Visitor experience in the Tasmanian Wilderness World Heritage Area

By

Mark J. Poll
BA Hons (Outdoor Ed.), Grad. Dip. (Env. Stud.)

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Declaration

This thesis contains no material that has been accepted for the award of any other degree or diploma in any tertiary institution and, to the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made in the text.

Mark J. Poll

March 2005

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The combined analyses undertaken by this study provide a comprehensive assessment of the robustness of visitor norms as inputs to the development of limits of acceptable change standards. This study is the first of its kind in Australia, and such an integrated study has not been reported in the literature. Consequently, this study establishes a model for similar assessments of the parameters that affect the quality of visitor's experiences in wilderness and natural protected areas.

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Surfs up!

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Acronyms and abbreviations

ABM	Australian Bureau of Meteorology
AGPS	Australian Government Printing Service
CV	Coefficient of Variation
DLPW	Department of Lands, Parks and Wildlife
DPIWE	Department of Primary Industries, Water and Environment
DPWH	Department of Parks, Wildlife and Heritage
LIS	Land Information Services
MIB	Minimum Impact Bushwalking
PWH	Parks, Wildlife and Heritage
PWS	Parks and Wildlife Service
SD	Standard Deviation
SIQR	Semi-Interquartile Range
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
USDA	United States Department of Agriculture
USDI	United States Department of Interior

Chapter 1. Introduction

The Tasmanian Wilderness World Heritage Area (TWWHA) is one of the world's few remaining temperate wilderness areas, and is of outstanding universal value (PWS 1999). The area was first inscribed onto the World Heritage List in 1982 and was later enlarged and relisted in 1989. The TWWHA now encompasses approximately 1.38 million hectares, approximately 20% of the island State of Tasmania (Figure 1.1).

Of the 630 properties currently inscribed on to the World Heritage List, the Tasmanian Wilderness is one of only 22 properties worldwide to be recognised for both its natural and cultural values. As the manager of the TWWHA, the Tasmanian Parks and Wildlife Service (PWS) has an obligation to identify, protect, conserve and, where appropriate, rehabilitate these values. The PWS also has a statutory duty to present the public with the opportunity to experience and enjoy those values by providing for appropriate forms of recreation (PWS 1999; UNESCO 1972; *World Heritage Properties Conservation Act 1983* (Cwlth)).

Following its listing, the TWWHA has become a key icon and focus for tourism in the State, providing the local tourism industry with a valuable marketing image and a destination that attracts visitors from around the globe (PWS 1997b). Every year, an average of about 38% of the interstate and overseas travellers to Tasmania visit the TWWHA (Tourism Tasmania 2004). Since the beginning of the 1990s, the number of people from interstate and overseas visiting the TWWHA has increased from a total of approximately 134 000 to about 271 000 in 2003-04[1], an increase of 102% (Tourism Tasmania 2004). These visitors identify the unspoilt quality of the air, water, and natural environment as major attractions when choosing to visit the State (Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1997). It comes as no surprise then that 'the outstanding recreational value of the TWWHA is the opportunity it provides for experiencing wilderness' (PWS 1999: 25).

Visitors to the TWWHA enjoy a wide array of recreational activities associated with its natural and/or cultural values. Bushwalking provides visitors with perhaps the most direct experience of the TWWHA's values.

[1] The statistics for the number of individual interstate and overseas visitors to the TWWHA is measured in *person visits*. A person visit occurs when a visitor enters a protected area for the first time during their trip away from their usual place of residence. Repeat entries on the day or during the trip away from the usual place of residence are not taken into account.

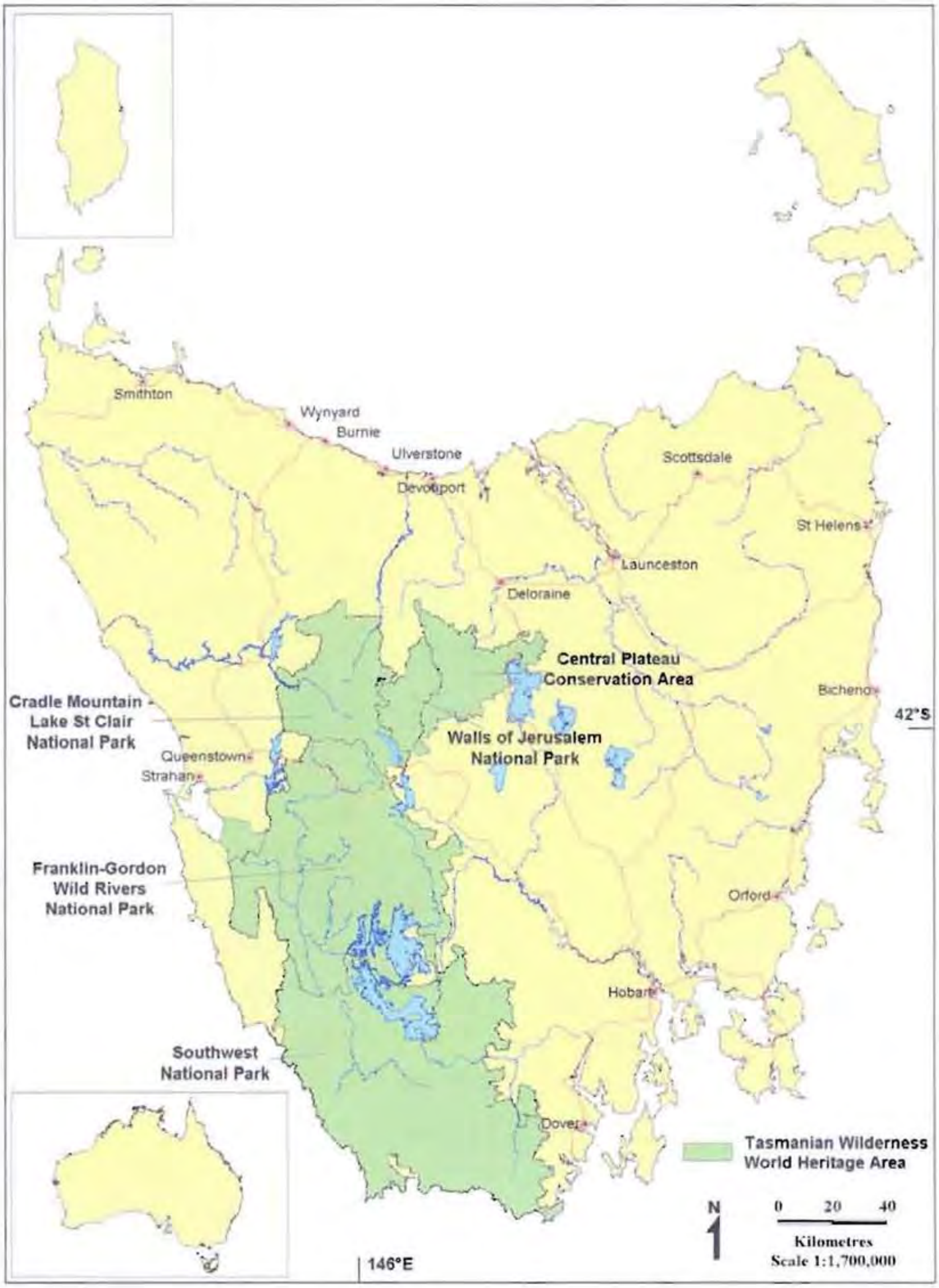

Figure 1.1 The Tasmanian Wilderness World Heritage Area (Ling 2000a)

Concerns about the impacts of bushwalking on the TWWHA were initially expressed by Sawyer, in a 1991 edition of the journal of the Hobart Bushwalking Club, *The Tasmanian Tramp*. Around that time the PWS also became concerned that unrestricted bushwalking in the TWWHA was resulting in significant environmental problems including extensive track degradation, the unplanned creation of new tracks and campsites, the deterioration of existing campsites, pollution and physical crowding (PWS 1997a, 1998d). As a result, the first Management Plan for the TWWHA, which came into effect in 1992, called for the development and implementation of a walking track management strategy to address these issues (DPWH 1992). Drafts of the Walking Track Management Strategy (the Strategy) were published in 1992 and 1994 and the final version was published in 1998 (PWS 1998b, 1998c, 1998d).

The main objective of the Strategy was to 'maintain track and campsite conditions and biophysical and social impacts within specified limits' (1998b: 67). As such, 'prescriptive' standards were set for biophysical impacts related to walking tracks and campsites, with social standards limited to maximum group sizes and number of tents per campsite (PWS 1998b: 91). However, it was noted that these standards were to be 'regarded as guidelines, not as rigid prescriptions' (PWS 1998d: 91). Thus, there were no definite limits of acceptable change that clearly defined thresholds beyond which further changes in the social and environmental conditions would not be tolerated. Consequently, the Strategy failed to establish a transparent mechanism to trigger the implementation of management actions to ameliorate or prevent further unacceptable impacts (Stankey *et al.* 1985).

The key prescription of the Strategy was the introduction of a 'comprehensive [TWWHA-wide] permit system' with the introduction of quotas in areas where the impacts were considered unacceptable (PWS 1998b: 71). However, in the absence of clearly defined standards, many bushwalkers feared the arbitrary and unjustified imposition of use restrictions. Furthermore, dissatisfaction with the extent and quality of the consultation process during the development of the Strategy, and the subjective nature of the guidelines, contributed to the uncertainty and opposition to the implementation of a permit system (Thyne, H. 2004, pers. comm., 27th October).

The PWS attempted to justify the introduction of permits from a predominantly biophysical perspective. Based on the findings of an extensive track condition monitoring program, and research directed at determining trampling impacts and thresholds of various vegetation communities, the PWS developed a public education campaign called *The Science behind the Strategy* (PWS 1997a) – complete with brochures and video – to establish and affirm the scientific rigour of the Strategy. Despite this, key stakeholders remained opposed to the Strategy and the introduction of permits.

While much biophysical research was undertaken to develop a scientific foundation for the Strategy, comparatively little effort has been made to understand what factors are important in determining the quality of visitors' experiences or to identify stakeholders' definitions of the limits of acceptable change in the social and biophysical conditions. It is evident from the Strategy that the PWS was aware that, as a part of the decision making process with respect to the management of wilderness and its use, there was and remains a 'need for managers to assess the ... norms of wilderness users ...' (PWS 1998d: 30). In this context, 'norms are standards that individuals use to evaluate recreation conditions' (Manning 1999: 152).

Despite recognition of the importance of such information (Manning 2001; PWS 1998d; Smith, V. & Moore 1990; Vaske *et al.* 1986), the emphasis of the social research undertaken by the PWS during the development of the Strategy was on determining public opinion regarding the form and support for a permit system (Brake 1996).

To date, there have been only superficial attempts to explore visitors' norms in the TWWHA. Similarly, the call for the 'identification of key factors that degrade the wilderness experience of visitors' and the need to identify indicators and standards, as well as monitoring 'the factors identified as adversely affecting the quality of visitors' wilderness experience' has gone largely unheeded since it was first identified in the 1997 draft (PWS 1999: 94-95). In these respects, the judgements and prescriptions of the Strategy, and its implementation, have been uninformed.

Determining the amount of impact that is to be tolerated in a given environment is a value-laden activity (Krumpe & McCool 1997; Manning 2001). Wilderness and natural area managers making such value judgements ought to be informed by scientific research findings on the relationship between recreational use and its associated impacts and those on visitor definitions of minimum acceptable standards for social and environmental conditions (Krumpe & McCool 1997; Manning 2001). As such, a key input into informed decision making is visitors' norms.

The lack of understanding of the social dimensions of recreation related impacts represents a serious gap in the knowledge necessary to maintain and enhance both wilderness quality and the quality of wilderness recreation experiences, as prescribed by the TWWHA Management Plan 1999 (PWS 1999) and the Convention Concerning the Protection of the World Cultural and Natural Heritage 1972 (UNESCO 1972).

It is important to recognise that during the decade or more that the PWS has been attempting to address concerns about the impact bushwalkers have on the values of the TWWHA, an already established and growing body of knowledge and literature was dealing with similar issues. Since the late 1970s, a range of planning frameworks has been developed to guide the management of wilderness recreation and its impacts on the environment and the quality of recreationists' experiences. These frameworks include the Limits of Acceptable Change

(LAC) (Stankey *et al.* 1985), Visitor Activity Management Process (VAMP) (Parks Canada 1985), Visitor Experience Resource Protection (VERP) (Hof, M. & Lime 1998), and the process for Visitor Impact Management (VIM) (Graefe *et al.* 1990).

Central to these frameworks is the limits of acceptable change concept which evolved from the realisation that even low levels of recreation result in some impact on the environment in which it takes place (Frissell & Stankey 1972; Nilsen & Tayler 1997), and that 'most impacts *do not* exhibit a direct linear relationship with user density' (Graefe *et al.* 1990: 214). As such, the fundamental question at the heart of these planning frameworks is not what level of recreation is appropriate, but rather what amount of impact is to be accepted. Additionally, two of the common themes among protected area planning and management frameworks reviewed by Nilsen and Tayler (1997: 54) are the use of 'interdisciplinary planning teams' and the 'need for sound ... social science information'. Despite evidence of an awareness of the LAC planning approach in the Strategy (PWS 1998d), any appreciation of the importance of the integration of social science into addressing the use – impact dilemma failed to manifest in the actions of the PWS.

Identification of the parameters that affect the quality of visitor experience is vital if the PWS is to ensure the ongoing ecological integrity of the TWWHA and provide quality recreation opportunities that are valued by visitors. Importantly, such understanding will also garner support for the ongoing preservation and protection of the area's World Heritage and other values upon which the Tasmanian tourism industry increasingly depend (Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1997, 1999).

In this thesis I contend that normative research can effectively contribute to an enhanced understanding of visitors' experiences and provide a robust foundation for the managers who need to make decisions regarding the development of socially acceptable standards to manage bushwalking and walking tracks in the TWWHA. A large and growing genre of research and related literature about the identification of key indicators, and the development of normative or evaluative standards through social survey demonstrates the value of stakeholder involvement in determining the levels of impact that are to be tolerated and, more importantly, at what point effective management actions are to be put in place to ameliorate those impacts (Manning 1999; Manning *et al.* 2002; Manning & Lime 2000; Merigliano 1990; Morin *et al.* 1997; Newsome *et al.* 2002; Roggenbuck *et al.* 1993; Watson *et al.* 1992).

Therefore, the aim of this research was to identify the parameters that affect the quality of visitor experience and to explore the development of visitor norms in the TWWHA. In doing so, the importance of a range of indicators in determining the quality of visitors' experiences was examined along with the impact of the conditions they encountered. In particular, the study focused on the identification of visitors' norms. In the course of these investigations several theoretical and methodological issues were examined, including the ability of visitors to report norms (Donnelly *et al.* 2000; Kim & Shelby 1998; Lewis *et al.* 1996b; Manning & Lime 2000; Shelby & Vaske 1991; Whittaker 1992); the influence of different evaluative dimensions on the level of visitors' norms and their validity (Manning 2001; Manning & Lime 2000); and the validity of visitors' norms and the characteristics that influenced this (Manning, Johnson *et al.* 1996; Patterson & Hammitt 1990; Shelby & Vaske 1991; Williams *et al.* 1991). In doing so, visitors to the popular Overland Track and the less visited Western Arthur Range were surveyed to explore whether and to what extent there were any differences between the norms of visitors to a high use, well developed area and a low use, less developed area (Hall & Shelby 1996; Lewis *et al.* 1996b; Shelby, Vaske *et al.* 1988).

This research also reviews contemporary wilderness planning frameworks, examines current and past management policy and practices of the PWS and applies an evaluative standards approach to developing an understanding of visitors' norms for a number of social and biophysical indicators (Heywood 2000). These techniques were not utilised in developing the standards outlined within the Walking Track Management Strategy for the TWWHA (PWS 1998b, 1998c, 1998d). More significantly, however, such an integrated study is the first in Australia, and has not been reported in the literature. Therefore, this study makes a substantive and original contribution to the knowledge base of the PWS in Tasmania, as well as broadening understanding in the field in general.

Following the Introduction, I examine the evolution of wilderness planning and review contemporary planning frameworks (Chapter 2). Key concepts such as carrying capacity, the management of visitor experience and outdoor recreational settings, the provision of a spectrum of recreation opportunities, and the limits of acceptable change are reviewed. The characteristics and selection of indicators of social and biophysical conditions are discussed and the methods used to develop normative standards through the use of social survey techniques are then examined.

In Chapter 3 I identify the unique values of the TWWHA and the significance of listing as a World Heritage site and then examine the management obligations of the PWS. Past and current management by the PWS is reviewed in light of the knowledge presented in Chapter 2. Chapter 3 closes with a brief examination of the decade-long impasse that developed between members of the bushwalking community and the PWS in regard to the management of bushwalking and walking tracks in the TWWHA.

The primary research methods adopted for the surveys of visitors' experiences and their norms at these sites are described in Chapter 4. The development of the survey instruments and the rationale for the different sampling strategies adopted are presented; and, the hypotheses and methods of analysis used are outlined. The limitations of the study are also discussed. A description of the two study sites, the Overland Track in the Cradle Mountain – Lake St Clair National Park, and the Western Arthur Range (hereafter referred to as the Western Arthurs) in the Southwest National Park, is presented in Chapter 5.

Chapters 6 and 7 present the results of the Overland Track and Western Arthurs visitor surveys respectively. In these chapters I describe and summarise visitor characteristics, including demographic variables and the routes taken while there. The factors that influenced the quality of their experiences are discussed and key indicators of the quality of visitor experience are identified. The quality of visitor experiences during the 1999-2000 peak walking season is examined via an in-depth exploration of respondents' expectations, the conditions they encountered, and whether these enhanced or detracted from the quality of their experiences. Finally, visitors' preferences and maximum acceptable limits for a range of social and biophysical indicators are examined.

