tours from Australian and NZ ports to the Pacific sector southern oceanic islands, with both cruise ships and smaller tour boats. Department of Conservation (1995) provides details of locally based tourism companies using the NZ subantarctic islands for smaller tour boat visits.

Finally, as with Antarctic tourism, there is a small component of private visitation in yachts, some with paying passengers and some chartered (Department of Conservation 1995, Wouters & Hall 1995a). More remote groups are seldom reached by these vessels. The NZ subantarctic islands and the Atlantic sector islands appear to have the highest levels of visitation of this type. Airborne tourism does not occur, mainly due to the lack of landing areas and great distances to the islands (Wouters & Hall 1995a) although some ships may use helicopters for landings at some islands (Rubin 1996).

Tourism visits to southern oceanic islands predate Antarctic tourism (Headland 1994b). The first tourism visits to many locations took advantage of resupply or official voyages, and only later did dedicated tourist voyages commence. Headland (1994b) reports evidence of tourist visits to New Zealand's subantarctic islands as early as 1882, and at least one voyage in 1891 to Macquarie Island. Visits to the Auckland Islands and Campbell Island occurred in the same year. South Georgia received tourist landings first in 1924, the South Orkneys in 1933, Gough Island in 1970, and the South Sandwich Islands in 1982 (Headland 1994b). Shag Rocks were first visited by tourists as late as 1991 (Headland 1994b). Codling (1995) describes a mail and passenger ship servicing the Falklands, South Shetlands and South Orkneys from 1924 until 1931. Headland (1994a) indicates that these services continued with different ships until 1971.

For present use, Rubin (1996) provides details of planned voyages for the 1996/97 season. The number of different companies offering voyages in 1996/97 to different islands is shown in Table 5.2. There is no certainty that all planned voyages went ahead. It is not known if passenger landings were achieved (or even planned) at all islands. Even taking into account the poor representativeness of a single season, the table demonstrates that all islands (with the exception of Shag Rocks) were the object of planned visits. The general pattern of visitation indicates that the islands visited by most companies are those closest to the main areas of interest on the Peninsula, (South Georgia, South Sandwich, and the Falklands), with a number of companies operating in the NZ sub-antarctic islands and Macquarie Island area.

5.2.1 TOURISM ON NON CASE STUDY ISLANDS

In order to provide a better understanding of the broader expedition cruising industry, tourism activity and management will be very briefly described for the southern oceanic islands not included as full case studies, namely the Falkland / Malvinas Islands, South Sandwich Islands, Tristan da Cunha, the French subantarctic islands, and Bouvetøya.

Wouters and Hall (1995a) describe tourism activity in the Falkland / Malvinas Islands. Expedition cruising is well established, with visits to sites on many of the 300 islands. Wouters and Hall noted a recent increase in the number of cruise ships, and Rubin (1996) stated that the islands are a popular addition to many Antarctic itineraries. Land based tourism occurs (Rubin 1996), with access by air to Stanley, and activities including trekking and wildlife. Lodges, camping, hostels and hotels provide accommodation (Rubin 1996). The South Sandwich Islands (claimed by the UK and Argentina) were first visited by tourists in 1982 (Headland 1994b). Three companies intended tourism visits to the islands in 1996/97. Little information was obtained regarding tourist visits to the South Sandwich

Islands. Lewis-Smith (1995) reported that the infrequent visits to the islands are mostly made by tourists.

Table 5.2: Island visits—companies offering visits 1996/97 season

Island or group	Number of companies (of 11) offering visits in 1996/97 from Rubin (1996)
South Georgia (UK, also claimed by Argentina)	8
Falkland Islands (UK) / Malvinas Islands (Argentina)	8
Heard and McDonald Islands (Australia)	4
Kerguelen Island (France)	4
South Sandwich Islands (UK, also claimed by Argentina)	3
Macquarie Island (Australia)	3
Campbell Island (NZ)	2
Auckland Islands (NZ)	2
Gough Island (UK)	1
Tristan da Cunha (UK)	1
Bounty Islands (NZ)	1
Antipodes Islands (NZ)	1
Snares Islands (NZ)	1
Ile Saint-Paul (France)	1
Ile Amsterdam (France)	1
Iles Crozet (France)	1
Prince Edward Islands (South Africa)	1
Bouvetøya (Norway)	1
Shag Rocks (UK)	0

Tristan da Cunha group includes Tristan, Inaccessible, and Nightingale Islands, and Gough Island 340km to the southeast. Tristan da Cunha has a permanent population of around 300 people (Swales 1996, Wouters & Hall 1995a, Rubin 1996). Access to the islands is very limited, with around six visits by fishing vessels each year, one visit by a supply vessel, and no airfield (The Commonwealth Secretariat 1999). Tourist visits to the island are rare, with only one visit planned for 1996/97 (Rubin 1996). Swales (1996, n.p.), commenting on Tristan da Cunha, noted that 'it has become evident that such interesting islands will become targets for tourism in a shrinking world', but felt that isolation and the difficulty of landing make it unlikely that tourism would ever be common. The island Administrator states that the islands have no tourist industry, and none of the facilities that tourism requires (Wouters & Hall 1995a).

The French subantarctic islands include Ile Amsterdam, Ile Saint-Paul, Iles Crozet, and Iles Kerguelen. The Iles Crozet have very high conservation and scientific values, including islands with no introduced species. Ile Amsterdam and Ile Saint-Paul have been substantially degraded (Jouventin & Micol 1995). Iles Kerguelen includes an ice cap and a rugged landscape. Wouters and Hall (1995a) note that although tourism interest is low, the islands may be included on more itineraries in the future. Tourism on resupply and research vessels occurs (Terres Australes et Antarctiques Françaises 1999). The islands have been preserved from mass tourism by their distance from ports and inaccessibility. Nature based tourism is offered aboard the research and resupply vessel *Marion Dufresne II*, based at Réunion Island. Five or six voyages of around 20 to 25 days are offered annually. A maximum of 15 people visit per voyage (Terres Australes et Antarctiques Françaises 1999). Wouters and Hall (1995a) reported that legislation is in place to govern human activities, and protect mammals and some bird species.

Bouvetøya is a Norwegian dependency in the Atlantic sector of the southern ocean. The $50km^2$ island is almost completely ice covered, and may still be volcanically active.

Landings are very difficult due to the steep cliffs on all sides. Some vegetation (mosses and lichens) is present. Southern elephant seal, Antarctic fur seal, three species of penguin, and up to 10 other seabird species breed on the island (Norsk Polarinstitutt 1999, Sømme 1995). The island and territorial waters were declared a nature reserve in 1971. Landing of aircraft is prohibited (Sømme 1995). The island is extremely remote (the nearest land, Antarctica is 1740km distant) and this, in combination with the difficult landing conditions, has prevented tourist visits (Wouters & Hall 1995a).

5.2.2 SOUTHERN OCEANIC ISLAND TOURISM RESEARCH

Many researchers, commentators, and analysts have contributed to the knowledge of tourism activities, impacts and management on southern oceanic islands. A brief summary of important contributions and issues is provided here. Literature on tourism on southern oceanic islands is usually case specific (dealing with a single island, island group, or region) or global, overviewing tourism activity on many of the islands and groups. Some areas have received more attention than others. To some extent this is a function of the level of tourism visitation.

5.2.2.a Overview papers

Overviews and works that cover the full range of southern oceanic islands include those of Wouters and Hall (1995a), Hall and Wouters (1994), Wouters (1993, cited in Wouters & Hall 1995a), and the edited volume of Dingwall (1995c).

Wouters and Hall (1995a) provided a comprehensive overview of tourism management for subantarctic islands (including cool temperate islands). Wouters and Hall examined possible explanations for growth including: an increased awareness of such destinations as a result of exposure to documentaries, and conservation organisation membership; overcrowding in the Antarctic Peninsula region; improved transport technology; and an overall expansion of the tourism market for subantarctic and Antarctic products. Wouters and Hall described impacts, including 'inadequate waste disposal, litter, vegetation trampling, disturbance to wildlife, and the potential threats of fire and the introduction of pests, particularly rodents' (1995a, p. 262). Impacts on cultural heritage values are also a concern. Tourism policies and legislation for a number of islands were compared, and issues identified included: lack of comprehensive conservation provisions for some islands; fragmentary enforcement; proliferation of private yacht visits; the complexity of managing tourism across a wide range of sovereign jurisdictions, and the lack of a single enforcement agency. Wouters and Hall argued that subantarctic and Antarctic tourism should be considered a single entity, and that international coordination and cooperation should pursue a regulatory system for both destination areas.

Hall and Wouters (1994) discussed similar issues. Hall and Wouters pointed out the need for management strategies, given the presence of tourism and the fact that isolation no longer prevents visits from occurring. They concluded that visits to wilderness areas are necessary to ensure public support for conservation, and provide an economic argument for preservation. The development of present management systems was made possible by clear sovereignty, but they are largely untested, and concerns were raised about the lack of tourism operator input into management strategies (Hall & Wouters 1994). Increased pressure on management authorities as a result of larger ships and an expanded market was forecast. Hall and McArthur (1993) analysed ecotourism in Antarctica and subantarctic islands. The increased rate of visits to Macquarie Island and the NZ islands was noted, and management responses such as levying of fees and construction of facilities like boardwalks were examined. They suggested that the management plan for Macquarie Island represented a model that could be applied to Antarctic tourism, and argued for a comprehensive ATS tourism management regime.

5.2.2.b SCAR/IUCN Workshop on protection, research and management of subantarctic islands

Dingwall (1995c) edited *Progress in the Conservation of the Subantarctic Islands*, the proceedings of a 1992 joint SCAR/IUCN Workshop on Protection, Research and Management of Subantarctic Islands. Lewis-Smith (1995) discussed the use of environmental impact assessment (EIA) for proposed activities on islands, and Dalziell (1995) reported on EIA discussions at the workshop. No particular mention was made of tourism activities and EIA. The general impression of the discussions is that EIA processes are not used extensively at present, and that workshop participants see EIA as a potentially useful tool in the broader set of management policies.

The protected area status of islands was summarised by Dingwall (1995a), with 7% of the total land area of southern oceanic islands included in legally protected areas. Some islands have no statutorily protected areas. The absence of marine protected areas or protection for marine and coastal environments was highlighted. Only Macquarie Island and the NZ Islands had management plans at the time. Dingwall advocated designation of protected areas, with strong legislation, institutional support, and management planning.

Perrin (1995) reported the workshop discussions of conservation management planning, with surveillance and policing issues, satellite tracking of vessels, on-ground personnel and observers discussed. Recommendations included: establishment of legally protected areas and marine protected areas and buffer zones; review of existing protected areas and their status; and legally binding management plans. While tourism was not specifically discussed, it is clearly within the ambit of management planning, and many of the provisions referred to, such as on-board observers, relate directly to tourism activity.

B. Davis (1995) examined problems associated with managing historic and cultural sites on southern oceanic islands. B. Davis noted that many visitors to subantarctic islands arrive on tourist ships, that controls are variable, and that problems arise from the lack of management presence on most islands. Problems with control of yacht based visitors were also noted. Cooper and Bonner (1995) report workshop discussion of historic issues. Management planning as a way of managing impacts was discussed. Tourism was discussed as a means of raising funds for historic conservation. The workshop recommended including heritage issues in management plans.

A session on tourism at subantarctic islands was included in the workshop. Valencia (1995) introduced the issues, while Dingwall (1995b) summarised the discussion and recommendations. Valencia noted the growth in subantarctic tourism, linking it to transport advances and the growth in popularity of Antarctic destinations. Valencia posed a number of questions relating to management conflict between tourism and science, the appropriateness of tourism on subantarctic islands, identification of ecological variables relevant for management of tourism impacts, and adequacy of legal instruments in managing tourism. Valencia described management responses to tourism issues, including legal controls, permits, official supervision, minimum impact codes, open and closed areas and times of visits, charges and fees, and education and information dissemination.

Dingwall (1995b), summarising the workshop discussion, identified issues including the need for close relations between operators and management authorities, the need for more social research to understand tourist requirements, the difficulty of controlling small private yachts, and concern about construction of shore based tourism facilities. Enforcement problems were identified. The NZ system of requiring official observers was commended as useful. Codes of conduct and industry self regulation were also discussed. Recommendations included the following.

1. Tourism is a legitimate activity, and legal provisions are required for management. Such provisions should ensure protection of unmodified or near pristine islands, where tourist landings should normally be prohibited.

2. Authorities should exchange experiences and information on tourism management to promote standardisation of policies and practices.
3. Close links between operators, industry associations, management authorities, and the scientific and conservation communities should be maintained to promote responsible and safe tourism.
4. Further socio-cultural and environmental research should be undertaken to gain a better understanding of tourists, their activities and impacts, with wide dissemination of results.
5. Improved education about island conservation, the risks of unauthorised landings, and tourist restrictions is needed, especially to minimise problems with small expeditions.

5.2.2.c Social research

The most significant social research relating to southern oceanic islands is that of Cessford and Dingwall (1994, 1996, 1998). A visitor survey and monitoring program of visits to NZ subantarctic islands has been carried out for a number of years by the NZ Department of Conservation. This work provides the only reliable and detailed information on characteristics of subantarctic visitors. The results are interesting to compare with those of Enzenbacher (1995a) and P. Davis (1995b), detailed in chapter three. The research responded to the need for managers to understand the wants and needs of tourists, to ensure satisfaction and to make sure that management actions are appropriate and are supported by operators (Cessford and Dingwall 1994). The 1990/91 survey looked at basic visitor characteristics, asking open-ended questions about visitor satisfaction, motivation, enjoyment, and perceptions of impacts. Responses were obtained from 183 passengers (Cessford & Dingwall 1994). The 1992/93 and 1993/94 surveys used refined versions of the survey, with a total of 458 respondents over the two seasons. In the 1994/95 season, the focus of the research turned to more site-specific questions, using short survey forms presented after each site visit of the voyage, with 352 responses. Macquarie Island was also incorporated in the surveys. In the 1995/96 season surveys were applied at five key sites (Cessford & Dingwall 1998). Table 5.3 presents demographic, employment, and previous visit information, converted to percentages, pooled across all seasons (from Cessford & Dingwall 1998).

As summarised by Cessford and Dingwall, the visitors were characterised by high proportions of older, retired and professional people, and those involved in conservation groups. Around 30% of visitors had visited polar or subpolar regions before. Visitors included 30% from the US, 30% from Australia, 17% from NZ, 5% from Japan, 5% from Germany, and 4% from the UK. Cessford and Dingwall suggested that the use of Australian and NZ ports, and a wider range of voyage costs and options have made visits more accessible to domestic markets. Cessford and Dingwall also reported on visitor perceptions of their own impacts (physical, biological, and social). Trampling of plants or soils were cited by 36%, and disturbance of wildlife was cited by 33%. Users noted different impacts at different sites. Cessford and Dingwall reported no major sources of dissatisfaction about visits in general. More time ashore was desired by more than a quarter of visitors, and more information was wanted. On-shore facilities were not desired by many. Cessford and Dingwall concluded that there was no real need to consider development of facilities, but that there may be opportunities for better education and interpretation.

The attitudes of visitors to management controls were also examined. Respondents strongly supported most management restrictions on visits. Management provisions disagreed with by more than 25% of respondents included the absence of toilet and shelter facilities, lack of close up access for viewing and photographing wildlife, and the ban on overnight stays. Cessford and Dingwall suggested managers address these concerns through information and education. The overall conclusion of Cessford and Dingwall was that the desires of the tourists are consistent with those of the site managers.

Table 5.3: NZ subantarctic island visitor characteristics (from Cessford & Dingwall 1998)

		% of total
Gender (n=993)	Male	50
	Female	50
Age (n=993)	<20	1
	20–29	4
	30–39	8
	40–49	17
	50–59	21
	Over 60	49
Work status (n=641)	Retired	28
	Professional	36
	Admin/management	8
	Service	6
	Other work	7
	Home duties	7
	Student	4
	Other	7
Previous polar visits (n=810)	Yes	31
	No	70

5.2.2.d Physical impacts

Little research has been conducted (or at least reported) on impacts of recreational and tourist use of subantarctic islands. One exception is a study of human trampling of vegetation at Macquarie Island (Scott & Kirkpatrick 1994). The research examined vegetation trampling and use levels, using an upland plateau section of the track network on Macquarie Island, and historical use data. Scott and Kirkpatrick pointed out that much land near sea level is widely trampled by native wildlife, with human trampling insignificant by comparison. The research concluded that under usage levels of around 150 passes per year, tracks were in good condition. Vegetation on sections of track subject to 890 passes per year was damaged to an unacceptable level on all slopes and exposures. Scott and Kirkpatrick estimated that the maximum acceptable damage threshold is around two to three hundred passes per year. Given the levels of tourism existing at that time, Scott and Kirkpatrick asserted that if tourism access were expanded beyond the beaches and boardwalks, additional track modifications would be necessary to maintain vegetation condition. Scott and Kirkpatrick also examined vegetation disturbed by construction of tourist boardwalks, finding good survival of replanted plants and recovery of areas, with ongoing damage limited to bruising of overhanging plants.

5.3 Tourism Management for the New Zealand Subantarctic Islands

The southern oceanic islands governed by NZ lie in the cool temperate biogeographic zone, but are consistently referred to as the NZ subantarctic islands in official documentation. The islands include five groups—Bounty Islands, Antipodes Islands, Campbell Island, Snares Islands, and the Auckland Islands (map 5.1). The NZ islands receive relatively high levels of visitation because of their proximity to the NZ mainland, Australia, and the main route to the Ross Sea.

5.3.1 Physical and Environmental Resource

A brief description of the islands is appropriate for understanding the tourism management context. The sources of information are Department of Conservation (1995) and Higham (1991) unless otherwise specified. The different environmental histories of the islands mean that different values exist for each—substantially unmodified islands and those free of introduced species are of particular importance. Wouters and Hall (1995b, p. 277) state that 'the island reserves contain some of the world's last remaining areas of vegetation mostly unmodified by people or introduced animals'.

Auckland, Campbell and Antipodes Islands are volcanic in origin, and the Snares and Bounty Islands are granitic. Auckland and Campbell islands show evidence of glaciation. The Bounty Islands have no soil, the other groups have peaty soils (Higham 1991, Department of Conservation 1995). The Auckland Island group includes Auckland, Adams, Enderby and Disappointment islands, with spectacular sea cliffs, fjords, and sheltered harbours (Rubin 1996). The Antipodes Islands (Antipodes Island, the Windward Islands, Leeward Island, and Bollons Island) include high inaccessible cliffs (Higham 1991). The Campbell group (Campbell, Dent and Jaquemart islands) has an indented coastline, with coastal cliffs, stacks, and volcanic plugs (Higham 1991). The Bounty Islands (more than 20 small islands, islets and rocks) are low, bare, and spray swept. The Snares Islands are spectacular primarily for their wildlife concentrations.

Climate is cold, wet, and windy, with frequent strong westerly winds, and little sunshine. Rainfall varies between the island groups, but is generally high. Light snowfalls are common on the Auckland and Campbell Islands (Department of Conservation 1995).

Vegetation is influenced by the climate, and wildlife influences such as trampling, burrowing, and nutrient transport (Higham 1991, Department of Conservation 1995). The Bounty Islands support only algae and lichens. The Snares and Auckland Islands have some forest cover, shrublands, herb moors, alpine rushlands, cushion bogs, and fellfields (Department of Conservation 1995). The Auckland Islands have one of the richest floral assemblages of the southern ocean, with 233 species of vascular plant (196 indigenous and 6 endemic). Campbell Island has 228 species (143 indigenous, and 5 endemic), the Antipodes have 71 species (68 indigenous and 4 endemic), and the Snares have 22 species (20 indigenous, 1 endemic) (Department of Conservation 1995, Higham 1991). The Snares Islands, and Adam Island and Disappointment Island in the Auckland group are very important as their vegetation remains substantially unmodified by people or introduced animals (Department of Conservation 1995).

The NZ subantarctic islands support a diverse range of seabirds. 41 species (10–15% of the world's seabird species) breed there, with 120 species recorded. Breeding birds number in the millions, with the Snares Islands hosting an estimated 6 million. Eleven species of penguin occur, four species regularly breeding on the islands including the endangered yellow-eyed penguin, the vulnerable snares crested penguin (endemic), erect crested penguins on the Bounty and Antipodes Islands (also endemic and vulnerable), and rockhopper penguins on Antipodes, Auckland, and Campbell Islands. Seven species and two subspecies of albatross occur, with the only breeding colony of southern royal albatross, and the world's largest populations of three albatross species. Around 18 species of petrels occur. Three shag (cormorant) species are endemic to a single island group each (Auckland Islands, Campbell, and Bounty Islands), one being the rarest cormorant species in the world with only 600 individuals. 14 endemic land birds occur. The Campbell island teal is the rarest duck species in the world. Introduced pest species on the main islands in the Auckland and Campbell groups have confined some bird species to outlying islands. Many endemic insects are present, although introduced rodents have affected populations on some islands. Land molluscs (including endemic snails) also occur.

Marine mammals include the rare and endangered New Zealand sea lion, which breeds on the Auckland Islands. Elephant seals also occur. New Zealand fur seals breed on all groups. Leopard seals visit regularly. Whale species include southern right whale (breeding at Campbell Island), and blue, fin, sei, and humpback whales. Toothed cetaceans include sperm whales, orca, southern bluenose dolphin, bottlenose dolphin, hourglass dolphin, and the rare spectacled dolphin.

5.3.2 HISTORICAL USE AND RESOURCES

The material in this section is drawn from Higham (1991) and Department of Conservation (1995). The islands were discovered by Europeans between 1788 and 1810. All of the island groups were known to Maori people and used before european discovery. Soon after european discovery, a rush of sealing occurred with a boom occurring between 1792 and 1815. Population levels of some species became extremely low.

There is a close association with the history of Antarctic exploration. Antarctic explorers visited the islands to reprovision, explore, and carry out scientific work. Settlement at Port Ross on Auckland Island was attempted by Maori and Moriori people from the Chatham Islands in 1842. British settlers established a settlement in 1849 but poor whaling and cropping led to its abandonment in 1852, with the Maori and Moriori leaving by 1856. The remains of the settlement are still visible. Scientific expeditions visited for the transit of Venus in 1874, with evidence remaining on Auckland Island and Campbell Island. Castaway's huts were established on all of the island groups, and some remain. Between 1861 and 1934 unsuccessful attempts at grazing were made on the Auckland Islands, and sheep farming continued on Campbell Island until 1931. Sheep and cattle were left on the island, and a homestead and woolshed remain. Shore based whaling took place on Campbell Island between 1909 and 1916, with remains of equipment still in place. Derelict remains of Second World War coastwatching outposts remain on Auckland and Campbell Islands. Historical remains are of considerable interest and cultural value, and are covered by a draft historic resource management strategy (Wouters & Hall 1995b).

Adams Island (Auckland Islands) was declared a flora and fauna reserve in 1910. Auckland Island was declared a flora and fauna reserve in 1934. Campbell Island became a reserve in 1953. The Antipodes, Snares, and Bounty Islands became reserves in 1961, and all of the islands became nature reserves in 1978. Management plans were prepared for all islands in the 1980s. Management and scientific expeditions have occurred regularly to the islands, with small huts placed to support such work. The recent focus of management has been the eradication of introduced species. A meteorological station on Campbell Island was automated in 1985.

5.3.3 TOURIST VISITS

Tourist passengers often visited on government vessels in the 1800s (Wouters & Hall 1995b). The first tourism motivated visit to the islands was by the *Magga Dan* in 1968, as part of an Antarctic cruise. Infrequent visits followed, regular from 1979/80, with around ten vessel visits and 500–600 tourists each year up until 1995 (Department of Conservation 1995, Sanson 1994). Wouters and Hall (1995b) provide historical figures from 1967/68. The Department of Conservation (1995) outlined major growth in demand in the five years to 1995, compared to the previous twenty years. Sanson and Dingwall (1995) include visit information for 1987–1992, with Sanson (1994), Cessford and Dingwall (1998), and Cessford and Dingwall (1996) providing other figures. Table 5.4 shows visitation from the 1986/87 season until 1995/96.

Table 5.4: Visits to NZ subantarctic islands

Cruise season	No. of ship visits	No. of visitors
1986/87	1	125
1987/88	3	45
1988/89	3	47
1989/90	5	72
1990/91	12	812
1991/92	2	15
1992/93	9	600
1993/94	11	240
1994/95	15	542
1995/96	not known	600

The tourism industry has two components (Sanson & Dingwall 1995, Sanson 1994, Wouters & Hall 1995b). NZ tour boats carrying up to 40 passengers provide ten to twenty day tours. Auckland and Campbell Islands are the focus, with numerous sites visited. International cruise ships visit on the way to or from Antarctica, carrying 40–180 passengers, and make only two or three landings. Cessford and Dingwall (1996) stated that in 1994/95 there were three cruise ship visits, seven smaller boat visits, and five private vessel visits. Sanson and Dingwall noted increasing numbers of private yacht visits, while Cessford and Dingwall noted demand to allow visits by larger cruise vessels carrying up to 400 passengers.

5.3.4 MANAGEMENT OF TOURISM

Wouters and Hall (1995b) provided a review and analysis of the management system in place for the islands, and an important examination of sustainability of tourism activity, of the management planning and policy processes, and general management issues. Department of Conservation (1995) outlined the statutory basis for management. Under the Conservation Act of 1987, a Conservation Management Strategy (CMS) has been approved by the New Zealand Conservation Authority and regional conservation boards (Dingwall 1998). The CMS aims to integrate management by meshing the different pieces of legislation. Under the CMS system an overall management strategy is applied. Each group is designated a nature reserve of national significance, a status that can only be revoked by act of parliament (Department of Conservation 1995). As nature reserves they are managed to protect and preserve indigenous flora and fauna or natural features. Management aims of nature reserves include: preservation of areas in a natural state; preservation of ecological associations of indigenous flora and fauna, and the natural environment; the extermination of exotic flora and fauna; prohibition on entry into reserves except by permit; inclusion of the foreshores to low water mark; protection of scenic, historic, archaeological, biological, or scientific features; and protection of soil, water and forest conservation values.

The most recent and comprehensive provisions for tourism management available to this author were those included in the draft CMS (Department of Conservation 1995). A final CMS has been put in place since the publication of the draft (Dingwall 1998). The islands of the five groups were categorised according to their different ecosystems, condition, and vulnerability to disturbance, and placed into one of two different categories according to future management objectives (Department of Conservation 1995). The two categories used were 'minimum impact islands', and 'refuge islands'. Minimum impact islands are those with minimal habitat modification, low levels of introduced flora, and no introduced animals. Refuge islands have higher levels of habitat modification, more introduced floral species, and presence of introduced faunal pests in most cases.

The draft strategy lists a number of tourism management issues, including: increasing demand; requests to visit vulnerable islands or sites; visit management (eg. visitor guidelines, Department representatives); site management and facilities including boardwalks, signage and shelter; quality of experience; and attitudes of operators.

The management rationale includes avoidance of risk rather than damage, closer attention to effects of human disturbance, and the need for a precautionary approach (Department of Conservation 1995). The future strategy for tourism was to focus on risks deriving from visits, with particular emphasis on rodent introductions and on keeping landings to a minimum. The draft strategy also states that 'Cruising expeditions must have a genuine educational or inspirational purpose relating to a better appreciation of nature' (Department of Conservation 1995, p. 67). The underlying rule relating to visit management is 'balancing the benefits to be gained by permitting a visit against the risk and disturbance which may occur. The more pristine or vulnerable the site, the greater the justification needs to be for allowing visits' (p. 71). Tourist visits are accordingly limited to the islands classified as Refuge Islands. Importantly, tourism is regarded as a legitimate use of the islands, conditional on observance of regulations, management to maintain the conservation values of the islands, and keeping in mind the paramount objective of nature conservation that arises from the status of the island groups as nature reserves (Cessford & Dingwall 1996).

Objectives for management are provided in the draft strategy. The objective for visitor impacts management is: *'to maintain visitor numbers and the manner in which those numbers are managed on-shore, at a level at which long term protection of the islands is assured'*. Visitor impact management in this case includes all human activities. Specific visit actions are summarised here.

- Tourist visits to refuge islands are permitted under controls. Vulnerable sites on Refuge Islands are not to be entered.
- Visitor quotas apply. Criteria include: allowing only one ship visit per day at any site; maximum 600 visitors per year for specified locations; and 150 visitors per year for all other landing sites. Other limits may be applied if adverse impacts exceed acceptable limits. Daily limits may be set for sites.
- Tourism must be ship based, with no overnight stays on islands.
- Entry permit quotas are allocated to authorised concessionaires up to five years in advance.
- *Visitor Guidelines* and a *Minimum Impact Code* are used for all landings, and include strict quarantine measures, and measures to avoid marine pollution and fires.
- Departmental representatives supervise all access under the entry permit system.
- Review of the permit system, and monitoring of visitor impacts at key landing sites are included.
- Liaison between the department and the New Zealand Antarctic Program and cruise operators is required.
- Management is to ensure tour operators recognise the special values of the islands, and provide adequate, quality interpretation services.
- Expedition organisers are to be encouraged to prepare environmental evaluations of operations, similar to those required under the Protocol (Department of Conservation 1995).

The objective for managing visits around wildlife is: *'to ensure that indigenous wildlife is not subject to disturbance which may have adverse effects on behaviour, distribution or breeding'*. Tourism specific actions to implement the objective are summarised as:

- Permits are not issued for vulnerable wildlife sites (unless for research or management).
- Guidelines apply to wildlife viewing, with the precautionary principle paramount.
- Effects of visitor activities, management, and research activities are monitored (Department of Conservation 1995).

The objective relating to marine mammal viewing is *'to protect marine mammals from visitor harassment by ensuring that no human interactions impact upon or cause changes to their behaviour'*, with actions aimed at:

- implementing visitor guidelines to avoid or minimise disturbance of marine mammals ashore, and during non-commercial marine mammal viewing activities;
- not issuing permits for commercial viewing of whale species around the islands until it can be demonstrated that risks associated with viewing are acceptable;
- providing permits for commercial viewing of seals on water only to small boats; and
- facilitating research to establish baseline behaviour, and establishing monitoring of marine mammal viewing operations on or around the islands (Department of Conservation 1995).

The two facilities and site management objectives are: *'to allow a minimum of on-shore facilities essential for management requirements, while protecting the natural values of the island nature reserves'* and *'to remove all non-biodegradable waste materials from the islands and dispose of biodegradable waste in ways which do not endanger or modify the natural ecosystems'*. Implementing these objectives (with respect to tourism) entails:

- requiring facilities to conform to the provisions of the Protocol;

- restricting onshore facilities to tracks, boardwalks or signs at a limited number of sites;
- maintaining only facilities and structures with an ongoing use. New structures can be established, if they would have low impact, and if they are removable;
- tracks will be established only for management activities or long term occupation purposes. Existing tracks may be upgraded to minimise damage;
- prohibition of new wharf or shore mooring facilities;
- prohibition of the use of vehicles on shore; and
- removal of all non-biodegradable waste from the reserves. Burning or burial of rubbish is permitted in some cases. Visitors are to be encouraged to use portable toilets where practicable (Department of Conservation 1995).

The final objective for visitor management relates to the use of aircraft. The objective is '*to avoid unnecessary disturbance to wildlife from aircraft operations over or near to the Subantarctic islands*'. Helicopter landings are banned except for scientific or search and rescue purposes. The strategy calls for restrictions on low flying over or close to the islands. Permanent aviation facilities are prohibited.

In a practical sense, the system requires operators to obtain permits for all activities, to carry departmental representatives on board, and to obey *Visitor Guidelines* including a *Minimum Impact Code*. Visits are restricted to a number of sites, and numbers allowed to visit sites are also restricted. Islands not available for landings can be viewed from the sea (including IRB cruising). The compulsory carrying of a departmental representative is justified in the plan on the basis that the risks associated with visits are so great that it is essential to ensure compliance. The departmental representative is responsible for: helping the operator ensure that all visitors understand the reasons for the *Minimum Impact Code*; for ensuring compliance with the code and guidelines; enforcing animal and plant quarantine procedures; ensuring compliance with permits and legislation; and explanation of policy and management provisions.

5.3.4.a Guidelines for tourism

The guidelines on tourism provide more detail on tourism policies and management actions. Guidelines written in 1990 were obtained (Department of Conservation 1990), and while these may have changed in some respects, details are corroborated and supplemented by information provided by Dingwall (1998). In addition to those provisions already mentioned (arising from the draft CMS) are the provisions below (Dingwall 1998, Department of Conservation 1990):

- A permit fee and visitor impact fee is charged.
- Zodiac cruising is permitted at the Antipodes and Snares groups.
- Landings at the Bounty Islands are only permitted on Depot and Proclamation Islands.
- Visiting cruise ships may carry no more than 180 passengers.
- Departmental representatives can refuse entry, or change landing sites at any stage.
- A maximum of 600 visitors for any site in any year is enforced. Restrictions on the number allowed ashore at any one time apply to some sites (90 at some Enderby Island sites, 30 at some Auckland Island sites, and 10 on any of the Bounty Islands).
- Numbers of people ashore, sites permitted for use, and seasonal or discretional closures of sites are provided for. Some areas are closed, others are available at the discretion of the representative. Extended walking is permitted at some sites.
- A guide to visitor ratio of 1:20 is required (1:10 for the Bounty Islands).
- Overnight stays ashore are not permitted.
- Operators must ensure visitors remove all soil and plant material from all equipment before and after each landing.
- No collection of specimens or souvenirs is permitted.
- Behavioural guidelines are specified (relating to approach distances, right of way for animals, avoiding animal groups, not touching or feeding animals, and keeping noise to a minimum).

- Food and drink to be taken ashore is to be checked by the departmental representative. No avian food products are permitted ashore.
- Safety, communications and first aid requirements are specified.
- No toilets are provided ashore for tourist use.
- No rubbish is to be left, and smoking is prohibited.
- Entry to historic structures may only be made with the departmental representative.

5.3.4.b Minimum impact code

All visitors are provided with a copy of Higham's subantarctic island guidebook, as well as a copy of the minimum impact code (Wouters & Hall 1995b, reproduced in Higham 1991). The code explains the fee levied on visitors, and mentions contingency plans for rodent and plant pest species incursions (Department of Conservation n.d.). The code explains the permit and departmental representative system, the reasons prohibited islands are off limits, and the approved landing sites. Quarantine measures are explained, with instructions given on checking footwear and clothing, and on packing gear for shore excursions. Rules for behaviour on shore are included. Visitors are advised not to disturb or remove anything, not to collect any specimens or souvenirs, not to leave rubbish, and not to take avian food products ashore. Explanations as to why provisions are necessary are provided. Appropriate behaviour around wildlife is described. Visitors are to: give animals the right of way; observe a minimum approach distance of five metres; not touch wildlife; not surround animals; and keep noise to a minimum. Finally, visitors are advised to keep to formed tracks and boardwalks, not to smoke, and that no toilets are provided for visitor use.

5.3.4.c Other features

Sanson (1994) provided some additional information. Sanson cited fees of NZ$150 per passenger for cruise vessels, NZ$190 per passenger for tour boats, and NZ$190 for yacht crew. The fees include components for resource rental, the government representative system, rodent contingency plan costs, shore facilities, the *Sub-Antarctic Island Guidebook*, and the visitor impact monitoring program (Sanson 1994). Sanson also provides details of accidental rodent introduction contingency planning. Visitor impact monitoring is carried out at two sites (Sanson 1994). Sanson also refers to regular and early consultation with tour operators in formulating the management system, and the cooperation between science and tourism, with science benefiting from logistic and transport capabilities of tourism.

Wouters and Hall (1995b) point out that there is a significant problem with monitoring of compliance with requirements, including detection of unauthorised landings, as a result of the remoteness of the islands and the lack of capacity for long distance surveillance.

5.3.5 SUMMARY

The NZ subantarctic islands differ from the other case study groups of the southern oceanic islands, being composed of five widely separated groups. The management system applies to the groups as a whole, and while tourism landings are permitted only at certain sites on three of the island groups (Campbell, Auckland, and Bounty), IRB cruising allows tourists to experience the attractions of the other islands. Islands with few or no introduced pest species, and the very large breeding bird populations on some islands are of particular significance. The tourism management system is summarised in tables 5.6 to 5.9 below.

Tourism management provisions are linked to the values of the different islands. Tourism is recognised as a legitimate use of the islands, and the management system seeks to allow a tourism experience within a conservation management framework. Particular features of the tourism management system are: the use of government personnel on all vessels; the linkage between conservation management objectives and tourism management provisions; conservative limits on visitor numbers on shore and to sites each season; a system of approved concessionaires; and the use of permits. The presence of a contingency plan for rodent introduction is noteworthy. Vessel capacity limits, to maintain the visitor experience and minimise impacts are another important feature. Shore infrastructure is provided in the form of boardwalks. Monitoring to establish baseline conditions and ongoing impacts is provided for. Overall, the tourism management system establishes a comprehensive framework for allowing, controlling, monitoring and allocating tourism use of the resource. The vulnerability of very important sites and features is balanced against the need to allow people to experience the islands directly.

5.4 Tourism Management for Macquarie Island

Macquarie Island lies in the Southern Ocean south of the Tasman Sea, around 1294km from the Antarctic continent (map 5.1). The island is Australian territory, part of the state of Tasmania, which has legislative responsibility for most affairs. The island consists of a main land mass (34km long and up to 5.5km wide), two groups of islets (Bishop & Clerk, and Judge & Clerk Islets) and offshore islets, rocks, reefs, and seastacks (Parks and Wildlife Service 1998). Tasmanian state waters (to a distance of 3nm) are included in the Macquarie Island Nature Reserve. The island and surrounding seas to 12nm were included on the World Heritage List as a natural heritage property mainly on the basis of unique geological values (WCMC 1999, Parks and Wildlife Service 1998).

5.4.1 Physical and Environmental Resource

A brief description of the physical and environmental characteristics of the island is useful in understanding the context in which tourism and tourism management operate. The unique geological origin of the island is of international scientific value. Macquarie Island is formed from what was a sea floor spreading ridge, with rock from as deep as 6km into the earth's crust exposed with little deformation, a globally unique situation, providing very high geological scientific values (Parks and Wildlife Service 1998). Peats and peat bogs are extensive on the island. In parts, wind and water action remove fine soil material, forming extensive cobble and boulder areas (Parks and Wildlife Service 1998). The general landform is of steep coastal slopes, rising to an undulating plateau. The highest point is 433m. Terrace features occur on the coastal slopes, and there are some lakes (DPWH 1991).

Climate is dominated by the prevailing strong westerly winds and the nearby Antarctic convergence. Generally cold, wet, and windy, the island has frequent gales, cloud and fog, and rain on more than 300 days each year. Snow falls regularly but does not persist. The daily and annual temperature variations are small, with the mean annual temperature 3.7°C (DPWH 1990).

Information on vegetation is provided by DPWH (1990) and DPWH (1991). The island is free of trees, and has four main vegetation communities: tall tussock grassland; herbfields and short tussock grassland; feldmark; and mire. 46 species of vascular plant have been recorded. Only one vascular plant species is endemic to the island (*Azorella macquariensis*). Five species of exotic pest plant have established, one is common and widespread.

Macquarie Island is renowned for its congregations of wildlife. Around 100 000 seals and 3–4 million penguins use the island. 72 bird species have been recorded (29 breeding). Four species of penguin, four albatross species, eight petrel species, one cormorant species, two duck species, and one species each of rail, skua, cormorant, gull, and tern breed. Introduced birds include redpolls, common starlings and mallards (DPWH 1990, Brothers 1985 in WCMC 1999). Wekas, an introduced predatory bird, were eradicated, with the last sighting in 1988 (Rubin 1996). Around 850 000 breeding pairs of royal penguins, endemic to the island, are estimated, with colonies of up to 160 000 pairs. King penguin breeding pairs number around 100 000. Gentoo penguins breed in small colonies, with around 5000 pairs. Rockhopper penguins number around 500 000 breeding pairs (DPWH 1990, Parks and Wildlife Service 1998). A number of species of bird have become extinct or restricted as a result of predation by introduced pest species (cats, rats, and wekas) and habitat changes from rabbit grazing. Two endemic subspecies are extinct—the red-fronted parakeet, and the banded rail, probably because of the presence of weka (Taylor 1979 in WCMC 1999). Some species now breed only on offshore sea stacks and islets (DPWH 1990).

Invertebrate species number less than 300 (10% endemic) (Greenslade 1990 in WCMC 1999). Low numbers of terrestrial arthropods are found (30% endemic). Fish include 12 demersal and 21 pelagic species. Many species of marine mollusc (around 27) are endemic to the island (DPWH 1990, WCMC 1999).

Marine mammals include six species of seal, and six species of whale. Orca are seen most often, along with longfin pilot whale. Southern right whale, sperm whale, southern bottlenose whale, and Cuviers beaked whale have been recorded (DPWH 1991, DPWH 1990). The most common marine mammal is the southern elephant seal, which has increased to over 100 000 after exploitation in the 1800s, although a decline is now underway (DPWH 1991). An endemic fur seal species was exterminated within a decade of discovery (Cumpston 1968 in DPWH 1991). New Zealand fur seal breed on the island (up to 1000 animals). Subantarctic fur seal and Antarctic fur seal breed in small numbers. Low numbers of Hookers sea lions are sighted. Leopard seals are recorded in small numbers, and weddell seals and crabeater seals are seen very rarely.

Animal pests on the island have caused considerable impact. Rabbits have changed vegetation structure and composition, and distribution and abundance of vascular plants. Cats have had a very serious impact on burrow nesting birds, including prions and petrels, and rats may affect petrel breeding success (DPWH 1990). Rabbits, cats, rats, and mice remain on the island, with control work underway for rabbits, and a cat eradication program.

5.4.2 HISTORICAL USE AND RESOURCES

Historical information is summarised from DPWH (1990) unless otherwise specified. The first recorded sighting of the island was in 1810. Four sealing gangs were in place before 1810 was over. Seal skins and elephant seal oil were taken. At least 120 000 fur seal skins were taken in the first eighteen months from a population of between 200 000 and 400 000, and by 1821, only four skins were taken, and at least one species was extinct. Elephant seal oiling continued with similar results, and penguins (king and royal) were also exploited for oil. Oil production ceased in 1919 due to pressure from conservationists (including Douglas Mawson), and availability of substitutes. Remains of the shore stations represent some of Australia's earliest industrial sites. Nine recorded shipwrecks also occurred on the island. Scientific visits included Bellinghausen's expedition in 1820, Wilkes's expedition in 1840, a British expedition in 1898, Scott in 1901 and Shackleton in 1909. A station was established by Mawson's 1911 expedition, and a permanent station was placed in 1948. Physical artefacts present include remains of shore stations, sealers huts, steam digesters, and some shipwrecks (DPWH 1991, DPWH 1990).

Douglas Mawson started a campaign to declare the island a nature reserve following his 1911 visit (DPWH 1991, Parks and Wildlife Service 1998). Penguin oil production stopped in 1919 and the producers licence was revoked (Parks and Wildlife Service 1998). In 1933 the island was made a Sanctuary. It became a Conservation Area under the *National Parks and Wildlife Act 1971* (Tas.), and a State Reserve in 1972. The island was listed on the Register of the National Estate and declared a Biosphere Reserve in 1977. 1978 saw the island become a Nature Reserve under the Act. The permit system for visitors was introduced in 1979 after declaration of the reserve as a restricted area (DPWH 1991).

5.4.3 TOURIST VISITS

A domestic 'island only' tourism industry has not developed in Australia as it has in NZ, probably because of greater distances and the unsuitability of smaller vessels for travel to

Macquarie Island. One NZ operator regularly visits Macquarie Island as part of subantarctic and Antarctic voyages (Heritage Expeditions 1998), while other ship visits are internationally operated. The management plan for the reserve lists recent visits up until 1986 (DPWH 1991). The first visit was that of the *Lindblad Explorer* in 1971, as part of an Antarctic cruise. The same vessel visited again in 1973, 1979, 1981, and 1982. The *World Discoverer* visited in 1981 and 1982. A national government rule stating that ships from Antarctica had to enter Australia through a proclaimed port of entry resulted in cancellations of visits planned between 1983 and 1987. Kneebone (1995) provides visitor numbers from 1990/91 through to the 1995/96 seasons, shown in table 5.5.

Table 5.5: Visits to Macquarie island

Cruise season	No. of visitors
1990/91	825
1991/92	0
1992/93	105
1993/94	100
1994/95	175
1995/96	375

Note: Wouters and Hall (1995a) provide a figure of 564 visitors to Macquarie Island in 1990/91.

In 1990/91 limits were set on visitor numbers and since then the maximum of 500 visitors has been reached only once (WCMC 1999). The 1998/99 visitation was predicted to be six visits by three ships, with eight visits by three ships in 1999/00 (Australian Antarctic Division 1999a).

5.4.4 MANAGEMENT OF TOURISM

The management of Macquarie Island was 'greatly influenced' by the NZ subantarctic management plans (Wouters & Hall 1995a). The 1991 management plan was required under the state *National Parks and Wildlife Act of 1970* (Tas.). Nature Reserve status is, under the Act (Schedule 3), conferred on areas of land with natural values that 'contribute to the natural biological or geological diversity of the land, or both; and are unique, important, or have representative value'. Under the Act the responsible authority is the Tasmanian Parks and Wildlife Service. The objects of management are:

- To protect and manage the reserve as a natural habitat for its indigenous flora and fauna and in order to achieve ecosystem conservation.
- To seek to protect and preserve the marine habitat adjacent to the reserve in so far as it provides access and/or feeding grounds for the majority of the indigenous fauna.
- To conduct, promote and encourage research and studies in so far as they have no permanent detrimental effects into the natural and cultural aspects of the reserve, the surrounding seas, and the region.
- To prevent accidental introductions of alien flora or fauna and as far as possible to eradicate or control previously introduced species which affect or endanger native species.
- To record, protect and/or preserve and historic localities, artefacts or relics found in the reserve or adjacent waters.
- To permit tourist visits under strictly controlled conditions which allow visitors to experience the natural values of the island without compromising them.
- To publicise and promote the State's successful management of the island as a Nature Reserve and internationally recognised Biosphere Reserve. (DPWH 1991, p. 17).

The reserve has been declared a restricted area, and all visits require a permit. Three zones have been established based on levels of development and disturbance. Zone A is the main logistic and support facilities zone, and includes the main Australian National Antarctic Research Expeditions (ANARE) station, where the natural environment is significantly modified. Activities allowed include construction of buildings, scientific facilities, living facilities, and facilities for tourism, including walkways, viewing platforms, interpretative structures and emergency camps. Zone B includes the remainder of the island, and offshore islets and rocks with the exception of Bishop and Clerk and Judge and Clerk Islets. Development is to be kept to a minimum, but may include research sites and facilities, and limited facilities for tourism. New huts are not to be installed. Zone C covers Bishop and Clerk, and Judge and Clerk Islets. These offlying islets are least disturbed, and free from exotic species. No development is permitted, and visits are permitted for scientific programs only.

The plan addresses tourism use. Ship-based visits are permitted. Limited facilities, such as walkways, viewing platforms, and interpretation material may be provided. Tourist groups are required to be self-sufficient. The use and regular review of guidelines for tourism operations is required. The plan requires the management authority to monitor effects of tourism on wildlife, and on environmental, historical and scientific values of the reserve, with results to be considered when reviewing guidelines. Tourist visits are also subject to all commonwealth quarantine and customs requirements.

Provisions relating to tourism include waste disposal requirements, a ban on sea disposal of poultry products, a ban on the use of helicopters within 3nm of the reserve except for emergencies, a ban on disturbance of historic localities and artefacts, and a requirement to clean all materials, equipment, transport and foodstuffs to prevent introduction of non-indigenous species. Vessels must be certified rodent free. Shore mooring is prohibited, and vessels must anchor at least 200m from the reserve.

5.4.4.a Guidelines for tourism

The management plan requires guidelines for tourism visits. The guidelines are available online at the tourism web pages of the Australian Antarctic Division (AAD) (1999a). The guidelines form the basis for permit conditions and a contractual agreement with the Tasmanian Government. The guidelines state that in allocating rights for commercial visits, the Department will consider added benefits to Tasmania (such as use of Tasmanian ports). For protection of wildlife and the environment, and the quality of the visitor experience, vessels carrying more than 200 passengers may not land passengers at the island. The guidelines proper are divided into four sections, summarised as follows.

Protection of the environment.

- Visitors must be briefed on the reserve status of the island and requirements to protect the environment and wildlife.
- All visits are to be ship based with no overnight stays except in an emergency. Shore visits may only be conducted between 0700 and 1900 hours station time.
- Landing of visitors may only be at beaches previously approved in writing by the Department.
- Areas to be accessed on foot are designated in writing. Shore parties must be in radio contact with the ship.
- Shore parties may have no more than 15 visitors, and must be accompanied by one guide. A maximum of 60 people is permitted to land at Sandy Bay, and up to 100 people may land at the Isthmus at any one time.
- Visitors must be aware of and observe all quarantine procedures.
- Only unopened, pre-packed processed food and drink items may be taken ashore.
- Wildlife may not be fed.
- All rubbish is to be returned to ship. No rubbish may be disposed of in state waters.
- No collection, or disturbance of flora, fauna, or historical sites or artefacts is permitted.
- Helicopters may not be used with 3nm of the reserve.
- Vessels must supply provide a current deratting exemption certificate. Shore mooring is prohibited, and anchoring must be more than 200m from shore.

- Zodiac cruising within 200m of shore may be agreed upon between the Department and the organiser.

Protection of scientific programs
- The AAD (which operates the scientific station) will inform operators of shipping schedules. A tourist ship may not visit within 5 days of an AAD vessel, or on a public holiday, except by permission.
- 48 hour prior notice of arrival is required. The station leader must be informed of the start and end of landing operations, and informed of any accidents immediately.
- Station visits are at the discretion of the AAD. Number of visits and visitors may be limited. A maximum of 30 people may visit the station at one time. The post office is the only building that may be entered.
- Communications apart from limited postal services will not be available.
- Visitors may not enter field huts or use supplies except in an emergency.

Safety of visitors and ANARE personnel
- Mode of ship to shore transport is to be agreed by the Department prior to visiting.
- Two ship to shore units must be in the water before ship to shore operations begin. Personal flotation devices must be used.
- Approved emergency equipment and food must be placed on shore.
- A first aid qualified person must be in each shore party.
- Operators must be able to return all on shore to the vessel within one hour.
- Visitors must be briefed on safety requirements, and must be appropriately dressed.
- No diving or snorkelling is permitted.
- Crew members and employees of the operator are subject to all rules.
- Sufficient competent people to operate the vessel must remain on board at all times.

General
- Limits may be placed by on visits, visitors, and duration of visits each season or day.
- A deposit is required on allocation of a visit place, offset against prepaid landing fees.
- AU$150 is charged for each visitor, with revenue paying for ranger support, facilities to protect the environment, monitoring programs, interpretation material, and administration costs.
- Each guide must have customer contact skills, interpretation abilities, and an appropriate scientific background in flora, fauna, geology or cultural heritage of the reserve.
- The operator must accept responsibility for costs of search and rescue or other emergency assistance, and may be required to take out insurance cover.
- Commonwealth quarantine, customs and emigration requirements must be met.
- A written report on the visit is required.
- The guidelines apply to all types of vessel conducting tourism operations irrespective of passenger numbers, and to private vessels.

5.4.4.b Minimum impact code
A minimum impact code is provided to all visitors. The code describes the objectives of management, and provides information on the importance and status of the reserve. The need for a permit is mentioned. Visit times and ranger support are described. Quarantine precautions are discussed in some detail, including the need to ensure packing materials are clean. Clothing, footwear, and equipment must be cleaned and checked before and after landings. The bans on avian food products and on wildlife feeding are outlined. The need to return rubbish to the ship, and the ban on disturbing or collecting anything is also explained. The absence of toilet facilities is mentioned. Behaviour around wildlife is specified. Visitors are informed that animals can be under stress without exhibiting outward signs. Visitors are advised that rapid movements may cause disturbance. The minimum approach distance is advised as 'normally' five metres. Fur seals are not to be approached within fifteen metres. Visitors are to make sure that they do not get between fur seals and the sea. Visitors are also advised not to touch wildlife, surround animals, enter a colony of

breeding animals, or encroach on penguin walkways between the beach and colonies. For tourists, access to tracks is restricted to formed tracks, walkways, and beaches in the designated visitation areas.

5.4.5 SUMMARY

Macquarie Island, despite modification by introduced species, and species extinctions, has very high conservation values. The tourism management system in place is part of a broader management plan for the island as a nature reserve. A permit system is the main tourism allocation, management, and control mechanism. Land based personnel oversee all tourism operations, made possible by the presence of a permanent station, and the presence of departmental staff. Limits are placed on numbers ashore, and on the capacity of ships visiting, to maintain a reasonable visitor experience and reduce impacts. Total visitor number limits are imposed. Shore based infrastructure is provided in the form of boardwalks, and tourism activity is contained to limited areas. IRB cruising close to shore is permitted by agreement. Tourism management provisions are summarised in tables 5.6 to 5.9 below. The tourism management system allows the provision, allocation, management, and monitoring of limited tourism experiences within a conservation management framework.

5.5 TOURISM MANAGEMENT FOR HEARD AND McDONALD ISLANDS

Heard Island and McDonald Islands (officially the Territory of Heard Island and the McDonald Islands, referred to here as 'the territory' or 'the islands') lie in the southern Indian Ocean (map 5.1). Heard Island is the large (368km²) main island, while the McDonald Islands, 40km distant, are of the order of 1.8km² (WCMC 1999, Australian Antarctic Division 1995). The sea out to 12nm is included in the territory, giving a total area of 6364 km². The territory is listed on the World Heritage List. The absence of introduced plant or animal species makes Heard and McDonald Islands extremely important (Australian Antarctic Division 1995). While visitation to the island is very low, the comprehensive tourism management framework in place is instructive and justifies inclusion as a case study.

5.5.1 PHYSICAL AND ENVIRONMENTAL RESOURCE

A description of the character, climate, and environmental values of the islands is important in understanding the context of tourism and tourism management. The islands are located on the submarine Kerguelen Plateau (WCMC 1999), and are of limestone and volcanic rock, dominated by active volcanic features. Heard Island is roughly circular, around 25km across. The central massif of the island, 'Big Ben' is topped by the volcanically active Mawson Peak (2745m). A second volcanic cone forms a peninsula to the northwest. Much of the shore consists of ice cliffs and exposed rocky beaches. The island is more than 80% ice covered, with ice up to 150m deep (Australian Antarctic Division 1995). Coastal ice free areas supporting terrestrial life are limited. McDonald Island and nearby islets and rocks are low lying, ice free, and cliff lined, composed of volcanic material from eruptions near sea level. Evidence of volcanic activity was recently observed (Australian Antarctic Division 1999b).

Climate is influenced by the position south of the Antarctic convergence and altitude of the terrain. Strong westerly winds prevail. There is mean annual temperature of 1°C, with a summer mean of 3.2°C and a winter mean of 0.1°C. Snow or rain falls on 75% of days, and heavy cloud cover is very common (WCMC 1999).

Information on the vegetation of the island is taken from Australian Antarctic Division (1995) and from WCMC (1999). The vegetation is substantially unmodified by human activity. Six major plant communities are identified on the island: tussock grassland; meadow; herbfield; pool complex; cushion carpet; and fellfield. Different ice free areas have unique community compositions. 11 vascular plant species are found (five of these also occur on the McDonald Islands). None of the vascular plants are endemic. Bryophytes and lichens are important components of the plant communities, especially above 200m (WCMC 1999). On the McDonald Islands, tussock grassland and cushion carpet communities are the most common (Australian Antarctic Division 1995).

Information on fauna is taken from Australian Antarctic Division (1995). 34 bird species have been recorded, 19 breeding, with one endemic species (Heard Island cormorant). Penguins include macaroni penguins (1 000 000 pairs on Heard and the same on McDonald Islands). Southern rockhopper penguins number around 10 000 breeding pairs, and gentoo penguins number around 16 000 breeding pairs. King penguins are recovering rapidly after near extermination, with 5700 pairs. The Heard Island sheathbill (an endemic sub-species) is the only breeding population in the world unaffected by introduced predators. Subantarctic skua, kelp gull, and small numbers of three different albatross species breed. Cape and Wilson's storm petrels breed in large numbers, as do other burrowing petrels. Southern giant petrels breed. The Heard Island cormorant (also called the Heard shag) has a breeding population of less than 100 pairs in three breeding sites, and is considered rare and vulnerable (Australian Antarctic Division 1995).

Around 127 terrestrial invertebrates are recorded, some endemic or regionally endemic. The invertebrate fauna of the islands is the least disturbed of any subantarctic island and provides unique opportunities for scientific research (Australian Antarctic Division 1995).

Southern elephant seal are recovering from over-exploitation and are now abundant. Antarctic fur seal breed and are increasing from low levels. Subantarctic fur seals were found to be breeding on the island in 1987/88. Leopard seals are relatively common on the island in winter. Information on cetaceans in the territory is sparse, with six species known: hourglass whale, orca, minke whale, pilot whale, southern bottlenose whale, and spectacled porpoise. Marine life in the territory is poorly understood. There is a generally low species diversity of macrophytic algae (Australian Antarctic Division 1995). Fish include a number of commercially important species. Nine species are recorded from inshore waters and fifteen from deeper waters.

5.5.2 HISTORICAL USE AND RESOURCES

The island was officially reported in 1853. Sealing was first recorded in 1855. The McDonald Islands were discovered in 1854. Twenty years of continuous use of Heard for sealing was followed by sporadic occupation until 1929 (WCMC 1999). Elephant seals, fur seals, and penguins (especially king penguins) were exploited (WCMC 1999). A range of cultural heritage sites and artefacts, including sealing era stone platforms, hut footings and ruins, caves once occupied, barrel caches, tryworks, flensing platforms, coopering sites and domestic areas and graves, remain (Australian Antarctic Division 1995). The first Australian National Antarctic Research Expedition (ANARE) set up a station in 1957. Numerous artefacts and remains of this station are still in evidence. Remains of a 1929 shelter hut erected for stranded sailors, and of more recent expeditions are also present.

Heard Island and McDonald Islands are an external territory of Australia. Responsibility for management lies with the Commonwealth (federal) government. A maritime zone has been declared based on the 200nm exclusive economic zone and the continental shelf. The continental shelf extends into the Antarctic Treaty area. Control of the islands was transferred to Australia from Britain in 1947, formalised under the *Heard Island and McDonald Islands Act 1953* (Cwlth) (WCMC 1999). Under the Act, ordinances can be passed for administration and protection of the islands. The islands were listed on the Australian Register of the National Estate in 1983, based on their status as the only unmodified example of a subantarctic island ecosystem in the world and for important scientific and historic values. In 1987 an ordinance was passed (*The Territory of Heard Island and McDonald Islands Environment Protection and Management Ordinance 1987*) to ensure the territory is preserved and managed to protect its environment and indigenous wildlife. In 1997 the islands were listed on the World Heritage List on the basis of biological and physical processes, their role in the Southern Ocean ecosystem, the undisturbed environment, landscape features and physical grandeur (WCMC 1999). The name *Heard Island Wilderness Reserve* was assigned by the 1995 management plan 'in recognition of its wilderness values and the way in which it will be managed' (Australian Antarctic Division 1995, p. 6). There is no formal protected area designation (such as national park or nature reserve) for the area. The statutory and administrative provisions for the islands are tailored specifically, using dedicated legislation.

5.5.3 TOURIST VISITS

The remoteness of the islands, their distance from normal routes to the Antarctic, difficult access, and poor weather limit the viability of commercial tourism. The management plan (Australian Antarctic Division 1995) noted that only two small parties had ever landed. The plan anticipated increasing demand, given the unique tourism experience available, increasing interest in special interest tourism, and the dramatic nature of the attractions available. One visit was planned for the 1998/99 season, by a tourist icebreaker capable of carrying around 114 people, and no visits were planned for tourist vessels in 1999/2000 (Australian Antarctic Division 1999a).

5.5.4 MANAGEMENT OF TOURISM

The ordinance required a plan of management for the territory, and established powers of protection, including a permit system for entry, and penalties for a range of offences. The ordinance permits designation of part of the territory as a zone of special status, which can then be managed under a separate management plan. The plan of management must include: protection of the environment and indigenous wildlife; regulation of zones of special status to protect the territory while allowing use such as construction of buildings for research; and the preservation of the territory in its natural state to allow observation and appreciation of the wildlife and environment.

The management of the territory is dictated by the statutory provisions of the management plan (Australian Antarctic Division 1995). The overall vision for the territory is stated thus:

> Acknowledging the outstanding natural qualities of the Territory of Heard Island and McDonald Islands, and its great importance to the ecosystems of the Southern Ocean, management of the Territory will allow natural processes to proceed with minimal human intervention and will assign highest priority to conserving its environment, its value to research and its unique cultural heritage (Australian Antarctic Division 1995, p. 9).

The plan states that the main determinant of activities is the potential of the activity to detract from values rather than the purpose of the activity itself. Extractive activities including mining and fishing (and resource exploration or prospecting) are not permitted. The plan includes a hierarchy of goals, objectives, and strategies. Management goals designed to achieve the overall vision are:

1. To conserve the values of the Territory by preventing undue human modification of natural processes and features of the Territory;
2. To support research in the Territory that either directly assists in the management of the territory or cannot adequately be undertaken elsewhere, providing this can be achieved without degrading the values of the territory;
3. To conserve, record and interpret the cultural heritage of the territory; and
4. To promote public appreciation and enjoyment of the features of the Territory's environment, including its paramount wilderness character consistent with the primary objective of preserving and managing the Territory so as to protect its environment, indigenous wildlife, and cultural heritage (Australian Antarctic Division 1995, pp. 22–32).

The main goal relating to the management of tourism relates to public appreciation and enjoyment of the territory (goal four). Three objectives are laid out under this goal. The objectives are presented below, with the strategies to achieve each objective summarised.

Visitor's awareness—To ensure visitors to the territory are aware of the territory's features and the measures they should take to protect those features.
Strategies to achieve this objective are to:
- Provide copies of the management plan to organisers and prospective visitors, along with advice on obtaining further information.
- Develop a guide for visitor behaviour, and ensure copies are available for all visitors.
- Include in a *Guidance for visitors* information on avoiding bird burrow areas, damage to vegetation, disturbance of bird or seal colonies, and bans on feeding wildlife or disturbing historic sites.
- Ensure all ANARE visitors are briefed on the management plan and appropriate behaviour.
- Seek to place an official observer (who may act as a guide/lecturer) on tour vessels.
- Make verbal and pictorial information about the Territory and its management readily available.

Recreational use and environmental management—To ensure that tourism and other recreational use of the Territory is consistent with the management plan's primary aim of conserving the Territory's environment, indigenous wildlife and cultural heritage.
Points made regarding this objective include that:
- Commercial tourism and recreational uses are legitimate uses of the Territory provided they do not adversely affect values.
- All visitors are subject to the same provisions, including prior assessment of impacts and limits on visitor numbers.

Strategies to achieve this objective are to:
- Ensure potential visitors are advised of legal requirements and management provisions, and are provided with appropriate information.
- Record information on the level of tourist and recreational interest and activity.
- Monitor reports of tourist and recreational visits, and reports from observers, to establish the effectiveness of the plan in managing these activities.
- Consider applying a levy for commercial use of the Territory, and consider the need for services to cater to the needs of tourists or recreational visitors.
- Place an official representative on board to act as observer and possibly a guide and lecturer on selected vessels, with priority given to first time operations or those which have not been observed for some time.

Minimising injury—to minimise the incidence of injuries amongst visitors to the Territory.
Points made regarding this objective include that:
- The harsh weather, hazardous terrain, isolation, difficult access, and intermittent volcanic activity present dangers. No shelter is available and water can be hard to obtain. Search and rescue services are costly and difficult to provide, and can adversely affect the Territory's environment.
- It is essential that visitors are informed of risks, accept responsibility for their safety and take appropriate action to minimise accidents.

Strategies to achieve this objective are to:
- Inform prospective visitors of hazards, the need to be self-sufficient, and the need for adequate precautions. Include such warnings in relevant publications.
- Require persons or organisations to indemnify the Commonwealth from any liability arising from an accident and to have suitable insurance where appropriate.
- Require visitors to report any emergency use of materials in the Territory to the AAD.

The plan establishes four different management areas. The Main Use Areas coincide with areas of past and current use, and with the best access. Because of the concentration of previous use in these areas, they contain historic and cultural artefacts and sites. All visitor landings (apart from research) are to be made in the main use areas. Restricted Access Areas include all of the McDonald Islands and some offshore rocks. These have been visited rarely (some never). They serve as reference areas. Tourist and recreational visits are not to be permitted. The Marine Area is the 12nm sea around the islands, to be managed to allow natural interaction between land-based predators and the marine environment. The remainder (and majority) of the territory is designated as Wilderness and Heritage Area, and is largely free of evidence of human activity. Activity not requiring significant logistic or other support is permitted. Maintenance and use of field huts may continue, and temporary facilities may be permitted in exceptional circumstances. Transport is to be strictly controlled through the permit system.

A number of additional provisions apply to tourism. One objective relates to the prevention of environmental impact. Strategies include limiting visitor landings in the Territory to a total of 400 persons per year, and a limit of 60 ashore in the Atlas Cove Main Use Area in groups of no more than 15, each under the control of a guide. Other locations are limited to 15 persons on shore at any time with a guide. The rationale behind the limits is clearly explained. Waste management strategies applying to tourism include a ban on disposal of certain foodstuffs on land or in the waters of the Territory. Under an environmental impact assessment objective, organisers are required to evaluate potential environmental impacts. Environmental protection measures arising from impact assessments are to be included in the permit conditions. Other strategies require education of visitors to avoid introducing non-indigenous species, and a requirement to clean all footwear, clothing and equipment. Vessels are required to have a de-ratting certificate. Discharge of ballast water is banned in the Territory, as is landing of plant foods of certain families, or poultry products. The plan also makes provision for review, and includes standards for measuring the effectiveness of each objective.

5.5.4.a Guidelines for tourism

Guidelines and Instructions for visits to Heard Island and McDonald Islands World Heritage Area are available at the AAD tourism web pages (Australian Antarctic Division 1999a). These guidelines consolidate the requirements of the management plan, and describe administrative procedures. Briefing of visitors; size of shore parties; total numbers to be landed at any time; quarantine procedures and requirements; restrictions on food types; waste removal; bans on collecting or disturbing anything; permit restrictions on helicopter flying; vessel deratting certificates; and anchoring and mooring restrictions are described. The guidelines provide some safety advice, including the requirement for survival equipment to be landed.

The guidelines also describe 'Tourist Visit Zones', established to 'enable appropriate management of visitor activities and maximise the experience and enjoyment of visitors in the brief time normally available at the island' (Australian Antarctic Division 1999a, n.p.). These include the Main Use Areas specified in the management plan, and an additional area in the south of the island within the Wilderness and Heritage Area. Descriptions of the features of each of the tourist zones are provided in online and pamphlet form. These contain specific site information, including boundaries, warnings, features of interest, and access information, helicopter access corridor maps, and areas of particular sensitivity (Australian Antarctic Division 1999a).

5.5.4.b Code of conduct

A code of conduct is also provided, titled *'When visiting HIMI: remember'* (Australian Antarctic Division 1999a, n.p.) and includes advice on behaviour under the headings: 'protect animals and plants'; 'keep the territory pristine'; 'respect protected areas'; and 'take care of yourselves and others'. The advice in these areas is similar to that provided in the guidance documents of Rec. XVIII-1 of the ATS, with some additional safety provisions relating to glacier dangers and risks associated with lava tubes.

5.5.5 SUMMARY

Heard Island and the McDonald Islands are among the most pristine of the southern oceanic islands. Their freedom from introduced plant or animal species confers exceedingly high wilderness, scientific, and conservation values. The dramatic and scenic nature of the islands, wilderness qualities, isolation, and wildlife and plant attractions make the island unique as a tourism destination. To date low numbers have visited. The managing authority has instituted a management system for the reserve and has included tourism management provisions. The tourism management system is summarised in tables 5.6 to 5.9 below. Tourism is recognised as a valid use of some areas of the islands. Three sites are chosen for landings, and a permit system is in place to control visits. Limits are placed on numbers permitted ashore at different sites, and an overall limit on the number of visitors is applied. Provisions for government personnel to be on board vessels exist, but such measures are not compulsory and are not always used. The tourism management system for Heard Island provides for limited tourism in a controlled way, and provides a framework for managing tourism in the event of growth in numbers.

5.6 TOURISM MANAGEMENT FOR THE PRINCE EDWARD ISLANDS

The Prince Edward Islands lie in the southern Indian Ocean (map 5.1) 2180km southeast of Capetown, South Africa. They consist of two islands and a number of offshore rocks and stacks. Prince Edward Island is the smaller of the two (at $45km^2$) while Marion Island, lying 19km to the southwest of Prince Edward Island is larger ($290km^2$). The nearest land is the Crozet Islands, 950km to the east (Department of Environmental Affairs and Tourism 1996). The islands are extremely isolated, but are the only accessible landfall between South Africa and the Antarctic continent, and in the event of Antarctic tourism developing in the region, would be sought after as an interim destination. To date, very little commercial or recreational visitation to the islands has occurred. The policy development process undertaken by the relevant South African authorities in response to illegal landings and requests for visits is instructive, as is the outcome of this process.

5.6.1 PHYSICAL AND ENVIRONMENTAL RESOURCE

A brief description of the characteristics of the islands is appropriate to provide an understanding of the tourism resource and tourism management issues. Comprehensive information and references are provided in the management plan for the islands (Department of Environmental Affairs and Tourism 1996). The islands represent the glacially eroded summits of a shield volcano. A small ice plateau persists on Marion Island (Department of Environmental Affairs and Tourism 1996). Volcanic activity continues. The islands are characterised by volcanic and glacial landforms. Marion Island has an undissected coastline, with a low, dome like profile. There is a central highland and slope separated by a steep escarpment from coastal plains. Offshore stacks, arches, caves and sea cliffs characterise the coast. Prince Edward Island rises to 672m and has an elevated central massif (Department of Environmental Affairs and Tourism 1996). Peat soils occur in low altitude vegetated areas, and higher areas have little vegetation (Department of Environmental Affairs and Tourism 1996).

The mean annual temperature is around 5°C with little daily or seasonal variation. Precipitation is more than 2500mm each year. Cloud cover is very common, humidity is high, and winds are generally strong and westerly (Department of Environmental Affairs and Tourism 1996).

Vegetationally, the islands are species poor, with only 38 vascular species, 14 of which are introduced aliens. The 72 species of mosses and 35 species of liverworts form an important part of the vegetation. Lichen dominate at higher altitudes. None of the vascular plant species and few of the other species are endemic to the islands (Department of

Environmental Affairs and Tourism 1996). Six vegetation community complexes are described in the management plan: salt spray complex (shore areas affected by wind-blown spray); biotic complex (influenced by trampling and manuring by animals); springs, flushes and drainage lines; mire and bog complex; fernbrake complex; and wind desert or feldmark complex (rocky areas exposed to strong winds).

Bird life includes very large colonies of penguins (four species), four species of albatross, and burrowing petrels and scavengers. King penguins are the most common of the penguin species (215 000 on Marion Island and 5000 on Prince Edward Island) (it is unclear whether these are estimates of breeding pairs or individuals). Macaroni penguins breed (405 000 on Marion and 17 000 on Prince Edward Island), as do Rockhopper penguins (137 600 on Marion and 35 000 on Prince Edward Island), and a few gentoo penguins (900 on Marion Island and 650 on the Prince Edward Islands). Comparatively large numbers of albatross breed, with 1500 wandering albatross on Marion and 1300 on Prince Edward Island. 5000 and 1500 greyheaded albatross breed on Marion and Prince Edward Islands respectively. Smaller numbers of sooty albatross and lightmantled sooty albatross breed. Around 7000 yellownosed albatross breed on Prince Edward Island. Northern and southern giant petrels are present. Kelp gulls, lesser sheathbills, and subantarctic skua breed. Twelve species of burrowing petrel have suffered due to the former presence of cats, although recovery has been quite dramatic (Cooper 1995a). Prions and cormorants also breed.

Three species of seal breed on the islands, and three species visit occasionally. Southern elephant seals number around 2000 on Marion Island and 780 on Prince Edward Islands, but are declining. Antarctic fur seal breeds in small numbers on Marion Island, and subantarctic fur seals breed in very large numbers. Leopard seals, weddell seals, and south african fur seals visit. Terrestrial mammals were introduced to Marion Island. Feral cats were recently eradicated, a first for a subantarctic island. Indications are that the islands are species poor in invertebrates compared to similar sized islands in the Crozet group, probably due to past glaciation. Many of the 89 recorded invertebrate species are introduced (Department of Environmental Affairs and Tourism 1996). Prince Edward Island is free of introduced animal species. There is a low degree of endemism in marine invertebrates (Department of Environmental Affairs and Tourism 1996).

5.6.2 HISTORICAL USE AND RESOURCES

The islands were discovered first in 1663. They were re-discovered by ships under the command of French naval officer Marion Du Fresne in 1772. Cook, on his third voyage in 1776 renamed them the Prince Edward Islands (Department of Environmental Affairs and Tourism 1996). By 1810 fur seal populations were close to extinction. Elephant seal exploitation and visits by whaling vessels occurred after 1810, with sealing rapidly becoming uneconomic. Scientific activity was sporadic with a British expedition in 1873, and a French expedition in 1939. Whaling in the region was the dominant activity after the 1930s. The first meteorological team replaced a military group in 1948, and a station has been operated since. An EIA was carried out in 1986 for a proposal to build an emergency landing facility on Marion Island, with the proposal dropped as a result.

Historical resources include artefacts in several sites from the sealing era, mainly shelters, tools, containers, and trypots. The remains of a village of 17 huts built by shipwrecked sailors are visible (Department of Environmental Affairs and Tourism 1997).

Despite Dutch and French discovery of the islands, they were treated as a British possession, with proprietary rights for sealing allocated by the British government (Rubin 1996). In 1947 a South African military party annexed the islands. Until 1995, the islands were managed through interim guidelines in the form of a Department of Environmental Affairs and Tourism Code of Conduct (1988), applying to all activities. This code declared that activities should be conducted in accordance with the *Agreed Measures for the Conservation of Antarctic Fauna and Flora* and CCAMLR (of the ATS). Formal protection in the form of status as a Special Nature Reserve was achieved in 1995 under the *Environment Conservation Act 1989*. The management planning process began in 1992 after a number of calls for a management plan (Cooper 1995a).

5.6.3 MANAGEMENT OF TOURISM

Until 1995 a *Code of Conduct for the Prince Edward Islands* (Department of Environment Affairs 1988, p. 4) was used to manage activities on the islands. This code stated that visits by anyone other than scientists and government personnel required a special permit from the Department, because of the fragility of ecosystems and the need for all resources to be used for official science activities. Visits authorised by the Department were to be contained to Marion Island, as Prince Edward Island was regarded as a 'Specially Protected Area'. The code made allowance for the declaration of specially protected areas within the islands. Flying about, around or between the islands for sightseeing purposes was also banned under the code.

In 1989 the *Environment Conservation Act* superseded the code. The islands, as a Special Nature Reserve, fall into the most protected category (of four) under the Act, being managed for research and the preservation of their wilderness character (Department of Environmental Affairs and Tourism 1997). This status corresponds to IUCN Category 1a. A management plan now applies (Department of Environmental Affairs and Tourism 1996). The management plan contains a number of elements important to understanding the management position taken on tourism. Policies on access are laid out in the plan. The controlling authority may allow entry to a Special Nature Reserve to persons desiring to view a reserve because of its special nature or characteristics, or for science or management visits. Access to the islands is controlled, and visitor numbers (including science visitors) are regulated. The Director-General of the department, may, on the advice of the management committee, issue entry permits for non-study visits. Prince Edward Island is declared a Special Entry Area. Special Entry Areas are closed to all access excepting occasional strictly limited scientific visits.

Under the plan, a zoning system is applied. Five zones are declared, four on land and one marine zone. Zone 1 is a service zone, and includes the present station on Marion Island, intending to centralise support and administrative facilities to minimise their impact. Zone 2 is called a natural zone, being a buffer zone between the service zone and more protected zones. Areas close to the station (approximately 2–3km inland of the station) and areas around field huts are included in this zone. Limited free walking is permitted in the zone. Zone 3 is a wilderness zone, where protection of natural resources and the character of the environment are primary considerations. The zone is closed to general access but open to approved research activity. The majority of Marion Island falls within this zone. Zone 4 is a protected zone, and all entry is prohibited unless in accordance with a Special Permit. Rigorous application of quarantine, waste, and sewage disposal provisions are required in this zone. Some areas of Marion Island are included in this zone (gentoo penguin and southern giant petrel colonies, some albatross colonies, and all historical sites). All of Prince Edward Island is zoned as Zone 4. Visits to areas in Zone 4 are limited to science activity only, one visit per year, by up to six people, for a maximum of four days per visit.

The management plan briefly addresses tourism visits, noting that while visits are not prohibited under the Act, public interest in the islands can be satisfied in other ways. The plan stresses that facilities on the island are sufficient only for those involved in science and government activity, and that no information is available on the likely impact of tourism on island values. The plan states that no tourism is envisaged for the islands, but that non-study and educational visits will be considered. The management committee was to advise the Director-General of the Department on proposed visits and on tourism as a whole. The initiation of an EIA on the effects of limited tourism in Zone 2 was noted (Department of Environment Affairs and Tourism 1996).

5.6.4 EIA OF TOURISM ON MARION ISLAND

An EIA process, examining potential tourism in Zone 2 areas of Marion Island was conducted (Department of Environmental Affairs and Tourism 1997). The document illustrates some very important points, and sets some precedents. The EIA stated that no permission has ever been granted for tourist visits to the islands, although at least two breaches of the ban on tourist visits to Prince Edward Island have occurred (Department of Environmental Affairs and Tourism 1997). The EIA was prompted by applications from tour operators for visits to Marion Island, and the increase in tourist activity to other subantarctic islands. The applications to visit were denied at the time on the basis of insufficient information about likely tourism impacts, lack of facilities to house tourists in the event of an emergency, lack of facilities such as boardwalks to mitigate tourism impacts, and lack of search and rescue capacity. A sub-committee of the Prince Edward Islands Management Committee was formed to consider tourism at Marion Island. The terms of reference for the committee were to: investigate the possibilities for controlled, limited tourism to Zone 2 of Marion Island; complete an EIA of limited tourism to Zone 2; and investigate the possibility of constructing facilities to house tourists in an emergency and boardwalks to mitigate tourism impacts.

The EIA process included a scoping study among interested and affected parties, specialist reports on the impact of tourism on the environment, and other data collection. At the time of writing, the EIA report was in the draft stage, and being promulgated for expert and public comment.

The EIA developed two alternative tourism scenarios, based on proposals by operators, limitations imposed by the management plan, and a number of assumptions. The proposals presented to the managers involved large ship visits, with around 600 passengers making landings, smaller ship visits with around 100 passengers making landings, and smaller ship visits making no landings but IRB cruising close to shore. Limitations imposed by facilities and the management plan included shore accommodation for only 50 people, restriction of activities to Zone 2, and a ban on using helicopters to land passengers. Assumptions included that two groups of 25 were the maximum that could be accommodated on the island (due to space in the facility and logistics of transferring people from ship to shore); that each group should spend no more than four hours on shore, due to safety concerns and the length of time required to view the island; and that tours would take place in summer, due to the presence of wildlife at this time. The scenarios examined in the EIA were therefore: large, general interest tours (with 100 to 500 passengers, little specific knowledge on the part of clients, short landing times, and IRB cruising); small, special interest tours (40–100 passengers, more specific knowledge of the environment in question, accompanied by guides, and longer shore visits due to smaller numbers embarking and disembarking); and the no tourism alternative (including continued visitation by scientific or government personnel).

Three landing sites in Zone 2 were assessed according to criteria of rockiness, shelter, access to the station, wildlife viewing, safety, zoning, and wildlife viewing suitability. One site emerged as more suitable than the others, although some distance from the station (one hour walking), and with some safety risks from fur seals.

Impact assessment was based on impacts identified in the scoping study as being of concern or relevance, using the criteria of magnitude, intensity, scale, duration, probability and reversibility. The criteria were compared for the three alternative scenarios. Impacts examined included:

- Biophysical impacts (trampling of vegetation and soil; disturbance of seals; impacts on birds; impact of alien organisms on the survival of native species; impact on the marine environment).

- Social impacts (disturbance of base activities; disturbance of scientific monitoring activities; impact on historical artefacts; aesthetic impacts; impacts on education and awareness).

In addition, cumulative and synergistic impacts were examined. The EIA concluded that:

- Marion Island is more suited to the landing of small tourist parties than large parties, due to poor weather limiting time, the presence of only one suitable landing site, and risks posed by seals breeding at that landing site.
- The no tourism alternative was rated as having the least negative impact, followed by the small special interest tours alternative, with the large general interest tours alternative having the greatest impact.
- Certain impacts have a linear relationship between numbers of visitors and risk of occurrence. The small special interest tours alternative has a lower likelihood of certain impacts than large general interest tours.
- Tourism fees were not likely to cover the costs of tourism management.
- Both of the tourism alternatives may decrease the likelihood of illegal landings by providing a legal alternative and by increasing the legal presence around the islands.

The recommendations of the EIA were framed in light of financial constraints likely to limit management options. They were that:

- No large tours (more than 100 tourists) should be allowed to visit Marion Island under any circumstances.
- Small special interest tours of up to 100 tourists should be allowed, under a permit system forming part of an Impact Management Plan. Permits will depend on compliance with guidelines (that will form part of the Impact Management Plan).
- Tour operators must pay for a full time employee to coordinate permitting and tourist management.
- All impacts of tourism must be monitored by a conservation officer, and access for tourism may be reviewed if an unacceptable level of impact is detected.
- The EIA recommendations and the Impact Management Plan should be reviewed annually.

5.6.5 SUMMARY

The process adopted for developing tourism policy for Marion Island is ongoing—the EIA is not yet finalised (Jacobs, C. 1999, pers. comm., 30 August). The approach used is unusual in a number of respects. First, it is an example of tourism policy development and management initiated and largely completed before tourism usage begins. The responsible authority is in the unusual and arguably ideal position of being able to develop a tourism policy (and management system if tourism is eventually approved) before any industry has developed, without the need to deal with local precedents or pre-existing tourism related problems. This should allow the managing authority to put well thought out policy and management in place. Tourism can be constrained from the start, a situation more likely to result in an optimal outcome. The alternative in many cases is management intervention in a well established industry that may already be causing avoidable impact.

There may also be disadvantages, in that policy is developed without having the viability, operational characteristics, and potential problems of tourism tested in practice. The EIA may result in development of policy and management positions that prove unsuitable in light of the practicalities of tourism operations. An additional problem with the approach may be that the management plan (as opposed to the EIA) for the islands was prepared without detailed reference to visitation issues. This means that the tourism policy development process was constrained by a management plan that had set aside issues of tourism (or had decided that tourism was largely inappropriate). The EIA process reflects this in the assumptions and restrictions involved in developing the tourism alternatives for examination.

If the need for a comprehensive assessment of the environmental effects of tourism is accepted, then the approach adopted by South Africa for the Prince Edward Islands has a number of advantages. First, an EIA process carried out by the government authority can encompass all tourism activity, examining the effects of an entire industry. An alternative approach involves each tourism operator conducting an EIA for their own activities. While this serves a useful role in ensuring that the operator understands the effects of their activities, and may encourage operators to adopt best practice, it does not provide an overall analysis of the environmental effects of tourism on an area. The 'single EIA by government' approach also ensures that the effects of different tourism policy options are examined, while operator assessments are necessarily limited to forms of tourism they are interested in or capable of.

Second, the 'single EIA by government' simplifies the process for all concerned. While monitoring and review will still be necessary, annual or per-visit review and approval of operator EIAs is not necessary for the administrative authority. Similarly, operators have less of an administrative load if they are not required to provide EIAs for every season or voyage. If operational parameters are set as a result of the government EIA, operators should be able to conduct activities in the knowledge that the impacts have been examined and are considered as part of a wider conservation management scheme.

Many other nations follow a similar process to that used by South Africa, but incorporate their tourism policy development in the management planning process, rather than a formal, separate EIA. While this may provide a similar result, a formal EIA process, with its more specific and detailed focus on tourism issues, and with opportunity for specific consultations with affected groups, may produce better information for developing policy and strategy, that can then be incorporated in management plans.

A final area of interest arising from the South African process is the philosophy underlying the EIA. Beginning without the precedent of an existing industry, some basic aspects underlying the EIA of tourism are noteworthy. The EIA assumed that tourism activity must take place close to the station. This was to enable supervision of visits by government personnel, allow for emergency medical aid, and allow visitors to reach accommodation in an emergency. A related assumption was that emergency accommodation for all visitors must be available on the island. These limits indicate a precautionary approach to safety issues that is not in evidence in other case studies. This is not to say that this is a more correct approach—the policy of requiring full self-sufficiency adopted by other nations may be equally valid.

5.7 Tourism management for Gough Island Wildlife Reserve

Gough Island lies in the South Atlantic ocean, around 350km southeast of the main Tristan da Cunha group (map 5.1). The island is a British Possession, part of distant Tristan da Cunha, which itself is a dependency of the United Kingdom Crown Colony of St Helena (Cooper & Ryan 1995). Tourism is not a major management issue at present, but some provisions have been made that will be briefly discussed here. As with the Prince Edward Islands, the managing authority is in a position to develop tourism policy before the advent of regular tourism activity. The island, its rocks, islets and stacks, all of which are within around 100m of the coast, and the waters out to 3nm, form the Gough Island Wildlife Reserve, under the *Tristan da Cunha Conservation Ordinance*. The island is World Heritage listed on the basis of its important natural values. Unless otherwise stated, information is derived from the management plan (Cooper & Ryan 1994).

5.7.1 Physical and environmental resource

Gough Island is considered cool temperate, and is within the area of influence of the sub-tropical convergence (Cooper & Ryan 1995, Cooper & Ryan 1994). It is often classified insulantarctic (Clark & Dingwall 1995 cited in Cooper & Ryan 1995). Gough Island is regarded as the least disturbed or modified of the cool temperate oceanic islands (WCMC 1999). The island is roughly rectangular, about 14km long and 6km wide, and around 65km². The island is mountainous and dissected, with steep coastal cliffs and an undulating plateau rising to 910m, with steep valleys and ridges. The coast has boulder beaches under cliffs, and islets, rocks and stacks (Cooper & Ryan 1994). Soils include peats, while exposed ridges and mountain peaks support thin mineral soils. The climate of the island is oceanic, with an average annual temperature of 11.5°C and low annual variation. Winter snow falls on high peaks. Rainfall averages 3116mm, spread across the year (Cooper & Ryan 1994).

The island has a low vegetative species diversity. 12 species are endemic, 49 are regionally endemic, and 24 are introduced. Vegetation communities include: tussock grassland; fern bush which includes a species of low tree, and a tree-like fern; wet heath; feldmark and montane communities; and peat bogs on level upland areas (Cooper & Ryan 1994).

Gough Island has impressive bird fauna, with very large colonies, and a wide diversity of species. Of 54 bird species recorded on the island, 22 species breed (20 of which are seabirds). While none of the seabirds are endemic, many breeding populations on Gough represent significant proportions of the world population—48% of the worlds northern rockhopper penguins, around 25% of the worlds sooty albatross, and virtually all pairs of a northern race of the wandering albatross. Two landbird species are endemic and rare (Gough moorhen and the Gough bunting). Breeding bird populations are large, with significant numbers of rockhopper penguins (144 235 breeding pairs), great shearwater (300 000 pairs), and broadbilled prion (more than 100 000 pairs). Large populations of wandering, yellownosed, and sooty albatross breed. Introduced birds are no longer present (Cooper & Ryan 1994). Around 124 species of invertebrate are recorded, some 14 endemic. The marine and coastal environment has not been subjected to detailed study. Fish, octopus, and Tristan Rock Lobsters are all commercially exploited in the waters of the wildlife reserve.

Two species of marine mammals breed at the island, with around 200 000 subantarctic fur seals, and around 100 southern elephant seals. Whales seen near the island include southern right whales in small numbers, and dusky dolphins in large schools (Cooper & Ryan 1994). The house mouse is present on the island, and is widespread and abundant in all habitats except for islets, rocks and stacks.

5.7.2 HISTORICAL USE AND RESOURCES

Gough Island has been known since 1505, was rediscovered in 1655, with the first landing recorded in 1675 (Rubin 1996). Sealers first arrived in either the 1790s (WCMC 1999) or in 1804 (Rubin 1996), beginning the normal pattern of rapid exploitation and depletion of seal populations. Sealing continued through the 19th century (Cooper & Ryan 1994), and whaling occurred between 1830 and 1870. The islands were proclaimed a British Possession and dependency of St Helena in 1938. The first intensive scientific investigation was in 1955–56, with a private Gough Island scientific survey. The Republic of South Africa operates a weather station at Transvaal Bay under lease from the Dependency of Tristan da Cunha. A meteorological team of seven is present year round, with other scientific work being limited to periods of resupply and changeover. Present research is limited to annual environmental inspections for the Tristan da Cunha government. There is a commercial fishery for Tristan Rock Lobster with all fishing close to the shore. Impacts include seabird mortalities. Octopuses are taken as by-catch. Some poaching also occurs (Cooper & Ryan 1994).

The Government of Tristan da Cunha, which consists of an Administrator and an Island Council manages Gough Island (Cooper & Ryan 1994). Dependencies of the UK are largely self-governing, and UK financial assistance to Tristan da Cunha ceased in 1980 (The

Commonwealth Secretariat 1999). The economy is based on the rock lobster industry, other fishing, and the sale of stamps and handicrafts. The governing authority has limited resources for conservation management. The draft management plan was funded by the UK Foreign and Commonwealth Office and the UK WWF (Cooper & Ryan 1994).

Gough Island landbirds were protected under the *Wild Life (Tristan da Cunha) Protection Ordinance* of 1950. Continuing concern about introduction of alien species and removal of animals for zoos prompted the declaration of a wildlife reserve under the *Tristan da Cunha Conservation Ordinance* 1976 (Cooper & Ryan 1995). This ordinance provides protection for native mammals, birds and terrestrial plants. Erection of buildings without a permit, agriculture, and importation of alien biota are prohibited under the ordinance (Cooper & Ryan 1995). The waters of the island within the 200nm exclusive economic zone are governed for fisheries purposes by the *Tristan da Cunha Fishery Limits Ordinance* of 1983.

Historical levels of tourist visitation to the island are not presented in the management plan, and are not (to the knowledge of this author) readily available. Headland (1994b) places the first tourist visit to Gough Island in 1970. Rubin (1996, p.98) refers to Gough as 'rarely visited' but lists one planned visit for the 1996/97 season. The management plan states that 'there is no public access to the island, although tourist vessels from time to time express an interest in visiting' (Cooper & Ryan 1995, p. 4). It is clear that visitation is uncommon.

5.7.3 MANAGEMENT OF TOURISM

The overall policy for management is that the reserve 'should be managed as a Strict Nature Reserve / Wilderness Area (IUCN Category 1) and as a World Heritage Convention Natural Site, with emphasis placed on the conservation and scientific study of its indigenous biota and ecological processes, as well as of its geological and scenic features.' (Cooper & Ryan 1994, p. 27).

The management objectives for the island can be summarised as:

- To conserve indigenous flora, fauna and ecological processes in as natural a state as possible.
- To maintain geological features and processes and scenic features.
- To prevent introduction of alien flora and fauna, and eradicate or control those previously introduced.
- To protect historical sites and artefacts.
- To encourage natural science research not in contradiction with the above objectives.
- To prohibit or control activities that are (or may be) in contravention of the above objectives.
- To allow and manage fishing to avoid irreversible change to the marine environment.
- To promote an awareness through education of the value and significance of the reserve.
- To have the island placed on the World Heritage List.

Unlike in some other management plans, specific strategies or actions for achieving these broad objectives are not arranged hierarchically in the plan, and linkages between the various objectives and management provisions are not made explicit. At the outset, the objectives do not acknowledge recreational or tourism use of the reserve as a legitimate use, but some provision is made for future tourism activity. The management plan overall is written for scientific and management activities.

Written permission from the Administrator of Tristan da Cunha (the Administrator) is required for access. Access is limited to the station area (using helicopters or the cliff-top crane), and landings elsewhere are restricted to those for management or scientific purposes. Wildlife protection restrictions apply to helicopter use in all areas. Small boats may not approach whales, dolphins or seals in the water closer than 50m.

A zoning system is applied. A logistic zone surrounds the station, within which constructions and year round habitation are permitted. A marine zone, including waters to 3nm, is restricted to vessels holding a rodent-free certificate, and vessels may be required to proceed to Tristan da Cunha before entering the zone to complete customs, immigration and health controls. Recreational fishing is permitted. Recreational snorkelling and SCUBA diving is permitted from the shore abutting the logistic zone (keeping in mind that these provisions are intended for government personnel). Temporary scientific research zones may be declared to protect research, with permits required to enter. Offshore islets, rocks and stacks are zoned as scientific zones. The remainder of the island is a conservation zone. Access may be on foot, or by boat or helicopter. Activities permitted in this zone include recreational visits by government personnel, including walking, climbing, exploration, photography and camping. Overnight visits are limited to groups of four, only eight people may be in the zone on overnight trips at once, and overnight trips will not exceed seven days. Disturbance of historical sites and artefacts is prohibited. All biota are protected, and feeding of wildlife is prohibited. Import of leafy vegetables and domestic animals onto the island is prohibited. Other fresh food should be irradiated where possible. Poultry produce is banned from the conservation and scientific research zones. Vessels in the reserve must have effective blackout blinds and show no lights (other than navigational lights) to prevent bird strike.

The management plan makes provision for EIA procedures, triggered at the decision of the Administrator. The Gough Island Wildlife Reserve Advisory Committee has responsibility for overseeing EIA processes. As described below, the plan requires an EIA of tourism activity before any can proceed. A specific section outlines tourism policy. The plan states that:

> it is considered that the Gough Island Wildlife Reserve is not a suitable place for visits by tourists, whether arriving by yacht or passenger vessel. The paucity of sheltered landing beaches makes landings from small boats such as inflatable dinghies difficult on days of good weather and impossible on days of bad weather. Facilities at the meteorological station are inadequate to support tourism and tourist visits could adversely affect the daily work of the residents (Cooper & Ryan 1994, p. 47).

The plan suggests EIA procedures based on those of the Protocol, with IEE and CEE stages. Signage at entry points, and making the management plan available to all personnel, tourist organisers, and captains is suggested. A visitors guide in the form of 'an abbreviated, illustrated version of the management plan' is to be supplied to all visitors (Cooper & Ryan 1994, p. 50).

Other non-science visits requiring overnight stays, that have no environmental management or scientific value, such as recreation, exploration, climbing or ham radio purposes are not permitted in the reserve. The section goes on to note that the steep coastline would mean that any landings away from the station area would be on seal and penguin breeding shores on the sheltered east coast. High chances for disturbance of the animals exist, and access to the interior is only feasible in one location, 'The Glen'. The plan recognises that there may be some chance that tourism will be considered (it is not stated why a firm determination cannot be made under the plan). A number of provisions are made in the event that tourism is considered. The first is that an EIA procedure be followed before tourism is allowed. In advance of an EIA the plan suggests some tourism management options, summarised as follows:

- Vessels must first go to Tristan da Cunha for customs, health and immigration controls.
- Tourist landings should be restricted to day visits, with parties of less than 20 persons.
- Visits should be limited to 'The Glen', and a sign should be erected at the shoreline, specifying permitted activities and informing visitors they are entering the reserve.
- An inland limit should be marked, beyond which tourists may not proceed.
- Landings should be from small boats only, with helicopter landings banned.

- Small boat cruising should be permitted along northern and eastern coasts outside the surf and kelp zones, to allow viewing of scenery and wildlife. Speeding, anchoring, fishing, or approaching marine mammals closer than 50m should be prohibited.
- Tourist visits should be accompanied by a conservation officer. Fees should be instituted and costs of the conservation officer should be covered by the operator.
- Instructions of the conservation officer, and provisions of the plan must be obeyed.
- The conservation officer should ensure no alien plant or animal propagules are transferred ashore in clothing or equipment.
- Food should not be taken ashore.
- Animals should not be approached closer than 5m.
- No toilet facilities will be provided and human wastes must be deposited below the high water mark.
- Smoking ashore should be prohibited.

In addition to these provisions, the plan suggests that monitoring of seal and penguin numbers and breeding success at 'The Glen' and at a control site be instituted. Other factors to be monitored include trampling effects, and surveys for introduced species.

5.7.4 SUMMARY

The tourism management provisions for Gough Island are summarised in tables 5.6 to 5.9 below. The most important point relating to tourism management on Gough Island is the opposition of the management plan to tourism, contrasting with the fact that provisions for tourism are suggested. This tends to indicate that the management planners felt that there was some likelihood of pressure for (or a need for) tourism at the island. The linkages between the resource information, management objectives, and the decision to oppose tourism are not made clear. The unusual administrative and governmental context of Gough Island, coupled with the small size of the economy, may have some influence on tourism policy, given the fact that even small scale tourism may be of economic benefit. Tourist operations, attracted mainly by the characteristics of Gough Island, are also likely to utilise the settled island of Tristan da Cunha.

The provisions for tourism management, should tourism be approved as an activity, are instructive. The plan calls for an EIA process to be undergone before tourism is approved (it is a little unclear if the EIA process envisaged applies to development of tourism in general, or to individual operations and activities—it is presumed that the former was intended). Other suggested provisions are in line with tourism management at other islands. It should be remembered that these provisions do not (at least at the time of publication of the management plan) have force—they are suggested provisions in the event of tourism proceeding, and would be superseded or ratified through the EIA process.

5.8 TOURISM MANAGEMENT FOR SOUTH GEORGIA

South Georgia is positioned in the Atlantic sector of the Southern Ocean 2000km east of the tip of south America (map 5.1). The island lies to the south of the Antarctic convergence, is mountainous, and more than 50% of its area is ice covered (BAS 1999a). The limit of winter sea ice occasionally reaches the island. The island is large (3755km^2), around 170km long and 40km wide (BAS 1999a). The island is part of a British Dependent Territory (South Georgia and the South Sandwich Islands (SGSSI)), and is administered by a civil commissioner based in Stanley, Falkland Islands, who is also the Governor of the Falkland Islands (The Commonwealth Secretariat 1999). Tourism to the island is substantial in comparison to many southern oceanic islands, partly because of the proximity of the island to the popular Antarctic Peninsula region. Information on the island is derived from the BAS (1999a) *Environmental Management Plan for South Georgia: public consultation paper*, unless otherwise specified.

5.8.1 PHYSICAL AND ENVIRONMENTAL RESOURCE

The territory includes the main island, offshore rocks and islands, and a 12nm territorial sea. The southeast part of the island is dominated by a heavily dissected mountainous range (the highest peak is 2960m), with lower, more scattered peaks to the northeast. Ice free areas include steep sided valleys and coastal lowlands. Prevailing winds are westerly. On the windward side of the island there is little ice free ground, with glaciers extending to sea level. The northeast side is indented by fjords separated by peninsulas, and is substantially ice free, although the valleys hold large glaciers (BAS 1999a).

The landscape is glacial or post-glacial, and shows signs of active weathering (BAS 1999a). Some peat deposits occur and soils have formed in some places. Around twenty freshwater lakes lie along the north-east side of the island, as well as many small ponds and tarns, all of which may be ice covered for more than half of the year.

Climate is severe due to topography and the location south of the Antarctic convergence. The draft management plan describes the weather as cold, wet, windy and cloudy. Strong westerly winds prevail. Average annual temperature is 2°C, with a summer average of 4.8°C and winter of -1.2°C. Katabatic winds can occur. Precipitation is variable, with an annual average of 1602mm (BAS 1999a).

Vegetation composition is influenced by isolation from other land masses and the cool climate. In general, the flora is closely related to that of the Falkland / Malvinas Islands, and southern south America. No trees or shrubs are present. 25 indigenous species of vascular plant are recorded. Around 40 introduced plant species persist, and an introduced grass is widespread. Five vegetation communities are identified, all occurring at low altitudes (up to 200m) (BAS 1999a).

81 species of bird have been recorded, with 31 species breeding, and 33 species vagrant. Nine species of penguins are recorded, with four breeding regularly. Macaroni penguins number more than two million breeding pairs, in several large colonies. King penguins number around 400 000 pairs. Gentoo penguins are distributed in smaller colonies around the island. Chinstrap penguins and rockhopper penguins breed irregularly (BAS 1999a). Seven albatross species are recorded. Black-browed albatross breed (100 000 pairs). The grey-headed albatross population, with 80 000 pairs, represents 46% of the global total. 15% of the global wandering albatross breeding population (4000 pairs) occurs, and light-mantled sooty albatross also breed. 21 species of petrels and shearwaters are recorded, with eight breeding, some in very high numbers (Antarctic prion, for example, number 22 million pairs). Both southern giant and northern giant petrels breed. There is an endemic duck (South Georgia pintail) and the endemic South Georgia pipit. Threats to bird species include deaths of albatross as a result of fishing, commercial fisheries affecting food resources, habitat damage by reindeer and Antarctic fur seals, and egg and chick predation by rats (BAS 1999a).

The terrestrial fauna is limited by the isolation, climate, and previous glaciation events. Terrestrial invertebrate fauna includes around 230 species, one third being endemic, and a number of introduced insects have established themselves (BAS 1999a). Toothfish and icefish are fished commercially, as are 13 species of lanternfish. The planktonic invertebrate community is dominated by krill which are fished commercially. Foreshores have low species diversity and abundance, because of cold, ice abrasion, and a small tidal range (BAS 1999a).

Six species of seal are recorded. Antarctic fur seals are superabundant after nearing extinction during the sealing era, and 96% of the world population breeds at South Georgia (1 550 000). The population is growing at around 10% each year. Colonies are mainly on the beaches at the northwestern end of the island, with expansion along the coast. Southern elephant seals, depleted by sealing, number around 110 000 breeding females, around 54%

of the world population. Small numbers of Weddell seals breed on the island. Leopard seals are common on South Georgia during winter months (BAS 1999a).

Waters around South Georgia contained high numbers of whales before the whaling era, including blue, fin, sei, humpback, and southern right whales. South Georgia was a focus of whaling effort, with shore based and floating factory operations. All of the above whale species are now present, as well as sperm whale, orca, southern bottlenose whale, long-finned pilot whale, hourglass whale, and spectacled porpoise (BAS 1999a).

Three introduced mammals have established permanent populations. Reindeer were introduced by Norwegian whalers as a food source with around 2000 animals remaining (Lewis-Smith 1995). 20% of the snow free area of the island (313km²) is occupied by reindeer (Lewis-Smith 1995), which have a substantial impact on native vegetation. Brown Rats are abundant and widespread, and have a severe impact on the ground nesting birds. House mice are also present (BAS 1999a).

5.8.2 HISTORICAL USE AND RESOURCES

Information on historical use and resources is from BAS (1999a). The first recorded landing was made by Cook in 1775. Sealing began in 1778 and continued until 1825. The fur seal was protected in 1908. For a long time activity was concentrated on the coast, and the first major inland journey was by Shackleton's party on their famous and desperate traverse over the mountains in 1916. Inland scientific expeditions began in 1928. BAS expeditions began in 1967.

Land-based whaling began at Grytviken in 1904. Six land stations were operating by 1912. Whaling factory ships also anchored close to shore. Open ocean factory ships played a greater role from 1925. Whaling at South Georgia ceased in 1965. A permanent British administration was established in 1909, at King Edward Point until 1969, when the site was transferred to BAS and a research station was developed. In 1982 the station was occupied by the Argentine military during the Falklands conflict. A British military garrison took over the station after the conflict had ended, and is due to leave in 2000. There is a research station on Bird Island off the northwest tip of South Georgia, accommodating up to eight people. Field huts are also present on Bird Island and the main island.

The former station manager's villa at Grytviken has been turned into a museum. Displays include information on wildlife, whaling history, expedition and exploration history, and artefacts, photographs and paintings. A signposted heritage trail around the whaling station and cemeteries is maintained by two resident curators. A post office sells philatelic items and accepts mail (BAS 1999a).

Historic and cultural resources include six abandoned whaling stations, in varying states of decay. Four of the stations were used up to the 1960s and left intact in case of the resumption of whaling. Other historic sites include a number of cemeteries, artefacts from the sealing era, occupied cave sites, hut sites, try-pots, and wooden implements and artefacts from ships. Artefacts from scientific expeditions exist. 50 shipwrecks are recorded for the island, the earliest dating from 1796.

5.8.3 TOURIST VISITS

The first tourist visits occurred in 1924 (Headland 1994b). Dingwall (1985b) cites Lewis-Smith and Bonner who stated that in 1991/92 six tourist vessels and six yachts visited South Georgia, with more than 500 people visiting the museum at Grytviken. The draft management plan (BAS 1999a) records regular tourist visits since 1970, most for observation of wildlife, scenery, and historical features, with some participating in adventure activities. More recently, tourists have numbered around 1600 each year and an increase is expected (BAS 1999a). Trends foreseen by the management planners include larger vessels with more passengers, more yacht visits, and an increased demand for adventure pursuits such as skiing, walking, kayaking, and SCUBA diving. The proposed management plan identifies potential tourism impacts as: direct disturbance and damage including trampling of vegetation and burrows, disturbance of breeding sites, and damage to built heritage including souveniring; pollution by activities or by accidents, such as fuel spills, litter, and waste and sewage disposal; and introductions of plant and bird diseases, and of non-native flora and fauna. The draft plan notes that there is 'very limited scientific evidence so far of significant deleterious effects caused by visitors to South Georgia, apart from damage to built heritage and introductions of alien fauna and flora' (BAS 1999a, p. 63).

5.8.4 MANAGEMENT OF TOURISM

The area was a dependency of the Falkland Islands until 1985 when the territory was declared. The islands are governed by a commissioner (the Governor of the Falkland Islands), who manages legal, financial and administrative arrangements (this also constitutes the Government of SGSSI). International relations are managed by the Government of SGSSI and the British Foreign and Commonwealth Office. Local administration is by the Marine Officer at King Edward Point (The Commonwealth Secretariat 1999, BAS 1999a).

The Government of SGSSI commissioned a public consultation document from BAS detailing environmental management and conservation policy for the island. The resultant document *'Environmental Management Plan for South Georgia: public consultation paper'* (BAS 1999a) is referred to here as the draft plan. The *Falkland Island Dependencies Conservation Ordinance* (1975) currently allows for designation of protected areas, and flora and fauna protection regulations (BAS 1999a). The ordinance would be replaced with legislation implementing the conservation policy developed in the draft plan. Two ordinances relate directly to tourism: the *Visitors Ordinance* (1992) allows the levying of visit fees (*Visitor (Landing Fees) Regulations* under this ordinance increased fees in 1998); and *The South Georgia Museum Trust Ordinance* (1992), which established a trust to manage the museum, and transferred lands and objects to the trust. Additional regulations apply to customs fees and harbour fees. More general regulations provide for export of wild mammals and birds, transhipment and export of fish, and conservation and management of fisheries (giving effect to CCAMLR).

A range of new legislation is envisaged under the draft plan (BAS 1999a). Importantly, despite the extremely high values of the island, it is not designated as a protected area proper. The main mechanisms of protection are at present the 1975 conservation ordinance and associated legislation.

The management objectives for the island are summarised from BAS (1999a).

1. To conserve the indigenous flora and fauna, ecological associations, and natural environment of South Georgia.
2. To remove introduced flora and fauna as far as possible and prevent further introductions.
3. To manage and preserve historic and archaeological features.
4. To manage human activities to protect fauna, flora, and natural features, and encourage restoration and rehabilitation activities.
5. To manage sustainable tourism compatible with objectives one and three, and ensure the provisions of the *South Georgia Visitor Code* are met.
6. To sustainably manage fishery activities to prevent adverse impacts on the marine environment and meet CCAMLR obligations.
7. To allow development of the island compatible with objectives one and three within a planning framework, following completion of an EIA, and minimising the adverse effects of operations.
8. To encourage research especially that directed to protection and management of the island.
9. To seek cooperation with relevant parties on conservation management issues.

10. To manage the island to meet the UK's international conservation obligations.
11. To keep under review the nomination of the island for World Heritage status.

The objectives of the draft plan clearly establish tourism as a legitimate use of the island. At present, designations of protected areas, and flora and fauna protection regulations are the main measures to achieve conservation objectives (BAS 1999a). The ordinance of 1975 provided for designation of Specially Protected Areas (SPAs, aimed at preserving ecological systems or habitats), Sites of Special Scientific Interest (SSSIs, aimed at preventing interference with scientific research), and Areas of Special Tourist Interest (ASTIs, two of which have been designated). Under the present policy, areas other than ASTIs are closed to tourist visits, but in practice, permits are issued for areas outside as well as inside ASTIs. A zoning system with three different areas is proposed to replace the present system.

'Protected areas (terrestrial)', managed as IUCN Category 1a, would replace SSSIs and SPAs, and protect unique ecological systems, habitats, and scientific research areas. Eight such areas are proposed. Entry would be prohibited except by permit, and area management plans would be developed. 'Protected areas (marine)' are provided for. Controls on tourist visits in such zones may include limitations on anchoring and control of IRB activity. 'Open areas' will include most of the area of the island, with management of these areas approximating IUCN Category II. Permits will still be required for visits, and sites to be used must be specified. Monitoring would be required at frequently visited sites (identified from permit applications and post-visit reports). Limits on visitation, or closure of some areas may be required. Within 'Open areas' a more protected sub-area, an 'environmentally sensitive area' may be identified, with management plans for these areas to manage conflict between uses, and potential impacts.

An EIA scheme is also proposed. Proponents of activities likely to have a significant environmental impact will be required to carry out an EIA. EIAs are expected to be required for building and demolition projects, scientific research programs, tourism developments and expeditions, and media visits. EIA procedures would be based on those laid out under the Protocol.

More specific provisions for visitor management are provided in the draft plan. At present, visitor management provisions include:

- Designation of ASTIs (under the *Conservation Ordinance* of 1975).
- Permit arrangements, with permits required for all visits. Sites to be visited must be specified.
- Post-visit reporting requirements, including itinerary followed, numbers of passengers, landing sites, time ashore, and observed impacts.
- Compliance with provisions in government information booklet, and a code of practice supplied to visitors.
- Official supervision through briefings by the Marine Officer.
- Charges and fees for visits.

5.8.4.a Proposed visitor management policy

The draft plan (BAS 1999a) outlines a proposed visitor management policy, summarised below. Tourism is to be permitted in open areas (most of the island). Controls in these areas may be necessary on a precautionary basis in particularly sensitive areas or if monitoring reveals deleterious effects. Such controls may include building boardwalks, limiting numbers to particular areas, or temporary or permanent closure of damaged sites. Baseline data would be required for the most visited sites.

Monitoring at two levels will determine if impacts are occurring. A new requirement for government appointed observers is proposed, to monitor tourist behaviour and impacts ashore. Site monitoring would also be carried out at the most visited sites. Permits would continue to be required. Permits would only be issued to members of IAATO. Permits might be declined if there were evidence of inappropriate behaviour or activities by operators or passengers on previous visits, or if permit requirements were not complied with on previous visits. Adventure pursuits might be required to provide more detailed permit application information, including proof of competence and adequacy of preparations made for the expedition (including insurance, safety procedures and medical backup). Additional conditions might be applied to permits for such activities. Tourist operations would be required to be self-sufficient, and permit applications might require evidence of adequate insurance cover.

Requirements for post-visit reports would continue for tour operators, and the requirement could be extended to yachts. Operators and visitors would continue to be bound by the provisions of the information booklet and code of practice. Both would be updated to best practice level. Additional controls on visitation might be required (if monitoring so indicated), and could include limits on visitors per site per visit, limits on frequency of visits over a season, limits on time of year, season, or day when visits may occur, limits on party size, a prescribed guide / tourist ratio, and limited landing sites. Additional limits might be placed on adventure activities. Briefings by the Marine Officer would be retained. A new requirement for government appointed observers is proposed, to be paid for by operators. Observers would monitor impacts and compliance with permits and behaviour ashore. The requirement for vessels to visit King Edward Point as first landfall would be waived where vessels: have on board a government appointed observer and an expedition leader who has visited South Georgia before; advise the Marine Officer of the planned route when entering South Georgia waters; and call at King Edward Point at some stage during that visit.

Charges and fees would continue to be levied to raise funds for the sustainable management of the islands. Amounts would be reviewed regularly. At present a passenger landing fee of £50 is charged to visitors over 16 years of age, and harbour fees including £30 for harbour entry and exit, £30 for harbour clearance, £44 minimum for customs clearance, and daily harbour dues of between £53 to £3050 depending on tonnage and number of passengers are levied. The draft plan refers to a code of practice document, as well as a booklet *'Information for Visitors to South Georgia'*. Both of these would be updated to best practice standard, according to the draft plan. Neither of these documents were obtained by the researcher.

5.8.5 SUMMARY

The tourism management system in place at South Georgia is to be developed and extended in a number of ways. Tables 5.6 to 5.9 below summarise the management system, assuming the proposed changes to the system as outlined under the proposed management plan proceed. It should be kept in mind that these changes are part of a draft document, rather than a plan holding any statutory force at this stage.

Features of the South Georgia approach to tourism management include the adoption of an observer system, interesting in that it is being suggested after tourism has been operating to the island, in reasonably high numbers, for quite some time. Tourism is recognised as a valid use of the island. Also of note is the requirement for vessels to call at King Edward Point before visiting other sites, although under certain circumstances this requirement can be waived. While all management provisions to some extent restrict the movements and practices of operators, requiring vessels to proceed to a location imposes particular logistical and operational costs.

The zoning system employed on South Georgia is also noteworthy. While zoning systems on some islands establish relatively restricted areas in which tourism activity is permitted, the South Georgia system includes relatively small areas where tourism activity is not considered appropriate, with the remainder of the island generally open to tourism activity (although subject to restriction through the permit system). Overall, the management system proposed for South Georgia provides a framework for the allocation and control of tourism opportunities, within the context of managing conservation and other significant values.

5.9 Subantarctic Tourism Management Discussion

This section analyses the management systems for tourism on the case study islands. Tourism management provisions are examined, taking into account the different environmental and physical conditions, and present tourism use. Different philosophical approaches are discussed. Common elements of the management approaches are identified, as they serve as a guide to best practice management for expedition cruise tourism operations in sensitive areas.

Tables 5.6 through to 5.9 summarise management provisions and environmental features for the different case studies.

5.9.1 Management planning

Hall and Wouters (1994, p. 361) concluded that because tourism is generally accepted as a use of southern oceanic islands, 'developing appropriate tourism management strategies' is the main issue. The case studies represent many of the southern oceanic islands, and include all of the islands receiving significant levels of tourist visitation. There is consensus across the case studies regarding management planning. All of the case study areas have a management plan in place or in development. Management planning processes appear to be regarded as the chief mechanism for conservation management in this context, and tourism management is incorporated in those processes.

There is also wide agreement in the cases on managing tourism as part of a wider management planning strategy. In all cases, tourism issues are considered within the framework of conservation management goals (as would be expected in any management planning process). The degree to which tourism provisions are linked to physical or environmental conditions varies—in some cases the logical basis for tourism policy and provisions is made explicit, while in others it is not. Levels of protection are similar across all case studies, with IUCN Management Category Ia equivalent status for all islands excepting South Georgia, where much of the island corresponds to category II.

Table 5.6: Southern oceanic islands—management planning

	NZ Subantarctic Islands	Macquarie Island Nature Reserve	Heard Island Wilderness Reserve	Gough Island Wildlife Reserve	South Georgia
Management plan or equivalent	Conservation Management Strategy (statutory).	Management Plan (statutory).	Management Plan (statutory).	Management Plan (statutory).	Environmental Management Plan (proposed).
Tourism management system in place or proposed	In force.	In force.	In force.	Plan in force, does not support tourism. Interim provisions listed here are suggested by plan.	Plan in public consultation phase.
Protection status	Nature reserve (IUCN Management Category Ia: Strict Nature Reserve).	Nature reserve (IUCN Management Category Ia: Strict Nature Reserve).	Protected by legislation, no protected area designation as such, (managed as IUCN Management Category Ia: Strict Nature Reserve).	Wildlife Reserve (equivalent to IUCN Management Category Ia: Strict Nature Reserve).	Some zones correspond to IUCN Management Category Ia. The majority corresponds to IUCN Management Category II—National Park.
Tourism recognised as a valid use	Yes.	Yes.	Yes.	No.	Yes.
Visitor experience considered	Yes.	Yes.	Yes.	Not specifically.	Not specifically.
Wilderness values considered	Not explicitly.	Yes.	Yes.	Not specifically.	Not specifically.
Tourism provisions nested in overall strategy	Yes.	Yes.	Yes.	Yes.	Yes.
Specific provisions for tourism or private visits	Yes.	Yes.	No.	Yes.	Yes.
Clearly expressed rationale for tourism provisions	Yes.	No.	Yes.	No.	Yes.
Contingency planning (eg quarantine breach, marine pollution)	Yes, for accidental introduction of rodents.	Not specified.	Not specified.	Not specified.	Not specified.
Management zoning	Yes—islands classified as minimum impact islands (least disturbed), or refuge islands (more disturbed).	Yes—three zones (main logistic / support area, limited development / experimental zone, and minimum disturbance area).	Yes—four zones (Main Use Areas, Wilderness and Heritage Areas, Specially Protected Areas, Restricted Access Areas, Marine Area).	Yes—three zones (logistic zone, scientific research zone (including temporary), and conservation zone.	Yes—three zones. Protected Areas (terrestrial), Protected Areas (marine) and Open Areas.
Restriction of landing sites	Yes—restricted to a small number of islands and sites. Seasonal or discretional closures provided for.	Guidelines imply visits will be allowed to only two sites.	Yes—three sites available for landings.	Yes—limited to one site.	Site use allocated through permit system, generally all open areas are available.
Monitoring program	Yes—establishment of baseline conditions, ongoing monitoring.	Yes—monitoring of impacts of tourism on reserve values required.	Not specified.	Yes—monitoring needs specified.	Yes—site monitoring proposed.
Vessel capacity / tonnage limit	Yes—maximum of 180 passengers.	Yes—maximum of 200 passengers.	No.	No.	No.
Vessel numbers limit	One vessel per site per day.	Not specified but can be limited by permit conditions.	Not specified.	Not specified.	Not specified.

Table 5.7: Southern oceanic islands—shore management provisions

	NZ Subantarctic Islands	Macquarie Island Nature Reserve	Heard Island Wilderness Reserve	Gough Island Wildlife Reserve	South Georgia
Limit on passengers ashore at any one time	Limited—10 passengers at some sites.	Limited—60 at one site, 100 at the other.	Limited—60 in one site, 15 in others.	Limited—20 ashore per landing.	No but provisions allow for future limits.
Limit on passengers ashore per site per season	Limited to 600 per season at any site, some sites limited to 150.	Capacity exists under plan to limit.	Not specified.	Not specified.	No but provisions allow for future limits.
Overall visitor limits	No stated limit. Controlled though permit system and approval of concessionaires.	Yes—500 per season.	Yes—400 per season.	No.	No but provisions allow for future limits.
First landfall restrictions	No.	No.	No.	Yes—Tristan da Cunha for customs, health, and immigration controls before visiting Gough Island.	Yes—King Edward Point must be visited first (exemption allowed under certain circumstances).
IRB cruising policy	Yes—permitted at islands where landings are not allowed.	Yes—IRB use within 200m of shore permitted subject to agreement.	Not specified.	Yes—permitted in certain areas with certain limitations.	Permit system may be used to place controls on IRB activities.
Guide / passenger ratio specified	Yes—1:20 in most sites, 1:10 on the Bounty Islands.	Yes—1:15.	Yes—1:15.	Implied by group size limit—1:20.	No but provisions allow for future limits.
Shore infrastructure (specifically for tourism)	Boardwalks, taped routes.	Boardwalks and viewing platforms.	No.	No.	No but provisions allow for future development.
Code of Conduct	Yes—includes approved sites, quarantine measures, and bans on: souveniring, disturbance; littering; or taking avian products ashore. Behaviour around wildlife specified (5m minimum distance rule).	Yes—includes visit times, quarantine measures, bans on disturbance of anything, rubbish and food rules, and behaviour around animals (5m minimum distance rule, 15m for fur seals).	Yes—includes protection of animals and plants, keeping territory pristine, respecting protected areas, and safety.	Code of conduct discussed in plan, and includes need to abide by all relevant legislation, but Code document as such appears not to exist.	Yes (unseen by author).
Overnight stays	Not allowed.	Not allowed.	Not specifically ruled out.	Not allowed.	Not specified.
Activities permitted	Walking under supervision, wildlife viewing, IRB cruising.	Walking under supervision, wildlife viewing, IRB cruising. Diving and snorkelling not permitted.	Walking, observation, adventure recreation not ruled out.	Wildlife viewing, scenic viewing, IRB cruising.	Wide range, adventure activities may require more information in permit application, insurance cover, and other measures.

Table 5.8: Southern oceanic islands—administrative and other provisions

	NZ Subantarctic Islands	Macquarie Island Nature Reserve	Heard Island Wilderness Reserve	Gough Island Wildlife Reserve	South Georgia
Permit system	Yes.	Yes.	Yes.	Yes.	Yes.
Concessionaire system	Yes.	No but contractual agreement with Department required.	No.	No.	No.
Guidelines	Yes—provide detailed management practices and procedures.	Yes—detail management and administrative procedures.	Yes—detail management and administrative procedures including details on tourist zones.	No.	No.
Government representatives based on shore	No.	Yes.	No.	Yes.	Yes (compulsory briefing provided for all vessels).
Government representatives on vessel	Yes.	No.	Provided for, but not compulsory.	Yes.	Yes (proposed).
Entry fees, administrative fees, resource rental	Yes (NZ$190 for passengers on smaller vessels and NZ$150 on cruise ships, in 1994).	Yes—AU$150 in 1994/95.	No, but capacity under the plan exists to allow them.	Yes, entry and administration fees.	Yes—£50 passenger landing fee, other vessel and harbour fees also apply.
Use of EIA procedures	Not required of operators. No overall EIA conducted.	Not required of operators. No overall EIA conducted.	Required of operators for each season.	Overall EIA to be conducted if tourism considered.	Not required of operators. No overall EIA conducted.
Other					
Science use of tourism logistic capability	Yes—transport.	Yes—transport.	Yes, observers may conduct basic research and observation.	Not specified.	Not specified.
Guidebook available	Yes—provided to all visitors by management.	Yes.	No—some guide material available as brochures and online.	No.	Government provided information booklet.

Table 5.9: Southern oceanic islands—conservation characteristics

	NZ Subantarctic Islands	Macquarie Island Nature Reserve	Heard Island Wilderness Reserve	Gough Island Wildlife Reserve	South Georgia
Level of habitat modification	Varies—near-pristine to moderately disturbed.	Significantly modified.	Near-pristine.	Moderately modified.	Varier—near-pristine to significantly modified.
Introduced animal species	Some groups free of introduced animals. Cats, pigs, rats, and mice on some islands.	Rabbits, cats, mice, rats.	None known.	Mice.	Reindeer, Brown Rats and Mice.
Indigenous plant species	200 species of vascular plant.	46 species of vascular plant.	11 species of vascular plant.	62 species of vascular plant.	25 species of vascular plant.
Introduced plant species	Varies—from only two, to around 85.	Five species, one common and widespread.	None known.	Around 24 species, four widespread, two uncommon.	Around 40 species.
Endemic (E), or rare, endangered, restricted range, or threatened plant species	Varies—5% of species to 12% of species endemic, all island groups have many rare plants.	1 species endemic vascular plant.	No endemic vascular plants.	4 species endemic vascular plants, 27 regionally (Gough and Tristan da Cunha) endemic.	No endemic vascular plants known.
Total bird species (including non-breeding)	120 species.	72 species.	34 species.	54 species.	81 species.
Breeding bird species	41 breeding seabird species (10–15% of world species) Islands vary—from 13 landbird species to none.	25–29 species.	19 species.	22 species.	31 species.
Breeding mammal species	New Zealand sea lion, elephant seal, New Zealand fur seal.	Southern elephant seal, New Zealand fur seal, subantarctic fur seal, Antarctic fur seal.	Southern elephant seal, Antarctic fur seal, subantarctic fur seal.	Subantarctic fur seal, southern elephant seal (small population).	Antarctic fur seal, southern elephant seal, weddell seal.
Significant fauna: endemic (E) (breeds only at these locations), or rare, endangered, restricted range, or threatened animal species	Yellow-eyed penguin (rare), erect-crested penguin (E), snares crested penguin (E), 3 shag sp. (E), southern royal albatross (E), 13 landbird sub-sp. (E), 1 landbird sp. (E). Largest populations of wandering albatross, and white-capped and Salvin's mollymawks. New Zealand sea lion (E).	Royal penguin (E), king cormorant subspecies (E), species of petrel and prion restricted to offshore islands. Wandering albatross at risk on island. 3 endemic species extinct—Macquarie Island fur seal, red-fronted parakeet, banded rail.	Heard Island cormorant (E) rare and vulnerable, Heard Island sheathbill (E). Small populations of black-browed and light-mantled Sooty albatross. Recent resumption of subantarctic fur seal breeding.	Gough moorhen and Gough bunting, both endemic and rare. Northern rockhopper penguins (48% of the world total), 25% of the worlds sooty albatross, most wandering albatross (northern race).	Grey-headed albatross (46% of world), wandering albatross (15% of world) both vulnerable. South Georgia pintail (E), South Georgia pipit (E). Antarctic fur seals (96% of world), Southern elephant seal (54% of world). Weddell seal (at limit of range).
Permanent habitation	No (station closed 1985).	Yes—research station (up to 40).	No.	Yes—meteorological station (7 excepting changeover).	Yes—military garrison, research station (up to 8 people), museum with 2 curators.
Helicopter use	Not permitted.	Not permitted.	Permitted but restricted to accessing landing sites.	Not permitted under proposed rules.	Not specified
Access (safe anchorages and safe landing sites)	Varies—excellent at some islands to poor at others.	Poorly sheltered anchorages, good landing beaches.	Moderately sheltered anchorages, landing beaches good.	Poorly sheltered anchorages, poor landing beaches with wildlife crowding.	Sheltered anchorages, many landing sites.
Tourism use	Around 600.	Varies, up to 500.	Very low levels, around one visit per year in recent years with less than 100 people.	No tourism at present.	Around 1600 visitors each year.

5.9.2 POLICIES ON TOURISM

Different managing authorities have taken different positions on the appropriateness or otherwise of tourism. At one end of the spectrum is Gough Island, where tourism is not regarded as a valid or appropriate use. The extent to which this is an *a priori* position is unclear. The Gough Island management plan justifies its opposition to tourism on the basis of difficult landing sites, and the inadequacy of the station to provide facilities for tourism. Similarly, the EIA process for Marion Island, in developing the tourism alternatives to be examined, made a number of assumptions regarding the need for onshore accommodation. The managing authorities responsible for these islands have assumed that for safe tourism to occur, facilities must be available (among other things). At the other end of the spectrum, the managing authorities for Heard Island, South Georgia, Macquarie Island, and the NZ subantarctic islands have a specific charter to cater for tourism and recreational use—it is regarded as an appropriate and valid use of these reserves, and management is therefore tailored to providing some tourism experience.

Overall, the general policy positions on tourism do not appear to be directly related to the physical or environmental characteristics of the island—some of the more pristine islands (Heard for example) are managed to accept tourism, while more modified islands are less open to tourism activity. The SCAR/IUCN Workshop in 1992 recommended that tourism should be regarded as a legitimate activity on southern oceanic islands, as long as it is constrained with measures aimed at preserving conservation values. The workshop also recommended that tourist landings should normally be prohibited on unmodified or near-pristine islands (Dingwall 1995b, p. 207). Similarly, Clark and Dingwall 1985 (cited in Hall & Wouters 1994) agreed that tourism was a valid use of the southern oceanic islands, provided supervision and regulation are adequate.

While tourism is accepted at a number of islands, provisions for tourism vary, with some islands (NZ subantarctic and Macquarie Island) limiting numbers to quite low levels, while other islands (South Georgia particularly) remain free from number limits to date. There is no way to conclude that either of these approaches is right or wrong, they merely represent different levels of conservatism adopted by the managing authority, which influence management policies and provisions. The assumptions made in the Marion Island EIA and in the Gough Island management plan (about the need for shore accommodation, closeness of landing sites to stations, and search and rescue infrastructure) differ from the assumptions of other managing authorities—that expedition tourism operations should be capable of fully self-sufficient operations.

Three of the managing authorities considered the tourism experience in their planning. Specific attention was given in these cases to ensuring an appropriate visitor experience, undiminished through overcrowding or other impacts. Two of the case study managing authorities considered the related issue of wilderness qualities. Wilderness qualities were a major consideration in the management of Heard Island, while the management of the NZ subantarctic islands considered wilderness as it relates to the experience of visitors. Management of wilderness values is not specifically considered in the other cases examined, despite the very high wilderness values exhibited.

Some cases make use of EIA mechanisms. Two approaches are evident in the cases. One approach is for the managing authority to commission or conduct an EIA for all tourism to the island. Such an EIA can form the basis for a decision as to whether tourism impacts are acceptable, and for framing management provisions in the event that tourism is sanctioned. A second approach is to require an EIA from each operator for their activities each season.

5.9.3 SHORE MANAGEMENT PROVISIONS

All of the cases include provisions relating to the management of tourism operations on shore, and IRB cruising operations. Most islands have restrictions on the number of passengers ashore at a site at any time. The numbers vary, and some impose different number limits at different sites. A limit of 10 passengers is the lowest (for landings on one of the NZ subantarctic islands), while the largest of the official limits is 100 passengers at one site on Macquarie Island.

Limits are set with regard to particular site conditions. These limits are generally precautionary, as little evidence is available regarding the relationship between levels of impact and numbers of tourists in these environments. None of the cases examined made conclusions about what levels of impact were considered acceptable, an important consideration in some models of visitor management. Limits on total passenger numbers for a site over a season are applied in the NZ subantarctic (600 visitors per season at some sites, and 150 at others). In two cases (South Georgia and Macquarie Island) the power exists under the management system to impose seasonal limits. Seasonal site limits are not specified for Heard Island or Gough Island. Low levels of visitation to these islands may be one reason such limits are not an issue at present.

Limits on total numbers to all sites on an island per season are imposed on Macquarie Island (500 people per season), and Heard Island (400 per season). The capacity exists under the management system for such limits to be imposed for South Georgia. Permit systems in place or proposed in other cases give management the opportunity to impose such limits at their discretion.

Some of the cases specify a group size limit (and therefore a guide to passenger ratio). The Bounty Islands (NZ subantarctic) limit is one guide for every 10 passengers, while the other islands of the NZ subantarctic require one guide for every 20 passengers. Macquarie Island and Heard Island require one guide for every 15 passengers. The group size limit is 20 for Gough Island. No group size, or guide to passenger ratio is specified in the proposed plan for South Georgia.

Shore facilities also differ. The NZ islands and Macquarie Island include boardwalks to limit the impact of tourist use of sites and allow access to particular features of interest across vegetated areas. The remaining case study areas do not have such structures, although provision is made in the South Georgia plan for such measures if required in future.

Policies also exist for the use of IRBs for near shore cruising. This activity allows visitors to visit areas that may be unsuitable for landing, due to terrain, congregations of wildlife, poor landing sites, or poor conditions. The activity may help to satisfy demand for some experiences while minimising impacts on shore. In the NZ subantarctic islands IRB cruising is permitted, including at islands where landing is not allowed. For Macquarie Island, IRB cruising is allowed in certain locations under approval. A similar arrangement is advocated for Gough Island. The permit system at Sough Georgia will provide a mechanism for regulating IRB use in some zones if necessary.

Policies on helicopter use vary across the cases. Helicopters enable visitors to easily access inland sites, and land on islands that may otherwise be impossible to reach. They have, however, the potential to cause significant impacts on wildlife populations through visual and noise disturbance, and can impact on other values. The use of helicopters is only permitted in the case of Heard Island, and then only to access the designated tourist landing areas. Helicopter use policy is not specified for South Georgia, and use is specifically banned for tourism purposes at the NZ islands, Macquarie Island, and Gough Island.

The policy on activities permitted varies across the cases. Heard Island and South Georgia both acknowledge the attractions of their topography for adventure recreation activities, and make provision for such activities to occur. Other case study islands, on the other hand, do not permit overnight stays and it appears unlikely that adventure recreation activities would be permitted. All case studies recognise the benefits to be derived from public education, and make provision for the use of the islands for media production purposes. In general, activities such as walking (in limited areas, and remaining with a group) are permitted. Wildlife observation, photography, and so on are also permitted. Snorkelling and diving activities are ruled out on Macquarie Island.

Vessel controls or requirements (such as additional contingency planning for pollution incidents, carrying of extra equipment and so on) are largely absent from the management systems of the islands. Some mooring and anchoring conditions apply at Macquarie Island and the NZ islands, and at the latter some provisions and restrictions apply to marine mammal viewing. Both of these cases impose a limit on vessel capacity—Macquarie Island imposes a maximum of 200 passengers, and the NZ subantarctic islands allow vessels to carry up to 180. It is proposed that vessels visiting Gough Island first call at Tristan da Cunha. Similarly, vessels visiting South Georgia would need to proceed first to King Edward Point (although some exemptions may be permitted).

Self regulation of activities through a code of conduct is accepted as being necessary for all of the cases. The purpose of codes is not to introduce new provisions, but to make clear to visitors what requirements are in place, to advise on appropriate behaviour in different circumstances, and to advise on ways to comply with requirements. Common elements of the codes examined include measures to prevent species introductions, bans on souveniring, littering, creating graffiti, disturbing anything (animals, plants, rocks or cultural artefacts for example), and rules about taking certain foodstuffs ashore. Restrictions on activities, areas to be used, and advice on behaviour around wildlife are included in most codes.

5.9.4 ADMINISTRATION

All of the cases use (or propose) a permit based system of tourism regulation. Two of the cases (NZ subantarctic islands, and Macquarie Island) also include a formal agreement between the operator and the managing authority—in the case of NZ, operators become approved concessionaires, while operators using Macquarie Island are required to enter into a contractual agreement with the department. Three of the cases (NZ Subantarctic islands, Macquarie Island, and Heard Island) also use guidelines that provide more detailed management and administrative procedures, and operational requirements.

A number of the cases use official observers or departmental representatives on vessels or on site. In two cases (Macquarie Island and Gough Island) there is a management presence or government employee on shore. An alternative is the placement of departmental representatives on vessels, offering a partial solution to difficulties arising from lack of enforcement agencies on shore (highlighted by B. Davis 1995, and Wouters & Hall 1995b). This requirement is in place for the NZ islands, is an option under the management system for Heard Island, and is proposed for both Gough Island (in the event of tourism going ahead) and for South Georgia (on adoption of the Environmental Management Plan). South Georgia also has an official government presence on shore, and vessels are required to attend King Edward Point for briefings.

The proposed requirement at South Georgia for government representatives aboard ship has two implications for Antarctic tourism. First, a higher proportion of ships operating in the Peninsula may have an official government representative on board as a result, as ships visiting both destinations may carry that observer for the entire voyage. A second effect may be a reduction in visits or dampening of interest in South Georgia if operators seek to avoid this requirement.

The use of onboard representatives has the potential to make the site use system more dynamic. Permit based systems (even including a shore based representative) are constrained in that approval of sites to be used is given considerably in advance of the actual visit. Site conditions (including wildlife numbers, sea state, and so on) at the time of visit may visits to permitted sites impossible. An onboard representative could be given the discretion to make decisions about site use at the time, choosing which site is most appropriate from a number of permitted sites, for example. Situations can be envisaged where a permit might allow landings in a site normally suitable that is in fact unsuitable at the time of visit, leading to a situation where an operator has to decide between a permitted but unsuitable landing site, no landing at all, or breaching permit conditions.

Fees and charges are levied or proposed in most of the case study areas. In the case of the NZ subantarctic, fees are to cover resource rental, the government representative system, and contingency plan and readiness costs. The only case not to apply a fee is that of Heard Island. The Gough Island management plan suggests that if tourism were to go ahead fees would be charged. Fees vary in magnitude but are in the realm of around AU$120 to AU$150 per passenger at current exchange rates.

5.9.5 DIFFERENCES BETWEEN THE SOUTHERN OCEANIC ISLANDS AND THE ANTARCTIC

A number of differences (other than sovereignty) can be identified that need to be kept in mind when considering the applicability of southern oceanic island tourism provisions to Antarctica.

Sensitivity to tourism related impacts is likely to be different. The presence of more vegetation, the complexity of the vegetation communities, and the presence of organic soils, means that southern oceanic islands are likely to be more susceptible to problems of vegetation trampling, soil erosion, and track formation. The higher levels of endemism and general diversity on many islands may exacerbate the consequences of any disturbance—a greater number of significant or sensitive species in a small area raises the likelihood of tourism having an impact on such a species. Similar problems apply to both areas with respect to wildlife issues. Both locations host large congregations of wildlife, and visits occur during the breeding season. Wildlife congregations in the southern oceanic islands are generally larger. The presence of fur seals on many beaches in the southern oceanic islands introduces the potential for competition for space on landing beaches, which is less of a problem at Antarctic sites.

While it is hard to generalise about Antarctic sites, they may be more resilient and less susceptible to tourism impacts. Less vegetation (a greater proportion of rock, gravel, snow and ice) in many locations provides a less sensitive surface for foot traffic.

The risk of introduction of alien floral and faunal species through tourism activity may also be greater for the southern oceanic islands that for Antarctica. The lack of soils and lower temperatures at Antarctic sites make it less likely that introduced plants would propagate, survive, and reproduce. Similarly, animal species are less likely to survive Antarctic conditions. Diseases and microbial contamination may be inhibited by Antarctic conditions.

Operational aspects of tourism in both destination areas are very similar. At some southern oceanic islands, landing sites are very limited, and those available may be less than ideal in terms of safety and wildlife crowding issues. The lack of alternative sites (in some cases there are no other landfalls for thousands of kilometres) increases the incentive to land in poor conditions, or to land where chances of wildlife disturbance are higher than normally acceptable. Antarctic destinations (at least in the Peninsula area) do not share these characteristics to the same degree.

It appears that management is successful thus far in preventing major tourism related impacts at those islands receiving tourism visits. If tourism can be effectively managed in these more sensitive environments, it should be possible to achieve similar results in Antarctic tourism management, given that the environment in which it occurs may be more resilient in a number of ways.

5.9.6 DRAWING ON OTHER RESEARCH

The SCAR/IUCN workshop of 1992 called for further socio-cultural research. This call was responded to by Cessford and Dingwall (1994, 1996, 1998, section 5.2.2.c), working in the NZ and Australian region, and including some Antarctic sites. Specific social research in other areas appears to be lacking, although much of the work of both P. Davis and Enzenbacher applies indirectly to South Georgia, due to the large overlap of visits to that island and to the Peninsula area.

Comparing the results of surveys of visitors to the southern oceanic islands, with results of surveys of visitors to the Antarctic is instructive. Detailed results for the Antarctic destination area including the Peninsula region were presented in sections 3.1 and 3.2. Comparing these results, gender balance of visitors to both destinations is roughly similar (close to even proportions of men and women). The age structure of the Antarctic visitors is a little older (Cessford and Dingwall's respondents included slightly more younger visitors and fewer older visitors). As would be expected, more visitors in Cessford and Dingwall's surveys were from Australia and NZ, although the US, Germany, Japan, and the UK made up the remainder of the most visiting nationalities, matching the results for the Antarctic surveys. More of the Antarctic visitors were retired than were those responding to Cessford and Dingwall's surveys, by a considerable margin (28% retired for the NZ and Macquarie Island, and above 50% for the Antarctic research). Around 90% or more of those visiting the Antarctic had not visited Antarctica before, while only 70% of the respondents in Cessford and Dingwall's research had not visited polar regions, indicating that subantarctic and Ross Sea region visits may be stimulated by previous polar visitation.

Despite these differences, the demographic characteristics are largely similar for both groups. The local market for the NZ and Australian islands accounts for the nationality differences. Age differences may be related to more the adventurous nature of the longer sea voyages and more active shore landings offered in the Southern Ocean island experiences.

A comparison of perceived impacts is not practical due to the lack of standardised data. Given the general similarities between the tourism operations in both locations, sensitivity to impact, and types of impact possible from tourism, some conclusions can be drawn from the findings at southern oceanic islands. Cessford and Dingwall found that there is general acceptance of management provisions amongst visitors. This satisfaction with, understanding of and tolerance of management intervention in the visitor experience tends to indicate that similar tolerance and understanding may be displayed in Antarctic locations, if extra management provisions were to enter into force. It is possible that visitors perceive management as more valid in the sovereign environment of the southern oceanic islands, and may regard management intervention in the Antarctic as less valid because of the international status of the area, but this would require further investigation. Based on the present state of knowledge, it is suggested that management provisions such as those applied on the NZ subantarctic islands and Macquarie Island may also be acceptable to visitors in the Antarctic.

Similarly, a number of the findings of Cessford and Dingwall relate to problems identified by respondents. These provide a guide to issues likely to be encountered in Antarctic tourism management. Cessford and Dingwall found that a number of management provisions are disagreed with by a significant number of users (more than 25%). These issues included a lack of toilet facilities and shelters on shore, a lack of close wildlife viewing and photographing opportunities, and bans on overnight stays.

While the findings of research on tourism to the southern oceanic islands may not be directly applicable, the similarities in the demographic characteristics of the tourist populations, the form of tourism used, the impact types likely to occur, and the experience on offer, mean that the Southern Ocean findings can be considered relevant.

5.10 CONCLUSIONS AND IMPLICATIONS FOR ANTARCTIC TOURISM

While a number of authors have investigated tourism on southern oceanic islands (section 5.2.2) the contribution made here extends these offerings in a number of ways. It provides an up to date and comprehensive analysis of the state of tourism management for a range of islands, including those with significant usage and those with little or no tourism use but with tourism management policies that are instructive in their own right. Considerable changes have taken place in tourism management for southern oceanic islands since the work of Wouters and Hall (1995a) for example. The contribution made here is comprehensive, and focussed on specific elements of the management system of interest to compare with Antarctic tourism management. The possible application of these systems and provisions in the Antarctic context can be examined. Central to this approach is the distinction between the Antarctic and the southern oceanic islands. It is the clear sovereign territorial status of the islands that allows statutory tourism management systems to be put in place. Tourism in the southern oceanic islands is similar to Antarctic tourism in terms of the form it takes, operational practices, motivations of participants, likely impacts, and visitor characteristics. It operates in a similar environment, with globally important natural and scientific values, plentiful wildlife, little or no management presence, remoteness, and inhospitable conditions. The tourism management systems in place for southern oceanic islands can therefore be seen as a model for what may be appropriate in the Antarctic, were sovereignty and other ATS peculiarities not an issue. Put in other terms, these cases provide an indication of what measures might be considered appropriate if a managing authority were able to apply them to the Antarctic. The cases examined provide management frameworks, and a list of management strategies and actions, representing models of best practice management, that should be considered.

All of the cases examined adopted management planning processes. An official protected area status forms the basis for management planning. In each case, this management planning approach permits the establishment of a tourism management system within the context of an overall conservation management strategy. Most cases recognised tourism as a valid use.

Table 5.10 summarises key provisions according to how many of the case areas have adopted them. It is not intended to imply that the provisions adopted by more cases are the only ones that should be considered, as many of the provisions adopted by fewer cases are related to case specific factors. The provisions adopted by few cases or a single case include most of the allocation and restriction provisions, and this may be a reflection of the numbers visiting different case areas. A relationship can be seen between more stringent requirements for tourism and the number of tourists visiting. This tends to indicate that for the Antarctic case, where many sites in the Peninsula region receive substantially more visitation, these more stringent measures may require consideration.

Table 5.10: Tourism management provisions

Adopted in all cases	Adopted in most cases	Adopted in a few cases or one case
Permit IRB cruising	Accept tourism as a valid use	Contingency planning for tourism incidents
Provide a code of conduct	Limited landing sites	Consideration of wilderness qualities in planning
Use a permit system	Limits on passengers ashore at any one time	Limits on vessel capacity
	Zoning system in place that applies to tourism	Limits on number of vessels visiting sites
	Tourism impact monitoring	Limits on passengers ashore at a site over a season
	Bans on overnight stays	Limits on total visitors to island (or group) over a season
	Specified guide to passenger ratio	Initial landfall requirement
	Adoption of more detailed guidelines	Mechanism for allowing adventure recreation to occur
	Levying of fees for entry, administration or resource rental	Boardwalks / shore infrastructure
		Government representative on shore
		Government representative on vessel
		Appointment of concessionaires to operate tourism

Some elements of the tourism management systems evident in the case studies are already in place in the Antarctic. Other elements are not. Chapter seven compares the Antarctic tourism management system with those of the case study areas.

While clear sovereignty, among other features, makes the application of a management system possible, it does not guarantee protection. As Wouters and Hall (1995a) pointed out, while the application of a protective regime in the Antarctic is difficult because of the lack of sovereignty, the implementation of a single tourism management regime for the subantarctic islands is complex because of the different sovereign jurisdictions. The example of degradation of the French islands of St Paul and Amsterdam (section 5.1.4) while not tourism related, demonstrates that sovereignty is no guarantee of protection if political will is lacking, or indifferent, or if other considerations (social, economic or otherwise) are rated higher than conservation.

Chapter 6: Tourism management for northern polar locations

6.1 INTRODUCTION

This chapter describes and analyses the tourism management systems for cruise tourism case studies in northern polar regions. The chapter provides an overview of cruise tourism activity in the region, and examines specific case study areas and management strategies. Case selection, information gathering, and definitional issues are described. A brief description of the characteristics of northern polar regions and their conservation status is followed by a summary of general tourism activity in the region.

An Arctic-wide cooperative tourism and conservation initiative involving conservation NGOs, industry, and government is described and discussed. The initiative represents a planned approach to self regulation, and includes principles for Arctic tourism, and codes of conduct for operators and for tourists.

The case study areas examined in detail are Svalbard, Glacier Bay National Park and Preserve, and Arctic Canada. Cruise tourism activity in the Russian Arctic and to the north pole is also examined. For each of the cases, sources of information and a general description of the area are provided. The physical and environmental resource, historical use and resources, and the history of conservation management or reservation are described. Cruise tourism in the region is examined, including the structure of the industry, numbers of visitors, and impacts. Social research results, where available, are discussed. The tourism management system is then examined in detail, before the case findings are summarised. In the case of the Canadian Arctic, particular attention is paid to the ice navigation regime as it applies to tourism. The case study of Russian Arctic cruise tourism management was limited by the difficulty of obtaining management information. Available information is presented, because of the importance of the location to the range of experiences available, because of the intimate involvement of Russian vessels and citizens in polar expedition cruising, and because of the substantial potential of the Russian Arctic for cruise tourism. The Russian case study includes a description of the area's physical, environmental and managerial characteristics, a review of cruise tourism operations by the former USSR, the involvement of foreign operators in the Russian Arctic, and cruise tourism to the north pole (which has close Russian connections).

Issues raised by the case studies are discussed, and comparisons with the Antarctic situation are made. The conclusions of the analyses are outlined.

6.1.1 RATIONALE AND CASE SELECTION

The northern polar region is diverse (politically, geographically, and socially), and a wide range of tourism activities are carried out within the region. Some tourism activities undertaken in the northern polar region are very similar to Antarctic tourism in terms of mode of operation and attraction types. Expedition cruising in northern polar regions adopts an almost identical model to that used in Antarctic expedition cruising, and in many cases the same operators and vessels are involved.

In the early stages of the research a scoping exercise of tourism in northern locations was carried out, using readily available information including promotional material and government departmental information for Arctic nations. Literature searches identified important works. The scoping exercise identified a number of complications and limitations. Northern polar regions attract tourists with a range of different interests and motivations. These motivations, the wide range of access options, and the varied cultural and natural settings, mean that a complex array of tourism experiences ranging from mass tourism in urban settings to adventure tourism in wilderness settings is available. Individual case boundaries were chosen on the basis of management boundaries (where a single managing authority has responsibility), or where a bounded geographical area such as an island was apparent.

To provide a comparison with the nature conservation status of the Antarctic, it was decided to focus primarily on tourism to protected areas. Such areas provide an analog for the physical and environmental context in which Antarctic tourism operates. Protected area status in itself also prompts conservation management activity. It also became apparent that information on cruise tourism outside protected areas would be sparse, held by a wide range of different authorities, and difficult to obtain.

To limit the scope of the research to manageable proportions it was decided to focus only on ship based tourism. This decision was influenced by the dominance of the cruise tourism model in the Antarctic, and the likelihood that cruise tourism in the Arctic would provide useful parallels. It is acknowledged that forms of tourism other than cruise tourism may be applicable, as it is possible (or even likely) that in the medium to long term other forms of tourism will become more common in Antarctica.

Direct information gathering methods (interviews, access to archives, survey methodologies, and direct observation) were not possible for reasons of cost. Instead, approaches were made to protected area managing organisations via fax, email and post. The contact letter included a brief description of the aims of the research, and asked for information relating to management of cruise tourism in protected areas. In addition, key people were identified in tourism authorities, polar research organisations, conservation NGOs, and other organisations, and were contacted for information. In many cases regional, state or local offices of protected area management authorities were contacted, and in the remainder, national offices were contacted. Where an appropriate individual could not be identified, letters were addressed to the manager for that region, state, or department.

On the basis of the responses, some cases were ruled out as unfeasible. Language barriers were a problem for a number of areas. In other cases it was apparent that sufficient useful information was not readily available. For the remaining cases, follow up contacts were made where appropriate with appropriate authorities or persons. Other sources of information included published information, promotional brochures, online product marketing, and destination marketing information including guidebooks. Information from NGOs was also forthcoming as a result of the information gathering process.