A synthesis of the Overland Track and Western Arthurs survey findings is presented in Chapter 8. Some of the questions examined include: 'How do the expectations of visitors to these two areas compare?', 'Do the key factors that influence the quality of their experiences vary, and if so, in what way?', and 'Is there a set of common indicators that can be adopted to monitor the quality of visitors' experiences across different settings?'. Lastly, the norms identified for each of the two study sites are examined and discussed.

Finally, Chapter 9 discusses the findings within the wider policy and scholarly context of management, examines their implications, and explores whether and to what extent normative research can effectively contribute to an enhanced understanding of visitors' experiences and the development of socially acceptable standards for the management of bushwalking and walking tracks in the TWWHA. The final chapter also highlights the contribution the study has made to the broader body of knowledge with respect to the application of normative methods in the field of outdoor recreation.

Chapter 2. Wilderness management and the integration of social values

At the beginning of the 1990s concerns began to emerge over increasing visitor-related impacts in the TWWHA. Indeed, balancing recreation use and the preservation of wilderness is the challenge wilderness managers must address. From the brief outline given in Chapter 1 of the approach taken by the PWS to address those impacts, it is clear that there is a need for greater integration of social perspectives in the planning processes to better inform management decisions.

Developing strategies that provide for appropriate types and levels of recreational use while ensuring resource impacts are kept within acceptable limits has been an ongoing issue for managers in Australia (Absher 1994; Newsome *et al.* 2002; Prosser 1986) and overseas (Environment Canada and Park Service 1991; Graefe *et al.* 1990; Manning, Lime, Hof *et al.* 1995; National Park Service 1997; Parks Canada 1985; Shelby & Heberlein 1986; Stankey *et al.* 1985).

The aim of this chapter is to develop an understanding of how consideration of social values has become integrated with resolution of social and biophysical issues in contemporary wilderness planning. This chapter is organised around five related topics: the evolution of the carrying capacity concept; the development of the Recreation Opportunity Spectrum (ROS) and its role in managing for the provision of a range of recreational experiences; the Limits of Acceptable Change (LAC) and similar planning frameworks; management objectives and the selection of indicators, and the development of visitor-based standards; and finally, norm theory and methods in outdoor recreation.

2.1 Addressing the challenge: Carrying capacity and the evolution of wilderness planning

The United States is the birthplace of wilderness recreation planning and its land management agencies and universities continue to nurture research, innovation, and development in the field. While it is possible to trace the origins of wilderness recreation planning to earlier times (Sumner 1936), the increasing participation in outdoor recreation during the 1950s and 1960s sparked an increase in concern over the 'appropriate use level of outdoor recreation areas' (Manning 1999: 67). Attempts to address concerns over both the biophysical and experiential impacts of increasing use of wilderness and protected areas through planning and policy led to the growing prominence and adaptation of the carrying capacity concept to the field of outdoor recreation management (Manning 1999).

Carrying Capacity

The carrying capacity concept originated within the fields of biological science, wildlife and rangeland management (Birch 1981; Manning 1986; Shelby & Heberlein 1986). In its use to calculate stocking rates, and in the management of native animal populations, carrying capacity refers to the number of any one animal species that can be maintained in a given habitat (Dasmann 1964; Manning 1986).

The application of the carrying capacity concept to the management of outdoor recreation was first proposed during the mid-1930s in the United States. In 1936 Lowell Sumner, a wildlife technician with the United States National Park Service, recommended that recreation in wilderness areas be kept within carrying capacity (Manning 1986: 41). Some ten years later in 1946, Wagar stressed the importance of considering carrying capacity in the management of forest recreation, and later in 1951 proposed the concept as one of the major principles underlying the management of recreation (Manning 1986). By 1962, Dana (1957) and the Outdoor Recreation Resource Review Commission (1962) had firmly implanted the concept in the management of outdoor recreation (Manning 1986).

Wagar's (1964) *The Carrying Capacity of Wild Lands for Recreation* was the first significant examination of carrying capacity and its application to the management of recreation. As Manning (1986: 42) states, the most important and influential aspect of Wagar's monograph 'was the expansion of carrying capacity from its dominant emphasis on environmental effects to a dual focus including social or experiential considerations'. In the preface to his monograph Wagar declared that:

> The study reported here was initiated with the view that the carrying capacity of recreation lands could be determined primarily in terms of ecology and the deterioration of areas. However, it soon became obvious that the resource-oriented point of view must be augmented by consideration of human values.

In his expanded understanding of carrying capacity Wagar (1964) took into account both social and biophysical environments. His thesis was that increasing recreation use not only affected the biophysical environment, but that it also influenced the quality of the recreation experience (Manning 1986). In illustrating this point he hypothesised the effect of increased crowding on a variety of needs/motivations. Most significantly, he suggested that the effect of crowding (or perhaps more correctly perceived increases in visitor density) on visitors' satisfaction would vary depending on their needs and motivations (Manning 1986; Wagar 1964). Wagar described a series of hypothetical relationships between 'the needs that commonly motivate outdoor recreation' and the impact of increasing use level on visitor satisfaction (1964: 7).

Indeed, the influence of visitors' needs and motivations is also evident in the findings of an early examination of carrying capacity in the Boundary Waters Canoe Area, in Minnesota. In that study, Lucas (1964) found that paddling canoeists were more sensitive to crowding than motorboaters. Many more recent studies continue to substantiate Wagar's (1964) hypothesis, amongst them Absher and Lee (1981); Devall and Harry (1981); Ditton *et al.* (1983); Ruddell and Gramann (1994); and Schreyer and Roggenbuck (1978). In addition, examinations of motivations in outdoor recreation have explored both the variation in motives for recreation and their relationship to users' attitudes, expectations, and preferences. For example, in their analysis of motivation scale items, Roggenbuck and Schreyer (1977), and Schreyer and Roggenbuck (1978) found significant relationships between people's motives and their attitudes to campsite development, crowding and maximum group size.

In short, it was clear that the quality of visitors' experiences was enhanced when there was consistency between visitors' needs, motivations and expectations and the setting in which they chose to recreate. Where a mismatch occurred between visitors' recreational desires and the recreational setting, the result would be a decrease in satisfaction and a reduction in the quality of their experiences. This insight established the basis for the realisation that 'experiences derived from recreation are related to the settings in which they occur, and that settings in turn are a function of environmental, social, and managerial factors' (Manning 1999: 182).

Notably Wagar (1964; 1968) also introduced the idea that the amount and type of management activity can influence an area's carrying capacity. For example, the introduction of infrastructure such as boardwalks can improve an environment's ability to withstand the impact of trampling on vegetation and soil. Similarly, the implementation of fuel-stove only areas to stop damage to vegetation resulting from the collection of firewood benefits the environment as well as improving the aesthetic quality of the setting. Additionally, measures such as regulating the distribution of visitors, providing infrastructure such as composting toilets, and running education campaigns encouraging the use of minimum impact practices enhance the quality of visitor experience (Manning 1986), and mitigate potentially negative environmental impacts. As such, Wagar had expanded the original carrying capacity concept to encompass three interrelated elements: the environmental, social and managerial settings.

Contemporary definitions of carrying capacity remain consistent with Wagar's original concept despite their own particular terminology (Alldredge 1973; Heberlein 1977; Shelby &

Heberlein 1986). Other writers nevertheless make a distinction among four types of capacity that are 'differentiated by decisions about which kinds of impacts are important' (Shelby & Heberlein 1986: 19). Alldredge (1973), Cole and Schreiner (1981), Gramann (1982), Heberlein (1977), Shelby and Heberlein (1986), and Verburg (1977) have all reflected these distinctions in their writings. Building on their generic definition of carrying capacity, which they describe as 'the level of use beyond which impacts exceed levels specified by evaluative standards', Shelby and Heberlein (1986) outline four types of carrying capacity:

- **Ecological capacity** is focused upon ecosystem impacts, such as soil erosion, loss of vegetation cover, disturbance to animal populations, and increased coliform counts in waterways.

- **Physical capacity** relates to the spatial parameters of the physical setting, for example, people per square metre of flat sleeping area.

- **Facility capacity** describes the developed facilities and infrastructure, such as the number of bunks in a hut, time waiting to use toilets, the number of tent sites at a campsite.

- **Social capacity** is concerned with quality of experience. Measures of social capacity include the frequency of encounters with other people at camp and on track/trail, number of people camped within sight and sound of each other, and the size of groups encountered.

Developing at the same time as the evolution of the carrying capacity concept, and the increasing concern over the provision of quality recreation, was a growing recognition of the importance of diversity in the types of recreation opportunities available to outdoor recreators (Wagar 1966). After expanding the original concept of carrying capacity, and recognising the fallacy of the 'average camper' (Lime 1974; Shafer, E.L., Jr. 1969; Wagar 1963), Wagar (1966) began building a definition of quality in outdoor recreation that embraced the importance of diversity. Using camping to illustrate his emerging definition, he called attention to the differences in campers' preferences for facilities. By pointing out that there are extremes in the preferences of campers and also a spectrum of opinion in between, Wagar (1966), along with Bultena and Klessig (1969), Shafer, E.L., Jr. (1969), Lime (1974), and Lloyd and Fischer (1972) laid the foundation for the development of what is now commonly known as ROS, the Recreation Opportunity Spectrum (Clark & Stankey 1979b).

2.2 Recreation Opportunity Spectrum (ROS)

The ROS is 'experience management' on a macroscale (Clark & Stankey 1979b; Hendee *et al.* 1990). The underlying rationale for the ROS is that the provision of a diversity of settings 'is the best way to assure quality outdoor recreation' experiences (Clark & Stankey 1979b: 4). As its name suggests, the ROS describes a variety of conditions which can be characterised as ranging from highly modified through to those that are unaffected by human influence, an idea consistent with earlier works by Marshall (1933, 1938 in Manning 1999), Carhart (1961), and the Outdoor Recreation Resource Review Commission (1962). Further, it has been shown that aspects of the biophysical, social and managerial environment shape the overall quality of visitors' experiences (Beard & Ragheb 1980; Burns *et al.* 1998; Connelly 1987; Dorfman 1979; Floyd *et al.* 1997; Foster & Jackson 1979; Rollins & Chambers 1990; Williams *et al.* 1991).

The ROS emerged from the concurrent efforts of two groups of researchers in the United States, namely Clark and Stankey (1979b) and Brown and Driver and their associates (Brown, P. *et al.* 1979; Driver & Brown 1978). Both groups derived methods based on a behavioural approach to recreation that suggests that most human behaviour is goal-oriented, and directed at satisfying some need (Crandall 1980; Driver & Brown 1978; Driver & Toucher 1970; Haas *et al.* 1980; Manning 1999). Central to both approaches is the definition of recreation settings according to their environmental, social and managerial characteristics.

While Brown and Driver and their associates focused on determining the link between the setting and the achievement of psychological outcomes, Clark and Stankey (1979b) took a more applied tack. Based on the assumption that diverse experiences will flow from a range of recreation settings that differ in character, their approach concentrated on articulating those differences by defining recreation settings according to their attributes along a spectrum from *modern* to *primitive* (Figure 2.1). Each site's position is determined according to the six factors that define the parameters of physical, social and managerial settings. These factors are: level of access, non-recreational resource uses, on-site management, social interaction, acceptability of visitor impacts, and acceptable regimentation (Figure 2.1).

The philosophy underlying the ROS approach was that the provision of a diverse range of settings 'ensures sic that the broadest segment of the public will find quality recreational experiences, both now and in the future' (Clark & Stankey 1979b: 4). Since the idea of the ROS is to ensure that a range of quality recreation opportunities is provided, each area should be considered in terms of the niche it fills along the continuum. As Wagar (1974) and Manning (1999: 178-179) point out, 'in this way, [the management and protection of] low density and other minority recreation opportunities can be justified'. Thus, the power of the

ROS is greatest when applied at a large scale, with individual recreation areas considered within the broader context - or spectrum of opportunities - within which they sit (Manning 1999).

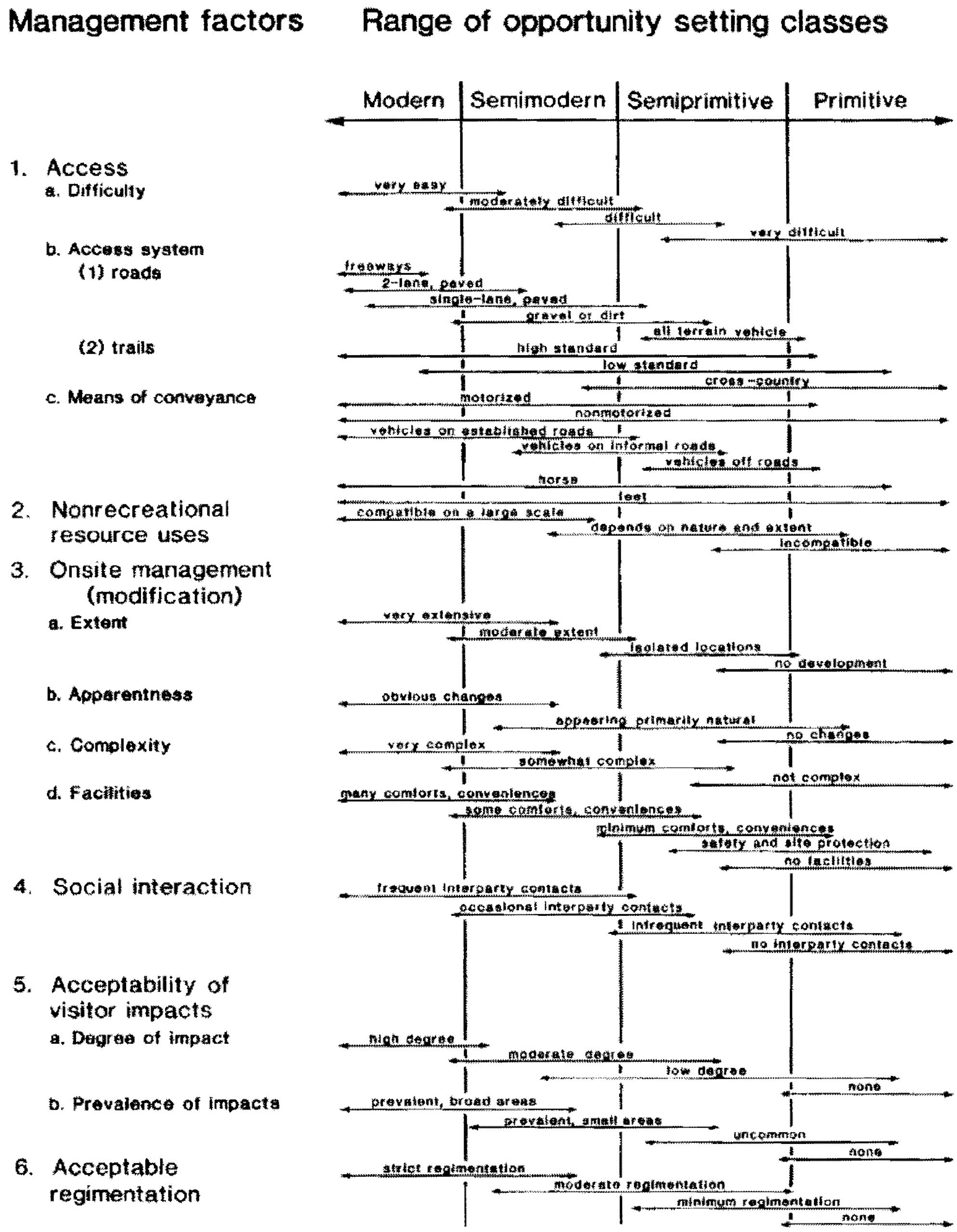

Figure 2.1 Factors defining outdoor recreation opportunity settings (Source: Clark & Stankey 1979b: 15)

When assessing and determining the spatial distribution (inventory and analysis) of recreation opportunities, mapping can be used as a visual analysis tool. Payne *et al.'s* (1997) application of the ROS to the assessment of visitor opportunities in Pukaskwa and Yoho National Park regions in Canada provides an example of utility of this mapping technique. Using this approach, the environmental, social and managerial characteristics of an area can be thematically represented on map overlays which are then combined to assess and assign allocation and planning zones that best reconcile environmental and recreation priorities. This zoning can also ensure appropriate spatial distribution of recreational opportunities. Management objectives for each setting attribute (Figure 1.1) can then be defined for each recreational opportunity, or zone, to direct management. These maps and defined objectives are often presented in the form of a management plan (Newsome *et al.* 2002; Payne *et al.* 1997; PWS 1999).

Once recreation opportunities are described, allocated, mapped, and their objectives outlined, the challenge is to set standards for appropriate impact levels for different areas or opportunity types (Clark & Stankey 1979a, 1979b). These standards allow managers to monitor the condition of the setting attributes over time to ensure inconsistencies can be addressed, and thus continue to provide quality recreation experiences.

The ROS is used to it fullest potential when employed as a planning and allocation tool. When so applied, its power lies in its practicality and ability to 'force managers to rationalise management' from the perspectives of resource protection, the provision of a range of recreation opportunities, and their ability to maintain the standards that are set (Nilsen & Tayler 1997: 50). Managers' attention is drawn to the relationship between supply and demand, which has led to the ROS being easily integrated with other processes (Nilsen & Tayler 1997). Ultimately, the ROS's capacity to direct the provision of a range of quality recreation opportunities is its greatest strength.