Based on information made available through the aforementioned processes, case studies were chosen. Three detailed cases were selected. Svalbard was selected as it has a specific visitor management plan, which warranted further attention. The Canadian Arctic was selected for the management system in place for passenger vessels in Canadian ice covered waters. Glacier Bay National Park and Preserve was chosen as an example of an area receiving very high cruise tourism use levels in a wilderness setting. In particular, the use of a vessel management plan (VMP) was of interest. Limited information was obtained for cruise tourism in Russia, but it was included because of the importance (present and potential) of the extensive Russian Arctic territory as a expedition cruising destination, and the general importance of Russian vessels, personnel, and Arctic experiences in expedition cruising.

6.1.2 THE NORTHERN POLAR REGION

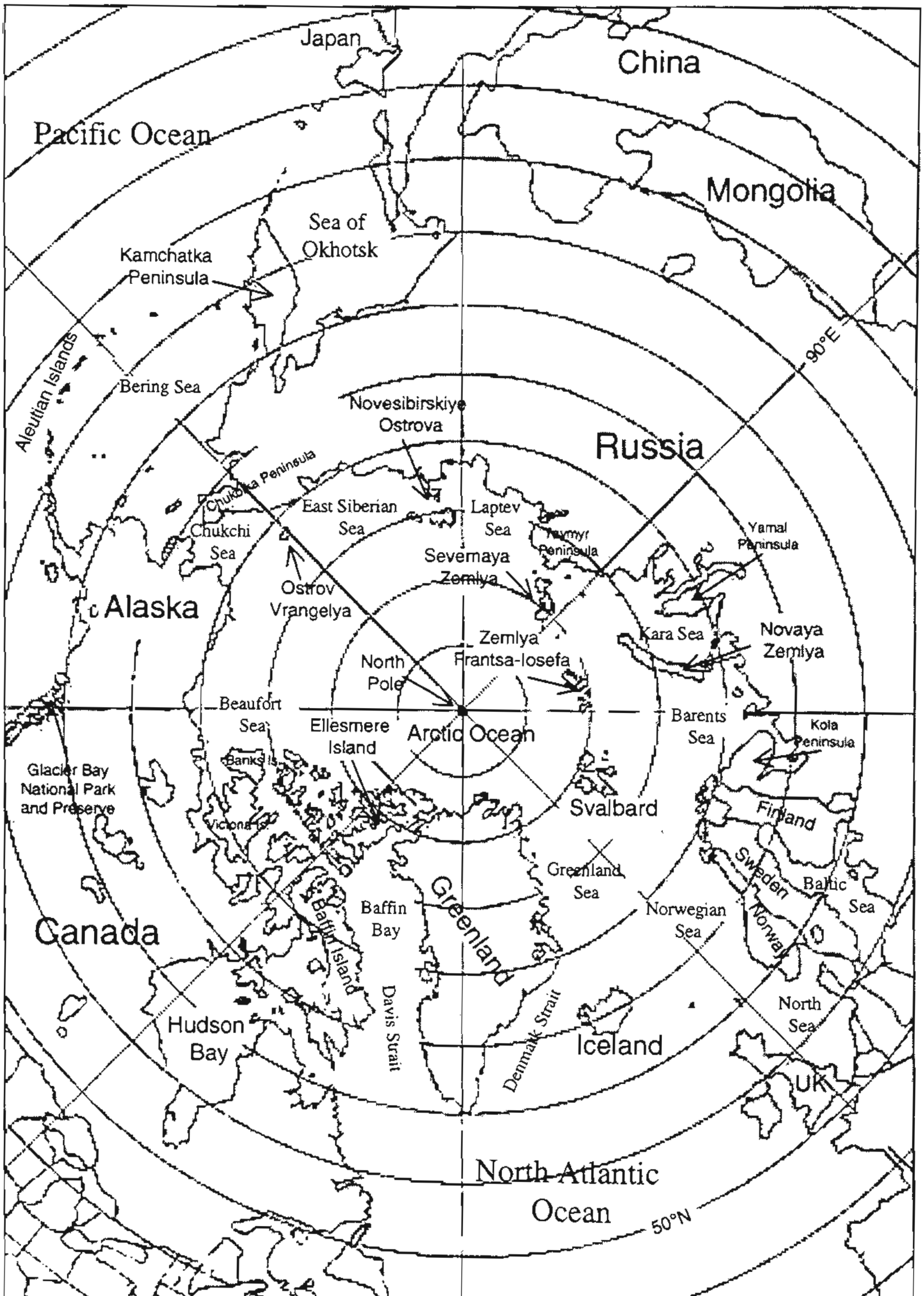
The case studies are drawn from the northern polar regions, including the Arctic, subarctic, and lower latitude areas. The terms Arctic and subarctic are used where appropriate. It is useful to examine briefly the different definitions applying to the region to understand comments other authors have made. Samson (1997) noted that 'the Arctic ocean is clearly the centre of the region, but mapping a precise southern frontier for the circumpolar lands is altogether more difficult' (p. 31). The Arctic Monitoring and Assessment Programme (AMAP 1997) identified different boundaries commonly used in Arctic definitions. The Arctic circle (latitude 66°32'N) is a convenient and commonly recognised defining boundary, although as AMAP pointed out, definitions based on environmental factors can be more meaningful. A climatic definition uses the 10°C July isotherm. Treeline (the border between forests and tundra) is used as another boundary. Another vegetational categorisation divides high Arctic and subarctic, with high Arctic having full permafrost (permanently frozen ground), and the subarctic lying between the treeline and the area where closed forest canopy is found. Johnston (1995) took a social approach to the definitional issue, describing the elements of the Arctic that contribute to its attraction for visitors, including pristine qualities, wilderness character, and physical and cultural unusualness. Johnston investigated the notion that different cultures have different conceptions about the Arctic, with europeans and Alaskans focusing on the Arctic circle as the defining boundary, while Scandinavians regard North Cape, rather than the high Arctic, as the quintessential Arctic, and Canadians prefer the treeline delimitation (Johnston 1995).

Physically, the northern polar region consists of a polar ocean largely surrounded by continental and island land masses. Sea ice is present on the ocean year round. Thick, multi-year ice can be present. The seas, gulfs, straits and channels on the continental shelves (which in some cases extend far from land) are shallow. Eight countries have Arctic territory—Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russia, Sweden, and the US (Alaska) (map 6.1). Much of the Arctic territory of Canada is an archipelago with large islands. A number of significant islands and island groups lie off the Russian and European coasts, the most substantial being Ostrov Vrangelya (Wrangel Island), Novosibirskiye Ostrova (New Siberian Islands), Zemlya Frantsa-Iosefa (Franz Joseph Land), Severnaya Zemlya, Novoya Zemlya, and the Svalbard Archipelago. Iceland and Greenland are, according to some definitions, wholly within the Arctic region. Greenland supports a massive ice cap, and smaller ice caps exist on several of the other islands. AMAP summarised the region thus:

> The Arctic is characterized by a harsh climate with extreme variation in light and temperature, short summers, extensive snow and ice cover in winter and large areas of permafrost. The plants and animals of the Arctic have adapted to these conditions, but these adaptations have in some cases rendered them more sensitive to human activities (AMAP 1997, p. 2).

Indigenous people and more recent settlers live throughout the region, in settlements ranging in size from small villages up to cities. Arctic indigenous peoples include Inuit in Canada, Alaska, and Greenland, Kutchin in western Canada and Alaska, Chukchi in eastern Russia, Yakut and Nenet in Siberia, and Sami in Scandinavia (Hall 1987). Kotlyakov and Agranat (1994) stated that 200 000 indigenous people of 26 distinct nationalities live in the Russian north. Large cities are established in the Russian north and parts of Scandinavia and Iceland. Political tensions across the Arctic ocean have led to the presence of military installations in the Arctic (Hall 1987). Extensive offshore and land based oil exploitation occurs, with substantial infrastructure. Environmental problems are many. Pollution incidents have included catastrophic oil and gas releases, radioactive contamination from nuclear weapons testing, nuclear waste dumping, and release from nuclear power sources, environmental contamination with a range of persistent organic pollutants and heavy metals, acidification problems, and impacts of climate change and ozone depletion (Vil'chek, Serebryannyy & Tishkov 1996, AMAP 1997, section 6.6.1). Threats to flora, fauna, and habitats are also significant in some areas.

Map 6.1: Northern polar regions



Individual nations have declared a range of protected areas in the region. These protected area systems 'vary widely with respect to coverage and ecosystem representativeness' (Circumpolar Protected Areas Network, (CPAN) 1997, p. 7). Most of these countries have a traditional protected area approach focussing on land use restrictions, and restrictions on the exploitation of living resources (CPAN 1997). CPAN, with the aim of developing and enhancing protected areas, was formed under the Conservation of Arctic Flora and Fauna programme, part of the Arctic Environmental Protection Strategy, an initiative of the Arctic nations. Cooperation in developing Arctic protected area systems is important because of the presence of many migratory species in the Arctic, the cross boundary nature of ecosystems and species, and the need to protect critical sites within one territory but important to the entire Arctic. In addition, many indigenous and local people depend on hunting, and therefore on maintenance of ecosystems. Table 6.1 shows the number of protected areas and proportion of land area under protection in 1997 (from CPAN 1997). Areas vary considerably in size, from the Northeast Greenland National Park, the largest in the world, to small nature reserves.

Table 6.1: Protected areas in the Arctic

Country	Number of Arctic protected areas	Total size (km²) of areas in Arctic region	% of Arctic region of that country protected
Canada	48	462 674	8.8
Finland	52	25 905	32.6
Greenland (Denmark)	14	993 023	45.7
Iceland	26	12 165	11.8
Norway	38	41 637	25.5
Russia	31	313 818	4.9
Sweden	44	20 348	21.4
USA (Alaska)	41	331 425	56.1

Wildlife in the polar ocean and seas forms an important part of the visitor experience in ship based tourism, and includes polar bear, seals (walrus, ringed seal, hooded seals, harp seals, spotted seals, and others), whales (beluga, narwhal, bowhead, minke, fin, sperm, orca, sei, pilot, and humpback), and many birds including fulmars, gulls, guillemots, kittiwakes, auks, and eider duck. The cold polar ocean and seas, including the ice zone, are very productive, and support land ecosystems through nutrient transfer via sea birds and other predators (GRID-Arendal 1999).

Conservation of the northern polar regions has been managed by individual nations with Arctic territory, in contrast to the Antarctic, which is managed through a collection of international agreements. International agreements apply to non-sovereign waters and to some other aspects of the region, but there is no central conservation regime, even though some issues can only be addressed through international cooperation (CPAN 1997). This need was recognised in 1991 with a meeting of environment ministers from the eight Arctic countries, and the development of the Arctic Environmental Protection Strategy (AEPS). AEPS aims to protect Arctic ecosystems, to provide for protection and enhancement of environmental quality and sustainable use of natural resources, to recognise and accommodate traditional and cultural needs of indigenous peoples, to review the state of the environment, and to identify, reduce and eliminate pollution (AMAP 1999). Under AEPS, four programmes were developed: AMAP (examining anthropogenic pollutants); Conservation of Arctic Flora and Fauna (exchanging information and coordinating research on species and habitats); Emergency Prevention, Preparedness and Response; and Protection of the Arctic Marine Environment, with responsibility for marine pollution issues. In 1996 the governments of the eight Arctic countries established the Arctic Council, which continues the work begun under the AEPS (AMAP 1999). International environmental cooperation in the Arctic region is discussed in more detail in Samson (1997), AMAP (1999), and Young and Osherenko (1991).

The maritime characteristics of the Arctic are of particular importance to ship based tourism. The central portion of the Arctic ocean remains frozen year round. The seas closer to the continents and islands may be open for part of the year, but subject to drifting pack ice. Two routes pass through the Arctic ocean between the Pacific and the Atlantic (although the most powerful icebreakers are not restricted to these routes). The northwest passage passes west of Greenland through Davis Strait, follows a number of routes through the islands of Arctic Canada, and then across the Beaufort Sea to the Bering Strait between Alaska and Russia (Pharand 1988). The northern sea route (sometimes referred to as the northeast passage) passes through the Barents Sea, and then along the Siberian coastline via a number of routes to the Bering Strait (Brigham 1991a, Mulherin 1996). Both of these passages are subject to very poor ice and weather conditions, and both are navigationally hazardous due to shallow waters. Both passages require transit through territorial waters. The islands of Iceland, Greenland, Svalbard, and some of the Canadian Arctic islands can normally be reached without ice breaking, but ice hazards are present year round. The high latitude parts of the polar ocean are navigable by only the most powerful icebreakers.

6.1.3 REGIONAL TOURISM ACTIVITY

Tourism experiences vary across the northern polar regions more than in the Antarctic or the southern oceanic islands. National, regional and cultural differences across the northern polar regions are pronounced, as are geographical differences. Johnston (1995) provides an excellent overview of tourism in Arctic and subarctic regions. Ready land and air access permits hundreds of thousands of tourists to visit northern circumpolar regions each year (Johnston 1995). The Alaskan Arctic receives around 25 000 people yearly. Northern Scandinavia receives around 500 000, Iceland 129 000, Yukon Territory in Canada 177 220, Northwest Territories in Canada (NWT) 47 600, Svalbard 35 000, and Greenland less than 6000 (Johnston 1995, WWF Arctic Programme 1997b). Johnston notes that road access facilitates the highest numbers of visitors, with numbers declining where access is by water or air (as capacity is limited and access more expensive). Many visitors reach Alaska by sea (around 247 000 of the total mentioned above), contributing to Alaska's lead role as a cruise destination. Johnston and Hall (1995) noted that estimating numbers for Arctic and sub-Arctic tourism is difficult, due to different statistical reporting boundaries, and problems of measuring domestic and intra-continental travel to the Arctic regions.

Land access is available to a range of subarctic destinations, and to some high Arctic locations. Scandinavia is well served with roads and rail access across the Arctic circle. Alaska has good road access into the subarctic region, as does Canada (Yukon and Nunavut). Canada has one highway crossing the Arctic circle itself (Johnston 1995). Land access to the Russian Arctic is by road and rail to the main western cities, but is more limited in the Siberian east, with some access via the river systems (Viken, Vostryakov & Davydov 1995, North 1991). Tourism to the Russian Arctic in general appears to be substantially undeveloped, although few figures are available (Johnston 1995). Best estimates put numbers in the early 1990s in the tens of thousands (WWF Arctic Programme 1997b).

Air access is possible to many areas but costs vary with distance, market size, and difficulty. Virtually any settlement in the subarctic or Arctic can be reached by air, and even very small settlements are accessible in the Canadian north, but at considerable expense (Soubliére 1997). Destinations with better infrastructure and larger visitor numbers are less expensive. Access to remote locations by ski equipped or rough field small aircraft, while common, caters mainly for the needs of local people, people working in these areas, and specialist adventure recreationists. More general tourism to these locations is limited by lack of infrastructure, including accommodation and local transport, and costs imposed by the small scale of operations. Access to cities and major settlements is sufficient those of the european Arctic, northern Siberia, Svalbard, Greenland and Iceland accessible.

Sea access is a common option for northern polar regions. Different forms of ship based tourism exist, unlike in the Antarctic where small vessel expedition tourism has dominated to date (section 2.2). Many major cruise lines include Alaska in their itineraries, and the state supports a considerable number of regional and local vessels (Slater & Basch 1998). The USSR operated cruise tourism, with summer cruises in the Barents, Kara, and Bering Seas, and voyages to Svalbard and Anchorage (Armstrong 1989, 1990). Svalbard, Iceland, and the Scandinavian coast receive visits from large cruise vessels operated by a variety of companies (Slater & Basch 1997). The expedition cruising model is suitable for northern polar regions, as it is for other remote areas with little or no infrastructure. Tourism promotional material indicates that ice strengthened and icebreaking vessels are used in a range of locations, including Svalbard, Greenland, the Russian Arctic islands, and the Canadian Arctic islands. The operations of these vessels overlap with the destinations of larger cruise vessels, but they generally spend more time and visit more sites in an area, and are less dependent on port facilities. Shore visits are more frequent, and opportunities for wildlife viewing, nature interpretation, and cultural experiences including visits to settlements are important elements of the experience.

In terms of growth, Johnston and Hall (1995) suggested that cruise tourism in the Arctic and sub-Arctic had the potential to grow considerably, drawing on the large untapped cruising markets of the northern hemisphere, and the opening up of Russian Arctic regions. Cultural tourism and historic tourism are likely to be major focuses. Johnston and Hall noted that great care would be needed to ensure that tourism is appropriate to indigenous values and reflects local community wishes, and that benefits flow to local people. Johnston and Hall also predicted displacement of tourists from the european Arctic to Svalbard, Greenland and parts of Iceland and northern Russia (citing Jacobsen 1994) and displacement from heavily used north American Arctic destinations to Arctic Canada, northern Alaska, and possibly Greenland. They also felt that the popularity of the road accessible Arctic destinations is likely to continue. Another trend identified by Johnston and Hall was that of de-seasonalisation, where the present summer only model of operations would change to include winter experiences, although they felt that off-season operations would remain a small proportion of overall activity (Johnston & Hall 1995).

6.2 ARCTIC-WIDE TOURISM PRINCIPLES

An Arctic-wide tourism initiative has been developed by the World Wide Fund for Nature (WWF). In 1992, WWF initiated an Arctic Programme to serve as a focal point for Arctic conservation issues and promote WWF activities in the Arctic, with participants in Canada, Denmark, Finland, Norway, Sweden, the US and Russia. The WWF Arctic Programme is involved in a range of projects and lobbying in all of the Arctic countries, including public awareness activities, area protection, species protection, sustainable use, pollution control, and local development (WWF Arctic Programme 1996).

In 1996 WWF launched a project to encourage environmentally responsible Arctic tourism. A meeting of invited experts from tourism research, science, tour operation, and government backgrounds was convened. Johnston and Mason (1997) reported on the meeting and subsequent developments. The meeting, held in Longyearbyen, Svalbard, established principles for Arctic tourism guidelines, and proposed an implementation process. Further work was conducted by a smaller group (Johnston & Mason 1997). A 1997 meeting on Svalbard resulted in a set of *Principles for Arctic Tourism*, a *Code of Conduct for Tour Operators in the Arctic*, and a *Code of Conduct for Arctic Tourists*. Further meetings included work on developing criteria for measuring compliance with the Principles and Codes, developing an organisation to certify tourism operations and oversee implementation, and developing pilot projects to implement the Principles and Codes (WWF Arctic Programme 1997b). Johnston (1997) discussed the basis for the code, noting that it could be implemented as a component of a broader regional conservation plan. Johnston (1997) also noted that the success of the code would depend on international cooperation and participation of governments, operators and tourists, and on the extent to which the code is appropriate for the different sites, regions and activities in the Arctic region. The Principles and Codes of Conduct are summarised in table 6.2.

Table 6.2: Summary of WWF Principles for Arctic tourism, Code of Conduct for operators, and Code of conduct for tourists

	Ten Principles for Arctic tourism	Code of conduct for tour operators in the Arctic	Code of conduct for Arctic tourists
1. Make tourism and conservation compatible	Tourism should be part of conservation plans. Tourism planning should support conservation and include conservation plans. Tourism should cooperate with environmental organisations and support research and monitoring of tourism impacts.	Support conservation, through relationships with conservation organisations, encouraging clients to join such organisations, lobbying for conservation, and donating time or money. Avoid conflict with conservation efforts through planning. Access protected areas only with permission. Know conservation laws and other rules, and ensure clients know and obey them. Have an environmental plan, including procedures used to prevent or minimise impacts. Evaluate trips to monitor environmental performance and get client views on environmental performance.	Support reputable, conservation minded operators and suppliers. Get permits if required before visiting protected areas, leave areas as you found them, and do not disturb wildlife. Obey wildlife protection laws. Learn about endangered species in the area and do not hunt or fish them or buy products made from them. Provide feedback to operators on their environmental performance. Join Arctic conservation organisations and support conservation projects.
2. Support the preservation of wilderness and biodiversity	Arctic wilderness areas are an important attraction. Tourism should: support protection of wildlife and habitat; support efforts to stop or reverse habitat fragmentation; support the circumpolar protected area network.	Promote large undeveloped areas to maintain values important to tourism. Support wildlife conservation projects, and ensure clients are aware of them. Ensure clients do not hunt protected species, enter sensitive habitats, or purchase products made from protected species.	Support efforts to preserve wildlife and habitat through donations of time or money, or by educating others or lobbying. Oppose development that fragments wilderness areas, or disrupts wildlife or ecosystems. Visit parks and reserves to support existing areas with revenue and stimulate protection of other areas.
3. Use natural resources in a sustainable way	Sustainable use is essential to long-term environmental health. Undeveloped areas are not a renewable resource. Tourism should encourage sustainable use of natural resources including undeveloped areas.	Where hunting and fishing are allowed, follow rules, take only what is required, ensure clients obey laws, and do not deplete local stocks. Cooperate with local hunters associations. Ensure client equipment is appropriate and used properly. Consider site characteristics when planning visits, and limit numbers accordingly. Cooperate with other operators to avoid overuse. Limit numbers from ships to 100 in wilderness areas. Use trails and campsites where they exist. Avoid wildlife disturbance, and instruct clients on how to view wildlife appropriately.	Walk, ski, kayak, boat, or use dogsleds or other non-motorised transport. Minimise use of snow scooters. View and photograph wildlife from a distance, and respect signs of disturbance. Fish and hunt only where permitted, follow all rules, and take only what is required. Fish and hunt sustainably and in way that does not disrupt local communities. Leave undisturbed areas as found. Collect specimens only where permitted. Use existing trails and campsites and use minimum impact camping techniques. Ensure operators provide a briefing on how you can minimise damage to sites visited.
4. Minimise consumption, waste and pollution	Environmental damage is minimised by reducing pollution and consumption, improving the tourism experience. Tourism should: encourage minimal impact, safe, and appropriate waste disposal; use biodegradable or recyclable packaging; minimise consumption of fossil fuels; avoid motorised transport, using it only to move from one place to another; support lodgings that conserve energy, recycle, and dispose of waste appropriately.	Use biodegradable, recyclable products with minimal packaging. Compress and remove garbage. Recycle and encourage recycling, with finance if necessary. Limit energy use. Choose transport with the least impacts, using non-motorised transport if possible. Use motorised transport for transport rather than as an activity in itself. Choose accommodation consistent with local tradition and minimal impacts. Support waste and pollution clean ups. Ensure no evidence of visits remain. Dispose of bilge water and sewage appropriately.	Choose biodegradable or recyclable products, and those with minimal packaging. Recycle where possible, choose operators who recycle. Limit energy use. Live as little trace of your visit as possible and remove garbage. Choose transport with the least environmental impact. Choose lodgings using effective waste treatment systems, recycling, that practice energy efficiency, and that use environmentally friendly energy sources.
5. Respect local cultures	Tourism should not change lifestyles of people and communities unless they want it to do so. Tourism should: respect the rights and wishes of local and indigenous people; ask for permission before visiting sites including religious sites, graves, camps and fishing sites.	Ensure visits are planned and coordinated with local communities. Provide advance notice and re-confirm. Pay for costs of cancellations. Obtain permission for all activities. Plan group sizes according to community wishes. Avoid work sites unless agreed to beforehand. Obtain permits and obey laws. Respect culture and ensure clients do so. Brief visitors on cultural aspects, using local lecturers where possible. Ask permission to use cameras. Ensure clients respect religious and cultural sites and do not remove artefacts.	Learn about local culture and customs before visiting. Respect local customs and etiquette. Respect the rights of residents. Inform communities that you will be visiting, and be prepared to bring your own supplies. Ask permission to photograph people or enter property or living areas.

Table 6.2 continued: Summary of WWF Principles for Arctic tourism, Code of Conduct for operators, and Code of conduct for tourists

	Ten Principles for Arctic tourism	Code of conduct for tour operators in the Arctic	Code of conduct for Arctic tourists
6. Respect historic and scientific sites	Archaeological, historic, prehistoric and scientific sites are important heritage and scientific resources. Tourism should respect the value of these sites and promote their protection.	Respect sites, and ensure artefacts are not removed. Obtain permission to visit sites. Ensure respectful behaviour where sites have religious significance. Respect scientific work. Obtain permission for visits to work sites or installations.	Respect historic sites and markers, and do not take souvenirs. Keep out of abandoned military installations. Respect the work of scientists by arranging visits to science installations beforehand and not disturbing work sites.
7. Communities should benefit from tourism	Local involvement in tourism planning helps address environmental and social concerns, maximise benefits and minimise damage, and enhance the tourism experience. Tourism should involve community involvement and partnership, and should promote recruitment, training and employment of local people.	Hire local staff and use local businesses where possible. Provide training for local people. Develop long term partnerships with local businesses. Operate in ways that benefit local communities. Buy locally, but ensure you do not deplete supplies of limited goods. Encourage clients to buy locally made products. Use accommodation built, owned and staffed by locals.	Buy local, and choose companies, excursions and suppliers that are locally owned and that employ local people. Buy locally made products and handicrafts. Choose locally owned, built and staffed accommodations.
8. Trained staff are the key to responsible tourism	Staff training should include environmental, cultural, social and legal issues, increasing tourism quality. Staff should be role models for tourists. Tourism should encourage staff to behave responsibly and encourage tourists to do so also, and should familiarise staff with laws and regulations.	Educate staff. Hire or train professionals who are knowledgeable, environmentally, and culturally aware. Provide training in avoiding impacts, safety, and service. Evaluate staff performance. Hire lecturers for ships who are familiar with conservation and safety requirements and can guide passengers ashore. Ensure a majority of staff are familiar with the high Arctic. Include staff with remote location first aid and survival training. Brief staff on the Principles and Codes of Conduct and local rules. Provide copies. Have a proper staff-client ratio, 1:8–15 for land based tourism, 1:15–20 for ship based. Ensure subcontractors comply with these Principles and Codes of Conduct.	Select reputable operators who employ trained staff preferably with Arctic experience. Choose operators with a staff to client ratio of 1:15 or better for land based tours and 1:20 or better for ship based tours.
9. Tourism should be educational	Education of tourists about communities and the environment ensures benefits are maximised for all and damage is minimised. Knowledge and a positive experience allow tourists to act as ambassadors for Arctic conservation. Information should be provided about environmental, cultural and social issues. Codes of conduct should be applied to promote responsible attitudes and actions.	Provide clients with information, lectures, and written materials about environment, conservation issues, and appropriate behaviour in specific areas and the general Arctic. Specify ways clients can support conservation. Ensure the Code of Conduct for Arctic Tourists is obeyed, and enforce the code in a consistent way.	Learn about the Arctic environment and areas to be visited before arrival. Make your trip an opportunity to learn about Arctic conservation. Choose tours that provide information about the environment, conservation, and ways to support conservation. Choose tours and excursions that provide information about the climate, species, habitats, and local people and culture and appropriate behaviour in the area.
10. Follow safety rules	The Arctic can be dangerous. Caution needs to be exercised and safety rules and practices need to be followed, to avoid costly and disruptive intervention or rescue. Tourism should follow accepted safe practice, comply with regulations, and ensure that all involved have safety training and information.	Provide local authorities with an itinerary. Brief staff and clients on dangers of wildlife encounters. Allocate responsibility for safety coordination and avoiding wildlife conflicts.	Treat dangerous wildlife with respect (especially polar bears and muskox). Ensure a gun or scaring device is carried in polar bear areas. Don't feed sled dogs. Use trained guides if hiking over ice or glaciers. Ensure local authorities are aware of your itinerary. Be aware of weather and potential weather changes. Carry appropriate equipment, clothing, and food on trips.

The Principles and Codes of Conduct represent a comprehensive approach to self regulation and environmental improvement for tourists and the tourism industry. The inclusion of underlying principles is important, as they provide a mechanism by which tourists and operators are able to understand the reasoning behind other rules and elements of the codes, which is likely to enhance the acceptance of the codes. The codes are neither restrictive nor admonitory. At the level of individual operators, and tourists, the codes provide a guide to minimising the impacts of tourism activities. As such, the initiative represents a grassroots regulatory intervention, acting as an addition or adjunct to more formal regulatory strategies imposed by governments.

6.3 TOURISM MANAGEMENT FOR SVALBARD

Svalbard is an archipelago lying north of Europe, extending from 74° to 80° north (map 6.1). The group is Norwegian sovereign territory. The group is substantial in area, and consists of the islands of Spitsbergen (39 000km²), Nordaustlandet, Barentsøya, Edgeøya, Prins Karls Forland, Kong Karls Land, Kvitøya, and the far offlying Bjørnøya, a total area of around 62 000km² (Bakken 1995). Around 60% of the land is glaciated. Spitsbergen has a number of settlements, with Longyearbyen, a Norwegian town, the largest with 1200 people, followed by the Russian towns of Barentsburg (950) and Pyramiden (650) and three very small villages. There are three airfields, the main one at Longyearbyen, and no roads between the settlements. Coal mining occurs, as well as tourism, research, and education (Info-Svalbard 1996). Around half of the land area of the group is protected. The whole area is subject to a tourism and outdoor recreation management plan. Ship based tourism has occurred since the late eighteenth century, and presently around 30 to 40 large cruise ships, and 5 to 7 expedition cruising vessels visit each year. Land based tourism also occurs. Johnston and Hall (1995) regard Svalbard as unique because of the strict regulations governing travel and environmental protection, distinct from those applying to the rest of Norway.

Information and documentation was provided by tourism and management authorities responsible for Svalbard. Academic references were consulted and are cited where appropriate. In addition, tourism promotional material, and online reference material was used, and is cited and referenced where appropriate.

6.3.1 PHYSICAL AND ENVIRONMENTAL RESOURCE

A brief description of the physical and environmental characteristics of the group is useful in understanding the context in which tourism and tourism management operate. The island group is well within the Arctic, although the warm Norwegian current ensures the west and parts of the north coast are ice free during summer for around 8 months despite the high latitude (Small 1996, Bakken 1995). Pack ice makes access to the east and north-east coasts difficult (Small 1996). The west coast of Spitsbergen has jagged granitic peaks up to 1717m, and the eastern islands of the group, and inland areas on Spitsbergen are sedimentary, characterised by peaks with flat summits and distinct stratification. Fossils are common (Loland 1994). All soils are permafrost (Info-Svalbard 1996). Hot springs (named 'Trollkildene') with water around 20°C exist in one location, Bockfjord (Small 1996).

The climate is warmer than the latitude would suggest, as a result of the warm ocean currents. Mean temperature is -14°C for winter and 6°C for summer, with lows of around -20°C to -30°C in winter (Info-Svalbard 1996). Precipitation is low, between 200 and 300mm per annum.

The vegetation coverage of Svalbard is limited to 6–7% of the land area, primarily on the inner fjords of Spitsbergen (Info-Svalbard 1996) and in west coast areas, with flowering plants, fungi, moss carpets and grasses but no trees or shrubs (Loland 1994). Northern and eastern areas are largely barren. The vegetation is susceptible to trampling damage. Around 164 species are recorded through the group (Loland 1994). Faunal species are generally those associated with the highly productive marine drift ice ecosystem. Nutrient transport by birds is important in the land ecosystem of the islands (Loland 1994). Svalbard is a breeding site for many seabird species, and supports a number of landbirds. Some cliffs have colonies of several hundred thousand auks, kittiwakes or fulmars (Info-Svalbard 1996). Geese, wading birds, eider duck, and grouse occur. Around 30 bird species breed, with 163 recorded in the area. Only the Svalbard grouse remains during winter (Info-Svalbard 1996, Loland 1994).

Land mammals include polar bear (around 2000), normally found on the pack ice in summer, but also on coasts. Svalbard reindeer (an endemic sub-species, numbering around 10 000) are found. Arctic fox are common. An introduced rodent has limited distribution, and musk oxen introduced in 1930 died out in 1985 (Loland 1994). Freshwater rivers and lakes support char. Marine mammals include whales (beluga and narwhal being notable), walrus (around 1000, recovering after overexploitation), common seal, ringed seal, bearded seal, Greenland seal, and hooded seal (Loland 1994, Info-Svalbard 1996).

6.3.2 HISTORICAL USE AND RESOURCES

Svalbard has had no known indigenous population (Ministry of Environment 1992), and may have been known to Vikings, but confirmed discovery is attributed to Barents in 1596. Whaling activity followed, with many nationalities involved, and settlements of up to 1200 people. Hunting, fur trapping, and sealing activity took place, with Russian involvement from the 1700s. Exploration activities from the 1700s have included many notable expeditions, including those of André, Nobile, and Amundsen (Mirsky 1970). Coal exploitation began in the early 1900s, with many nationalities involved. Resource rights became an issue around the time of the First World War, and led to the negotiation of the 1920 Treaty of Spitsbergen. During the Second World War fighting occurred on Svalbard, with occupation by German, British and Norwegian troops.

Historical and cultural resources and artefacts are common, including remains from whaling, winter fur trapping, mining operations, and Second World War fighting. Buildings, graves, blubber ovens, and iron artefacts remain. Some memorials are also present. Bone scatters from walrus and beluga whale processing sites also occur. The state of preservation of artefacts is good, but thin soils mean that all objects remain above ground, and are vulnerable to human traffic (Ministry of Environment 1992)

The Treaty Regulating the Status of Spitsbergen and conferring the Sovereignty on Norway 1920 (Treaty of Spitsbergen) was agreed by Norway, the US, Denmark, France, Italy, Japan, the Netherlands, the UK, Ireland, Sweden, and the British overseas territories. Germany signed in 1924, and the Soviet Union in 1935. The Treaty of Spitsbergen granted sovereignty of the islands to Norway, which formally declared sovereignty in 1925. The Treaty required Norway to provide citizens of signatory countries equality of involvement in commercial activities, within the rules applied by Norway. The Treaty stated:

> Norway shall be free to maintain, take, or decree suitable measures to ensure the preservation and, if necessary, the reconstitution of the fauna and flora of the said regions, and their territorial waters, it being clearly understood that these measures shall always be applicable equally to the nationals of all the High Contracting Parties (Article 2).

Particularly applicable to cruise tourism, is Article 3, part of which states that the nationals of all contracting parties

> shall have equal liberty of access and entry for any reason or object whatever to the waters, fjords, and ports of the territories specified in Article 1; subject to the observance of local laws and regulations, they may carry on there without impediment all maritime, industrial, mining and commercial operations on a footing of absolute equality.

Norway can determine ownership of property including mineral rights (Article 7). Some 5% of Svalbard is owned by mining companies under the terms of the Treaty (Loland 1994). The islands are demilitarised (Article 9). 42 nations are signatory to the Treaty.

6.3.3 Tourism on Svalbard

The tourism experience centres on the high Arctic nature of Svalbard, which confers symbolic importance (Bakken 1995, Viken 1995). Most activities involve an Arctic experience. Some achieve this through outdoor recreation, with adventure activities predominating, although others involve little more than mild physical exertion. Much of the cruise sector offers the latter type of experience, and there are similarly gentle activities in Longyearbyen and the local area such as snowmobiling or vehicular trips. Intermediate activities include short walks, ski tours, sea kayaking, or dog-sledding trips near Longyearbyen. The majority of land based tourism is relatively active. Local companies offer a range of activities including walking, kayaking, glacier travel, glacier caving, skiing, dog sledding, and IRB tours (Info-Svalbard 1996, Viken 1995). Other than adventure or challenge, attractions relate mainly to the natural environment or cultural history of the islands (Viken 1995). Arctic wildlife is a primary attraction (Bakken 1995). Bird congregations, especially nesting cliffs, are important attractions. Wilderness qualities are high, and scenery is spectacular. Other elements of the destination include the unique flora, geological features, mountains, glaciers, sea ice, and 24 hour daylight. Cultural components of the experience include visits to settlements, scientific stations, and many cultural and archaeological sites.

The environment poses hazards, including cold weather, crevassing on ice areas, and dangerous river crossings. Wildlife danger is also an issue. Polar bears are common in winter, and can be present in summer in all areas, but are most common in the north and east closer to the pack ice. Seven human fatalities as a result of bear attack have been recorded since 1970 (Gjertz & Scheie 1998). In 1995 two people were killed, one a tourist near Longyearbyen, the other a crew member from a tourist vessel. In both cases the people involved were inexperienced and insufficiently armed. While such incidents are rare, bears are a major safety consideration for all forms of tourism in the area (Gjertz & Scheie 1998).

Tourism has occurred for some time, with ship visits since the mid-1800s. Early visits were available to a generally exclusive clientele, but also included trappers and aristocratic adventurers (Loland 1994, Bakken 1995, Viken 1995). Since 1975, an airport has been open at Longyearbyen, permitting the development of a local land based tourism industry. The Norwegian government has had a policy since the mid-1980s to diversify the range of economic activity on Svalbard from what was essentially a coal mining economy (Bakken 1995). From 1975, when the airport opened, until 1990, government policy opposed tourism, and no accommodation, food or other services were available to visitors for much of that period (Viken & Jørgenson 1998). A tourism plan was developed and introduced in 1994 (Bakken 1995). Local tourism sector companies had been establishing since the mid-1980s (Bakken 1995, Viken & Jørgenson 1998). The present industry is supported by a range of services including accommodation, tour operators, conference facilities, and service businesses (Bakken 1995). Land based tourism centres on Longyearbyen (as the airport town), with local or more remote recreational activities available. Independent travel is permitted but discouraged for reasons of safety and environmental protection. Viken and Jørgenson (1998) divided visitors into seven categories. Two of these categories involve cruise tourism and will be discussed below. The remainder were:

- commercial field tourism (organised tourism, mostly using local operators, on foot, skis, or dog sledge);
- snowmobile tourism (organised by local tour operators);
- non-commercial field tourism (independent travel and field activities);
- Longyearbyen tourism (based in the town, with activities in nearby areas); and
- special interest tourism (subject or hobby oriented tourism, including bird-watching).

Bakken (1995) described 'bright winter' (outside the period of 24 hour darkness) tourism activity, largely restricted to dog sledding, snowmobiling, and local skiing or walking. There has also been a focus on developing conference tourism to the islands. Local attractions include a museum, an art gallery, a church, and coal mining industry remnants (Viken & Jørgenson 1998).

Tourist numbers, measured in Longyearbyen bed nights, were 45 100 in 1997 (up from 17 482 in 1991), 60% being leisure tourists (Viken & Jørgenson 1998). Numbers camping (in the Longyearbyen campground only) were about 1300 in 1990 and 2200 in 1994 (Bakken 1995). The average length of stay was between 2.5 and 3 nights (Viken & Jørgenson 1998).

Viken (1995) reported on a survey conducted in 1992, based on 227 responses to a questionnaire placed in the tourism information office at Longyearbyen. The general character of tourism was that of nature-based tourism (Viken 1995). Viken found that tourists were well educated, experienced in travel, interested in nature and environmentally conscious. Viken identified, amongst airborne tourists, five categories: Longyearbyen based visitors (doing day trips in the surrounding areas); those who arrive by air and do coastal cruises; trekkers; self-catering adventure travellers (using kayaks or zodiacs); and excursionists (taking courses on glacier travel, survival, wildlife safaris and so on). Viken found that the majority of visitors were Norwegian, with the remainder mostly european, with only 8% from non-european countries. 80% of travellers were visiting for the first time, and Viken noted that those who had visited before were more likely to travel further from Longyearbyen. Respondents assessed their levels of knowledge as generally good, with information coming from a broad range of sources. Viken, using factor analysis, identified three tourist types, describing them as: 'the conqueror' (motivated by the importance of having been to a remote area and having skills to cope in a dangerous and harsh environment); 'the naturalist' (interested in nature, silence, beauty, and wildlife experiences); and 'the scientist' (who values learning).

6.3.4 CRUISE TOURISM

Viken and Jørgenson (1998) described the historical development of cruise tourism to Svalbard. The first recorded organised cruise was in 1871, from Norway. Scheduled departures operated from Norway and Germany in the 1890s, and one shipping company established an hotel that operated for only a couple of years (Viken & Jørgenson 1998). Regular cruises from Norway and Germany occurred between the two world wars, with scheduled travel possible between 1934 to 1968 apart from the Second World War years. Visits spread further north on Spitsbergen during the 1930s, with 6000 visitors to the Kongsfjorden area in 1937. The 1960s saw the use of larger cruise ships and a Norwegian coastal liner, and further northerly spread, to Magdalenefjorden, which is now the most popular site. Arrivals in the early 1970s were 5000–6000, and were 15 000 by 1979. The present number of cruise tourists is estimated to be between 15 000 and 20 000 passengers each year (Viken & Jørgenson 1998), although Bakken referred to around 24 000 visitors on cruise ships. Loland (1994) described 40 to 50 cruise vessels, carrying around 15 000 to 20 000 passengers. Small (1996) referred to 30 to 40 cruise ships visiting each year.

The cruise tourism sector has three components. Locally based vessels offer boat tours, from a few hours to 14 or more days (Bakken 1995, Viken & Jørgenson 1998). Passengers for these vessels arrive by air, and may spend some nights on shore. The mode of operation can be described as expedition cruising, with IRBs used to make landings and cruise close to shore. Locally based operations include a circumnavigation of Spitsbergen in an ice-strengthened vessel, with the opportunity to visit more remote locations and see pack ice wildlife, while other local activity focuses on wildlife attractions, aimed at photographers and those with interests in biology. Local cruise vessels also offer combined trips, with overnight treks or extended ski tours and mountaineering as part of the experience. Examination of promotional material suggests that there are more than six local cruise vessels operating in the island group.

Non-local expedition cruising also occurs. Visits may take place as part of a wider Arctic cruise that includes destinations such as Iceland, Greenland, coastal Norway, the Russian Arctic coast and islands, or even a full circumnavigation of the Arctic. Some operators transfer passengers by air to Longyearbyen for cruises around the Svalbard archipelago only. Many of the companies involved come from the relatively small group of expedition cruise operators, with a global range of destinations, that include the Antarctic, and use ships that also work in the Antarctic. The ships include larger vessels than those used in the local expedition cruise industry. Promotional material indicates that expedition cruise activities cover most of the archipelago, and visit or cruise at all the islands in the group, including the remote Bjørnøya. The range of shore activities does not appear to be as extensive as those offered by specialised local companies. Some operators offer short walks or day walks. Landings occur 1–3 times per day (Bakken 1995), and IRB cruising is used. Small (1996) discussed possible impacts of expedition cruising on Svalbard, regarding historic sites as most at risk from souveniring or trampling impacts, and noted potential impacts on wildlife. The number of non-local expedition cruise vessels visiting the islands each year is not known, although Small (1996) stated that five to seven of these vessels were visiting per annum.

The third form of cruise tourism is that of large cruise ships. As well as offering specialised expedition cruising, Svalbard is a destination for more traditional cruise vessels, including large vessels, and those that are not ice-strengthened. Passengers are entirely catered for on board, with accommodation and food, and arrive and depart with the vessel. These ships visit one to three sites, with average length of stay on land being 3–4 hours (Viken & Jørgenson 1998). Between 40 and 50 cruise ships visit each year, with 15 000 to 20 000 passengers. The large cruise vessels generally visit Longyearbyen, the research settlement of Ny Alesund, or the Russian mining settlements of Barentsburg, or occasionally Pyramiden (Small 1996). The only unsettled area receiving intensive use from large cruise ships is Magdalenefjorden, in the north of Spitsbergen, which receives a relatively high number of visits (between 13 000 and 17 000 each year) for walking and barbeques (Small 1996). Viken and Jørgenson (1998) note that this site is seen by some as an exception to the general rule, while others see it as an example of the future of other sites. On-site interpretation and supervision is provided (Bakken 1995, Viken & Jørgenson 1998), and it is regarded as a site designated particularly for tourists (Viken & Jørgenson 1998).

Viken and Jørgenson (1998) discussed the possible impacts of cruise tourism. Impacts can be seen at Magdalenefjorden, with some erosion and track formation. They regard Magdalenefjorden as a special case. Otherwise, they noted that rules for protection of the biota have been broken only occasionally. A number of sites show some wear and tear but there is no agreement about the severity of the problems. A survey of public officials in Longyearbyen in 1997, reported by Viken and Jørgenson, found that few of them saw any environmental problems as a result of tourism (including land-based tourism). The cruise tourism industry is seen as having potential risk for major accidents and pollution incidents, with this risk being recognised in tourism development plans (Viken & Jørgenson 1998). Recent grounding incidents involving expedition cruising vessels in 1996 and 1997 have highlighted such concerns (Viken & Jørgenson 1998).

6.3.5 MANAGEMENT OF TOURISM

This section describes the management of tourism in Svalbard, primarily as it is laid out in the 1994 *Management plan for tourism and outdoor recreation in Svalbard* (Ministry of Environment 1994). In addition to this plan, a range of provisions apply to the area including flora and fauna protection regulations. As noted, the island is Norwegian territory. Criminal and civil law is that of Norway. Other statutory regulations can be brought to bear on a case by case basis (Ministry of Environment 1994). The government of Norway has the power to issue regulations for environmental protection (under the *Svalbard Act* of *1925*). To date, regulations are in place to preserve areas, flora and fauna, and historical sites and artefacts, and to establish protected areas.

6.3.5.a Tourism regulations

Regulations covering tourism and pleasure travel have been issued (Ministry of Environment 1994). Johnston (1997) describes the overall regulatory framework for tourism activities as comprehensive, legally binding, and enforceable through prescriptions, restrictions and penalties. Copies of the tourism regulations were not obtained, but they can be summarised based on Info-Svalbard (1996), Ministry of Environment (1992), and Johnston (1997) as follows:

- no rubbish is to be discarded;
- hunting or disturbing birds or animals is prohibited;
- removal of plants or fossils is prohibited;
- use of cross country vehicles is prohibited;
- landing aircraft is prohibited;
- new buildings may not be erected;
- catching or trapping is prohibited;
- cultural remains from 1945 or earlier are protected, including buildings, graves, and artefacts. Some more recent remains are also protected;
- human graves and traces of graves are protected regardless of age;
- skeletal remains of walrus, beluga, or polar bears are protected;
- camping, pitching tents, or lighting fires within 100m of historical remains is prohibited;
- protected historical remains may not be removed from Svalbard;
- harvesting life from the sea floor is prohibited in nature reserves and national parks; and
- introduction of new species is prohibited in nature reserves and national parks.

Regulations apply to tourist movements and entry to protected areas. Tour operators are responsible for safety, and ensuring participants comply with relevant legislation. Operators are required to notify the Governor's Office of travel arrangements, and to have insurance covering rescue and other contingencies. Independent tourists are required to notify the Governor's Office if they are visiting protected areas, but are not normally required to have insurance. Cruise ship visits to national parks or nature reserves require prior notification to the Governor's Office, with details of sailing plans and landings. The Governor has the power to intervene in undesirable or dangerous travel arrangements (Ministry of Environment 1992).

6.3.5.b Protected areas

Protected areas cover more than 50% of the islands (Ministry of Environment 1992). There are four categories of protected area: nature reserves; national parks; bird sanctuaries; and plant conservation areas. Three national parks are declared: North-west Spitsbergen National Park (3560km²), Forlandet National Park (640km²), and South Spitsbergen National Park (5300km²). The remainder of the main island of Spitsbergen has a number of plant preservation territories, and some bird sanctuaries. All of the other islands are nature reserves excepting the small Hopen Island and the offlying Bjørnøya. Industrial activity is prohibited in protected areas. The nature reserves are the most strictly protected areas, corresponding to IUCN Category 1a. South-east Svalbard Nature Reserve (6450km²) covers two large islands, and smaller islands and rocks, with reindeer, polar bears, walrus, and breeding sites for two species of geese. North-east Svalbard Nature Reserve (19 030km²) is also a biosphere reserve. Within this reserve, the islands of Kong Karls Land are important polar bear breeding areas, and access is prohibited year round. Approaches closer than 500m are prohibited, as are overflights lower than 500m. Moffen Nature Reserve is a small island (and 300m marine zone), within North-west Spitsbergen National Park. The reserve is an important walrus resting site and bird breeding site, and all access is prohibited between 15 May and 15 September. Bird reserves (including a 350m zone seaward) are located on the west coast of Svalbard, protecting important breeding sites for eider ducks, barnacle geese and brent geese. Access to the bird reserves is prohibited between 15 May and 15 August. Three plant protection reserves are in place, where picking or damaging plants is prohibited.

6.3.5.c Tourism management plan zoning

A management plan for tourism and recreation covers all areas up to 4nm offshore, and all forms of recreation. The plan outlines government conservation and tourism policy, and was intended to cover 1995–1999. One of the main policies is the preservation of Svalbard's unspoilt and natural environment and wilderness character. Policy also states that tourism should be developed in consultation with local authorities and within the limitations of nature and the environment. Tourism is to be managed, and not developed on a scale that threatens wilderness values. Tourists are to be directed away from vulnerable areas. The government intends to develop a small-scale, controlled, and varied tourism industry (Ministry of Environment 1994). The management plan summarises the vulnerability of the environment to disturbance, and the importance of some areas to flora and fauna. Risks of trampling damage to vegetation, soil and artefacts are noted. Noise pollution, and risk of oil pollution from vessels is also discussed (Ministry of Environment 1994).

The management plan overlies the regulations already in place for the islands. As noted above, visits to protected areas must be notified to the Governor's office in advance. Safety protocols and rescue services are also in place. Increasing tourism, and the expectation of continued interest, made the preparation of a longer term plan necessary (Ministry of Environment 1994). The purpose of the plan was to: translate the political objectives of wilderness preservation into reality; to provide a framework for future management of tourism and outdoor recreation (with more detailed objectives and actions to be prepared by the Governor); to be based on existing regulations (the plan is not statutory); to provide a strategy for managers; to be a practical management tool; and to provide the industry with long term predictable guidelines (Ministry of Environment 1994).

The plan zones the land area of Svalbard, directing different activities to appropriate areas, in order to protect environmental values and the experiences of participants. The zones span a spectrum ranging from least disturbed and least visited, to the most disturbed and more highly organised areas. The categories used are nature reserve, and national park (matching the protected areas), outdoor recreation area, and excursion area, the latter being the more disturbed. Geographically, 10 management areas are defined—two nature reserves, three national parks, four outdoor recreation areas, and one excursion area (Ministry of Environment 1994).

The nature reserve category is defined by the unspoilt, wilderness nature of an area. Nature reserves preserve pristine or near-pristine natural environments so that ecological processes can take place. Research and intrinsic values are high. Areas in this category are far from settlements, and weather and ice conditions make access difficult. The regulation level for this category is high, and management of activities is more stringent than for any other area. The Governor has the power to prohibit or otherwise restrict travel. As noted, tourist vessels are required to report sailing schedules and landings, and the Governor is authorised to demand changes or prohibit any activities. The management strategy is to hold tourism at a low level. Monitoring and reporting is regarded as essential. If tourist traffic and landings increase, limitations may be considered, including prohibition on visiting certain areas, licensing the number of trips, or establishing vessel movement corridors. Management measures include improving visit statistics, site monitoring, possible restrictions on cruise tourism, possible limits on vessel numbers, and possible fee imposition.

The national park category aims to preserve distinctive and largely unspoilt natural environments, and allows research, teaching and nature experiences. The objectives include protecting areas for simple non-motorised recreation. Many of the qualities of the parks match those of the nature reserves, and they are distinguished mainly on the basis of better accessibility and heavier usage. Levels of regulation are lower than in the nature reserves. Snowmobile use and hunting by residents is in some cases permitted. As with nature reserves, tourist vessels are required to inform the Governor of visit plans, including details of landings. The Governor is empowered to place restrictions on vessel numbers and sites used. On-site supervision and interpretation is provided at the most heavily used site, Magdalenefjorden. The management strategy calls for vessel traffic to be controlled. Improved systems of recording and monitoring include paying particular attention to heavily used northern areas. If an increase in large vessel use of additional sites is noted, controls may be imposed. The plan calls for the assessment of sites to determine where travel should be forbidden, and investigations of limits on passenger numbers in particular areas. A fee may also be considered for visits.

The third category is that of outdoor recreation area. This category covers significant areas of the island of Spitsbergen, and the islands of Hopen and Bjørnøya. Additional small areas (within the excursion area) near Longyearbyen provide areas close to the town for non-motorised outdoor recreation without disturbance by motorised activities. The objectives include allowing simple forms of recreational activity and controlled tourism, without the need for formal organisational measures. Access varies according to the season. The plan proposes that notification of travel in these areas be required, for collection of information on usage. Tourism in these areas is not actively encouraged. Some regulation may be necessary for heavily used sites, including the town of Ny Alesund, which receives many visits from large cruise vessels. The management measures for this category of area include regular monitoring of historic and environmental sites, possible regulatory measures in areas of high use, marking of historic sites with signs, and assessment of land based motorised traffic. The island of Bjørnøya, presently an outdoor recreation area, is being investigated for formal protection and may become a national park.

The final category of area is that of excursion area, where future tourism development can be concentrated, and a range of pursuits can be offered. The area is readily accessible, has more economic activity, more present use, and intervention by management is more acceptable. Settlements are in this area, and mining, hunting and other research occurs. Most motorised activity occurs in this area, and most organised tourism occurs here. No prior notification is required to visit the area. The plan requires assessment of vulnerable areas, and measures are to be introduced to channel tourists into desired areas. While the excursion area has a substantial coastline, most provisions cover land based tourism activity.

6.3.5.d Additional elements of the management plan

In addition to the zoning system, the management plan proposes a statistical report that would include information on cruise ships and coastal cruising. Numbers of ships, voyages, passengers, and landings in different areas are to be recorded for both large cruise vessels and smaller coastal cruises. Environmental monitoring programs and an inspection and control system are discussed. Issues such as guide training, signage, and an information centre are also examined. A code of conduct is provided, in the form of common sense rules for Svalbard, reproduced in figure 6.1.

Figure 6.1: Code of conduct for Svalbard tourism

Common sense rules for Svalbard

The invisible tourist is not possible to be but we appreciate your trying

1. Don't be an arctic litterbug! Leave no lasting signs of your visit.
2. Birds and other animals are not to be disturbed. Remember, you are the guest.
3. Help take care of the biodiversity. Do not pick flowers.
4. Leave old cultural remains alone. Law protects all traces of humans from before 1946.
5. Pursuing, attracting or enticing polar bears is strictly prohibited. They are dangerous animals, but also vulnerable.
6. Do not leave the settlements without a suitable gun, and experience in using it.
7. Be considerate of others.
8. Contact the Governor's office (Sysselmannen) if planning a longer field excursion. A mandatory registration applies for travel to large parts of Svalbard.
9. Acquaint yourself with the rules and regulations pertaining to travel and other tourist activities on Svalbard.
10. For the sake of both the environment and yourself, we recommend organised tour arrangements. (Info-Svalbard 1999)

6.3.6 SUMMARY

The management system at Svalbard includes a number of interesting elements. The protected area system and regulations provide a framework of powers to regulate. The *Management plan for tourism and outdoor recreation in Svalbard* provides a rationale for control or development of tourism according to experience settings and natural conditions. The management plan does not have statutory force—it specifically aims to achieve its objectives through existing regulations and management structures. The most important element of the plan lies in its rational planning approach to provision of tourism experiences, both for the sake the participants and for economic development, within a framework of protected area management. The sovereign environment of Svalbard provides an interesting contrast with that of the Antarctic. Sovereignty is granted to Norway, but other nationalities may use the resources of Svalbard. This can be contrasted with the Antarctic Treaty, where a similar equality of access is enshrined by international agreement, but sovereignty is not granted any claimant, and the development of environmental law and environmental protection has proceeded (or failed to proceed) in a very different way.

As with the subantarctic cases, tourism management is made possible by the presence of a comprehensive conservation management framework. The Svalbard case extends further than the subantarctic cases by the inclusion of recreation and tourism experience planning, with an active approach to ensuring tourism and recreational experiences are matched to settings, and ensuring that conflicting uses do not interfere with each other.

The mix of cruise tourism options available on Svalbard provides an interesting comparison between responses to large vessel and small vessel issues. Numbers of tourists landing at certain sites are high to very high, and are therefore addressed in the plan. The issues associated with the penetration of expedition cruising to more remote sites and less disturbed sites are not addressed in detail, although restrictions on the use of certain areas are discussed and the regulatory framework is designed to allow the imposition of restrictions. Perhaps most importantly, the tourism and recreational experiences are matched with appropriate conservation settings, in what is essentially an application of the ROS (section 7.2.3.b). Although no information is available concerning the implementation or success of the Svalbard system, it resembles an 'ideal' management system in that it systematically, rationally and logically places tourism experiences into the overall conservation system, while permitting appropriate experiences to continue. Criticisms can be levelled at a number of aspects of the system—for example, the lack of measures for assessing the effectiveness of the plan, but the intent and approach are appropriate. Provisions for cruise tourism are briefly summarised in table 6.3.

Table 6.3: Tourism management provisions for Svalbard

	Svalbard
Management planning	
Management plan or equivalent	Tourism and recreation management plan, Regulations.
Tourism management system	Tourism management system in force.
Protection status	From nature reserve (IUCN Category I) through to unprotected.
Tourism recognised as a valid use	Yes.
Visitor experience considered	Yes.
Wilderness values considered	Yes.
Tourism provisions nested in overall strategy	Yes.
Specific provisions for tourism or private visits	Yes.
Clear rationale for tourism provisions	Yes.
Contingency planning (eg quarantine breach, marine pollution)	Search and rescue provisions.
Management zoning	Four zones (nature reserve, national park, outdoor recreation area, and excursion area). Tourism permitted in all zones
Restriction of landing sites	Yes—certain protected areas may not be visited.
Monitoring program	Statistical reporting required. Some monitoring proposed.
Vessel capacity / tonnage limit	No.
Vessel numbers limit	Provision exists to impose limits in zones.
Shore management	
Limit on passengers ashore at any one time	No, but provision exists to regulate this.
Limit on passengers ashore per site per season	No, but provision exists to regulate this.
Overall visitor limits	No.
First landfall restrictions	Not specified.
IRB cruising policy	No (apart from restricted zones).
Guide / passenger ratio specified	No.
Shore infrastructure (specifically for tourism)	None known apart from tourism infrastructure in settlements.
Code of Conduct	Yes, a basic code is provided (figure 6.1).
Overnight stays	Permitted.
Activities permitted	Wide range of activities permitted, limited in some zones.
Use of EIA procedures	Not required of operators. No overall EIA conducted.
Administrative	
Permit system	Yes, for certain zones.
Concessionaire system	No.
Guidelines	Not known, regulations provide details of management requirements and provisions.
Government representatives based on shore	Yes, in some locations.
Government representatives on vessel	No.
Entry fees, administrative fees, resource rental	No but provision exists to impose fees for visits to certain zones.
Other	
Science use of tourism logistic capability	Not known, probably unnecessary given ready air access.
Guidebook available	Not known.

6.4 Tourism Management for Glacier Bay National Park and Preserve, Alaska

Glacier Bay National Park and Preserve (referred to here as 'the park' or Glacier Bay) is located in the US state of Alaska. The park includes extensive sheltered waterways and one of the worlds largest protected marine areas (2331km^2), with a total park area of 12 950km^2. The park has World Heritage status as part of a contiguous group of Canadian and US parks and reserves, and is also a UNESCO Biosphere Reserve.

The chief attraction of the park is the extensive fjord system, with actively calving tidewater glaciers (glaciers that flow into the sea), mountain ranges, forests, vegetation communities ranging from wet tundra and alpine tundra to rainforest, and faunal attractions including seabirds, marine mammals and terrestrial mammals. The park is managed by the US National Park Service (NPS). There are two small settlements within the park—the village of Gustavus, and the management headquarters, with a combined total of 1000 people in summer. Roofed accommodation is only available in Glacier Bay Lodge. Very high visitation (254 160 people in 1995) is mainly on cruise ships (203 789 people in 1995).

Glacier Bay is included here as an example of the management of cruise tourism in an area with very high natural and scientific values, and high wilderness values. The more mature character of the destination area, and the dominance of larger vessels are important features, providing a case study where high demand for cruise tourism use is balanced against natural, scientific, wilderness, and other values, including the experiences of cruise users and other users. Tourism in the park includes large ships, small tour boats, and expedition cruising vessels. It is unlikely that the Antarctic destination will reach the level of popularity that is evident in this case, but the case includes features that are of considerable interest, including management of large cruise vessels in environmentally sensitive waters, management of the experiences of a range of users, and incorporation of wildlife protection, pollution prevention, and noise reduction planning in the management system. The case study area includes the park waters used for cruise activity, namely the fjord and sound systems of Glacier Bay.

Management information and the results of visitor surveys were provided by the local office of the NPS, as a result of the information collection process described in section 6.1.1. Additional information is sourced from promotional material, and from NPS visitor information and management information available online (NPS 1999). Background information on the resource characteristics of the area is also derived from WCMC (1999).

6.4.1 PHYSICAL AND ENVIRONMENTAL RESOURCE

A brief description of the physical features and environmental characteristics of the park is useful in understanding the context in which tourism and tourism management operate. Given the focus on cruise tourism, the fjord and bay systems of the park are the focus of this description. The park lies between 58° and 60° north, on the pacific coast of north America. The glacial history of the area has resulted in a deeply dissected, mountainous landscape, with deep fjords, islands, and straits (NPS 1999). The park includes 1415km of shoreline (WCMC 1999), a fjord system penetrating 105km inland, and marine waters. There are 10 major fjords, four of which have actively calving tidewater glaciers (NPS 1995, WCMC 1999).

The region has experienced glaciation for around seven million years, and approximately 25% of the park is presently glaciated (WCMC 1999, NPS 1999). A very rapid glacial decline over the last 200 years resulted in one glacier retreating more than 100km between 1879 and 1916. This rapid retreat is unparalleled in other locations, and is a dominant influence in shaping the parks natural and scientific values (NPS 1999). The character of land and marine areas varies according to the length of time they have been ice free (NPS 1999). The climate of the region is generally cool and maritime. The mean high and low temperatures for January are -2°C and -7°C, and for July are 17°C and 8°C. Around 1800mm of precipitation falls annually (WCMC 1999).

Vegetation reflects the past ice regime. 35% of the land is ice or snow covered or bare rock. Successional vegetation occurs on 30% of the land, and more mature vegetation on 35%, with a distinct gradient of vegetation succession in some areas (WCMC 1999), with very high value for the study of post-glacial succession. Vegetation types include post-glacial barrens, tundra, shrublands, forests, beach meadows, bog communities, sub-alpine meadows, and alpine tundra. Around 420 species of plant are found in the park (NPS 1999).

Large mammals include black bear, grizzly bear, coyote, wolf, and red fox, lynx, beaver, mountain goat, moose, and Sitka blacktail deer. Smaller mammals include three shrew species (one restricted to Glacier Bay), seven weasel species (including river and sea otters), three squirrel species, four mouse species, porcupine, and hare (NPS 1999). 210 bird species are recorded including gulls, kittiwakes, cormorants, puffins, terns, and guillemot, although only 14 sea bird species and 23 land bird species are common (WCMC 1999). Waterfowl including geese, duck and scoter species moult in the park, and are susceptible to disturbance. Important species including marbled murrelets and Kittlitz's murrelets breed in coastal areas. Bald eagles are common (NPS 1995).

Marine mammals include the threatened steller sea lions (which haul out but do not breed in the area), northern fur seals, and harbor seals. Harbor seals haul out and breed in the park in groups of up to 500, with more than 7000 in the park, making it one of the most important locations for this species in the world. Cetaceans include orca, harbor porpoise, dall porpoise, grey whale, finback whale, minke whale, and the endangered humpback whale (NPS 1995). More than 237 species of fish are found in the park (WCMC 1999). Marine fish are diverse, and a fishing industry exploits halibut, rockfish, and a variety of shellfish and crab species. A number of freshwater fish species also occur (WCMC 1999).

6.4.2 HISTORICAL AND CULTURAL USE

Occupation in the area dates from around 10 000 years before present (WCMC 1999, NPS 1995). More recently, Hoonah Tlingit people used the area of the park (NPS 1995). Numerous heritage sites associated with Tlingit people are located on the coastline. Euro-american use included fur trapping, fishing and fish processing, and mining. Archaeological sites are many, and much of the area remains unsurveyed (NPS 1995). Historic use of the area includes a long history of exploration and science, with glaciology studied since 1890, and vegetational succession studied for more than 70 years.

There are no permanent Native American settlements in the park (WCMC 1999). Tlingit people are involved in the fishing, timber and tourism industries, with one of the high profile tourism concessionaires in the park owned by an Alaska Native corporation (Glacier Bay Park Concessions 1998). The park administration centre (Bartlett Cove) inside the mouth of the bay has 135 staff in summer and around 13 for the rest of the year. A 55 unit lodge, ranger station, dock for boats, and camp ground are located at Bartlett Cove (WCMC 1999). The nearby small town of Gustavus, which has an airport, is enclosed by the park.

6.4.3 TOURISM USE

Visitation to the park has increased dramatically in recent decades. The early 1970s saw visitor numbers to the entire park around 25 000, growing to around 130 000 by the early 1980s. From the late 1980s there was a very rapid increase through the early 1990s, to more than 252 000 by 1994 (NPS 1995), and a total visitation in 1998 of 405 246 (NPS 1999). Most of these visitors come aboard cruise ships—339 406 in 1998. Some of the remainder participate in small boat cruises (NPS 1999). Backcountry use includes hiking and kayaking, representing less than 1% of total visitor numbers. The majority of these users rent a kayak from a concessionaire or participate in a guided kayak tour (NPS 1995).

6.4.3.a Cruise vessels

The park is located on the northern end of the Inside Passage, the waterway linking the northeastern mainland US, the Canadian west coast, and Alaska. The passage is a natural waterway using channels and straits through the islands off British Columbia, and is a major cruise tourism destination. Glacier Bay and Preserve is a highlight on this cruise route, and was the fifth ranked Alaskan attraction in 1989/90 (NPS 1995). Other cruise destinations in the Alaskan region include Prince William Sound, Kenai Fjords, Cook Inlet, and the city of Anchorage (NPS 1995).

The cruise tourism industry using the park has a number of components—large cruise ships, tour boats, and charter boats, offering different experiences. Private boats also use the park. As at 1998, there were 10 cruise lines with concessions to operate in the bay. Of these, four are significant (with worldwide operations) expedition cruising companies. Five companies operate tour boats in the park (Glacier Bay National Park and Preserve Concessions Office 1998), with two of these companies also operating expedition cruising in a range of destinations worldwide, including Antarctica.

Cruise ships are defined by the managing authority as any vessel at or over 2000 tons gross, carrying passengers for hire. The large cruise vessels make day visits (averaging 10 hours) into the park, without landings (NPS 1995). Most cruise ships visit the West Arm of the bay to view the two larger, more active glaciers, spending 15 minutes to an hour at each glacier front. Cruise ships move as close to the glacier fronts as do smaller vessels, and sometimes push through floating ice in the water, accessing areas that smaller vessels are unable to visit (NPS 1995). The remainder of the time in the park is spent in transit along a mid-channel course 1.6km or more from shore, under command of a pilot (NPS 1995). The larger cruise vessels offer a large, high viewing platform that provides good views of the glaciers and landforms, but limit the opportunities to view wildlife and other natural features (NPS 1995).

6.4.3.b Tour boats

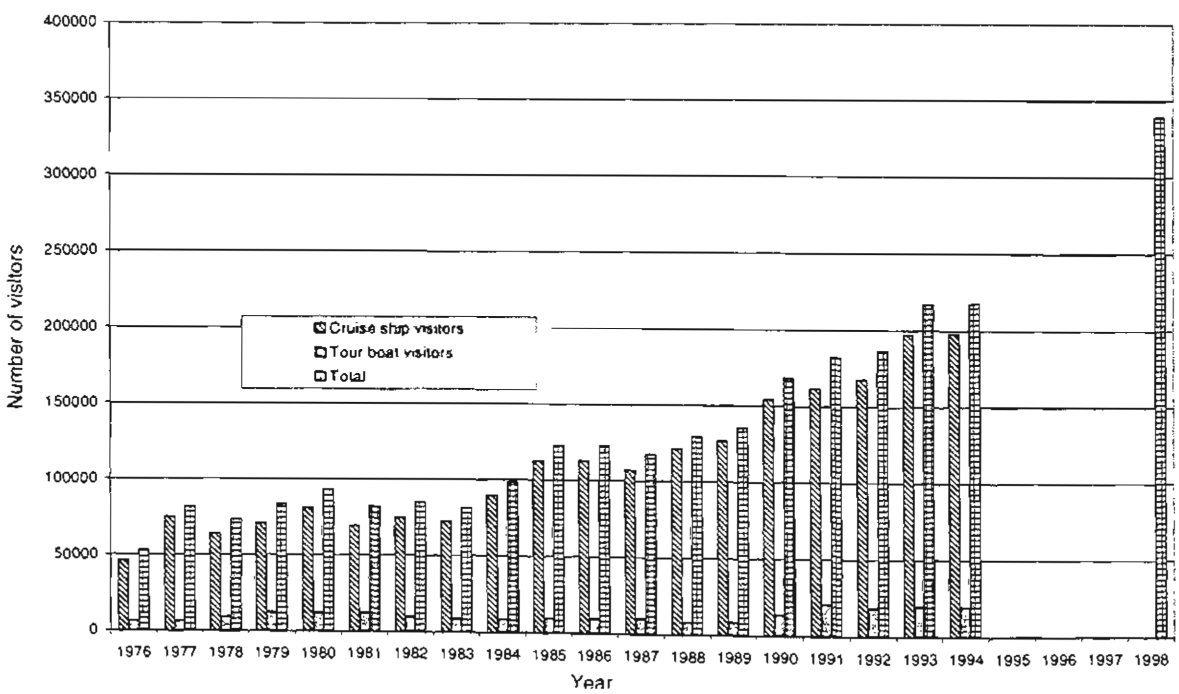
Tour boats are defined as motor vessels under 2000 tons gross, carrying more than 49 passengers, or any smaller vessel with a regular schedule (NPS 1995). Some tour boats operate entirely within the park on day or overnight cruises. Other boats offer multi-day trips in southeast Alaska, including a day in the park. In addition to visiting at least one glacier, tour boats travel closer to the shoreline, entering bays and inlets, and offer closer viewing of wildlife. Some of the tour boats are catamaran hulled, and most are multi-deck, with limited open deck viewing spaces (NPS 1995).

Charter boats are defined by the managing authority as a motor vessel under 2000 tons gross carrying up to 49 passengers, operating on an unscheduled basis (NPS 1995). These boats mainly offer day trips for sport fishing, cruises to glaciers, or whale watching outside the park. Most are small, carrying less than 10 people. Charter boats operate in a similar fashion to tour boats, cruising close to shore and into inlets, and transport passengers for day walks, fishing or other activities (NPS 1995).

6.4.3.c Visitor numbers

A dramatic increase has occurred in park visitation overall, and in cruise visits in particular. Figure 6.2 shows the increase in numbers of visits on cruise ships and tour boats. A large proportion of the increase between 1980 and 1994 is attributable to an increase in capacity of cruise ships, and some increase in off-season visitation, as regulation prevented any increase in vessel numbers during this period (NPS 1995). Figures on ship capacity indicate an average passenger number of 600 in 1980, and 1851 in 1994 (NPS 1995).

Figure 6.2: Growth in visits on cruise ships and tour boats (source NPS 1995, NPS 1999)



An increase of 76% occurred between 1978 and 1988, with a further increase of 162% between 1988 and 1998, or an overall increase of 361%. The number of cruise ship visits each year is between 100 and 110, and the number of tour boat visits each year has been around 250 to 300 (NPS 1995).

6.4.3.d *Tourist characteristics*

Basic information on cruise ship passenger characteristics indicates that passengers are predominantly older or middle aged professionals, with a higher proportion of women than men. An increase in younger age groups was noted in the years leading up to 1995 (NPS 1995).

More detailed research was conducted on the motivations of tour boat visitors in 1989, with 1438 people responding to a mail survey (a response rate of 84%), all having participated on a single tour boat cruise within the park. Viewing glaciers was rated the most important motivation for the visit by 55% of respondents, with viewing wilderness scenery rated most important by 13%, and seeing wildlife rated as most important by 9%. Activities ranked as very important by more than 50% of respondents included 'seeing a part of Alaska', 'seeing wildlife', 'viewing wilderness scenery', and 'seeing glaciers' (Johnson 1990). Visitors averaged 50 years of age, with 51% of respondents over 50, 9% over 70 and 10% under 30. 45% of respondents had 17 years or more of formal education, and 45% were employed in professional or managerial positions. Most (85%) were from the US. Most visitors (94%) were visiting other southeastern Alaskan destinations as part of the trip, and 63% nominated Glacier Bay as the primary destination for the trip (Johnson 1990).

6.4.4 MANAGEMENT PLANNING

The protection of the area began with the declaration of the Glacier Bay National Monument in 1925, which was expanded in 1939 and 1978, becoming Glacier Bay National Preserve in 1980. It was redesignated as national park and enlarged under the *Alaskan National Interest Lands Conservation Act* (ANLICA) (WCMC 1999, NPS 1995). Management authority is vested in the NPS.

Management goals and objectives are derived from statutory, policy, and planning instruments. At the state level, ANLICA sets goals for the management of Alaskan lands of conservation importance. NPS management policies represent additional objectives. With reference to vessel management, these policies include:

- conservation of threatened and endangered plants and animals;
- perpetuation of native animal life;
- the encouragement of visitor use for inspirational, educational and recreational activities;
- management of visitor use and, if necessary, regulation of the amount, time, place and kind of activities;
- management of water quality; and
- perpetuation of air quality because of its importance to visitor enjoyment, health, scenic vistas, and preservation of resources (NPS 1995).

At the park level, a general management plan is used, with objectives for the management of vessels forming the basis of a vessel management plan. The two objectives of interest are:

> Protection of park resources: allow ecological processes to continue unimpaired by visitor use. Protect marine and terrestrial wildlife and vegetation from adverse effects of visitor use. Identify marine areas that have special sensitivities for wildlife, solitude, or other values and develop methods for protecting these special sensitivities.
>
> Provision for visitor use: continue recognition of Glacier Bay's waterways as primary access corridors to the area. Ensure visitors have a wide variety of quality and environmentally sound alternatives for experiencing the Glacier Bay story, employing a wide variety of vessel types. Establish vessel operating requirements and limits on the number of vessel entries necessary to protect park purposes and resources. (NPS 1995, p. 1.5).

About 85% of the park is designated wilderness, including five marine areas called 'wilderness waters' (NPS 1995). In the US park system, motorised transport is not normally permitted in areas declared wilderness. Because of traditional uses, travel distances, and a lack of roads, ANLICA made exceptions for Alaskan wilderness, permitting motorised access subject to appropriate regulation. Park waters designated as wilderness are therefore managed in the same way as other waters, with motor vessels allowed (NPS 1995). A *Wilderness Visitor Use Management Plan* governs access, group size, length of visit, and commercial considerations on the land areas (NPS 1995).

Active vessel management began in the 1970s following concern that increases in vessel traffic might alter the behaviour of endangered humpback whales. Opinion from the National Marine Fisheries Service (NMFS), required under the federal *Endangered Species Act*, indicated that the NPS should regulate vessel numbers, restrict vessels from approaching or pursuing whales, and conduct research into whale feeding behaviour, the effects of vessels on whale behaviour, and the acoustic environment (NPS 1995). On the basis of the results of this research, and historical data on whale numbers, the NMFS issued a second Opinion in 1983, to the effect that increased vessel traffic would be likely to jeopardise the existence of the whale stock. This Opinion recommended restrictions on vessel numbers, with an increase only to be allowed if whale numbers increased (NPS 1995). A *Final Recovery Plan for the Humpback Whale* was published in 1991 by the NMFS. This plan includes objectives that require maintenance and enhancement of habitat through reduction of human produced noise and correction of existing impacts, identification and reduction of human related injury and mortality from collisions, and measurement of whale population parameters. Opinions were also issued by the NMFS on the threatened steller sea lion, concluding that levels of proposed vessel activity would not be likely to jeopardise the existence and recovery of the population.