The clear attribute-based setting description technique established by ROS also provides a useful foundation from which to develop and undertake inventories and reviews of the provision of recreation opportunities (Kliskey 1998). The setting-based opportunity descriptions that emerge from the ROS also provide the basis for facilitating better self-selection (Manning 1999). When choosing a place to recreate, people select locations that they perceive as meeting and satisfying the experiential requirements for their chosen activity, and avoid those that do not (Shelby, Bregenzer *et al.* 1988; Shelby & Heberlein 1986). In the case of self-selection, consistency between experience and expectations will be sought and favoured since 'the confirmation of expectancies is one of the central motivating forces in human behavior' (Brehm & Cohen 1962: 179).

Indeed one of the keys to enhancing the quality of people's recreation experiences is effectively communicating the nature of the opportunities that are provided. In addition to Clark and Stankey's (1979b) setting based description approach, Brown *et al.* (1978) developed a narrative approach to describing the opportunities available. Such narrative descriptions are becoming frequently included in management documents to communicate the types of opportunities available to the public (Eldorado National Forest and Lake Tahoe Basin Management Unit 1998; National Park Service 2001; USDA Forest Service 1997).

However, the successful application of the ROS depends on managers accepting the methodology in total. Managers must agree on the range of opportunity classes (Figure 1.1) and the criteria by which they are defined before decisions about their spatial distribution and extent can be made. The successful definition of the recreation opportunities/zones and development of accompanying maps will be compromised if there is disagreement (Nilsen & Tayler 1997).

A weakness of the ROS approach is that after implementation, steps to address unacceptable changes to the setting conditions are only determined when and if managers become aware that inconsistencies have arisen. In the absence of having a predetermined management strategy to maintain the desired spectrum of recreational opportunities there is a danger that managers' ability to address unacceptable impacts (inconsistencies) may be compromised. Such management strategies and their associated management actions must be effective, affordable, and supported by the public. If inconsistencies between existing conditions and the setting conditions outlined for a particular area/recreation opportunity are left unaddressed, 'invasion and succession' may take place (Clark *et al.* 1971: 145). Such a process is likely to result in further unplanned changes in the nature of the recreation opportunity (product shift), the spectrum that is available to recreationists, and their distribution across the landscape. Should such a process take place, additional impacts may be caused at other sites due to displacement of dissatisfied recreationists.

The ROS has been criticised as being based on an "anachronistic 'consumer ethic'" that places emphasis on the provision for recreation in National Parks over their 'primary role ... as a means of preserving natural landscapes' (van Oosterzee 1984: 97). The ethical basis of the ROS, van Oosterzee argues, is inconsistent with the principal environmental protection and preservation role of National Parks in New South Wales, Australia. However, the ROS remains a practical and effective tool for addressing the preservation/recreation dilemma if applied within the context of an area's reservation status. As such, when applying the ROS, judgements of the acceptability of environmental impacts must be informed by the importance that is given to the protection of non-recreational resource values (Clark &

Stankey 1979b). Furthermore, Clark and Stankey (1979b) specifically point out that when determining opportunity settings or recreation zones it is important to avoid inconsistencies with overarching management plans, administrative policies, and legislative guidelines. As such they provide the foundation that underpins the allocation and provision of recreation opportunities.

Since its development, elements of the ROS framework has been integrated into the LAC and like planning and management frameworks (Nilsen & Tayler 1997). As such, the importance of providing a range of recreation opportunities continues to be a feature of contemporary wilderness management.

2.3 Limits of Acceptable Change (LAC) and like planning processes

Wagar's (1964) monograph marks the beginning of the evolution of the carrying capacity concept in the field of wildland recreation management (Cole & Stankey 1997). Based on likely relationships drawn from reasoned analysis, Wagar (1964) made a number of conclusions that heralded the direction for wildland recreation research and the development of management frameworks for the next four decades. These conclusions were as follows.

1. Recreationists seek a variety of experiences, and not all recreationists seek the same experience.

2. 'The relationship between the amount of use and experience-quality varies with the experience being sought' (Cole & Stankey 1997: 6).

3. Human values are a key determinant of what constitutes environmental quality and appropriate use.

4. Management objectives should prescribe outputs rather than inputs. For example, use and group size limitations are management tools which are inputs that may be used to deliver quality recreation experiences — outputs (Stankey & McCool 1984).

5. There are many variables, in addition to amount of use, that influence the quality of visitor experiences. Such variables include mode of travel, group size, behaviour, environmental impacts, motivation, and management. Manning (1999) provides a concise summary of the large body of research that has developed since the 1960s.

6. A wide variety of strategies, not just controlling use levels, may be employed to manage the recreation setting and the variables that affect quality to promote the delivery and maintenance of quality recreation experiences (Cole *et al.* 1987). 'Consequently, management actions other than limiting use are an equally and often more effective means of dealing with recreation management problems' (Cole & Stankey 1997: 6).

Now reinforced by the findings of empirical research, Wagar's (1964) conceptual work has provided the fundamental understandings from which The Limits of Acceptable Change (LAC) System for Wilderness Planning (Stankey *et al.* 1985) and related planning processes have developed (Cole & Stankey 1997).

Frissell (1963) was the first to articulate the concept of the limits of acceptable change in his 1963 Masters thesis, in which he examined the Recreational use of campsites in the Quetico-Superior canoe country, in the United States. Stated simply, he concluded that even very low levels of human use of an area would result in some impact on the environment. Thus, the focus of carrying capacity shifted from determining what amount of recreational use is acceptable, to ascertaining what amount of change is to be tolerated.

Joined by Stankey in 1972, Frissell further developed the limits of acceptable change concept and advanced it as an alternative approach to understanding carrying capacity in wilderness and protected areas. Motivated by concern about increasing levels of participation in wilderness recreation and its related impacts, the absence of clear objectives in management plans that specified the desired experiential and environmental conditions to be achieved and/or maintained Stankey *et al.* (1985) developed the definitive handbook for incorporating the LAC into wilderness planning (see also Stankey & McCool 1984). Since publication of the handbook in 1985 a variety of planning frameworks have been developed in Canada and the United States to address the acceptable use – acceptable impact dilemma. These include: the Carrying Capacity Assessment Process (Shelby & Heberlein 1986), Visitor Activity Management Process (Environment Canada and Park Service 1991; Parks Canada 1985), Visitor Experience and Resource Protection (Manning, Lime, Hof *et al.* 1995; National Park Service 1997), and Visitor Impact Management (Graefe *et al.* 1990). In Australia, the Tourism Optimisation Management Model (TOMM) was 'developed specifically for tourism planning in natural areas' (Newsome *et al.* 2002: 170).

Several comparative analyses and workshops of some or all of these frameworks have been undertaken, among them Graefe *et al.* (1990); Graham and Lawrence (1990); Payne and Graham (1993); Rickson *et al.* (1995); Nilsen and Tayler (1997), Manning (1999) and Newsome *et al.* (2002). Of all the carrying capacity frameworks developed, the Limits of Acceptable Change (LAC), Visitor Impact Management (VIM) and Visitor Experience and

Resource Protection (VERP) are the most commonly used (Manning 1999). The basic elements of these rational planning approaches are presented in Table 2.1.

Table 2.1 Carrying capacity frameworks (Adapted from Manning & Lime 2000)

Limits of Acceptable Change	*Visitor Impact Management*	*Visitor Experience and Resource Protection*
Step 1. Identify area concerns and issues	Step 1. Pre-assessment — database reviews	Element 1. Assemble an interdisciplinary project team
Step 2. Describe and define opportunity classes	Step 2. Review of management objectives	Element 2. Develop a public involvement strategy
Step 3. Select indicators of resource and social conditions	Step 3. Selection of key impact indicators	Element 3. Develop statements of primary park purpose, significance, and primary interpretive themes
Step 4. Inventory resource and social conditions	Step 4. Selection of standards for key impact indicators	Element 4. Analyse park resources and existing visitor use
Step 5. Specify standards for resource and social indicators	Step 5. Comparison of standards and existing conditions	Element 5. Describe a potential range of visitor experiences and resource conditions
Step 6. Identify alternative opportunity classes	Step 6. Identify probable causes of impacts	Element 6. Allocate potential zones to specific locations
Step 7. Identify management actions for each alternative	Step 7. Identify management strategies	Element 7. Select indicators and specify standards for each zone; develop monitoring plan
Step 8. Evaluate and select an alternative	Step 8. Implement	Element 8. Monitor resource and social indicators
Step 9. Implement actions and monitor conditions		Element 9. Take management action

The LAC process has been criticised for being focused on issues rather than being guided by statements that outline the general goals and desired conditions (Cole & McCool 1997; Nilsen & Tayler 1997). As a result, Cole and McCool (1997) proposed the addition of a new first step to the original nine-step LAC process (Stankey *et al.* 1985). This first step - to define goals - involves:

> assembling the legal and policy mandates that will guide management of the area and developing a perspective on the significance of the area, its uniqueness, and its regional or national 'niche.' These can then be used to describe general goals for the area (Cole & McCool 1997: 61).

Despite variation in respect to the order of the steps, and the language used, each carrying capacity framework follows a rational decision-making process with some common characteristics (Manning 1999; Nilsen & Tayler 1997). These include:

1. use of interdisciplinary planning teams;

2. establishment of clear, measurable management objectives;
3. definition of the types of recreation opportunities to be provided [in terms of the biophysical, social and managerial setting conditions]. Recreational opportunities should be defined as specifically and quantitatively as possible through indicators and standards of quality [using sound natural and social science information];
4. monitoring of indicator variables to determine whether existing conditions meet standards of quality; and,
5. management action when and where monitoring suggests that standards of quality have been violated (Manning 1999).

It is evident then that clearly defined management objectives, and indicators and standards of quality are vital aspects of outdoor recreation planning, of which the provision and maintenance of a range of quality recreation opportunities are the desired outputs.

2.4 Management objectives, indicators and standards

Management objectives are broad statements that outline the type/s of recreation opportunities to be provided. They should be based on, and designed to be consistent with, an area's purpose and the protection of its values. Details of these obligations are commonly articulated in conventions, legislation, and policy documents. Public involvement and interdisciplinary planning and management teams may also be a feature of the development of objectives to guide the management of an area (Manning 1999; Manning & Lime 1996).

Once objectives have been clearly articulated, indicators are then identified. Indicators provide the means by which managers can quantify, measure and monitor the quality of the prescribed recreation opportunities and gauge the extent to which they are being met (Manning 1999; Manning & Lime 1996). Indicators may include aspects of biophysical and social settings that are influential in shaping the quality of visitors' experiences (Manning & Lime 1996).

Indicators are the basis for clearly articulated minimum acceptable standards that are to be maintained by managers. Such standards, also known as limits of acceptable change, do not describe an ideal state to be achieved - unless conditions are beyond the threshold/s prescribed by the standards (Cole & McCool 1997). Rather, they define the point at which changes in the character of the social and biophysical setting are no longer acceptable (Manning 1999). As such, the standards prescribe the point at which management actions designed to ameliorate the impacts are to be implemented (Cole & McCool 1997).

To illustrate the relationships among management objectives, indicators and standards, Manning (1999) has used the following example. The U.S. Wilderness Act of 1964 states that wilderness should provide opportunities for solitude. Therefore, the provision of opportunities for visitors to experience solitude is a suitable management objective that supports the legislative requirement. An important and defining feature of solitude is the frequency of encounters experienced at campsites and along walking tracks (Manning 1999). Campsite and on-track encounters are therefore likely to be suitable indicators of the quality of the recreation opportunity being provided in designated wilderness areas in the United States. Furthermore, research has found that:

> visitors may have normative standards about how many trail [on-track] and campsite encounters can be experienced before opportunities for solitude decline to an unacceptable degree. For example a number of studies suggest that wilderness visitors prefer to see no more than five other groups per day along trails [tracks]. Thus, a maximum of five encounters per day with other groups along trails may be a good standard of quality (Manning 1999: 72).

In short, the use of indicators and the identification of standards provide the basis for measuring and monitoring the quality of the recreation opportunities being provided, and for gauging the extent to which management objectives and legislative obligations are being met.

Management objectives, indicators, and standards are fundamental components of planning and management, therefore it is vital that their definition is well founded. In the process of this definition, a number of issues must be considered. Manning (1999) has described these issues according to the three elements of the carrying capacity. They are:

1. **Natural resource considerations**

   The amount of change resulting from recreation use depends on the biophysical characteristics of the setting. While even low levels of recreation use result in some environmental change (Frissell 1963), the nature of some environments makes them more vulnerable to recreation-related impacts. In these cases, research can be helpful in developing management objectives and indicators that are sensitive to the specific characteristics of the setting, and as such help to determine appropriate standards of quality.

2. **Social considerations**

   What are visitors' opinions and preferences with respect to appropriate use and setting conditions? Examination of their needs, wants, and attitudes is important in the analysis of recreation opportunities, and the determination of standards that are supported by stakeholders.

3. **Management considerations**

   Management objectives, indicators, and standards of quality must be consistent with obligations set out in international conventions, legislation, agency policy, and other statutory guidelines. These sources can provide guidance in formulation of objectives, indicators, or standards. Resourcing issues must also be considered with respect to managers' abilities to achieve the objectives that are set.

These various considerations contribute to the ability of wilderness managers to make 'informed judgements' in determining management objectives, and identifying indicators and standards that define the range and types of experiences and conditions that are to be provided and the levels of impact that will be accepted (Manning 2001: 21).

Indicators and standards of quality

Since the development of contemporary carrying capacity frameworks, researchers and wilderness managers have focussed on the use of indicators and the development of minimum acceptable standards that mark thresholds at which management strategies are implemented to ameliorate the impacts of outdoor recreation. Determining which indicators are the most appropriate ones to use is a key task. Even more critical is the formulation of standards and the integration of social values to allow informed judgements to be made by managers of wilderness and other protected areas (Manning 2001).

To identify which indicators are important and develop standards of quality, researchers have applied normative theory and related empirical methods traditionally used in the fields of sociology and social-psychology (Heberlein 1977; Shelby & Heberlein 1986; Shelby *et al.* 1996; Vaske *et al.* 1992; Vaske *et al.* 1986). As applied to outdoor recreation, norms are generally defined as standards that individuals and groups use for evaluating behaviour and social and environmental conditions. If visitors have normative standards concerning aspects of the recreation experience, then these norms can be measured and used as a basis for developing standards of quality (Manning 2001).

Use of this normative approach in developing visitor-based standards has been described in detail by Shelby and Heberlein (1986), Vaske *et al.* (1986) and Shelby *et al.* (1996). The influence of Jackson's (1966) *Return Potential Model* for the measurement of norms is a central feature of these researchers' work in translating visitor's preferences into standards (Shelby & Heberlein 1986; Shelby & Vaske 1991; Shelby *et al.* 1996). Following Jackson's method, personal norms can be aggregated to test for consensus and where possible to develop social norms (Manning 1999, 2001; Manning & Lime 2000). Most of the normative research has concentrated on crowding (Heberlein *et al.* 1986; Whittaker & Shelby 1988; Williams *et al.* 1991), but has expanded to include other potential indicators such as environmental impacts at campsites (Shelby, Vaske *et al.* 1988).

Several reviews and syntheses of this expanding field of research have been recently completed, including those by Donnelly *et al.* (2000), Manning (1999; 2001), Manning and Lime (2000), and Shelby *et al.* (1996). The remainder of this chapter draws on these works in a discussion of the application of the normative approach to outdoor recreation and the identification of potential indicators and the development of standards.

2.5 Norm theory and methods in outdoor recreation

Developed in the fields of sociology and psychology, norm theory has been embraced by researchers in the field of outdoor recreation as a means to better inform management decisions with respect to carrying capacity. Adaptation of Jackson's (1966) methodology in particular has been rewarding; specifically, in exploring visitors' evaluations of different levels of recreation related impact and activity, and the development of visitor-based standards.

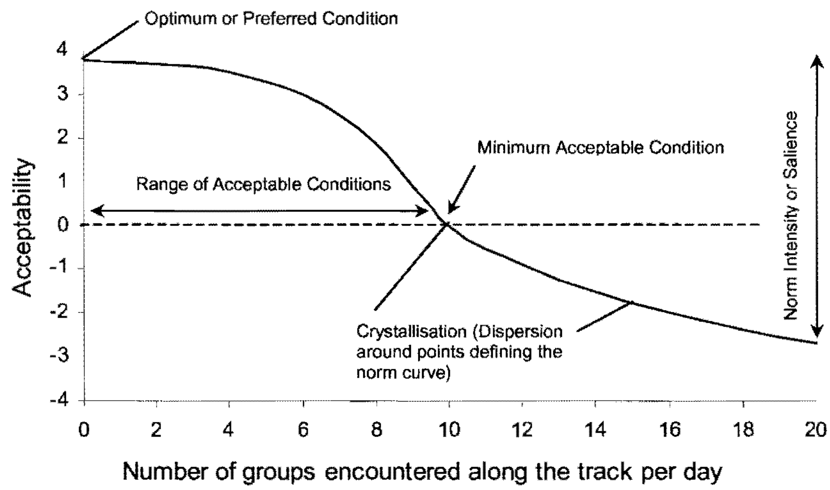

Figure 2.2. Hypothetical norm curve for the number of groups encountered along the track per day (Adapted from Manning & Lime 2000)

An example of such an application of this methodology could be to assess on-track encounter norms using a repetitive item format (Donnelly *et al.* 1992) that asks bushwalkers to rate the acceptability of encountering increasing numbers of other parties while walking on tracks. Individual responses can be aggregated to identify the existence of social norms and the degree to which norms are shared.

The data from such a hypothetical question can be graphically illustrated (Figure 2.2). The curved line traces the average acceptability ratings for the number of groups hypothetically encountered along a track. This plotted line is variously called an 'encounter' or 'contact preference curve' (when applied to encounter related variables), or more generally an 'impact acceptability' or 'norm curve'.