Since 1984 a permit system has regulated the entry of cruise ships, tour boats, charter boats and private vessels. Growth of 20% over 1976 levels was allowed under this system, with that level reached in 1988 (NPS 1999). From 1988 through to the introduction of the VMP, the summer seasonal quota of cruise ship entries was 107, while the quota for tour boats was 239 from 1985 to 1992, and 276 after that.

6.4.5 VESSEL MANAGEMENT PLAN

In 1992 the NPS began preparing a vessel management plan and environmental assessment for vessels in Glacier Bay. The draft VMP considered requests for additional entries, and issues including:

- potential effects on threatened and endangered species (including vessel proximity, noise disturbance, and pollution);
- potential effects on marine mammals (including disturbance and pollution)
- potential effects on birds (including disturbance and pollution)
- potential effects on air quality (primarily on visibility at glacier fronts)
- potential effects on the experience of other users and their safety;
- potential effects on wilderness values (of motor vessels in pristine locations);
- potential effects on cultural resource (vessel wakes, pollution or vandalism) (NPS 1995).

The draft VMP and environmental assessment considered six alternatives. All of the alternatives included vessel quotas, vessel operating requirements, and special-use areas. The draft VMP and environmental assessment represents a detailed analysis of different management options and their effects. The plan focussed on the impacts of the different alternatives including: impacts on marine mammals (with a focus on threatened and endangered species) through underwater noise, collisions, petroleum pollution, and disturbance through vessel presence and proximity; impacts on birds through vessel disturbance or petroleum pollution; impacts on air quality including visual pollution; impacts on water quality from fuel spills, sewage, grey water and ballast water and garbage; impacts on visitor experiences (of those on vessels and others); impacts on wilderness values; impacts on the local economy; and impacts on cultural resources.

The details of the process and the findings for the different alternatives will not be entered into here. It is sufficient to say that the plan represents a systematic planning process, with full consideration of the impacts of alternative management approaches. The outcome of the plan and the reasoning behind the choice of the alternative will be briefly described.

6.4.5.a Daily entry restrictions

The draft VMP proposed an increase in the number of vessels allowed into the park and mitigation measures designed to offset the potential effect of these increases. Public comment and modification of the plan followed, and the VMP and associated regulations entered into force in 1996. Daily entry restrictions are a maximum of 2 cruise ships, 3 tour boats, 6 charter vessels and 25 private boats. The daily restrictions are applied year round for cruise ships and tour boats, and June, July and August for charter and private vessels. Scheduling of entries across different cruise companies to ensure daily limits are observed is managed commercially by Cruise Line Agencies of Alaska (NPS 1998b).

6.4.5.b Seasonal entry restrictions

A cap on the total number of vessels entering the bay each season is also applied. An increase of 30% in cruise ship entries over 1996 and 1997 was allowed (from 107 to 139), with a further increase in 1998, conditional on research indicating it would be acceptable, to 184 per season. Annual adjustments of this total are possible. NPS (1999) states that the present limit is 139 ships. There is no seasonal limit on tour boat entries, with daily limits applying year round.

6.4.5.c Other regulations

Regulations, including ship operating restrictions, restricted waters, permit conditions, and other matters are applied. These are laid out in the *Vessel Regulations* (see NPS 1998b). Some areas are closed to motor vessels to ensure wilderness and solitude, protection of humpback whales, protection of pupping, moulting, and hauled out seals and sea lions, and protection of nesting seabirds (NPS 1995). Operating within one-quarter nautical mile of a whale or pursuing a whale is prohibited. A number of areas are designated 'whale waters' between 15 May and 31 August. In whale waters vessels over 18ft (unless under sail) must remain one nautical mile from shore, or remain mid channel if transiting narrows (NPS 1998b). In certain waters, from 15 May to 31 August, operating a vessel at more than 20 knots is prohibited. Other waters have speed limits applied (NPS 1998b).

For specified islands, vessel approaches closer than 100 yards are prohibited. Approaching a steller sea lion hauled out on land or rock, or a seabird nesting colony closer than 100 yards is prohibited. A number of waters are completely closed to cruise ships from May to August inclusive, and a range of other seasonal restrictions are also specified (NPS 1998b). Emission restrictions also apply. Limits relating to the visibility of exhaust emissions are imposed. Regulations permit different limits during different ship operational modes (eg docking, underway, or start-up of engines) (NPS 1998b).

6.4.5.d Concession system

A concession system is operated. Some cruise ship entries are allocated using a prospectus and competitive tendering, while others are allocated on the basis of historical usage. The seasonal limits on ship entries are managed through this system. A concession fee of US$5 per passenger is applied. Additional charges are made for the onboard NPS interpretation program (approximately US$0.75 to US$1.50) (NPS 1999, NPS 1998b). Under permit conditions, commercial vessel operators must submit and implement a pollution minimisation plan to ensure industry best standards are applied to oil-spill response planning and prevention, minimisation of air pollution, and minimisation of underwater noise pollution. As part of the permit application process, operators must specify the mitigation measures they will apply (NPS 1998b). The permit allocation process gives preference to those companies that minimise air, water and noise pollution. Permit conditions also prohibit off-boat activity from commercial vessels unless authorised (NPS 1998b).

6.4.5.e *Other management*

Interpretation services are compulsorily provided on cruise vessels and tour boats. Interpretive rangers are placed on board vessels, ensuring interpretive messages reach a large proportion of the park's visitors, and heightening the visitor experience (NPS 1995). Rangers board cruise ships as they enter the bay, and remain until ships depart. The ship public address system is used to provide commentary on park values and features. Slide shows are provided, an information desk is staffed, and rangers move about the ship to respond to questions. For tour boats, rangers board at the dock, and supplement the naturalists employed by most boat operators.

The NPS imposes a number of other requirements to ensure the quality of the visitor experience. The terms of the permits require operators to provide NPS brochures to all passengers before entering the park. Vessels must enter after sunrise and leave before sunset to ensure optimal viewing. They are required to spend at least 5 hours in the upper West Arm area, and one hour or more at the face of tidewater glaciers. The ranger interpretive program must be the priority activity while the ship is in the upper West Arm area. No shipboard events are to be organised that compete with the interpretive programs (NPS 1998b).

The park also has a research and monitoring program, developed in conjunction with the VMP. The program assists in the prediction, assessment and management of human (particularly vessel related) effects on the environment (NPS 1995). The program includes studies of vessel and visitor distribution, marine mammal and vessel interactions, and identification of sensitive resources (NPS 1999). In addition to specific research relating to vessel use, other research activities include social research on the visitor experience, monitoring of the effectiveness of visitor programs (Johnson 1990), and ongoing resource inventory. A range of other research and monitoring needs are identified in the VMP.

6.4.6 SUMMARY

Glacier Bay National Park and Preserve is an example of a natural resource area heavily used for cruise tourism, and probably the protected area most heavily used for cruise tourism in the world. This use occurs in an area with high wilderness values and a relatively undisturbed natural environment, with very high natural, cultural and scientific values. The management of cruise tourism in this context is of considerable interest.

The protection status of the park (National Park, IUCN Category II) means that the managing authority has a statutory responsibility to provide for recreational and tourism uses. Cruise tourism provides the only practicable way of meeting high demand for such experiences without compromising other values. Commercial cruise tourism occurs on large cruise ships and smaller tour vessels. The experience offered differs between these modes, although both centre on the viewing of wilderness scenery and especially the actively calving tidewater glaciers of the bay.

Important features of the resource area and the industry are:

- the largely natural qualities of the area, including designated wilderness;
- easily accessible tidewater glaciers and scenic areas, in waters navigable by large vessels;
- the presence of threatened and endangered species, requiring protection by law, that are susceptible to impacts from vessel operations;
- the presence of other significant wildlife attractions;
- specific scenic focal points (glacier fronts) that are the primary attraction for visits to the area;
- a sightseeing only mode of operations, with no landings permitted;

- a range of other uses and user groups whose experiences can be affected by cruise operations;
- lack of other access options;
- close proximity to very large markets with a tradition of cruise tourism participation;
- proximity to other attractions and destination areas, increasing the marketability of cruise products;
- very high demand for cruise experiences in the park;
- very high historical cruise tourism usage, and recent very rapid rises in usage levels; and
- a range of statutory and policy restrictions on the planning process.

Ship based use of the park poses a difficult management problem. A range of natural, cultural and scientific values are affected by vessel use of the park. Tension exists between those using the area for wilderness experiences, and the effect that vessel presence has on these experiences. In addition, vessel use has effects on the natural, scientific, and cultural values of the park, including disturbance of wildlife through vessel presence and underwater noise, and reduction of scenic qualities through emissions.

In response to the need to manage these diverse goals while addressing the very high demand exhibited for cruise tourism experiences, a management regime for cruise tourism operations has been developed that is detailed, structured, regimented, and regulatory.

Important features of the regime include:
- a detailed process of assessing the impacts of vessels on values of the park;
- a specific management plan for the management of vessels including cruise ships, tour boats, charter boats and private vessels;
- restrictions on the numbers of vessels permitted to enter daily and across the season;
- a range of restrictions on access to locations for wildlife protection, and maintenance of visitor experiences;
- restrictions on speeds, operating areas, emissions, and noise;
- planning requirements for mitigating the impacts of normal operations and for emergencies;
- compulsory participation in NPS operated interpretive programs;
- fees and charges for access and for services; and
- a competitive system for allocating most vessel entry permits to operators.

Overall, the management system in place contrasts strongly with the minimal intervention experienced by the cruise tourism industry (particularly expedition cruising) in many other locations. The very high levels of usage, the protection status of the park, and its place as part of the US National Park System would seem to justify the level of regulation. Table 6.4 summarises the characteristics of the management system.

Table 6.4: Cruise tourism management, Glacier Bay National Park and Preserve

	Glacier Bay National Park and Preserve (waters)
Management planning	
Management plan or equivalent	General Management Plan, Vessel Management Plan, Wilderness Visitor Use Management Plan.
Tourism management system in place or proposed	In place.
Protection status	National Park (IUCN Category II). Also World Heritage Area.
Tourism recognised as a valid use	Yes.
Visitor experience considered	Yes, in considerable detail.
Wilderness values considered	Yes, in considerable detail.
Tourism provisions nested in overall strategy	Yes.
Specific provisions for tourism or private visits	Yes, comprehensive tourism regulation.
Clearly expressed rationale for tourism provisions	Yes.
Contingency planning (eg quarantine breach, marine pollution)	Yes, contingency planning required of vessel operators, NPS planning in place.
Management zoning	Yes—areas closed to traffic permanently, seasonally and temporarily.
Restriction of landing sites	Landings from tour boats and cruise ships not permitted (drop offs of hikers and kayakers regulated).
Monitoring program	Yes—monitoring of vessel emissions, noise, wildlife interactions, populations, and disturbance.
Vessel capacity / tonnage limit	No limit—very large vessels in use.
Vessel numbers limit	Yes, daily and seasonal limits on cruise ships and tour boats.
Environmental Impact Assessment	Carried out for the industry as a whole through the VMP. Some requirement for operators to assess the impacts of their activities on park values, and to plan for their mitigation, though the concession and permit system.
Shore management	Shore management provisions not in place, as cruise tourism does not provide landings. Tour boats provide access to backcountry for hiking and kayaking, but this activity is separate to cruise based tourism overall. Shore based, backcountry, or kayaking activities are regulated through Wilderness Visitor Use Management Plan. Use of small vessels from ships and boats subject to authorisation.
Vessel operations	Speed restrictions, approach distance limits, and other operating restrictions apply.
Administrative	
Permit system	Yes.
Concessionaire system	Yes, with allocation of entries to companies operated competitively.
Guidelines	No.
Government representatives based on shore	No (excepting park headquarters).
Government representatives on vessel	Yes, interpretive specialists placed on board all vessels.
Entry fees, administrative fees, resource rental	Entry / concession fees of US$5 per passenger, additional fee for provision of interpretive services.
Other	
Science use of tourism logistic capability	Not necessary—ready access.
Guidebook available	Considerable interpretive material available.

6.5 TOURISM MANAGEMENT FOR THE CANADIAN ARCTIC

Canada has a large Arctic territory, including an archipelago of large islands and peninsulas extending to high latitudes (map 6.2). Three Canadian territories include Arctic lands—Yukon, NWT, and the newly formed Nunavut. A range of attractions and features, both cultural and natural, are present. Wildlife, spectacular Arctic scenery, cultural sites of indigenous people and explorers, trappers, traders and settlers, the symbolic attraction of the Arctic itself and more specific icons such as the northwest passage, all serve to attract visitors. Proximity to the large north American travel market, the familiarity of many people with the history of Arctic exploration, and expensive land and air access, have encouraged the development of a specialised cruise tourism industry. Access with ice strengthened vessels or even icebreakers can be difficult in some areas. Many waters are shallow and poorly charted, and straits and channels are often narrow. The northwest passage linking the

Pacific and the Atlantic through the islands of the archipelago is significant for its historical and symbolic meaning, and is an attraction in its own right. There are a number of settlements in the Canadian Arctic, most on the coast. Recently (1 April 1999) the territory of Nunavut formed, after the settlement of the Nunavut land claim in 1993, which recognised native rights.

This case study provides a general overview of the cruise tourism industry in the Canadian Arctic, and describes the context of tourism and tourism management. Johnston (1997) noted that 'there is no comprehensive strategy in place to control tourism impacts in the Canadian north; however, a variety of tourism codes of conduct or restrictions have been adopted by operators, associations and communities' (p. 17). Johnston identified a number of elements of a management framework, including individual pieces of legislation, rules for national parks and for hunting or fishing, and indirect measures including insurance and safety requirements applied to operators.

This case study focuses on maritime regulation for safety and environmental protection. As the only country other than Russia with a comprehensive system in place to regulate shipping in ice covered waters, Canada provides an example of provisions that may be considered for Antarctic application, and the application of these provisions to the cruise tourism industry.

Information for the case study comes from a number of sources. Contact with protected area management authorities revealed that levels of tourism to any one protected area are not high enough to warrant specific cruise tourism management provisions. In one case, Parks Canada advised that a park management plan (for Aulavik National Park on Banks Island) includes a requirement for departmental staff to be present for cruise ship visits, at the expense of the tour operator (Fox, B., 1997, pers. comm., 1 December). Very low levels of visitor usage in the region mean that visitor management planning is not highly developed. Regulatory functions are distributed among many authorities (see Johnston & Hall 1995). Information on the ice shipping regime was provided by the Northern Region of the Canadian Coast Guard.

6.5.1 PHYSICAL AND ENVIRONMENTAL RESOURCE

A brief description of physical features and environmental characteristics is useful in understanding the context in which tourism and tourism management operate. Particular attention is paid to coastal areas, especially coastal national parks and protected areas. Information was more readily available for protected areas than other locations. An ecozone approach is used by Parks Canada (1999) to describe the character of different areas, and that approach is adopted here.

The lands and enclosed waters of the Canadian Arctic archipelago are sovereign Canadian territory. A number of large islands dominate the archipelago (map 6.2). The northernmost island is Ellesmere Island, the large Baffin Island lies in the east, and Victoria Island and Banks Island are further to the west. The coast of the mainland itself is broken into broad peninsulas in the east. Landforms vary considerably across the region, and include sheer coastal cliffs, mountains, glaciers, ice caps, canyons, fjords, flat or rolling coastal plains, uplands and plateaux, large rivers, bogs and wetlands, moraine deposits, polar deserts, and permafrost soils and features.

Three ecozones are represented in the coastal Canadian Arctic (Parks Canada 1999). In the eastern section of the Canadian Arctic, a mountainous region known as the Arctic Cordillera ecozone covers eastern Baffin and Devon islands, and most of Ellesmere and Bylot islands. Ice caps and numerous extensive glaciers and fjords are present. Climate is cold and arid, with average January temperatures of -35°C in the north, and average summer temperatures of 5°C. Precipitation is very low. Vegetation is largely absent but some areas, referred to as thermal oases, have lush meadows of sedges, mosses, cushion forming herbs, and occasionally heathers. In coastal areas polar bears are the main mammals, while bird life includes the northern fulmar, ringed plover, hoary redpoll and snow bunting (Lands Directorate 1986 in Parks Canada 1999).

The northern Arctic ecozone includes the remainder of the Arctic islands and some mainland coastal areas. The climate is very dry and cold. Average January temperatures are around -35°C, while summer averages are 5–10°C. Precipitation is very low. Vegetation is limited to herbs and lichens. Land mammals are more common than in the Arctic Cordillera, with caribou, muskox, wolf, Arctic fox, ermine, Arctic hare, lemming, and polar bear among others. Bird species include red-throated loon, brant, oldsquaw, gyrfalcon, ptarmigan species, owls, and others (Lands Directorate 1986 in Parks Canada 1999).

The coastal edge of the NWT and Nunavut are part of the southern Arctic ecozone, characterised by rolling lowland moraine covered plains. Climate is cold and dry, with January average temperatures of -30°C, and summer averages of 10°C. Precipitation is between 200–400mm. Vegetation includes shrublands, with dwarf birch, willows, and heaths, with herbs and lichen species. Mammal species are diverse, with moose, muskox, wolf, Arctic fox, grizzly bears, polar bears, and others. Numerous bird species breed in parts of the area (Lands Directorate 1986 in Parks Canada 1999).

Marine mammals across the Canadian Arctic include walrus, bearded seal, harp seal, harbour seal, beluga, narwhal, orca, and bowhead whale. Narwhal are often found in deep fjords, and beluga congregate at shallow river mouths (Soubliére 1998).

Cultural sites are common, and include prehistoric sites representing a number of different cultures (Paleoeskimo, Dorset, and Neoeskimo cultures). Remains of settlements, graves, stone markers and stone fox and bear traps are found. Historic sites include Inuit sites from the historical past, and sites associated with exploration and polar exploitation.

6.5.2 Land tenure, national parks and protected areas

The protected area system in Canada includes national parks, national wildlife areas, wildlife sanctuaries, bird sanctuaries, and heritage rivers. Parks Canada and the Canadian Wildlife Service manage these areas. National historic sites and territorial protected areas including Territorial Parks and Game Sanctuaries are declared. Large areas of Nunavut and other territories are controlled and managed by Inuit people, after land claims agreements returned control to the original owners (Soubliére 1998, Parks Canada 1999). The national parks and other protected areas known to receive cruise tourism attention will be briefly described.

6.5.2.a Nunavut

Quttinirpaaq (Ellesmere Island) National Park covers 33 775km² in the north of Ellesmere Island, including areas of Arctic Cordillera and Northern Arctic ecozones. The coastline is incised by glacial valleys and fjords, and ice shelves up to 80m thick extend into the Arctic Ocean. On the eastern coast, 700m cliffs overlook the channel separating Canada from Greenland. Mountains up to 2616m, an ice cap, and glaciers feature in the north of the park. The park has a small warden station, visitor shelter, and airstrip located at the head of an extensive fjord in the south. Mammals include polar bear, musk ox, caribou, Arctic hare, and Arctic wolf. 30 species of bird nest in summer. Cultural sites include stone ruins of Inuit occupation, and Fort Conger (in the northeast), a very significant site of some of the most important exploratory and scientific activities (Soubliére 1998, Mirsky 1970, Parks Canada 1999). Promotional material and travel writing (Martin & Martin 1996) confirm that the park is used by cruise tourism vessels.

Auyuittuq National Park lies on the east side of Baffin Island, in the Arctic Cordillera ecozone, and covers 21 500 km². The park is dominated by highlands, has a substantial icecap, and peaks of up to 2100m. The north coast includes fjords with walls 900m high, and the park boasts the tallest uninterrupted cliff face in the world. Plants and animals are typical of the Arctic Cordillera. Cultural sites include numerous prehistoric and historic sites. Some cruise companies advertise regular visits to this park, often in combination with a visit to Pangnirtung (Soubliére 1998, Parks Canada 1999).

Sirmilik National Park covers around 23 000km² of north Baffin Island, including most of Bylot Island. The nearby community of Pond Inlet also acts as an attraction. Bylot Island includes mountains, ice fields, glaciers, spectacular fjords, and wetland areas. The island is a very rich wildlife area. Large colonies of birds nest on spectacular coastal cliffs. Marine mammals and polar bear are common in the area. Archaeological sites are also present (Soubliére 1998, Parks Canada 1999).

In addition to these three national parks, a number of other coastal Arctic parks are proposed. Nunavut also has three territorial parks, two national wildlife areas (and two proposed), three wildlife sanctuaries, nine bird sanctuaries (and five proposed), four territorial Historic Parks (and five proposed), and 11 National Historic Sites (Parks Canada 1999). Many of these areas, especially the historic sites, serve as attractions for cruise tourism.

6.5.2.b Northwest Territories

There are two national parks in the NWT, Aulavik National Park on northwest Banks Island, and Tuktut Nogait National Park. At least one cruise tourism visit has taken place to Aulavik National Park, by the icebreaker *Kapitan Khlebnikov* in 1994, as advised by Parks Canada (Fox, B. 1997, pers. comm., 1 December). Tuktut Nogait National Park, around 16 340 km², protects the calving habitat of the bluenose caribou herds. Spectacular river valleys, canyons, and rolling hills characterise the park. Little further information is available as the park was only declared in 1996.

6.5.2.c Yukon

The Yukon territory has one coastal national park, Ivvavik National Park, 10 170 km², where a coastal plain with lagoons adjoins the Beaufort Sea. The land has not been heavily glaciated. The park is important as a breeding and feeding ground for a herd of around 16 000 caribou. Specific mention of the use of this park for cruise tourism was not noted in any promotional literature or other sources, although Herschel Island, a Yukon Territorial Park, just offshore from Ivvavik National Park, is visited relatively often (Fox, B. 1997, pers. comm., 1 December).

6.5.3 TOURISM ACTIVITY

For a general description of the Arctic cruising experience see Martin and Martin (1996) and Soubliére (1998). Marsh and Staple (1995) provide a history of the industry in Arctic Canada. They show that commercial cruising began relatively recently, in 1984. Purpose built ice-strengthened expedition cruising vessels were active before the collapse of the Soviet Union made additional ice-strengthened ships available. The first cruise noted was a transit of the northwest passage by the *Lindblad Explorer*. The first transit of the passage by a passenger ship, it was only the 34th transit since Amundsen's first in *Gjøa* in 1906. It was also the first pleasure cruise of the passage and the first commercial voyage (Pullen & Swithinbank 1991). The second voyage recorded by Marsh and Staple is a 1985 transit of the passage by the *World Discoverer* (Pullen and Swithinbank noted that this was the first west to east transit), followed by a partial transit in 1986. The *Society Explorer* (formerly *Lindblad Explorer*) made a west to east transit in 1988 (the first passenger ship to transit in both directions). 1988 saw more utilisation of accessible areas, such as the coast of Baffin Island. 1992 appears to have been the next year cruises were offered (Marsh & Staple 1995), with the newly available *Kapitan Khlebnikov* making a transit of the northwest passage, visiting the Ellesmere Island coast, and Axel Heiberg Island, an area that appears to be seldom visited by tourist vessels. Another transit of the northwest passage was made by the *Frontier Spirit*. 1993 cruises included more visits by the *Kapitan Khlebnikov*. The review of activity by Marsh and Staple ceases in 1993. Since that time, promotional material indicates that activity in the region has continued, and a number of additional companies have joined the market. Less ambitious itineraries are offered in the Baffin Island, Lancaster Sound region, that allow passengers to have an Arctic experience while maintaining a higher degree of reliability in scheduling and getting to advertised destinations, using readily available ice strengthened vessels. A large proportion of the vessels used in the Antarctic during the southern hemisphere summer also operate in the Arctic region, many in the Canadian Arctic. Many advertised itineraries combine western Greenland and the eastern Canadian Arctic. In 1996 the Transportation Safety Board of Canada noted that for the previous eight summers, around three passenger vessels cruised for two to three weeks in the Canadian Arctic (Transportation Safety Board of Canada 1996). As in the Antarctic, the symbolic attraction of making a 'first ever' voyage is significant. Companies continue to plan itineraries and market occasional voyages based on this premise, with the attraction of such an event presumably being more potent than the more achievable opportunities that may be foregone.

6.5.3.a Geographic areas

A review of promotional material and other general sources was used to identify the areas of the Canadian Arctic commonly used for cruise tourism. Reference to map 6.2 is instructive. The eastern Arctic is more commonly used than other areas, due to reasonable access through ice, and the presence of natural, physical, and cultural attractions. Settlements with scheduled air services allow operators to develop cruises with minimal transit time to attractions. The proximity of the area to Greenland permits both destinations to be visited in one voyage. Some areas require the use of an icebreaker, while others are accessible to ice strengthened vessels at certain times of the year. Section 6.5.4 discusses accessibility with respect to shipping safety and control.

One area receiving considerable cruise tourism attention is Lancaster Sound, including Bylot Island, the coast of Devon Island, Beechy Island (where the Franklin Expedition spent its last winter), and a range of other historic, archaeological and wildlife sites. This area is on the northwest passage, and its association with exploration is a considerable attraction. The town of Resolute lies at the head of Lancaster Sound / Parry Channel on Cornwallis Island and acts as a terminus for cruises. The Baffin Island region is also used often, particularly the settlement of Pangnirtung on Cumberland Sound. The eastern and north-eastern coasts are visited by vessels going to Lancaster Sound through Davis Strait. This area is accessible to ice strengthened vessels during part of the year.

The areas deeper into the northwest passage including Peel Sound, Somerset Island, Boothia Peninsula, King William Island, and Franklin Strait are where many of the most famous events in northwest passage exploration activity occurred (Mirsky 1970). This area is accessible to ice strengthened vessels, and is part of the traditional northwest passage route. It appears to be traversed relatively regularly by cruise vessels. Some areas are navigationally very difficult, and include very shallow waters (Pharand 1988, Transportation Board of Canada 1996). The western section of the northwest passage, following the mainland straits, appears to be visited less often, and ice can present problems in these waters.

Areas receiving attention from fewer ships, or less regular visits, include the east and south coasts of Ellesmere Island. Passenger visits in 1992 from an icebreaker to Axel Heiberg Island, west of Ellesmere Island, are reported by Marsh and Staple (1995)—this area appears to have been seldom visited, and has very difficult access (section 6.5.4). Marsh and Staple also report on visits by helicopter from an icebreaker to Lake Hazen in the Quttinirpaaq (Ellesmere Island) National Park.

All advertised cruise itineraries examined included visits to local settlements. Local people in some cases participate in the tourism economy by selling crafts, often with a traditional theme. The lifestyle of northern peoples, and their cultural traditions such as dance, song, and art are important attractions. The small size of many settlements means that the visit of a single ship can have considerable social impacts, both positive and negative. Marsh and Staple (1995) report passengers on one voyage as being concerned about the impacts they, as tourists, had on the local people. Passengers were also concerned that local people did not benefit sufficiently from tourism activities.

6.5.3.b Tourist characteristics

Little research appears to have been conducted on the characteristics of passengers on Canadian Arctic cruises. One survey of passengers on a 1993 cruise aboard an icebreaker transiting the northwest passage and visiting the coast of Ellesmere Island, is reported in Marsh and Staple (1995). Little information is presented by Marsh and Staple about the design and conduct of the survey. The single cruise surveyed, the small sample size, and the lack of basic background information on the conduct of the survey mean that it can serve only as a general indication of the characteristics of the passengers on that voyage. A total of 89 passengers completed the self-administered survey. 58% of respondents were women. 62% were over 60 years of age. 30% had completed a postgraduate course of study, and 44% had a tertiary education. 46% of respondents were retired. Nationalities were Canadian (47%), American (33%), and a range of others. 55% were members of conservation or wildlife organisations. 52% were visiting the Arctic for the first time, with others having visited a wide range of european, Russian, and north American Arctic areas. Motivations for taking the voyage were wildlife (mentioned by 78%), recreation (53%), education (53%), photography (42%), history (37%), and conservation (30%). Things that passengers wanted to see included wildlife (55%), and Inuit people (18%) (Marsh & Staple 1995).

6.5.4 VESSEL MANAGEMENT AND REGULATION

The focus of this case study is the marine regulation system applying to shipping in the Canadian Arctic. Canada and Russia are the only two Arctic nations with a comprehensive Arctic maritime regulatory system (Brigham 1997, Santos-Pedro n.d.). The Russian system is relatively inaccessible for the purposes of this research. The Canadian system, on the other hand, is well documented. The marine section of the Prairie and Northern Region of Transport Canada provided a collection of regulations and a draft of the *Arctic Passenger Ship Guidelines*, prepared by Northern Region of the Canadian Coast Guard (Canadian Coast Guard 1994). The system as it applies to passenger vessels and the cruise tourism industry will be examined.

It is important to reinforce here that there are at present no international agreements in place establishing specific rules for ships in ice covered waters. In the Arctic, states have the power to regulate some activities in their territorial waters. The systems in place are national rather than international, with some substantial differences that make operating in the different jurisdictions problematic (Santos-Pedro n.d.). Since 1993 Canada has led an international initiative to both harmonise existing Arctic rules, and develop a bi-polar regime including Antarctic waters (Brigham 1997, section 4.2.3). A Polar Code is being negotiated. If adopted, such a code will have major ramifications for expedition cruise operations in polar regions. In light of the fact that the Polar Code is not yet a reality, this case study provides an example of a system that is in place and has been working for some time in the sovereign context.

The *Arctic Passenger Ship Guidelines* summarise the regulatory instruments applying to passenger shipping in the Canadian Arctic. They are prepared by the Northern Region of the Canadian Coast Guard to help operators negotiate the many regulations and rules that apply. They include information on regulations concerned with: pollution prevention; ship safety; vessel traffic management; the ice regime; tourism and Arctic communities; search and rescue, Arctic marine survival; and ice navigation (Canadian Coast Guard 1994). The elements of the regulatory system as described in the guidelines are summarised here, with reference to the actual regulatory instruments where appropriate.

The primary instrument relating to shipping in Canada's Arctic waters is the *Arctic Waters Pollution Prevention Act* (enacted in 1970), applying to Canadian waters north of 60°N. The Act was a response to the possibility of large oil tankers using the northwest passage on a regular basis, and focuses on pollution and environmental protection issues. The provisions of the Act, while designed for the cargo and oil shipping trade, were in place when expedition cruising commenced. The Act regulates waste disposal, structures on the land that may deposit waste in Arctic waters, and shipping safety control zones. The *Canada Shipping Act* also covers some aspects of the shipping regulatory system.

Under these Acts, there are a number of regulations. Regulations applying specifically to Arctic waters, or otherwise important, are as follows:

- *Arctic Shipping Pollution Prevention Regulations* (regulating shipping in Arctic waters, including construction, navigation, waste disposal, and oil transport);
- *Oil Pollution Prevention Regulations* (covering prevention of oil pollution from ships in all Canadian waters);
- *Ship Station Radio Regulations* (regulating ship communications equipment in Arctic waters); and
- *Shipping Safety Control Zones Order* (prescribing certain areas of Arctic waters as control zones).

Some explanation of the *Arctic Shipping Pollution Prevention Regulations* is worthwhile, as it is through these regulations that the Shipping Safety Control Zone system is established. The regulations divide Canadian Arctic waters into 16 geographical areas (control zones) according to the ice conditions pertaining at different times of the year (map 6.2). The zones are based on analysis of historical ice data. A table defines periods of the year when ships of different ice classes may navigate in each zone (table 6.5). In addition, a second system overlies the zoning system, allowing ships to navigate outside the dates allowed for a zone if they apply Arctic Ice Regime Shipping System (AIRSS) Standards. The AIRSS standards require a trained ice navigator to be aboard, and involve an analysis of the ice regime (how difficult the ice is to transit). This analysis includes forecasting, predictions of ice conditions and analysis of remote sensing images. The analysis of the ice regime according to the AIRSS Standards, along with knowledge of the strength and other characteristics of the ship, allow the ice navigator to decide if the ship can pass through a certain area. Certain reporting requirements also apply.

In essence, the overall system regulates the use of ice strengthened ships or icebreakers in different areas at different times of years. To allow comparison between the ice classes of different ship classification societies, equivalent standards are defined under the ASPPR. In table 6.5, Arctic class ships are those with icebreaking capacity, while 'type' ships are ice strengthened vessels, such as most of the expedition cruising fleet. All waters of the Canadian Arctic have some seasonal restriction on ice strengthened vessels. Map 6.2 and table 6.5 provide an indication of the accessibility of different areas of tourism interest.

The Canadian section of the traditional northwest passage route can be transited in some (but not all) 'type' (ice strengthened) vessels under this system. The popular attraction areas of Lancaster Sound, Beechy Island, northern Somerset Island, northern Baffin Island, and the settlement of Resolute are accessible to 'type' vessels for considerable parts of the year. Some 'type' vessels are able to access the eastern coast of Ellesmere Island. The northeast and southern coasts of Baffin Island are accessible to all 'type' vessels during part of the year. Access to part of the northwest coast of Banks Island in the western Arctic is possible for some 'type' vessels for a short period. Two zones completely exclude the use of 'type' vessels and lower class icebreakers, including much of the western side of the Arctic archipelago, and part of the Parry Channel and northeast side of Victoria Island.

Map 6.2: Arctic Canada including Shipping Safety Control Zones (accompanies table 6.5)

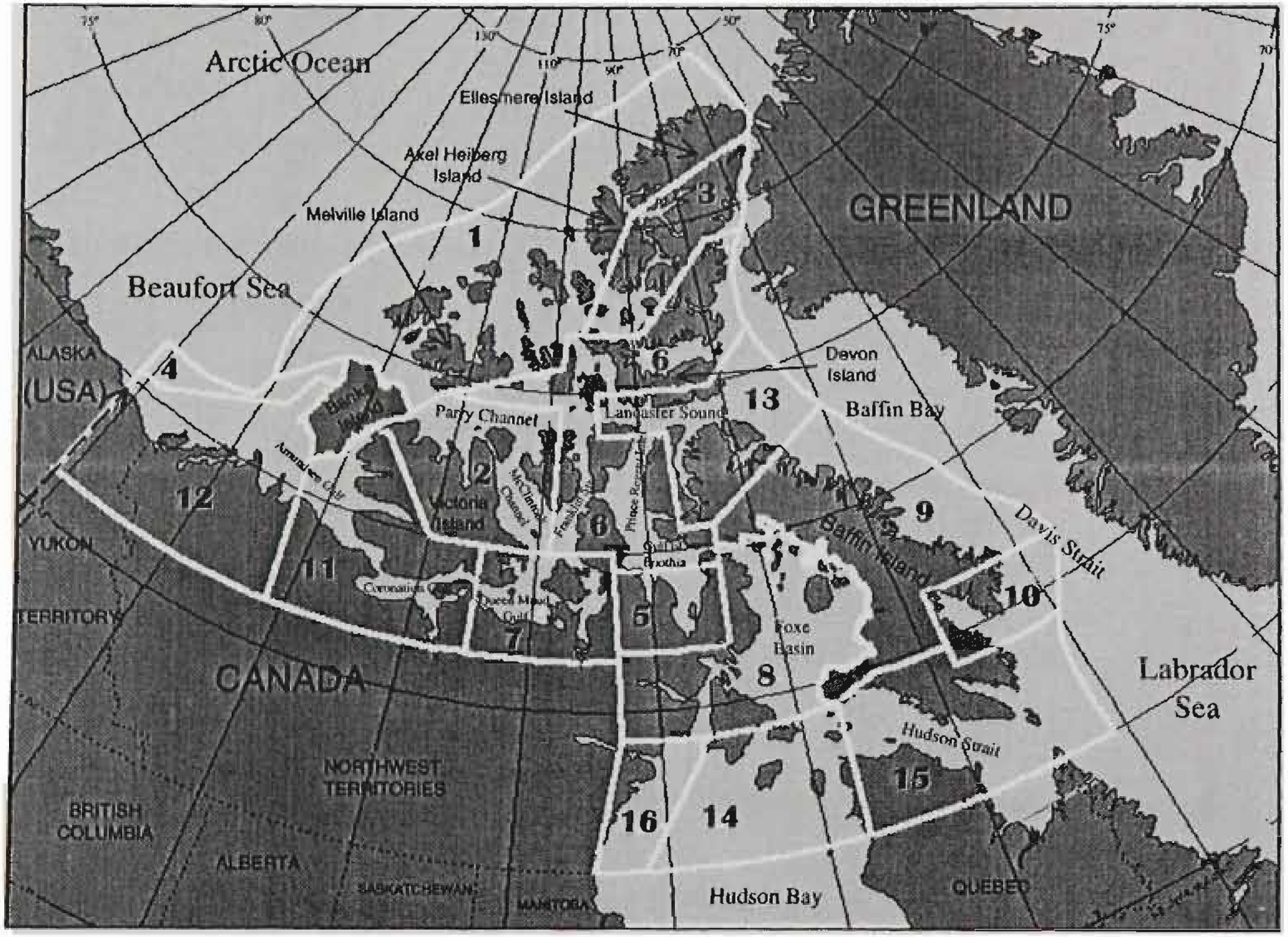


Table 6.5: Ship types and Shipping Safety Control Zone entry dates (accompanies map 6.2)

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Zone 12	Zone 13	Zone 14	Zone 15	Zone 16
Arctic Class 10	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year
Arctic Class 8	July 1 to Oct. 15	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year
Arctic Class 7	Aug. 1 to Sept. 30	Aug. 1 to Nov. 30	July 1 to Dec. 31	July 1 to Dec. 15	July 1 to Dec. 15	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year	All year
Arctic Class 6	Aug. 15 to Sept. 15	Aug. 1 to Oct. 31	July 15 to Nov. 30	July 15 to Nov. 30	Aug. 1 to Oct. 15	July 15 to Feb. 28	July 1 to Mar. 31	July 1 to Mar. 31	All year	All year	July 1 to Mar. 31	All year	All year	All year	All year	All year
Arctic Class 4	Aug. 15 to Sept. 15	Aug. 15 to Oct. 15	July 15 to Oct. 31	July 15 to Nov.15	Aug. 15 to Sept. 30	July 20 to Dec. 31	July 15 to Jan. 15	July 15 to Jan. 15	July 10 to Mar. 31	July 10 to Feb. 28	July 5 to Jan. 15	June 1 to Jan. 31	June 1 to Feb. 15	June 15 to Feb. 15	June 15 to Mar. 15	June 1 to Feb. 15
Arctic Class 3	Aug.20 to Sept. 15	Aug. 20 to Sept. 30	July 25 to Oct. 15	July 20 to Nov. 5	Aug. 20 to Sept. 25	Aug.1 to Nov. 30	July 20 to Dec. 15	July 20 to Dec. 31	July 20 to Jan. 20	July 15 to Jan. 25	July 5 to Dec. 15	June 10 to Dec. 31	June 10 to Dec. 31	June 20 to Jan. 10	June 20 to Jan. 31	June 5 to Jan. 10
Arctic Class 2	No Entry	No Entry	Aug. 15 to Sept. 30	Aug. 1 to Oct. 31	No Entry	Aug. 15 to Nov. 20	Aug. 1 to Nov. 20	Aug. 1 to Nov. 30	Aug. 1 to Dec. 20	July 25 to Dec. 20	July 10 to Nov. 20	June 15 to Dec. 5	June 25 to Nov. 22	June 25 to Dec. 10	June 25 to Dec. 20	June 10 to Dec. 10
Arctic Class 1A	No Entry	No Entry	Aug. 20 to Sept.15	Aug. 20 to Sept. 30	No Entry	Aug. 25 to Oct. 31	Aug. 10 to Nov. 5	Aug. 10 to Nov. 20	Aug. 10 to Dec. 10	Aug. 1 to Dec. 10	July 15 to Nov. 10	July 1 to Nov. 10	July 15 to Oct. 31	July 1 to Nov. 30	July 1 to Dec. 10	June 20 to Nov. 30
Arctic Class 1	No Entry	No Entry	No Entry	No Entry	No Entry	Aug. 25 to Sept. 30	Aug. 10 to Oct. 15	Aug. 10 to Oct. 31	Aug. 10 to Oct. 31	Aug. 1 to Oct. 31	July 15 to Oct. 20	July 1 to Oct. 31	July 15 to Oct. 15	July 1 to Nov. 30	July 1 to Nov. 30	June 20 to Nov. 15
Type A	No Entry	No Entry	Aug. 20 to Sept. 10	Aug. 20 to Sept. 20	No Entry	Aug. 15 to Oct. 15	Aug. 1 to Oct. 25	Aug. 1 to Nov. 10	Aug. 1 to Nov. 20	July 25 to Nov. 20	July 10 to Oct. 31	June 15 to Nov. 10	June 25 to Oct. 22	June 25 to Nov. 30	June 25 to Dec. 5	June 20 to Nov. 20
Type B	No Entry	No Entry	Aug. 20 to Sept. 5	Aug. 20 to Sept. 15	No Entry	Aug. 25 to Sept. 30	Aug. 10 to Oct. 15	Aug. 10 to Oct. 31	Aug. 10 to Oct. 31	Aug. 1 to Oct. 31	July 15 to Oct. 20	July 1 to Oct. 25	July 15 to Oct. 15	July 1 to Nov.30	July 1 to Nov. 30	June 20 to Nov. 10
Type C	No Entry	No Entry	No Entry	No Entry	No Entry	Aug. 25 to Sept. 25	Aug. 10 to Oct. 10	Aug. 10 to Oct. 25	Aug. 10 to Oct. 25	Aug. 1 to Oct. 25	July 15 to Oct. 15	July 1 to Oct. 25	July 15 to Oct. 10	July 1 to Nov. 25	July 1 to Nov. 25	June 20 to Nov. 10
Type D	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	Aug. 10 to Oct. 5	Aug. 15 to Oct. 20	Aug. 15 to Oct. 20	Aug. 5 to Oct. 20	July 15 to Oct. 10	July 1 to Oct. 20	July 30 to Sept. 30	July 10 to Nov. 10	July 5 to Nov. 10	July 1 to Oct. 31
Type E	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	Aug. 10 to Sept. 30	Aug. 20 to Oct. 20	Aug. 20 to Oct. 15	Aug. 10 to Oct. 20	July 15 to Sept. 30	July 1 to oct. 20	Aug. 15 to Sept. 20	July 20 to Oct. 31	July 20 to Nov. 5	July 1 to Oct. 31

6.5.5 Additional requirements

The *Arctic Passenger Ship Guidelines* provide advice on the complex set of legislative, regulatory, and other requirements, at all levels of government. A summary of these guidelines is presented here, in sufficient detail to provide an understanding of the regulatory system applying to cruise vessels.

6.5.5.a *Federal requirements*

The *Arctic Shipping Pollution Prevention Regulations* are monitored by inspection of certificates, approval of ship suitability, and random inspection. An Arctic Pollution Prevention Certificate is issued by the classification society. Port state control is applied, allowing Canada to inspect vessels even if they hold a valid certificate. Waste discharge from vessels is prohibited, discharge of sewage is permitted. The most important element of these regulations is the Shipping Safety Control Zone System as described above. CCGN requires cruise schedules in advance of travel to arrange port state control inspections, and for customs and excise reasons, police liaison, and liaison with military command. The Canadian Coast Guard operates an Arctic Traffic System (called NORDREG) free of charge, that provides recommended routes and ice conditions, coordinates icebreaker assistance, and monitors position reports of vessels. Vessels using the AIRSS system of ice navigation are required to report to NORDREG. The regulations require an ice navigator (a qualified master or deck officer with specified experience in operating ships in ice conditions) to be on board vessels. The regulations also require vessels to have sufficient fuel and water to complete voyages, and sufficient storage for all waste other than sewage.

The *Arctic Passenger Ship Guidelines* describe the search and rescue system, including rapid response military resources, and Coast Guard ships including icebreakers. Requirements for searchlights (to assist in ice navigation at night), navigational appliances, and charts and publications are also detailed. Publications required on board include *Ice Navigation in Canadian Waters*, and a *Cold Weather Marine Survival Guide*. Information on the use of the ice information service, customs and excise requirements, and liaison with the police is described. The use of helicopters in the Arctic region, including licensing and fuelling requirements, is described.

The requirements of the Canadian Wildlife Service are also discussed. Wildlife is protected by legislation, and visits to wildlife sanctuaries and migratory bird sanctuaries may only be made under license. Interpretive programs and tours are offered by prior arrangement. Migratory birds receive special attention in the guidelines. Sport fishing and purchases of marine mammal products are governed by federal legislation and require licenses or export permits.

6.5.5.b *Territory government requirements*

The draft *Arctic Passenger Ship Guidelines* obtained by the author did not include provisions relating to the newly formed Nunavut territory. The land area of Nunavut was formerly part of the NWT. Inuit people have control over large areas of land—both what is now Nunavut, and NWT lands controlled by the Inuvialuit organisation. The *Arctic Passenger Ship Guidelines* describe the regulations applied by the Government of the Northwest Territories (GNWT). Advance arrangements are required to visit Inuit communities and cross Inuit lands. Licenses for tourism activity are arranged through the GNWT Department of Economic Development and Tourism, who also notify communities to expect cruise ship visits. The GNWT also has responsibility for many heritage sites, which are protected by legislation. The GNWT heritage centre requires in advance: cruise itineraries, with specific landfalls, dates, and contingency plans in the event of unfavourable conditions; a description of the activities to be conducted at each landfall where heritage sites exist; details of provisions made by operators to educate clients about preservation of heritage sites and about legislation protecting these sites; and the name and resumé of the lecturer with heritage interpretation responsibilities. Operators are also advised: that all archaeological and historic sites are protected and removing artefacts or modifying structures is banned; that foot traffic can be damaging, and existing trails should be used where possible; standing on or in structures, or moving rocks is banned; and that ancillary activities should be conducted off site. The *Arctic Passenger Ship Guidelines* also advise that Canadian Arctic Heritage Parks may be visited, but registration is mandatory, a park warden may be placed on the vessel, prior notice of visit is required, and a national park business licence is required. Interpretive programs and literature, and tours can be arranged with prior notice.

6.5.6 SUMMARY

Expedition cruising in the Canadian Arctic, while relatively recent, is well established and appears to be growing. As with other destinations, the expedition cruising model allows operators to cater to people who would otherwise be unable or unwilling to visit the destination area. The model of operations appears to be very similar to that in use in other areas, and many of the vessels used in the Canadian Arctic are common to other polar expedition cruising destinations. Attractions centre on wildlife and natural features, historical and archaeological sites and associations with events, and cultural experiences derived from the presence of communities and indigenous people.

Important features of the resource area and the industry include:

- the very large size of the area;
- wilderness character of much of the area;
- largely natural qualities of the area;
- important historic sites, archaeological sites, and places associated with historic events;
- areas of symbolic attraction including the northwest passage;
- wildlife attractions including whales, polar bears, and concentrations of birds;
- spectacular scenery including mountains, glaciers, and ice features;
- a range of land and resource uses;
- the presence of some settlements;
- the presence of indigenous and other local people;
- regular or charter air access to many areas;
- locally based tourism operations;
- areas with difficult access requiring icebreakers, and areas of easier access requiring ice-strengthened vessels;
- a relatively small industry with low levels of visitation;
- a dangerous navigational environment with shallow waters and other hazards;
- a short operating season;
- a moderate degree of freedom to choose sites, with relatively few sites restricted;
- many of the same companies and vessels as operate in other expedition cruising destinations including Antarctica;
- a range of vessel sizes and standards;
- passengers who are on average older, well educated, experienced in travel, and interested in wildlife and conservation;
- a relatively short history of cruise tourism; and
- close proximity to the large markets of north America;

Given the characteristics of the resource area and the industry, and the presence of a number of geographical foci for tourism activity, tourism impacts are an issue. As with other locations, ship based tourism involves a number of low significance, medium likelihood impacts, associated with shore visits, minor emissions from vessels, general disturbance to wildlife through vessel presence, noise, and so on. Severe (but low likelihood) impacts are also possible, such as oil pollution as the result of a marine accident. The most significant feature of the system in place for the Canadian Arctic is the management of risks of not only the low significance, medium likelihood impacts, but management (and minimisation) of the risk of severe, low likelihood impacts from marine incidents relating to ice navigation or other Arctic hazard.

The industry operates in a heavily regulated environment in many respects. The broad scope of operations, varying land tenure and protection status, and the range of jurisdictions (community, territory and federal) establish a complex regulatory regime. In addition, a sophisticated and rigorous maritime control system is in place, controlling all aspects of ship navigation and transit. Many aspects of the system are not aimed specifically at the cruise tourism industry, and it seems unlikely that such a system would be appropriate solely for the regulation of the relatively small number of cruise vessels visiting the area. Regardless of the genesis of the maritime regulation system, it provides a means by which environmental safety (and somewhat incidentally passenger safety) can be optimised in a difficult environment. When the maritime regulatory system is combined with the other elements of the regulatory regime, including protected areas, wildlife protection legislation, protection of historic and archaeological sites, and rules aimed at encouraging culturally sensitive tourism practices, a comprehensive (albeit complex and widely spread) management system applies.

Important components of the tourism management system include:
- enclosed waters with clear sovereignty;
- a range of land tenures including land owned by indigenous people;
- presence of protected areas of a number of different types;
- management representatives on-site in some locations and the capacity to place representatives on vessels for visits to some protected areas;
- widely dispersed responsibilities for tourism including federal and territorial governments, and a range of different agencies and departments;
- a complex set of legislative and regulatory instruments implementing environmental protection and safety goals;
- a comprehensive ice navigation regulation system, dictating which ships are permitted to go where and at what times of year;
- systems of observing and enforcing maritime regulation;
- coordination, search and rescue, and navigational support infrastructure;
- systems of prior notification, including the need to ensure local communities are prepared for visits; and
- a range of general wildlife protection legislation, and cultural and historical site protection.

This system has implications for the tourism experience. Limitations on movement of vessels mean that flexibility in product offerings is reduced. Planning needs to be more rigid, despite the fact that limitations caused by adverse weather and ice conditions still apply. Complex legal and bureaucratic considerations also increase the cost and difficulty of operations. The presence of many land tenures, including native owned land, wildlife reserves, national parks, and other protected areas also increases the complexity of operational planning. Balanced against these considerations are the benefits of such a system. While the system of Shipping Safety Control Zones to some extent limits vessel movement and operational flexibility, the zoning system reflects the real world difficulty of ice navigation and as such should not be regarded as unduly restrictive. Operators have the option of taking advantage of seasonal variations in ice conditions by using the AIRSS system. Some benefit may also be derived by knowing that operations, if kept within the rules established by the managing authority, are officially sanctioned, with responsibility for the management of impacts resting with the authority rather than operators. In this light, the system does not seem unduly restrictive.

Other features of the system include the apparent lack of active management of landings in areas other than protected areas or settlements, the lack of a site allocation system or permit system for site visits outside such areas, the absence of environmental assessment requirements (by the operators or by the managing authorities), the apparent absence of cruise tourism specific codes of conduct, and the lack of centralised management of industry operations.

6.6 THE RUSSIAN ARCTIC AND THE NORTH POLE

This section examines cruise tourism in the Russian Arctic and Russian involvement in cruise activities further afield. It is not a full case study, as insufficient information on cruise tourism management was obtained due to language barriers and the complex administrative system in Russia. Information on the management of protected areas may be held at federal, regional or local levels of government, making access to information complicated (Volkov & de Korte 1994 provide a description of the conservation system). Site information is not readily available. Operational details are also sparse. Some published material was obtained, and additional information was available through promotional material. The significance of the area for Arctic expedition cruising, its potential as a major destination, and the involvement of Russian vessels and nationals in the polar expedition cruising industry in other areas make a discussion of the information that was obtained valuable.

Russia has an extensive Arctic coastline with a number of significant Arctic island groups (map 6.1). The route between this coast and the polar ice massif is referred to as the North Sea Route or the north east passage. Many areas have important natural, wildlife, scenic, and cultural features likely to be of interest to tourists. An extensive, shallow continental shelf is biologically productive, and supports much wildlife. Large areas of Siberia drain through very large rivers along the coast, forming massive shallow deltas. Ship transit is subject to ice conditions, and is generally difficult. Mulherin (1996) indicated that even in the optimum month (October), there is a high probability that ice strengthened vessels will need icebreaker assistance at some point along the North Sea Route.

Based on promotional literature, general geographic references, and cruise industry information including company websites, it is possible to describe the attractions and features of the area. Attractions include marine life—whales (bowhead, beluga, grey, humpback and others), seals and walrus, and breeding seabird colonies, including very large and spectacular congregations. Ostrov Vrangelya (Wrangel Island) is a breeding site for walruses, and has around 200 polar bear winter dens. Novosibirskiye Ostrova (New Siberian Islands) have bird cliffs, walrus, and spectacular volcanic spires and cliffs. Bird congregations are often massive, and species including cormorants, murres, puffins, geese, amongst others are present. Animals on land include reindeer, musk ox, and Arctic foxes as well as polar bears and seal species. Geographically significant sites include the easternmost point of the Eurasian continent (Cape Deshnev), the northernmost point of Asia (Cape Chelyuskin), the international date line and the Arctic circle, famous waters such as the Bering Strait, and remote island groups. General scenery varies considerably, from coastal deltas like the Lena delta, through to the volcanic Novosibirskiye Ostrova, the dissected plateaux of Zemlya Frantsa-Iosefa (Franz Josef Land), and the ice cap and glaciated valleys of Novoya Zemlya. Pack ice is scenic in its own right, and added attractions include the experience of icebreaking, and wildlife in the pack ice.

Cultural experiences include visits to indigenous settlements or nomadic camps, visits to indigenous historic sites (including settlement sites and religious sites), modern settlements, and exploration era historic sites. Exploration era sites include winter camps of Barents (1596, on Novoya Zemlya), and Nansen (1896, on Zemlya Frantsa-Iosefa). Research stations are also visited in a number of other locations.

The massive industrial complexes such as at Noril'sk, including oil and gas fields, are not likely to provide a major attraction for expedition cruising tourists (Vil'chek, Serebryannyy & Tishkov 1996). While interesting as examples of the industrialisation of the Russian Arctic and the legacy of the Soviet system, they conflict markedly with the largely natural experience presently offered by operators (see Johnston 1995, and Viken, Vostryakov & Davydov 1995). Similarly, the cultural attractions included in most advertised experiences involve traditional lifestyles or ancient sites of indigenous people, in keeping with the natural, ancient, primitive or wild characterisation of the visitor experience, rather than a modern industrial city.

A number of protected areas are present on the coasts and islands, and declarations of new areas continues. Overall, in the Russian Arctic there are 31 protected areas, with five new areas created in 1996 and 1997, and a total Arctic protected estate of 4.9%. Plans are to increase this, and to represent each ecological zone in a Zapovednik or a national park by 2005. Priority areas include those under threat from human activity (CPAN 1997). Russian protected areas include federally designated and regionally designated reserves. At the federal level the Zapovednik category corresponds to IUCN Category I, strict nature reserve, while Zakaznik corresponds to IUCN IV, wildlife sanctuary (CPAN 1997). Zapovedniks normally include a ban on all commercial activity including tourism, although this is changing (according to Volkov & de Korte 1994), and present tourism activity in many of these areas is apparent. National Nature Parks (IUCN category II) were not represented in the Russian Arctic but were planned in the Kola and Chukotka Peninsulas, and on Severnaya Zemlya (Volkov & de Korte 1994). Special Purpose Reserves, which can be local or federal, are areas where restrictions can be placed on land use, with around 16 in the Arctic, a number being coastal (Volkov & de Korte 1994). Other categories include nature-ethnic park, established in areas with indigenous people to protect nature and the traditional use of resources. The only example of this category noted was the Beringiya nature-ethnic park on the Chukotka Peninsula (Volkov & de Korte 1994).

Many of the Arctic islands are protected, and a number of coastal areas also have protected status. Important protected areas (from the point of view of cruise tourism) are Ostrov Vrangelya Zapovednik, encompassing the whole island group (around 7957km²), with a planned expansion to include marine areas. This reserve was declared in 1976 to protect the vegetation and fauna including lemming, Arctic fox, ermine, polar bear including winter dens (around 200), and walrus breeding grounds. Birds include 52 nesting species, some breeding in massive numbers. The reserve is vulnerable to impacts associated with hydrocarbon development in the East Siberian and Chukchi seas (Volkov & de Korte 1994).

The Lena-delta and New Siberian Islands Nature reserve is 61 320km² in area. A core area includes the main part of the delta, with the islands and the remainder of the delta being zones of 'traditional nature use', and 'specially certified harvest of biological resources' (WWF Arctic Programme 1997a). Zemlya Frantsa-Iosefa was protected in 1994, and includes a marine area (CPAN 1997). The island group is protected as a Zapovednik. Like Svalbard, this island group has associations with the exploration era, including historic sites, as its high latitude position made it suitable as a starting point for attempts on the pole. Voyages attempting the northeast passage often encountered the group (Small 1996). Novoya Zemlya is a very large island group, with a substantial ice cap in the north. The island was the site of nuclear testing for many years. The CPAN report (1997) noted that a Zapovednik is proposed for the islands. A number of coastal and island protected areas occur along the coast of the Taymyr Peninsula, and on the east coast of the Kola Peninsula.

6.6.1 USSR CRUISE ACTIVITY

Before its dissolution the Soviet Union operated some Arctic tourism activities, including north pole voyages. In addition, some voyages were operated carrying foreign passengers on ice strengthened vessels. Small (1996) referred to a voyage by a Soviet tourist vessel to Zemlya Frantsa-Iosefa in 1971. Summer passenger cruises in 1989 on a Soviet vessel in the Barents and Kara seas are referred to by Armstrong (1989), with at least one voyage calling at Svalbard. Similar voyages are reported in Armstrong (1990), who noted they had been operating for some time in these seas. The 1989 summer saw a Soviet cruise vessel operating in the Bering Sea for probably the first time (Armstrong 1990). In the same summer, a passenger voyage from the Chukotka Peninsula to Alaska was made on a Soviet vessel (Armstrong 1990). Also that summer, a Soviet cruise liner travelling from Iceland to Svalbard collided with an ice floe at 18.5 knots. The vessel was evacuated, with some passengers and crew forced to leave ice-damaged life boats and rafts for ice floes. No lives were lost, and the vessel was saved, although damage was serious. The accident was attributed to the failure of the captain to reduce speed when the vessel had already sighted ice (Barr 1990).

An important development began in 1990, with the use of a Soviet nuclear icebreaker to take passengers on what was only the third visit to the North Pole by a surface ship. A West German firm arranged with the Murmansk Shipping company for 40 tourists from seven nations, aged 10 to 88, to undertake the voyage (Armstrong 1991). The vessel used was the *Rossiya*, a nuclear powered vessel of 75 000 shaft horsepower (equal to the most powerful icebreakers ever made). The vessel departed from Murmansk, through the Laptev sea to the pole, and returned via Zemlya Frantsa-Iosefa, with some passengers landing there (Armstrong 1991). Mulherin (1996) reported the first voyage as carrying 88 tourists from 12 countries, and provided information on subsequent voyages. In 1991 80 tourists from 15 countries visited on the *Sovietskiy Soyuz* (a sister ship of the *Rossiya*), in 1992 two voyages were made on the same vessel, three were made in 1993 on the *Yamal* (also a sister ship of the *Rossiya*). Four ship visits were made in 1994, two of them at the same time, with the *Yamal* escorting the smaller diesel electric *Kapitan Dranitsyn* (a sister vessel of the *Kapitan Khlebnikov* familiar in the Antarctic) (Mulherin 1996). Brigham and Armstrong (1996) report that two tourist voyages to the Pole were conducted in 1995 on the *Yamal*. These voyages continue, with some advertised as leaving from or finishing at Svalbard.

Armstrong (1991) noted concerns expressed by Soviet conservationists with these activities. Prokosch (1997) reported an interview with Professor Alexey Yablokov, a leading environmentalist and former personal adviser to President Yeltsin, who stated 'from what we know from records of Russian nuclear icebreakers, they are absolutely unsafe with a high risk for radioactive pollution inside the Arctic' (Prokosch 1997, p. 12). The first nuclear icebreaker *Lenin* is reported to have had serious nuclear accidents involving radiation leaks and the possible death of 30 crew members in 1966, resulting in the removal of fuel assemblies from one of her three reactors (Nilsen & Boehmer 1994). More problems in 1967 resulted in further radiation leaks, and the replacement of the entire reactor section was required. Three reactors, the fuel assemblies from the 1966 incident, and a contaminated cooling circuit were dumped in the Tsivolky Bay east of Novoya Zemlya in 1967 after the *Lenin* was towed to the area (Vil'chek, Serebryannyy & Tishkov 1996, Nilsen & Boehmer 1994). The *Lenin* had two reactors of a newer design installed, and operated until decommissioning in 1989 (Nilsen & Boehmer 1994). Other incidents, including a near meltdown incident, have been reported in the nuclear icebreaker fleet (Nilsen & Boehmer 1994).

While the *Lenin* was built in 1959 (Brigham 1991b) and was never used for tourism, disposal options for the more recent nuclear vessels remain problematic. Around 645 spent fuel rods, many damaged, from the nuclear icebreaker fleet reactors are presently stored in a vessel called the *Lepse*, the entire vessel being considered high-level radioactive waste (Bellona 1996). Bellona reported that Russian authorities planned to tow *Lepse* to Novoya Zemlya for burial in the permafrost, a highly undesirable situation, and so Murmansk Shipping Company and Bellona are developing an alternative proposal to store *Lepse* temporarily and eventually remove the spent fuel from the ship, avoiding having to dump the entire vessel (Bellona 1999).

The problems associated with use of these vessels for tourism were highlighted by a number of events reported by Bellona (1999). They reported that the 1999 season of north pole visits on the *Sovietskiy Soyuz* caused considerable concern, with the vessel denied permission by the Norwegian authorities to enter the waters around Svalbard on the basis that the nuclear installations aboard the vessel fail to meet current safety norms. Opposition from Svalbard local residents has also been reported, with a former Svalbard Governor noting that tourism development in the area should not include the use of nuclear powered vessels (Bellona 1999).

A 1995 north pole voyage package was disrupted when a Norwegian environmental organisation tried to block a chartered plane flight from Tromsø to Murmansk to prevent passengers participating on a voyage of the *Yamal*, and local environmentalists protested the voyage in Murmansk (Bellona 1999). Bellona reported that *Arktika* has exceeded her 100 000 hour tour of duty by 40 000 hours, and will remain in service for 12 months or another 10 000 hours. *Yamal* was reported by Bellona as having fresh fuel for only one of her two reactors, and as having been inactive for a year. Four other nuclear icebreakers are operating in the Arctic (Bellona 1999). Armstrong reported in 1993 that the *Ural* (another *Rossiya* class nuclear icebreaker) was being built with accommodation for 100 tourists. Renamed *50 Years of Victory*, the vessel is still under construction in the Baltic shipyards of St Petersburg, but is plagued by funding problems (Bellona 1999).

Safety of tourists and the obvious environmental concerns aside, it is something of an irony that tourists participating in expedition cruising, an industry heavily reliant on its environmental credentials, create continued demand for technologies that are patently responsible for significant environmental harm.

6.6.2 FOREIGN INVOLVEMENT AND ACCESS

Foreign involvement in the Soviet Arctic began in 1988 with a visit to Provideniya on the Chukotka peninsula by the *World Discoverer* (Armstrong 1989). Armstrong (1990) reported on Soviet press reports of proposals by an American company for voyages from Alaska to Murmansk via the northeast passage, and proposals by a German firm for visits to Zemlya Frantsa-Iosefa and Svalbard. Small (1996) notes that Zemlya Frantsa-Iosefa was closed to foreigners until 1990 because of strategic concerns. In 1991 a transit of the North Sea Route from west to east was made by the French icebreaker *L'Astrolabe*, the first of a foreign vessel since 1940—although this was not a tourist voyage (Mulherin 1996).

A general indication of the present state of the industry can be gained from promotional literature and on operating company websites. As with Antarctic tourism, the collapse of the Soviet Union made the commercial tourism use of ex-Soviet ice capable ships possible and necessary. In most cases, operators charter Russian vessels, captains and crews from the two shipping companies that ended up owning the vessels. Foreign companies are responsible for the planning, marketing and management of voyages. Ship visits are advertised to all major island groups, seas and coastal areas, including the Chukotka Peninsula, Ostrov Vrangelya, the east Siberian Arctic coast, Novosibirskiye Ostrova, the Lena River Delta, Severnaya Zemlya, Zemlya Frantsa-Iosefa, Novoya Zemlya, and Svalbard. The seas and straits along the North Sea Route are all advertised as destinations.

Patterns in expedition cruising in the Russian Arctic appear to closely match ice conditions (and therefore accessibility). Access to Ostrov Vrangelya and the Chukotka Peninsula in the east is often possible using ice strengthened vessels (rather than icebreakers), and Zemlya Frantsa-Iosefa in the west is similarly accessible. Small (1996) notes that for around one month in most summers access by ice strengthened ships is possible to the southern islands of Zemlya Frantsa-Iosefa. A number of companies operate in the east, with the Chukotka Peninsula and Ostrov Vrangelya being major attractions. The Bering Strait, Kamchatka Peninsula, and the Kuril Islands also serve as destination areas for vessels operating in this region. The central portion of the North Sea Route appears to be visited only by icebreakers, with one company offering voyages in the area at present. North pole voyages also call at Zemlya Frantsa-Iosefa.

Management of cruise tourism to these areas is not known. Many of the locations attracting tourism interest are protected, particularly Zemlya Frantsa-Iosefa, Ostrov Vrangelya, Novosibirskiye Ostrova, and coastal areas with wildlife interest. The Zapovednik system did not originally allow for commercial use, but this is clearly changing, Ostrov Vrangelya being an example (Volkov & de Korte 1994), as itineraries of cruises clearly indicate regular usage of these areas for tourism. Given their protection status, structures may exist for the management of tourism. The degree to which regulatory activity exists or is applied is not known.

With reference to management of passenger vessels, Brigham and Armstrong (1996) referred to a *Guide to navigation along the NSR*, made available in 1995 along with marine charts. The guide includes navigational regulations, information on navigating the seas, and on icebreaker escorting services (Brigham & Armstrong 1996). Mulherin (1996) provided further information on the regulatory system, noting that approval for passage of the North Sea Route was required from the Administration of the North Sea Route, that ships require certification for ice worthiness and an experienced master, and proof of indemnity for damage liability including pollution. The route is administered by two marine operations headquarters, one in Dikson (Kara Sea coast), and one in Pevek (East Siberian Sea). These authorities can assess the suitability of masters and appoint ice pilots if necessary, and have the authority to direct all shipping activity on the route. In addition, they have personnel, aircraft, and forecasters suitable for ice navigation purposes. Mulherin also reported on requirements for the design, equipment and supply of vessels, and escorting rates for foreign vessels. Design requirements apparently specify double hulls, plate thickness, power-plant size, and propeller design. In addition, 30 days of fuel, 60 days supply of food, and a water distillation plant are required (Mulherin 1996).

The development, structure, and management of expedition cruising in the Russian Arctic deserves close attention both in its own right and because of its place in the global expedition cruising industry. Conservation management practices and solutions developed in the unusual political and administrative climate of the former Soviet Union may be innovative and instructive. This research was unable to conduct such an analysis, but a detailed examination should be made as soon as possible.

6.7 CRUISE TOURISM TO OTHER ARCTIC DESTINATIONS

Cruise tourism occurs in a number of other areas beyond those detailed above. This research was unable to complete a comprehensive overview of all polar cruise tourism, as noted in the introduction. Areas that have not been detailed include Iceland, Greenland, and the Norwegian north coast, and a very brief summary of some of the existing activity in these areas is therefore worthwhile. Greenland is receiving increasing attention from expedition cruising companies, as well as developing a locally based expedition cruising industry, in a wider push to find alternatives to fisheries dependence (Christensen 1992). Much of the Greenland coast is subject to ice conditions that restrict visits to at least ice strengthened ships, and general cruise industry guide books including Fielding's (Slater & Basch 1997) do not refer to any larger non-ice-strengthened vessels visiting. A useful reference for further information on the development of cruise tourism in Greenland is the *Greenland Guide* (1999). Greenland is regularly included in itineraries along with locations in Arctic Canada. Norway's northern coast, including North Cape (Europe's northernmost point) is visited by expedition cruising vessels, small cruise ships, and larger traditional cruise ships (Slater & Basch 1997). The destination is often packaged together with Norwegian fjords, with Svalbard, or in a longer itinerary that may include Iceland. Iceland also appears to be a destination growing in popularity, with a range of large cruise vessels visiting, as well as smaller specialist vessels and expedition cruising vessels. Expedition cruise companies package visits to Iceland (often starting from Reykjavík) with Greenland cruises. Ice conditions generally permit ready access to Icelandic waters, with icebergs, rather than sea ice, representing a hazard. All of these locations warrant further attention, but this research is unable to provide this due to time constraints and the need to limit the overall scope of the research.

6.8 Northern polar regions tourism management discussion

This section discusses and summarises the management provisions for cruise tourism in the case study areas examined, taking into account the different environmental, cultural, and geographical considerations of each case. The degree of variation in the cases examined makes it impractical to compare cases in a detailed, systematic way. Instead, important features of the management systems in place for different case areas are examined and discussed, as far as possible in line with the categories used in chapter five.

6.8.1 General discussion

The cases examined for northern polar locations generally indicate a higher degree of regulation and management than presently applies to the Antarctic. A wider range of cruise tourism products are offered, made possible by geographical differences, infrastructure and access differences, and the nearness of large populations of potential travellers. Cruise tourism utilises all areas of the northern polar region, including the pole itself. Products range from expedition cruising in less than luxurious vessels, to sightseeing cruising in very large, comfortable vessels, with few or no landings.

As with the Antarctic, nature (including wildlife, scenery, and landscapes) is a dominant factor in the tourism experience. An additional dimension is added by human occupation and activity, including the presence of indigenous people. Cultural aspects are a major component of the experience in some locations, and indigenous land ownership adds a dimension to the management system in a number of locations.

Generally speaking, Svalbard and Glacier Bay have specific cruise tourism management provisions as part of broader management planning and area protection mechanisms. The management instruments in place are relatively sophisticated and comprehensive, and as such dominate the following discussions to some extent. Canada has a fragmented management system, spread across a number of different jurisdictions (federal and territorial). Cruise tourism is actively managed, but not in a fully integrated or comprehensive way. An important component of the Canadian management system is the ice navigation regime that applies to all vessels. While little was discovered about the management system in place in Russia, it is clear that tourism is presently utilising protected areas and as such may be subject to some regulation. An ice navigation regime also exists for Russian Arctic waters.

A significant difference to the Antarctic region is the lack of a polar scale approach to conservation and management issues. Cooperation across the northern polar region is only beginning to emerge, and must grapple with multi-jurisdictional and cross sectoral issues that have been largely avoided by the ATS. In the tourism sector, cooperative initiatives between conservation NGOs (primarily WWF) and industry have developed Arctic-wide self regulatory instruments, which may lead to common approaches to tourism issues, despite the range of jurisdictions responsible for different polar territory. The Principles and Codes for Arctic tourism, when compared to Antarctic tourism codes, are more cohesive and comprehensive, and have clearer logical links between principles and advice. In contrast to the Antarctic guidance documents (appendix three, section 4.9.2) these Principles and Codes stand apart from the regulatory system, and do not attempt to codify management requirements, and as such are more truly self regulatory. An important feature of the code for Arctic visitors is the intent to reach visitors before product choices are made. This enables visitors to base choices of tourism activity and operator on the principles of the code. The Antarctic guidance for visitors is not aimed at visitors before they travel, and assumes visitors have already made their choices about operators. The Arctic Principles and Codes are not based on a single operational mode, instead encompassing many activities. The codes provide considerable detail, especially in areas such as staff training, education, and methods of reducing general and specific impacts.

Geographical constraints on the conduct of cruise tourism are evident, as with Antarctic tourism. Some areas are suitable for large vessels without ice strengthening, others require ice strengthened vessels, and some areas require icebreaking capability. This is analogous to the Antarctic, where parts of the Peninsula region are relatively ice free, some areas are suitable for ice strengthened ships, and large areas of the continent require icebreaker access. Svalbard in particular is a good analogue for cruise tourism in the Peninsula region of Antarctica, with a similar range of ice conditions, attraction types, and issues, albeit on a smaller scale. Svalbard presently involves larger numbers of visitors in a somewhat smaller area, but levels of use and operational activity appear to be of the same order of magnitude. Svalbard has a different mix of products than the Peninsula, with large vessels carrying a large proportion of visitors.

These case studies, in the same way as the southern oceanic island cases, clearly indicate that where sovereign rights exist management of cruise tourism is more structured, decisive, and stringent than in the Antarctic. The case of Svalbard is of particular interest. The Treaty of Spitsbergen enshrines the rights of signatories to use the resources of the islands. Under the Treaty of Spitsbergen, Norway has the right to make laws for the preservation and reconstitution of the flora and fauna of Svalbard as long as these laws are applied equally to all signatories. This represents a situation where equity of access is ensured, but the right to make laws is clearly allocated—in a sense, halfway between the collective governance of the ATS and normal territorial sovereignty.

6.8.2 DESTINATION CHARACTERISTICS AND TOURISM EXPERIENCES

The northern polar region case studies include a wide range of visitor experiences. They show that experiences based on scenic attraction, with participants content to remain aboard the vessel as passive observers, are popular and marketable in some locations, lending support to predictions of increased activity of this type in Antarctica (section 3.8.5). Some of the products, specifically large cruise ship visits to Spitsbergen, and cruise vessel activity in Glacier Bay, represent a very different experience than expedition cruising—a much less specialised activity, with less focus on education, less emphasis on natural history and wildlife, and a far greater emphasis on scenery, general aspects of the natural environment, and passenger comfort. These products by their nature are suited to a larger market, and this is supported by the high numbers of visitors participating.

Svalbard and Glacier Bay exhibit another important feature, that of a diversified cruise sector, with a range of ship based products and experiences, from ship supported adventure activities, through expedition cruising, to large vessel, relatively passive experiences. These cases support the destination life cycle model discussed in section 3.6.2, which suggests that as destinations mature, differentiation of products increases. Similarly, there is some indication that the destinations that have been used for cruise tourism for the longest periods have the most diversified products, and now attract larger numbers of visitors participating in less specialised experiences. It is acknowledged that accessibility has played a role in the development of these destinations—case areas such as Svalbard and Glacier Bay have been used for long periods of time because standard vessels are able to visit, and more diversified products may reflect changes in the broader cruise industry rather than specific destination development processes. The presence of smaller vessel and expedition cruising in these locations indicates that as a general rule these processes probably apply.

Expedition cruising maintains a role both in areas where larger vessel cruising is possible, and where forms of access other than by ship are available. Where experiences on larger vessels are possible, expedition cruising services a different market by providing different experiences, leading to a more diversified cruise sector. In places where air transport is available, expedition cruising plays an important role in providing transport and accommodation in areas otherwise devoid of such infrastructure, making it possible to visit a wide range of attractions that would otherwise be almost impossible to get to. The Canadian Arctic includes examples of hybrid operations taking advantage of air access, where visitors fly direct to the destination area and board a vessel there. Both the Canadian Arctic and especially the Russian Arctic would seem to have considerable scope for further development, with a broad range of experiences and attractions becoming available.