Such norm curves have several features that are potentially useful to researchers and managers seeking to establish visitor-based standards. These features are:

1. The 'range of acceptable conditions' is defined by the portion of the curve that is situated above the neutral line. Encounters with other groups in this frequency range are judged to be acceptable by approximately 50% of respondents.

2. "The 'optimum condition' is defined by the highest point on the norm curve. This is the condition that received the highest rating of acceptability from the sample as a whole."

3. "The 'minimum acceptable condition' is defined as the point at which the norm curve crosses the neutral line. This is the condition that approximately half of the sample finds acceptable and half finds unacceptable."

4. "'Norm intensity' or norm 'salience' — the strength of respondents' feelings about the importance of a potential indicator of quality — is suggested by the distance of the norm curve above and below the neutral line. The greater this distance, the more strongly respondents feel about the indicator of quality or the condition being measured. High measures of norm intensity or salience suggest that a variable may be a good indicator of quality because respondents feel it is important in defining the quality of the recreation experience."

5. "'Crystallisation' of the norm concerns the amount of agreement or consensus about the norm. It is usually measured by standard deviations or other measures of variance of the points that describe the norm curve. The less variance or dispersion of data around those points, the more consensus there is about social norms. Norm curves are sometimes constructed with the vertical axis of the graph representing the percentage of respondents who report each level of impact as the maximum acceptable." (Manning & Lime 2000: 17).

While providing a greater detail with respect to visitor's ratings of the acceptability of a range of encounter frequencies, the repetitive item format has been criticised for being too much of a burden with respect to the time required of respondents to provide the requested information in a survey context. As a result, shorter, open-ended question formats have been developed that ask respondents to report the maximum level of impact that is acceptable to them. In the example illustrated in Figure 2.2, respondents could simply be asked: What is the maximum number of groups you would accept to encounter while walking along the track in a day? Question formats for measuring norms are discussed later.

The application of normative theory to outdoor recreation, however, has not gone unquestioned (Heywood 1993; McDonald 1996; Noe 1992; Roggenbuck *et al.* 1991; Shelby & Vaske 1991; Shelby *et al.* 1996). As originally conceived within the disciplines of sociology and social psychology norms were social rules or standards of behaviour. Compliance with these norms was encouraged or ensured through a shared of sense of obligation and social sanctions (Heywood 2000; Manning & Lime 2000). But, outdoor recreation researchers applying normative methods have adopted broader definitions. In this field, norms have been defined as 'standards that individuals use for evaluating behaviour, activities, environments, or management proposals as good or bad, better or worse' (Shelby *et al.* 1996: 116); or more simply, they are 'evaluative standards which define the important aspects of a particular recreation experience' (Donnelly *et al.* 1992: 43). Consequently, outdoor recreation norms are a measure of what conditions ought to exist. As a result, it has been suggested that the terms 'personal evaluative standards' or 'social evaluative standards' be applied to the standards that are developed from the research based on such definitions (Heywood 2000; Manning 1999; Manning & Lime 2000). However, while the application of such labels would highlight the contrasting definitional foundations of the norms developed by researchers, the terms *personal* and *social norms* have become common parlance in the field of outdoor recreation research, and therefore, they have been adopted by this study.

Selection of indicators

It is vital to carefully select the indicators to be used to measure and monitor the social and environmental conditions of an area as they provide the foundation for the management of that area. While the normative theory and methods described above have more commonly been used to identify standards, they are also useful in determining potential indicators of the quality of visitors' recreation experiences (Morin 1996; Morin *et al.* 1997; Roggenbuck *et al.* 1993; Shafer, C.S. & Inglis 2000; Tarrant & Shafer 1997). Visitors' opinions on the importance of potential indicators in determining the quality of their experience reveal normative characteristics (Manning 1999 , 2001; Manning & Lime 2000). But what are criteria that define good indicators of quality and how important are such indicators in determining the quality of visitors' experiences?

Criteria for the selection of potential indicators

A number of authors have developed criteria to assist in the selection of reliable indicators from the range of potential indicators available (Merigliano 1987 , 1990; National Park Service 1997; Stankey *et al.* 1985; Whittaker 1992; Whittaker & Shelby 1992). High-quality indicators exhibit the following characteristics (Manning & Lime 2000: 18):

- **Specific and quantitative**. Indicators such as 'the number of people encountered at a campsite' are better indicators are than 'solitude' because it is too general.
- **Objective**. Indicators should be objective rather than subjective. For example, 'the number of people encountered at a campsite' is a clear absolute value, while 'the percentage of campers who felt crowded' is subjective and influenced by other factors such as the behaviour of those encountered.
- **Reliable**. If trained, different people should record similar information under like conditions.
- **Related to visitor use**. Visitor use and changes in the condition of an indicator should be strongly correlated.
- **Sensitive**. An indicator should be sensitive to small changes in condition over relatively brief time spans to facilitate timely management responses.
- **Responsive to management.** The condition of an indicator should be influenced by changes in management to ensure conditions are maintained within prescribed standards.
- **Efficient and effective to measure.** Indicators should be relatively simple and cost-effective to measure. The more an indicator exhibits these characteristics the more likely they are to be monitored on a regular basis.
- **Significant.** The condition of an indicator must be important in defining the quality of visitors' experiences.

But what indicators are important to visitors?

When selecting indicators it is important to ensure that they are influential and important in shaping the quality of visitors' experience. That is: do they meet the criterion of *significance* outlined immediately above? As Manning (1999) and Manning and Lime (2000) have pointed out, much of the outdoor recreation research literature has given consideration to the influence of factors such as crowding, the perception of encounters, conflict, visitor characteristics and their attitudes in shaping the quality of visitors' experiences. In addition, the range of acceptability inscribed by the norm curve has been interpreted as a sign of the importance or salience of an indicator, as illustrated in Figure 2.2 (Manning & Lime 2000). Others have used the proportion of survey respondents who reported a norm when asked as an indication of salience (Shelby & Vaske 1991).

While such research is suggestive in identifying indicators that are important to visitors, several researchers have taken a more direct approach (Manning, Lime & Hof 1996; Manning, Lime, Hof *et al.* 1995; Manning, Lime & McMonagle 1995; Merigliano 1990; Morin 1996; Morin *et al.* 1997; Roggenbuck *et al.* 1993; Shafer, C.S. & Hammitt 1994; Shindler & Shelby 1992; Watson *et al.* 1992; Whittaker 1992). Researchers like Morin *et al.* (1997), Roggenbuck *et al.* (1993), Rutledge and Trotter (1995a), and Watson *et al.* (1992) have directly asked survey respondents how important potential indicators were in influencing the quality of their experiences. Potential indicators of quality examined in these and other studies are outlined in Table 2.2.

Table 2.2 Potential indicators of quality

Study/area/respondents	Potential indicator of quality
Merigliano (1990) Wilderness Wilderness managers and scientists	- Number of campsites above an acceptable impact index - Percent of visitors who report seeing wildlife - Range condition and trend - Air visibility - extinction coefficient or visual range - Litter quantity – number of pieces of litter per campsite or per trail [track] mile; number of pounds of garbage packed out each season - Number of manager created structures - Number of signs per trail mile - Trail [track] condition – length of multiple trails [track braiding] or number of trail miles with unacceptable problems to visitors (e.g., depth exceeding eight inches, year round muddiness) - Length of trail in areas managed as trailless - Faecal coliform/faecal streptococci ratio (drinking water quality) - Number of occupied campsites within sight or sound of each other or visitor report of number of groups camped within sight or sound - Number of violations of no-trace [minimum impact bushwalking] regulations - Percent of groups carrying a stove (not using a campfire) - Number of occurrences of unburied faeces - Number of occurrences of motorised noise per day - Percent of season wilderness rangers are out patrolling the area - Number of regulations that limit visitor use or restrict travel - Number of regulatory signs posted beyond trailhead
Shindler & Shelby (1992) Wilderness campsites Members of five interest groups	- Amount of bare ground - Size and appearance of fire rings - Distance from trail - Screening from other sites - Out of site/sound of other sites

	- Evidence of litter - View of scenery - Available firewood - Sheltered from the weather - Dry and well drained - Water for aesthetic reasons - Flat place for sleeping – Close to good fishing - Logs and rocks for seating - Close to drinking/cooking water
Whittaker (1992) Five Alaska rivers Floaters, motorboaters	- Litter - Signs of use - Campsite competition - Fishing competition - Launch congestion - River encounters - Camp encounters - Powerboat use - Airboat use - Rafting/canoeing use - Airplane landings - ORV (off-road vehicle) use - Hazard signs - Interpretive signs - Public use cabins - Private cabins - Concessions - Long-term camps
Roggenbuck, Williams & Watson. (1993) Four wilderness areas (Cohutta, Caney Creek, Rattlesnake and Upland Island) Visitors	- Amount of litter I see - Number of trees around campsites that have been damaged by people - Amount of noise associated with human activities within the wilderness - Amount of man-made noise originating from outside the wilderness - Number of animals I see - Amount of vegetation loss and bare ground around a campsite - Number of horse groups that camp within sight or sound of my campsite - Number of horse groups that travel past my campsite while I am there - Number of campfire rings that people have made - Number of hiker groups that walk past my campsite - Number of large groups (more than 6 people) that I see along the trail - Number of horse groups that I see along the trails in a day - Percent of time other people are in sight when I'm along the trail - Visibility of lights originating from outside the wilderness - Total number of people I see hiking along the trail - Number of groups of hikers I see along the trail - Amount of time I spend travelling on old roads in wilderness - Number of miles of gravel road I travel to get to the wilderness
Shafer, C.S. & Hammitt (1994) Cohutta Wilderness, Georgia	- The total amount of time that your party has in an area without seeing or hearing anyone else - The amount of restriction management places on where you travel in the area

Visitors	- The number of permanent structure placed by management in the wilderness - Seeing an unusual type of plant - The amount of restriction management places on where you camp in the area - The level of difficulty required to obtain an overnight permit - The number of vehicles you see at a trailhead - The number of fire rings found in a campsite - The number of days in a row that you are able to stay in the wilderness on a given trip - The number of signs designating locations in the wilderness - The number of groups you pass during the day while travelling - Having signs placed by wilderness managers that state regulations about wilderness - The amount of wilderness which does not have trails in it - The distance of campfire rings from trailheads - The number of rangers you see in the area - The amount of ranger contact in the backcountry to check your permit and/or explain regulations about use - The amount of litter found in campsites - The amount of litter seen along the trail - The number of trees and other vegetation damaged by previous users - The amount of noise heard in the area that comes from outside the wilderness - The amount of fully mature forest in the wilderness area - Observing a natural ecosystem at work - The amount of solitude your group experiences - The amount of noise heard in the area that comes from other wilderness visitors - The number of species of wildlife that you see - The number of areas in the wilderness that are very remote - The distance between your campsite and the campsite of others - Seeing specific types of wildlife - The amount of light visible at night which comes from outside the wilderness - The level of maintenance - The number of groups that pass within sight if your camp - An area in the wilderness that is left completely primitive (no trails, bridges) - Having a portion of the wilderness where camping location is unconfined - Having trail markers placed by management (blazes, cairns, posts)
Manning, Lime, Hof & Freimund 1995; Manning , Lime & McMonagle (1995); Manning & Lime (1996). Arches National Park, Utah Visitors	- Orientation, information and interpretation services - Number and type of visitor facilities - Number of people encountered - Visitor behaviour and activities - Resource impacts - Park management activities - Quality and condition of natural features
Jocobi, Manning, Vallieri & Negra (1996) Arcadia National Park, ME	- Number of visitors encountered - Type of activities encountered (hikers or bikers) - Behaviour of visitors (speed of bikers, keeping to the right, obstructing the

Carriage road visitors	roads, travelling off the roads)
Morin, Moore & Schmidt (1997) Nuyts Wilderness, Walpole-Nornalup National Park, Western Australia, Australia Visitors	- The amount of litter - Inadequate disposal of human waste - The presence of wildlife - Erosion of trails leading to Coves - Vegetation loss and bare ground around Coves - Number of trees damaged around campsite - Erosion along main trail - Amount of vegetation loss and bare ground around campsite - Amount of vegetation loss and/or bare ground along trails - The number of people in a group - Number of other groups camping within sight or sound of my campsite - Evidence of campfires - Width of trail (size) - The presence of signs - Number of trails - Number of other groups seen along trails

Note: A study by Schafer, C.S. & Inglis (2000) has examined the influences of social, biophysical and managerial conditions on snorkelers' tourism experiences in the Great Barrier Reef World Heritage Area. Being a non-terrestrial study it has not been discussed here.

Adapted from Manning and Lime (2000) and expanded

The studies outlined in Table 2.2 have employed a variety of research methods, including open and closed-ended question formats in their surveys of wilderness visitors, interest groups, managers, and scientists. Additionally, these studies vary with respect to the areas and activities being examined. Despite these differences, Manning and Lime (2000) advanced the following five general conclusions from their review of these studies[2]:

1. There is a broad range of potential indicators that suit a variety of contexts. As such selection of indicators in a fashion consistent with the management of the environmental, social and managerial setting framework established by the ROS may be helpful in ensuring all aspects of the recreation setting are monitored and managed to agreed standards.

2. Many of the potential indicators examined in the studies outlined were considered to be at least somewhat important to the quality of respondents' experiences; this is generally consistent with the findings from outdoor recreation research that have found a range of motivations for outdoor recreation and thus the search by visitors for satisfaction of a range of desired recreation outcomes (Driver & Toucher 1970; Haas *et al.* 1980; Hendee 1974).

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[2] Manning and Lime (2000) did not review the study by Morin *et al.* (1997); however, their findings were consistent with the general conclusions outlined.

3. Indicators are considered to be of varying levels of importance. Litter and other use impacts are consistently rated highly on the scale of importance in determining the quality of visitors' experiences. Management-related impacts (such as the presence of signs) are considered less important. Indicators regarding encounters with other people/parties are important, but ought not to be considered only from a quantitative perspective. Consistent with the literature on crowding and conflict in outdoor recreation, visitors' evaluations of encounters are influenced by many factors, including the activity being undertaken by those encountered, their behaviour, perceptions of alikeness, as well as competition-related impacts such as those associated with limited-campsite capacity.

4. The character of a setting in terms of level of development and level of use (ROS category or zone) has an influence of how important different indicators are considered. Findings suggest that some indicators of quality are more relevant to the types of experiences being sought in wilderness and like areas, than to the quality of the experiential opportunities in more highly used developed areas.

5. Visitors may consider environmental indicators less important than social setting indicators for wilderness campsites. For example, the amount of vegetation loss and bare ground and the size of fire rings at campsites could have less influence on the quality of visitors' experiences than screening from other campsites and the number of people camped within sight or sound. The notion that campsite encounters are an important determinant of the quality of wilderness recreation experiences is generally supported by the research literature. This research also suggests that there is a general lack of awareness and recognition of the recreation-related environmental impacts.

Specifying limits of acceptable change standards

Once indicators have been identified, the next task is the definition of limits of acceptable change standards. The development of clearly articulated and specific standards is vital to establish a transparent mechanism that will trigger the introduction of management actions to mitigate unacceptable changes in condition if standards are breached.

Characteristics of rigorous standards

Several authors have examined and or discussed the types of qualities that are characteristic of standards that are rigorous (Brunson *et al.* 1992; Manning 1999; Manning & Lime 2000; National Park Service 1997; Schomaker 1984; Whittaker & Shelby 1992). It is evident from the work of these authors that if standards are to be accurate and reliable they should exhibit the following characteristics:

1. **Be quantifiable.** Standards should be quantitative and avoid qualitative terminology. For example, an indicator such as 'the number of people camped within sight or sound per night' a poor standard would be 'low numbers of other people camped within sight or sound'. A better standard would be 'an average of three other groups camped within sight or sound per night'. The latter standard is more precise because it specifies a minimum acceptable condition that is measurable and not subject to interpretation.

2. **Be time or space bounded.** Standards should be expressed as 'per hour', 'per day', 'per night', 'per trip', or 'at one time' to give them a defined temporal context. Similarly, a spatial standard might specify the extent of trampling impact to be tolerated around campsites by stipulating, for example, the maximum number of square metres of vegetation impacted by social trails per acre.

3. **Be impact oriented.** Standards should be directed at impacts that affect the quality of visitors' experiences, rather than the source of those impacts or related management actions. For example, 'no more than 10 other people encountered along the track per day' is a better standard than one that specifies the maximum number of people permitted to walk a particular section of track in a day. The encounter standard is better, as the direction and speed of travel, and temporal dispersal influence the number of encounters with other visitors along the track.

4. **Be expressed as a probability.** Expressing the standards as a probability accounts for the natural variability of visitor use and the dynamic nature of the biophysical environment. This built in tolerance acknowledges that extreme events are infrequent, short lived and unpredictable. An example of a standard expressed as a probability might be 'on 80% of days during peak season no more than 10 other people encountered along the track per day'.

5. **Be realistic.** Standards should be attainable. They should take into account ecological considerations, as well as the political feasibility of enforcement and the social acceptance of the management actions required to maintain conditions at the minimum acceptable standards.

Developing standards

A large number of normative studies have been undertaken to inform the development of standards. As Table 2.3 illustrates, normative methods have been applied in diverse recreation settings/areas and have involved respondents from a range of different activity groups.

Table 2.3 Studies that have applied normative methods to the identification of visitor-based standards: study areas and respondents

Study	Area	Respondents
Stankey (1973)	Boundary Waters Canoe Area, MN, USA	Visitors - paddling canoeists, motor canoeists, motor-boaters
	Bob Marshall Wilderness, MT, USA	Visitors including backpackers, horseback riders, hikers with stock.
	Bridger Wilderness, Wyoming, USA	Visitors including backpackers, horseback riders, hikers with stock.
	High Uintas Primitive Area, UT, USA	Visitors including backpackers, horseback riders, hikers with stock.
Stankey (1980)	Desolation Wilderness, CA, USA	Visitors – hikers, horseback riders, hikers with stock, hunters, fishers
	Spanish Peaks Primitive Area, MT, USA	Visitors – hikers, horseback riders, hikers with stock, hunters, fishers
Shelby (1981)	Colorado River, Grand Canyon National Park, AZ, USA	Boaters
	Rogue River, OR, USA	Boaters
	Illinois River, OR, USA	Boaters
Heberlein *et al.* (1986)	Apostle National Lakeshore, WI, USA	Boaters
Vaske *et al.* (1986)	Brule River, WI, USA	Floaters
Shelby, Bregenzer *et al.* (1988)	Illinois River and Rogue River, OR, USA	River runners
Shelby, Vaske *et al.* (1988)	Mt Jefferson Wilderness, OR, USA	Campers
Whittaker & Shelby (1988)	Deschutes River, OR, USA	Boaters
Patterson & Hammitt (1990)	Great Smokey Mountains National Park, NC/TN, USA	Backpackers
Roggenbuck *et al.* (1991)	New River, WV, USA	Floaters
Young *et al.* (1991)[1], Watson *et al.* (1992)[2], Roggenbuck *et al.* (1993)[3]	Caney Creek, AK, USA	Visitors including hikers, hunters, rockclimbers
	Cohutta Wilderness, GA, USA	Visitors including hikers, horseback riders, hunters, rockclimbers
	Rattlesnake Wilderness, MA, USA	Visitors including hikers and horseback riders
	Upland Island, TX, USA	Visitors including hikers, horseback riders, hunters
Ewert & Hood (1995), Ewert (1998)	San Gorgonio Wilderness and John Muir Wilderness, CA, USA	Hikers
Hammitt & Rutlin (1995)	Ellicott Rock Wilderness, SC/NC/GA, USA	Trail users
Rutledge & Trotter (1995a)	Fort Nelson Forest District, British Columbia, Canada	Visitors including hunters, canoeists/kayakers, horseback riders, hunters, fishers
Shelby & Whittaker (1995)	Delores River, CO, USA	Boaters
Shindler & Shelby (1995)	Rogue River, OR, USA	Boaters
Watson (1995)	Boundary Waters Canoe Area, MN, USA	Canoers
Hall & Shelby (1996)	Eagle Cap Wilderness, OR, USA	Hikers and stockusers

Hall *et al.* (1996)	Clackamas River, OR, USA	Kayakers and rafters
Lewis *et al.* (1996a)	Boundary Waters Canoe Area, MN, USA	Paddle canoeists
Manning, Lime, Hof *et al.* (1995); Manning, Lime & McMonagle (1995); Manning, Lime & Hof (1996); Manning, Lime, Freimund *et al.* (1996)	Arches National Park, UT, USA	Visitors
Vaske *et al.* (1995); Vaske *et al.* (1996)	Columbia Ice Field, Jasper National Park, Canada	Snow-coach riders and hikers
Morin (1996), Morin *et al.* (1997)	Nuyts Wilderness, Walpole-Nornalup National Park, Western Australia	Visitors including day-walkers and overnight campers
Manning *et al.* (1997)	Arcadia National Park, ME, USA	Carriage road users
Tarrant *et al.* (1997)	Nantehala River, NC, USA	Floaters
Kim & Shelby (1998)	Chiri-Mountain National Park, Korea	Campers
Lah (2000)	Mount Rainier National Park, WA, USA	Visitors

[1] Cohutta Wilderness, GA

[2] Caney Creek, AK; Cohutta Wilderness, GA; Upland Island, TX

[3] Caney Creek, AK; Cohutta Wilderness, GA; Rattlesnake Wilderness, MA; Upland Island, TX

Adapted from Manning & Lime (2000) and expanded

While most of the studies outlined in Table 2.3 adopted methods consistent with that described earlier, they varied in a number of ways, including question format, wording, and response scales. Manning and Lime (2000) reviewed these studies and drew the following general conclusions:

1. Norms can be measured for a range of indicators of the quality of visitors' experience. While some studies have concentrated on encounter/crowding related variables, norms have been measured for both social and biophysical variables.

2. Most respondents have and are willing to specify norms for the majority of the variables examined; however, some exceptions have been found. For example, Roggenbuck *et al.* (1991) report that for several of the encounter variables they examined across a variety of hypothetical recreation opportunities, respondents specified norms in only 29% to 66% of cases. Many of their respondents not reporting norms 'said encounters made no difference [to the quality of the experiences described], or said they made a difference but couldn't give a number' (Roggenbuck *et al.* 1991: 131).

3. 'Norm prevalence' (Kim & Shelby 1998) — the proportion of visitors able to specify a norm — tends to be higher among wilderness and backcountry visitors than frontcountry and developed site visitors. There is also more agreement (crystallisation) evident among the norms of wilderness recreators.

4. Norms tend to be lower for wilderness and backcountry experiences than for those in frontcountry and developed areas.

5. Norms tend to be similar for different areas providing a comparable recreation opportunity.

6. Norms can be categorised as no tolerance, single tolerance, or multiple tolerance (Figure 2.3).

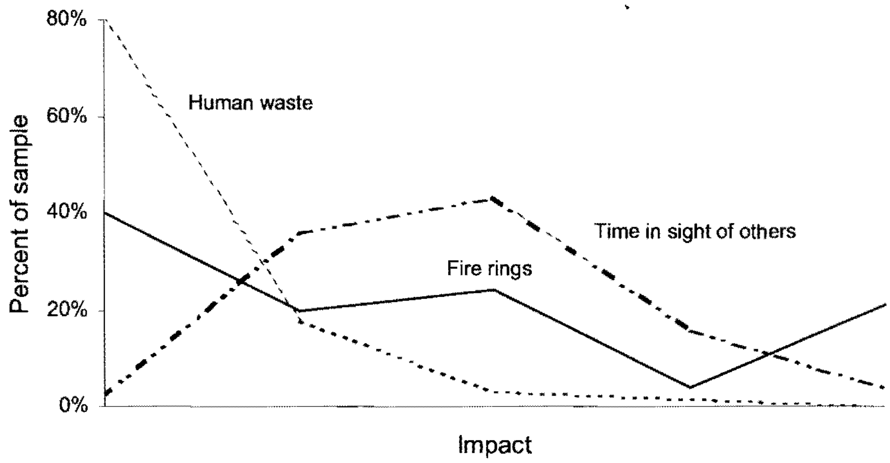

Figure 2.3 Example of no tolerance (human waste), single tolerance (time in sight of others) and multiple tolerance (fire rings) norms (Source: Whittaker & Shelby 1988)

7. The character of respondents and the people they encounter, as well as other situational variables, frequently influence their encounter norms. Examples of such variables are the types of activity, perceptions of alikeness, type of recreation area, and the location within an area (campsite versus track and interior versus periphery) that an encounter is experienced.

8. Managers' and visitors' norms can differ with respect to their tolerance for various impacts.

2.6 Conclusion

An inadequate appreciation of the social dimensions of wilderness planning was identified in Chapter 1 as impeding the PWS's ability to maintain and enhance the quality of both the wilderness quality and the quality of visitors' experiences. The purpose of this chapter has been to examine the evolution of the carrying capacity, and the importance and integration of social values in wilderness planning.

Having achieved this task, several key conclusions are evident. First, since its adoption, the carrying capacity concept has expanded from its original focus on the management of biophysical resources to encompass the consideration and management of social values. Second, the carrying capacity of an area is shaped by the interplay of the character of the social, biophysical and managerial setting. Third, outdoor recreation experiences are characterised and shaped by the social, biophysical and managerial settings in which they take place. Moreover, managers of wilderness areas should seek to provide a range of appropriate recreation opportunities consistent with the area's purpose and values. Fourth, the objectives for an area should be clearly articulated and prescribe the range of recreation opportunities to be provided. In doing so, a range of factors should be considered. These factors include the area's natural and social values, obligations according to conventions and legislation, statutory requirements outlined in management plans, and policy. Fifth, indicators and standards provide the basis for monitoring and evaluation of the quality of the recreation opportunities being provided and for determining if management objectives are being met. Importantly, clear criteria for the selection of high-quality indicators have been established, and the characteristics of rigorous standards have been defined. Furthermore, should such rigorous standards be breached, they afford a transparent mechanism for the implementation of management actions to stabilise and or return conditions to a state that is acceptable. Sixth, the most commonly applied carrying capacity planning frameworks exhibit these characteristics and emphasise the importance of input from a range of disciplines in development of the management objectives and their associated indicators and standards. Seventh, the application of normative approach that has evolved in the field of outdoor recreation has proved useful in identifying potential indicators of quality and developing visitor defined limits of acceptable change standards. Finally, such information is necessary to inform the judgements required of wilderness managers seeking to establish management strategies that reflect the integrated values of an area and are supported by stakeholders.

This chapter establishes the conceptual foundation for the examination of the management of the TWWHA in the following chapter.

Chapter 3. Wilderness management in the TWWHA

The examination of the evolution of wilderness management techniques presented in Chapter 2 reveals that the focus has shifted from trying to determine the maximum amount of recreational use an area can sustain, to one which seeks to define the minimum acceptable standards that will be tolerated. Perhaps the most significant aspect of contemporary wilderness planning is the incorporation of visitor input into decision-making processes that inform the judgements of wilderness managers when setting standards. As such, the aim of this chapter is to build an understanding of the social dimensions of the impact issue and, in the light of contemporary wilderness management practices, to examine the management of the TWWHA, and the social research that has underpinned it.

This chapter is structured around five main topics: the UNESCO Convention and the listing and protection of the TWWHA values; an overview of the values for which the TWWHA is recognised; the link between recreation and the protection of the TWWHA and its development as a focus for outdoor recreation; the impact of bushwalking and the development of the management impasse; and finally, the management of bushwalking and walking tracks in the TWWHA as outlined in the Strategy and the 1999 TWWHA Management Plan.

3.1 The UNESCO Convention and the listing and protection of the TWWHA values

The UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage

In 1974, Australia became a State Party to the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) (UNESCO 1972). The World Heritage Convention establishes a framework to support and encourage the development of programs by State Parties to conserve natural and cultural values that are recognised for their outstanding universal value. When Australia became a party to the Convention the federal government recognised a perpetual duty to ensure the identification, protection, conservation, presentation and transmission to future generations of the world heritage within its boundaries.

In accordance with the Convention, a list of sites of global significance has been established. The World Heritage Committee assesses sites nominated for inclusion on the list. Once a site is listed, it is the responsibility of the sovereign country to ensure management is in accord with the duties and obligations set out in the Convention:

> To ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage situated on its territory, each State party to this Convention should endeavour, in so far as possible, and as appropriate for each country:
>
> (a) to adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning programs;
>
> (b) to set up with in its territories, where such services do not exist, one or more services for the protection, conservation and presentation of the cultural and natural heritage with an appropriate staff and possessing the means to discharge their functions;
>
> (c) to develop scientific and technical studies and research to work out such operating methods as will make the State capable of counteracting the dangers that threaten its cultural or natural heritage;
>
> (d) to take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage; and
>
> (e) to foster the establishment or development of national or regional centres for training in the protection, conservation and presentation of the cultural and natural heritage and to encourage scientific research in this field. (UNESCO 1972: Article 5):

Listing of the Tasmanian Wilderness

The TWWHA is one of the world's few remaining temperate wilderness areas. Recognised internationally for its outstanding natural and cultural values the Cradle Mountain – Lake St Clair National Park, the Franklin – Lower Gordon Wild Rivers National Park and the Southwest National Park were first inscribed on the World Heritage List in 1982. Known formerly as the Western Tasmanian Wilderness National Parks World Heritage Area, the area initially encompassed 769,355 hectares. Relisted in 1989, the protected area was expanded to its current size of approximately 1.38 million hectares, and renamed (PWS 1999). Today, a network of more than twenty National Parks, Reserves, Conservation Areas and other lands that make up the contiguous TWWHA (PWS 1999).

Commonwealth legislation

In Australia, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) recognises World Heritage properties as being of national environmental significance. It is through the *EPBC Act*, and bilateral agreements set up between the federal and state governments, that Australia's World Heritage properties are managed (Environment Australia 2001).

State legislation

At the State level, both the *Nature Conservation Act 2002 (Tas)* and the *National Parks and Reserves Management Act 2002 (Tas)* set the statutory foundation for the reservation and management of land for conservation purposes. These Acts outline the purpose and objectives of those lands, and how they are to be administered and managed. In particular, Schedule 1 of the *National Parks and Reserves Management Act 2002* stipulates that the PWS is to ensure 'the protection and maintenance of the natural and cultural values of the area of land [national park] while providing for ecologically sustainable recreation consistent with conserving those values'.

3.2 Values of the TWWHA

Of the 630 properties inscribed on to the World Heritage List, the Tasmanian Wilderness is among only 22 properties worldwide recognised for natural *and* cultural values. Satisfying all four natural criteria, as well as three of the seven cultural criteria for listing, the Tasmanian Wilderness is of outstanding World Heritage value. In terms of its natural values, the area listed:

- is an outstanding example representing the major stages of the earth's evolutionary history;
- is an outstanding example representing significant ongoing geological processes, biological evolution and humanity's interaction with the natural environment;
- contains superlative natural phenomena, formations or features, or areas of exceptional natural beauty; and
- contains the most important and significant natural habitats where threatened species of animals or plants of outstanding universal value still survive (PWS 1999: 22).

From a cultural value perspective, the area:

- bears a unique or at least exceptional testimony to a civilisation which has disappeared;
- is an outstanding example of a traditional human settlement which is representative of a culture and which has become vulnerable under the impact of irreversible change; and
- is directly or intangibly associated with events or with ideas or beliefs of outstanding universal significance (PWS 1999: 22).

Natural values

Internationally, the Tasmanian Wilderness shares many similarities with both the World Heritage Areas of South West New Zealand and Los Glaciares in Argentina. The fauna, flora, and geology of these areas testify to their common past as part of the supercontinent Gondwana (Hill *et al.* 1993; PWS 1999).

The natural values of the TWWHA include the magnificent glacially carved landscapes of Cradle Mountain, Frenchmans Cap and the Arthur Ranges, and myriad tarns and lakes, of which Lake St Clair at 165 metres is the deepest in Australia (Hannon *et al.* 1993). These features make up just part of Australia's most extensive glacially-formed landscape. Vast karst systems can be found throughout the TWWHA. Among these are Australia's longest and deepest. Exit Cave is Australia's longest measured cave system (19 km) and Anne-a-kananda Australia's deepest (373 m) (Tasmania 1989).

After the break-up of Gondwana some 140 million years ago, a series of glaciations and deglaciations, and a period of dynamic climatic variation spurred a rash of floral extinctions and speciation (Hill *et al.* 1993; Kirkpatrick & Brown 1984). As a result of this activity, much of Tasmania's vegetation is unique. Many rare and threatened species are protected within the TWWHA, and can be found nowhere else in the world. Among these is Australia's longest-lived species, the Huon pine (*Lagarostrobos franklinii*) which can live for 2000 years or more (Brown, M. J. *et al.* 1977; Millington *et al.* 1979; Tasmania 1989). The King Billy pine (*Athrotaxis selaginoides*), a Gondwanan relic, is known only from Tasmania. Also growing here is the world's tallest flowering plant, *Eucalyptus regnans*, growing to over 90 m in height (PWS 1999; World Conservation and Monitoring Centre 1997).

The TWWHA is habitat for fauna of international significance due its high proportion of endemic species. The isolation and the diversity of climate, topography, geology, soils and vegetation has contributed to the evolution and protection of Tasmania's unique fauna (World Conservation and Monitoring Centre 1997). Many species of Gondwanan ancestry inhabit the area, including certain marsupials. The most well known of these being the Tasmanian Devil (*Sarcophilus harrisii*), the world's largest surviving carnivorous marsupial, as well as the spotted-tailed (*Dasyurus maculatus*) and eastern (*D. viverrinus*) quolls (PWS 1999; World Conservation and Monitoring Centre 1997). Both monotremes, inhabit the TWWHA; the platypus (*Ornithorhynchus anatinus*), and the short-beaked echidna (*Tachyglossus aculeatus*).

Many animals that live within the TWWHA are locally extinct, rare or threatened on mainland Australia. These include the pademelon (*Thylogale billarderii*) (Figure 3.1), broad-toothed mouse (*Mastacomys fuscus*), and the ground-parrot (*Pezoporus wallicus*) (PWS 1999). 'One of the world's rarest and most endangered species', the orange-bellied parrot (*Neophema chrysogaster*), has it's only known breeding site within the TWWHA (PWS 1998a, 1998e).

Although precious in themselves, the aforementioned characteristics, sites and species are best considered as part of the integral value of the Tasmanian Wilderness. Its true significance is realised when viewed as a symbiotic whole, 'where biological, ecological and evolutionary processes can occur largely free from [human] interference' (PWS 1999: 23). As one of the few extensive temperate wilderness areas that survive, it is of global importance.

Figure 3.1 Pademelon (*Thylogale billarderii*), mother with joey in pouch

Cultural values

The cultural heritage in the TWWHA is of outstanding value. Many sites throughout the TWWHA provide a valuable link to the past for the descendants of the Tasmanian Aboriginals. Undisturbed cave paintings and cultural artefacts reveal Aboriginal occupation of the south-west dating to between approximately 35 000 and 11 500 years before the present (PWS 1999; World Conservation and Monitoring Centre 1997). Evidence of more recent coastal occupation can be seen along the south and south-west coasts, where 3000 year old middens lie largely undisturbed by European settlement and activity.

The Tasmanian Wilderness is also rich with examples of eighteenth and nineteenth century colonisation by the forced transportation of convicts. Chosen for its remoteness, Sarah Island, in Macquarie Harbour, was established in 1821 and is the site of the first penal settlement in Tasmania (PWS 1999; World Conservation and Monitoring Centre 1997).