Cruise tourism in the Russian Arctic and Arctic Canada is geographically constrained by the need for ice strengthened vessels. Tourism in the Russian Arctic has been politically constrained and as such the destination is in a very early phase of development. Svalbard has seen the gradual evolution of a more supportive environment for land based and local ship based tourism, although the larger vessels have been welcomed for a long period.

Little social research information was found for the case study areas. Results of a Canadian Arctic survey of a single cruise were reported, and a more comprehensive Glacier Bay survey examining the tour boat sector was provided by the park managers. Generally speaking, the results indicate that the demographic characteristics of Arctic tourists are similar to those of Antarctic tourists.

6.8.3 MANAGEMENT SYSTEMS AND MANAGEMENT PLANNING

A range of management approaches are used in the case study areas. Some have specific tourism management plans or strategies, while others have more general protected area management schemes in place. Management planning applies in most of the formally protected areas examined. In cases where cruise tourism occurs outside protected areas, management plans may still apply (for example, the visitor management plan for Svalbard applies to the whole archipelago). Management zoning is an important component of the systems in place in Glacier Bay and in Svalbard. Permitted and prohibited activities in different zones are specified in some cases.

The importance of tourism issues varies in the different management systems. In cases with a long history of usage, and relatively high numbers of tourists, management specifically aimed at tourism is in place. In the case of Glacier Bay, an entire assessment process and vessel management plan were developed for cruise tourism. Concern about the level of vessel activity in the park, and the legislative requirement to consider impacts on endangered species, prompted very detailed impact assessment, and resulted in specific management planning for cruise tourism.

In Canada, provisions for tourism management are more widely distributed, but summarised in a single document (*Arctic Passenger Ship Guidelines*). As far as could be ascertained, individual national park management schemes do not make specific provision for cruise tourism. Canadian territory governments also apply tourism-specific management conditions. Visits to National Heritage Parks in Canada require mandatory registration, licensing, prior notice, and supervision by management staff apply. Visits to other protected areas such as wildlife sanctuaries are also managed. Some specific provisions apply to cruise tourism visits to indigenous communities and lands, or heritage sites.

Svalbard has a range of protected area categories but applies an overlying visitor management plan to all lands in the archipelago. This has the advantage of managing visitation in lands that are otherwise unprotected, and allows management to be integrated across all areas—by contrast, individual protected area management plans cannot take into account the range of tourism experiences that might be desirable across all areas. Specific provisions for cruise tourism of different types are included in the visitor management plan.

6.8.3.a Environmental assessment

Environmental assessment is used as a tool in the management of tourism in only the case of Glacier Bay, where the assessment was of the impact of the use of all vessels in a planned way, rather than the assessment of individual activities or voyages. The permit and quota allocation system in place gives preference to companies with the best environmental standards, and a pollution minimisation plan must be prepared to ensure industry best practice applies to operators—in effect, a form of environmental assessment. There is a focus in the management system on vessel related impacts, including emissions and oil spill contingency planning.

6.8.3.b Visitor experience

The visitor experience is taken into account in the management of Svalbard and of Glacier Bay. To some extent the need to consider the quality and form of the visitor experience is imposed by historical legacy. In the case of Glacier Bay, historical usage of the resource by vessels, and the presence of other long established recreational uses means that visitor experiences are an important consideration. The quality of the visitor experience is regulated, with the management system requiring operators to provide certain amounts of viewing time in different areas, and specifying interpretive services. The impacts of cruise tourism on the experiences of other users are also taken into account in the zoning system.

In the case of Svalbard, the presence of local people using areas for recreation, and the long history of cruise ship visitation required consideration in the management system. The Svalbard management system applies a form of the ROS (section 7.2.3.b), where different recreational opportunities are matched to different settings. Different forms of visitor activity are allocated to the different zones of Svalbard, catering to user groups including local residents, and ensuring that the quality of different visitor experiences can be maintained.

6.8.3.c Limits on tourism

Limits or quotas have been placed on tourism only in the case of Glacier Bay, although the management system for Svalbard includes the capacity for such limits to be imposed. The limits imposed in the Glacier Bay case study apply to vessel entries, as landings are not permitted. Daily and seasonal vessel entries are limited.

At present, there are no restrictions on numbers of vessels or visitors for Svalbard. Relatively high levels of use, from large cruise vessels, are tolerated at one coastal landing site, and other sites are used commonly but less intensively. The visitor management plan raises the possibility of applying limits on cruise tourism, including limits on vessel numbers, and limits on passengers landed.

6.8.3.d Research and monitoring

Management planning in some of the cases includes consideration of research needs, and monitoring of tourism impacts. The Glacier Bay VMP and general management plan specify cruise tourism related research, including studies of vessel and visitor distribution, interactions between marine mammals and vessels, and identification of sensitive resources. In the case of Svalbard the visitor management plan specifies different research and monitoring strategies for different zones, including recording and monitoring of visits, monitoring of sites, assessment of sites where tourism may need to be curtailed, and identification of vulnerable areas.

6.8.3.e Codes of conduct

Arctic-wide Principles and Codes of conduct are being developed. In the Glacier Bay case, the very specific regulation of tourism, the detailed management measures that operators must comply with as part of their concession permit, and the prohibition on landing passengers mean that there is little need for self regulatory mechanisms. Concession and permit requirements are clearly specified in contractual documents, and operators have little flexibility in what they can do, as most aspects of their operations are prescribed. The management system in place for Svalbard includes a basic code of conduct, aimed at all visitors. The code is brief, and includes administrative, safety, and environmental advice.

6.8.3.f Management presence

Management supervision and assistance is required on vessels in Glacier Bay, mainly to ensure official interpretive messages are conveyed to visitors. In Arctic Canada, one province requires official personnel to supervise visits to Arctic Heritage Parks. For Svalbard, there is no requirement for a management presence on board vessels, but on-site supervision is provided at the site most heavily used for large vessel cruise tourism.

6.8.3.g Wildlife disturbance issues

The focus on disturbance of wildlife differs between the cases examined. Glacier Bay vessel management is largely concerned with the impacts of vessels on wildlife, particularly marine mammals. Some areas are permanently or seasonally closed to protect whales and other animals, and approach distances (of vessels) are specified for some species or congregations of wildlife. The Svalbard management system prohibits the hunting or disturbing of animals, without being more specific about disturbance issues. Wildlife in the Canadian Arctic is protected, and restrictions apply to visits to wildlife areas, although these relate to major disturbance such as taking, killing, or destroying rather than more subtle visit related disturbances. A general prohibition on disturbing wildlife applies to these areas.

6.8.3.h Administrative arrangements

The management system for Arctic Canada requires operators to provide schedules and itineraries to the Canadian Coast Guard, and to territorial governments. The management system for Svalbard requires operators to notify the Governor of planned visits to three of the four zones under the visitor management plan. The management system for Glacier Bay allocates quotas to companies through a permit and concession system, and requires operators to use a private company to manage scheduling of entries to comply with daily and seasonal limits.

6.8.4 Ice navigation

The ice navigation system in place for Arctic Canada is significant. A system applies in Russian Arctic waters, but was not investigated. The absence of ice navigation regimes in the european Arctic, waters of Greenland, and Arctic Alaskan waters is probably attributable to the generally low levels of commercial shipping in waters with significant ice cover in those regions. Russia and Canada both have an interest in an ice navigation regime as they claim territorial sovereignty over waters that have the potential to be used by international shipping. As such, they have developed rules to enhance vessel safety and environmental protection in ice covered waters. The Canadian system is in effect a two tiered system, using either shipping safety control zones or a more flexible real-time system based on ice conditions. Tourism shipping in the Antarctic is now considerable, and as noted in chapter four, a significant gap exists in the regulatory regime of the ATS with respect to maritime safety and control. The Canadian example demonstrates that such a system can be applied to tourism activity. If such a regime is appropriate for Arctic tourism it is arguably appropriate in the Antarctic context.

6.9 Conclusions and implications for Antarctic tourism

The northern polar regions tourism cases, and the Antarctic tourism case are poles apart only in the geographic sense. There are sufficient operational, experiential, demographic, and structural similarities for comparison to be valuable. A number of important features emerge. Firstly, and most importantly, cruise tourism is managed, in many of the cases examined, within a broader conservation management framework. Management regimes derived from protected area management or from visitor management apply, and cruise tourism is treated as a subset of a broader system. While the Protocol applies to all Antarctic activities, it does not represent a conservation management framework in the sense of active management and planning as applied in these cases.

The cases illustrate that management planning is the tool of choice for tourism management in northern polar regions. Management planning is applied to protected areas, and to visitor management outside protected areas. Self regulation plays a less important role than it does in the Antarctic. The application by managing authorities of clear, well founded and planned regulatory measures lessens the reliance on self regulation. It is important to note the difference between enforcement and self regulation at this point. Regulatory measures can be imposed by a managing authority without enforcement being necessary—in essence, the managing authority makes the rules, and the operator applies self regulation in abiding by them. The present form of Antarctic self regulation involves a much higher degree of involvement by operators in the devising of appropriate rules.

The cases also make very clear that environmental assessment processes are not regarded as a tool for ongoing management or as a replacement for management planning. Assessment of the impacts of cruise tourism activities occurs in the planning phase, rather than the ongoing operational phase of the management process. Responsibility for assessing impacts of different options is vested in the managing authority, rather than the individual operator. The managing authority is in a better position to take into account issues such as cumulative and long term impacts, and is able to integrate environmental assessment into a management plan that may include different forms of tourism or different types or levels of use.

The visitor experience is recognised as being an important consideration in planning. The need to ensure a high quality and appropriate visitor experience while considering the effects of cruise tourism on other users is fundamental to the planning processes for some cases. The cases recognise the validity of tourism activity, and apply management schemes that allow people to experience the values of natural areas, while taking into account the different expectations of visitors and the different experiences that may be available.

The cases also reinforce the global nature of expedition cruising, and the importance of expedition cruising in polar regions, as well as the importance of polar regions to the expedition cruising sector. Expedition cruising is a little-studied sector of the wider cruise industry, and is important as a phenomenon in its own right. Importantly, the cases also clearly establish the viability of more standard cruising, using large, non ice-strengthened vessels, in polar regions. The experiences offered by these vessels are substantially different to the expedition cruising model, and are marketable to a very large target market. The cases show that less active cruises, with a greater emphasis on scenery and general environmental features, less emphasis on education, and appealing to a less specific market group, are very successful. The cases examined support the destination development models described in chapter three, support the contention that the Antarctic destination will continue to mature, and suggest that Antarctic experiences will continue to diversify.

The final point that emerges from the cases relates to the regulation of ice navigation. A model exists for the management of ice navigation for cruise tourism. The Canadian case study demonstrates that such a system can be applied to cruise tourism. The application of the system to tourism indicates that Canada feels it is a necessary measure. The absence of such a system in the Antarctic has been a continuing concern.

It could be argued that some of the management systems in place in the cases examined were not instituted solely for the management of cruise tourism. It could reasonably be assumed that the same should apply in Antarctica—a comprehensive conservation management regime should be in place, so that activities such as tourism can be managed within the overall framework. Unfortunately, this is not the case. The absence of an existing management planning framework for Antarctica does not mean that Antarctic tourism should be exempt from such management—if it is necessary for a management system to evolve from beginnings in tourism management, so be it.

Chapter 7: Evaluating the Antarctic tourism management system

This chapter evaluates the Antarctic tourism management system according to goals, aims and objectives implied within the system, standards identified from protected area management theory, and standards set by the management systems analysed in the case studies.

The chapter serves as a general critique of the present management system. First, the implied goals of the ATS for tourism management are identified. Second, a brief review of protected area management planning theory is used to identify established management planning models, and assess best practice in management planning. Next, the findings of the case studies of management of cruise tourism in high latitude natural areas are summarised, to act as external standards against which the Antarctic tourism management system can be compared. Finally, the Antarctic tourism management system as it relates to these three types of standard is evaluated, with reference to both the coverage and adequacy of the system.

7.1 ATS GOALS FOR TOURISM MANAGEMENT

Chapter one specified the following objectives for the research:

- identify goals, aims and objectives for tourism management implied in the present regulatory system; and
- critically assess the present system of management in light of these assessments and analyses, and determine the coverage and adequacy of the present system for meeting the tourism management goals, aims and objectives.

The absence of stated or agreed goals, aims and objectives for tourism management within the ATS make it difficult to assess the success or otherwise of the regulatory measures in place. As Herr pointed out (1996b, section 1.1.2) if the ATS regime's own stated objectives are used as a yardstick, the system can scarcely be said to have failed, as these objectives are generalist, and set a very low standard. There are a number of goals, aims and objectives, that, while not necessarily made explicit, are implied within the existing management system. These can be identified and used as internally derived standards in assessing adequacy.

The second objective involves assessing the coverage and adequacy of the management system based on the goals, aims and objectives identified from the first objective, and on the issues identified through the broader assessments and analyses. This is carried out in section 7.4.

Broad goals can be derived from the content of the Protocol and tourism related Recommendations. Some of these are stated plainly, such as the environmental management goals underlying the Protocol, while others are implied by the intent of provisions. The broader environmental management goals of the ATS, as provided in the Protocol and annexes, while not directed specifically at tourism, set the context for tourism management.

The concept of goal heirachies is important in planning and management (see section 7.2.2). Wyatt (1989) asserts that overall goals can be broken down into subsections, and each of these can be further reduced, finishing with a set of concrete goals. 'These bottom-level goals have to be worthwhile because they have been logically derived as a means of achieving their respective parent goals further up the heirachy' (p. 69). In many cases, these bottom-level goals are referred to as objectives. Goal heirachies need to begin with the most abstract of ideals, and progress to more specific goals with the lower levels in the heirachy. Concreteness should be left until the lower levels of the heirachy are reached. Goal heirachies should be comprehensive, otherwise efforts may be directed towards a sub-goal that contributes little to the outcome, compared to a missing sub-goal (Wyatt 1989, p. 73). Because the Antarctic tourism management system is the result of evolution rather than strategic planning, there is no clear heirachy in the provisions of the system. To clarify the place and intent of the different elements of the tourism management system, the commonly used heirachy of goals (highest level non-specific intentions), aims (more specific focused intentions) and objectives (specific, topic or issue related, achievable and measurable intentions) will be used in this description. Strategies and actions will also be referred to. These are the fundamental measures taken to achieve objectives. If objectives are achieved, aims and goals can ultimately also be achieved. It is difficult to identify and arrange goals, aims and objectives for Antarctic tourism management, given the lack of clarity and coherence in the system. The following represents an attempt to arrange the intention of the Antarctic tourism management system heirarchically, as far as is possible.

Identifiable tourism related goals include to:
- manage Antarctica as a 'natural reserve' devoted to peace and science;
- protect the Antarctic environment;
- conserve flora and fauna;
- protect scientific research and government operations;
- ensure, as far as possible, universal observance of the provisions of the ATS;
- permit tourism to occur in accordance with the principles of the Protocol.

Aims include to:
- specify provisions to prevent pollution of land, ice and marine areas;
- ensure tourism activities on land, seas and in the air are safe;
- ensure tourism activities are self sufficient;
- use a system of protected areas to prevent tourism from harming scientific or environmental values;
- rely on industry self regulation for the development and application of some rules;
- use a combination of binding, non-binding, and self regulatory measures to achieve goals;
- apply environmental assessment processes to tourist activities, to identify likely impacts, including cumulative impacts, and ensure environmental impacts are taken into account in the planning and conduct of the activity.

Specific objectives include to:
- collect information on tourism activity and use of areas;
- monitor to detect unforeseen impacts and to verify predicted impacts;
- take into account marine pollution considerations in designing and operating vessels;
- apply specific rules to station visits including restrictions at the discretion of the party operating the station;
- use a code of conduct (applied voluntarily) to prevent impacts at sites used for tourism;
- use a code of conduct to encourage safe operations and behaviour;
- allow ATPs to observe and inspect tourism operations including those organised outside their jurisdiction.

The linkages between higher level environmental protection goals of the Protocol, and the more specific aims and objectives that can be derived from the Protocol annexes and tourism are not clearly specified. Importantly, there are no specific higher level goals relating to tourism or recreation use, other than the recognition that tourism and non-government activity are legitimate uses of Antarctica.

A number of goals, aims or objectives have also been expressed by the ATS (section 4.1) at different times that have not yet been implemented. These include the recognition of the need to regulate the presence of tourists and other visitors to limit adverse impacts, and the tacit acceptance, through the adoption of the ASTI category, that some form of site management may be necessary.

7.2 PROTECTED AREA MANAGEMENT PLANNING THEORY

The Treaty area, under the Protocol, is a natural reserve devoted to peace and science. As such, it can be considered a protected area of sorts. This section provides a brief review of general protected area planning and management concepts and theory, and describes management models developed and in use in some places. The review identifies the basic principles involved in managing protected areas, allowing comparison with the Antarctic tourism management system, and provides a foundation for examining future management directions. The World Conservation Union (IUCN) definition of a protected area is:

> an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (WCMC 1992).

In order to inventory protected areas around the world, IUCN has developed a classification system based on the management objectives of areas. These categories permit comparison of protected areas on an international basis, which would otherwise be impossible. Table 7.1 describes relevant categories in the IUCN scheme.

Table 7.1: Relevant IUCN Protected area management categories

Protected area category	Management objectives	Definition
Category 1a: Strict Nature Reserve	Protected area managed mainly for science	Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.
Category 1b: Wilderness Area	Protected area managed mainly for wilderness protection	Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.
Category II: National Park	Protected area managed mainly for ecosystem protection and recreation	Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreation and visitor opportunities, all of which must be environmentally and culturally compatible.

On the basis of the stated and implied goals of the system (section 7.1) Antarctica corresponds to categories Ia, Ib, and to some extent category II, although the lack of specified goals for the management of different activities makes categorisation difficult. The Antarctic does not fit neatly into this scheme, which is designed to categorise more traditional protected areas, reserved and managed for clearly identified values, but it is clear that the level of protection intended for Antarctica is equivalent to these categories.

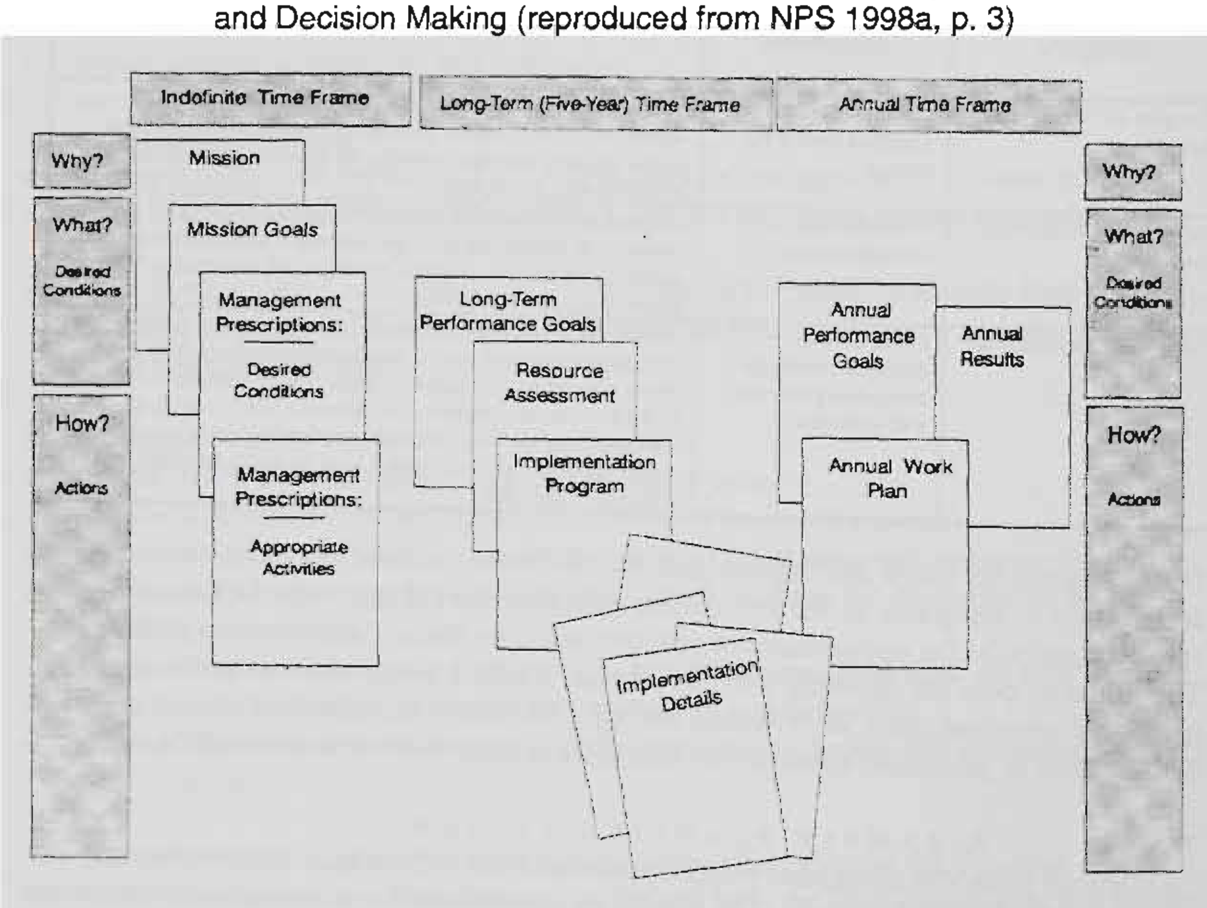
7.2.1 A SAMPLE PLANNING SYSTEM

To illustrate general management planning processes and principles, a sample planning system will be briefly described. The planning system is used for planning and management in the US park system, and is illustrative of a number of fundamental principles. It is a higher level planning policy, but provides a philosophical framework within which all protected area management occurs, and details planning processes and decision making (NPS 1998a).

The park service uses planning 'to bring logic, analysis, public involvement, and accountability into the decision making process' (NPS 1998a, p. 2). The three principles underlying the policy are those of logic, analysis, and public involvement. Logic means that it should be possible to demonstrate 'how decisions relate to one another in terms of a logical, trackable rationale' (p. 2). The principle of analysis means that 'planning decisions regarding the treatment and use of park resources will be based on scientific, technical and scholarly analyses. Analyses will be tiered, focusing first on the park as a whole and in its full global, national and regional context, and then on site-specific details' (p. 2). Analysis also involves the identification and comparison of alternatives according to specified criteria. Public involvement requires that the NPS understands and considers public opinions on the implications of planning and decisions. Existing and potential visitors, neighbours, traditional users or owners of the land, scientists and scholars, concessionaires, cooperating associations, partners and government agencies are consulted.

Beyond these basic principles, each park has several levels of planning. Figure 7.1 presents the planning framework used by the NPS. The upper levels describe the reason for the park's existence, and the desired resource conditions and visitor experiences. Lower levels focus on the means by which these conditions can be achieved (NPS 1998a). Each park has a legislatively established mission. Broad goals (termed mission goals) are articulated. Management prescriptions for areas of the park (the desired resource conditions, visitor experiences, and types and levels of use) are developed. Specific and measurable long term goals are agreed upon. An implementation program detailing actions for achieving long term goals is prepared. At the lower levels of the planning framework are the setting of annual performance goals, annual work plans, and the reporting of annual results (figure 7.1)

Figure 7.1: Framework for NPS Park Planning and Decision Making (reproduced from NPS 1998a, p. 3)



The NPS (1998a) also distinguishes between general management planning (resource protection and visitor use planning), park strategic planning (planning of human and financial resources for meeting park missions), implementation planning (more specific plans related to achieving individual goals), and annual performance planning and reporting (annual work plans, performance goals, and reporting).

This planning framework represents a highly developed, generalised management planning system for application to different national parks in the US, and to the US park system in general. The principles used to construct the management framework—logic, analysis, and public involvement—are applicable in any protected area management context, and it can be argued that they should be applied to the management of Antarctic tourism. The planning and decision making process (figure 7.1) exhibits the heirachical arrangement of goals, the identification of desired conditions, practical distinctions between different time frames, and implementation planning. Within this framework, more specific visitor management planning models are used for some parks (see section 7.2.3.d).

7.2.2 WILDERNESS MANAGEMENT

A specific area of protected area management theory relates to wilderness management. There are three reasons why a brief examination of wilderness management theory is important. First, reference is made in the Protocol to the need for management of wilderness values (section 1.2.5). Second, other authors have proposed that elements of wilderness management theory are of value for the management of Antarctic tourism (section 1.1). Third, many of the motivations for Antarctic tourism involve the concept of wilderness, and wilderness management theory offers ways to understand and incorporate these values into management. The seminal work on wilderness management is that of Hendee, Stanley and Lucas (1990), who state:

> Wilderness management is essentially the management of human use and influences to preserve naturalness and solitude. It includes everything done to administer an area—the formulation of goals and objectives, and all policies, standards and field actions to achieve them (Hendee, Stanley & Lucas1990, p. 15).

Hendee, Stanley and Lucas (1990) describe 13 principles, covering the basic concepts involved in managing wilderness, summarised as follows:

1. Manage wilderness as one extreme on the environmental modification spectrum.
Environments can be categorised according to their level of human modification on a spectrum from highly modified to unmodified, wilderness being the furthest extreme. Management of wilderness should ensure that modification is avoided.

2. Manage wilderness as a composite resource, not as separate parts.
'Wilderness is a composite resource with interrelated parts, and its management must be focused on the whole' (p. 182). Separate management plans for vegetation, wildlife and recreation should not be developed. One plan should deal simultaneously with the interrelationships of all component parts of the resource.

3. Manage wilderness and sites within, under a nondegradation concept.
'The nondegradation concept calls for the maintenance of existing environmental conditions if they equal or exceed minimum standards, and for the restoration of conditions which are below minimum levels' (p. 183). 'The objective is to prevent degradation of current naturalness and solitude in each wilderness and restore substandard settings to minimum levels' (p. 183).

4. Manage human influences, a key to wilderness protection.
'The principal goal of wilderness preservation is the maintenance of long-term ecological processes. Thus, wilderness management is basically concerned with management of human use and influences to preserve natural processes' (p. 184).

5. Manage wilderness to produce human values and benefits.
Wilderness designations aim to provide enjoyment to people as well as to protect flora and fauna. Management needs to produce wilderness benefits to people, using a biocentric approach that 'emphasizes environmental integrity as the basis for human benefits'. Actions diminishing benefits through change to the primeval quality of the wilderness, should be avoided, but not to the extent of purity at all costs, which can alienate user and other interest groups (p. 185).

6. Favour wilderness dependent activities.
'Whenever one or more uses conflict, the principle of wilderness dependency, favouring activities most dependent on wilderness conditions, is used to resolve use conflicts and prevent overuse. This principle is intended to assure optimum use of wilderness resources' (p. 185). Wilderness dependent opportunities are in short supply compared to most other opportunities, and nondependent opportunities can be enjoyed in alternative settings.

7. Guide management with written plans that state objectives for specific areas.
'Wilderness management actions must be guided by formal plans that state goals and objectives and explain in detail how they will be achieved. Without such clear prescriptions, management can become uncoordinated and even counterproductive' (p. 186). 'It is crucial to develop, through an orderly planning process, the clearest and most specific objectives possible and to use them as constant guides to management' (p. 187).

8. Set carrying capacities as necessary to prevent unnatural change.
This principle states that physical-biological carrying capacity, and social-psychological carrying capacity must be set at a level necessary to prevent unnatural change. 'The standards of ecological integrity and human solitude that are established for an area—and the specific area management objectives that express these standards—help define the carrying capacity of an individual wilderness' (p. 187).

9. Focus management on threatened sites and damaging activities.
This principle calls for 'selective, site-specific orientation rather than an across-the-board approach that would impose restrictions everywhere in a wilderness'. 'Restrictions should be selective—to times, places, and users having the greatest potential for damage' (p. 188).

10. Apply only the minimum regulations or tools necessary to achieve wilderness area objectives.
'The guiding principle is that only the minimum regimentation necessary to achieve established wilderness management objectives is justified. This principle is sometimes called the minimum tool rule—apply only the minimum tools, equipment, device, force, regulation, or practice that will bring the desired result' (p. 188).

11. Involve the public as a key to acceptance and success of wilderness management.
'Public involvement is recognized as perhaps the most important tool for the successful development and implementation of wilderness management plans and actions' (p. 189). Such involvement is a source of knowledge about the resource, as well as a means of obtaining public support.

12. Monitor wilderness conditions and experience opportunities as a key to long-term wilderness management.
Monitoring is required to assess the degree to which objectives are achieved, and for the revision and refinement of management plans. 'The challenge is to measure and evaluate certain indicators that reflect important attributes of *biological, physical* and *social* conditions in wilderness' (p. 190).

13. Manage wilderness in coordination with management of adjacent lands. 'Wilderness does not exist in a vacuum—what goes on outside of, but adjacent to, a wilderness can have substantial impacts inside its boundary' (pp. 190-191).

7.2.3 VISITOR MANAGEMENT

Within the broader body of theory applying to protected area management, and in the realm of recreation and tourism management theory, visitor management frameworks have been developed (Graefe, Kuss & Vaske 1990a). The most fundamental and influential visitor management frameworks are examined in this section: Carrying capacity, the Recreation Opportunity Spectrum (ROS), and Limits of Acceptable Change (LAC) model. These frameworks represent the state of the art in visitor management planning. More specific models, intended for use in the protected area systems of particular nations, have also been developed. One such model, the Visitor Experience and Resource Protection (VERP) Framework of the NPS is briefly examined.

7.2.3.a Carrying capacity

A fundamental dilemma in management of visitation to natural areas is the conflict between protecting natural areas and resources, and allowing people to experience and enjoy them through tourism and recreation. A number of ways of understanding and dealing with this dilemma have been developed, beginning with the concept of carrying capacity. Carrying capacity originally applied to the ability of lands to support populations of wildlife—beyond a certain limit, lands are not capable of supporting greater numbers of animals. The concept has been applied to recreational use of areas for some time (Graefe, Kuss & Vaske 1990a), where in general, the concept refers to the ability of the physical environment to withstand recreational use, and to the amount of use that is consistent with maintaining an acceptable recreational experience (Graefe, Kuss & Vaske 1990a, Hendee, Stanley & Lucas 1990). Carrying capacity involves estimation, often using quantitative methods, of a numerical limit on use levels. While the notion of reducing management problems to a single figure is appealing, difficulties were encountered from the outset in actually applying the concept to recreation management (Hendee, Stanley & Lucas 1990, Graefe, Kuss & Vaske 1990b). Hendee, Stanley & Lucas (1990) point out that it has become clear carrying capacity is only meaningful as a product of value judgements as well as science, and that carrying capacity cannot be determined solely through scientific assessment, but instead 'becomes a process by which biophysical and social research is integrated with agency policies and the values of managers and users to reach a collective judgement' (p. 218). NPS (1997) defines visitor carrying capacity as 'the type and level of visitor use that can be accommodated while sustaining acceptable resource and social conditions that complement the purpose of a park' (p. 8), and subsumes the concept into a more dynamic, less formulaic model, stressing that visitor management begins with a plan, but continues as 'a cyclical process involving monitoring, evaluation, and taking action to make adjustments' (p. 8). The concept continues to be discussed and utilised but in a different form to the traditional conception of a numerical limit on visitor numbers, arrived at through quantitative means. Deficiencies in the traditional carrying capacity model have prompted development of other approaches, outlined below.

7.2.3.b Recreation Opportunity Spectrum

A specific framework for the planning and management of recreation opportunities, called the Recreation Opportunity Spectrum, was developed by Clark & Stankey (1979). The ROS has become a mainstay of planning for recreation and visitor use in many areas. The concepts of the ROS are valuable in clarifying the setting of recreational and tourism experiences, and the effect that management change can have on such experiences. The ROS also forms an element of more specific visitor management models such as the LAC described in section 7.2.3.c. Clark and Stankey arrange recreational opportunities along a spectrum 'distinguished by varying conditions, ranging from modern and developed to primitive and undeveloped' (1979, p. 1). The concept concentrates on the relationship between the setting and the recreational activity. The ROS concept formalises the previously acknowledged need for a range of recreational opportunities in order to provide for diverse recreation needs (Clark & Stankey 1979). Clark and Stankey define a recreation opportunity setting as 'the combination of physical, biological, social and managerial conditions that give value to a place' (p. 1). Through variation of these conditions, the concept suggests, managers can assure a range of opportunity settings for recreation.

> ROS offers a framework within which to explicitly vary situational attributes (access, density, etc.) to produce different recreation opportunity settings. From these opportunity settings, recreationists participating in different kinds and styles of activities derive different satisfactions and experiences and, ultimately, benefits. (Clark & Stankey 1979, p. 7).

Clark and Stankey suggest that factors defining the range of recreation settings can be identified and described. They can be used to select appropriate settings for recreation, and to aid planning of recreation offerings. Each of these factors can vary across the spectrum from modern though to primitive, as summarised below (from Clark & Stankey 1979).

1. Access: access is subject to management control, and can be via a range of modes, motorised or nonmotorised, private or commercial. Access varies across a continuum from modern to primitive. Access can be constrained by environmental features, limiting management control.

2. Other nonrecreational resource uses: areas are subject to uses other than recreation, all of which can conflict with recreational experiences. In some cases, nonrecreational uses can contribute to enhanced recreational enjoyment.

3. Onsite management: site modifications such as landscaping, facilities and management controls vary the opportunity setting. Primitive settings have few or no onsite management modifications. The extent, obtrusiveness, and complexity of modifications help to define this factor.

4. Social interaction: amounts of social interaction help to characterise different settings. More primitive settings involve low levels of interaction, while a modern setting may require high levels of interaction.

5. Acceptability of visitor impacts: setting is determined by the degree to which human impacts are compatible with the activity. Visitor impacts can vary in magnitude and in importance (a subjective notion). The ROS suggests that certain levels of impact will be more acceptable in certain settings than in others.

6. Acceptable regimentation: setting is defined by the degree of regimentation, ranging from subtle management such as site design or information provision through to legal sanctions or fines. More primitive settings should have less regimentation.

'A recreation opportunity setting is the result of a specific combination of the six factors in a particular location. Alternative combinations of the factors create different opportunity settings' (Clark & Stankey 1979, p. 14). Natural features must be considered in addition to the six factors in defining settings. Landforms, scenery, water, and vegetation are examples used by Clark and Stankey. They suggest that 'there is no intrinsic quality of these other natural features that suggests the appropriate type of recreation opportunity setting' (1979, p. 16). For example, a mountainous setting may be just as appropriate for modern opportunity settings as it is for primitive opportunity settings. Clark and Stankey describe four generic opportunity settings—modern, semimodern, semiprimitive, and primitive. Clark and Stankey suggest that opportunity settings where one or more of the factors are outside the normal range for that setting may be appropriate—for example, an otherwise primitive setting may have better than primitive access, allowing for certain recreational opportunities.

The ROS as a framework has a variety of applications (Clark & Stankey 1979). First, it can be used for the allocation and planning of recreational resources, to assist in making decisions about the use of an area, and in management of the factors which comprise the opportunity setting. Second, the ROS aids the inventory of recreational opportunities to identify which areas of the spectrum are oversupplied or neglected. Third, the ROS can be used to predict the consequences for recreation of management decisions. The ROS provides a framework for understanding how changes to access, physical infrastructure, management presence or other factors will affect the recreation opportunities available in the area. Finally, the ROS allows managers to match visitor experiences to the most appropriate settings (Clark & Stankey 1979).

At present, the majority of Antarctic tourism would appear to occur within a largely primitive opportunity setting when evaluated against the six factors outlined above. Access is the only one of the factors that is not at the primitive end of the spectrum, as most access is by ship. This form of access does not however involve onsite modifications or infrastructure. This primitive opportunity setting is not the result of management decision, although the reluctance of ATCPs to support tourism for much of its history, and the resistance to land based infrastructure is a form of unconscious management intervention in the opportunity setting.

The ROS has potential for application in the Antarctic situation, with appropriate modification in recognition of the position of most of the Antarctic region in the primitive end of the spectrum. Depending on the higher level goals of the ATS about tourism management, the ROS could be used to make management decisions about providing a range of opportunities in certain areas in the Antarctic (as suggested by P. Davis 1995b). It may be that the ATS and stakeholders would regard it appropriate for a range of settings to be available. Alternatively, it may be that all Antarctic opportunities should be close to the primitive end of the spectrum. The most valuable Antarctic application of the ROS may be in helping understand the effect management changes will have on setting.

7.2.3.c Limits of Acceptable Change

A system for coping with the demands placed by recreation on wilderness areas has been developed, that reformulates the carrying capacity concept. The Limits of Acceptable Change (LAC) system for wilderness planning was developed by Stankey, Cole and others of the Intermountain Forest and Range Experiment Station in Utah in 1985. The system is specifically concerned with the management and effects of recreation on wilderness, and as such has considerable potential when Antarctic tourism is being considered. The LAC system was developed in 'response to the need of managers for a means of coping with increasing demands on recreation areas in a visible, logical fashion', and represents 'a reformulation of the recreational carrying capacity concept, with the primary emphasis now on the conditions desired in the area rather than on how much use an area can tolerate' (Stankey et al. 1985, p. i). Rather than attempting to determine the number of users an area can support, the system involves agreeing on the amount of change that will be allowed to occur, defining that change explicitly with quantitative standards, identifying management actions required to prevent change beyond that point, and establishing monitoring procedures (Stankey et al. 1985). The system 'derives from a management by objectives (MBO) approach to planning and is conceived of as a dynamic, continuing process' (p. 3). The process also incorporates elements of the ROS described in section 7.2.3.b.

While acknowledging that wilderness management has a broader ambit than only recreation, Stankey et al. (1985) make a number of points in supporting a system concerned only with recreation. First, recreation impacts are a problem in many wilderness areas, and recreation uses occur in almost all wilderness areas. Second, recreation is a value endorsed in the definition of wilderness (at least in the US legislative context) and so is a valid management focus. Finally, Stankey et al. state that legislative and administrative guidelines emphasise the need to manage recreation in wilderness areas (a condition that applies in most formally declared wilderness areas). The LAC process has four major components:

> (1) the specification of acceptable and achievable resource and social conditions, defined by a series of measurable parameters; (2) an analysis of the relationship between existing conditions and those judged acceptable; (3) identification of management actions necessary to achieve these conditions; and (4) a program of monitoring and evaluation of management effectiveness (Stankey et al. 1985, p. 3).

In applying these components, nine steps guide the process of developing measurable objectives and management actions needed to meet them. Table 7.2 summarises, for each step of the LAC, the purpose, process involved, and the product or outcome.

The key elements of the LAC process are the management by objectives foundation, the monitoring and feedback loops in the system, the logical and systematic approach applied to planning, and the recognition of the need to manage both resource and social conditions. Important elements of the LAC are the specification of standards for resource and social conditions, and development of management provisions to maintain conditions within the standards, with monitoring and feedback mechanisms to refine management provisions if standards are not being maintained.

With reference to use levels, Stankey et al. acknowledge the difficulty of predicting in any meaningful way impacts from growth in use. They maintain that the understanding of the relationship between impact and use is poor. In situations where conditions are close to contravening the standards set in the LAC process, and where other management actions are insufficient, use limits will be needed (Stankey et al. 1985). The LAC authors state that 'if existing conditions are close to those described in the area standards, then managers reasonably can assume that current use levels approximate capacity' (Stankey et al. 1985, p. 21). In actually reducing use levels, a trial and error approach may be needed (Stankey et al. 1985), using monitoring to fine tune the level of use.

Finally, it is worth pointing out that Stankey et al. regard the LAC as a conceptual process (1985, p. 3). They acknowledge that field application would lead to modification and improvement. They also envisage the incorporation of the LAC into the institutional framework of different wilderness management agencies. Section 7.2.3.d describes one example where the LAC has been incorporated into a visitor management framework specific to one institution.

7.2.3.d Agency specific visitor management models

The Visitor Experience and Resource Protection Framework (VERP) is an example of the application of the LAC and carrying capacity concepts within the institutional framework of the US National Park System. A number of similar frameworks exist for different institutional settings, including the Visitor Impact Management process (VIM) developed by the US National Parks and Conservation Association (Graefe, Kuss & Vaske 1990b), and the Parks Canada Management Process for Visitor Activities (VAMP) (NPS 1997, P. Davis 1995b). These frameworks share most elements in common with the VERP framework, including the:

- description of desired future conditions;
- establishment of standards that define minimum acceptable conditions;
- formulation of monitoring techniques to determine when and if management actions must be taken to keep within standards; and
- the development of management actions to ensure that indicators are kept within standards.

Table 7.2: Steps in the Limits of Acceptable Change Process (Stankey et al. 1985, pp. 4–20)

	Purpose	Process	Product
Step 1: Identify area issues and concerns	• To identify features or values of particular concern to be maintained or achieved. • To identify specific locations of concern. • To provide a basis for the establishment of management objectives. • To guide the allocation of land to different opportunity classes.	• Identify issues raised during public involvement. • Identify concerns raised by resource managers, planners and policymakers. • Review agency policy. • Analyze regional supply and demand. • Analyze opportunities in the area from a regional and national perspective.	• Narrative writeup identifying unique values and special opportunities to be featured in the area's management and problems requiring special attention.
Step 2: Define and describe opportunity classes	• To facilitate the provision and maintenance of inter- and intra-area diversity.	• Review information collected during step 1 concerning area issues and concerns and select number and names of opportunity classes.	• Narrative descriptions of resource, social and managerial conditions defined as appropriate and acceptable for each opportunity class.
Step 3: Select indicators of resource and social conditions	• Identify specific variables to guide inventory process (step 4). • Provide basis for identifying where and what management actions are needed.	• Review information outlined in descriptions (step 2). • Review issues and concerns regarding specific conditions identified in step 1 and select factors that reflect these issues and concerns.	• List of measurable resource and social indicators (preferably quantifiable).
Step 4: Inventory resource and social conditions	• Knowing the range of conditions helps establish meaningful standards. • Helps in decisions on allocation of land to different opportunity classes. • Critical step in knowing where and what management actions will be needed.	• Conduct field inventory of conditions of resource and social indicators and map resulting information.	• Map of existing conditions of each indicator throughout the wilderness area.
Step 5: Specify standards for resource and social indicators	• To provide a means to evaluate where and what management actions are needed through comparison of existing conditions with those defined as acceptable for each indicator in each opportunity class.	• Review opportunity class descriptions developed in step 2. • Analyze inventory data collected in step 4 for each indicator.	• A table of specific (quantified where possible) measures of acceptable conditions for each indicator in each opportunity class.

Table 7.2 continued: Steps in the Limits of Acceptable Change Process (Stankey et al. 1985, pp. 4–20)

	Purpose	Process	Product
Step 6: Identify alternative opportunity class allocations	• A step toward defining what resource and social conditions will be provided in different parts of the wilderness. • Provision of allocation alternatives for public review and evaluation.	• Review information obtained from area issues and concerns. • Review information contained in opportunity class descriptions. • Review information derived from inventory of existing conditions of indicators.	• Maps and tabular summaries of alternative opportunity class allocations.
Step 7: Identify management actions for each alternative	• Contributes to evaluating the costs of implementing each alternative. • Contributes to selecting a specific management program.	• Review the managerial conditions of the opportunity class defining the appropriate types of actions. • Analyze the differences between existing conditions and those defined as acceptable by the standards. • Analyze the alternative management actions for bringing existing conditions in line with standards.	• List or map of all places where existing conditions are worse than standard and identification of what management actions would best bring conditions up to standard.
Step 8: Evaluation and selection of an alternative	• To finalize opportunity class allocations and a specific management program to achieve this allocation.	• Analyze resource, social and managerial costs—what are they, who pays, what alternatives exist etc. • Analyze resource and social benefits—what are they, who receives them, etc.	• Final allocation of opportunity classes and selection of a management program.
Step 9: Implement actions and monitor conditions	• To implement a management program to achieve the objectives of the selected alternative. • To provide periodic, systematic feedback regarding the performance of the management program.	• Periodically reinventory condition of indicators—essentially a repeat of step 4. • Compare indicator conditions with standards. • Analyze performance of management program.	• Summary of relationship between existing conditions and standards for all indicators in all opportunity classes. • Where necessary, recommendations for change in management program to obtain satisfactory progress toward bringing existing conditions up to standards.

The steps of significance in the VERP framework are divided into four sections. The first establishes the foundation of the framework:

- assemble an interdisciplinary project team;
- develop a public involvement strategy;
- develop statements of park purpose, significance, and primary interpretive themes; and
- identify planning constraints.

The second stage is the analysis stage:

- analyse park resources and existing visitor use.

The third stage involves the development of prescriptions:

- describe a potential range of visitor experiences and resource conditions (potential prescriptive zones);
- allocate the potential zones to specific locations in the park (prescriptive management zoning); and
- select indicators and specify standards for each zone, and develop a monitoring plan.

The final stage is monitoring and management action:

- monitor resource and social indicators; and
- take management action (NPS 1997).

In essence, the process is a combination of management by objectives, using an LAC approach, applied through zoning. The VERP framework and its siblings provide structures for formalising the planning process, adopting the concept of the LAC. They are evidence of the practical acceptance of this form of planning for visitor management. Some of the specifics of these systems are not necessarily applicable in the Antarctic context—for example, it may not be appropriate to try to offer a range of recreational opportunity settings—but the general foundations and underlying principles are widely recognised, and worthy of consideration.

7.2.4 SUMMARY OF PROTECTED AREA MANAGEMENT PLANNING

The protected area management theory examined here reinforces the findings of the case studies regarding the importance of management planning.

It is argued in this thesis that management planning is the most appropriate method to apply to the management of Antarctic tourism. It is also argued, in section 8.1, that if Antarctica were the responsibility of a national protected area management agency, management planning would have been applied to Antarctic tourism at some point in the past. This section defines what constitutes best practice management for protected areas. Section 7.4 then discusses the Antarctic tourism management system, considering these ideal concepts. It is acknowledged that this entails judging the Antarctic tourism management system against goals that it has never professed to address, but the intention is to compare the existing system with an alternative system for management that could be applied, and arguably would have been applied under different circumstances.

In summary, an ideal management planning based system would include a number of key elements. Drawing from the NPS park planning framework, from the VERP framework, and from the wilderness management principles, management planning would exhibit a logical process with a clear (and trackable) rationale for decision making. Planning decisions would be based on scientific, technical, and scholarly analyses. Alternatives to decisions would be carefully considered with reference to the potential of each option to meet the objectives defined for the area. Public opinion would be sought and taken into account in management planning and decision making.

Goals for the management of the area would be clearly specified, and a heirachy of management intentions established, progressing through to specific actions. Appropriate conditions for an area would be defined, and management would be directed towards achieving or maintaining those conditions.

Drawing from the wilderness management theory, wilderness values would be explicitly considered in planning and management, and wilderness would be recognised as very valuable, vulnerable to change, and relatively scarce. Tourism and recreation use would be recognised as value producing activities, and management would be aimed at ensuring such values can be derived. Wilderness dependent activities would be favoured if there were a conflict between uses. Tourism management would be part of a wider conservation management framework, rather than being managed in isolation. Management actions would be used to avoid unnatural change. Management would be focussed on threatened sites and damaging activities. The minimum amount of management intervention necessary to achieve objectives would be used. Monitoring would be used to assess the degree to which management objectives are being achieved.

Drawing on the ROS model, visitor activity would be assessed and understood according to the characteristics of the opportunity setting. Goals relating to what opportunity settings should be provided would be identified, developed, and formalised. Management would take into account the opportunity settings available in the area, and the effect on opportunity setting would be considered when management provisions were being developed.

Based on visitor management theory, the limitations of the carrying capacity concept (as a simple numerical limit) would be recognised. A planning process would be employed that identifies the desired future social and resource conditions, establishes standards that define these conditions, analyses existing conditions to see how they measure up to the desired conditions, chooses appropriate management actions to ensure that standards are met, and develops monitoring techniques to determine if management actions need to be taken or changed to keep within standards.

7.3 RESULTS OF CASE STUDY ANALYSES

The case studies of cruise tourism management in high latitude natural areas detailed in chapters five and six identify a range of management principles and measures. These principles have been applied to the management of cruise tourism in similar situations to those pertaining in the Antarctic. The general principles of tourism management applying in the case study areas provide a practical example to accompany the theoretical management principles discussed in section 7.2. In addition to general management principles, the case studies identified management strategies and actions used specifically for the purposes of cruise tourism management in high latitude natural areas. The case study results provide an indication of accepted practice, the feasibility of management measures and practices, and identify what is practicable in the context of managing cruise tourism in remote natural areas.

The case material and analyses are set out in chapters five and six. A brief summary will be provided here as a basis for the evaluation of the Antarctic tourism management system in section 7.4.

7.3.1 SOUTHERN OCEANIC ISLAND TOURISM MANAGEMENT

Tables 5.6 to 5.9 provide a summary of the management planning, shore management provisions, administrative and other provisions applying to cruise tourism in southern oceanic island cases. Section 5.9 discusses the range of management provisions applying to the different islands. The key points were as follows.

General management approaches and philosophies.

1. The application of management planning is universal amongst the cases, with plans in place or in development. Management planning processes are regarded as the primary conservation management mechanism.
2. Tourism issues are considered within broader management planning strategies, and within the framework of conservation management goals.
3. Formal protection status, equivalent to IUCN management category I, applies in most of the cases.
4. A range of policies on the appropriateness of tourism activity are exhibited, with some authorities declaring opposition to tourism activity on the basis of lack of facilities, and others regarding self reliant tourism activity as an appropriate use. Some areas have a specific charter to provide for such use.
5. The tourism experience was a consideration in management planning for some of the cases, with attention paid to ensuring an appropriate experience is available, and not diminished by social factors such as crowding.
6. Wilderness qualities as they relate to the experiences of visitors were considered in some cases.
7. Self regulation of certain measures is recognised as necessary in all cases. Codes of conduct, with the aim of summarising management provisions, are used in all cases.

Specific management strategies and actions.

8. Limits on the total number of tourists, some of these limits conservative, apply in some cases. Other case areas are free of limitations on total tourist numbers, and some have included the ability to impose such limits in the management system.
9. Environmental assessment mechanisms were used in the cases in two ways. In some cases, an environmental assessment was conducted for tourism as an overall activity, by the managing authority, as part of the decision making and management planning process. In only one case were environmental assessment processes applied before each visit.
10. Limits on the number of people allowed ashore at a site are applied in most cases, ranging from 10 to 100.
11. In some cases guide to visitor ratios are specified, ranging from 1:10 to 1:20.
12. Land based infrastructure specifically for tourism management is present in two cases, in the form of boardwalks to protect vegetation.
13. IRB use is permitted in most cases under certain conditions, including at some locations where landings are not allowed.
14. The cases differ on policies about activities other than passive observation and limited walking. Some cases acknowledge the validity of adventure activities, others specifically prohibit them.
15. Permit systems are used to regulate tourism for all cases, and in two cases a contractual agreement between a tourist operator and the area manager is established.
16. Management presence on vessel or on shore is applied in some cases.
17. Fees and charges apply in most cases.

7.3.2 TOURISM MANAGEMENT FOR NORTHERN POLAR LOCATIONS

Chapter six presents and analyses case information on cruise tourism management for northern polar locations. Section 6.8 summarises and discusses the findings of the case analyses, and section 6.9 makes conclusions and discusses the implications for Antarctic tourism management. The key points are as follows.

1. A higher degree of regulation and management than in the Antarctic applies to all cases, and management is more structured, decisive, and stringent in most cases.
2. Sophisticated and comprehensive management systems are in place in some cases.
3. Specific cruise tourism management plans, including zoning of cruise tourism use, or provisions specifically for cruise tourism are applied in some cases.

4. A generally lower level of reliance on self regulation is evident in most cases.
5. In some cases specific cruise tourism management provisions are included as part of broader management planning systems. Areas with low levels of tourism have a degree of regulation through protected area management planning, in some places.
6. Less distinct geographic areas (compared to the southern oceanic islands) have resulted in fragmented management systems in some cases.
7. Arctic-wide management regimes are not in place. Self regulatory codes applying to the entire region have been developed, which are substantially different to those used in the Antarctic.
8. Environmental assessment was used in only one case, for an assessment of different cruise tourism management options, conducted by the managing authority as part of the management planning process. Environmental assessment is not regarded as an ongoing management tool or a replacement for management planning in the cases examined.
9. In one case, the permit allocation system favours operators with better environmental standards than others, and all operators must develop a pollution minimisation plan.
10. The cases recognise the validity and value of visitor experiences. In two cases, the visitor experience is specifically taken into account in planning and management, and the quality of the experience is regulated in one case.
11. Management zoning (similar to the ROS) for visitor management purposes is used in two cases.
12. Numerical limits on tourism have been imposed in one case, while one other case has included the right in the management system to impose limits.
13. A comprehensive ice navigation regime applies to all shipping including cruise tourism in one case area, and ice navigation is regulated in another.

7.4 EVALUATING THE ANTARCTIC TOURISM MANAGEMENT SYSTEM

The Antarctic tourism management system is evaluated in this section. The system is compared with the internally derived goals, the ideal management models identified from protected area management theory, and the management principles and practices identified in the case studies. Two areas of the tourism management system are evaluated—coverage and adequacy.

7.4.1 COVERAGE

The coverage of elements of the tourism management system is an ongoing concern as identified in section 1.1. For the purposes of this chapter, coverage is broadly defined as the extent to which the management system (or the elements thereof) applies to those carrying out (or those who may carry out) Antarctic tourism operations, participants in tourism operations, or those involved in provision of services as part of tourism operations. Coverage includes the ability of the system to provide regulation for operations based in non-ATS nations. This is a critical issue, as the ATS is an international regime with limited membership, and the potential will always exist for entities to act outside the regime.

It is possible for tourism to occur without it being subject to all (or indeed any) of the elements of the ATS management system. Countries not party to the Treaty may host tourism operations, which would be subject to very few of the provisions examined in chapter four. The potential remains for unregulated tourism operations involving operators and participants from non-treaty nations to proceed. This could include new operations developing within a non-ATS nation, or operations (new or existing) being established in a non-ATS nation in order to avoid ATS obligations. ATPs are not completely without recourse if a non-ATS party, or a person or company under the jurisdiction of such a party were to proceed with activities in contravention of the Protocol, as a range of diplomatic and international relations options are available, although these options are usually reserved for much more serious issues. Such strong measures may be inappropriate, and are unlikely if the issue at stake were relatively benign tourism activity being organised in a non-treaty nation. Section 4.5, where legislation of a number of parties to the Protocol was examined, indicates that most tourists would be subject to Protocol enabling legislation even if the operator of an activity was not. For example, if tourism activities were organised in a country not party to the Protocol, the participation of clients from the main tourist markets, including the US, would be in question, as the tourists themselves must comply with the legislation of their country. While in principle these mechanisms allow ATPs control over much of the industry, in practice the application of law in such a situation could prove problematic.

The entry into force of the Protocol, and the implementing legislation passed in ATS jurisdictions has to some degree alleviated concerns identified in the literature (section 1.1) about jurisdiction. Opportunities exist for regulation through a number of different jurisdictional mechanisms, primarily the nationality principle. Some of the concerns identified still apply. Crew or passengers from a non-ATS nation, on a vessel flagged in a non-ATS nation are (in most cases) not personally subject to any legislation, and as such there is no recourse if an action in contravention of the Protocol is taken. In some cases, territorial jurisdiction may provide a mechanism for dealing with such offences—for example if a person from a non-treaty nation were to commit an offence in the Australian claimed Antarctic territory they are, from the point of view of Australia, subject to Australia's Protocol enabling legislation, although application of this legislation in practice would in all likelihood be difficult.

Even where coverage is provided by the tourism management system, it may vary in character. The processes of enabling the Protocol through implementing legislation have resulted in some degree of variability for tourism regulation. Tourism operators in different jurisdictions are required to comply with different legislative and administrative processes, and different interpretations of the Protocol apply. Some potential exists for selection of, as an operational base, nations where compliance may be less onerous, although the disadvantages for an operator of doing so would probably outweigh any advantages. Operators from some nations may be disadvantaged by comparison with those from other nations, in that they are required to comply with different provisions.

Coverage is not guaranteed even within the ATS. The example of Canada, signatory to the Protocol but not having passed enabling legislation, while having jurisdiction over substantial tourism activity (section 4.5), is a case in point.

Non-ATS elements of the management system have broader coverage. The IMO agreements (MARPOL 73/78 and SOLAS) have larger memberships than the ATS, and so the provisions of these agreements will apply in the Treaty area to operators from more nations. The planned ice navigation regime (the Polar Code) as originally constituted would have a similarly broad application, although this is dependent on the code being adopted under auspices of the IMO, and on the final status of the agreement.

Self regulatory measures have variable coverage. IAATO imposes self regulatory measures on its members (section 4.9.1). The self regulatory measures developed by IAATO do not apply to other operators, and as noted, there are a number of companies operating in the region who are not IAATO members. Such operators may adopt the same or similar measures on a voluntary basis. For other self regulatory measures, ATPs with jurisdiction over operators expect or require operators to impose some form of self regulation, independent of IAATO membership. These include self regulatory aspects of compliance with national law, ATS rules, and Recommendations.

Practically speaking, the main tour operations from different countries are subject to the ATS management provisions (excepting those originating in Canada), most of them are members of IAATO and are therefore subject to certain self regulatory measures, and all are expected to apply self regulation of, at a minimum, compliance with the binding rules of the ATS.

7.4.2 ADEQUACY

For the purposes of this chapter, adequacy is defined as the capacity of the management system (and elements thereof) to achieve primary objectives, to meet implied tourism management goals of the ATS, and to meet the environment protection aims outlined in Articles two and three of the Protocol. Adequacy includes implementation as far as is known, but otherwise the assessment of adequacy is restricted to the likelihood of success rather than any objective measure of outcomes. As well as addressing adequacy through comparison with the internally derived goals, the tourism management system is compared with the standards identified through protected area management theory, and the examples of the case studies.

7.4.2.a Lack of a strategic management approach

The most significant concern with the present management system is the lack of a strategic management approach. Most other weaknesses of the system are related in some way to this gap. Concerns over cumulative impacts, site use issues including crowding, dealing with novel activities, and change over time in the industry are difficult, if not impossible, to address effectively without a strategic approach to tourism management. The present management system includes a number of components that would be expected, based on management theory and the management systems of the case studies, however significant gaps are apparent.

Beginning at the broadest level, management planning theory states that a logical and trackable process for decision making should be used. Decisions would be based on scientific, technical, and scholarly analysis. The Antarctic tourism management system does not show evidence of these traits. It is clear that there is no underlying strategic management direction for tourism management in the ATS. A range of concerns arise from the lack of clear statement of purpose or mission for the area. The Treaty area is declared a natural reserve for peace and science, and the Protocol provides some guidance with principles under which activities are to operate. The fundamental issue of for what purpose the area is reserved for is not addressed, and this lack of clarity in intent flows through to lower levels of goal setting. Many of the elements of the system are in place to address perceived needs, but are not clearly linked to any goals. As a result, there is no indication as to what these measures are aiming to achieve in the broader sense, or what role they play in achieving overall management goals. This also means that there are no measures against which the effectiveness of the system can be easily assessed. This is a legacy of the ad hoc and reactive development of the system, and the lack of fundamental review or reform. The ATS has never clearly laid out its tourism management goals, aims and objectives, and has proceeded to regulate some aspects of tourism activity, but not others, without explaining the logical basis for decisions, or making clear its intentions, or reasons for doing so.

Management planning theory indicates that, ideally, management measures would be designed to achieve clearly defined goals, aims and objectives. Planning would determine the desired social and resource conditions for an area, establish standards that define these conditions, and develop management strategies to ensure that the standards are met. Case study research indicates that management planning processes are regarded as appropriate for similar types of tourism, in areas with similar characteristics. This approach has not been adopted for the management of Antarctic tourism.

7.4.2.b Lack of a mechanism for implementing management measures

The question of allocation of the tourism resource is of great importance. One of the main management strategies available to managers in the case study areas is the limitation of tourism activity on the basis of its type, magnitude, form, or location. While other management actions exist, these options were considered necessary in some of the case areas examined. The Antarctic tourism management system does not at present provide for these options to be applied to tourism activity, and as such management options are limited. This becomes an issue especially when the cumulative or additive effects of repeated use of a location are a concern. Even if assessment methodologies could be applied to measure cumulative impacts and the contribution that different activities make to overall impact, the present tourism management system provides no mechanism for responding to that information. The Protocol requires that cumulative impacts are considered, but provides no guidance on how activities should be coordinated to facilitate this, and no guidance on what amount of impact or change is acceptable. If an operator is contributing to a cumulative impact that is considered undesirable, it is unlikely that the operator (or the party whose jurisdiction they are under) will reduce their component of the impact by changing the activity, without an assurance that other operators will do the same.

7.4.2.c Unclear distribution of regulatory responsibility

A result of the lack of strategic management direction is the unclear distribution of regulatory responsibility within the system. The ATS has taken responsibility for regulating certain aspects of tourism activity, and has left other issues for the industry to deal with. There is no clear rationale justifying why regulatory responsibilities are allocated as they are, although it seems that the ATS has regulated where it is unavoidable, and all other responsibilities have defaulted to self regulation or other regulatory arenas. Some important issues, including safety of shipping, and shore behaviour of tourists, are largely left to self regulation. In the present system, self regulation is not a clearly defined, unitary set of responsibilities. It is rather a range of measures and actions, with an unclear role in the overall system, derived from different sources, and applied differently by different operators. A number of tourism management issues that have been recognised by the ATS are left to self regulation only by default—the ATS has not stated that these issues are best dealt with by self regulation, or formally passed responsibility to the industry. The ATS has not made clear what it regards the role of self regulation to be, and as a result the industry has had to define its own role, and develop management strategies, actions, and operational standards and practices. The responsibility for all aspects of tourism regulation not provided for by the ATS has defaulted to the industry and operators, and in some cases the industry is somewhat unfairly held responsible if regulation is not in place to address concerns.

An associated problem is the question of who develops self regulatory measures and practices. The industry body, IAATO, is well placed to do so, but is not able to impose measures on non-members. Some concern also exists about the level of coherence required within the industry for an effective self regulatory role. While cooperation between operators has to date been exceptional, a number of regular operators are not members of the industry representative body, and some are restrained from joining because of their wish to use larger vessels. The operator offering airborne access with land accommodation and activities is not listed as a member of IAATO. The ability of the industry to provide a coherent self regulatory response to issues is complicated by these problems. At a minimum, agreement between the ATS and the industry on who is responsible for regulating what would be appropriate.

The lack of a strategic approach to tourism management issues means that self regulation is not applied within a broader management framework. Many of the most important and meaningful elements of the management system are self regulatory, and credit is due the industry for the fact that tourism has to date had little in the way of readily detectable environmental impact, few safety problems, and caused little disruption to other users. The ATS has relied heavily on the goodwill and expertise of operators in this respect. The case studies exhibit a lesser reliance on self regulation as part of the management system, with management measures being defined by a managing authority, and a clear role for self regulation being assigned.

7.4.2.d Lack of management institutions

The lack of appropriate management institutions is a further limitation of the present system. There is no identified management authority other than the ATS and individual nations. Management decisions are made at the highest international diplomatic level without direct participation of specialist protected area managers. There is no management authority with the ability to advise on management issues, requirements or measures, or to provide non-partisan policy direction on tourism management. The lack of a single authority with responsibility for tourism management issues clearly limits the way in which management provisions can be developed and implemented. This is an unusual management situation. It is assumed in management theory, and evident in all of the cases examined, that a management authority of some description will have oversight of the management of an area. In the Antarctic situation, responsibility for overall ATS tourism management is vested in the ATCMs, which occur once a year at most, and have a wide range of responsibilities and issues to address. The attention that can be paid to tourism management issues is limited, and the consensus nature of the decision making process slows progress further. Responsibility for the implementation of the existing management provisions is widely distributed across different nations and operators.

The CEP, under Protocol Article 12, has responsibility for providing advice to the ATCM on the effectiveness of measures under the Protocol, and for advising on the need for further measures to achieve the ends of the Protocol, including additional annexes. There is potential for the CEP to take responsibility for some tourism management issues, and it is the most likely forum for addressing tourism management issues at the policy level, although its role is environmental, and does not include safety issues. It remains to be seen if the CEP will take a pro-active role in tourism management issues.

7.4.2.e The environmental assessment system

The Antarctic tourism management system uses environmental assessment as one of the main tools for regulation of activities. Environmental assessment processes are applied to all activities in Antarctica, including each tourist operation (usually on a seasonal basis), with the intent of ensuring that the goals of the Protocol are achieved. It is argued here that environmental assessment is an unsuitable mechanism for the ongoing management of tourism in Antarctica.

Issues relating to the role of environmental assessment in the tourism management system are the inability of ATS environmental assessment processes to address multiple activities and cumulative impact issues, the lack of a broader framework for the results of environmental assessment to be considered within, the use of environmental assessment on an activity to activity basis rather than for tourism as an overall activity, and the practicality and value of requiring assessments for each season from operators.

Environmental assessments have the ability to improve the conduct of activities to ensure that impacts are examined and minimised, but there is no system for considering the place of each activity in the context of all other activities. The environmental assessment system is structured to treat activities as 'one-off', unitary events. Tourism, from the point of view of the overall activity rather than the individual operator, is an ongoing activity of considerable size and scope. It is not assessed in this light. This issue is linked to that of cumulative impacts. The main concern with the impact assessment process is its inability to consider cumulative impacts adequately or realistically. There are two dimensions to cumulative impacts. The first is the assessment, measurement, and understanding of these impacts. The second relates to the question of what action should be taken to reduce or avoid cumulative impacts.

The Protocol acknowledges the need to take into account cumulative impacts, but does not provide a realistic mechanism by which this can be achieved. The responsibility for addressing the issue of cumulative impacts lies at the lowest level in the planning and management heirachy (that of the individual operator as organiser of the activity), when it could be argued that the issue needs to be addressed at the highest level. The environmental assessment process is unable to address either the cumulative effects of multiple activities in one season (due to the lack of ongoing coordination between ATPs authorising activities) or the cumulative effects of activities occurring across many seasons (because assessments refer only to each season). If an environmental assessment found that the tourism activity of a single operator were contributing in a significant way to a cumulative impact, it is difficult to see what action could be taken under the present system. An authorising party could suspend or reduce the activity, but this would in effect be an ad hoc allocation of the resource that would be of little use without coordination with other ATPs authorising activities in the same location.

The distribution of responsibility for assessing and authorising tourism activities amongst unconnected operators from different nations poses a considerable challenge, one that is presently not being addressed. It is unreasonable to expect that individual operators can adequately assess their contribution to cumulative impacts, nor is it reasonable to expect individual ATPs to be able to judge the assessments in an overall context, in the absence of a framework for doing so.

A second concern that is not being addressed under the current system is that of risk and consequence. Some impacts have a low likelihood of occurring but very severe consequences if they do, a hydrocarbon spill from a ship accident being an example. The environmental assessment system as presently constituted does not consider these issues in a meaningful way.

The case studies show that the use, under the Protocol, of environmental assessment for managing tourism is unusual. In only one of the cases examined is environmental assessment used on a visit by visit basis, and it is not used as a substitute for management planning, but as an addition to it. Environmental assessment is more commonly applied to tourism as a whole, by the managing authority, as part of the decision making or planning process.

The case studies and management planning theory both show that management planning can be used to address the issue of cumulative impacts. The LAC model incorporates the management of cumulative impacts into the broader system. It is difficult to envisage an effective way to deal with cumulative impact issues using the present tourism management system. It is only where unrestricted use of a resource can occur in the absence of an allocation mechanism that cumulative impacts are a significant issue. Under a management planning system, cumulative impacts are incorporated into an overall management process and can be managed effectively and efficiently.

It can also be questioned whether requiring operators to complete environmental assessments is an efficient or effective way to achieve good environmental outcomes. At present each operator is required to put considerable effort into preparing and submitting environmental assessments. For ship based tourism, conducted according to standard practice, the environmental effects of activities will differ very little from operator to operator, and every additional assessment contributes little to the sum of knowledge about tourism impacts. The process ensures that operators at the very least consider the effects of their activities and act to minimise their impacts, but similar outcomes might be possible simply by prescribing or agreeing on ways of conducting activities. The overall effect of the environmental assessment requirements is to produce a number of unconnected documents each season. No overview assessment is conducted, and no linkage between the various activities is made.

The environmental assessment system is useful in addressing the impacts of novel activities. As the industry changes, activities will diversify, and each new form of activity will be subjected to impact assessment.

However effective the environmental assessment process is at identifying impacts and modifying activities to minimise them, the absence of a system for overall consideration of tourism impacts will remain a problem. In the absence of a framework for managing tourism in an overall sense, and with issues such as cumulative impact, site use levels, and possible future resource allocation needs, the environmental assessment component of the management system is a poor mechanism, capable of achieving limited objectives, but incapable at present of addressing some issues of major concern.

7.4.2.f Binding and non-binding measures

Measures differ in the degree to which they are binding. Some provisions of the Protocol are binding, in that they are passed into domestic legislation, such as the environmental assessment process. The protected area system indirectly gives management provisions binding force through the Protocol (once a management plan is agreed by an ATCM, visits must then occur only in accordance with that plan). Other parts of the Protocol exhort ATPs to take certain actions, or give them the option of taking an action, and these measures have legislative force only in some cases, depending on the party passing enabling legislation. Examples include requiring garbage record books on vessels, or requiring a bond or insurance of operators (see section 4.5). ATS Recommendations, while agreed by ATPs, are somewhat less binding, as ATPs are not required to enact them in legislation (section 1.1.f). Implementation of Recommendations applying to tourism has been incomplete (section 1.1.1). Elements of some tourism Recommendations, particularly Rec. XVIII-1, are advisory only.

Some elements of the management system are self regulatory. Self regulation includes compliance with binding rules (such as not entering protected areas without a permit), as well as compliance with rules or suggestions that have no effective force, such as the safety provisions of Rec. XVIII-1. Self regulation also includes the application of industry derived rules, such as ratios of staff to tourists, limits on numbers carried on ships or numbers landed at a site. While these rules are in many cases the most important or restrictive elements of the management system, they are the least binding, having no formal status within the ATS.

7.4.2.g The protected area system

The protected area system, updated and rationalised by the Protocol, includes among its functions management of tourism, both by default through management of all visits, and specifically, where tourism is listed in Annex V as one use that may require coordination with other uses. Tourism can be excluded from sites declared as protected areas, or can be restricted to entry by permit on certain conditions. The ASMA category is intended to apply management planning to areas to plan and coordinate activities, avoid conflicts, improve cooperation and minimise environmental impacts. ASMAs may include areas where there is a risk of cumulative environmental impacts. While entry to ASMAs does not require a permit, a code of conduct may be applied. At present, there is little use of the protected area system as a tourism management tool, apart from the management of visitors though the management plans for Ross Sea area historic sites. Even in the case of those plans, there are serious unresolved issues relating to the allocation of visit rights if maximum visit numbers were approached (section 4.7).

ASMAs can include zones where different management measures apply, including specification of what activities may occur, but as there is no requirement for a permit to enter an ASMA, there is no way that an ASMA management plan can place limitations on overall numbers of visitors. The other mechanism associated with ASMAs, a code of conduct, may be of value in specific cases where certain activities or behaviour may be required. More general elements of a code, if appropriate for an ASMA would probably also be appropriate for other areas. ASPAs provide for a more prescriptive form of management. Permits are required for entry to an ASPA, and these, in combination with the other actions permitted through an ASPA management plan, provide management with a full suite of management actions except an allocation mechanism.

There are a number of practical problems with using the protected area system for managing tourism within the present context of the Antarctic tourism management system. The relatively small number of areas declared by the ATS to date, and their small sizes, mean that the protection conferred only applies to a small proportion of locations. While the protected area system can be used to confer protection on sites with particular values, it is unlikely that every site with important values can be included. Tourism as an activity is mobile and flexible, and to attempt to use protected areas to manage tourism in more than a few locations would entail declaration of most ice free or otherwise sensitive areas, unless tourism were restricted only to ASMAs (a variation of the ASTI concept). Declaring all tourist sites as ASMAs or ASPAs would appear be an inefficient means of achieving tourism and conservation management aims and objectives, as every protected area would have to be nominated and adopted by an ATCM. Operators planning a season of activity in the Peninsula region for example, would require a permit for entry of each ASPA, and would have to comply with the codes of conduct and management plans (which might all differ) of many different areas. The management plans for the resultant agglomeration of areas would in all likelihood be developed separately rather than within a larger planning context, and the potential for a strategic approach to regional planning would be lost. It would be preferable to apply management planning measures to Antarctica in total or on a regional basis, although the ASPA and ASMA categories may provide a potential mechanism for this.

The protected area system is adequate for managing tourism with respect to particularly sensitive sites or sites that are scientifically important, through simple exclusion or entry only under conditions. In its present form, it is inadequate to manage the more general impacts and issues associated with tourism, unless many new areas were declared within a strategic framework.

7.4.2.h Neglect of wilderness and aesthetic values

While the management system includes references to certain types of values, including wilderness and aesthetic values, no mechanisms are in place for considering or managing them, other than consideration of the effects of individual activities through the environmental assessment system. Tourism (as well as other activities) has the potential to modify such values, however, there is no framework for assessing wilderness or aesthetic conditions. Wilderness and aesthetic values are likely to be the most important values of the Antarctic region when the values of all citizens are considered. These values are also easily diminished, and the net loss caused by any reduction in these values would be considerable. The nature of the environmental assessment process, which is not well suited to considering such values, the lack of formal mechanisms for specifically protecting such values, and the lack of demonstrated commitment to protecting areas on the basis of these values indicates that they are somewhat neglected.

Wilderness and aesthetic values are also important to the visitor experience. Protected area management theory suggests that a management system should recognise the social components of wilderness value and manage to ensure that a wilderness experience remains available. At present, wilderness values and the visitor experience in general are not considered in any detail in the tourism management system, in contrast to some case study management systems.

7.4.2.i Monitoring

Monitoring is discussed in Annex I of the Protocol and in Rec. XVIII-1. Monitoring is to be undertaken at the IEE level of assessment if appropriate, and is expected for activities requiring a CEE. There has been much discussion about the role of monitoring to detect impacts associated with tourism (section 1.1.i). Calls for long term monitoring to detect subtle change and attribute cause for such change have been made for some time. To a large extent monitoring is conflated with baseline research, and research investigating the relationship between visitation and the natural environment. Annex I of the Protocol calls for monitoring for verification of impacts and identification of unforeseen impacts. Experimental research into the relationship between aspects of visitation and environmental impact is also important, as it can contribute to the predictive aspects of tourism planning. Such research would assist in planning strategies and actions to avoid or minimise impacts, and ensure that conditions remain within desired parameters.