Evidence of early exploration, Huon pine logging for boat building, mining and hunting can also be found throughout the TWWHA, and provide important insights into the development of Tasmania (PWS 1999).

The PWS also recognises more contemporary cultural values attributed to the Tasmanian Wilderness by the Australian community. Thus, its meaning is extended beyond heritage - the cultural values for which it was listed - to include contemporary social values of cultural significance (PWS 1999). In this regard, the Management Plan for the area states that:

> For the modern Australian community a significant cultural value of the Tasmanian wilderness is as a place for reflection, a source of inspiration and as a symbol of untouched nature. In these times of widespread environmental degradation, for many people there is great value in simply knowing that a large area of temperate wild country still exists in Australia. For other people direct experience of wild country provides challenge and adventure and can also be therapeutic and character-building (PWS 1999: 25).

Recreational values

A range of recreational activities is pursued in the TWWHA, which is recognised as providing outstanding opportunities for experiencing wilderness. The access and ability to undertake self-reliant recreation is of great significance at both state and national levels, and the opportunities for extended overnight walks, rafting and trout fishing are regarded as among the best in Australasia (PWS 1999). An extensive variety of short walks are also available and the use of the area by sightseers and picnickers is extensive.

Tourism and its economic value

Described as a lynchpin of the tourism industry in Tasmania, the TWWHA is a key icon and focus for tourism in the state (PWS 1999). Each year approximately 40% of interstate and overseas travellers visit the TWWHA, contributing some $308 million dollars to the local economy annually (Tourism Tasmania 2004; Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1997). Consistent with the image of the TWWHA is visitors' identification of the unspoilt quality of the air, water and natural environment as being major attractions when they choose to visit the state (Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1999). As a Tasmanian icon, the TWWHA provides the local tourism industry with an invaluable marketing image and destination, attracting people from around the globe.

It is clear that the Tasmanian Government, like many other governments of peripheral economies, has seized the opportunity to turn the rising international demand for nature-based tourism experiences into a means of promoting economic growth within the State (Trauer & McIntyre 1998). In 1997, Tourism Tasmania and the tourism industry outlined their shared vision to establish tourism as a cornerstone of the Tasmanian economy (Tourism

Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1997). In reaching this goal Tourism Tasmania, in conjunction with the tourism industry, announced its intention to 'double tourism expenditure to more than $1 billion; and achieve a minimum of 23,000 jobs' by 2007 (Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1997: 8). In achieving these targets, the Parks and Wildlife Service predicted a considerable increase in the number of people that visit the TWWHA (PWS 1999).

With a 61.4% increase in the number of people visiting Tasmania from interstate and overseas between 1996-97 and 2003-04 Tourism Tasmania had achieved its target three years ahead of plan. During those six years, the number of people visiting Tasmania rose from approximately 489 400 visitors in 1996-97 to about 751 000 visitors in 2003-04 (Tourism Tasmania 2000, 2004). Moreover, as the PWS predicted, the number of people from interstate and overseas that visited the TWWHA also increased, rising by about 44.9% from approximately 187 000 visitors in 1996-97 to about 271 000 in 2003-04[3] (Tourism Tasmania 2000, 2004).

It is clear that as 'a key part of the natural quality of Tasmania that attracts visitors to the island, [the TWWHA] is an extremely important asset for tourism. [Therefore,] the challenge for management is to present the area to a wide variety of visitors without damaging the area's natural and cultural values' (PWS 1999: 52).

3.3 The TWWHA: The link between recreation and its protection, and its development as a Mecca for outdoor enthusiasts

Recreation in TWWHA is rooted in the exploration for timber and mineral resources of the early 1800s (Gee 1978; Luckman 1948, 1998; McAulay *et al.* 1978). Tracks cut by early explorers, such as Alex McKay in 1836 and Surveyor James Calder in 1834, allowed many early settlers 'keenly appreciative of the wild scenery ... walking and camping in the bush' access to wilds of the South-West (Luckman & Davies 1978: 32; see also Gee 1978; Luckman 1998; Luckman *et al.* 1978). Many sections of track cut during the 1800s are still in use today, such as the Port Davey and McKays (now more commonly known as the Arthur Plains Track) tracks in the South-West National Park, and the Innes Track which forms part of the Overland Track in the Cradle Mountain – Lake St Clair National Park.

[3] The statistics for the number of individual interstate and overseas visitors to the TWWHA is measured in *person visits*. A person visit occurs when a visitor enters a protected area for the first time during their trip away from their usual place of residence. Repeat entries on the day or during the trip away from the usual place of residence are not taken into account.

Gustav Weindorfer, first articulated the importance of preserving the Cradle Mountain area. In 1910, Weindorfer reputedly stood upon the summit of Cradle Mountain, and with outstretched arms proclaimed 'this must be a National Park for the people for all time. It is magnificent, and people must know about it and enjoy it' (Smith, R. 1936: n.p.). Later in 1915, with the support of E.T. Emmett, who was the Director of the Government Tourist Bureau, this area became the first reserve to be declared in the area that is now the TWWHA.

An increase in bushwalking following World War I saw walking parties visiting more remote areas. This growth in bushwalking was reflected in the founding of the Hobart Walking Club (HWC) in 1929. Through the production of maps, walking notes and journals, the HWC was instrumental in increasing awareness and opening up the Southwest to bushwalkers. Later, the increased availability of light aircraft following World War II allowed bushwalkers to go further a field and for longer periods with the aid of air drops of food and supplies to remote locations (Luckman & Davies 1978).

During the 1940s, Lake Pedder became a popular base camp for extended treks into the wilderness. The popularity of the area led to the proposal, by the HWC, for the declaration of the area as a National Park, and in 1955, the 23 500 hectare Lake Pedder National Park was declared (Green 1981). Access to the area became easier in 1963 with the construction of the road to the Gordon River as part of the hydro-power developments planned for the South-West by the Hydro Electric Commission. This new road provided easy access to a previously remote area and resulted in an increase in the number of people visiting the area for recreation.

In 1963 the South-West Committee was formed as a result of concern over 'the need for a rational and controlled plan for the development of the South West of Tasmania' (South-West Committee 1966: 33). Several walking and other outdoor activity clubs, including the HWC, were represented on the Committee. Motivated by their concern over the future conservation and development of South-West Tasmania, the threat of the proposed stage one of the Gordon River hydro-power development scheme and 'the destruction of Lake Pedder', the South-West Committee produced a report that called for the creation of a National Park incorporating the existing Lake Pedder and Port Davey reserves (South-West Committee 1966: 1). Further, the Committee recommended 'the zoning within the proposed park of areas specifically for recreation or conservation purposes, and the establishment of wilderness areas for conservation of habitat, to the exclusion of extensive recreation' (South-West Committee 1966: 3).

The growing controversy surrounding the Lake Pedder proposal deeply divided the people of Tasmania. There was great interest in the South-West by the HWC the Launceston Walking

Club and the many bushwalkers from Sydney and Melbourne that came to Tasmania 'every year to do summer trips' (Green 1981: 43). However, at a local level:

> There was a kind of ambivalence amongst Tasmanian bushwalkers towards the South West. They were split in their views between their feelings as [Tasmanian] citizens and their feelings as bushwalkers. They felt that there was probably something a bit selfish about wanting to keep this area as a playground for themselves. That sort of split personality, evident in the Hobart Walking Club then, has developed more widely in Tasmania since (Mosley 1981: 43).

During the 'save Pedder campaign' that gained momentum in the late 1960s and early 1970s, wilderness photographer Olegas Truchanas realised that no words or maps could effectively communicate the beauty that was to be lost should Lake Pedder be flooded (Angus 1975). Since most of the state politicians and members of the public had never seen the Lake, Truchanas (who had visited it more than 30 times and photographed the magic of its many moods) held a series of audio-visual presentations at the Hobart Town Hall. With the assistance of Ralph Hope-Johnstone, Truchanas' images of Pedder were put to music. Repeatedly the Town Hall was packed to capacity and hundreds turned away because there was no room, as Truchanas' presentations spread awareness of the beauty that was soon to be lost (Angus 1975; Dombrovskis 1981).

Recognition of the biological importance of the South-West, and increased use of the area for dispersed, self-reliant recreation (essentially bushwalking) resulted in the declaration of the 189 000 hectare Southwest National Park in 1968. This step proved but a consolation prize since plans were already well under way for a hydro-electric power scheme and the 'modification of Lake Pedder National Park' (Reece 1965: n.p.). Heralded by the construction of the road to the Gordon River, and later to Scotts Peak, details of the proposed power scheme and flooding of Lake Pedder were made public in 1967. Despite state, national and international campaigns protesting the flooding of Lake Pedder, the Tasmanian State Parliament passed legislation on the 24th August 1967 allowing the project to proceed (Angus 1975; Carlington 1988). Drawing strong condemnation from the United Nations, the drowning of Lake Pedder in 1972 was regarded as 'the greatest ecological tragedy since European settlement of Tasmania' (Luther & Rzoska 1971: 218). Finally, a Committee of Inquiry by the federal government (Angus 1975) was established in 1973, and in its report it proposed that the South West be nominated for World Heritage listing (Green 1981).

Like the failed battle to save the Hetch Hetchy Valley, in northern Yosemite National Park (California, USA) from inundation for hydro-power development, the fight to save Lake Pedder, raised political and social awareness of the environmental issues in Australia (Helman 1981; Hendee *et al.* 1990). The subsequent establishment of the *Environmental*

Protection (Impact of Proposals) Act, the Task Force on the National Estate and the *Heritage Commission Act* have all been attributed to the Pedder conflict (Mosley 1981, 1983). It also led to the establishment of a Select Committee of the Tasmanian Legislative Council of the Upper House of the State Parliament that in its final report recommended the formation of the Tasmanian National Parks and Wildlife Service (now the Parks and Wildlife Service) (Carlington 1988).

The loss of Lake Pedder represented only stage one of the Gordon River power scheme. In 1979 the Tasmanian Hydro-Electric Commission revealed plans recommending the construction of the Gordon-below-Franklin Dam. Immediately the conservation movement, born out of the Pedder campaign, led a massive response to create awareness and mobilise national and international public opinion (Carlington 1988; Hendee *et al.* 1990; Mosley 1981). In November 1981, the Western Tasmanian Wilderness Parks were nominated for inscription on the Word Heritage List.

In December 1981, just one the month after the World Heritage nomination, the Tasmanian State Government held a Referendum to resolve the issue. Public opinion in Tasmania at the time was such that some 30% of Tasmanians' wrote *No Dams* on their ballots despite the 'no dam' option not being canvassed (Hendee *et al.* 1990). In the face of clear opposition to the project, work began on the Gordon-below-Franklin scheme in July 1982, just one month after the Liberals were elected under the leadership of Premier Robin Gray.

The Western Tasmanian Wilderness Parks were inscribed onto the World Heritage List on the 14th December 1982.

Just as Olegas Truchanas had communicated the beauty of Lake Pedder through his photography during the Lake Pedder campaign, Peter Dombrovskis became known for his images of the Franklin River region. In 1977, Dombrovskis produced the first of his annual Tasmanian Wilderness Calendars. Dombrovskis' photograph of Rock Island Bend (Figure 3.2) on the Franklin became the image for the fight for the Franklin, and was 'reproduced more than a million times in campaign advertising for the 1983 Federal election' (Green 1981: 101).

In March 1983, another even greater show of support to save the Franklin came during the Federal election. Some 40% of voters wrote *No Dams* on their ballots to show their opposition to the dam. Under promise of halting the construction of the Gordon-below-Franklin Dam, the Federal Labor Government was brought to power under the leadership of Prime Minister Bob Hawke.

Immediately following its election, the Hawke Federal Government passed legislation that prevented construction of the dam under the *National Parks and Wildlife ACT (Aust) 1975* and proclaimed the *World Heritage Properties Conservation Act (Aust) 1983* to further protect the area from development.

Now known as the Tasmanian Wilderness World Heritage Area (TWWHA) the area was re-listed and enlarged in 1989. Today the TWWHA is broadly recognised and valued as an icon for nature based tourism in Tasmania. 'Campaigns to save wilderness areas in Australia, and in Tasmania in particular, have heightened public awareness of the values of wilderness' (PWS 1999: 93).

Source: Dombrovskis

Figure 3.2 Rock Island Bend, Franklin – Gordon Wild Rivers National Park

Records of the number of bushwalkers visiting the area in the early years are sparse and often inaccurate (Kirkpatrick 1979). However, on the basis of very limited data Kirkpatrick (1979: 21) states that 'the late sixties marked the start of an explosion of wilderness use in Tasmania' that paralleled similar increases overseas. Several factors have been said to have contributed to the increased pursuit of wilderness recreation, including the development of lightweight camping equipment, higher education levels, increased leisure time, increased mobility, rising incomes and growing interest in the natural environment (Hendee *et al.* 1978).

From bushwalkers' log book registrations and entries for various locations throughout the South-West, and the results of a number of tourism surveys conducted throughout the state, Kirkpatrick (1979) estimated that approximately 37 000 people visited Tasmania's wilderness during 1978. Furthermore, in the two decades until 1988, as the conservationists and developers battled over the future of the South-West 'the popularity, reputation and use of the region grew' (Carlington 1988: 14).

Since 1990 the number of people visiting the TWWHA has increased as the area has gained international significance and reputation for the beauty of its spectacular wilderness and popularity as a primitive recreation destination. At least 500 000 people now annually travel from all over the world to enjoy a wide array of recreational activities associated with the area's natural and/or cultural values (World Conservation and Monitoring Centre 1997). Today, the Tasmanian Wilderness is a Mecca for outdoor enthusiasts, offering a range of recreation opportunities such as sightseeing, walking, rafting, caving, and fishing. Day visitors to the area can enjoy less strenuous short walks, picnics, and scenic flights while the more adventurous and self-reliant can undertake extended bushwalks in remote wilderness.

3.4 The impact of bushwalking and the development of the management impasse

With National Parks and World Heritage Areas bearing the brunt of much of the increase in nature-based recreation, 'the question of tourism land-use has developed into one of conservation versus development' (Trauer & McIntyre 1998: 44). Increased human use of any area has both social and environmental impacts, and it is important that the natural beauty and integrity be conserved along with the types of experiences that are consistent with, and come from, the existence of such places. Moreover, in places such as the TWWHA qualities must be protected because the global significance of their natural and cultural values is paramount.

Despite numerous and ongoing battles to protect and conserve the values of the TWWHA, and in spite of increases in levels of recreational use, it was not until 1979 that concern over the impact of bushwalking was first expressed. In discussing the projected trends in wilderness demand between 1978 and 1985 for Federation Peak, Frenchmans Cap and the Overland Track, Kirkpatrick (1979) noted the potential social impacts arising from anticipated increases in visitor use. According to him, 'the rate of increase in use is much greater for the more demanding walks [such as Federation Peak] than for ... easier walks (overland track [sic] and Frenchmans Cap) indicating that ... high rates of usage on easier tracks are diverting walkers to the less used parts of the Tasmanian wilderness' (1979: 22). He was the first to publicly suggest that it may become necessary to regulate access to avoid damage to the wilderness 'resource' (1979: 22).

Established in 1971, the PWS was responsible for managing the TWWHA. Prior to the development of its first management plan for the TWWHA in 1992, a number of studies examining the impacts of bushwalking in the area had been conducted by post graduate students at the University of Tasmania (Calais 1981; Calais & Kirkpatrick 1986; Carlington 1988; Sawyer 1990), and the PWS (PWH 1990, 1991). These studies are now addressed in turn.

Calais (1981)

The earliest examination of the physical impact of bushwalking in the TWWHA was presented in an unpublished Masters thesis by Calais in 1981, elements of which were later published as a peer reviewed article by Calais and Kirkpatrick (1986). Calais' study incorporated surveys of social and biophysical impacts of visitors to the Cradle Mountain – Lake St Clair National Park. The social survey used self-administered questionnaires distributed on four randomly selected days each month. The questionnaire forms were distributed from walker registration booths at Cynthia Bay and Waldheim in the Cradle Mountain–Lake St Clair National Park. The survey was conducted in the 12 months to June 1979, with the number of questionnaires distributed proportional to the previous years monthly registrations. From the 800 questionnaires distributed a 61.6% response rate was achieved.

As part of his research, Calais completed the first ever inventory of the biophysical conditions of the Overland Track and other walking tracks in the Cradle Mountain area. This inventory found that high levels of use contributed to the deterioration of the walking tracks examined and that the greatest impacts were at high altitudes. Calais also identified trampling thresholds and examined natural revegetation of walking tracks in different vegetation communities, finding that after trampling vegetation recovery in alpine areas was extremely slow and that active rehabilitation may be necessary.

Calais also conducted a survey of visitors to the Cradle Mountain – Lake St Clair National Park during 1979-80. When asked about the condition of a range of facilities they encountered, 69.7% of day walkers and Overland Track walkers agreed that the walking tracks required improvement (Calais 1981). Furthermore, 32.5% of walkers stated that the poor condition of walking trails had reduced their enjoyment Table 3.1. The majority of visitors (between 64.2% and 75.4%) stated that they 'did not notice' campsite and social impacts, but 16.5% revealed that 'crowded campsites' or encountering 'very large parties' had reduced their enjoyment (Table 3.1).

Table 3.1 Conditions that detracted from day walkers' and Overland Track walkers' enjoyment of the Cradle Mountain – Lake St Clair National Park in 1979-80, *N* = 1951

Conditions	Did not notice (%)	Noticed (%)	Reduced enjoyment (%)	Don't know (%)
Rundown campsites	68.2	17.6	8.8	5.4
Crowded campsites	75.4	11.0	6.2	7.4
Very large parties	64.2	15.2	16.5	4.1
Poor condition of walking trails	29.9	34.7	32.5	2.9

Adapted from Calais 1981

It appears then, that campsite and encounter-related impacts were not substantial issues in reducing the quality of walkers' experiences at that time, but the poor condition of walking tracks was. In trying to ascertain what mitigation strategies might be acceptable to visitors Calais examined a number of options. While he found conditional support for the limitation of party sizes (63.5%) and the closure of damaged tracks and campsites (69.2%), the majority of respondents (60.0%) were opposed to the introduction of use restrictions in that area. Further, 'most of the respondents believed access to public land is a basic human right and any attempt to alter this would be regarded as infringement of personal freedom' (Calais 1981: 90). Rather, most respondents (69.7%), particularly those walking the Overland Track (81.0%), 'expressed their support for immediate track improvements' (Calais 1981: 78).

After completing his study of the impact of walkers on the tracks of the Cradle Mountain – Lake St Clair National Park, Calais (1981: 198) concluded that in order to address the 'track problem' visitor numbers to the area would have to be 'drastically reduced. [However, from the results of his survey he concluded that such an] option would be totally unacceptable to the public and the political ramifications would be severe'. According to Calais (1981), the only feasible option was to design and construct tracks to cope with visitor demand. Indeed, Calais and Kirkpatrick (1986: 14) noted that 'the key to minimising the extent of damage due to trampling is to make the track more comfortable than the adjacent vegetation'.

Calais also suggested the establishment of management zones and the introduction of user fees. In fact, the concept of zoning for different management purposes and for the provision of different recreational experiences in Tasmania's reserves first appeared fifteen years earlier in 1966: the South-West Committee's 1966 *Submission covering conservation and* *development of South-West Tasmania*; and an article by Mosley, *The Tasmanian National Park System*, that appeared in the magazine of the HWC that same year. Both Mosley (1966) and the South-West Committee (1966) proposed a system of zoning to permit different types and levels of use and different forms of management. The concepts of zoning put forward by both, though lacking detail, preceded the development and publication of the ROS approach to wilderness planning that emerged some ten years later in the United States (Brown, P. *et al.* 1979; Brown, P. *et al.* 1978; Clark & Stankey 1979b; Driver & Brown 1978).

Yet despite growth in popularity, recreation in the South-West remained largely uncontrolled and unmonitored by the PWS until 1988 (Carlington 1988). Work on tracks had been ad hoc and focused on the more popular Overland and South Coast Tracks. In 1988 the Track Ranger and Minimum Impact Bushwalking (MIB) walker education programs commenced and the first campsite inventories were undertaken along the Overland Track.

Carlington (1988)

Following Calais' (1981) study of visitors' impacts in the Cradle Mountain – Lake St Clair National Park, Carlington (1988) undertook a doctoral study of the characteristics, expectations and attitudes of users of the area formerly known as the Western Tasmanian Wilderness Parks WHA. Self-administered mail-back questionnaires were used to sample non-rafting visitors to the parks with contact details gathered via initial contact forms distributed at park entry points at Cradle Mountain, Lake St Clair, Mt Field and Maydena. Three thousand initial contact forms were handed out between December 1981 and June 1982 using a systematic sampling approach (distribution days at 13-day intervals to ensure sampling on different days of the week). Of these, 805 (26.8%) were usable (included postal addresses of respondents). The single mail-out of 805 questionnaires yielded 395 completed forms for an adjusted response rate of 13.2%.

In his discussion of the management implications of his findings Carlington described bushwalkers as a 'significant minority among the park visitor categories' studied (1988: 326). Unlike the majority of visitors to the park, bushwalkers ventured further into the park's interior. Moreover, 'the specific settings in which that participation took place would likely have been far more central to the decision process that brought them to the park than would have been the case' for visitors whose stay was brief and restricted to the more developed periphery (Carlington 1988: 327).

From the responses of visitors surveyed in the Cradle Mountain, Lake St Clair, Mt Field and Southwest areas during 1981-82, Carlington concluded that track networks and conditions could be improved to better meet expectations and needs. He found:

> Unexpectedly, bushwalkers were as strong in their support for improved signposting and greater use of duckboarding as were the developed area visitors [60.3% and 69.9% respectively]. This support may reflect a realization by participants of the fragile nature of some of the vegetation and substrate in some areas and a recognition of the need for improved track standards to prevent excessive track deterioration. Another and more likely reason, is that the poor condition of some sections of a number of popular walking tracks resulted in bushwalkers being both less inclined to rate the condition of the areas as highly as other visitors and to support greater management presence in the form of more developed tracks. In either event, some 60% of participants in this activity are of the view that greater use should be made of duckboarding and that increased signage is necessary. At the same time a significant proportion of bushwalkers [10.3%], support the marking of walking tracks by stone cairns only (1988: 330).

Carlington also canvassed bushwalkers' views about the prevention of damage from overuse. Of the regulatory and non-regulatory techniques explored by him (see Table 3.2), just over a quarter of bushwalkers surveyed supported reinforcing tracks and campsites to cope with visitor use, with a similar but fractionally higher proportion favouring the closure of sites showing signs of overuse. The greatest support was shown for limiting the number of visitors to the area as the best way to prevent damage and deterioration.

If rules and restrictions are to be successful, they either require a great deal of public support and voluntary compliance, or they must be enforced to ensure they are effective. As Table 3.3 shows, 56.9% of bushwalkers surveyed supported moderate to strict enforcement of any regulatory action taken by the PWS. Only 20.7% of bushwalkers indicated compliance with such regulations should rely on common sense alone.

Table 3.2 Bushwalkers' views on the best way to prevent damage from overuse in the Western Tasmanian Wilderness Parks WHA, in 1981-82, *N* = 125

Rules and regulations should be to	%
Limit numbers	40.4
Limit time	5.3
Close areas	28.1
Reinforce site	26.3

Adapted from Carlington (1988)

Table 3.3 Bushwalkers' views on the best way to prevent damage from overuse in the Western Tasmanian Wilderness Parks WHA, in 1981-82, in 1981-82 *N* = 125

Rules and regulations should be	%
Strict and enforced	24.1
Moderate	32.8
Minimal	22.4
Rely on common sense	20.7

Adapted from Carlington (1988)

Carlington also asked respondents whether they thought the parks they visited were too crowded. While specific data have not been reported in his dissertation, Carlington noted that despite having experienced the lowest number of encounters, users of the Franklin – Gordon Wild Rivers National Park (rafters) felt the most crowded of the visitors to the five national parks examined. On the other hand, respondents visiting Mt Field National Park were the least crowded despite experiencing the second highest rate of encounters across the five areas studied. Of the visitors (day-walkers, bushwalkers, developed area campers, sightseers and picnickers) surveyed at Cradle Mountain, Lake St Clair, Mt Field and the Southwest, an average of 80.3% of visitors said the park they had visited was not too crowded. This finding indicates that, at 1981-82, crowding impacts had not yet become an issue requiring significant action by PWS managers across the park network.

Sawyer (1990)

Sawyer's (1990) Masters study, *The management of wilderness bushwalking in the Tasmanian Wilderness World Heritage Area*, focused on the Mt Anne area within the Southwest National Park. His findings are based upon a survey of the biophysical condition of walking tracks during which measurements were taken in July 1988 and May 1989, and a survey of visitors undertaken between December 1987 and April 1988 (Sawyer 1990).

From his survey of track conditions Sawyer found some heavily used tracks in the Mt Anne area had 'already suffered severe and essentially irreversible damage (erosion)' (1990: Appendix A, 2). Measurements revealed rapid deterioration of tracks and highlighted 'the "threshold" nature of trampling damage' (Sawyer 1990: Appendix A, 2). The expansion and continued deterioration of some of the 10 campsites was also 'cause for concern' (1990: Appendix, 3).

Using self-administered questionnaires, Sawyer employed convenience sampling and self-selection techniques to survey bushwalkers visiting the Mt Anne area between December 1987 and April 1988 (Sawyer 1990). Due to administrative shortcomings with the conduct of the study, the overall number of questionnaires distributed to visitors is unclear; however, data for the January to April period show 349 questionnaire forms were distributed and 195 were returned resulting in a response rate of 55%. Of the forms returned during this period, 172 were useable resulting in an adjusted response rate of 49%.

Despite some minor variation, Sawyer's findings are consistent with those of Calais and Carlington in as much as they indicate that social impacts, such as encountering large parties and crowding, were a concern for only a small proportion (20% or less) of respondents to the three surveys (Calais 1981; Carlington 1988; Sawyer 1990) discussed thus far. Of these impacts, encountering large parties is the greater concern (see Tables 3.1 & 3.4).

Table 3.4 Impact of track condition, big parties and crowded huts on the quality of visitors' experiences in the Mt Anne area, Southwest National Park, in 1987-88

Did any of the following concern you during your trip?	Did not notice (%)	Noticed (%)	Mildly detract (%)	Greatly detract (%)
Track conditions ($N = 220$)	18.2	46.8	26.8	8.2
Big parties ($N = 207$)	73.4	9.2	9.2	8.2
Crowded hut ($N = 201$)	69.7	16.9	7.0	6.5

Adapted from Sawyer (1990)

Sawyer's study was the first to attempt to gather users' impressions of what maximum acceptable group sizes should be in the TWWHA. However, the question used was poorly constructed[4] and the resulting data unsuitable for the development of user-defined norms for the management of a recreation setting.

Concern over how visitor related impacts affect the natural qualities of the Mt Anne area was indicated by respondents to Sawyer's survey (1990). Of the 92.3% of respondents who noticed the degraded tracks, 81.1% stated that they had detracted from the natural quality of the area (Table 3.5). Track work, which often includes drainage, cording, duckboarding and benching, was noticed by 86.9% of respondents, however, only a third of all respondents felt track work detracted from the naturalness of the area.

Table 3.5 Impact of track work, degraded tracks and evidence of other visitors on the natural qualities of the Mt Anne area, Southwest National Park 1987-88

Do you consider that any of the following detract from the natural qualities of the area?	Did not notice (%)	Noticed (%)	Mildly detract (%)	Greatly detract (%)
Track work ($N = 221$)	13.1	51.6	31.7	3.6
Degraded track ($N = 222$)	7.7	11.3	49.6	31.5
Evidence of other walkers ($N = 212$)	32.1	43.9	19.3	4.7

Adapted from Sawyer 1990

When asked what management actions they would support 'if it became necessary to prevent overcrowding and degradation of the Mt Anne area', just 42% of respondents supported the use of free permits to limit the number of people in the area at the one time (Sawyer 1990).

[4] The question used by Sawyer asked respondents 'What do you think the [maximum] party size should be for a trip such as yours?' As such, respondents' answers were 'trip' specific rather than setting specific. Thus, the question would elicit different responses in different 'trip' contexts. For example, a person on a school 'trip' with 10 other walkers is being asked to state the group size s/he felt was appropriate for a school trip, while another person on a trip with a friend (a party of two walkers) would respond within that 'trip' context. If users' norms are to inform the development of limits of acceptable change standards for a recreation setting then questions ought to be setting specific, such as, the track, campsite, or area.

This level of support is consistent to that reported by Carlington (1988). Further, just 13% supported such a permit if it was associated with a fee. However, most (71%) respondents supported restricting camping to designated sites to prevent crowding and the degradation of campsites.

Presented with 'two possible options to prevent further degradation of the Mt Anne area', respondents' opinions were almost evenly divided. Forty-eight per cent of respondents favoured 'no restriction on visitor numbers in conjunction with substantial upgrading of tracks to protect the environment (e.g. boardwalk across alpine plateau areas), and 52% preferred 'some form of limitation on the number of walkers in the area at any one time in conjunction with minor track upgrading' (Sawyer 1990: Appendix 2, 64).

PWS visitor surveys

Between 1988-89 and 1991-92, a series of visitor surveys was undertaken by the PWS prior to the development of the 1992 Management Plan for the TWWHA. Much of the data collected during these surveys has since been lost. The available data indicate that a great deal of information was not entered into computerised databases or spreadsheets, nor was it analysed and, of the data that were processed, analysis is limited to descriptive statistics such as response frequencies and means. The lack of sophistication is perhaps largely due to the focus on findings that were easily understood and applied by non-specialists and managers.

Data for just two of the surveys conducted by the PWS between 1988 and 1992 have been located. These are the 1990-91 Wild Area Users (PWH 1990) and the 1991-92 Wilderness Walker Surveys (PWH 1991).

1990-91 *Wild Area Users and the* 1991-92 *Wilderness Walker Surveys*

Printed spreadsheets of data (in possession of the Author) were located for Wilderness Walker Surveys (PWH 1990, 1991) conducted during 1990-91 and 1991-92. Notes on the spreadsheets indicate that much of the data was never transposed from the survey forms returned by respondents. While focused predominantly on MIB, these surveys also contained questions exploring influences on walkers' enjoyment and their experiences, preferences and attitudes.

Using a convenience sampling method during an unknown period over the main bushwalking season between November and April, track rangers distributed self-administered questionnaires to visitors. No information is available on the number of visitors who refused to take part, nor is any indication of the response rate given. The data discussed here are for questionnaires completed by visitors walking the main tracks in the Southwest National Park, the Overland Track and Frenchmans Cap, and the Walls of Jerusalem/Central

Plateau. In considering the aggregated results, it is useful to recognise that the sample group is dominated by visitors surveyed while on, or after, their journey on the Overland Track. Between 60% to 65% of respondents during 1990-91, and 70% to 75% in 1991-92 were visitors walking Overland or Frenchmans Cap Track, with an unknown majority being visitors on the Overland Track.

In assessing what factors might detract from the quality of walkers' experiences, the 1990-91 survey found 49.9% (N = 441) of visitors surveyed considered *track conditions* to have mildly to greatly detracted from the enjoyment of their walk. Similar results emerged the following year (1991-92), with 46.3% (N = 485) indicating that *track conditions* had detracted from the enjoyment of their walk. The 1991-92 questionnaire also found *big parties* (32.7%, N = 538) and *crowded huts/camps* (44.2%, N = 472) had detracted from respondents' enjoyment.

After grouping the survey areas into high use (taking in the Overland Track and Frenchmans Cap Track) and low use areas (the Southwest National Park and Central Plateau) the data collected during the 1991-92 survey reveal that *track conditions* are a greater problem in low use areas than in the high use areas, in terms of detracting from walkers' enjoyment of their trips. These results can be interpreted in a number of ways. Firstly, walking tracks may be in worse condition in lower use areas due to lack of maintenance and/or more fragile environments. Secondly, more tracks may have been hardened in the high use areas to cope with the high use intensities. Or, finally, visitors walking in low use areas may be more sensitive to visitor impacts; conversely visitors in high use areas may rationalise such impacts as the expected result of increased visitor access that is often associated with high use.

Social impacts appear to be more of an issue in the high use area of the Overland - Frenchmans Cap Track area. Large parties and crowded huts/campsites more negatively affected visitors' enjoyment in the Overland – Frenchmans Cap Track area than in the Southwest National Park and the Central Plateau. These findings are consistent with the greater frequency of larger parties on the Overland Track which is used by schools, walking clubs, outdoor groups and commercially guided groups that commonly travel in groups of more than 10 people. However, studies have also shown large parties to be inconsistent with the philosophy of more remote wilderness recreation (Lime 1972; Stankey 1973).

Both the 1990-91 Wild Areas User Survey and the 1991-92 Wilderness Walker Survey examined the impact of the frequency of encounters experienced by visitors on tracks and at campsites. While not directly comparable due to inconsistent wording of questions, crowding does not appear to have been a significant issue across the TWWHA areas studied and encounters were perceived both positively and negatively by the visitors surveyed (Tables 3.6 & 3.7).

In both years surveyed more than 50% of walkers reported the number of walkers/people they met on the track as they travelled made no difference to their trip. However, more walkers were sensitive to crowding at campsites than on the track in both years (Tables 3.6 & 3.7). The results between the years show no substantial differences in impacts of the encounters visitors experienced.

Table 3.6 Impact of encounters experienced on track and at campsites reported by TWWHA visitors participating in the 1990-91 Wild Areas User Survey

Did the number of walkers you met enhance or detract from you trip?	Year of survey	Enhanced (%)	No Difference (%)	Detracted (%)
On the track	1990-91 (N = 442)	32.8	53.2	14.0
At campsites	1990-91 (N = 386)	33.4	36.8	29.8

Note: Percentages may not add up to 100 due to rounding.

Table 3.7 Impact of encounters experienced on track and at campsites reported by TWWHA visitors participating in the 1991-92 Wilderness Walker Survey

Did the number of people you met enhance or detract from your trip?	Year of survey	Enhanced (%)	No Difference (%)	Detracted (%)
As you travelled	1991-92 (N = 476)	32.8	53.6	13.7
At campsites	1991-92 (N = 457)	29.3	40.9	29.8

Note: Percentages may not add up to 100 due to rounding.

As noted earlier, findings of the 1990-91 Wilderness Walker Survey show track conditions detracted from the quality of 49.7% of TWWHA visitors' enjoyment of their walks. When asked whether they would support limiting the number of visitors to minimise environmental degradation and the development of new tracks, 60.6% to 70.0% of TWWHA visitors surveyed supported such actions (Table 3.8). This finding represents a substantial increase from previous studies by Carlington (1988) and Sawyer (1990) who found less than half (40.1% and 42% respectively) their respondents to favour such restrictive management actions.

Limiting the size of parties to prevent crowding received the greatest support with 75.7% of respondents favouring this strategy to *prevent congestion/overcrowding* (PWH 1990). Visitors were further asked *what do you consider the maximum party size should be for this area?* For the area encompassing both the Eastern and Western Arthur Ranges the median acceptable group size was 6 persons while a subset of respondents on the Frenchmans Cap or Overland tracks considered the median acceptable group size to be 8 persons. Despite these findings, no assessment was made of the congruence of these maximum acceptable group sizes and the impact on the quality of visitors' experiences of encountering group sizes in excess of them (the issue of congruence is discussed in more detail in Chapter 4).