Monitoring tourism impacts is difficult. Environmental assessments of tourism activity conclude that, if operated sensitively and in accordance with guidelines, impacts will be minor and transitory, although it is fair to say that there is some uncertainty about whether long term cumulative impacts may be more substantial. Monitoring for minor impacts is problematic. Tourism activity occurs over a wide range of sites, and monitoring programs would need to take into account variations between sites used, or monitor all sites. Attribution of causes would remain difficult, as a range of natural perturbations and fluctuations may be responsible for change in some parameters monitored. Adequately controlled experimental research aimed at attributing cause for any change would be difficult and expensive. Again, the main impacts likely are cumulative in nature, and would occur as a result of more than one season's visits to a site. Such visits are carried out by different operators, over different seasons, and there are practical problems with responsibility for monitoring impacts. It is clear that individual operators will be unable to monitor for the impacts of all tourism activities at a site. It would also seem unlikely that the industry collectively has the capacity to carry out monitoring of the type that would be required to identify long term or cumulative change. In the case studies, responsibility for monitoring, where conducted, lies with the managing authority.

Protected area management theory confirms that monitoring is used in a specific way in most models of management—that is, to determine if conditions are being maintained within set standards, and to identify when management action is necessary. In the absence of any agreement on standards or conditions of an area, monitoring in the Antarctic tourism context will remain limited to verifying predicted impacts and identifying unforeseen impacts. Monitoring only becomes useful as an ongoing management tool when desired conditions are agreed upon, and standards are set, that can then be monitored. At present, monitoring could be carried out, looking at a variety of parameters, and would in all likelihood detect some change (if only very slight) in those parameters. This information would have value as an indication of the relationship between tourism and impact and would be useful in management planning (were it carried out), but is not useful for actual management, unless a broader management planning framework (including decisions about what levels of change are acceptable) is put in place.

At present, there is no ATS coordinated tourism impact monitoring being carried out, and little monitoring is sponsored or conducted by ATPs. Existing projects, including the important Oceanites work (section 1.1.4) are mainly private or university supported, or supported in part by the tourism industry.

Monitoring as envisaged in Annex I, aimed at detecting cumulative impacts, is unlikely to be put in place by the industry or by individual operators, as their individual contribution to impacts is likely to be small. Similarly, the present environmental assessment system treats each season as a new activity, and there is no guarantee that an operator from one season will return the next, making monitoring by any operator unwieldy and unlikely. The tourism management system does not at present include a mechanism for the coordination of monitoring that would be necessary for monitoring to be useful in tourism management. Improved monitoring, while useful, would in a sense be premature in the absence of agreement on what conditions or changes are acceptable.

7.4.2.j Site management and management presence

The case studies include a range of specific site management measures. Notable amongst these are the designation of zones for tourism activity, limits on numbers ashore at certain times, specified ratios of visitors to guides, a management presence on shore, and shore infrastructure for tourism. In the Antarctic case, several of these measures have been applied, while others are absent. Most are applied through self regulation in a less prescriptive way than in the case studies. Guide to visitor ratios, for example, in the southern oceanic island cases, are specified by the managing authority, and operators are expected to comply as a form of self regulation. In the Antarctic situation, the Antarctic tourism management system has not specified a ratio—instead, some operators have imposed one on themselves as a self regulatory measure.

Site management is incorporated in the case studies as part of the management planning process. In the Antarctic case, site management is not part of the system in any way, despite the comparatively high levels of use occurring in some areas. In case study areas, management planning has included zoning for visitation, including specific zoning of cruise tourism use.

There are a range of management strategies and actions available to ensure that desired social and resource conditions are maintained. Within the ATS there have been suggestions of limiting visitor numbers to sites or regions, or of excluding tourism from all except a designated set of sites. The management planning theory and the case studies offer a range of alternative management strategies to ensure environmental conditions are taken into account, while recognising the importance of the tourism experience and the practical needs of tourism operators.

In some case studies, observers or official representatives on shore or on board are used, as part of a broader set of management measures. In the Antarctic tourism management system, observer programs are used by some nations to ensure that operators or tourists are complying with the provisions of the Protocol, and to verify the findings of the environmental assessment process. Observer programs are unilateral rather than ATS-coordinated, and are evidence that some nations regard it as necessary to apply additional oversight of tourism activity. Observer programs are not generally applied to all tourist visits, and as such are not a replacement for self regulation and voluntary compliance. Inspections under Protocol Article 14 or Treaty Article VII (different from national observer programs) are an alternative offering scope for verification of compliance. To date, inspections have been used only infrequently for tourism activities.

7.4.2.k Prevention of pollution

The measures within the tourism management system for the prevention of pollution at sea and on land are relatively structured and prescriptive. Many of the provisions are binding (that is, they have legal force by virtue of their Protocol status or their inclusion in other international agreements) and implementation is likely to be relatively effective as a result. Annex III to the Protocol, relating to waste management, has limited application to tourism at present, as only one operator regularly uses land or ice areas of the continent for more than very short periods of time. The Annex provides measures that would apply to tourism activities such as land based infrastructure and operations should they occur at some point in the future. Annex IV, relating to prevention of marine pollution, applies to many aspects of tourism activity. The clear specification of the procedures and practices of the Annex simplify compliance and implementation. Some aspects are not well specified—for example, the nature of the responsibility of ATPs under Annex IV to conduct contingency planning for marine pollution from tourism shipping is not made clear—but on the whole these provisions appear practical. MARPOL 73/78, with the declaration of the Treaty area as a special area, provides a mechanism for prevention of certain types of marine pollution. The obvious missing component in the area of marine pollution relates to the increased risk to shipping posed by ice navigation. The potential for marine pollution is greatly magnified by the possibility of ice damage to vessels. The need for such a regime is discussed separately (section 7.4.2.n).

7.4.2.l Safety

While the ATS has discussed safety issues relating to tourism, they have not entered the tourism management system in any binding way. The issue of vessel safety is examined in section 7.4.2.n. The safety of tourists during landings is of some concern. Rec. XVIII-1 encourages operators and visitors to behave in a safe manner. Prescribed safety practice, or specific regulation is not included. Small boat operations, which expose operators and tourists to a relatively high risk environment, are not formally regulated, nor are safe practices specified. The ATS has in effect passed responsibility for safety issues to the industry and to individual operators (unless individual ATPs wish to pursue them). The shore practices of operators, which to some extent include safety management, are described in section 2.3. The ATS has no stated goals for managing tourism safety, but acknowledges the dangers of the operating environment in Rec. XVIII-1, and provides some advice on operating safely.

Safety issues play a role in the tourism management systems of the case studies. For some southern oceanic islands, safety issues have had a major influence in the character of the system, and in the cases of Marion Island and of Gough Island safety concerns have led managing authorities to recommend against tourism. Other case studies regard safety issues as the responsibility of the operator, including in areas that are extremely remote.

7.4.2.m Self-sufficiency and contingency planning

The ATS has on many occasions expressed the need for tourism activities to be able to operate independently of assistance from government programs or other users of Antarctica. Self sufficiency involves the general planning and equipping of an activity to ensure that it can proceed to completion without requiring outside assistance. It may also imply a degree of redundancy or backup for unforseen circumstances, such as equipment breakdown. Importantly, there is no binding requirement in the ATS for ATPs to ensure that tourism activities are self sufficient. While the environmental assessment system provides an opportunity for authorities to be involved in ensuring an activity is planned to avoid environmental impact, no similar mechanism is in place to ensure activities are safe and self sufficient.

No formal mechanism is in place to assess whether a tourist operation is likely to require basic assistance to complete an activity. Informal mechanisms may be in place in different nations to assess the planned activity and ensure that planning of the activity has been adequate. No mechanism is in place to assess or ensure that tourism operations have either adequate redundancy of systems or appropriate backup support, although as part of self regulation the industry has developed a capacity for response and rescue that appears to be adequate. Liability concerns may also be a major influence on prompting operators to develop appropriate contingency planning for emergencies, including medical emergencies.

A person could, at present, propose an activity with a high likelihood of requiring government operator assistance. If that activity did not pose environmental risks, the ATS components of the tourism management system do not provide a means for preventing the activity—any such intervention would be the initiative of the appropriate authorising party. ATPs will deal with these issues as they see fit, but an ATS endorsed response is not available.

The degree to which tourism operations are self sufficient is difficult to judge in the absence of standards or inspections. In cases of major emergency involving threat to a vessel, it is unrealistic to expect full self sufficiency within the context of a single operation or expedition, but effective self sufficiency may be achievable within the industry, obviating the need for intervention by national operators.

While self sufficiency is repeatedly stated as an aim or requirement of the tourism management system, no mechanism for assessing or enforcing it is provided, and the adequacy of the system to meet this aim is therefore questionable.

7.4.2.n Lack of an ice navigation regime
The ATS has stressed the need to use appropriate ice strengthened vessels when operating in the Treaty area. Rec. XVIII-1 states that operators should arrange to use equipment, vehicles, vessels and aircraft appropriate for Antarctic conditions, and that they should be operated safely and according to appropriate procedures. The issue of vessel adequacy has been raised on a number of occasions. In general, operators appear to have consistently used vessels appropriate to their area of operations, and operated conservatively, and the author is aware of no serious incidents relating to ice damage or entrapment of tourist vessels to date. The absence of an ice navigation regime is, however, of concern. Environmental risks and human safety issues are significant in ice covered waters. At present, the management system includes only a mild statement requiring operators to use appropriate vessels and operate them safely. There are no standards, and no binding requirements to use appropriately trained personnel or to follow approved operating procedures. If an operator proposed to take an unsuitable vessel into an inappropriate area, the only formal ATS mechanism for preventing this is the environmental assessment system, which is not structured to assess levels of environmental risk associated with ice operations of vessels.

The case study of cruise tourism in the Canadian Arctic reviews an ice navigation regime applied to cruise tourism activity. The regime restricts ship activity in some ways but is designed to ensure safety and avoid environmental damage. This contrasts markedly with the Antarctic situation, where, while the ATS recognises the dangers of ice navigation and the need to operate appropriately, the tourism management system includes only weak advice on self regulatory measures.

7.4.2.o Conservation of flora and fauna
Annex II of the Protocol bans harmful interference with animals or plants, and the introduction of non-native species (appendix one). Modification of habitat is also banned. Practices that disturb concentrations of birds or seals using aircraft, boats, vehicles, or on foot are banned. Causing significant damage to terrestrial plants, on foot or using vehicles, is banned. The Annex does not, however, specify in any detail what constitutes disturbance, and makes no reference to practices that should be avoided, beyond doing anything in a 'manner that disturbs concentrations of birds and seals'.

It is clear that disturbance related impacts are possible as a result of tourism use. The provisions relating to disturbance of wildlife and flora include Protocol Annex II, and advice in Rec. XVIII-1. The environmental assessment system also provides a mechanism for prediction of disturbance impacts and inclusion of mitigation and minimisation measures. The lack of clear guidance on what constitutes disturbance in the visitation context is a problem. Previous versions of guidelines described distances to be maintained from animals (section 4.9.2). Rec. XVIII-1 does not include any such advice. Similarly, the guidance requests visitors not to walk or drive on extensive moss beds or lichen covered scree slopes, but provides no advice on recognising where plants may be present, nor advice on avoiding less extensive areas of plant life. Section 4.9.2 shows that there is a confused array of guidelines for shore behaviour, although it appears that Rec. XVIII-1 has now been adopted as the official and definitive version by operators. The lack of practical aspects to the guidance document in terms of approach distances or similar advice is a limitation on the ability of the instrument to prevent disturbance.

Management planning theory offers a mechanism for systematic examination of the likelihood of wildlife disturbance, and for developing management actions and prescriptions to minimise or mitigate disturbance. Such measures may include restricted areas or zones, or prescription of operational practices. The case studies include a wide range of approaches to the management of wildlife disturbance issues. In many cases codes of conduct include provisions aimed at avoiding wildlife disturbance, including specified viewing approach distances. Some managing authorities have installed shore infrastructure to allow particularly sensitive species to be viewed safely. In other locations, more stringent zoning and supervisory arrangements are used. In the case of Glacier Bay, a detailed environmental assessment examined the likelihood of vessel traffic disturbing whales and other species, and an important part of the management system (the vessel management plan) is designed to ensure such impacts do not occur.

7.4.2.p Level of impact
In a conventional management planning context, the managing authority decides on appropriate conditions, and activities are managed to ensure that those conditions are maintained. The ATS system is very different, in that it involves proposing an activity and assessing it, with little guidance on the desired state of the receiving environment. While the Protocol aims to limit the adverse impacts of activities on the environment, it does not specify the present state of the environment or the conditions that are desired. In the case studies, management makes decisions about the level of impact or appropriateness of different activities or infrastructure at the outset. In the Antarctic, the responsibility rests on the authorising party to decide whether the activity and level of impact is appropriate.

The power of the ATS to prevent activities from going ahead is limited. Protocol Annex I, Article 4, provides substantial leeway for countries to use an 'other considerations' clause to authorise an activity, even where impacts are likely to be more than minor or transitory. Decisions are to be based on the findings of a CEE, and other relevant considerations. As noted by Blay (1992), Article 4 of the Annex indicates that CEEs must be discussed at an ATCM before activities can be approved, but does not suggest that an ATCM can veto an activity. In cases where an activity is approved by a party in possible contravention of the Protocol, the only recourse other ATPs have is through the dispute settlement mechanism. Some ATPs have relinquished their right to authorise an activity if the CEP or an ATCM has provided unfavourable advice on a CEE, in effect giving the ATS veto power over any CEE level activity under their jurisdiction (section 4.5).

The environmental assessment provisions and mechanisms of the Protocol and Annex I are ultimately an advisory rather than an approvals mechanism. They should serve, if implemented as intended, to ensure that environmental effects are assessed, predicted, and taken into account in decision making. They do not, however, provide a clear mechanism for the ATS to prevent any activity going ahead if it is deemed appropriate by the responsible party.

A strong argument can be mounted that more than minor or transitory levels of impact are justified for certain scientific research, but not for tourism activity. It is almost certain that conservation NGOs would oppose such activity in the name of tourism. Ideally, the party responsible for assessing such an activity would determine that the benefits did not justify the impacts, but this is not certain. The logical end point of the present ATS stance on the equality of tourism and other activities is that, if a party felt the benefits of tourism were sufficient, tourism activity requiring a CEE level assessment (that is, having a more than minor or transitory impact) is acceptable. There is a lack of clear guidance on how ATPs should decide if the benefits of an activity justify the level of impact, and it is with tourism that such questions are likely to be most difficult. This has the potential in the future to cause dissent within the ATS, with conservation NGOs, and the public.

7.5 CONCLUSIONS

Protected area management planning theory was used to identify best practice management planning. In brief, this would involve: a logical planning process, with a clear rationale for decision making; goals, aims and objectives for management and for the desired outcomes; the careful consideration of alternative methods of achieving objectives; and the definition of desired conditions for the resource area, with management targeted at meeting those conditions. Wilderness management issues would be considered, and the value and scarcity of wilderness would be recognised. Management intervention would be restrained to the minimum necessary to achieve objectives, and monitoring would be aimed at assessing the success of management. Visitor activity would be managed in accordance with opportunity settings. The limits of simple carrying capacity would be recognised, and a process of identifying desired conditions, and managing to maintain these conditions would be adopted.

The coverage and the adequacy of the Antarctic tourism management system were assessed against these benchmarks. While the issue of parties outside the ATS is of continuing concern, it is concluded that the coverage offered by the implementing legislation of different nations is as close to adequate as can be hoped for. In particular, the fact that most tourists are citizens of an ATS nation means that coverage may be provided through the indirect method of control over tourists, even if operators are not subject to the jurisdiction of an ATS nation. Within the ATS, not all ATPs have Protocol enabling legislation in place, demonstrating the difficulties of achieving full coverage. The elements of the system provided by other international agreements have a wider coverage than the ATS instruments. Self regulatory measures vary in their coverage, with a difference between self regulatory functions expected by an authorising government, and those imposed collectively by the industry. As not all operators are members of the industry body, some self regulatory provisions are not universal (although some may be voluntarily adopted even where operators are not members).

The research concluded that the system is not adequate in all respects. A number of fundamental features identified in the management planning theory and in the case studies are lacking, insufficient, or inappropriate in the Antarctic tourism management system. There is a lack of a strategic management approach, an unclear distribution of regulatory responsibility, and a lack of management mechanisms and institutions. Some elements of the system, while effective in themselves, are incapable of achieving broader objectives that they are presently being expected to satisfy—the environmental assessment system is the main example. Elements of the management system differ in the extent to which they are binding, and some important management strategies have no formal status within the management system. It is arguable that some elements should have more force. The protected area system offers potential as a tourism management tool, but in its present form, and without a strategic foundation, is unable to address important broader scale issues. The management system neglects certain important Antarctic values which arguably should be given more weight. Monitoring strategies are not well directed, and are able to contribute little in the absence of a management framework or definition of desired resource conditions. There is an absence of site management, considered important in the case studies. Safety issues, self sufficiency of operations, and contingency planning are regulated via a non binding Recommendation. There is no ice navigation regime in place, despite the potential for dangerous conditions and the clear need to prevent inadequate vessels from entering certain areas. Guidance documents and codes of conduct, rationalised in Rec. XVIII-1, do not provide sufficiently practical advice on avoiding disturbance of flora and fauna. The management system allows any activity including, for example, a land based tourism development, to be authorised, even if impacts are predicted to be more than minor or transitory.

Tourism is not managed within the context of a broader conservation management system or framework as would be recommended by theory or the case study analyses—indeed, the lack of a broader management system with clear goals has contributed to the state of the present tourism management system.

In the Antarctic tourism management system, environmental impact assessment is used as the main tool for managing the effects of tourism activity. Environmental assessment is an unusual, and, it is argued here, unsuitable tool for managing tourism in this way. Environmental assessment requirements in their present form impose costs without providing significant additional benefits—each new assessment does not contribute a great deal to the sum of knowledge of tourism effects on the environment. The system also relies heavily on self regulation, but does not specify the parameters within which self regulation should work. There is an unclear allocation of regulatory roles, resulting in uncertainty as to who should respond to different management issues.

This research concludes that the present management system is not able to achieve its implied goals. Antarctic tourism management contrasts sharply with protected area management theory, and with the management systems in place in the case studies. The long term effects of failing to address the weaknesses of the system may include reduced value of the tourism experience, gradual and unplanned change in the resource conditions of visited sites, potential for increased conflict between user groups, and potential for loss of life or disruption to operations of others as a result of safety related incidents or need for support. They may also include an inability to deal with new developments or proposals in tourism in a timely or effective way, diversification of tourism experiences and a consequent need for ad hoc responses, risk of alienation of stakeholders and the general public if land based tourism development is authorised by a Treaty party, and unnecessary risk of severe impacts related to improper ice navigation.

Overall, the Antarctic tourism management system can be characterised as a set of management strategies and actions, developed in an unsystematic way, without the benefit of an overall planning framework. Linkages from these strategies and actions to objectives, aims and goals are unclear or non-existent. The different provisions of the management system are not logically planned. Fundamental goals for the management of the area are not explicated, meaning that there is no basis for development of an effective management system. The elements of the management system that are in place have been introduced as ad hoc responses to concerns, and address only some of the identifiable management issues.

Chapter 8: Conclusions and recommendations

This chapter discusses the management system for Antarctic tourism and possible alternatives, and makes recommendations, based on the research carried out and case study findings from southern oceanic islands and northern polar locations. Factors influencing and constraining the management system for Antarctic tourism are discussed. The need for change to the management system is established. Options for the management of Antarctic tourism are examined, referring to alternative management systems and provisions identified in the review of literature, and drawing on the findings and conclusions of this research. Management alternatives proposed in the past are discussed with reference to the findings of this research. The final section of the chapter makes recommendations, suggesting a process for development of a more comprehensive management system, and discussing means of implementing such a system.

The objectives of the research were stated in section i.4.1. The first objective, aiming to complete a comprehensive analysis of Antarctic tourism, was satisfied through chapters two and three, with section 3.9 summarising the results. The second objective involved an analysis of the tourism management system. Chapter four described and analysed the tourism management system, and section 4.11 summarised the findings. The third objective was to clarify the values surrounding Antarctic tourism, and this was completed in section 1.2. The fourth objective involved analysing tourism management in case study areas with similar characteristics to those pertaining in the Antarctic. This is described in chapter five (southern oceanic islands) and chapter six (northern polar locations), with findings summarised in section 5.10 and 6.10. The fifth objective was to examine tourism theory and relate it to Antarctic tourism. Antarctic tourism was accordingly examined with reference to models of destination development, and concepts of ecotourism in section 3.6. The sixth objective involved examining management planning theory, to identify concepts and elements applicable to Antarctic tourism management. Section 7.2.4 summarised the findings of this component of the research. The research also aimed to identify ATS goals, aims and objectives for tourism management. This is described in section 7.1. Section 7.4 analysed the coverage and adequacy of the management system and provided a critical assessment of the management system, satisfying the eighth objective. The final objective was to examine tourism management alternatives and propose future options, and is addressed in sections 8.2 and 8.3.

The introduction to the thesis also posed three central propositions to guide the research, help develop the research objectives, and underlie the discussion of the tourism management system. The first proposition, asserting the deficiency of the tourism management system was addressed in chapter seven, and summarised in section 7.5. It is concluded that the Antarctic tourism management system exhibits a range of key weaknesses. The second proposition asserted that Antarctic tourism management issues are not unique, and that methods developed in other places for coping with these problems can be applied to Antarctic tourism management. The case analyses established that management systems and mechanisms for coping with the problems posed by expedition cruising in remote locations have been developed and implemented, and section 8.3 argues that they are suitable for application in the Antarctic. The third proposition, that the present form of the management system is not the only form that could exist, is discussed in section 8.3. The constraints that resulted in the present management system do not pose insurmountable obstacles to the implementation of different forms of management. In particular, the lack of clear sovereignty, while a constraint, is not an obstacle to more comprehensive management.

8.1 GENERAL DISCUSSION

Antarctic tourism is an important industry. The magnitude of values derived from tourism use of the region by participants is partly indicated by the market value of the industry. The fact that experiences are available only to those who have relatively large amounts of money does not invalidate Antarctic tourism experiences, rather, it serves to indicate how highly valued such experiences are. The secondary benefits that flow from the experiences of participants are unmeasured and unquantified, but are likely to include: advocacy for Antarctic conservation and science; contribution to the vicarious use values of others; generation of indirect use values through records of visits; education of others; a greater awareness of Antarctic issues among the general public; and inspiration of others. More direct benefits include contributions to the development of environmentally improved modes of operation, support for science, increased general and specific knowledge of the region, and the safety and environmental benefits of having more operations in the region to provide emergency response. For these reasons, and recognising that there is a basic right to experience places and nature as long as that experience does not reduce the values of a place, tourism is without doubt a valid use of the Antarctic region.

Herr states that 'pursuit of the ideal of a stateless society in which to demonstrate the cooperative rather than the competitive in human nature has probably never enjoyed such a grand laboratory or been perceived so widely to have succeeded as in Antarctica' (1996a, p. 91). One concern with tourism activity is the multiplicity of nationalities involved in any one tourism operation, but this also reinforces that tourism is a use of Antarctica that is truly international. Such concerns are rooted in the issues of sovereignty and jurisdiction, both concepts intensely national. Tourism is one of the few Antarctic activities to transcend the legalistic quagmire associated with lack of sovereignty in a meaningful and practical way. In a sense, tourism activities achieve the ideal, fundamental to the ATS, of peaceful use of the continent by all nations. This cooperation extends to the interaction between companies in commendable efforts to share information on environmental and safety practices and participate in management, despite their relationship as commercial competitors.

Tourism activity has a long history. It preceded the Treaty, and has occurred annually since 1966. Tourism was not acknowledged (in a regulatory sense) by the ATS until a decade after the Treaty was signed. For a large portion of its existence, Antarctic tourism has operated in a regulation-free environment. The development of environmentally sensitive tourism has largely been driven by individual operators and the industry.

Tourism has generally been practiced in a prudent and environmentally sensitive manner, including in the past when no regulatory mechanisms were in place. Present operational models offer valuable, high quality tourism experiences, with minimal environmental impact. No permanent infrastructure is required for present forms of tourism. Evidence suggests that the environmental effects of tourism have been minimal, and operators have demonstrated that activities can be conducted and managed in ways that cause very little impact. Ship based expedition cruising offers visitors an intimate natural experience, and an opportunity to see and feel the Antarctic environment, without degrading that environment. Present air based tourism operations currently provide a best-practice example of minimal impact inland operations, including removal of most wastes, and using light, low energy consumption, non-permanent field camps, an advance on the practices of some national operators.

Overall, impacts of tourism in Antarctica are minimal. Some unavoidable impacts exist, such as engine emissions, noise, and impacts on wilderness and aesthetic values as a result of transitory presence. Impacts on biotic components of the environment are of concern to many commentators, and include potential impacts on vegetation or wildlife. To date no obvious impacts have been recorded, but potential subtle, longer term (and concerning) impacts are a possibility. Impacts with a low likelihood of occurring, but severe consequences are also possible. Management of these types of impact is challenging.

Monitoring and further research on impacts of tourism are proposed by many, and are certainly important, but it is clear from this research that they are not solutions in themselves. Monitoring may well detect some impacts—indeed, it would be surprising if impacts were not detectable at some level. At present, there is an absence of any framework for decisions about what levels of impact, on which values, are acceptable for tourism activity, making monitoring less relevant and less focussed on key issues.

At present, self regulation plays an important role in the system in two ways. First, compliance with most management provisions is self regulated. There is little capacity for supervision of activities in the field, and consequently there is almost total reliance on operators to comply with mandatory and voluntary elements of the system. Second, the members of the industry have played a crucial role in actually developing management provisions and operational protocols, and voluntarily complying with them. These constitute some of the most stringent protective mechanisms in the system. The industry has consistently taken the lead on development of measures for environmental protection, has considerable expertise for such a role, and has demonstrated a clear commitment to ensuring environmental protection.

The industry has in the past been dominated by expedition cruising activity, with small vessels (by cruise industry standards), and an active focus on natural history, science, and education. This research suggests that the destination is maturing, and that changes in the types of tourism experiences of interest to visitors are likely. In the absence of management intervention, such changes are likely to proceed as part of normal destination and market development processes.

Such changes will pose management questions that at present have no clear answer. Developments may include increased use of large vessels, a more diverse range of tourism experiences overall, including more adventurous and active programs with less focus on educative tourism, and potential changes in operational modes, including land based infrastructure and large scale airborne tourism. Such changes clearly have management implications. At present, the management system is not well placed to respond to any of these issues.

Conservation organisations, and to a large extent the global public, see the environmental risks of tourism as an important issue. Levels of awareness of tourism issues remain low in the general public, but concern is often expressed about potential tourism impacts. This highlights the existence and importance of Antarctic non-use values held by members of the general public, but also demonstrates the negative perceptions people may have of tourism in the context of Antarctica. Such concern is valid (although not necessarily justified), and will play an important role in public influence on ATS management of tourism.

The Antarctic tourism management system has evolved in response to issues raised by tourism activity. The history of the system shows that, until the late 1980s, the possibility of a strategic or planned approach to tourism management was not seriously addressed. Despite substantial support for comprehensive review, consensus was not reached, and a middle road was taken that involved clarifying previous ad hoc management provisions, while retaining the main features of the system. The argument that tourism should be treated in exactly the same way as any other Antarctic activity in all binding regulatory respects prevailed. The ATS has continued in a responsive mode, rather than adopting a pro-active approach.

Precedents have been established for certain activities and developments. Large vessels have been used in the past, and activity of this type has returned. An airborne tourism operation with a land based facility has operated for some time. More adventurous activities, previously the domain of private expeditions, are now being offered commercially. In terms of future management options, it would be difficult to argue that an activity should not proceed if a similar activity has been going on for some time. Precedents will continue to be set, and they may act to constrain the management options available.

The present system has a number of significant weaknesses, outlined in section 7.4. It fails to take a strategic approach, exposing the Antarctic tourism resource to the potential for gradual changes, including an increase in the number of sites being used, fewer sites remaining unvisited, increases in use levels at sites, changes in the types of activity being conducted, and changes in the visitor experience. The management system fails to provide an adequate response to more radical changes, such as proposals for land based tourism infrastructure. The Protocol currently provides no direction or guidance on what forms of tourism should occur, and on what is acceptable—a tourism 'station' is well within the realms of possibility at present. This is not to say that all such changes are necessarily inappropriate, but consideration should be given to the overall goals of the management system, and changes considered in light of such goals.

Based on the evidence of the case studies, it is arguable that, if a sovereign state were managing Antarctica for the same basic principles as apply now (science, peace and conservation) it would do so using a protected area designation and management planning mechanisms. Relatively small numbers of visitors would be permitted to visit sites. The evidence of the cases suggests that 'best practice' cruise tourism management for isolated, unpopulated high conservation value sites involves a conservative approach. This should be tempered with the knowledge that demand for tourism experiences in most of the case areas is quite low, and that management authorities have been able to adopt management regimes that satisfy demand, rather than regimes that must cap levels of access below the level of demand. In addition, the case areas are generally much smaller than the Antarctic region (or even the Peninsula region) and management options vary accordingly.

The general desires of different stakeholders also need to be considered. Very broadly speaking, ATPs are primarily interested in protection of the Antarctic environment and other Antarctic values, safety of people, and avoidance of disruption to national programs and scientific resources. Tourism operators are likely to desire the same, and a number of other things including: the protection of the Antarctic tourism resource, including the environment; recognition of the legitimacy of tourism activities and of access to the resource; the maintenance of wilderness and aesthetic values, including protection of these values from impacts of national program activities; a regulatory environment that permits economically viable operations, with minimal bureaucratic requirements and sufficient certainty to allow longer term planning; and protection of the reputation of the industry. They are also likely to desire a regulatory environment that permits the level of flexibility required to operate effectively; regulatory measures that are fair, well planned, logical, and effective; safe and valuable experiences for their clients; a system that permits a range of opportunities to be offered; constructive cooperation with national operators; and the opportunity to contribute their expertise to management developments. Members of the public are likely to desire protection of the Antarctic environment, the right to visit and experience Antarctica, the right to participate in a range of activities in Antarctica, and participation in decision making processes. Conservation organisations desire the protection of Antarctic values, primarily environmental values.

There is evidence that some variability in application of management provisions has arisen as a result of different Protocol implementing legislation. If it is accepted that the management of Antarctic tourism, as an activity that occurs in an area of global significance governed in a non-sovereign way by many nations, is an international or global responsibility, it must also be accepted that management of tourism should be uniform, rather than fragmented along national lines. In practical tourism management terms, these issues demonstrate the complexity of managing Antarctic tourism where many different nations have jurisdiction over the same or similar activities.

The management challenge for stakeholders in Antarctic tourism could be greater. The present situation involves relatively small numbers of tourists, participating in forms of tourism that require no permanent infrastructure and have very little impact, and that do not conflict with the activities of other users to any great degree. Tourists and operators are committed to environmental protection, to the point of cooperating with competitors and developing significant self regulatory measures. Little pressure has been applied to the present management system to allow permanent or major development, with the difficult operating environment and high cost of entry into the industry, or of establishing facilities, providing some protection. Rogue operators, taking advantage of the incomplete coverage of ATS mechanisms, have not emerged (to the knowledge of this author). It is arguable though, that the present system is not well placed to respond to any challenges that may present themselves in the future. This research indicates that such challenges will become more pressing as time passes. The stakeholders, primarily the ATS, need to consider whether it is advisable to consider such issues in advance, to avoid the need for a rearguard action. The ATS has considered more comprehensive management systems in the past, although the models suggested have been less than adequate. It seems clear that some ATPs, and certainly some conservation NGOs, would prefer the ATS to reconsider a more comprehensive regime.

8.1.1 FACTORS INFLUENCING AND CONSTRAINING TOURISM MANAGEMENT

It is instructive to briefly consider the factors influencing and constraining the tourism management system, as these factors may act to constrain future management options.

The present management system has developed through evolution rather than design. A number of precedents have been set that would be difficult to change. The review of the ad hoc Recommendations of previous decades, conducted from 1991 to 1994 did not result in the planned system that some were hoping for. Rather, the review represented a minimalist attempt to clarify and codify the elements of the system.

The system is based on provisions developed primarily for the types of activities undertaken by national operators in conducting and supporting science. Science is the means by which nations earn the right to participate in ATS decision making, and most nations have opted to establish a station to conduct science and obtain this influence—in a sense, buying influence with impact. Tourism is managed under a system designed for this type of activity. Tourism is entitled to undertake any activity that complies with the provisions of the Protocol. In a sense this is a lowest common denominator approach, as the needs of science have defined the system, and the needs of science (at least historically) have involved higher levels of impact than tourism. While some impacts may be justified for science, they may not be justified for tourism activity. It is clear that there would be disquiet if a tourism operation involving more than minor or transitory impacts were proposed—this reality should be recognised and addressed before such a situation presents itself.

The pre-eminence of science continues to affect tourism management. Operations under the jurisdiction of Canada are an important component of Antarctic tourism. As Canada does not conduct substantial Antarctic science, it is not a consultative party. Canada, while clearly having an interest in Antarctic governance as a result of its tourism responsibilities, is effectively excluded from full membership of the Treaty system.

The lack of clear sovereignty is commonly cited as a barrier to a more comprehensive tourism management system. This has, however, not been an impediment to requirements for environmental assessments, nor has it prevented the on-ground management provisions of the protected area system. Similarly, allocation of resources in the non-sovereign environment is not without precedent (CCAMLR includes mechanisms for this). A comprehensive tourism management should pose no significant new sovereignty related problems.

Responsibility for tourism management issues has never been vested with any ATS institution, and has remained in the generalist realm of the ATCMs, where planning has been supplanted by a process of international diplomacy. A related problem is the lack of ATS expertise in environmental and protected area management, and tourism management in particular.

Consensus has been an issue in a number of key tourism management episodes. ASTIs were adopted through Rec. VIII-9, but consensus on actually designating areas was not possible. Similarly, in the early 1990s two paths were available to the ATS—more comprehensive rules for tourism, or a no-change approach, and Rec. XVIII-1 represents the compromise necessary to gain consensus. The management system will continue to be shaped by the need for compromise. Any management options must therefore be palatable to all ATCPs, which almost certainly rules out radical approaches.

The interaction between the ATS and the tourism industry has also been important. The ATS has tabled or passed tourism management initiatives, most notably the concept of ASTIs and the draft tourism annex to the Protocol (section 4.1). While one failed and one was presented as a draft for debate these episodes represent a failing of the ATS to adequately consider issues, and a lack of consideration of the implications of decisions for the tourism industry, with no clearly conceived, rational management approach. The resistance of the ATS to tourism industry participation and consultation on issues affecting them (section 3.7) may also have contributed to concern in the industry about the ATS approach to tourism management.

The history of environmental protection in the Antarctic has also influenced the tourism management system. The majority of the tourism management measures in the present system developed before the designation, through the Protocol, of Antarctica as a natural reserve. The minimalist protected area system of small areas aimed at protecting very specific values has mitigated against the use of a management planning approach.

8.1.2 A NEED FOR CHANGE

The weaknesses in the present management system indicate a need for some changes. Section 1.1.1 examined problems with the system identified by other authors, including regime-scale issues relating to the overall management system, and more specific problems. Section 1.1.2 discussed the debate over the need for change as seen by other authors. Most of these issues are still of concern despite the entry into force of the Protocol, and all still constitute reasons for change. In addition, a number of ATPs supported more comprehensive regulation of tourism during the pivotal period of 1989 to 1994 (section 4.1). While these parties ultimately agreed to a middle option, rejecting the draft Protocol annex on tourism and supporting a review of provisions, it is likely that not all of their concerns have been alleviated. The arguments for the draft annex are outlined in section 4.1.5, and, with the exception of the consolidation of existing Recommendations (which was achieved through Rec. XVIII-1) still apply. In addition, issues and concerns have been expressed within the ATS that have not been addressed by the steps taken in 1991 (the Protocol) and 1994 (Rec. XVIII-1).

The working paper proposing the draft tourism annex (appendix two) argued that the tourism provisions of the Protocol are too general and imprecise, with the potential for inconsistencies in implementation. This research has shown this to be the case. The paper also argued that provisions for tourism should have more legal force than is provided by a Recommendation. While some protective measures are provided by the Protocol, this argument remains valid for those aspects of management covered by Rec. XVIII-1. Rec. XVIII-1 does address some of the practical issues raised as arguments in support of the draft tourism annex.

The weaknesses in the tourism management system limit its ability to address present management issues. The system is also in a poor state of readiness to deal with likely developments in the industry. Plausible scenarios can be envisaged that involve land based tourism proposals, large scale airborne tourism, increased use of larger vessels, and continued increases in site pressures through growth in visitation. The management system is not well placed to respond to these scenarios in a way that will satisfy stakeholders and the global public.

The problem is more than one of imperfect implementation. It is clear that, even if all provisions of the tourism management system were fully implemented, the system would still have serious inadequacies. The inability of the system to deal with cumulative impacts and low likelihood but severe impacts, and the potential for tourism activities with more than a minor or transitory impact, are examples.

The ATS has the capacity to act pro-actively, as proven through the adoption of the Seals Convention, the CCAMLR regime, and even CRAMRA, all of which were agreed in advance of major exploitation taking place. The treatment of tourism in the same way as science and government operations recognises the fact that tourism is, in practice and impact, more akin to national programs than any other activity (such as resource consumptive uses). The fact remains, however, that tourism activity poses unique management problems. It should be stressed that many issues and concerns identified for tourism also apply to science activity—for example, there is no system in place for consideration of cumulative impacts of science activities. While this is of concern, it is not a reason to argue against improved regulation for tourism.

8.2 Evaluation of Proposed Management Options

Most of the suggestions for management in the literature reviewed involve specific management strategies or actions—that is, they are designed to serve a specific end. Many are based on identified concerns, or on the basis that they are used in other locations. While such actions are likely to be suitable for achieving certain objectives, it is critical to ensure that any actions have a place in a well thought out strategic plan, directed at satisfying identifiable and measurable objectives, aims and goals. The full range of strategies and actions need to be considered for each management objective, to ensure that the most effective and appropriate way to address that objective is chosen. There is a danger that the ATS will continue to implement actions or strategies to address specific concerns, without properly integrating them with other actions. While ad hoc introductions of elements of a management system may resolve some pressing issue for a time, they may be counterproductive in the longer term. Given that need, options and suggestions for tourism management proposed in the past are evaluated here.

Restriction of tourism to certain sites, and prevention of unrestrained new site access has been advocated. The case studies show that such measures are not uncommon in managing cruise tourism in other locations. This issue is contentious. Operators would not wish to have access to popular sites restricted, or to be limited to such a small number or range of locations that a viable experience cannot be offered. Access to many sites provides operational flexibility if a preferred site is inaccessible, and some of these alternative sites may be previously unvisited. On the other hand, there are risks, however low, of irreversible impact to previously unvisited sites. Visits to sites where basic site information has not been collected may be a concern, although the majority of sites presently used are in this situation.

Limiting the number of visitors to a site over a time period is another possible management strategy, and is used in several of the case study areas examined. The limitations of carrying capacity concepts, and the range of other management actions available to achieve the same objective, would need to be considered before this strategy were adopted. A mechanism for equitable allocation of visits to a site would be required, which would be a major challenge, although ATS experience with resource rights allocation through CCAMLR provides some precedent.

Some have discussed the development of 'park areas', with information and research centres, recreational facilities, and camp areas. Overall, these proposals do not accord well with the wilderness status of most of the areas used for Antarctic tourism. There is clearly some demand for camping experiences, and operators are providing them (section 3.5), but a wide range of locations are suitable for sleeping ashore as part of a ship based visit. No convincing argument for designating a set camping area with facilities has been made, and the wilderness camping experience would certainly be lessened if such a facility were present. As a camping experience can be obtained at present with almost zero additional impact over a normal landing, it would seem unnecessary to limit such activity to a few sites. A complex of recreational facilities, camp accommodation, and visitor and research centres would be, in essence, a land based tourism facility, which would be undesirable if such experiences can be offered with less impact. The potential for land-based tourism development needs to be considered by the ATS, as at present the management system is not well placed to deal adequately with such proposals.

Open and closed seasons have been proposed by some. Again, these represent a management action that would need to be directed toward a management objective, and used in the context of an overall plan. A potential application could involve closure of certain locations during critical periods of the breeding cycle of animals present, if a management need were identified.

The possibility of applying the carrying capacity concept has regularly been discussed, usually in the form of a simple numerical limit on tourist visits to prevent unspecified 'damage'. As noted in section 7.2.3, carrying capacity in its simplistic form is not overly useful as a management tool. Models have since been developed (section 7.2) that better handle the complexity of visitor impacts, and recognise the need to define acceptable change.

The literature review noted calls for more comprehensive guidelines. As noted in section 4.9.2, the present guidelines have weaknesses, and could be improved. As with any management actions, a revision would be most effective as part of a broader process, identifying goals, aims, and objectives, and making clear what objectives the guidelines are designed to achieve.

Controls over educational and interpretive material have been suggested, as applied in one of the case studies examined (Glacier Bay). There may be some advantage to standardisation and vetting of interpretive material to ensure that accurate information is always presented, but considerable effort would be required. The present industry practices of employing people with Antarctic experience and credibility, and providing lectures and shore interpretation, results in a more valuable interpretive experience than a centralised, authorised (and possibly sanitised) package could achieve. Standardised interpretive packages may be more applicable for operations outside the expedition cruising model, where lectures and naturalist guiding may be less important or completely absent.

Standards for staff certification, training, and education are possible management strategies. These are well suited to self regulatory application. Such schemes could ensure that staff are aware of legal obligations, safety issues, and their role in minimising impacts. Operators are presently responsible for such training. An approved, centralised curriculum or training scheme could be of value in ensuring high standards across the industry.

Some authors have suggested tourism be restricted to ship based modes. Other forms of tourism already exist (chapter two) and it would be difficult to require present non-ship operations to cease. It is clear that ship based tourism offers an environmentally sensitive opportunity for tourists to visit, but other forms of visitation should not necessarily be assumed to have greater impact—the operations of ANI, for example, appear to have low levels of impact. The installation of permanent infrastructure for tourism, however, could have considerable impact, and calls to restrict tourism only to ships may be directed more at this possibility than at other travel modes.

The literature review (section 1.1) noted calls for a better system of enforcement and monitoring of operations, usually in conjunction with more stringent management provisions, and including use of ATS observer systems. A number of the management systems examined in the case studies used on-site management personnel, and others used ship based observer programs. Issues of jurisdiction and the lack of a managing authority would need resolution for broader application in the Antarctic context. Any shore based enforcement officer would require authority from all ATPs to do anything more than observe and inspect operations, other than those authorised in their own jurisdiction. Supervision by shore based management personnel would be impractical in almost all locations. Ship based observer systems—possibly an ATS authorised or organised program—might be more practicable, but the large number of voyages would make placing an observer on each voyage costly for ATPs and operators. Regular observation at longer intervals might be useful. Overall, though, in the absence of significant financial or human resource contributions by ATPs, enforcement will remain largely self regulatory.

There have been suggestions of operator accreditation, registration or licensing as part of an enhanced administrative system. These would seem to have some potential in ensuring operators are aware of, and capable of complying with, any standards that may be set. Such systems do not address management objectives in themselves, but are a means of administering other measures, and may be particularly useful in administering a system of resource allocation. A number of the case studies use such systems.

The levying of fees is proposed by some authors. In some case study management systems, fees are levied for management purposes or resource rental. Philosophically, a resource rental would not be inappropriate. Few other situations exist where commercial operators are able to use a natural area for profit making activity without paying something for use of that resource. The counterargument is that the global public 'own' the resource and members of that public are entitled to visit it free of cost. Charging a management fee would have the advantage of providing funds for management activity, but practical constraints relating to the lack of any managing authority or institution would need resolution. Unilateral application of fees by any one nation for anything other than the domestic administration of laws and regulations could be divisive. Fees may be an appropriate administrative action, depending on the management model in place—at present, charging fees in the absence of other changes to the system would be impractical.

Some calls for technical assessment of the safety and preparedness of tourism operations have been made. Safety issues are not completely covered by existing measures (section 7.4). A technical assessment of operational procedures and practices would provide more certainty, although such a system presumes that a party or authority would be able to deny access to the Treaty area because of an unfavourable assessment. This would require negotiation and agreement at the ATS level, but is analogous to the denial of access for non-compliance with environmental assessment procedures, and should therefore be achievable. An alternative might involve the definition of standards, with which all operations must comply, and measures for checking compliance.

Improved compliance with existing Recommendations has long been an issue. Since the adoption of Rec. XVIII-1, it is clearer what is expected of operators and, to some extent, ATPs. Levels of non-compliance with some Recommendations are not well known, given the general lack of observation or enforcement. There is some evidence of lack of compliance with self regulatory wildlife disturbance guidelines by some tourists (section 3.1). Elements of Rec. XVIII-1 lack specificity, and as a result voluntary compliance, even with the best will, may be difficult for some.

A mechanism for assessment of cumulative impacts, such as strategic environmental assessment is proposed by some. Any such mechanism would normally be integrated into a management planning process. If the practicality of using environmental assessment processes as an ongoing management tool is accepted, then a cumulative impact assessment mechanism would be useful. As argued earlier, however, environmental assessment processes, applied to individual operators or activities, are not particularly useful as an ongoing tool for certain management issues, and would be better applied in the context of broader management planning.

The review of the literature also identified calls for mandatory insurance, bonds, or other financial guarantees to cover search and rescue or other assistance. It is not known to the author whether the proposed liability annex to the Protocol (appendix one) is likely to provide such measures. Some ATPs have already legislated for operators to provide a financial guarantee (section 4.5). There would be considerable advantage, and no major obstacle, to requiring a guarantee of some sort from tourist operators. The ability of any company to cover, in the absence of insurance, the costs of passenger evacuation, or oil spill response, for example, would be very limited. The costs of providing such a guarantee should be regarded as a basic and non-negotiable component of operating in the region. These arguments apply equally to national operations—the importance of the liability annex to the Protocol cannot be overstated.

A range of suggestions relating to the implementation of a more comprehensive regime were identified in the literature. An international convention on Antarctic tourism was suggested, but seems unlikely given the acceptance of the ATS as appropriate governance by most governments and the UN. Unilateral application of national law to regulate Antarctic tourism is another possibility. While this might achieve limited goals relating to a particular area or claimed territory, or the citizens of one country, the lack of ATS agreement, and the potential for a fragmented management system makes this undesirable. National efforts would be better directed towards encouraging the ATS to negotiate an improved system. Other suggestions have included a centralised administration using an ATS secretariat or the CEP, which would seem a likely starting point. Others have advocated a regular ATS-wide meeting between operators and ATPs. Some of the functions of this type of meeting might be achieved through IAATO participation in ATCMs. A regular ATS / operator meeting could be of value if a defined role were identified as part of a more comprehensive management system. State sponsorship of tourism operators has also been suggested. This would make ATPs more responsible for the actions of operators, but it is not clear what this would achieve that a clarification of liability, financial guarantee, or better safety measures would not. It would also be complex to implement in cases where multinational tourism operations are involved.

Finally, some have discussed the need for a mechanism to control third parties. While desirable, this is not readily achievable. This research indicates that coverage of the present management system, while imperfect, is not inadequate to the point where regulation is completely ineffective. The broad application of national law may be the best that can be achieved in the foreseeable future.

8.2.1 COMPREHENSIVE MANAGEMENT SYSTEMS

In addition to the wide range of suggested management actions, three authors proposed more detailed systems, specifically P. Davis, Vidas, and B. Davis. The most highly developed of these management system proposals is that of P. Davis (1995b, 1998, 1999), and special attention will be paid to this alternative. In addition to these systems, the provisional draft annex to the Protocol must also be considered.

The philosophical foundation of any tourism management scheme is an important issue. P. Davis asserts that there is a lack of a management philosophy underpinning Antarctic tourism management, and advocates an ecocentric philosophy with primacy of wilderness values (1995a, 1999). In contrast, this author asserts that a utilitarian philosophy is acceptable. The values scheme (section 1.2) shows that a utilitarian philosophy does not deny the existence or importance of non-use values, including wilderness. It is the view of the author that an approach based on the management of all human derived values is preferable. It should include consideration of important non-use values, conservation values, and wilderness values, and may be more politically palatable than an ecocentric approach in the context of the ATS. It is probable that the ATS is not ready to consider an ecocentric basis for management of tourism, especially while science activity continues as a primary use.

P. Davis (1995a) argues that activities need to be in keeping with the wilderness qualities of the area, and that only wilderness dependent activities should be permitted. The wilderness management principles of Hendee, Stankey and Lucas (1990, section 7.2.2), however, suggest that activities most dependent on wilderness should be favoured if other activities, less dependent on wilderness, are in conflict. A decision rule on activities in keeping with the other wilderness management principles of Hendee, Stankey and Lucas might be that activities that degrade wilderness values (through longer term modification), or activities that conflict with other uses, should be managed carefully or disallowed in some areas. The size of Antarctica offers ample scope to permit a range of activities while ensuring that they do not detract from wilderness values or the experiences of other users. If issues of land based infrastructure are resolved, long term maintenance of wilderness values can be achieved without restricting tourist activities on the basis of philosophical appropriateness.

Site management is the main focus of P. Davis's management scheme (1995a, 1999), using the LAC to designate a number of visitor sites, categorise them into opportunity classes, and define appropriate activities and levels of development within those classes. The use of the LAC model or elements of the model has significant advantages, including the re-casting of management questions from 'is tourism doing damage to site values?' to 'what standards of site values should apply at each site?'. Application of the LAC would serve to guide monitoring efforts more efficiently, to detect change in set indicators, rather than aiming to detect all change. The practical difficulty of designating sufficient sites for a valuable tourism experience to be offered has been discussed (section 7.4). The application of opportunity classes would be a necessary step for a full application of the LAC. Based on conditions pertaining at different sites, and the LAC criteria for defining opportunity classes (section 7.2.3.c), P. Davis's four opportunity classes (section 1.1.3.a) might be considered too many, as distinctions between sites could be problematic. P. Davis positions Scott Base and Port Lockroy, with buildings and substantial modification, closer to the wilderness end of the spectrum than the blue ice runway at Patriot Hills, which has no permanent infrastructure. Similarly, describing Patriot Hills or the Dry Valleys as a 'semi-urban site within wilderness' does not reflect the near-pristine wilderness qualities of these locations. P. Davis's distinction between these sites is based on activities to be permitted, but it could be argued that the more fundamental aspect of wilderness quality should probably take precedence.

Under P. Davis's scheme, tourism activity should not include permanent land based infrastructure or motorised transport (1995b). The author agrees that the ATS needs to decide whether land based tourism infrastructure is appropriate, and suggests that it is not. The issue of motorised transport is complex, as access to Antarctica will continue to require motorised transport (at least for a long time yet). Motorised transport has the potential to impact on a range of values, perhaps most importantly the experiences of other users. Use of motorised transport for secondary access to local areas presently occurs, such as the use of IRBs, and the use of transport ashore may be comparable. Again, it may be best to use criterion of impact on the environment and on the experiences of other users in deciding if and where such activity is permissible.

The use of site selection criteria to choose sites that permit easy compliance with guidelines and enhance shore supervision and management is advocated by P. Davis (1998). Broader agreement (including within the ATS) and formalisation of criteria, and a firm commitment to using them would indeed be beneficial, especially if implemented as part of a wider set of management actions aimed at specific objectives.

P. Davis's proposed application of the LAC model has substantial merit. The LAC provides a comprehensive planning and management framework. As with any issue within the ATS, the views of ATCPs are paramount, and convincing some that such measures are required would be challenging. P. Davis has gone some of the way to showing that such an approach could be applied to Antarctic tourism, although important practical, theoretical and philosophical issues remain unresolved. From the point of view of operators, the main issues are likely to be the quality of the experience they are able to provide to tourists, site access (including access to a sufficient number and geographical range of sites), the administrative burden of any system, and limits on the size of operations.

Vidas listed a range of elements that would be required for any comprehensive system, including regulation relating to science and to the environment, means for monitoring behaviour, and reparation (section 1.1.3.a). Vidas's model serves to identify key areas both of concern and possible action. Importantly, Vidas identifies insurance, liability rules, contingency planning, self sufficiency, licensing systems and jurisdictional solutions as being of importance. The model identifies issues at the highest level, and complex issues at lower levels would need to be resolved—for example, Vidas argues for prevention of marine pollution through ship design and safety, a desirable aim but complex to address. Vidas's model does not incorporate a goal setting stage (although all of these suggested approaches have implicit goals), nor does it involve a management planning approach. While there is considerable breadth and little detail within the areas Vidas identifies as important, the model represents an enhancement and formalisation of the present system. Vidas provides no suggestions on the negotiation or implementation that would be required to put in place such a system. The suggested system is based around the normative principles of the ATS (peace, science, and environment protection) and does not acknowledge the interests of tourists as users.

B. Davis suggested that a process was needed to identify elements of an integrated tourism management system (section 1.1.3.a, B. Davis 1996). The process advocated by B. Davis—identifying elements of an integrated system, to be negotiated and agreed by ATPs—acknowledges that the first step in achieving any more comprehensive system will be gaining agreement among ATPs on the need for such a system. Negotiation of a set of management strategies to be included in such a system would follow—B. Davis provided a preliminary checklist of items for consideration.

B. Davis's suggested approach does not explicitly include a process of setting goals and identifying desired conditions, from which management strategies and actions follow. It does include the need for clear aims, to permit performance measurement. B. Davis identifies a range of management actions that may be necessary. The approach does not suggest that site management (to the degree proposed by some) would necessarily be required. The items on B. Davis's checklist included existing provisions and a number of additional measures, including some site visit controls, field supervision of some site visits, operator accreditation, inspections and reporting of site behaviour, and contingency planning. B. Davis's suggestions acknowledge the importance of understanding the visitor experience, and the need to consider the effects of management actions on the experience. A need for environmental monitoring at key tourism sites is also identified. Overall, B. Davis's system, as represented by the preliminary checklist and items for consideration, represents an enhancement and formalisation of the present system, with the addition of some important elements. The approach does not include a process of planning for the long term future conditions of different areas, and tends to focus on management strategies for the existing format of the industry, which may not be sufficient when potential developments need to be considered. The approach does not resemble the models derived from the case studies (section 7.3) or from management planning theory, except that some suggested management actions and strategies are similar to those in place in case study areas.

The preliminary draft annex to the Protocol (appendix two) was an example of a more comprehensive management system. The preliminary draft annex shows that the author nations (Chile, France, Germany, Italy and Spain) at that stage supported a more comprehensive regime. The draft annex is the only alternative comprehensive system (the earlier ASTI proposals aside) that has been seriously considered within the ATS. The preliminary draft annex raises some important issues. Tourism was to be permitted only in ASTIs (which were to become a category of ASMA), or in other areas only if a CEE had been prepared and processed. This would have significantly restricted the range of opportunities available to tourism, and placed the responsibility for allocating the tourism resource with the ATCM. Consensus at an ATCM would be required for each area in which tourism was to occur. For areas where a CEE was required (areas not declared an ASTI/ASMA), the ATCM would have veto power over approvals, which would be valid for only two years. To visit any area not designated an ASTI/ASMA would require a CEE regardless of the likely level of impact of the activities, setting a different standard for tourism operations than for scientific activities. The requirement for a CEE would impose costs on both operators and ATPs. The short period of validity of any authorisation means it would probably not be worthwhile for any operator or even group of operators to go through this process.

Significant problems with implementation could be envisaged under these rules, not least of which would have been the need for a substantial number of ASTI/ASMAs and management plans to be prepared to allow access to a sufficient number of sites to offer a practical, commercially realistic, and worthwhile experience. At a minimum, at least 30 or 40 sites would need to be available to the industry for operations (based on the rates of site use reported in section 2.6), meaning that an equivalent number of management plans would need to be approved. A smaller number of approved sites would concentrate impacts, or require restrictions on the size of the industry.

A key problem is that of allocation. If number limits are to be imposed, allocation of places between different operators becomes an issue, especially if only a few sites are available. The draft annex did not propose a mechanism for allocation, despite the fact that the issue posed a major obstacle to successful implementation. Practical and administrative aspects of the draft annex also raise concerns. 15 months before commencement, an operator would be expected to have approval from an ATP, a completed environmental assessment, plans and itineraries, and numbers of visitors. Completion of these requirements so far in advance would be very difficult. The annex also proposed a five year ban for non-compliance. This would pre-empt a liability annex and possibly introduce conflicts with domestic policy on penalties and sanctions.

The draft annex included a rudimentary effort to apply safety rules to the tourism industry. Non-binding rules for hull strengthening, duplication of vital equipment, special training and pilotage, and survival equipment were included in the draft, representing an attempt to address some of the outstanding safety and environmental protection issues. The draft annex also proposed that land based or floating infrastructure should require the approval of an ATCM. This provides evidence of the discomfort the author nations had with the concept of such infrastructure being installed for tourism purposes. There may be other ATPs with similar concerns. Such a requirement would have circumvented the processes required in the Protocol for authorisation of activities, and set a different standard for tourism than that for national operations.

The CEP was proposed as the main management body, with responsibility for formulating management measures for ATCM approval, including terms of visits to sites and stations, training requirements, information to visitors, and advice on monitoring, supervision, and reporting. The CEP was also to advise on temporary number limits on visitors to a site, or temporary closure of areas to ensure visitation is compatible with the 'receiving capacity and safeguarding' of the areas visited (presumably similar to carrying capacity), tasks which would require substantial capacity on the part of the CEP. The draft annex did not propose a mechanism or institution for developing such capacity. In effect, the draft annex proposed that the CEP act as a protected area manager.

The draft annex did not propose an overall management plan. It suggested a system with a limited number of sites for visitor use, each with a management plan, and the potential for use of other sites if a CEE has been prepared and authorised by an ATCM. It did not propose a framework for systematic consideration of the effects of all tourism activity. It does not include a process of goal setting, and proposes no basis for CEP decisions about restricting numbers.

8.3 MANAGEMENT RECOMMENDATIONS

The remaining tasks are to complete the final objective and address the remaining propositions of the research. The objective that remains is to:

- examine alternatives to the present management system, and propose options and alternatives that would provide better outcomes for environmental protection, the industry, and ATS needs.

The first element of this objective was satisfied by the identification of management alternatives through the case studies and protected area management theory, and by the examination of management alternatives suggested by others. The latter part of the objective is addressed in this section, where management options and alternatives are proposed. The propositions that require final examination are:

- that many of the problems encountered and likely to be encountered in Antarctic tourism management are not unique, and that methods for coping with these problems have been developed and tested, and can be applied to Antarctic tourism management; and
- that the present form of the tourism management system is not the only form that could exist under the ATS.

This section argues that management models identified in the case studies and in protected area management theory can be applied, in part or in full, to the management of Antarctic tourism. It is also argued that, while historical and governance factors have influenced and constrained the development of the Antarctic tourism management system, there are no fundamental impediments to the development and successful implementation of a more comprehensive management system.

This thesis has identified weaknesses in the present Antarctic tourism management system. The analyses of: the present structure and operating practices of the industry; the resource on which the industry depends; the impacts of tourism on that resource; the social components of the tourism experience; and the likely future development of the industry support the argument that these weaknesses will increasingly render the ATS unable to satisfy basic goals of tourism management. The thesis has added weight to arguments for change to the Antarctic tourism management system. The research contributes to the understanding of Antarctic tourism, and provides a foundation for informed discussion of potential changes to tourism management. It also serves as a useful case study of a highly specialised, unusual, valuable, and influential tourism industry sector.

There are no simple answers to the management questions posed by Antarctic tourism. It is impossible to state with certainty that 'this is what the ATS and stakeholders should do' because there are no clear goals for management, and it is not possible to develop such goals without taking the policy views of ATCPs and stakeholders into account. All activities have some level of impact, and there is no objective reason why any level of impact is more acceptable than another—it may be appropriate in some areas to allow a higher level of impact than in others, if sufficient other benefits can be derived from doing so. In the absence of broader goals of the ATS regarding tourism management, it is impossible to state that certain actions should be taken—this must come after a process of defining goals, aims and objectives.

This section therefore outlines a framework for a comprehensive tourism management system, and proposes the steps the ATS and other stakeholders should take to work towards such a system. A management plan for Antarctic tourism is not presented, nor are detailed goals, aims and objectives for the management of tourism provided. While such contributions are useful in directing and influencing the debate, and in illustrating how different actions might contribute to some management objectives, it is important for the ATS and stakeholders to agree first on the need for change (or otherwise), on a basic process for pursuing such change, and then on goals, aims and objectives for management. The framework and process proposed here is derived from the systems in place in other areas, on management planning theory, and the findings of the analyses conducted during this research. The values of the Antarctic are sufficiently important that a responsible, open and answerable planning process is required of the ATS. It is acknowledged that a comprehensive management system may not be possible at this stage. Priorities for tourism management in the absence of a comprehensive approach are therefore briefly outlined at the end of section 8.3.1.

Any future management system should be directed toward managing human derived Antarctic values, some of which compete with each other. While use values are important (including those derived from tourism, extractive uses, and science use), non-use values constitute some of the most important values associated with Antarctica. These values, including non-use values for wilderness and conservation, must be taken into consideration in any management system. Basing a tourism management system on the full range of human values derived from Antarctica is more likely to attract broad support within the ATS and with stakeholders, while having the potential to achieve the same outcomes as an ecocentric approach centring on intrinsic values.

The collection of management actions and strategies available for achieving specific management objectives is well established—from existing strategies, from this research, from the case studies, and from the suggestions of other authors. In effect, a 'toolkit' of management strategies and actions is available. The critical factor is the agreement of a framework within which goals, aims and objectives can be identified, before appropriate strategies and actions are selected to achieve objectives.

The ATS must recognise that tourism management issues have not all been resolved by the entry into force of the Protocol. Tourism management issues are becoming more pressing, as stakeholders turn their attention from resolved issues such as Protocol ratification back to tourism, and as the industry continues to grow and change. When the present concerns of the ATS—the liability annex and the establishment of a secretariat—are resolved, increasing attention will be paid to tourism issues. New challenges will arise from changes in the industry. The issues are not going to solve themselves or recede, and, in contrast to the past, the industry is not now in a position to deal with issues that the ATS is not willing to address. Substantial numbers of stakeholders, possibly including ATCPs, still have concerns about tourism management issues.

This section has four parts. First, crucial aspects that any comprehensive tourism management system will have to consider, resolve, or otherwise address are identified, based on the findings of this research. Second, a number of management strategies and actions are presented, additional to those in use and those suggested by others, to be added to the 'toolkit' of such strategies to use if a more comprehensive system is pursued. A framework for the development of a comprehensive management system is then outlined. Finally, issues of implementing a more comprehensive tourism management system within the context of the ATS are discussed.

8.3.1 ANTARCTIC TOURISM MANAGEMENT NEEDS

A number of clear needs can be identified that any Antarctic tourism management system will have to satisfy. Some of these needs may be regarded as obvious, but previous proposed systems have not always considered them, and they therefore require elucidation.

A comprehensive tourism management system will need to have clarity of intent—the identification of goals, aims and objectives is essential. A system with unclear intent (such as the present system) would make evaluation of effectiveness impossible, would fail to satisfy stakeholders that the system is appropriate, and would be incapable of solving or avoiding management problems.

A strong argument can be made that any tourism management system should be comprehensive. Inclusion of all tourism management issues is desirable, including safety issues, environmental issues, the tourism experience, and the need to avoid disruption of science. A comprehensive system can ensure that multiple goals are satisfied by management actions or strategies wherever possible. Many issues are linked—for example ship safety, safety of lives, and environmental protection are linked, and some management strategies can address all of these goals at once. An integrated, comprehensive scheme is likely to be more effective and efficient, if only because addressing all issues in one process will consume less time and resources than separate processes would. The requirement for a system to be all-inclusive is not paramount—if an issue emerged that threatened to prevent consensus, that element of the system could be left out (if it were not a key element) to ensure the remainder proceeded.

A strategic approach to tourism issues will be required. The system could continue to develop in an ad hoc and reactive way, with provisions added to address specific problems or issues, but without a strategic framework, precedents will continue to be set that may be undesirable. Ad hoc and reactive responses are not suitable for dealing with changes in the industry. The lack of a strategic approach in the present system contrasts with the approaches used in most of the case study areas examined, and with the most fundamental principles of protected area management.

Any system, whether developed within ATS forums, or tabled in entirety by one or more ATPs, must have reasonable prospects for consensus and adoption. The rigorous application of an idealised management planning system may not be possible—flexibility and compromise will be needed, beyond that required for a normal management planning situation. A relatively pragmatic system will be necessary to accommodate the viewpoints held by different ATCPs. As far as possible, any system should take into account likely developments. Flexibility will be required to allow the system to respond to both predicted and unforeseen developments, such as new activities, improved scientific information, changed conditions (perhaps as a result of climate change), technological change (that may permit safer, more benign, or more extensive operations), large scale air based tourism, or changes in the visitor profile or preferences of tourists.

Any management system must take into account the views and positions of all stakeholders, through appropriate consultation. While ATCPs are the decision makers and have veto power, other stakeholders have considerable influence and can wield that influence through various channels. A disaffected stakeholder has only to convince one ATCP to prevent the agreement of any system. An inclusive process will be required to ensure that a system has a reasonable chance of satisfying the key aims of stakeholders. Public input in the development of any such system will be difficult, although a similar requirement for public comment as applies to CEE documents could be considered. To some extent, conservation NGOs serve as a proxy for public participation, although they focus on conservation and do not necessarily represent the full range of public interests.

A comprehensive management system will need to include a clearly laid out and plausible basis for any management decisions and measures. Operators or other stakeholders are likely to challenge any provisions or elements of a management system that do not have a firm basis. This is not to say that a precautionary approach to some issues may not be appropriate—if a clear and plausible rationale for such an approach can be provided, agreement should be possible. This issue highlights the importance of a strategic, systematic and professional approach to the issues of tourism management.

A comprehensive management system will need to take into account safety—of vessels, ship to shore operations, air operations, safety of people ashore, and safety aspects of adventure activities. Vessel safety relating to ice navigation and to poorly charted waters needs consideration. While they have a low likelihood of occurring, environmental impacts associated with ship accidents are potentially the most severe. Human safety is an associated issue, and while a comprehensive management system can be envisaged that did not take this into account, it can be argued that the ATS has a responsibility (as it purports to manage the Treaty area) to take reasonable measures to ensure the safety of visitors, especially given that ATCPs have explicitly acknowledged the hazards of Antarctic operations.

A comprehensive management system should also consider the response to those tourism activities likely to result in higher levels of impact, such as the installation of a permanent tourism facility. Such activities will be controversial, and the system needs to be able to respond to any such proposals.

An important requirement of any comprehensive management system will be the clarification of regulatory responsibility. As part of an integrated system, regulatory responsibility should be properly allocated to different levels and participants—in particular, self regulatory responsibility should be defined and clarified.

The core values of the ATS must underlie any system. While effective management of tourism furthers the core value of environmental protection, it is important to remember that 'use' is not a core value. Although tourism has been recognised as an appropriate use of the Treaty area by the ATS for some time, tourism use, recreational use, and even education are not high level values of the ATS—it is possible that they should be.

Recognition of the full range of Antarctic values will be necessary in any management system. While the core values of the ATS are science, peace and environmental protection, non-use values are very important to the global public. The magnitudes of these values (including existence, bequest, option, and indirect use values) are massive. Wilderness values are very important, and the perception that tourism may threaten these values will influence any process designed to develop a comprehensive management system. These values will need to be adequately considered to ensure that public acceptance can be achieved. In addition to non-use values, the use values derived by tourists from the Antarctic resource must be considered.

Any comprehensive management system will need to provide a sufficient level of environmental protection to achieve the backing of conservation NGOs, ATCMs concerned primarily with environmental issues, and other stakeholders. Any system that did not provide adequate protection of environmental values, and address the concerns that these groups have, would be resisted, possibly even if it represented an improvement on the present situation. If a process is undertaken to develop a more comprehensive system, many stakeholders may view it as an appropriate time to push for the achievement of most or all of their tourism management objectives, and reveal policy positions or issues of concern that at present have not been aired.

Site management issues will need to be considered and resolved by any management system. Issues will include whether tourism activities should have access to all sites that are currently available (that is, all areas other than protected areas) or whether tourism should be restricted to a smaller number of sites. Other issues include dealing with cumulative impacts of visits on site values, decisions about what levels of impact are acceptable at sites, and management actions required to address impacts. If actions include limits on visits, principles and mechanisms for allocation of access will be required.

The visitor experience must form a primary consideration in any system. Tourists represent an important group of the global public for whose good the resource is being managed, and, in the absence of direct mechanisms for public consultation in ATS matters, the rights and interests of tourism users should be taken into account. Ignoring the desires of tourists when developing a system could lead to provisions that are unrealistic or unworkable, and to a greater potential for non-compliance. Visitors also influence decision makers. A good understanding of the visitor experience and visitor motivations can provide an indication of demand, and help in forecasting change.

Any management system will need to provide a degree of certainty for operators. To allow operators to plan itineraries, maintain economic viability, and offer a high quality visitor experience, the conditions applying to any season of operations (including access to different sites) will need to be known in advance. Numerical limits, if included, and allocation of visits would need to be provided well in advance of each season. It would not be reasonable, for example, to have a system where a site is used until a limit was reached, beyond which visits would not be permitted, nor would it provide optimal outcomes. Concentration of visits in the early part of the season might occur, and problems with crowding or other user conflict could arise.

Any system will also need to offer appropriate levels of flexibility for operators. The nature of expedition cruising, and Antarctic conditions mean that fixed itineraries are not always practical. Operators will need sufficient options to be able to provide a reasonable visitor experience if conditions change, and this will include maintenance of access to a range of sites in different areas.

A range of visitor experiences will need to be possible within any system. There is a danger of developing regulations only aimed at the types of activity conducted at present. Any process needs to consider the range of activities that people may wish to pursue, and ensure that the system is sufficiently flexible to permit commercial provision of activities other than those now available, if those activities are consistent with other goals of management. Issues relating to different types of activity, both commercial and private will need to be considered, including whether some types of activity are not acceptable in some places. A mechanism for considering novel activities may also be required.

An important aspect of any system will be the need for national operators to abide by management provisions. Recreational activities of national personnel will need to comply with any system applied to tourism, and science and science support activities should not conflict with tourism management aims and objectives. Of particular interest will be permanent or semi-permanent science related infrastructure, which has the potential to detract from wilderness values, and change the quality of the visitor experience. It may be necessary to give national operations the flexibility to operate outside the provisions of any management system if circumstances require. Some scientific work may require the use of a site that is important for tourism, and may even fall outside the management objectives for that site, and a mechanism would be needed to determine if such work is justified.

Simplicity of implementation is also important. The ATS has limited capacity to provide ongoing management, and has limited ability to develop such capacity. Any system must therefore have achievable institutional support requirements, and be relatively simple to implement. Minimising bureaucratic requirements would also provide benefits to operators, ATPs, and other stakeholders.

It is acknowledged that the framework for proceeding with tourism management may not be adopted. The author believes that, at minimum, some issues require urgent consideration, and could be addressed without implementation of a comprehensive system, if need be.

These issues include: the clarification of regulatory responsibility; consideration of whether present provisions are adequate to respond to a proposal for a tourism activity with a higher level of impact (such as permanent land based infrastructure); and safety needs, primarily the safety of vessels in ice covered waters.

8.3.2 MANAGEMENT STRATEGIES AND ACTIONS

If the ATS proceeds with a process of management planning under the framework laid out in section 8.3.3, a range of potential management strategies and actions are available for addressing specific objectives in the management of Antarctic tourism. Based on research presented in this thesis, some suggestions on variations or additions to these strategies can be discussed.

Two options for site access strategies are available. They are an opt-in system, where specific sites are identified, with tourism restricted to those sites, or an opt-out system where it is assumed all sites are available for tourism, and sites not to be used for tourism are identified and designated as protected areas.

The opt-in style of system has been discussed elsewhere. A site management system based on an opt-out system might include:

- identification and designation of particularly significant or sensitive sites as protected areas, where tourism can be carefully managed or excluded under a site management plan (heavily managed sites);
- permitting tourism activity to occur at some sites where specific strategies are applied, based on site characteristics (sites with specific strategies);
- permitting 'standard tourism activity' to occur at the remainder of sites (standard sites).

In effect, this would constitute a three zone scheme. This system would place the onus on the ATS to identify and designate as protected areas particularly sensitive or important sites, and would avoid the need for all sites to be designated. The application of site management strategies for the latter two categories might be possible in agreement with operators, in a flexible system to be complied with through self regulation, rather than through a management plan. Different strategies could be applied to these sites in a systematic way, in accordance with an LAC approach or a management zoning approach. Visits to new sites might require a site assessment (based on site criteria) by an operator before a visit, to identify if certain strategies need to be applied. Whilst such a scheme would require a capacity for management support, it might be less than that required for an opt-in system, where a set number of sites would be selected, designated, and managed for tourism.

Special strategies for vessels wishing to land very large numbers of tourists may be required. A number of sites might be identifiable where, on the basis of physical and environmental characteristics, visits of larger numbers of people are acceptable. Objectives relating to safety and avoidance of conflict with other users would need to be set and met for successful, regular and trouble free large vessel visits involving landings.

Activity categories might be defined as part of a management planning process. Strategies applying to 'standard tourism activity' could be defined. Activities outside the definition of 'standard tourism activity' (such as private expeditions, land based operations, or novel activities) could be subjected to safety assessments, environmental assessments, or other processes that 'standard operations' would not need to undergo. Specific strategies might be developed for categories such as 'large vessel tourism', 'inland commercial operations' or 'commercial yacht tourism'.

If a process of management planning was used to consider and plan for impacts of tourism, it might be possible to reduce the requirements for ongoing environmental assessment of tourism operations (excluding novel activities or activities outside the scope of the original planning process). This would be on the assumption that a more comprehensive system would consider relevant issues involved in 'standard tourism activity' and put in place management strategies to manage impacts. Operators might need only to demonstrate compliance where appropriate, and provide an undertaking to operate within the requirements of the management system.

Objectives relating to land based activities and infrastructure may be necessary. Concerns about land based activity might be resolved with a compromise position, recognising that higher levels of impact are not justified for tourism activities. One strategy might involve criteria for land based tourism operations—for example, that facilities should be installed without site modification, be cached or made safe for periods not occupied, and be easily removed. A removal bond or guarantee might be required, lodged with the authorising ATP, of a value sufficient to permit that party to cover the costs of removal of any infrastructure in the event of an operator becoming insolvent or otherwise defaulting.

Safety assessments, as suggested by other authors, might be required if safety objectives were included in the system. Assessments would include weighing risk against consequences of an incident. Such assessments could be applied to all or some activities—possibly private adventure expeditions, large vessel, and non ice-strengthened vessel operations. Safety could be assessed against agreed criteria including appropriateness of vessel or aircraft and crews, preparedness and contingency planning, evidence of redundancy in systems, and participation in cooperative emergency response systems. If operating procedures and equipment can lower risks to minimal levels, and adequate arrangements have been made for response to serious incidents, including consideration of total numbers on vessels, shelter needs, and evacuation needs, safety might be considered adequate. Operations where persons on board a vessel exceeded the capacity of combined operations in the region to provide reasonably timely assistance might be unacceptable, when consequences of an incident are weighed against risk.

A second strategy to achieve safety objectives might be adoption of an ice navigation regime, with mandatory compliance.

Objectives relating to impacts of tourists on sites might include improved codes of conduct for 'standard tourism activities', with defined approach distances for people and vehicles. Additional safety and environmental codes of conduct for activities other than standard shore visits, including IRB cruising, diving, kayaking, and skiing might be required. Site specific visit criteria might be considered for some sites, as suggested by P. Davis.

If objectives relating to maintenance of wilderness quality were adopted in the planning process, one strategy for consideration might be the designation of a protected area in the Peninsula region. Such an area might have the specific aims of protecting wilderness values and permitting a high quality wilderness experience in an accessible part of Antarctica. Such an area could be managed to keep it free of any tourism or government infrastructure such as stations, huts, science equipment, beacons, or navigation markers, to maintain a large area of absolute wilderness. Very few areas in the world that are relatively accessible have such high wilderness values. Such a designation could prevent the slight reductions in wilderness values caused by small installations and developments, or larger reductions caused by facilities such as stations. Tourism activity in the area could be managed with wilderness quality and wilderness experiences as the primary objective. Self-reliant recreation zones and limited motorised access zones within the area might be appropriate. Science activity would also be managed with maintenance of wilderness quality as the primary objective. This might conflict with the status of science as a core value of the ATS, but it could be argued that the very high wilderness values of Antarctica, combined with relative ease of access of the Peninsula region and the evidence of gradual decline in wilderness values in some parts, make such a strategy prudent.

8.3.3 A WAY FORWARD

The final form of any management system cannot be dictated to the ATS and stakeholders—agreement must first be reached on the need for change and on the basic range of issues that must be considered. Assuming that the ATS and stakeholders were to agree on the need for a more comprehensive management system, a framework for advancing a comprehensive management system will be required.

This research has concluded that the best way of taking the issues forward in a strategic manner is a management planning approach. Management planning, at its most basic, offers a framework for identification of goals, aims and objectives, and for rational and accountable consideration of management issues. Agreement to take a management planning approach would not commit the ATS and stakeholders to particular management strategies or actions. Rather, it offers a strategic approach, and provides a structure for systematic consideration of different management issues. The basic elements of management planning should be adopted as a framework for consideration of tourism management issues. Management planning is clearly indicated, by case studies and by protected area management theory, as the appropriate mechanism for dealing with issues of tourism in natural areas.

The application of the LAC approach, as advocated by P. Davis and outlined in section 7.2.3.c, may be valuable. It should be noted, however, that in most of the case studies this approach was not adopted, with more conventional protected area management planning applied instead, (although in some cases with zoning of recreational activities). There are arguments for and against the application of the LAC. On one hand, Antarctic values are of such significance that the management framework with the potential to achieve best outcomes should be applied, and the LAC arguably represents the state of the art in visitor management planning. On the other hand, it may be more difficult to obtain consensus on this type of approach, as fewer examples of its application are available, fewer ATCPs will have direct experience of it, and a traditional management planning approach might be more readily acceptable to stakeholders. The LAC approach offers considerable advantages, but not to the point that a more conventional management planning approach should be rejected if use of the LAC were not possible. The LAC in its raw form will clearly not be applicable, because of the character of the Antarctic and the focus of the ROS components on a wide range of resource conditions, but a modified form could be developed, or important elements applied. The acceptable change concept should be considered in any event, as it would provide a means of dealing with cumulative impacts, and help direct monitoring in a more efficient way.

The framework should also manage tourism with respect to the full range of values associated with Antarctica. Use values, non-use values, and intrinsic values need to be considered. It is important to keep in mind that the focus of management should be on values, rather than people, activities, or things. In proceeding with development of a management system, the ATS and stakeholders must consider all values—concentration in the past on only some values (science, for example) has limited the usefulness of the present system, and this should not be perpetuated.

The framework should include the clarification of the fundamental goals of the ATS as regards tourism management. Some of the basic goals are apparent, deriving from the core values of the ATS. Others will require development—for example, the right or otherwise of people to visit Antarctica should be clarified. In a normal management planning situation for a protected area, these basic goals are derived from legislative or other formal requirements—in a national park, for example, there is normally recognition that a basic function of such a place is to allow visitation and recreation. In the absence of a formal protected area designation for Antarctica, such goals require definition. Given this framework, the ATS and stakeholders could then proceed with processes of management planning. Initial steps would involve deciding on the scope of the system—for example, should all tourism management issues be included, such as safety issues, or should the planning process be limited only to environmental aspects of tourism?

Institutional and support needs for the planning process would need to be identified and provided for. Forums in which the planning process should occur, contribution of expertise from within the ATS and externally, practical aspects of communication and negotiation, input of different stakeholders, and terms of reference would need to be agreed.

Once such issues were agreed, a management planning process could be decided upon—the LAC model and more conventional models could be examined and a model adopted. The management planning process itself would then commence, starting with the examination of the resource and resource issues. The work of Oceanites (section 1.1.3.a) might form a basis for the resource information that would be required. Other information needs might be identified. It is here that an environmental evaluation of tourism activity as a whole may be appropriate, either as an integral part of the management planning process (as seen in most of the case studies), or as a separate, stand alone document that contributes to the planning process (as seen in other case studies).

Appropriate stages of planning, according to the model adopted, would follow, including the detailed agreement of goals, aims and objectives, and the definition of desired conditions. Different objectives and conditions might be appropriate for different areas. Goals, aims and objectives would include all values, for example those aimed at ensuring visitors can continue to obtain value from tourism experiences, and those aimed at maintaining wilderness quality.

Once these tasks were complete management strategies and actions could be identified to achieve the objectives. A variety of management strategies and actions are available to address management objectives, as identified in the case studies, the suggestions of different authors, and in ATS forums. It is at this stage where difficult issues for the ATS and stakeholders would require resolution.

Decisions might need to be made regarding whether management of sites should be based on a single plan with site specific elements, or on a number of management plans. Depending on the management objectives, it might be necessary to restrict tourism to certain sites, or to select sites where tourism should not occur or should occur only under certain conditions. If the management planning process determined that the desired conditions at a site were likely to deteriorate under present use, an appropriate strategy to prevent that change would be necessary. Some form of restriction on use might be the only strategy, however, on the basis of the goals, aims and objectives for tourism management and site conditions, other strategies might suffice. It is worth re-iterating that in the case studies examined, management strategies involving limits on visitor numbers are not universal or, in the cases of the northern polar region, even common.

If restrictions are necessary, allocation mechanisms would have to be incorporated in management strategies. If an open, systematic and participative management planning process has been carried out, the basis for introduction of such strategies would be firm and defensible.

At this level another critical issue could be resolved—the allocation of regulatory responsibility. The collection of management strategies and actions includes self regulatory measures, and it is likely that many of the more useful management strategies would be of this type. The matching of management strategies to objectives would make it clear where regulatory responsibility lay, and would also define the roles of different bodies. The responsibilities of states (in enacting legislation, for example), ATS institutions (for administrative or ongoing management roles, for example), individual operators, the industry collectively, and shared responsibilities would be defined. The planning process would define the rules within which tourism operations can occur, and reduce or eliminate the need for operators to grapple with site use issues, cumulative impact issues, and other issues with which they are ill-equipped to cope.

Once management strategies were devised to address the objectives, ongoing management, monitoring, administrative, and institutional needs would be clear, and agreement could be obtained on mechanisms to provide appropriate support for implementation and ongoing management. Criteria for measuring effectiveness of the system would need to be included. A system of review and feedback would need to be developed to ensure the system achieved management goals, or was modified to do so if initial management strategies were not effective. Review and feedback could also determine the suitability of strategies, including the identification of any strategies that may be unnecessarily stringent.

8.3.4 IMPLEMENTING A SYSTEM WITHIN THE ATS

There are no insurmountable physical or operational impediments to implementing a more comprehensive tourism management system—ice hazards, remoteness, abundant wildlife, sensitive areas, lack of infrastructure, very high wilderness values, and potential for disruption of science are all features of the case studies examined, and have not prevented more comprehensive tourism management in those locations. Implementing a system within the unique international governance context of the ATS poses some difficulties. It should not, however, be impossible.

While the risks of implementing management strategies in isolation rather than in the context of a management planning process are certain, and a framework is recommended above for the development of a comprehensive system, it is also acknowledged that there are intermediate options. Such options represent partial steps to a more complete system, or implementation of elements to address particularly pressing issues. It might be impossible to gain agreement within the ATS or with other stakeholders on the need for a comprehensive system, and in that event addressing key needs by negotiating and implementing smaller elements should be a priority. There might also be some potential for the staged negotiation of a comprehensive system. Based on this research, it is clear that the present system requires a number of additional elements to be even minimally satisfactory. Section 8.3.1 identifies these elements, and describes what this author would regard as the minimum necessary changes.

A major impediment to managing Antarctic tourism in a more conventional (and effective) way is the lack of institutions to take the issue forward, to conduct management planning, or to provide ongoing management support. The institutional support required to develop a comprehensive management system would be comparatively modest. As noted in section 8.3.1, such a system would need to take into account the limited capacity of the ATS and stakeholders to provide support for ongoing management. Selection of management strategies to satisfy objectives would be influenced by their ease of implementation and ongoing management requirements. The allocation of regulatory responsibility to bodies other than the ATS, where possible and appropriate, would help minimise these needs. As such, the need for new ATS institutions to carry out ongoing management functions would be modest. Other international agreements have developed capacity for international administration—the *Convention on International Trade in Endangered Species of Wild Flora and Fauna* (CITES), the UN conservation agreements, maritime treaties, and fisheries agreements are examples. To date the ATS has not needed such institutions, other than within CCAMLR. The relatively modest capacity required to provide and maintain a comprehensive tourism management system is achievable.

An alternative approach to the development of a comprehensive management system in ATS forums is for a single ATP to take responsibility. Such a system could be presented to an ATCM, with an attempt to convince other ATCPs that their interests, those of the ATS, and those of other stakeholders are served by such a system. While this would circumvent or delay a participatory planning process, it is acknowledged that such an approach may be effective in certain circumstances, and should not be ruled out.

The processes of management planning are not beyond the abilities of the ATS if the will is there and adequate support is provided by ATPs. A body dedicated to development of a system may be required, to avoid the problems associated with the infrequent meeting schedule of ATS bodies. A variety of options are available—for example, ATCPs could devolve responsibility for the development of a system to a meeting of experts, to the CEP, or to special ATCMs. It is unlikely that the participation of full diplomatic delegations through all stages of the planning process would be appropriate or productive. A likely option is that the ATCPs would use the CEP, within specified terms of reference, and drawing on additional expertise, to develop the whole or parts of a system. The CEP, with its role as defined by the Protocol, is an appropriate forum to take responsibility for the development of a tourism management system. Alternatively, a meeting of experts would permit the inclusion of other stakeholders, which might otherwise be problematic. Ongoing management needs might require the establishment of a separate body, dedicated to tourism management, possibly under the auspices of the CEP.

The type of legal agreement by which a comprehensive tourism management system would be included in the ATS would need to be resolved. This would depend largely on the nature of any system emerging from a management planning process. The immediately obvious form of agreement is a separate annex to the Protocol, as proposed for the preliminary draft tourism annex. Another option would involve the distribution of elements of a system amongst existing annexes (permitting all shipping related provisions to be collected together, for example) or between existing annexes and a new annex. A separate convention is another possibility, although the linkages between tourism activity and the functions of the Protocol make the Protocol a more likely option. An important issue is the degree to which elements of the system should be binding. Mandatory elements arising from certain management strategies would require enactment in domestic legislation, taking considerable time and adding to the administrative burden of ATPs. Hortatory requirements, which ATPs might choose to apply to operators and themselves without enactment in legislation, can be included in an annex (witness many of the Provisions of Annex III) and while this might open some loopholes and opportunities for variation in implementation, it might be appropriate for some management strategies.

A number of strategies and actions could pose particular negotiation or implementation problems. Restriction of access (complete restriction or restriction to certain periods) to sites has been identified as a contentious strategy. The protected area system provides a limited precedent, effectively restricting access of both tourists and other visitors, at a number of locations. The general principle of restricting access where necessary has been accepted by the ATS. If management strategies include limits on the numbers of visitors to a site (per season, for example), equitable allocation of visits to different operators becomes an issue. A system of allocation would require clear criteria, and either centralised administration, an effective system of communication between authorising ATPs, or a combination of both. Allocation across operators from different nations might also be an issue.

8.4 Concluding comment

Antarctic tourism is an important and, at present, largely benign use of the Antarctic region, undergoing a relatively rapid period of change. The present tourism management system is not sufficient, when the important values involved and the potential for change in the industry and in the tourism resource are considered. A management planning approach should be used as a framework for the development of a more comprehensive regime.

Antarctic tourism is a well established industry, with a long history. It provides people other than government personnel with an opportunity to visit the continent, and in doing so enhances knowledge about and appreciation of Antarctica. It may help create support for Antarctic conservation through lobbying and support for the work of conservation organisations. The industry is economically significant, supports science and governmental activity in the region, and helps enhance safety for all, through the presence of additional operators and their vessels and aircraft.

Information on potential and actual environmental impacts to date indicates that the impacts of tourism are minor at present. The potential for severe impacts exists, at a lower probability of occurrence. Cumulative impacts may also occur, from multiple seasons of tourism use, repeat visits, or visits of many different operators, but these impacts are poorly understood. There are a range of other issues relating to tourism, including impacts on environmental and other values, safety issues, appropriateness of some types of tourism activity, and the potential for disruption to science and national programs.

Tourism activity is managed by a collection of measures and instruments in what can be described as a tourism management system, consisting of the main ATS agreements, specific ATS measures applying to tourism, non-ATS international agreements, and self regulatory measures. A historical review of the development within the ATS of tourism management provisions shows the changing issues of concern and the tensions involved, and demonstrates the limitations of the ATS as a managing authority. These limitations largely relate to the ponderous rate of decision making and debate in the rarefied atmosphere of international diplomacy that underlies the ATS. Variations in the implementation of these agreements and measures between different nations were identified, which have the effect of creating different regulatory environments for operators based in different nations.

The main environment protection instrument is the environmental assessment process, with each tourism operator required to provide an assessment for each season of activities. Activities are authorised by the ATP with jurisdiction over that operator, without reference to a wider management framework. There is no mechanism for assessing the effects of repeat tourism activity, and there is no system of resource restriction or allocation. Site management measures are limited to an ATS code of conduct, for behaviour of tourists on-site, and various voluntary restrictions developed by the industry, including limits on numbers of people ashore, limits on total number of passengers on a vessel, and recommended guide to passenger ratios. The most recent guidance documents, agreed by the ATS and adopted as Rec. XVIII-1, do not compare well in some practical respects with previous industry developed guidelines. Safety provisions are largely absent from the tourism management system, despite the obvious hazards associated with Antarctic operations. The most concerning safety issue is the lack of an ice navigation regime for vessels in ice covered waters—this also has significant environmental implications.

Some of the most important elements of the management system have been developed and implemented voluntarily by members of the tourism industry. It is largely through the good intentions and conservative practices of tourism operators that tourism related impacts have remained minor. The ATS has relied heavily on the tourism industry to ensure environmental protection. While tourism has remained relatively small, and operations have been of the expedition cruising model, this has been largely sufficient. There is a relatively high probability that both of these factors will change, and the present management system does not have the scope nor capacity to deal with such changes without substantial restructuring or additions. Despite the high levels of expertise and goodwill within the tourism industry, the industry cannot and should not be expected to deal with all tourism management issues. As an example, cumulative impact is one issue that operators cannot be expected to adequately resolve alone. Such regulatory action is not expected of the tourism industry in other locations—the values of Antarctica are so important that it is inappropriate to experiment with unusual forms of management for activities there.

Current Antarctic tourism management is very different from the management of similar forms of tourism, in similar environments. Case study analyses of northern polar locations and southern oceanic islands, examining how cruise tourism is managed in natural areas in sovereign environments, provide a range of alternative management strategies and actions, and all utilise management planning. Protected area management theory also provides clear direction for Antarctic tourism management.

This thesis concludes that, in order to meet the basic goals of the ATS and the Protocol, and in the interests of responsible management of an exceptionally important natural area, the ATS and other stakeholders should recognise that the present management system is inadequate, and that changes to the management system are necessary. They should acknowledge that a comprehensive, strategic management system is appropriate at this juncture, and that a systematic management planning approach is the best way to achieve this. If this is not possible, key issues require attention. The research suggests a process that might be appropriate for proceeding with management planning. The ATS, having achieved wide (almost undisputed) recognition as an appropriate governing regime for Antarctica, has the ability, and more importantly the responsibility, to put in place an adequate, well planned, and reasonable tourism management system. Such a system can offer the opportunity for high quality and valuable experiences for visitors, predicability and certainty for operators, appropriate protection of all Antarctic values, and a framework for dealing with future developments.

Appendix 1: Elements of the Antarctic Treaty System

a1.1 The Antarctic Treaty System

The Antarctic Treaty System (ATS) is the framework of governance that applies to the area south of 60° south, often referred to as an international regime (Stokke & Vidas 1996). The ATS is a complex of international agreements and arrangements agreed by participating countries. The overall regime has three core values—peaceful use of Antarctica, the use of Antarctica for science, and environmental protection. The ATS consists of a number of agreements, with the Antarctic Treaty, the *Convention on the Conservation of Antarctic Marine Living Resources* (CCAMLR), and the *Protocol on Environmental Protection to the Antarctic Treaty* being the most important.

a1.1.1 The Antarctic Treaty

Antarctica is governed by an agreement between a number of nations, the Antarctic Treaty. A suite of other instruments supplements the original Treaty, collectively forming what is known as the ATS. The Antarctic scientific efforts of 12 nations (Argentina, Australia, Belgium, Chile, France, Japan, NZ, Norway, South Africa, the USSR, the UK, and the US) in the International Geophysical Year of 1957–58 prompted the agreement of the Treaty. These 12 nations were invited by the US to participate in a conference at which the Treaty was negotiated and signed in 1959.

The primary purpose was to ensure that the Treaty area (south of 60° south) would be used for peaceful purposes and not become the scene or object of international discord (Antarctic Treaty 1959, Heap 1990). The Treaty established contracting parties (all parties signing the Treaty, known as Antarctic Treaty Parties or ATPs) and contracting parties with the right to appoint representatives to Treaty ATCMs (Antarctic Treaty Consultative Parties— ATCPs). The right to appoint representatives to meetings is earned by demonstrating interest in Antarctica by establishing a scientific station or despatching a scientific expedition. All original signatories are entitled to appoint representatives to meetings (Antarctic Treaty 1959). Parties that have acceded to the Treaty (by signing and ratifying), but do not have the right to appoint representatives to meetings (because they do not operate stations or scientific expeditions) are often called non-consultative parties.

Table a1.1 provides a summary of the provisions of the Treaty. Important points include the well recognised aspects of the Treaty, such as the effective freezing of territorial claims or activities aimed at strengthening those claims, the use of the area for peaceful purposes only (including the ban on military activity except in support of science), and the prohibition of nuclear explosions and nuclear waste disposal. The Treaty also established the need for unanimity in decisions, be they modifications to the Treaty or measures in furtherance of the principles and objectives of the Treaty. The exception to the rule of unanimity is if a conference is called under Article XII(2), where a majority decision making rule applies. Unanimity is an important factor in the Treaty and Protocol. On one hand, it provides all ATCPs a veto, and all decisions are therefore widely supported. On the other hand, measures supported by a clear majority can not be taken, and the decision making process is necessarily conservative. The very slow progress in certain areas of ATS responsibility, and the current deadlock over the establishment of a permanent secretariat are examples of the constraint imposed by the need for consensus.

Table a1.1: Summary of the provisions of the Antarctic Treaty

	The signatories: recognise that it is the interests of all mankind to use Antarctica for peaceful purposes and protect it from international discord; acknowledge the substantial contributions resulting from international scientific cooperation in Antarctica; are convinced that a foundation for such cooperation on the basis of freedom of scientific investigation accords with the interests of science and the progress of mankind; and are convinced that a Treaty ensuring the peaceful use of, and international harmony in Antarctica will further the purposes and principles of the UN charter.
I.	Antarctica is to be used for peaceful purposes only, with no military activity. Military equipment and forces may be used for science or other peaceful pursuits.
II.	Free scientific investigation, and cooperation to that end shall continue
III.	To enhance cooperation, ATPs should exchange plans for programs, personnel should be exchanged between expeditions and stations, scientific results should be made freely available, and cooperation with UN and other international organisations with a scientific or technical interest will be pursued.
IV.	The Treaty does not: imply that ATPs renounce any claims to territorial sovereignty; renounce or diminish any basis for such claims; or affect the position of any party as regards the claims of other states. No actions can be used as a basis for asserting, supporting or denying a claim of territory, and no new claims of territorial sovereignty or enlargements of claims shall be made.
V.	Nuclear explosions and disposal of nuclear waste are prohibited. Any international nuclear energy and waste disposal agreements to which all ATCPs have agreed, shall apply in Antarctica.
VI.	The Treaty applies to the area south of 60° south latitude including ice shelves, but the Treaty does not affect the high seas rights of states under international law.
VII.	ATCPs may carry out inspections. Observers conducting such inspections are to have freedom of access to any area, and all stations, installations, equipment, ships and aircraft. Aerial observations may be carried out. All ATCPs are to give advance notice of expeditions by ships or nationals of that party or proceeding from the territory of that party. Advance notice of station installation or use of military personnel or equipment is also required.
VIII.	Observers and staff are subject only to the jurisdiction of their own country. ATPs who are in dispute over jurisdiction are to consult together to agree on a solution.
IX.	ATCPs are to meet regularly (ATCMs), and develop measures furthering the principles of the Treaty. ATPs who demonstrate interest by conducting research or establishing a station are eligible to participate in meetings. Measures take effect when and if approved by all ATCPs.
X.	ATPs undertake to make efforts to ensure that no one engages in activity contrary to the Treaty.
XI.	Disputes between parties about interpretation or application of the Treaty are to be resolved using negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement, or other peaceful means. Unsolved disputes are to be referred to the International Court of Justice.
XII.	The Treaty may be modified by unanimous agreement of ATCPs. Modifications enter force for all ATCPs when all have ratified them, and for non-consultative parties when they ratify them. If ratification is not completed within 2 years from entry into force of a modification, a party is considered to have withdrawn from the Treaty. A conference to review the operation of the Treaty can be called for by any consultative party after 30 years. Modifications agreed at such a meeting by a majority of ATPs, including a majority of ATCPs, are to be communicated to all ATPs, and enter into force after ratification by all ATCPs.
XIII.	The Treaty is subject to ratification by signatory states. It can be acceded to by any member state of the UN, or any state approved by the ATCPs. The US is the depositary government, and shall inform all parties of dates of deposit, ratification, or accession, the date of entry into force of the Treaty, and of any modifications. When all states have ratified the Treaty, it enters into force for all original and acceding states.
XIV.	The US as the depositary government shall deposit the Treaty in its archives in English, French, Russian and Spanish, and transmit certified copies to signatory and acceding states.

Modifications or amendments to the Treaty apply to all ATPs. Measures, on the other hand, as agreed under Article IX, although they become effective when approved by all ATCPs, are recommended to the governments of ATPs, and as such do not appear to have a binding status (see section 1.1.f). A number of ATCMs have discussed the status of Recommendations (see Heap 1990, p. E1), concluding that by becoming parties to the Treaty, states bind themselves to uphold its purposes and principles, and that Recommendations should be viewed as part of this obligation. In practice, however, unless a party in some way ratifies a Recommendation or Resolution of the ATS, by enshrining it in legislation or in statutory regulations, or incorporating it in administrative processes, it may not have effect for persons and organisations subject to the jurisdiction of that country.

States can accede to the Treaty, although accession does not grant states the right to vote on decisions in ATCMs. Such rights are 'earned' by conducting 'substantial scientific research activity there, such as the establishment of a scientific station or the despatch of a scientific expedition' (Antarctic Treaty 1959, Article IX(2)). This mechanism forms the basis for the pre-eminence of scientific activity as the dominant 'currency' in the ATS. In 1998 43 states were party to the Treaty, 27 of those states being ATCPs (USA 1998, IP74 ATCM XXII, ATCM 1998). Countries involved in Antarctica through the tourism industry, but without substantial scientific activity, are effectively blocked from full membership of the ATS. The need to conduct substantial scientific activity also serves to exclude the involvement of countries without the capacity for such expensive research. The involvement of non-consultative parties in the ATS has, however, increased over time, with non-consultative parties taking part in ATCMs as observers since 1983 (Heap 1990, p. xii).

The Treaty made little provision for conservation, although it set an agenda for future negotiations which included the 'preservation and conservation of living resources in Antarctica' (Article IX-1(f)). The original Treaty made no specific provision for non-government or private commercial activities, although it is interesting to note that at the time the Treaty was signed, whaling and sealing continued (Rubin 1996, p. 281).

a1.1.2 FUNCTIONING OF THE ATS

The Treaty does not at present have a secretariat or a permanent office, and functions through regular meetings. The responsibility for organising and hosting ATCMs rotates amongst the ATCPs. Provision has also been made for Special Consultative Meetings and for Meetings of Experts (Heap 1990, p. 1101). The issue of a secretariat has become one of the prominent topics for ATS attention in recent years. ATPs have agreed for some time that a permanent secretariat was necessary. IUCN reported that 'at the 1989 regular consultative meeting, and again at the Special Consultative Meeting held in November/December 1990, a mood to accept the establishment of a permanent secretariat for the Treaty was evident' (1991, p. 31). Most ATCPs agreed on Buenos Aires in Argentina as the location for the Secretariat, based partly on the need to provide a balance in distribution of Antarctic bodies, but consensus has not been reached. Signs indicate that this impasse may soon be broken (see for example ATCM 1997). The lack of a secretariat has had implications for tourism management, not the least of which has been the absence of a centralised location for the coordination, collection and dissemination of tourism information. Enzenbacher (1995b) notes that the lack of a centralised source with responsibility for such tasks has been a barrier to effective regulation of tourism.

a1.1.3 ADDITIONAL COMPONENTS OF THE ATS

Since the entry into force of the Treaty, a range of other international agreements have been established. In 1964 at ATCM III, a set of conservation measures were agreed, applying to land and ice shelves in the Treaty area, the *Agreed Measures for the Conservation of Antarctic Fauna and Flora* (the Agreed Measures, Rec. III-VIII). The Agreed Measures evolved from *General Rules of conduct for the preservation and conservation of living resources in Antarctica*, developed by SCAR in 1960, in response to concerns arising from activity during the International Geophysical Year (Heap 1990, p. 2402). The Agreed Measures declared the Antarctic to be a 'Special Conservation Area', and made provisions in seven main areas, as summarised by Heap (1990, p. 2402) including:

- i. prohibition of the killing, wounding, capturing or molesting of any native mammal or bird except in accordance with a permit;
- ii. such permits to be issued only for certain restrictive purposes;
- iii. the designation of Specially Protected Species;
- iv. the designation of Specially Protected Areas;
- v. regulating the importation into Antarctica of non-indigenous species, parasites and diseases;
- vi. minimizing harmful interference with the normal living conditions of Antarctic mammals and birds;

vii. exchange of information between consultative parties as to actions they have permitted.

Under the provisions of the Agreed Measures, ross seals and fur seals have been designated specially protected species, and a variety of specially protected areas were designated (section 4.7, Heap 1990, p. 2402). While the Agreed Measures provided for the management and protection of flora and fauna on land and ice shelves, concern over the vulnerability of seals in the pack ice zone to commercial exploitation developed. The *Convention for the Conservation of Antarctic Seals* entered into force in 1978 to regulate the taking of seals (Heap 1990, p. 4101). The taking of ross, elephant and fur seals was prohibited, and limits were set on the take of crabeater, leopard and weddell seals. Commercial sealing has not been attempted, and the provisions of the Convention have been used only with reference to scientific activity (Heap 1990).

The other major agreement in the ATS is the *Convention on the Conservation of Antarctic Marine Living Resources* (CCAMLR). Heap (1990) describes the development of concern and action relating to the exploitation of marine living resources other than mammals. the ATCM VIII noted the potential for large scale exploitation of krill (*Euphasia sp.*) and fin fishery activity. ATCM IX recommended a Special Consultative Meeting, which was held in a number of sessions from 1978 to 1980. CCAMLR was negotiated accordingly, and entered into force in April 1982. Heap (1990) noted that CCAMLR has three features unusual in international agreements. First, while developed as part of the ATS, the area of application of CCAMLR is larger than the Treaty area, following the biogeographic boundary of the Antarctic convergence. Second, CCAMLR entered into force before the relevant fisheries had progressed beyond the experimental phase. Third, the agreement adopted an ecosystem approach to conservation and management. As Heap (1990) stated, 'in reaching conclusions about the rate of use of any target species, the effects on species dependent on the target species for food must be taken into account. It is not enough to have regard to the effect utilization will have on the target species alone' (p. 4201). This approach makes research important, with a good knowledge of the marine ecosystem and its components required to manage the regime (Bush 1990). As Bush pointed out, the institutional structure provided for under CCAMLR 'was everything that the Treaty was not' (1990, p. 136). Under CCAMLR, a Commission was established, with legal personality, privileges, and immunity, and the power to pass measures binding on CCAMLR signatories. Rather than relying on SCAR, CCAMLR has its own scientific committee, and, importantly, has a full time secretariat with an Executive Secretary (Bush 1990, p. 136).

a1.2 The Protocol on Environmental Protection to the Antarctic Treaty

a1.2.1 The Convention on the Regulation of Antarctic Mineral Resource Activities

The final element of the ATS involves a complex series of events relating to the negotiation and drafting of a *Convention for the Regulation of Antarctic Mineral Resource Activities* (CRAMRA), the subsequent scuttling of this agreement, and the development of an alternative comprehensive environmental regime (the Protocol). A brief description of the mineral regime is important as it places the subsequent negotiation of the Protocol into context, and because it demonstrates some important points about the ability and the will of the ATS to deal with an issue in a manner that binds parties when required. Heap (1990) tracks the important milestones in the development of CRAMRA, and Vicuña (1996a) provides a good overview of the issues involved.

The question of mineral exploration and exploitation in the Treaty area has been open since the negotiation of the Treaty. According to Beeby (the Chairman of the Special Consultative Meeting that drafted CRAMRA), the motivation for the development of the instrument was twofold—fear of the effect that unregulated mineral resource activity could have on the environment, and a fear that if important resources were found, conflicts about sovereignty could become important again, threatening the Treaty itself (Beeby 1990). The ATS began considering the issue in 1975. As negotiation of an agreement would be more difficult if left until exploitation was occurring or pending, it was decided that the development of a framework regime to cover prospecting, exploration and development was desirable (Heap 1990, p. 4301). A moratorium on exploration and exploitation was agreed in 1977, and in 1981 the ATCPs recommended (Rec. XI-1) the convening of a Special Consultative Meeting to negotiate a mineral resource development regime (Heap 1990, p. 4301).

Eleven sessions of the Special Consultative Meeting were held, with CRAMRA adopted and opened for signature in 1988. CRAMRA was the most complex element of the ATS yet devised (Bush 1990, p. 143), designed to regulate mineral resource activities, and to ensure that such activities did not adversely affect the Antarctic environment. In addition, CRAMRA sought to maintain the values of the ATS, safeguard other uses of Antarctica, maintain compatibility with other elements of the ATS, and maintain the position established by the Treaty on sovereignty (Bush 1990). CRAMRA would provide 'an institutional mechanism for assessing the possible impact on the environment of Antarctic mineral resource activities and determining their acceptability' (Blay 1992).

Against a background of public concern, nineteen states signed. Australia (who had played an active role in negotiating CRAMRA) announced that it would not sign, and would instead support a world park or wilderness reserve proposal. France, India and Belgium supported the Australian position (Blay 1992). As all claimant states needed to sign and ratify for CRAMRA to enter into force, these developments effectively scuttled the instrument. A very important factor in the abandonment of CRAMRA was continued public criticism. As Blay put it,

> Despite the environmental stringency of CRAMRA, the enthusiasm with which it was negotiated has not been matched by public support. In an ever more environmentally conscious world, the general view is that a "mining convention" is not consistent with protection of the Antarctic environment (1992, p. 378).

Despite defence of CRAMRA, on the basis that it did not assume mining was acceptable or that it should take place (Beeby 1990), it was far from a comprehensive and long lasting ban on mining, as many conservation NGOs and members of the public desired. The Protocol developed after CRAMRA was abandoned, filling the environmental protection void that the abandonment of CRAMRA would otherwise have left.

a1.2.2 THE NEGOTIATION OF THE PROTOCOL

The Protocol now constitutes the main environmental protection instrument of the ATS. Concluded and opened for signature in 1991, it entered into force in January 1998 (Richardson 1998). The Protocol represents a significant change in the ATS, including changes to the treatment of tourism. As Herr (1993, p. 93) argued, before the agreement of the Protocol, 'the primacy of the two core values of the Antarctic Treaty—security and science—necessarily subordinated other activities such as tourism. The Protocol, by adding a third core value—protection of Antarctica's very special natural environment—to the two earlier values, has set the scene for a comprehensive reassessment of all activities in Antarctica'. Vicuña (1996a) examined the processes leading to the agreement of the Protocol, and provided a detailed analysis of the effectiveness of the Protocol. Blay (1992) provided a good description of the events leading up to the adoption of the Protocol, which can be briefly summarised here.

After the announcement by Australia that it was opposed to CRAMRA, and support for that position from a number of other parties, Australia and France made joint efforts towards drafting and adoption of a comprehensive environmental protection instrument (Blay 1992). Prior to ATCM XV in 1989, they circulated a joint proposal for comprehensive measures for environmental protection, suggesting a convention would be a means of achieving this. Vicuña suggested that public concern about Antarctic conservation, heightened by a number of oil spill accidents in the Antarctic and sub-arctic, caused Chile to 'formally raise the subject of comprehensive environmental protection of the Antarctic in 1988' (Vicuña 1996a, p. 176). Some parties (Chile, NZ, the US, and Sweden) reassessed their original opposition to the Australian / French position and also presented proposals for comprehensive protection measures at the 1989 ATCM (Blay 1992). All proposals agreed that the current environment protection framework was inadequate, but some suggested that rather than a new convention, another mechanism could be used. ATCM XV decided that the proposal of Australia and France and the CRAMRA liability protocol would be discussed at a special consultative meeting in 1990 (Blay 1992). Prior to the 1990 special consultative meeting other states including the Soviet Union and NZ moved to support the Australian / French proposal. A draft protocol on the Antarctic environment was submitted to the 1990 meeting, reflecting the Australian and French proposals. It was at this point that the decision was made to use the form of a Protocol to the 1959 Treaty, rather than a supplementary convention (Vicuña 1996a). The draft served as a working paper for the second session of the special consultative meeting in Madrid in 1991, which finished drafting the Protocol and Annexes I to IV, and adopted the instrument. 23 of the 26 ATCPs signed immediately, with the remaining three signing by the end of 1992. Ratification took some time, with the Protocol and Annexes I to IV entering into force in January 1998 (Richardson 1998). Annex V was adopted separately and needs to be approved and ratified separately. The rate of ratification of this Annex has been slower than for the Protocol (Richardson 1998). The Protocol represents the comprehensive environmental protection regime that many ATPs were seeking, and it satisfies many of the demands of the public and conservation NGOs relating to the environmental protection of the Antarctic.

a1.2.3 THE PROTOCOL ARTICLES

The Protocol is described here with emphasis on the provisions and mechanisms that have particular importance for tourism activity. The Protocol imposes a number of new responsibilities on parties and on any person conducting activity in the Treaty area. The most obvious and significant provision is the prohibition of mineral resource activities other than those conducted for scientific research, under Article 7. Although the Protocol may be modified at any time, a full consensus is required, meaning that a reversal of the prohibition on mining is extremely unlikely as only one anti-mining party would need to veto such a change (Blay 1992). This alone constitutes a major accomplishment, regarded by Blay as 'perhaps the greatest achievement of the Protocol and its initiators' (1992, p. 399).

The Protocol applies to all activities (including those of national operators, individuals, companies and consortia) in the Treaty area. Some proposals during the negotiation phase suggested application of the instrument to areas north of 60° south to include the seas up to the Antarctic convergence, as was the case with CCAMLR, but these were not agreed to (Vicuña 1996a). The Protocol states that the parties, committed to 'the comprehensive protection of the Antarctic environment and dependent and associated ecosystems hereby designate Antarctica as a natural reserve, devoted to peace and science' (Article 2).

Article 3 describes the environmental principles underlying the Protocol, summing up the intent and practical implications for planning and conduct of activities. Article 3(1) establishes, as fundamental considerations in planning and conduct of activities: the protection of the Antarctic environment and its dependent and associated ecosystems; the intrinsic value of Antarctica including its wilderness and aesthetic values; and, its value as an area for the conduct of scientific research. Important aspects are the inclusion of dependent and associated ecosystems, and the explicit recognition of intrinsic values, wilderness values and aesthetic values.

Article 3(2a) states that activities 'shall be planned and conducted so as to limit adverse impacts' on the environment. Article 3(2b) lists effects and occurrences that must be avoided through planning, including: adverse effects on climate or weather patterns; significant adverse effects on air or water quality; significant changes in the atmospheric, terrestrial, glacial or marine environment; detrimental changes in the distribution, abundance or productivity of species or populations of species of fauna and flora; further jeopardy to endangered or threatened species or populations of such species; and degradation of, or substantial risk to, areas of biological, scientific, historic, aesthetic or wilderness significance. Article 3(2c) states that planning and conduct of activities must be based on sufficient information to allow prior assessment of, and informed judgement about possible impacts both on the environment and on the value of Antarctica for scientific research. Issues to be taken into account include: the scope of the activity (area, duration, and intensity); the cumulative effects of the activity; whether the activity will detrimentally affect other activities; whether technology and procedures are available to provide for environmentally safe operations; whether the capacity exists to monitor key environmental and ecosystem components, so as to identify and provide early warning of adverse effects of the activity, and allow modification of actions in response to results; and whether the capacity exists to respond promptly and effectively to accidents. Article 3(2d) requires that regular monitoring shall take place to allow assessment of impacts, including verification of predicted impacts. Article 3(2e) requires regular monitoring to provide early detection of any unforeseen effects of activities on the environment. Article 3(3) requires priority to be given to scientific research, and protection of the value of Antarctica for such research. Article 3(4) explicitly applies the environmental principles to all activities, including science related activities, tourism, and all other governmental and non-governmental activities. Under this article, any activities 'shall be modified, suspended or cancelled if they result in or threaten to result in impacts upon the Antarctic environment or dependent or associated ecosystems inconsistent with these principles' (Protocol Article 3(4)). The principles outlined in Article 3 form the core of the comprehensive environmental regime.

Article 4 establishes the Protocol as a supplement to the Treaty. Article 5 requires cooperation between parties to ensure that the objectives of all elements of the ATS are met, and to avoid inconsistency in implementation between the Protocol and other instruments. Article 6 encourages parties to cooperate: in programs related to environmental protection; in environmental assessment preparation; to provide information relevant to environmental risk and assistance to minimise the effects of accidents; in consulting with other parties on sites for stations and other facilities to avoid cumulative impacts; and in joint expeditions and shared use of facilities. Parties are also to share information on planning and conducting activities with a view to environmental protection, and cooperate with parties exercising jurisdiction in areas adjacent to the Treaty area to ensure that adverse effects do not occur outside the Treaty area. Article 7 prohibits any activity relating to mineral resources.

Article 8 establishes a system of environmental impact assessment. The thresholds determining the type of assessment to be carried out are set, defined according to the term 'minor or transitory impact'. Article 8 requires parties to apply Annex I to all activities or changes in any activity. Article 9 deals with adoption of, changes to, and application of annexes to the Protocol. Article 10 enables ATCMs to define general policy for protection of the environment consistent with the Protocol, and to adopt measures (through Article IX of the Treaty) to implement the Protocol. Article 11 establishes the membership of the Committee for Environmental Protection (CEP). Each contracting party is entitled to membership. ATPs not party to the Protocol may appoint observers. The president of SCAR, and the chairman of the CCAMLR Scientific Committee may observe, and other organisations may be invited as observers. The CEP reports to the ATCM, with reports made publicly available.

Article 12 details the functions of the CEP. Primarily, the CEP provides advice on Protocol implementation and formulates Recommendations, and performs other tasks referred to it by the ATCM. The CEP advises on the effectiveness of measures pursuant to the Protocol, and on: the need to update, strengthen or improve measures; the need for additional measures; the application and implementation of the environmental assessment procedures; means of minimising or mitigating impacts of activities; procedures for urgent situations, including response actions in environmental emergencies; operation and elaboration of the protected area system; inspection procedures; collection, archiving, exchange and evaluation of information; the state of the Antarctic environment; and the need for research including monitoring.

Article 13 encourages parties to ensure compliance. ATCMs are to notify any third states of activities undertaken by that state or its subjects that do not comply with the Protocol. Article 14 establishes an inspection scheme similar to that established under the Treaty. Parties are to cooperate fully in allowing access to facilities and to records relating to the Protocol. Article 15 requires parties to provide for response action to emergencies, and to develop contingency plans for environmental emergencies. Parties are to cooperate in formulating contingency plans, and develop procedures for notification and cooperative responses. Article 16 commits the parties to develop rules and procedures relating to liability for damage from activities covered by the Protocol. Liability rules and procedures are to be included as an annex to the Protocol. Article 17 sets out reporting requirements, whereby parties are to report on their efforts to implement the Protocol.

Articles 18 through 20 develop a mechanism for settlement of disputes. A range of choices of settlement mechanisms, including an Arbitral Tribunal are established. The Arbitral Tribunal has among its powers and functions some powers to direct parties to take measures to prevent serious environmental harm. Article 21 opens the Protocol for original signature. Article 22 deals with ratification, acceptance, approval or accession. Importantly, Article 22 prevents any Treaty contracting party from becoming an ATCP unless they have committed to the Protocol. Article 23 specifies that the entry into force of the Protocol is subject to ratification by all ATCPs. Article 24 prevents any reservation to the Protocol—a party is unable to commit to only part of the Protocol.

Article 25 deals with modification or amendment. The Protocol may be amended by an ATCM (as set out in the Treaty). A review of the Protocol can be requested by any ATCP after 50 years. At a review conference, decisions can be made by a majority that includes three quarters of states that were ATCPs when the Protocol was adopted. Any change to the prohibition on mineral resource activities may only be introduced if a binding legal regime (such as CCAMLR) were included in its place.

Articles 26 and 27 deal with notifications by the depositary government, authentic texts in the four Treaty languages, and registration of the Protocol with the UN.

The Protocol includes, in addition to these articles, a Schedule (dealing with aspects of the Arbitral Tribunal), and annexes. The first four annexes (I through to IV) are in force, as they were adopted and ratified along with the main articles of the Protocol. Annex V was adopted separately and needs to be approved and ratified separately. The rate of ratification of this Annex has been slower than for the Protocol (Richardson 1998). The Annexes are the practical side of the Protocol, dictating rules, procedures and processes to be followed. As such, they are very significant for tourism, and require closer examination. The Annexes are: I—Environmental impact assessment; II—Conservation of Antarctic fauna and flora; III—Waste disposal and waste management; IV—Prevention of marine pollution; and V—Area Protection and management.

a1.2.4 ANNEX I TO THE PROTOCOL: ENVIRONMENTAL IMPACT ASSESSMENT

Annex I deals with environmental impact assessment (EIA) processes. A three level process is laid out, with a preliminary stage, an Initial Environmental Evaluation (IEE) stage, and a Comprehensive Environmental Evaluation (CEE) stage.

Article 1 requires all activities to undergo the preliminary stage of the environmental assessment process. If activities are determined to have less than a minor or transitory impact, the activity may go ahead. This allows activities that are readily assessed as having a low impact to proceed without extensive assessment procedures.

Article 2 provides for the IEE stage of assessment. If the preliminary stage indicates that the activity may have a minor or transitory impact, an IEE must be prepared. An IEE must contain enough detail to assess if the activity will have more than a minor or transitory impact. The requirements of an IEE include a description of the activity, its purpose, location, duration and intensity. An IEE must also describe the consideration of alternatives to the activity, and any impacts the activity may have, including cumulative impacts, when existing and planned activities are considered. If, based on the IEE, the activity is likely to have no more than a minor or transitory impact, it may proceed (Article 2(2)). Appropriate procedures including monitoring are to be put in place to assess and verify impacts.

Article 3 of the Annex deals with the CEE stage of assessment. If an IEE indicates (or it is determined in another way) that the proposed activity is likely to have more than a minor or transitory impact, a CEE is required. Article 3(2) describes the requirements of a CEE, summarised as:

i. a description including purpose, location, duration and intensity of the activity, and possible alternatives to the activity (including not proceeding);
ii. a description of the initial environmental reference state to compare predicted changes with, and a prediction of the future state of the environment in the absence of the activity;
iii. a description of the methods and data used to forecast impacts of the activity;
iv. estimation of the nature, extent, duration and intensity of the likely direct impacts of the activity;
v. consideration of possible indirect or second order impacts of the activity;
vi. consideration of cumulative impacts, taking into account existing and planned activities;
vii. identification of measures to minimise or mitigate impacts of the proposed activity, monitoring programs to provide early warning of adverse effects, and measures to deal promptly and effectively with accidents;

viii. identification of unavoidable impacts;
ix. consideration of the effects of the activity on scientific research and other existing uses and values;
x. identification of gaps in knowledge and uncertainties encountered in compiling necessary information; and
xi. a non-technical summary.

A draft CEE is to be made publicly available and circulated to all parties (who make it publicly available). The draft CEE is also forwarded to the CEP, for 'consideration as appropriate' (Protocol Annex 1, Article 3(4)). Before a decision can be taken to proceed, an ATCM must have considered the draft CEE (and any advice of the CEP), although this process must not delay an activity more than 15 months after the draft CEE is distributed (Protocol Annex 1, Article 3(5)). The final CEE addresses comments received on the draft. The final CEE, notice of decisions, and evaluation of the significance of predicted impacts in relation to the advantages of the proposed activity, must be circulated to all parties and made publicly available at least 60 days prior to the activity commencing. Article 4 states that any decision on whether a proposed activity which requires a CEE should go ahead, in the original or modified form, 'shall be based on the Comprehensive Environmental Evaluation as well as other relevant considerations'.

Article 5 of the Annex specifies requirements for monitoring. Procedures are to be put in place to assess and verify the impact of any activity proceeding on the basis of a CEE. Such monitoring is to be designed to provide: a regular and verifiable record of the impacts of the activity to assist in judging whether such impacts are consistent with the Protocol; information on minimising or mitigating impacts; and information on any need to suspend, cancel or modify the activity. Article 6 deals with circulation of information to parties, the CEP and the public. The article cover information on preliminary stage assessments, IEEs and corresponding decisions, and information obtained and actions taken relating to monitoring of activities. Article 6 also states that any IEE shall be made available on request (it is not specified who is able to so request). Article 7 relates to emergency situations. In cases of emergency involving safety of lives, ships, aircraft or other high value equipment or facilities, activities may be undertaken without completing the procedures required under the Annex. Any activities undertaken in emergency that would otherwise have required a CEE must be reported to all parties and the CEP immediately, and a full explanation provided within 90 days.

a1.2.5 Annex II to the Protocol: Conservation of Antarctic Fauna and Flora

Annex II is a restatement of the 1964 *Agreed Measures for the Conservation of Antarctic Fauna and Flora* (Blay 1992) with a substantial reworking and expansion of certain aspects. Important changes include the banning of sledge dogs, the inclusion of whales and invertebrate life forms under the terms of the Annex, stricter controls on dressed poultry imports (to prevent disease importation), and controls on the importation of non-sterile soils.

The Annex clearly holds some implications for the management and practice of tourism in the Treaty area. Article 3 prevents anyone from taking or causing harmful interference to fauna and flora. Harmful interference is defined (in Article 1 of the Annex) to include practices that disturb concentrations of birds or seals, including through the use of helicopters and other aircraft, hovercraft, small boats, or vehicles. Wilful disturbance of breeding or moulting birds, or concentrations of birds or seals by persons on foot is also prohibited. Causing significant damage to concentrations of native terrestrial plants through vehicle use, aircraft landing, walking, or any other means is defined as harmful interference. Tourism operations include many activities (including helicopter and small boat use) that have the potential to cause harmful interference. Article 4, dealing with introduction of non-native species, bans the importation of non-native plants and animals (while making appropriate provision for foodstuffs). Tour vessels are therefore not permitted to carry live animals or plants (including indoor plants) into the Treaty area. The disposal of food waste is covered by Protocol Annex III, while Appendix C to the Annex requires the inspection of dressed poultry for disease, and removal or incineration of poultry waste.

a1.2.6 ANNEX III TO THE PROTOCOL: WASTE DISPOSAL AND WASTE MANAGEMENT

Annex III deals with all aspects of waste disposal and management, in four sections: general obligations; waste disposal; waste management planning; and prohibited substances. Under Article 1, general obligations, waste is to be reduced 'as far as is practicable' (this term is used frequently in the Annex). The planning and conduct of activities must take into consideration waste storage, disposal, removal, recycling, and source reduction. Wastes removed from the Treaty area are to be returned, where practicable, to the country of organisation, or a place where arrangements have been made for waste disposal. Waste disposal sites and abandoned sites on land are to be cleaned up by the waste generator or site user, unless removal would result in a greater adverse environmental impact.

Article 2 lists a range of wastes that must be removed from the area (excepting those deposited before the Protocol entered force). These include a range of toxic substances, heavy metals, fuels and oils, plastics, and items that produce harmful emissions if incinerated. Fuel drums and other solid non-combustible wastes are to be removed unless the adverse impact of removal is greater than the impact of leaving them. Other liquid wastes, sewage and domestic wastes are 'to the maximum extent practicable' to be removed from the Treaty area. Remains of imported animals (such as food wastes) are to be removed, incinerated or made sterile. Article 3 permits some wastes to be incinerated, with solid residue to be removed. Open burning was due to be phased out by the 1998/99 season.

Article 4 covers land disposal. No wastes may be disposed of on ice free areas or into fresh water systems. As far as practicable, sewage, domestic liquid and other liquid wastes should not be disposed of onto sea ice, ice shelves, or the grounded ice sheet. Deep ice pit disposal of wastes generated inland is acceptable if that is the only practicable option, as long as pits are not located where they may end up in ice free areas or areas of high ablation. Field camp waste is to be removed to stations or ships for disposal. Article 5 covers sea disposal. Sewage, domestic liquid wastes, and sewage treatment by-products may be discharged directly into the sea providing the discharge location allows dilution and rapid dispersal. Where large amounts are discharged, maceration is required. Article 6 requires wastes to be stored so as to prevent their dispersal into the environment.

Article 7 prohibits introduction to the area (or release of) PCBs, non-sterile soil, polystyrene beads or chips, or pesticides. The remaining articles of the Annex relate to waste management planning for national operations, and general operation of the Annex. The Annex does not apply in cases of emergency relating to the safety of human life or valuable equipment, or in cases of emergency involving threat to the environment.

In summary, tourism operations are required to remove certain articles from the Treaty area, and are permitted to incinerate others. Provisions for land based disposal of wastes, and disposal from land into the sea apply to tourism, but are applicable to only a few activities at present, although future developments might include such actions. The Annex requires operators to obey the general obligations relating to waste reduction, planning of waste management, and arrangements for disposal in other countries.

a1.2.7 Annex IV to the Protocol: Prevention of Marine Pollution

Annex IV, while dealing with some of the same substances as Annex III, is concerned only with disposals and discharges from ships. A separate international agreement exists governing marine pollution, the *International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978* (MARPOL 73/78). Not all parties to the Protocol will necessarily be party to MARPOL 73/78. While Annex IV of the Protocol deals mainly with discharge practices, and to a limited extent with ship design and equipment requirements, MARPOL 73/78 is a much more comprehensive instrument. Annex IV provides an additional layer of regulation, recognising that some practices are not appropriate in the Treaty area.

Article 2 applies the Annex to ships and marine craft. The Annex does not apply to 'any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service' (Protocol Annex IV, Article 11). This means that the provisions of the Annex relating to ships are likely to apply mostly to tourism vessels (being the main non-governmental traffic) (Pineschi 1992). In cases of emergency involving ships or lives, the Annex articles on discharge do not apply (Protocol Annex IV, Article 7). Interestingly, an emergency threatening the environment is not included in Article 7 as a reason for exemption from the provisions of the Annex, in contrast to the other annexes.

All discharges of oil and oily mixtures in the Treaty area are prohibited under Article 3. Sludge, dirty ballast, tank washing waters, and other oily mixtures must be stored on board. Damage to a ship or its equipment exempts the operator from the Article if reasonable precautions were taken and reckless or deliberate behaviour was not the cause. Article 4 prohibits the discharge of noxious liquid substances and chemicals 'in quantities or concentrations that are harmful to the marine environment' (Protocol Annex IV, Article 4).

Disposal at sea of all garbage (plastics, paper, rag, glass, metal, bottles, crockery, incineration ash and others) is prohibited under Article 5. Food wastes may be disposed of at sea if they have been ground, and disposal must occur as far as possible (and at least 12 nautical miles) from the nearest land or ice shelves. The parties may require the keeping of garbage record books.

Sewage is not to be discharged within 12 nautical miles of land or ice shelves 'except where it would unduly impair Antarctic operations' (Protocol Annex IV, Article 6). The qualifier would seem to offer considerable opportunity for operators to avoid compliance. Stored sewage is to be discharged at a moderate rate while the ship is doing at least 4 knots. Ships certified for 10 people or less are not required to comply. Parties may require the keeping of sewage record books.

Article 8 requires due consideration of the effects of the Annex on dependent and associated ecosystems. Parties are to ensure that ships have sufficient capacity (tanks and storage space) for substances to be removed from the Treaty area (Article 9). Ships also have to make arrangements to discharge substances at a port reception facility, before entering the Treaty area. Parties with entry and exit ports are to provide adequate facilities for the reception of substances. Article 10 requires parties to take into account the Annex when designing, constructing, equipping and staffing ships.

Article 12 details the measures parties must take to be prepared for emergencies, including contingency planning, cooperation with other states, obtaining advice, and developing cooperative responses to pollution emergencies. Other articles require the parties to review the Annex and its implementation regularly.

a1.2.8 Annex V to the Protocol: Area Protection and Management

Annex V was adopted within two weeks of the Protocol in the form of Rec. XVI-10. As a result, it requires separate ratification by parties, and will enter into force only when this has been achieved (Richardson 1998). Annex V rationalises and simplifies the protected area system, and provides new opportunities for management practices not previously available or practicable in the region. The Annex provides for designation of Antarctic Specially Protected Areas (ASPAs) and Antarctic Specially Managed Areas (ASMAs). Previous forms of protected area are absorbed into these new categories, with the exception of Historic Sites and Monuments, which can still be designated and listed separately. The objectives of the Annex are the management, restriction or prohibition of activities, in any area (including marine areas) designated an ASMA or ASPA.

Article 3 provides for ASPAs. Any area can be designated to protect outstanding environmental, scientific, historic, aesthetic, or wilderness values, or ongoing or planned scientific research. Parties are to identify and designate (within a systematic environmental and geographical framework) areas with the following characteristics:

a) areas to be kept inviolate from human interference to allow comparison with areas affected by activities;
b) representative examples of major terrestrial (including glacial and aquatic) ecosystems, and marine ecosystems;
c) areas with important or unusual assemblages of species;
d) type localities or only known habitat areas of any species;
e) areas of particular interest to on-going or planned research;
f) outstanding geological, glaciological, or geomorphological features;
g) areas of outstanding aesthetic or wilderness value;
h) sites or monuments of recognised historic value;
i) other areas necessary to meet the objectives of Article 3.

Previously designated areas, particularly Specially Protected Areas (SPAs) and Sites of Special Scientific Interest (SSSIs) are absorbed into the ASPA category. Entry into ASPAs is prohibited except in accordance with a permit.

Article 4 provides for ASMAs. Any area (marine areas included) can be designated as an ASMA to assist in the planning and coordination of activities, avoid conflicts, improve cooperation between parties, and minimise environmental impacts. ASMAs may include:

i. areas where activities pose risks of mutual interference or of cumulative environmental impacts;
ii. sites or monuments of recognised historic value.

ASMAs can be entered without the need for a permit, although they may contain ASPAs, which would require a permit.

Article 5 details the requirements for a management plan for an ASPA or an ASMA. The designation process begins with the submission of a plan by any party or by the CEP, SCAR, or the CCAMLR Commission (Protocol Annex V, Article 1). Importantly, the protected area shall be of sufficient size to protect the values for which the area is designated. This diverges from the previous philosophy of the protected area system which encouraged declaration of areas as small as possible (Heap 1994). Management plans are to include, where appropriate:

a) a description of the values for which protection is needed;
b) aims and objectives of the management plan for protection or management of those values;
c) management activities needed to protect the values;
d) period of designation;

e) a description of the area including geographical description, access to and within the area by air, land and sea, mechanised or pedestrian; location of structures within and near the area, locations of other protected areas within or nearby, zones within the area within which some activities are prohibited, restricted or managed, and maps and photographs showing the boundary.

For ASPAs, the management plan must include the conditions for granting of a permit to enter, including rules of: access to and movement within the area; permissible activities; restrictions on time and place of activities; installation or removal of structures; location of camps; restricted materials; interference with fauna and flora; removal of material; waste disposal; and reporting requirements. These same elements are listed for inclusion in a code of conduct for an ASMA, which may be incorporated in a management plan.

Article 6 details the designation and review procedures for protected areas. Article 7 provides for the issuing of permits in accordance with the management plan by an appropriate authority. Article 8 establishes a listing of historic sites and monuments. All sites or monuments of historic value designated as ASPAs or ASMAs, or within such areas, are included. Sites or monuments located outside protected areas can be listed.

Under Article 9 each party is to make available information including locations of ASMAs and ASPAs, maps, management plans, prohibitions and conditions, and locations of historic sites and monuments. Parties are to ensure that ASMAs and ASPAs are shown on maps they produce. Where appropriate the boundaries of ASMAs, ASPAs and historic sites and monuments should be marked on-site.

Article 10 details information to be collected and exchanged, including records of permits, visit reports, and significant changes or damage to ASMAs, ASPAs or historic sites or monuments. Common forms are to be developed for this exchange of information, which is to be reported on a regular basis to other parties and the CEP. Research conducted in protected areas is also to be recorded and reported. Article 11 provides exemption from the Annex in cases of emergency endangering life, equipment, or the environment. Amendment and modification is as established for the Protocol.

a1.2.9 THE PROPOSED LIABILITY ANNEX TO THE PROTOCOL

The Protocol requires parties to reach agreement on 'rules and procedures relating to liability for damage arising from activities taking place in the Antarctic Treaty area' and include them as an additional annex (Article 16). This issue has proved difficult, with consensus not yet reached. A Group of Legal Experts was established to negotiate aspects of the liability agreement. This group reported to ATCM XXII and passed responsibility back to the political and diplomatic process to resolve a number of issues (ATCM 1998) being, in summary:

i. whether a comprehensive approach (covering all categories of harmful impacts) should be taken, or whether more than one annex should be devised, with the first dealing only with failure to take response action in the event of an environmental emergency:

ii. whether a liability annex should require precautionary measures, response action, or remedial measures (or a combination of these);

iii. whether a liability annex should apply to all activities equally, or whether science and logistic activities should have preferential treatment (an associated concern relates to the effect of the liability regime on cooperative science programs);

iv. whether compensation should be required for damage that has not been repaired or cannot be repaired (irreparable damage), and how amounts of compensation could be determined if no repair was carried out;

v. whether an annex should establish an Environmental Protection Fund (for voluntary contributions or compensation for unrepaired damage) and how such a fund should be administered;

vi. whether impacts resulting from activities authorised by parties under the environmental assessment process should be excluded from the liability regime, and if so should this apply to both IEEs and CEEs; and

vii. whether impacts caused by permitted activities under the Protocol (such as marine discharges under Annex IV, or cases of emergency) should be subject to liability (ATCM XXII 1998).

These key issues indicate what the liability annex may address. Clearly, there are significant implications for the tourism industry. If a liability annex to the Protocol enters into force, tourism operators will be exposed to legally binding responsibilities for environmental impacts. Considerations for tourism include the possibility of preferential treatment being given to government program activities, possible exposure to liability for damage caused through activities that have already gone through environmental assessment processes and been authorised, and possible liability for the effects of acts considered acceptable and legal under the Protocol. Division of responsibility for compensation for cumulative impacts caused by more than one operator is another issue. If established, an Environmental Protection Fund could provide a mechanism for tourism to contribute more directly to Antarctic environmental conservation and protection.

The ATCM in 1998 referred responsibility for further negotiations to the next ATCM. Deliberations were to take into account the report of the Group of Legal Experts, and inputs from SCAR, COMNAP and others (including IAATO and the CEP) on practical issues of risk assessment, 'concentrating on facts, data and evaluations with regard to circumstances leading to and types of environmental damage, the financial magnitude of potential damages and the probable costs of response actions and remedial measures under the circumstances of Antarctica' (ATCM XXII Decision 3 1998, ATCM 1998).

Appendix 2: The proposed tourism Annex to the Protocol

A preliminary draft tourism annex was tabled at ATCM XVII in 1992 (see section 4.1.5). The preliminary draft took the form of a working paper provided by Chile, France, Germany, Italy and Spain (1992, WP1 ATCM XVII), titled 'Preliminary draft of (proposed) Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty: Regulation concerning Tourism and Non-Governmental Activities'.

The preliminary draft annex contained 12 articles. Article 1 permitted any visit to Antarctica provided that it did not adversely affect the environment or the conduct of scientific activities. Article 2 provided definitions, distinguishing between 'organised group visitors', 'independent visitors' (organising a trip on their own behalf), and 'non-official visitors' (any visitor not operating on behalf of a Protocol party). The article provided for designation of ASTIs, where visits and stays would be permitted. Other areas of the continent would only be visited subject to paragraph 5, Article 3 of Protocol Annex I—in effect, a CEE would need to be carried out and approved by a party after ATCM consideration, and after consideration of previous scientific investigation.

Article 4 set out conditions tour organisers or independent visitors would need to meet before, during, and after travel. Notice of travel would be required at least 15 months before commencement, including:

- authorisation to carry out the activity (given by the country in which the organiser was based);
- a detailed description of the voyage including dates of travel and stays, navigation plans, numbers of visitors, conditions of how visits would be conducted, and particulars of crew and tour guides;
- an environmental impact assessment;
- a declaration of willingness to prevent environmental damage;
- authorisation for any planned station visits;
- measures to be used to inform and guide tourists;
- measures to avoid the need to call on outside assistance;
- information on insurance type, the nature of risk covered, and maximum amount of compensation in the event of accident;
- documents proving the financial standing of the organiser;
- list of equipment and provisions for self-sufficiency;
- information on self-rescue capacity and measures to prevent marine pollution (for organised tours).

Organisers from states that are not party to the Protocol could apply to the Protocol depositary state with the above information. During travel, organisers and independent visitors would have to commit themselves to:

- abide by norms of conduct drawn up by the ATCM (via the CEP);
- confirm station visits at least 72 hours in advance;
- comply with the Protocol, its annexes, and ATCM Recommendations;
- provide copies of insurance policies covering liability for pollution and other risks.

After the trip organisers and independent visitors who were required to produce a CEE would need to report on activities undertaken in accordance with the monitoring provisions of Article 5 of Annex I of the Protocol.

Article 5 would have required parties to adopt appropriate measures to guarantee compliance, and decide on sanctions. Parties were to provide documentation describing areas open for visits, and practical guidelines, as well as ensuring that accompanying personnel received proper training. Parties were to provide prior permission for visits, and in the case of actions requiring CEEs, states could not provide permission except on the advice of the ATCM. A five year ban on any operator (or independent traveller) who had not complied with the Protocol and its annexes in the past was provided for. States were also to provide visit information to the CEP, and were to exert efforts to ensure no-one engaged in activities contrary to the Annex.

Article 6 established the CEP as the main advisory body for regulatory measures. The CEP could propose ASTIs. The CEP was to direct the formulation of ATCM measures, including the terms for visits to ASTIs and stations, directives on crew and personnel training, and information to visitors concerning compliance and hazards. The CEP was to: propose measures to ATCMs to ensure monitoring and supervision of visits; publish visit statistics; and report to the ATCM on visits, impacts, and any emergencies. The CEP would if necessary propose temporary limitations on numbers of visitors, or temporary closure of areas, to ensure that visitation was compatible with the 'receiving capacity and safeguarding of the areas visited' (Chile, France, Germany, Italy & Spain 1992, WP1 ATCM XVII, p. 8).

Article 7 outlined the functions of the ATCM. The ATCM was to provide advice (favourable or unfavourable–essentially approval or not) to parties on tourism activities requiring CEEs. An approval could not cover a period of more than 2 years. The ATCM was to draw to the attention of relevant parties tourist activities that contravened the Annex. In the case of non-Protocol states, the ATCM would notify the state with jurisdiction that such activities were in contravention of the Annex, and advise as to appropriate measures that could be undertaken to avoid environmental damages.

Article 8 covered logistics of tour operations. Structure and equipment of ships used for tourism were to be appropriate for Treaty area navigational conditions, and would have required basic means for the prevention of marine pollution in case of accident. The article required that 'to the fullest extent possible' ships would have to be operated by qualified personnel, and should have strengthened hulls for navigation in ice, duplicated gear for vital functions (steering, propulsion, navigation), and rescue equipment designed for polar conditions (Chile, France, Germany, Italy & Spain 1992, WP1 ATCM XVII, p. 10). Ships would need to comply with normal international maritime law, and crews would need to be experienced and receive special training for navigation in polar areas. Pilots (presumably ice pilots) were to be on board. Helicopters would be carried where possible for rescue and navigation. Landings ashore would be restricted to daylight, and would be in ASTIs or at stations. Decisions about construction of floating or land based tourist accommodation would be based on an environmental evaluation under Annex I of the Protocol, and only after the consideration and favourable advice of the ATCM.

Article 9 provided for surveillance of areas visited, ships, and aircraft. Periodical inspections of ASTIs and any other areas visited were to be conducted. Article 10 required insurance for reimbursement of parties involved in rescue operations, cleanup, or repair, without prejudice to the proposed liability annex. Article 11 exempted from the provisions of the Annex any activities relating to emergencies. The standard requirement for reporting of such activities was included (as used in the other Protocol annexes). Article 12 contained standard amendment and modification rules.

Appendix 3: Recommendation XVIII-1 and Recommendation VIII-9

RECOMMENDATION XVIII-1

TOURISM AND NON-GOVERNMENTAL ACTIVITIES

The Representatives,

Reaffirming the exceptional character of the Antarctic environment given in particular the fragility of its fauna and flora and of the setting which the Antarctic offers for the conduct of scientific activities;

Acknowledging the increase in the development of tourist activities in the Antarctic;

Noting that those who visit the Antarctic and organise or conduct tourism or non-governmental activities in the Antarctic are currently subject to legally binding obligations pursuant to national legislation implementing the Antarctic Treaty and associated legal instruments;

Noting further that such visitors or organisers will be subject to additional legally binding obligations upon entry into force of the Protocol on Environmental Protection to the Antarctic Treaty;

Recognising the need for visitors and organisers to have practical guidance on how to best plan and carry out any visits to the Antarctic;

Recalling the Final Act of the Eleventh Special Antarctic Treaty Consultative Meeting, at which the Protocol was adopted, in which the signatories of the Final Act decided that the Annexes of the Protocol should be applied in accordance with their legal systems and to the extent practicable;

Desiring to ensure that those who visit the Antarctic carry out their visits or tours strictly in accordance with existing obligations and in so far is consistent with existing national law, in accordance with the Protocol, pending its entry into force;

Desiring further to facilitate the early entry into force of the Protocol and of the implementation of its provisions in relation to those who visit or organise tours to the Antarctic.

Recommend to their Governments that:

1. They circulate widely and as quickly as possible the Guidance to Visitors to the Antarctic and the Guidance to those organising and conducting tourism or non-governmental activities in the Antarctic annexed to this Recommendation.
2. They urge those intending to visit or organise and conduct tourism or non-governmental activities in the Antarctic to act in accordance with the annexed guidelines consistent with the relevant provisions of their applicable national law.

GUIDANCE FOR VISITORS TO THE ANTARCTIC

Activities in the Antarctic are governed by the Antarctic Treaty of 1959 and associated agreements, referred to collectively as the Antarctic Treaty system. The Treaty established Antarctica as a zone of peace and science.

In 1991, the Antarctic Treaty Consultative Parties adopted the Protocol on Environmental Protection to the Antarctic Treaty, which designates the Antarctic as a natural reserve. The Protocol sets out environmental principles, procedures and obligations for the comprehensive protection of the Antarctic environment, and its dependent and associated ecosystems. The Consultative Parties have agreed that, pending its entry into force, as far as possible and in accordance with their legal system, that the provisions of the Protocol should be applied as appropriate.

The Environmental Protocol applies to tourism and non-governmental activities as well as governmental activities in the Antarctic Treaty Area. It is intended to ensure that these activities do not have adverse impacts on the Antarctic environment, or on its scientific and aesthetic values.

This Guidance for Visitors to the Antarctic is intended to ensure that all visitors are aware of, and are therefore able to comply with, the Treaty and the Protocol. Visitors are, of course, bound by national laws and regulations applicable to activities in the Antarctic.

A. Protect Antarctic wildlife

Taking or harmful interference with Antarctic wildlife is prohibited except in accordance with a permit issued by a national authority.

1. Do not use aircraft, vessels small boats, or other means of transport in ways that disturb wildlife, either at sea or on land.
2. Do not feed, touch, or handle birds or seals, or approach or photograph them in ways that cause them to alter their behaviour. Special care is needed when animals are breeding or moulting.
3. Do not damage plants, for example by walking, driving, or landing on extensive moss beds or lichen-covered scree slopes.
4. Do not use guns or explosives. Keep noise to the minimum to avoid frightening wildlife.
5. Do not bring non-native plants or animals into the Antarctic (e.g. live poultry, pet dogs and cats, house plants).

B. Respect protected areas

A variety of areas in the Antarctic have been afforded special protection because of their particular ecological, scientific, historic or other values. Entry into certain areas may be prohibited except in accordance with a permit issued by an appropriate national authority. Activities in and near designated Historic Sites and Monuments and certain other areas may be subject to special restrictions.

1. Know the locations of areas that have been afforded special protection and any restrictions regarding entry and activities that can be carried out in and near them.
2. Observe applicable restrictions.
3. Do not damage, remove or destroy Historic Sites or Monuments, or any artifacts associated with them.

C. Respect scientific research

Do not interfere with scientific research, facilities or equipment.

1. Obtain permission before visiting Antarctic science and logistic support facilities; reconfirm arrangements 24–72 hours before arriving; and comply strictly with the rules regarding such visits.
2. Do not interfere with, or remove, scientific equipment or marker posts, and do not disturb experimental study sites, field camps, or supplies.

D. Be safe

Be prepared for severe and changeable weather. Ensure that your equipment and clothing meet Antarctic standards. Remember that the Antarctic environment is inhospitable, unpredictable and potentially dangerous.

1. Know your capabilities, the dangers posed by the Antarctic environment, and act accordingly. Plan activities with safety in mind at all times.
2. Keep a safe distance from all wildlife, both on land and at sea.
3. Take note of, and act on, the advice and instructions from your leaders; do not stray from your group.
4. Do not walk onto glaciers or large snow fields without proper equipment and experience; there is a real danger of falling into hidden crevasses.
5. Do not expect a rescue service; self-sufficiency is increased and risks reduced by sound planning, quality equipment, and trained personnel.
6. Do not enter emergency refuges (except in emergencies). If you use equipment or food from a refuge, inform the nearest research station or national authority once the emergency is over.
7. Respect any smoking restrictions, particularly around buildings, and take great care to safeguard against the danger of fire. This is a real hazard in the dry environment of Antarctica.

E. Keep Antarctica pristine

Antarctica remains relatively pristine, and has not yet been subjected to large scale human perturbations. It is the largest wilderness area on earth. Please keep it that way.

1. Do not dispose of litter or garbage on land. Open burning is prohibited.
2. Do not disturb or pollute lakes or streams. Any materials discarded at sea must be disposed of properly.
3. Do not paint or engrave names or graffiti on rocks or buildings.
4. Do not collect or take away biological or geological specimens or man-made artifacts as a souvenir, including rocks, bones, eggs, fossils, and parts or contents of buildings.
5. Do not deface or vandalise buildings, whether occupied, abandoned, or unoccupied, or emergency refuges.

Guidance for those organising and conducting tourism and non-governmental activities in the Antarctic

Antarctica is the largest wilderness area on earth, unaffected by large scale human activities. Accordingly, this unique and pristine environment has been afforded special protection. Furthermore, it is physically remote, inhospitable, unpredictable and potentially dangerous. All activities in the Antarctic Treaty Area, therefore, should be planned and conducted with both environment protection and safety in mind.

Activities in the Antarctic are subject to the Antarctic Treaty of 1959 and associated legal instruments, referred to collectively as the Antarctic Treaty system. These include the Convention for the Conservation of Antarctic Seals (CCAS) (1972), the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) (1980) and the Recommendations and other measures adopted by the Antarctic Treaty Consultative Parties under the Antarctic Treaty.

In 1991, the Consultative Parties to the Antarctic Treaty adopted the Protocol on Environmental Protection to the Antarctic Treaty. This Protocol sets out environmental principles, procedures and obligations for the comprehensive protection of the Antarctic environment, and its dependent and associated ecosystems. The Consultative Parties have agreed that, pending its entry into force, as far as possible and in accordance with their legal systems, that the provisions of the Protocol should be applied as appropriate.

The Environmental Protocol designates Antarctica as a natural reserve devoted to peace and science, and applies to both governmental and non-governmental activities in the Antarctic Treaty Area. The Protocol seeks to ensure that human activities, including tourism, do not have adverse impacts on the Antarctic environment, nor on its scientific and aesthetic values.

The Protocol states, as a matter of principle, that all activities are to be planned and conducted on the basis of information sufficient to evaluate their possible impact on the Antarctic environment and its associated ecosystems, and on the value of Antarctica for the conduct of scientific research. Organisers should be aware that the Environmental Protocol requires that "activities shall be modified, suspended or cancelled if they result in or threaten to result in impacts upon the Antarctic environment or dependent or associated ecosystems."

Those responsible for organising and conducting tourism and non-governmental activities must comply fully with national laws and regulations which implement the Antarctic Treaty system, as well as other national laws and regulations implementing international agreements on environmental protection, pollution and safety that relate to the Antarctic Treaty Area. They should also abide by the requirements imposed on organisers and operators under the Protocol on Environmental Protection and its Annexes, in so far as they have not yet been implemented in national law.

Key obligations on organizers and operators

1. Provide prior notification of, and reports on, their activities to the competent authorities of the appropriate Party or Parties.
2. Conduct an assessment of the potential environmental impacts of their planned activities.
3. Provide for effective response to environmental emergencies, especially with regard to marine pollution.
4. Ensure self-sufficiency and safe operations.
5. Respect scientific research and the Antarctic environment, including restrictions regarding protected areas, and the protection of flora and fauna.
6. Prevent the disposal and discharge of prohibited waste.

Procedures to be followed by organisers and operators

A. *When planning to go to the Antarctic*

Organisers and operators should:

1. Notify the competent national authorities of the appropriate Party or Parties of details of their planned activities with sufficient time to enable the Party(ies) to comply with their information exchange obligations under Article VII(5) of the Antarctic Treaty. The information to be provided is listed in Attachment A.
2. Conduct an environmental assessment in accordance with such procedures as may have been established in national law to give effect to Annex I of the Protocol, including, if appropriate, how potential impacts will be monitored.
3. Obtain timely permission from the national authorities responsible for any stations they propose to visit.

4. Provide information to assist in the preparation of: contingency response plans in accordance with Article 15 of the Protocol; waste management plans in accordance with Annex III of the Protocol, and marine pollution contingency plans in accordance with Annex IV of the Protocol.
5. Ensure that expedition leaders and passengers are aware of the location and special regimes which now apply to Specially Protected Areas and Sites of Special Scientific Interest (and on entry into force of the Protocol Antarctic Specially Protected Areas and Antarctic Specially Managed Areas) and of Historic Sites and Monuments and, in particular, relevant management plans.
6. Obtain a permit, where required by national law, from the competent national authority of the appropriate Party or Parties, should they have a reason to enter such areas, or a monitoring site (CEMP Site) designated under CCAMLR).
7. Ensure activities are fully self-sufficient and do not require assistance from Parties unless arrangements for it have been agreed in advance.
8. Ensure they employ experienced and trained personnel, including a sufficient number of guides.
9. Arrange to use equipment, vehicles, vessels and aircraft appropriate to Antarctic operations.
10. Be fully conversant with applicable communications, navigation, air traffic control and emergency procedures.
11. Obtain the best available maps and hydrographic charts, recognising that many areas are not fully or accurately surveyed.
12. Consider the question of insurance (subject to any requirements of national law).
13. Design and conduct information and education programs to ensure that all personnel and visitors are aware of relevant provisions of the Antarctic Treaty System.
14. Provide visitors with a copy of the Guidance for Visitors to the Antarctic.

B. When in the Antarctic Treaty Area

Organisers and operators should:

1. Comply with all requirements of the Antarctic Treaty system, and relevant national laws, and ensure that visitors are aware of requirements that are relevant to them.
2. Reconfirm arrangements to visit stations 24 to 72 hours before their arrival and ensure that visitors are aware of any conditions or restrictions established by the station.
3. Ensure that visitors are supervised by a sufficient number of guides who have adequate experience and training in Antarctic conditions and knowledge of the Antarctic Treaty system requirements.
4. Monitor environmental impacts of their activities, if appropriate, and advise the competent national authorities of the appropriate Party or Parties of any adverse or cumulative impacts resulting from an activity, but which were not foreseen by their environmental impact assessment.
5. Operate ships, yachts, small boats, aircraft, hovercraft and all other means of transport safely and according to appropriate procedures, including those set out in the Antarctic Flight Information Manual (AFIM).
6. Dispose of waste materials in accordance with Annexes III and IV of the Protocol. These annexes prohibit, among other things, the discharge of plastics, oil and noxious substances into the Antarctic Treaty Area; regulate the discharge of sewage and food waste; and require the removal of most waste from the area.
7. Cooperate fully with observers designated by Consultative Parties to conduct inspections of stations, ships, aircraft and equipment under Article VII of the Antarctic Treaty, and those to be designated under Article 14 of the Environmental Protocol.
8. Cooperate in monitoring programs undertaken in accordance with Article 3(2)(d) of the Protocol.
9. Maintain a careful and complete record of their activities conducted.

C. On completion of the activities

Within three months of the end of the activity, organisers and operators should report on the conduct of it to the appropriate national authority in accordance with national laws and procedures. Reports should include the name, details and state of registration of each vessel or aircraft used and the name of their captain or commander; actual itinerary; the number of visitors engaged in the activity; places, dates and purposes of landings and the number of visitors landed on each occasion; any meteorological observations made, including those made as part of the World Meteorological Organisation (WMO) Voluntary Observing Ships Scheme; any significant changes in activities and their impacts from those predicted before the visit was conducted; and action taken in case of emergency.

D. *Antarctic Treaty system documents and information*

Most Antarctic Treaty Parties can provide through their national contact points copies of relevant provisions of the Antarctic Treaty system and information about national laws and procedures.

- The Antarctic Treaty (1959)
- Convention for the Conservation of Antarctic Seals (1972)
- Convention on the Conservation of Antarctic Marine Living Resources (1980)
- Protocol on Environmental Protection to the Antarctic Treaty (1991)
- Recommendations and other measures adopted under the Antarctic Treaty
- Final Reports of Consultative Meetings
- Handbook of the Antarctic Treaty System (1994)
- Handbook of the Antarctic Treaty System (in Spanish, 1991 edition)

ATTACHMENT A

INFORMATION TO BE PROVIDED IN ADVANCE NOTICE

Organisers should provide the following information to the appropriate national authorities in the format requested.

1. name, nationality and contact details of the organiser;
2. where relevant, registered name and national registration and type of any vessel or aircraft to be used (including name of the captain or commander, call-sign, radio frequency, INMARSAT number);
3. intended itinerary including the date of departure and places to be visitors in the Antarctic Treaty area;
4. activities to be undertaken and purpose;
5. number and qualifications of crew and accompanying guides and expedition staff;
6. estimated number of visitors to be carried;
7. carrying capacity of vessel;
8. intended use of vessel;
9. intended use and type of aircraft;
10. number and type of other vessels, including small boats, to be used in the Antarctic Treaty area;
11. information about insurance coverage;
12. details of equipment to be used, including for safety purposes, and arrangements for self-sufficiency; and
13. other matters required by national laws.

RECOMMENDATION VIII-9

EFFECTS OF TOURISTS AND NON-GOVERNMENTAL EXPEDITIONS IN THE ANTARCTIC TREATY AREA

The Representatives,

Recognizing that tourists and other persons not sponsored by Consultative Parties are visiting the Antarctic Treaty Area in increasing numbers;

Acknowledging that tourism is a natural development in this Area and that it requires regulation;

Recalling Recommendation VII-4, and particularly the need to avoid increasing interference with natural ecological systems which are not yet sufficiently understood;

Recognising the necessity to restrict the number of places where large numbers of tourists may land so that the ecological effects may be monitored;

Recommend to their Governments that:

1. They use their best endeavours to ensure that all those who enter the Antarctic Treaty Area, both those sponsored by Governments and those not so sponsored, are aware of the Statement of Accepted Practices and the Relevant Provisions of the Antarctic Treaty in Annex A to this Recommendation;
2. They request all organizers of tourist groups, except in an emergency, to:
   a. visit only those Antarctic stations for which permission has been sought and granted in accordance with Recommendation IV-27;
   b. land only within the Areas of Special Tourist Interest listed or defined in Annex B to this Recommendation;
3. When granting permission for tourist groups to visit Antarctic stations which they maintain, Consultative Parties shall require tour organizers to report their activities within the Treaty Area. These reports shall be made at the end of the season to the Consultative Parties whose stations they have visited, in accordance with the requirements listed in Annex C to this Recommendation. The Consultative Parties shall transmit any such reports received by them to the next Antarctic Treaty Consultative Meeting;
4. They keep Annexes A, B and C to this Recommendation under review at successive Consultative Meetings.

ANNEX A: STATEMENT OF ACCEPTED PRINCIPLES AND THE RELEVANT PROVISIONS OF THE ANTARCTIC TREATY

Introduction
The following statement is intended for the guidance of all those who visit the Antarctic. The Antarctic Treaty was negotiated in Washington in 1959 by the states which had established scientific stations in the Antarctic during the International Geophysical Year (1957-58) in order to perpetuate the close scientific co-operation which had marked that period. It provides, inter alia, that the Antarctic shall be used for peaceful purposes only and that any measures of a military nature shall be prohibited; that there shall be freedom of scientific investigation and that the results of such investigation shall be made freely available; that any nuclear explosions and the disposal of radioactive waste material in the Antarctic is prohibited; that notification of an expedition to the Antarctic shall be provided in advance; and that each of the Antarctic Treaty Contracting Parties shall exert appropriate efforts to the end that no one engages in any activity in the Antarctic contrary to the principles or purposes of the Antarctic Treaty.

Recommendations of Antarctic Treaty Consultative Meetings
The Treaty requires that meetings shall be held from time to time to consider and recommend measures in furtherance of its principles and objectives. Amongst these are measures of which all those who enter the Antarctic Treaty Area, both those sponsored by Governments and those not so sponsored, should be aware. The following notes indicate the nature of these measures and the reader is referred to the Recommendations of successive Consultative Meetings for the details.

Protection of the Antarctic environment
The ecosystem of the Antarctic Treaty Area is particularly vulnerable to human interference and the Antarctic derives much of its importance from its uncontaminated and undisturbed condition and the effects it has on adjacent areas and the global environment. For these reasons the Consultative Parties recognise their special responsibility for the protection of the environment and the wise use of the Treaty Area.

Conservation of wildlife
Animals in the Antarctic are in almost all cases tame and are therefore peculiarly vulnerable. Both animals and plants are living under extreme conditions and great care has to be taken to avoid upsetting the natural ecological

system. They are protected by the following five mechanisms under the Agreed Measures for the Conservation of Antarctic Fauna and Flora:

i. Protection of native fauna. The killing, wounding, capturing or molesting of any native mammal or native bird is prohibited except in an emergency or in accordance with a permit issued under the authority of a Participating Government. Any attempt to do any of these things is also prohibited under the same conditions.
ii. Harmful interference. Every effort shall be made to minimize harmful interference with the normal living conditions of any native mammal or bird.
iii. Specially Protected Species. Two species of seal, Fur Seals and the Ross Seal have been designated as Specially Protected Species and permits may only be issued in relation to these species in accordance with certain restrictive criteria.
iv. Specially Protected Areas. Certain area of outstanding scientific interest have been designated as Specially Protected Areas in order to preserve their unique natural ecological system (see Annex I). No person may enter such an Area except in accordance with a permit issued under the authority of a Participating Government. Such permits may only be issued in accordance with certain restrictive criteria.
v. Introduction of non-indigenous species, parasites and diseases. No species of animal or plant not indigenous to the Antarctic Treaty Area may be brought into the Area except in accordance with a permit issued under the authority of a Participating Government. Special precautions have to be taken to prevent the accidental introduction of parasites and diseases into the Treaty Area.

Pelagic sealing
The Consultative Parties, having regard to the possibly damaging ecological consequences that might arise from the exploitation of Antarctic seals for commercial purposes, negotiated the Convention for the Conservation of Antarctic Seals. This Convention entered into force on 11 March 1978.

Waste disposal
In addition to the measures for the conservation of Antarctic Fauna and Flora outlined above, the Consultative Parties have prepared a Code of Conduct for Antarctic Expeditions and Station Activities including, inter alia, recommended procedures for waste disposal (see Annex II).

Protection of Historic Monuments
Every effort should be made to prevent damage or destruction to any historic monuments. The Consultative Parties have listed a number of such monuments for special protection (see Annex III).

Facilitation of scientific research: Sites of Special Scientific Interest
There are many scientific investigations being carried out in the Antarctic which could suffer from accidental interference. For example, long term studies of the population dynamics of a penguin colony may require that visitors be kept to an absolute minimum. Intensive scientific work in one area may require that a nearby ecologically similar area be kept undisturbed and uncontaminated for reference purposes. Again, certain electromagnetically 'quiet' areas, where sensitive instruments have been installed for recording minute signals associated with upper atmosphere studies, may require that visits to the site should be kept to a minimum.

For these and similar reasons the Consultative Parties have designated certain Sites of Special Scientific Interest in the Antarctic (see Annex IV). Each Site is subject to a management plan designed to protect the particular scientific investigations being undertaken. Persons wishing to visit Sites of Special Scientific Interest should, well in advance, consult the national office responsible for the administration of a permanent Antarctic scientific expedition or, if this is not possible, should consult the station commander of the scientific station nearest the site which it is intended to visit.

Tourism and non-governmental expeditions to the Antarctic Treaty Area
An important feature of the Antarctic Treaty is that co-operation under it is facilitated by the prior exchange of information about planned activities. The Treaty commitment covers any expedition organised in or proceeding to the Antarctic from any state which is a Contracting Party to the Antarctic Treaty. A consolidated list of the information to be exchanged is attached at Annex V.

It is a traditional principle that expeditions render all assistance feasible in the event of an emergency. There is in the Antarctic a number of unoccupied huts and refuges which may be used by any expedition in an emergency, in which case the authorities who maintain the hut or refuge should be informed of what use has been made of it.

Special Measures relating to tourist and non-governmental expeditions
The number of non-governmental expeditions to the Antarctic is steadily increasing and there is a tendency for these expeditions to concentrate on the more easily accessible parts of the Antarctic. Frequent visits to scientific stations or undue dependence on the facilities of such stations can prejudice their scientific work. It is therefore required that the organizers of a tourist or non-governmental expedition should furnish notice as soon as possible, through diplomatic channels, to any other Government whose station the expedition plans to visit. Any such Government may refuse to accept a visit to a station which it maintains or may lay down conditions upon which it would grant permission including inter alia, that:

i. reasonable assurance be given of compliance with the provisions of the Antarctic Treaty, measures adopted under it and the conditions applicable at stations to be visited;
ii. tour organizers should ensure that prior to the commencement of the tour or expedition, procedures and systems for adequate telecommunications have been confirmed with the offices administering the Antarctic stations to be visited;
iii. final arrangements to visit any station be made with that station between twenty-four and seventy-two hours in advance of the expected time of arrival;
iv. all tourists and other visitors comply with any conditions or restrictions on their movements which the station commander may stipulate for their safety or to safeguard scientific programs being undertaken at or near the station;
v. visitors must not enter Specially Protected Areas and must respect designated historic monuments;
vi. tour organizers should report to the Governments whose stations they have visited, after completion of the tour, the name and nationality of the ship, the name of the captain, the itinerary of each separate cruise, the number of tourists accompanying each cruise and the places and dates at which landings were made in the Antarctic Treaty Area, with the number of persons landed on each occasion.

ANNEX I

Specially Protected Areas (refers to list of Specially Protected Areas)

ANNEX II

Extract from the Code of Conduct for Antarctic Expeditions and Station Activities relating to Waste Disposal (refers to Code of Conduct, Rec. VIII-11)

ANNEX III

List of Historic monuments (refers to list of Historic Monuments, Rec. VII-9)

ANNEX IV

Sites of Special Scientific Interest (refers to list of SSSIs)

ANNEX V

Standard format for the Annual Exchange of Information (refers to Rec. VIII-6)

GUIDANCE FOR VISITORS TO THE ANTARCTIC

Antarctica and its surrounding islands are one of the few places in the world which are still relatively unchanged by man's activities. Scientists still know very little about the ecological situation in the Antarctic. At the present early stage in research on these matters, some restrictions and precautions may seem unnecessarily harsh, but preliminary studies indicate the need for great caution. By following a few very simple requests, you can help preserve the unique environment of this region.

1. Avoid disturbing wildlife, in particular do not:
   - walk on vegetation;
   - touch or handle birds or seals;
   - startle or chase any bird from its nest;
   - wander indiscriminately through penguin or other bird colonies.
2. Litter of all types must be kept to a minimum. Retain all litter (film wrappers, tissue, food scraps, tins, lotion bottles, etc) in a bag or pocket to be disposed of on board your ship. Avoid throwing tin cans and other trash off the ship near land.
3. Do not use sporting guns.
4. Do not introduce plants or animals into the Antarctic.
5. Do not collect eggs or fossils.
6. Do not enter any of the Specially Protected Areas and avoid Sites of Special Scientific Interest.
7. In the vicinity of scientific stations avoid interference with scientific work and do not enter unoccupied buildings or refuges except in an emergency.
8. Do not paint names or graffiti on rocks or buildings.
9. Take care of Antarctic historic monuments.
10. When ashore, keep together with your party.

Annex B: Areas of Special Tourist Interest

[No Areas of Special Tourist Interest have yet been designated]

Annex C: Matters to be reported by tour organizers

1. Name and nationality of ship
2. Name of Captain
3. Itinerary of each separate cruise
4. Number of tourists accompanying each cruise
5. Places and dates at which landings were made in the Antarctic Treaty Area, with the number of persons landed on each occasion

References

Acero, J., Aguirre, C. (1994) 'A monitoring research plan for tourism in Antarctica', *Annals of Tourism Research* 21(2):295-302.

Adventure Network International (1998) *Adventure Network International*, web page, http://www.adventure-network.com, as at August 1998.

AMAP (1997) *Arctic Pollution Issues: A state of the environment report*, AMAP, Oslo, or web page, http://www.grida.no/prog/polar/amap, as at May 1999.

AMAP (1999) *Arctic Monitoring and Assessment Programme*, web page, http://www.grida.no/prog/polar/amap, as at May 1999.

Antarctic (1989a) 'Argentina's Bahia Paraiso sinks off Anvers Island', *Antarctic* 11(9&10): 391-393.

Antarctic (1989b) 'Sunken Argentinian supply vessel: a continued concern', *Antarctic* 11(11):441-442.

Armstrong, T. (1989) 'The Northern Sea Route, 1988', Note in *Polar Record* 25(154):247-248.

Armstrong, T. (1990) 'The Northern Sea Route', Note in *Polar Record* 26(157):127-129.

Armstrong, T. (1991) 'Tourists visit the North Pole, 1990', Note in *Polar Record* 27(161):130.

Armstrong, T. (1993) 'The Northern Sea Route, 1992', Note in *Polar Record* 29(170):245.

ATCM (1993) *Antarctic Treaty Final Report of the Seventeenth Antarctic Treaty Consultative Meeting*, Venice, 11-20 November 1993.

ATCM (1994) *Antarctic Treaty Final Report of the Eighteenth Antarctic Treaty Consultative Meeting*, Kyoto, 11-22 April 1994.

ATCM (1995) *Antarctic Treaty Final Report of the Nineteenth Antarctic Treaty Consultative Meeting*, Seoul, May 8-19 1995.

ATCM (1996) *Antarctic Treaty Final Report of the Twentieth Antarctic Treaty Consultative Meeting*, Utrecht, 29 April–10 May 1996.

ATCM (1997) *Antarctic Treaty Final Report of the Twenty-first Antarctic Treaty Consultative Meeting*, Christchurch, 19-30 May 1997.

ATCM (1998) *Antarctic Treaty Final Report of the Twenty-second Antarctic Treaty Consultative Meeting*, Tromso, 25 May–5 June 1998.

Aurora Expeditions (1999) 'Shipping News', *Aurora Expeditions Newsletter*, September 1999, Sydney.

Australian Antarctic Division (1995) *Heard Island Wilderness Reserve Management Plan*, Australian Antarctic Division, Department of the Environment, Sport and Territories, Canberra.

Australian Antarctic Division (1999a) *Antarctic tourism*, web page, Australian Antarctic Division web site, http://www.antdiv.gov.au/tourism, as at March 2000.

Australian Antarctic Division (1999b) *Volcanic evidence on McDonald Island*, web page, Australian Antarctic Division web site, http//www.antdiv.gov.au/new/news_releases/1997, as at May 1999.

Australian Financial Review (1996) *The Australian Financial Review: exchange rates*, 2 December.

Australian Maritime Safety Authority (1994) 'Ship safety and marine pollution in the Antarctic', Marine Notice 3/1994, Issued 11 May 1994, Australian Maritime Safety Authority, Canberra.

Bakken, T. (1995) Tourism on Svalbard: future potential and limitation, paper presented to Environmental Northern Sea Foundation, Stavanger, 22–23 August 1995.

Barr, W. (1990) 'Soviet cruise liner in collision with an ice floe near Svalbard, June 1989', Note in *Polar Record* 26(158):238–239.

Barrett, S. (1988) *Economic guidelines for the conservation of biological diversity*, Department of Economics, London School of Economics, London.

BAS (1999a) *Environmental management plan for South Georgia: public consultation paper*, Issued by British Antarctic Survey at the request of the Government of South Georgia and the South Sandwich Islands, British Antarctic Survey, Cambridge.

BAS (1999b) *Protected Areas in Antarctica*, web page, http://www.nerc-bas.ac.uk/public/magic/protected-area, as at May 1999.

BAS, SPRI, WCMC (1993) *Antarctic digital database, version 1.0*, CD Rom & manual, Scientific Committee on Antarctic Research, Cambridge.

Bauer, T. (1994) 'The future of commercial tourism in Antarctica', Note in *Annals of Tourism Research* 21(2):410–413.

Beck, P. (1989) 'Antarctica at the UN 1988: seeking a bridge of understanding', *Polar Record* 25(155):329–334.

Beck, P. (1990a) 'Regulating one of the last tourism frontiers: Antarctica', *Applied Geography* 10(4):343–356.

Beck, P. (1990b) 'The UN goes green on Antarctica: the 1989 session', Note in *Polar Record* 26(159):323–325.

Beck, P. (1992) 'The 1991 UN session: the environmental protocol fails to satisfy the Antarctic Treaty System's critics', *Polar Record* 28(167):307–314.

Beck, P. (1994) 'Managing Antarctic tourism: a front-burner issue', *Annals of Tourism Research* 21(2):375–386.

Beeby, C. (1990) 'The Convention on the Regulation of Antarctic Mineral Resource Activities and its Future', *Antarctica's Future: Continuity or Change?* eds R. Herr, H. Hall, & M. Haward, Australian Institute of International Affairs, Tasmania.

Bellona (1999) 'Nuclear Icebreakers for the next century', *The Nuclear Chronicle*, Bellona Foundation, Oslo, Norway, web page, http://www.bellona.no, as at May 1999.

Bennet, J. (1992) 'Assessing the prospects for contingent valuation in Australia', in *Valuing natural areas: applications and problems of the contingent valuation method*. eds M. Lockwood, T. DeLacy, Johnstone Centre of Parks, Recreation and Heritage, Albury.

Bishop, R. (1987) 'Economic values defined', in *Valuing wildlife: economic and social perspectives*, eds D. Decker, G. Goff, Westview Press, Boulder.

Blamey, R., Common, M. (1992) 'Sustainability and the limits to pseudo market valuation', in *Valuing natural areas: applications and problems of the contingent valuation method*, eds M. Lockwood, T. DeLacy, Johnstone Centre of Parks, Recreation and Heritage, Albury.

Blay, S. (1992) 'New Trends in the Protection of the Antarctic Environment: the 1991 Madrid Protocol', *American Journal of International Law* 86:377–399.

Boczek, B. (1987) 'The legal status of visitors, including tourists, and non-governmental expeditions in Antarctica', in *Antarctic Challenge III: conflicting interests, cooperation, environmental protection, economic development. Proceedings of an*

Interdisciplinary Symposium, July 7th–12th 1987, ed. R. Wolfrum, Duncker & Humblot, Berlin.

Brigham, L.W. (1991a) 'Introduction', in *The Soviet Maritime Arctic*, ed. L.W. Brigham, Naval Institute Press, Annapolis.

Brigham, L.W. (1991b) 'Technical developments and the future of Soviet Arctic marine transportation', in *The Soviet Maritime Arctic*, ed. L.W. Brigham, Naval Institute Press, Annapolis.

Brigham, L.W. (1997) 'An international polar navigation code for the twenty-first century', Commentary in *Polar Record* 33(187):283–284.

Brigham, L.W., Armstrong, T. (1996) 'The Northern Sea Route, 1995', Note in *Polar Record* 32(183):353–355.

Brune, E. (1992) 'Safety in ice navigation in Antarctic waters', in *Proceedings of the Second (1992) International Offshore and Polar Engineering Conference, San Francisco, USA*, International Society of Offshore and Polar Engineers.

Buckley, R. (1994) 'A framework for ecotourism', Research notes and report in *Annals of Tourism Research* 21(3):661.

Bush, W.M. (1990) 'The Antarctic Treaty System: a framework for evolution—the concept of a system', in *Antarctica's future: continuity or change*, eds R. Herr, H.R. Hall, & M. Haward, Australian Institute of International Affairs, Tasmania.

Butler, R. (1990) 'The concept of a tourist area cycle of evolution: implications for management of resources', *Canadian Geographer* XXIV(1):5–12.

Campbell, I., Claridge, G., Balks, M. (1998) 'Short- and long-term impacts of human disturbances on snow-free surfaces in Antarctica', *Polar Record* 34(188):15–24.

Canadian Coast Guard (1994) *Draft Arctic passenger ship guidelines*, Northern Region, Canadian Coast Guard, Minister of Public Works and Government Services, Canada.

CCAMLR (1999) *Ecosystem Monitoring*, web page, http:www.ccamlr.org, as at May 1999.

Cessford, G. (1998) 'Antarctic tourism—a frontier for wilderness management', in *Antarctica in the environmental era*, ed. P. Dingwall, Department of Conservation, Wellington, New Zealand.

Cessford, G., Dingwall, P. (1994) 'Tourism on New Zealand's subantarctic islands', *Annals of Tourism Research* 21(2): 318–332.

Cessford, G., Dingwall, P. (1996) *Tourist visitors and their experiences at New Zealand subantarctic islands*, Science and Research Series No.96, Department of Conservation, Wellington, New Zealand.

Cessford, G., Dingwall, P. (1998) 'Research on shipborne tourism to the Ross Sea region and the New Zealand sub-Antarctic islands', *Polar Record* 34(189):99–106.

Christensen, T. (1992) 'Greenland wants tourism', Note in *Polar Record* 28(164):62–63.

Clark, B. (1997) 'Issues to be addressed in the final rule for EIA of nongovernmental activities in Antarctica, promulgated under P.L. 104–227, The Antarctic Science, Tourism and Conservation Act of 1996', in *Tourism*, web page, ASOC web site, http://www.asoc.org/currentpress/tourism.html, as at May 1999.

Clark, R., Stankey, G. (1979) *The Recreation Opportunity Spectrum: a framework for planning, management, and research*, Pacific Northwest Forest and Range Experiment Station General Technical Report PNW-98, US Department of Agriculture Forest Service.

Clipper Cruise Line (1997) *Introducing the 122-passenger M/S Clipper Adventurer*, web page, http://www.clippercruise.com/advent.html, as at November 1997.

Cobley, N., Shears, J. (1999) 'Breeding performance of gentoo penguins (Pygoscelis papua) at a colony exposed to high levels of human disturbance', *Polar Biology* 21:355–360.

Codling, R. (1982) 'Sea-borne tourism in the Antarctic: an evaluation', *Polar Record* 21(130):3–9.

Codling, R. (1995) 'The precursors of tourism in the Antarctic', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Cooper, C. (1997) 'The contribution of life cycle analysis and strategic planning to sustainable tourism', in Tourism development and growth: the challenge of sustainability, eds S. Wahab & J. Pigram, Routledge, London.

Cooper, C., Jackson, S. (1989) 'Destination life cycle: the Isle of Man case study', *Annals of Tourism Research* 16:377–398.

Cooper, J. (1995a) 'Conservation status of the Prince Edward Islands', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Cooper, J. (1995b) 'Introduced biota at the Subantarctic and cool temperate islands of the Southern Ocean: the issues', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Cooper, J. (1995c) 'Introduced island biota: discussion and recommendations', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Cooper, J., Bonner, N. (1995) 'Protection of historic and cultural sites: discussion and recommendations', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Cooper, J., Ryan, P. (1994) *Management plan for the Gough Island Wildlife Reserve*, Government of Tristan da Cunha, Edinburgh, Tristan da Cunha.

Cooper, J., Ryan, P. (1995) 'Conservation status of Gough Island', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

COMNAP (1999) *COMNAP*, web page, www.delm.tas.gov.au/comnap, as at August 1999.

CPAN (1997) *Circumpolar Protected Areas Network (CPAN) Progress Report 1997*, Conservation of Arctic Flora and Fauna (CAFF) Habitat Conservation Report No.7, CAFF International Secretariat, Akureyri, Iceland, or web page, http://www.grida.no/prog/polar/caff/overview.html, as at May 1999.

Croydon Travel (1995) Antarctica, marketing brochure, Croydon Travel, Croydon, Victoria.

Croydon Travel (1996) Antarctica, marketing brochure, Croydon Travel, Croydon, Victoria.

Croydon Travel (1998) Antarctica, marketing brochure, Croydon Travel, Croydon, Victoria.

CLIA (1997) *What's new in cruising in 1998?*, web page, http://ww2.cruising.org, as at August 1998.

CLIA (1998) *Cruise industry posts 8.6 percent gain in 1997*, web page, http://ww2.cruising.org, as at August 1998.

Culik, B., Wilson, R. (1995) 'Penguins disturbed by tourists', *Nature* 376:301.

Daly, H., Cobb, J. (1989) *For the common good: redirecting the economy toward community, the environment, and a sustainable future*, Beacon Press, Boston.

Dalziell, J. (1995) 'Environmental impact assessment: discussion and recommendations', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Davis, B. (1995) 'Problems in management of historic and cultural sites', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Davis, B. (1996) Towards an integrated management strategy for Antarctic tourism, paper presented to Polar tourism: environmental implications and management workshop, Scott Polar Research Institute, University of Cambridge, 18–21 August.

Davis, B., Herr, R. (1992) 'An Australian perspective on Antarctic tourism', in *Proceedings of the Colmar Symposium on Polar Tourism*, Alsace, 21–23 April 1992.

Davis, P. (1995a) 'Antarctic visitor behaviour: are guidelines enough?', *Polar Record* 31(178):327–334.

Davis, P. (1995b) Wilderness visitor management and Antarctic tourism, PhD thesis, University of Cambridge.

Davis, P. (1998) 'Understanding visitor use in Antarctica: the need for site criteria', *Polar Record* 34(188):45–52.

Davis, P. (1999) 'Beyond guidelines: a model for Antarctic tourism', *Annals of Tourism Research* 26(3):516–533.

De Poorter, M. (1996) 'Environmental Issues', in *Antarctica: a lonely planet travel survival kit*, ed. J. Rubin, Lonely Planet, Hawthorn, Victoria.

Department of Conservation (n.d.) Subantarctic Islands Minimum Impact Code, brochure, Department of Conservation, Southland Conservancy, Invercargill.

Department of Conservation (1990) New Zealand's subantarctic islands: guidelines on tourism, unpublished paper, Southland Conservancy, Department of Conservation, Invercargill.

Department of Conservation (1995) *Draft Conservation Management Strategy: subantarctic islands*, Southland Conservancy Conservation Management Planning Series No.6, Department of Conservation, Invercargill.

Department of Environment Affairs (1988) Code of Conduct: Prince Edward Islands, unpublished paper, Department of Environment Affairs and Tourism, Pretoria.

Department of Environmental Affairs and Tourism (1996) *Prince Edward Islands Management Plan*, Department of Environmental Affairs and Tourism, Prince Edward Islands Management Plan Working Group, Pretoria.

Department of Environmental Affairs and Tourism (1997) *Environmental Impact Assessment of Tourism at Marion Island: Draft report for comment, December 1997*, Department of Environmental Affairs and Tourism, Prince Edward Islands Management Committee, Pretoria.

Department of the Arts, Sport, Environment, Tourism and Territories (1990) *Nomination of Subantarctic Heard Island and McDonald Islands by the Government of Australia for Inclusion in the World Heritage List*, Department of the Arts, Sport, Environment, Tourism and Territories, Canberra.

Diamond, P., Hausman, J. (1993) 'On contingent valuation measurement of non-use values', in *Contingent valuation: a critical assessment*, ed. J. Hausman, North-Holland, Amsterdam.

Dickman, S. (1989) *Tourism, an introductory text*, Edward Arnold / Hodder & Stoughton, Victoria, Australia.

Dingwall, P. (1994) 'Design and delimitation of protected areas' in *Developing the Antarctic Protected Area system. Proceedings of the SCAR/IUCN workshop on Antarctic Protected Areas, Cambridge, UK., 29 June–2 July 1992*, eds R.I. Lewis Smith, D.W. Walton, P. Dingwall, IUCN, Cambridge.

Dingwall, P. (1995a) 'Legal, institutional and management planning considerations in Subantarctic island conservation', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Dingwall, P. (1995b) 'Subantarctic island tourism: discussion and recommendations', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Dingwall, P. ed. (1995c) *Progress in the Conservation of the Subantarctic Islands*, IUCN, Gland.

Dingwall, P. (1998) 'Legal, policy and administrative developments for management of tourism in the Ross Sea region and New Zealand sub-Antarctic islands', Note in *Polar Record* 34(189):143–145.

Dixon, J., Sherman, P. (1990) *Economics of protected areas: a new look at benefits and costs*, Island Press, Washington D.C.

Dobson, A. ed. (1991) *The Green Reader*, Andre Deutsch, London.

Donachie, S. (1994) 'Henryk Arctowski station: mixing science and tourism', *Annals of Tourism Research* 21(2):333–343.

DPWH (1990) *One of the Wonder Spots of the World: Macquarie Island Nature Reserve*, Department of Parks, Wildlife and Heritage, Hobart.

DPWH (1991) *Macquarie Island Nature Reserve Management Plan 1991*, Department of Parks, Wildlife and Heritage, Hobart.

EPA (1998) *Letter to operators July 1998*, web page, http://es.epa.gov/oeca/ofa/articlo.html, as at November 1998.

Enzenbacher, D. (1991) 'In brief: International Association of Antarctic Tour Operators', *Polar Record* 27(163):372.

Enzenbacher, D. (1992a) 'Antarctic tourism and environmental concerns', *Marine Pollution Bulletin* 25(9–12):258–265.

Enzenbacher, D. (1992b) 'Tourists in Antarctica: numbers and trends', *Polar Record* 28(164):17–22.

Enzenbacher, D. (1993a) 'Antarctic tourism: 1991/92 season activity', Note in *Polar Record* 29(170):240–242.

Enzenbacher, D. (1993b) 'Tourists in Antarctica: numbers and trends', *Tourism Management* 14(2):142–146.

Enzenbacher, D. (1994a) 'Antarctic tourism: an overview of 1992/93 season activity, recent developments, and emerging issues', *Polar Record* 30(173):105–116.

Enzenbacher, D. (1994b) 'NSF and Antarctic tour operators meetings', Note in *Annals of Tourism Research* 21(2):424–427.

Enzenbacher, D. (1994c) 'Tourism at Faraday Station: an Antarctic case study', *Annals of Tourism Research* 21(2):303–317.

Enzenbacher, D. (1995a) The management of Antarctic tourism: environmental issues, the adequacy of current regulations and policy options within the Antarctic Treaty System, PhD thesis, Cambridge University.

Enzenbacher, D. (1995b) 'The regulation of Antarctic tourism', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Five U.S. Organizers (1997) Initial Environmental Evaluation: ship based tourism by five U.S. organizers. Antarctic Peninsula, South Shetland Islands and South Orkney Islands. November 1997–March 1998, unpublished report.

Foreign and Commonwealth Office (1997) *List of Protected Areas in Antarctica*, UK Foreign and Commonwealth Office & British Antarctic Survey, London.

Fraser, W., Patterson, D. (1997) 'Human disturbance and long-term changes in Adélie penguin populations: a natural experiment at Palmer Station, Antarctic Peninsula' in

Antarctic Communities: species, structure and survival, eds B. Battaglia, J. Valencia, D. Walton, Cambridge University Press, Cambridge.

Galimberti, D. (1996) 'The Antarctic Unit in the Tourism Board of Tierra del Fuego and its role in Antarctic education' in *Opportunities for Antarctic environmental education and training: Proceedings of the SCAR/IUCN Workshop on Environmental Education and Training, Gorizia, Italy, 26–29 April 1993*, eds P. Dingwall, D. Walton, IUCN, Gland.

Getz, D. (1992) 'Tourism planning and destination life cycle', *Annals of Tourism Research* 19:752–770.

Giese, M. (1996) 'Effects of human activity on Adelie penguin *Psygoscelis adeliae* breeding success', *Biological Conservation* 75:157–164.

Giese, M. (1998) 'Guidelines for people approaching breeding groups of Adelie penguins (*Pygoscelis adeliae*)', *Polar Record* 34(191):287–292.

Gjertz, I., Scheie, J.O. (1998) 'Human casualties and polar bears killed in Svalbard, 1993–1997', Note in *Polar Record* 12(2):107–340.

Glacier Bay Park Concessions (1998) *The Alaska Cruise & Tour Planner—Alaska's Glacier Bay Tours & Cruises*, web page, http://www.glacierbaycruises.com, as at October 1999.

Glacier Bay National Park and Preserve Concessions Office (1998) *Commercial visitor services at Glacier Bay National Park and Preserve, 2nd edition*, Glacier Bay National Park and Preserve Concessions Office, National Park Service, Gustavus, or web page, http://www.nps.gov/glba/admin/commercial/index.htm, as at October 1999.

Go, F., Frechtling, D. eds (1991) *World travel and tourism review: indicators, trends and forecasts, Volume 1 1991*, editors in chief D. Hawkins and J. Brent Ritchie, C.A.B. International, Wallingford, UK.

Graefe, A., Kuss, F., Vaske, J. (1990a) *Visitor impact management: a review of research*, National Parks and Conservation Association, Washington.

Graefe, A., Kuss, F., Vaske, J. (1990b) *Visitor impact management: the planning framework*, National Parks and Conservation Association, Washington.

Great Britain Hydrographic Department (1974) *The Antarctic pilot, comprising the coasts of Antarctica and all islands southward of the usual route of vessels*, 4th edn, Hydrographer of the Navy, Taunton, Somerset.

Greenland Guide (1999) *Greenland guide*, web page, http://www.greenland-guide.gl, as at May 1999.

Greg Mortimer Mountain Services (1996) Journeys to the Polar Regions 1996/97, marketing brochure, Polar Journeys and World Expeditions, Greg Mortimer Mountain Services, Sydney.

GRID-Arendal (1999) *Drift ice food web*, GRID-Arendal Maps and Graphics Database, web page, www.grida.no, as at July 1999.

Habitat Australia (1994) 'Tourism in Antarctica: yes or no', *Habitat Australia*, August 1994:32–36.

Hall, C.M. (1990) Tourism in Antarctica, paper presented to Institute of Australian Geographers Conference, University of New England, Armidale, September.

Hall, C.M. (1993) 'Ecotourism in Antarctica and adjacent sub-Antarctic islands: development, impacts, management and prospects for the future', *Tourism Management* 14(2):117–122.

Hall, C.M. (1994) 'Ecotourism in Australia, New Zealand and the South Pacific: appropriate tourism or a new form of ecological imperialism?' in *Ecotourism: a sustainable option?,* eds E. Cater and G. Lowman, John Wiley, Chichester, UK.

Hall, C.M., Johnston, M. (1995a) 'Introduction: Pole to pole: tourism issues, impacts and the search for a management regime in polar regions', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Hall, C.M., Johnston, M. eds (1995b) *Polar Tourism: Tourism in the Arctic and Antarctic Regions,* John Wiley & Sons, Chichester.

Hall, C.M., McArthur, S. (1993) 'Ecotourism in Antarctica and adjacent sub-Antarctic islands: development, impacts, management and prospects for the future', *Tourism management* 14(2):117–122.

Hall, C.M., Weiler, B. (1992) 'Introduction: what's special about special interest tourism?', in *Special Interest Tourism*, eds B. Weiler, C. Hall, Bellhaven Press, London.

Hall, C.M., Wouters, M. (1994) 'Managing nature tourism in the sub-antarctic', *Annals of Tourism Research* 21(2):355–374.

Hall, C.M., Wouters, M. (1995) 'Issues in Antarctic Tourism', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Hall, L. (1996) *First Ascent: the life and climbs of Greg Mortimer*, Simon & Schuster, East Roseville, NSW.

Hall, S. (1987) *The Fourth World: the heritage of the Arctic and its Destruction*, The Bodley Head, London.

Hart, P. (1988) 'Bound for 60 South—taxes, tips and transfers included: the growth of Antarctic tourism', *Oceanus* 31(2):93–100.

Haywood, K. (1991) 'Can the tourist-area life cycle be made operational?' in *Managing Tourism*, ed. S. Medlik, Butterworth-Heinemann, Oxford.

Headland, R. (1994a) 'Historic sites and monuments', in *Developing the Antarctic Protected Area System: Proceedings of the SCAR/IUCN Workshop on Antarctic Protected Areas*, eds R.I. Lewis-Smith, D.W.H. Walton & P.R. Dingwall, Cambridge, UK June 29–July 2.

Headland, R. (1994b) 'Historical development of Antarctic tourism', *Annals of Tourism Research* 21(2):269–280.

Headland, R. (1996) *Summary of the Peri-Antarctic Islands*, Scott Polar Research Institute, web page, http://www.spri.cam.ac.uk/bob/periant.html, as at February 1998.

Headland, R., Keage, P. (1995) 'Antarctic tourist day-flights', Note in *Polar Record* 31(178):347.

Heap, J. ed. (1990) *Handbook of the Antarctic Treaty System (7th Edition October 1990)*, Polar Publications, Scott Polar Research Institute, Cambridge, UK.

Heap, J., ed. (1994) *Handbook of the Antarctic Treaty System (Eighth Edition April 1994)*, US Department of State, Washington D.C.

Hendee, J., Stankey, G., Lucas, R. (1990) *Wilderness management,* 2nd edn, North American Press, Golden, Colorado.

Herber, B. (1991) 'The common heritage principle: Antarctica and the developing nations', *The American Journal of Economics and Sociology* 50(4):391–406.

Herber, B. (1992) 'The economic case for an Antarctic world park in light of recent policy developments', *Polar Record* 28(167):293–300.

Heritage Expeditions (1998) The Ross Sea Region of Antarctic and Subantarctic Islands of New Zealand and Australia, promotional brochure, Heritage Expeditions, New Zealand.

Herr, R. (1993) 'Antarctic tourism: Australia, regulation and the industry', in *Towards a conservation strategy for the Australian Antarctic Territory: the 1993 Fenner Conference on the Environment*, eds J. Handmer, M. Wilder, Centre for Resource and Environmental Studies, Australian National University, Canberra.

Herr, R. (1996a) 'The changing roles of non-governmental organisations in the Antarctic Treaty System', in *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, eds O.S. Stokke & D. Vidas, Cambridge University Press, Cambridge.

Herr, R. (1996b) 'The regulation of Antarctic tourism: a study in regime effectiveness', in *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, eds O.S. Stokke & D. Vidas, Cambridge University Press, Cambridge.

Higham, T. ed. (1991) *New Zealand's subantarctic islands: a guidebook*, New Zealand Department of Conservation, Invercargill.

Hills, B. (1991) 'Operation thin ice', *Sydney Morning Herald*, 27 January.

Holland America Line (1999) *Holland America Line*, web page, http://www.hollandamerica.com, as at August 1999.

HRSCERA (1989) *Tourism in Antarctica*, Report of the House of Representatives Standing Committee on Environment, Recreation and the Arts, The Parliament of the Commonwealth of Australia, AGPS, Canberra.

Hughes, J. (1994) 'Antarctic historic sites: the tourism implications', *Annals of Tourism Research* 21(2):281–294.

Hughes, J., Davis, B. (1995) 'The management of tourism at historic sites and monuments', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions,* eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

IAATO (1997) '9th Antarctic Tour Operators Meeting handouts', July 9, at NSF, Arlington Virginia.

IAATO (1998) '10th Annual Antarctic Tour Operators Meeting handouts', July 16, at NSF, Arlington Virginia.

IAATO (1999) *International Association of Antarctica Tour Operators*, web page, http://www.iaato.org, as at May 1999.

IACS (1999) 'Class—responsibility and regulation', *IACS Briefing no.8*, January 1999, International Association of Classification Societies Ltd., London.

ICAIR (1999) *A visitor's introduction to Antarctica and its environment,* web page, http://www.icair.iac.org.nz/tourism/visitor.htm, as at May 1999.

IMO (1998) *'International Code of Safety for ships in Polar Waters (Polar Code)'*, Sub-Committee on Ship Design and Equipment (DE), 41st Session, 9–13 March 1998, International Maritime Organisation, draft version, web page, http://www.tc.gc.ca/polarcode, as at May 1998.

IMO (1999) *International Maritime Organisation*, web page, http://www.imo.org, as at June 1999.

Info-Svalbard (1996) *Svalbard Spitzbergen (English)*, Svalbard Tourist Board and Info-Svalbard, Longyearbyen.

Info-Svalbard (1999) *Info-Svalbard*, web page, http://www.svalbard.net/eng/svalvett.htm, as at May 1999.

IUCN (1991) *A strategy for Antarctic conservation,* IUCN, Gland, Switzerland.

Johnson, D.R. (1990) *Glacier Bay National Park tour boat passenger visitor survey 1989*, National Park Service, Cooperative Park Studies Unit, College of Forest Resources, University of Washington.

Johnston, M. (1995) 'Patterns and Issues in Arctic and Sub-Arctic Tourism', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall, M.E. Johnston, John Wiley & Sons, Chichester.

Johnston, M. (1997) 'Polar tourism regulation strategies: controlling visitors through codes of conduct and legislation', *Polar Record* 33(184):13–20.

Johnston, M. (1998) 'Evaluating the effectiveness of visitor-regulation strategies for polar tourism', *Polar Record* 43(188):25–30.

Johnston, M., Hall, C. (1995) 'Visitor Management and the future of tourism in polar regions', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Johnston, M., Mason, P. (1997) 'The WWF initiative to develop guidelines and codes of conduct for Arctic tourism', Note in *Polar Record* 33(185):151–153.

Jones, C. (1998) 'Predictive tourism models: are they suitable in the polar environment?', *Polar Record* 34(190):197–202.

Jouventin, P., Micol, T. (1995) 'Conservation status of the French Subantarctic Islands', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Keage, PL. (1986) *Antarctic protected areas: future options*, Centre for Environmental Studies Occasional Paper No.19, University of Tasmania, Hobart.

Kelly, R., Griffiths, A. (1992) Letter responding to House of Representatives Standing Committee on Environment, Recreation and the Arts Report on Tourism in Antarctica, unpublished report accompanying *Tourism in Antarctica* report, Parliament House, Canberra.

Kindleberger, C. (1986) 'International public goods without international government', *The American Economic Review* 76(1):1–13.

Kneebone, J. (1995) Towards a unified tourism management strategy for the Australian Antarctic Territory, honours dissertation, Institute of Antarctic and Southern Ocean Studies, University of Tasmania, Hobart.

Kneese, A.V. (1977) *Economics and the environment*, Penguin, London.

Kotlyakov, V.M., Agranat, G.A. (1994) 'The Russian North: problems and prospects', *Polar Geography and Geology* 18(4):285–295.

Krakauer, J. (1998) 'Queen Maud Land', *National Geographic*, February 1998:46–69.

Kriwoken, L. (1995) 'Antarctic tourism and environmental impact assessment', *Issues: all Australian educational magazine* March 1995:28–33.

Kriwoken, L., Rootes, D. (1996) Environmental impact assessment and sustainable Antarctic tourism, paper presented to workshop Polar tourism: environmental implications and management. Scott Polar Research Institute, University of Cambridge, 18–21 August 1996.

Kvaerner Masa-Yards (1998) *High-Quality Ships from Finland,* web page, http://www.kvaerner.com/ship/masa-yards, as at 14th October 1998.

Ledingham, R. (1993) 'Reflections of an Antarctic tour guide', *ANARE News, Australian National Antarctic Research Expeditions Magazine*, Autumn:73.

Lewis-Smith, R.I. (1994) 'Introduction to the Antarctic Protected Area System', in *Developing the Antarctic Protected Area system. Proceedings of the SCAR/IUCN* *workshop on Antarctic Protected Areas, Cambridge, UK., 29 June–2 July 1992*, eds R.I. Lewis Smith, D.W. Walton, P. Dingwall, IUCN, Cambridge.

Lewis-Smith, R.I. (1995) 'Human activity and the requirement for environmental impact assessment', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Lewis-Smith, R.I., Walton, David W.H., Dingwall, Paul R., eds (1994) *Developing the Antarctic Protected Area system. Proceedings of the SCAR/IUCN workshop on Antarctic Protected Areas, Cambridge, UK., 29 June–2 July 1992*, IUCN, Cambridge.

Loland, H. (1994) *Svalbard—the land of the cold coasts*, produced by Nytt fra Norge for the Ministry of Foreign Affairs, Norway, web page, http://odin.dep.no/ud/nornytt, as at October 1999.

Mahon, P. (1984) *Verdict on Erebus*, Collins, Auckland.

Marsh, J., Staple, S. (1995) 'Cruise tourism in the Canadian Arctic', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Martin, D., Martin, B. (1996) *Adventure cruising: the complete guide to specialty and small ship cruises*, Pine Cone Press, Columbia, California.

May, J. (1988) *The Greenpeace book of Antarctica: a new view of the seventh continent*, Child & Associates Publishing Pty Ltd, Frenchs Forest, NSW, Australia.

Mellor, M. (1993) *Notes on Antarctic aviation*, Cold Regions Research & Engineering Laboratory Report 93–14, US Army Corps of Engineers.

Mellor, M., Swithinbank, C. (1989) *Airfields on Antarctic glacier ice*, Cold Regions Research & Engineering Laboratory Report 89–21, prepared for Division of Polar Programs, National Science Foundation, US Army Corps of Engineers.

Merin, J. (1992) 'Antarctica's popularity problem', *Conde Nast Traveller*, November.

Mill, R.C., Morrison, A.M. (1985) *The tourism system*, Prentice-Hall, New Jersey.

Ministry of Environment (1992) *Experience Svalbard on nature's own terms*, Ministry of Environment (Miljøverndepartementet) Norway, Oslo.

Ministry of Environment (1994) *Management Plan for Tourism and Outdoor Recreation in Svalbard*, Ministry of Environment (Miljøverndepartementet) Norway, Oslo.

Ministry of Foreign Affairs and Trade (1997) *Guidelines and procedures for visitors to the Ross Sea region*, Ministry of Foreign Affairs and Trade Miscellaneous Report, Ministry of Foreign Affairs and Trade, New Zealand, Wellington.

Mirsky, J. (1970) *To the Arctic! The story of northern exploration from earliest times to the present*, University of Chicago Press, Chicago.

Monteath, C. (1996) 'Private Expeditions', in *Antarctica: a lonely planet travel survival kit*, ed. J. Rubin, Lonely Planet Publications, Hawthorn, Victoria.

Mulherin, N.D. (1996) *The Northern Sea Route: its development and evolving state of operations in the 1990s*, Cold Regions Research and Engineering Laboratory (CRREL) Report 96–3, US Army Corps of Engineers, Alaska.

National Environment Research Council (1997) *Report of the British Antarctic Survey 1996–97*, National Environment Research Council, UK.

National Environment Research Council (1998) *Report of the British Antarctic Survey 1997–98*, National Environment Research Council, UK.

National Environment Research Council (1999) *Report of the British Antarctic Survey 1998–99*, National Environment Research Council, UK.

NATMAP (1979) *Antarctica, 1:10 000 000 scale*, map, NATMAP, Canberra.

Naveen, R. (1996) 'Proposals for a revised code of guidance for Antarctic visitors', *Opportunities for Antarctic environmental education and training: Proceedings of the SCAR/IUCN Workshop on Environmental Education and Training, Gorizia, Italy, 26–29 April 1993*, eds P. Dingwall & D. Walton, IUCN, Gland.

Naveen, R. (1997) *The Oceanites site guide to the Antarctic Peninsula*, Oceanites Inc., Chevy Chase, Maryland, USA.

Nicholson, I. (1986) 'Antarctic tourism: the need for a legal regime?', *Maritime Studies* 29(May/June):1–7.

Nilsen, T., Boehmer, N. (1994) *Civil Nuclear Powered Vessels*, The Bellona Foundation, Oslo, Norway, or web page, www.bellona.no, as at October 1999.

Nimon, A., Schroter, R., Stonehouse, B. (1995) 'Heart rate of disturbed penguins', *Nature* 374(6521):415.

Norsk Polarinstitutt (1999) *Bouvetoya*, web page, http://www.npolar.no/npi/Antarctic/bouvet.htm, as at August 1999.

North, R.N. (1991) 'The Siberian river as a transport system', in *The Soviet Maritime Arctic*, ed. L.W. Brigham, Naval Institute Press, Annapolis.

NPS (1995) *Glacier Bay National Park and Preserve Vessel management plan and environmental assessment*, Department of the Interior, National Park Service, Alsaka Region.

NPS (1997) *The Visitor experience and resource protection (VERP) Framework: a handbook for planners and managers*, U.S. Department of the Interior, National Park Service, Denver Service Center.

NPS (1998a) *Director's Order 2: Park Planning*, U.S. Department of the Interior, National Park Service.

NPS (1998b) *Prospectus under which concession permits will be open for competition for the operation of cruise ship services within Glacier Bay National Park and Preserve*, National Park Service, Alaska Regional Office, Anchorage.

NPS (1999) *Glacier Bay National Park and Preserve*, web page, http://www.nps.gov/glba/, as at May 1999.

NSF (1997) Tourism summary statistics in 9th Antarctic tour operators meeting handouts, IAATO / National Science Foundation, Arlington, Virginia.

NSF (1998) Tourism summary statistics in 10th Antarctic tour operators meeting handouts, IAATO / National Science Foundation, Arlington, Virginia.

Oceanites Inc. (1997) Initial Environmental Evaluation (Revised) Antarctic Site Inventory 1997–1998, unpublished report, Oceanites Inc., Chevy Chase, Maryland.

Orient Lines (1997) m/v Marco Polo Initial Environmental Evaluation Antarctic Cruises 1997–1998, unpublished report, Orient Lines, Fort Lauderdale, Florida.

Orient Lines (1998) mv Marco Polo Antarctic Cruise Program Initial Environmental Evaluation 1998–1999, unpublished report, Orient Lines, Fort Lauderdale, Florida.

Parker, S. (1994) 'Customers establish cruise concept', *The Motor Ship* 75(882):26–27.

Parker, S. (1995) 'Cruise ship orders continue unabated', *The Motor Ship* 75(898):25–27.

Parks and Wildlife Service (1998) *Macquarie Island World Heritage Area*, web page, http://www.parks.tas.gov.au/homemi, as at April 1998.

Parks Canada (1999) *Parks Canada*, web page, http://parskcanada.pcn.gc.ca, as at May 1999.

Pearce, D., Markandaya, A., Barbier, E. (1989) *Blueprint for a green economy*, Earthscan, London.

Pearce, D., Turner, R. (1990) *Economics of natural resources and the environment*, Harvester Wheatsheaf, New York.

Perrin, R.A. (1995) 'Legal, Institutional and management planning considerations in Subantarctic island conservation: discussion and recommendations', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Pharand, D. (1988) *Canada's Arctic waters in international law*, Cambridge University Press, Cambridge.

Pineschi, L. (1992) 'Tourist activities and the protection of the Antarctic environment: current obligations and possible future developments', in *International Environmental Law for Antarctica*, ed. F. Francioni, Giuffré, Milan.

Plimmer, N. (1994) *Antarctic tourism: issues and outlook*, PATA Occasional Papers Series, Paper No. 10, PATA, San Francisco.

Polar Record (1989) 'In brief: Expedition transport ships lost in Antarctica', *Polar Record* 25(153):154.

Polar Record (1990) 'In brief: Report on *Bahia Paraiso* oil spill', *Polar Record* 26(159):340.

Porzak, G. (1985) 'Continental divide', appendix in *To Everest via Antarctica: climbing solo on the highest peak on each of the world's seven continents*, R.M. Anderson, Penguin, Auckland.

Prokosch, P. (1997) 'Important Environmental Issues in the Arctic are Neglected!—a Russian point of view', *WWF Arctic Bulletin* 4.97, WWF Arctic Programme, Norway.

Pullen, T.C., Swithinbank, C. (1991) 'Transits of the Northwest Passage 1906–90', Note in *Polar Record* 27(163):365–367.

Qantas (1997) Preliminary assessment of environmental impacts of the proposal to conduct overflights of the Antarctic Continent, unpublished report, Qantas Airways Ltd, Mascot, New South Wales.

Quark Expeditions (1997) Initial Environmental Evaluation Antarctic Tourism Cruise 1997/98, Report submitted to US and Australia pursuant to the Protocol on Environment Protection to the Antarctic Treaty, unpublished report, Quark Expeditions, Darien, CT.

Randall, A., Stoll, J. (1982) 'Existence value in a total valuation framework', in *Managing air quality and scenic resources at national parks and wilderness areas*, eds D. Rowe, R. Chestnut, Westview, Boulder.

Readers Digest (1990) *Antarctica: the extraordinary history of man's conquest of the frozen continent*, Readers Digest, Surry Hills.

Reich, R. (1980) 'The development of Antarctic tourism', *Polar Record* 20(126):203–214.

Richardson, J. (1999) 'Under Ice', *Panorama (Ansett Australia's Magazine)*, March 1999: 20–25.

Richardson, M.G. (1998) 'The Protocol on Environmental Protection enters into force', Note in *Polar Record* 34(189):147–148.

Riffenberg, B. (1998) 'Impacts on the Antarctic environment: tourism vs government programmes', Commentary in *Polar Record* 34(190):193–196.

Rubin, J., ed. (1996) *Antarctica: a lonely planet travel survival kit*, Lonely Planet Publications, Hawthorn, Victoria.

Samson (1997) *Thin Ice: International Environmental Cooperation in the Arctic*, Pacific Press, Ecotrends Series, Wellington.

Sanson, L. (1994) 'An Ecotourism Case Study in Sub-Antarctic Islands', *Annals of Tourism Research* 21(2): 344–354.

Sanson, L., Dingwall, P. (1995) 'Conservation status of New Zealand's Subantarctic islands', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Santos-Pedro, V.M. (n.d.) *The case for harmonization of (Polar) ship rules*, unpublished paper, Arctic Ship Safety, Coast Guard Northern, Ottowa, Canada.

Sartori, G. (1991) 'Comparing and miscomparing', *Journal of Theoretical Politics* 3(3):243–257.

Scott, J., Kirkpatrick, J.B. (1994) 'Effects of human trampling on the sub-Antarctic vegetation of Macquarie Island', *Polar Record* 30(174):207–220.

Sierra Club (1995) *Sierra Club Policy: Antarctica, Adopted May 7-8 1977 amended 1995 Policy Code 5.2.2*, web page, http://www.sierraclub.org/policy/535.html as at January 1998.

Sinden, J., Worrell, A. (1979) *Unpriced values: decisions without market prices*, John Wiley & Sons, New York.

Slater, S., Basch, H. (1997) *Fielding's Worldwide Cruises 1998*, Fielding Worldwide Inc., Redondo Beach, California.

Small, A. (1996) 'New Tourist Threat to European High Arctic', *Islander Magazine* Issue 2 1996, or web page, http://www.islandstudies.org, as at August 1999.

Smith, J.R.G. (1999) *Ship safety and pollution prevention: the regulatory regime*, International Association of Classification Societies, London.

Smith, M. (1995) 'A green thought in a green shade: a critique of the rationalisation of environmental values', in *Values and the environment: a social science perspective* eds Y. Guerrier, N. Alexander, J. Chase, M. O'Brien, John Wiley & Sons, Chichester.

Smith, V.L. (1994) 'A sustainable Antarctic: science and tourism', *Annals of Tourism Research* 21(2):221–230.

Snyder, J., Stonehouse, B. (1998) 'First Antarctic Environmental Management Initiative Workshop', Note in *Polar Record* 34(191):343–344.

Sømme, L. (1995) 'Conservation status of Bouvetøya', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Soubliére, M., ed. (1997) *The 1998 Nunavut Handbook*, Nortext Multimedia Inc., Iqaluit, Canada.

Splettstoesser, J. (1996) 'Education of visitors to Antarctica', in *Opportunities for Antarctic environmental education and training: Proceedings of the SCAR/IUCN Workshop on Environmental Education and Training, Gorizia, Italy, 26–29 April 1993*, eds P. Dingwall, D. Walton, IUCN, Gland.

Splettstoesser, J., Folks, M.C. (1994) 'Environmental guidelines for tourism in Antarctica', *Annals of Tourism Research* 21(2):231–244.

Splettstoesser, J., Headland, R., Todd, F. (1997) 'First circumnavigation of Antarctica by tourist ship', Note in *Polar Record* 33(186):244–245.

Stankey, G., Cole, D., Lucas, R., Petersen, M., Frissell, S. (1985) *The limits of acceptable change (LAC) system for wilderness planning*, Intermountain Forest and Range Experiment Station General Technical Report INT-176, U.S. Department of Agriculture Forest Service.

Stokke, O.S, Vidas, D. (1996) 'Introduction', in *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, eds O.S. Stokke, D. Vidas, Cambridge University Press, Cambridge.

Stonehouse, B. (1990) 'A traveller's code for Antarctic visitors', Note in *Polar Record* 26(156):56–58.

Stonehouse, B. (1992a) 'Monitoring shipborne visitors in Antarctica', *Polar Record* 28(166):213–218.

Stonehouse, B. (1992b) 'IAATO: an association of Antarctic tour operators', Note in *Polar Record* 28(167):322–324.

Stonehouse, B. (1993) 'Shipborne tourism in Antarctica; Project Antarctic Conservation studies 1992/93', Note in *Polar Record* 29(171):330–332.

Stonehouse, B. (1994a) 'Ecotourism in Antarctica', in *Ecotourism: a sustainable option?*, eds E. Cater, G. Lowman, John Wiley & Sons, Chichester.

Stonehouse, B. (1994b) 'Tourism and Protected Areas', in *Developing the Antarctic Protected Area system. Proceedings of the SCAR/IUCN workshop on Antarctic Protected Areas, Cambridge, UK., 29 June–2 July 1992*, eds R.I. Lewis Smith, D.W. Walton, P. Dingwall, IUCN, Cambridge.

Stonehouse, B. (1999) 'Antarctic shipborne tourism: facilitation and research at Arctowski Station, King George Island', *Polish Polar Research* 20(1):65–75.

Stonehouse, B., Crosbie, K. (1995) 'Tourist impacts and management in the Antarctic peninsula area', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Sugden, R., Williams, A. (1978) *The principles of practical cost-benefit analysis*, Oxford University Press, Oxford.

Sunday Tasmanian (1998) 'Bid for icy fly buy', *Sunday Tasmanian*, 15 March, p.1.

Swales, M. (1996) 'Tristan da Cunha', *Islander Magazine* Issue 2 1996, or web page, http://www.islandstudies.org, as at August 1999.

Swithinbank, C. (1989) 'Non-government aircraft in the Antarctic 1988/89', Note in *Polar Record* 25(154):254.

Swithinbank, C. (1990a) 'Non-government aircraft in the Antarctic 1989/90', Note in *Polar Record* 26(159):316.

Swithinbank, C. (1990b) 'Obituary: John Edward Giles Kershaw', *Polar Record* 26(158):250.

Swithinbank, C. (1992a) 'Non-government aircraft in the Antarctic 1990/91', Note in *Polar Record* 28(164):51–56.

Swithinbank, C. (1992b) 'Non-government aircraft in the Antarctic 1991/92', Note in *Polar Record* 28(166):232.

Swithinbank, C. (1993a) 'Airborne tourism in the Antarctic', *Polar Record* 29(169):103–110.

Swithinbank, C. (1993b) 'Non-government aircraft in the Antarctic 1992/93', Note in *Polar Record* 29(170):244–245.

Swithinbank, C. (1994) 'Non-government aircraft in the Antarctic 1993/94', Note in *Polar Record* 30(174):221.

Swithinbank, C. (1995) 'Non-government aircraft in the Antarctic 1994/95', Note in *Polar Record* 31(178):346.

Swithinbank, C. (1996) 'Non-government aircraft in the Antarctic 1995/96', Note in *Polar Record* 32(183):355.

Swithinbank, C. (1997a) 'New intercontinental air route: Cape Town to Antarctica', Note in *Polar Record* 33(186):243–244.

Swithinbank, C. (1997b) 'Non-government aircraft in the Antarctic 1996/97', Note in *Polar Record* 33(187):340–341.

Swithinbank, C. (1998) 'Non-government aircraft in the Antarctic 1997/98', Note in *Polar Record* 34(190):249.

Terres Australes et Antarctiques Françaises (1999) *Economy of the Southern and Antarctic Lands*, web page, Secrétariat d'État à l'Outre-mer, http://www.outre-mer.gouv.fr/domtom/taaf/economie.htm, as at May 1999.

Thampapillai, D. (1991) *Environmental Economics*, Oxford University Press, South Melbourne.

The Antarctica Project (1997) *The Antarctica Project (newsletter)*, 6(2)June, web page, http://www.asoc.org/currentpress/june1997.html, as at May 1999.

The Antarctica Project (1998a) *The Antarctica Project*, web page, http://www.asoc.org/general/1998.htm, as at May 1999.

The Antarctica Project (1999) *Action Item: write to the Canadian Prime Minister to urge Canada to fulfil its international obligations to protect the Antarctic environment!*, web page, http://www.asoc.org/Canada.html, as at May 1999.

The Commonwealth Secretariat (1999) *The Commonwealth Online*, web page, http:/www.tcol.co.uk, Hanson Cooke Ltd, as at May 1999.

Thomas, T. (1994) 'Ecotourism in Antarctica. The role of the naturalist guide in presenting places of natural interest', *Journal of Sustainable Tourism* 2(4):204–209.

Thomson, R. (1977) 'Effects of human disturbance on an Adélie penguin rookery and measures of control', in *Adaptations within Antarctic ecosystems: proceedings of the 3rd SCAR symposium on Antarctic biology 26–30 August*, Smithsonian Institute, Washington D.C.

Tietenberg, T. (1988) *Environmental and natural resource economics*, Scott Foresman & Co., Illinios.

Tisdell, C. (1991) *Economics of environmental conservation: economics for environmental and ecological management*, Elsevier, Amsterdam.

Tourism Board of Tierra del Fuego (1997) *Report on Antarctic tourism numbers through the Port of Ushuaia 1996–97*, Antarctic Unit, Tourism Board of Tierra del Fuego, Ushuaia.

Tourism Board of Tierra del Fuego (1998) *Report on Antarctic tourism numbers through the Port of Ushuaia 1997–98*, Antarctic Unit, Tourism Board of Tierra del Fuego, Ushuaia.

Transportation Safety Board of Canada (1996) *Grounding—Passenger Vessel "HANSEATIC" Simpson Strait, Northwest Territories 29 August 1996*, Report Number M96H0016, or web page, Transportation Board of Canada, http://tsb.gc.ca, as at May 1999.

Valencia, J. (1995) 'Issues in the management of tourism on Subantarctic islands', in *Progress in the Conservation of the Subantarctic Islands*, ed. P. Dingwall, IUCN, Gland.

Vicuña, F. (1996a) 'The effectiveness of the Protocol on Environmental Protection to the Antarctic Treaty', in *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, eds O.S. Stokke, D. Vidas, Cambridge University Press, Cambridge.

Vicuña, F. (1996b) 'The legitimacy of the Protocol on Environmental Protection to the Antarctic Treaty', in *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, eds O.S. Stokke, D. Vidas, Cambridge University Press, Cambridge.

Vidas, D. (1996) 'The legitimacy of the Antarctic tourism regime', in *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty System*, eds O.S. Stokke, D. Vidas, Cambridge University Press, Cambridge.

Viken, A., (1995) 'Tourism experiences in the Arctic—the Svalbard case', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall, M.E. Johnston, John Wiley & Sons, Chichester.

Viken, A., Jørgensen, F. (1998) 'Tourism on Svalbard', *Polar Record* 34(189):123–128.

Viken, A., Vostryakov, L., Davydov A. (1995) 'Tourism in Northwest Russia', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall, M.E. Johnston, John Wiley & Sons, Chichester.

Vil'check, G. Ye., Serebryannyy, L.R., Tishkov, A.A. (1996) 'A geographic perspective on sustainable development in the Russian Arctic', *Polar Geography and Geology* 20(4): 249–266.

Vincent, W.F. (1989) *Microbial ecosystems of Antarctica*, Cambridge University Press, Cambridge.

Vincent, W.F. ed. (1996) *Environmental Management of a Cold Desert Ecosystem: the McMurdo Dry Valleys*, Desert Research Institute, University of Nevada, USA Special Publication, Nevada, USA.

Volkov, A.E., de Korte, J. (1994) 'Protected nature areas in the Russian Arctic', *Polar Record* 30(175):299–310.

Wace, N. (1990) 'Antarctica: a new tourist destination', *Applied Geography* 1990(10):327–341.

Wace, N.M., Holdgate, M.W. (1976) *Man and nature in the Tristan da Cunha Islands*, IUCN Monograph No.6, International Union for the Conservation of Nature and Natural Resources, Morges, Switzerland.

WCMC (1999) *Descriptions of Natural World Heritage Properties*, web page, http://www.wcmc.org.uk, as at May 1999.

White, K.J. (1994) 'Tourism and the Antarctic Economy', *Annals of Tourism Research* 21(2):245–268.

Wilson, R.P., Culik, B., Danfeld, R., Adelung, D. (1991) 'People in Antarctica—how much do Adélie Penguins *Pygoscelis adeliae* care?', *Polar Biology* 11:363–370.

World Resources Institute (1991) *The values of biodiversity*, World Resources Institute, Washington D.C.

WWF Arctic Programme (1996) WWF's Arctic Programme, brochure, WWF, Oslo, Norway.

WWF Arctic Programme (1997a) *Lena-Delta and New Siberian Islands Nature Reserve*, WWF Arctic Programme, Norway.

WWF Arctic Programme (1997b) WWF Arctic Tourism Project: Linking Tourism and Conservation in the Arctic, letter and insert in *WWF Arctic Bulletin* 4.97, WWF Arctic Programme, Oslo, Norway.

Wouters, M., Hall, C.M. (1995a) 'Managing Tourism in the Sub-Antarctic Islands', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall & M.E. Johnston, John Wiley & Sons, Chichester.

Wouters, M., Hall, C.M. (1995b) 'Tourism and New Zealand's Sub-Antarctic Islands', in *Polar Tourism: Tourism in the Arctic and Antarctic Regions*, eds C.M. Hall, M.E. Johnston, John Wiley & Sons, Chichester.

Wyatt, R. G. (1989) *Intelligent planning: meaningful methods for sensitive situations*, Unwin Hyman, Boston.

Yin, R. (1991) *Case study research: design and methods*, Applied Social Research Methods Series, Volume 5, Sage Publications, London.

Young, O.R., Osherenko, G. (1991) 'International cooperation in the Arctic: Soviet attitudes and actions', in *The Soviet Maritime Arctic*, ed. L.W. Brigham, Naval Institute Press, Annapolis.

Antarctic Treaty Consultative Meeting documents cited

ASOC (1991) IP77 ATCM XVI, 'The regulation of tourism in Antarctica'.

ASOC (1995) IP38 ATCM XIX, 'Qantas Antarctic overflights'.

ASOC (1998) IP84 ATCM XXII, 'Report of the Antarctic and Southern Ocean Coalition (ASOC)'.

Australia (1995) IP33 ATCM XIX, 'Monitoring of activities by a shipboard observer'.

Australia (1995) IP34 ATCM XIX, '1994/95 tourist overflights of Antarctica'.

Bulgaria (1998) IP115 ATCM XXII, 'Acceptance of Annex V to the Madrid Protocol and approval of recommendation XVI-10'.

Chile (1998) IP43 ATCM XXII, 'Enforcement of the Protocol on Environmental Protection to the Antarctic Treaty'.

Chile, France, Germany, Italy & Spain (1992) WP1 ATCM XVII, 'Preliminary draft of (proposed) Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty: Regulation concerning Tourism and Non-Governmental activities'.

COMNAP (1996) IP39 ATCM XX, 'Tourism and non-governmental activities in Antarctica: operational concerns'.

COMNAP (1998) WP13 ATCM XXII, 'The Polar Code for shipping'.

Finland (1998) IP110 ATCM XXII, 'Implementation of the Madrid Protocol to the Antarctic Treaty in Finland'.

Finland (1998) IP114 ATCM XXII, 'Information on Finnish legislation implementing the protocol'.

Germany & the UK (1999) WP23 ATCM XXIII, 'Report of a joint inspection under Article VII of the Antarctic Treaty by United Kingdom and German observers'.

Germany (1997) WP16 ATCM XXI, 'Inspections of ships by port states (agenda item according to the final report (96) of the XXth ATCM)

Germany, UK & USA (1998) IP27, ATCM XXII, 'Antarctic site inventory: update on results through completion'.

IAATO (1994) IP23 ATCM XVIII, 'Draft Initial Environmental Evaluation: Adventure Network International Antarctic airborne operations. Prepared by Poles Apart for Adventure Network International, Vancouver'.

IAATO (1995) IP108 ATCM XIX, 'Initial Environmental Evaluation: Antarctic and Southern Ocean tourism of Marine Expeditions Inc'.

IAATO (1996) IP76 ATCM XX, 'IAATO Medical emergency contingency plan'.

IAATO (1997) IP108 ATCM XXI, 'Report of the International Association of Antarctica Tour Operators (IAATO)'.

IAATO (1997) IP75 ATCM XXI, 'Overview of Antarctic tourism activities a summary of 1996–1998 and five year projection 1997–2002'.

IAATO (1998) IP104 ATCM XXII, 'IAATO Oil Spill contingency planning'.

IAATO (1998) IP105 ATCM XXII, 'Post visit reporting for tourism and non-governmental activities in the Antarctic'.

IAATO (1998) IP86 ATCM XXII, 'Overview of Antarctic tourism activities'.

IAATO (1998) IP87 ATCM XXII, 'Education and training. A survey of IAATO member companies'.

IAATO (1998) IP88 ATCM XXII, 'Report of the International Association of Antarctica Tour Operators (IAATO)'.

IUCN (1992) IP18 ATCM XVII, 'Tourism in Antarctica'.

IUCN (1997) IP61 ATCM XXI, 'Cumulative environmental impacts in Antarctica: minimisation and management'.

IUCN (1998) IP52 ATCM XXII, 'Report of the World Conservation Union (IUCN)'.

Japan (1998) IP45 ATCM XXII, 'Report on the measures taken for the implementation of the Protocol on Environmental Protection...'

New Zealand (1995) WP35 ATCM XXI, 'Further understanding of the terms minor and transitory'.

New Zealand (1996) IP14 ATCM XX, 'Compliance with Recommendation XVIII-1 in the Ross Sea: observations by New Zealand representatives aboard tour ships'.

Norway (1997) IP38 ATCM XXI, 'A description of norwegian procedures developed in accordance with Article 1 of Annex 1 to the protocol on environmental protection to the Antarctic Treaty and Norwegian regulations relating to the protection of the environment in Antarctica'.

Norway (1998) WP18 ATCM XXII, 'The international code of safety for ships navigating in polar waters—the Antarctic issues'.

Russia (1998) IP63 ATCM XXII, 'Measures to ensure the implementation of the protocol on environmental protection to the Antarctic Treaty upon its ratification by Russian Federation'.

Russia (1998) IP66 ATCM XXII, 'Minor or Transitory impact criterion for EIA in different regions'.

The Netherlands (1998) IP31 ATCM XXII, 'Information on Dutch legislation implementing the Protocol'.

The Netherlands (1998) IP32 ATCM XXII, 'Protection of Antarctica Act'.

United Kingdom (1992) WP3 ATCM XVII, 'A revised "Code of Guidance for Visitors to the Antarctic"'.

United Kingdom (1997) WP22 ATCM XXI, 'Enhancing compliance with the protocol: departure state jurisdiction'.

United Kingdom (1998) IP1 ATCM XXII, 'Yacht visits to Antarctica, 1970–98'.

USA (1998) IP74 ATCM XXII, 'Report of the depositary government of the Antarctic Treaty and its Protocol'.

WTO (1991) IP87 ATCM XVI, 'Tourism and Antarctica'.