Table 3.8 Support for possible management actions to address social and environmental impacts reported by TWWHA visitors participating in the 1990-91 Wilderness Walker Survey

For the track you walked on would you support:	Yes (%)	No (%)	Unsure (%)
A limit on the number of walkers to prevent congestion and overcrowding? (N = 444)	50.5	32.4	17.1
A limit on the number of walkers to prevent/minimise environmental degradation? (N = 445)	70.3	17.6	11.9
A limit on the size of walking parties to prevent crowding/overcrowding? (N = 448)	75.7	13.8	10.5
A limit on the number of walkers in untracked areas to minimise the development of new tracks? (N = 442)	60.6	23.8	15.6
The closing of damaged campsites and tracks? (N = 444)	65.8	16.7	17.6

Note: Percentages may not add up to 100 due to rounding.

Of all the reasons for implementing limits, least support (50.5%) was shown for limiting the number of visitors to prevent crowding (Table 3.8), probably because less than 30.0% of TWWHA visitors surveyed during both 1990-91 and 1991-92 felt the number of people they encountered had detracted from their experience (Tables 3.6 & 3.7). The findings nevertheless lack context, since no insight into the actual conditions experienced by visitors is available despite the 1990-91 Wilderness Walker Survey asking visitors to report the number of people they encountered 'as you travelled' and 'at campsites'. It appears that the related data were never processed or analysed. However, the available data do show the median number of other people respondents stated they would 'like' to meet per day as they travelled and at campsites (Table 3.9). These data show respondents 'like' to encounter few people while travelling and few or none while at camp. Given these findings, it appears that respondents encountered few if any other people along the track and at campsites, since the majority stated that the number of other people they encountered had either not affected, or in fact enhanced, the quality of their experience (Tables 3.6 & 3.7).

Table 3.9 Median number of people TWWHA visitors participating in the 1991-92 Wilderness Walker Survey stated they would like to meet per day

How many other people would you like to meet per day?	Overland and Frenchmans Cap Tracks (no. of people)	Area encompassing the Arthur Ranges (no. of people)
As you travelled	6-10	2
At campsites	6-10	0

General conclusions

Several general conclusions can be drawn from the numerous studies undertaken to 1992:

- a variety of sampling strategies have been employed ranging from convenience sampling to more sophisticated methods. These strategies have produced varied response rates. The representativeness of findings varied among studies with Sawyer's (1990) study and the Wilderness Walker Surveys being the least so. None could be said to be truly representative;
- tracks in high altitude are more fragile and are slower to recover than tracks at lower altitudes. In alpine areas, vegetation recovery after trampling is very slow and may require active rehabilitation if impacts are to be mitigated;
- degraded tracks were noticed more, and had a more negative impact on, the quality of the visitor experience than degraded campsites, evidence of other walkers and social impacts;
- though trackwork is perceived by some visitors to detract from the environments' natural quality, it is accepted as necessary to prevent excessive track degradation;
- social impacts are greater at camp than on the track;
- respondents who visited low use areas, such as the Arthur Ranges, 'like' to encounter fewer other people while travelling or at camp than those visiting higher use areas such as the Overland Track of Frenchmans Cap;
- respondents considered that maximum party sizes should be smaller in low use areas such as the Arthur Ranges than in higher use areas like the Overland Track and Frenchmans Cap;
- the validity (congruence) of walkers responses in terms of the number of encounters they would 'like' or what they considered should be the maximum group size was not assessed. That is, if visitors experienced more encounters than they stated they would

'like' did it have a negative impact on the quality of their experience? If not, their reaction is incongruent with their response and thus the response is invalid.

- crowding does not appear to have been a significant issue in the WHA prior to 1992;
- none of these studies sought visitors' opinions on what biophysical conditions they considered to be acceptable;
- support for use limitations as a management tool varied from 40.4% to 42.0%, reported by Carlington (1988) and Sawyer (1990) respectively, to as high as 70.3% of respondents to the 1990-91 Wilderness Walker Survey conducted by the PWS;
- use limits were less supported as a tool to manage social impacts than when used for environmental reasons; and
- respondents supported track development and improvement over restriction of use.

Development of the Walking Track Management Strategy and the management plan for the TWWHA

The results of the visitor surveys undertaken in the TWWHA prior to 1992 informed the development of the 1992 TWWHA Management Plan (DPWH 1992) and the 1992 and 1994 drafts of the Walking Track Management Strategy (hereafter the Strategy), the final version of which was published in 1998 (PWS 1998b, 1998c, 1998d). While the majority of respondents to surveys conducted prior to 1990 (Carlington 1988; Sawyer 1990) opposed the introduction of use restrictions to manage walker related impacts, the increased backing for the proposal recorded in the 1990-91 Wilderness Walker Survey supported the development and introduction of a permit system as prescribed by the 1992 Management Plan and the Strategy.

Following development of the second draft of the Strategy in 1994, a survey was undertaken in 1994-95 to find out users' attitudes to environmental problems and Parks and Wildlife policies (Sawyer 1998). In the subsequent year, this survey was followed by a study into user regulation in the TWWHA and walking permit systems and their application in Tasmania (Brake 1996). The empirical component of that research was a survey of walkers undertaken in 1995-96.

1994-95 Wild Area User Survey

Like other surveys conducted by the PWS (Brake 1996; PWH 1990, 1991), track rangers employed a convenience sampling approach to gather data for the 1994-95 Wild Area User Survey (Sawyer 1998). Between late December to February and again at the peak period, Easter, track rangers in the TWWHA surveyed people visiting the Overland, South Coast, Frenchmans Cap and Mt Anne tracks and in the Central Plateau, Walls of Jerusalem, Southern and Arthur Ranges[5]. A total of 694 useable forms were returned, however as 'no attempt was made to record rejection rates or the number of surveys distributed but never returned' a response rate cannot be calculated.

The findings reveal that most respondents (71%) encountered 'some environmental problems, the most common being muddy and eroded tracks' (Sawyer 1998: 3). Sawyer reports more than half the respondents visiting the Overland Track (56%) and the high south west area (51%,) that encompasses the Southern and Arthur Ranges and the Mt Anne area, encountered eroded tracks. In comparison, overall less than half the respondents (39%) encountered 'some overcrowding problems' (Sawyer 1998: 3); however, crowding issues were noticed by a greater proportion of respondents (59%) on the Overland Track and in the Walls of Jerusalem area (60%) than in any of the other areas surveyed.

While only 18% of respondents reported encountering at least one party they considered 'too large', the majority (78%) felt party sizes should be limited. Walkers who supported party size restrictions suggested maximum party sizes from 4 to 20 persons, averaging at 7.1 people per group. For the TWWHA areas surveyed, average maximum party sizes ranged from 5.6 people per group in the high southwest, to 7.7 people in the Walls of Jerusalem. Supporters of party size restrictions considered an average maximum party size of 7.2 to be appropriate for the Overland Track. A comparison between the findings of the 1991-92 Wild Areas user Survey and these findings show little change in the opinion of respondents in this regard (PWH 1991; Sawyer 1998). However, like the 1991-92 survey, no check of the congruence of respondents' reactions to party sizes in excess of the limits they reported was made, thus the validity of their responses are uncertain.

The most critical aspect of the 1994-95 survey for the PWS was its examination of potential displacement resulting from the proposed introduction of a comprehensive permit system. According to Sawyer (1998: 4), the finding revealed 'at least 50% of walkers in the [TW]WHA [unable to get a permit for the walk they undertook] would be displaced to other areas which already have problems with overuse'. As a result, he concluded that the 'permit system needs to apply to the entire [TW]WHA [as proposed], not just the currently most overused areas' (Sawyer 1998: 4).

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[5] The survey also sampled walkers in the Freycinet National Park, outside the TWWHA, however, as analysis revealed 'surprisingly little difference between the characteristics and opinions of walkers in different areas, e.g. Freycinet walkers are not dramatically different to walkers in the [TW]WHA' a breakdown of the general findings has not been presented (Sawyer 1998: 8).

1995-96 Walker Survey

The 1995-96 Walker Survey (PWS 1995) 'focused on the issue of permits as a management strategy' (Brake 1996: 9). Using a convenience sampling approach, track rangers surveyed visitors they encountered on the Overland, South Coast, Frenchmans Cap and Mt Anne tracks and in the Central Plateau, Walls of Jerusalem, Denisons, and Arthur Ranges areas between late December 1995 and late February 1996. Of the 613 questionnaires distributed, 586 completed forms (95.6%) were returned (Brake 1996).

Limited findings of the survey are outlined in *User regulation in the Tasmanian Wilderness World Heritage Area: a report on walking permit systems and their application in Tasmania* (Brake 1996). According to the report some 69.0% of all respondents supported the use of a permit system for the area they visited, and as a subset (33.0% of those surveyed), just 52.0% of Tasmanians felt this way. Furthermore, if a permit was unavailable, 39.0% of respondents stated they would 'go to another track where a permit was available', 20.9% stated they would 'go somewhere a permit is not necessary', while others stated they would postpone their trip (20.5%) or wait for the next permit to become available (7.6%) (Brake 1996).

Opposition to the introduction of permits and use restrictions in the WHA

Opposition to the introduction of a permit system and the introduction of use restrictions in the TWWHA was evident as far back as 1979-80 (Calais 1981). Despite support for such management actions apparently increasing from approximately 40%, in surveys undertaken in 1997-98 and 1981-82 (Calais 1981; Carlington 1988), to approximately 70% of respondents, in surveys conducted by the PWS in 1990-91 and 1995-96 (Brake 1996; PWH 1990), a still substantial proportion of respondents did not support the implementation of permits at the time of their prescription in the 1992 TWWHA management plan (DPWH 1992), and incorporation in the Strategy (PWS 1998b).

Since permits were initially prescribed in 1992, the battle between supporters and opponents has been played out locally in Tasmania at workshops (Attwater 1998c) and in Australia's foremost rucksack sports magazine *Wild* (Diggins 1996, 1999; French 1998; Heatley 1999; Morgan 1996; Wootton 1996, 1999). Parallel to public debate over the need for permits and restrictions, the PWS was dedicating resources to justifying the need for and the design of a permit system (Attwater 1998b, 1998c; PWS 1997a). Significantly, however, little effort was made to engage visitors or other stakeholders in determining the minimum acceptable conditions (PWH 1990, 1991; Sawyer 1990, 1998). Such engagement in the planning process is fundamental to the informed judgements of wilderness managers and planners (Ashor *et al.* 1986; Manning 1999, 2001).

Recent re-examination of data collected by the survey of visitors undertaken by the PWS during 1995-96 suggests that the level of concern and opposition among visitors to a permit system was under-estimated; particularly amongst local Tasmanians who were almost evenly divided on the question of support for such a system (Brake 1996; Rundle 2000). Several issues emerged from the reanalysis of data that cast doubt on the veracity of the claim that '69% of respondents supported the use of a permit system' (Brake 1996: 10). Scrutiny of the returned questionnaire forms revealed confusion between the existing park entry fee system and a 'permit system'. Indeed, '5% of respondents thought that permit systems were already in place in Tasmania' (Rundle 2000: 2). Further, not all respondents completed the survey forms independently, with the influence of track rangers and other respondents evident in peoples' responses, confounding the results to an unknown degree. Moreover, 30% of respondents supporting a permits system also qualified their response. Common qualifications included concerns about the 'cost, ease of obtaining a permit, [and] concerns about the loss of flexibility and spontaneity of walking'. Others questioned the reason for their use and asked whether they were the appropriate management tool, or if they would be effective in addressing impacts of concern.

Most significantly, the focus on the issue of support for a permit system and its design by the PWS was more consistent with the magic number approach to carrying capacity that sought to determine how many visitors is too much, than determining the amount of change to be tolerated. The former approach is more akin to historic conceptions of carrying capacity in rangeland management than contemporary wilderness planning built on the *limits of acceptable change* concept discussed in Chapter 2.

3.5 The management of bushwalking and walking tracks in the TWWHA

Bushwalking and walking tracks in the TWWHA have been actively managed to varying effect since the early 1980s (Table 3.10). The management of walking tracks in the decade following the original listing of the Western Tasmanian Wilderness National Parks World Heritage Area in 1982 was ad hoc and largely focused on popular walking routes. An inventory of the 1000 kilometre plus track network and the development of the first TWWHA Management Plan in 1992, established a more prioritised approach to the management of walking and walking tracks in the TWWHA (DPWH 1992). It was in this Plan that the introduction of quotas was first mooted as a means of 'maintaining environmental quality ... [and preventing] the formation of inappropriate tracks and routes and ... [preserving] a sense of solitude' (DPWH 1992: 69). The Plan also called for the development of a strategy for the management of the TWWHA walking track network (DPWH 1992; PWS 1994).

Two documents form the basis for the management of bushwalking and walking tracks in the TWWHA: the *Tasmanian Wilderness World Heritage Area Management Plan 1999* (PWS 1999), and the Strategy (PWS 1998b, 1998c, 1998d).

Table 3.10 History of track management in the Tasmanian Wilderness World Heritage Area between 1980 and 1999

1980s	▪ Ad hoc track works focuses largely on popular routes
1982	▪ World Heritage listing of the Western Tasmanian Wilderness National Parks
1988	▪ Track Ranger and MIB program commences
	▪ First campsite inventories undertaken on Overland Track, Cradle Mountain – Lake St Clair National Park
1988-90	▪ Track management plans prepared for selected tracks/areas
1989	▪ Extension and relisting of the TWWHA under the name of the Tasmanian Wilderness World Heritage Area
1990-91	▪ TWWHA-wide track inventory
1992	▪ First TWWHA Management Plan (DPWH 1992)
	▪ The introduction of quotas 'on particular walking tracks, routes and in some areas of the Wilderness and Self-Reliant Recreation Zone' was first mooted as a means of 'maintaining environmental quality, to prevent the formation of inappropriate tracks and routes and to preserve a sense of solitude' (DPWH 1992: 69)
	▪ Preparation of a track management strategy prescribed by the TWWHA Management Plan (DPWH 1992)
	▪ First draft of the Walking Track Management Strategy completed
	▪ Move to a more prioritised track works program
1994	▪ Second draft of the Walking Track Management Strategy completed following a period of public consultation
	▪ Prioritised track works program implemented across the TWWHA
	▪ Focus on PEC (Priority Erosion Control)
	▪ Commencement of more stable funding for track management
	▪ Park Entry Fees provide ongoing track maintenance funding
	▪ Start of ongoing track monitoring program
1995	▪ Start of aerial monitoring program
	▪ Appointment of Track Education Officer
Summer 1995-96	▪ Survey of walker support for a permit system
1996	▪ Start of promotion and public consultation regarding the proposed permit system
	▪ User regulation in the Tasmanian Wilderness World Heritage Area: a report on walking permit systems and their application in Tasmania. Draft for Comment released in July. The report falsely claimed support for a permit system to be 'around 70% of walkers' (Brake 1996: 39)

1997	▪	Release of the Statewide Walking Track and Marketing Strategy
	▪	Release of the 1997 Draft TWWHA Management Plan (PWS 1997b) for public comment
1998	▪	Final version of the Walking Track Management Strategy published in March 1998
	▪	Consultant contracted to develop an effective permit system
	▪	Briefing papers released prior to Public workshops (Attwater 1998b)
	▪	Public workshops held in Hobart and Deloraine
	▪	Proposed Overnight Walker Permit System for the Tasmanian Wilderness World Heritage Area. Draft Report for Review, June 1998 (Attwater 1998c)
1999	▪	Review of campsite inventory and upgrading of monitoring program
	▪	Release of the final 1999 TWWHA Management Plan (PWS 1999)

The Walking Track Management Strategy for the Tasmanian Wilderness World Heritage Area

The Strategy (PWS 1998b, 1998c, 1998d) was developed because staff of the PWS considered the level of recreational use (bushwalking) within the TWWHA to be 'creating significant environmental problems' (PWS 1997a). According to the Strategy (PWS 1998b: 3), 'the extensive degradation of existing walking tracks and the unplanned development of new walking tracks in many areas. Campsite impacts, crowding, pollution and broadscale trampling damage to vegetation and soils are also creating serious problems in some areas'. An inventory of walking tracks and track conditions throughout the TWWHA, conducted during 1990-91, and an 'extensive literature review', formed the basis of the Strategy (Attwater 1998b: Management Objectives, 3). The first draft of the Strategy was published in 1992 and, following public consultation, a second draft published in 1994 (Attwater 1998b). The final version of the Strategy was published in 1998 prior to the release of the TWWHA Management Plan (PWS 1999).

The Strategy (PWS 1998b, 1998c, 1998d), detailed how the PWS was to address the 'unsustainable' levels of visitor use evident in many areas of the TWWHA (PWS 1997a). The key management actions prescribed in the Strategy are:

- the introduction of a track classification scheme;
- promotion of voluntary guidelines for the publicity of walking tracks and areas;
- 'comprehensive monitoring of [the biophysical] condition of walking tracks [and campsites], recreation impacts, and usage levels and trends';
- a 20-year prioritised track works program;

- the expansion of the existing walker education program;
- introduction of a 'comprehensive permit system'; and
- 'research into a broad range of issues related to the management of walking tracks and walkers' (PWS 1998b: 3-4).

The Track Classification Scheme

The seven-tiered Track Classification Scheme (PWS 1998b) was developed to meet the needs of a range of users, and to provide a spectrum of bushwalking opportunities that range from highly developed and visited tracks, to those with little to no infrastructure and very low levels of use. The specifications for walking tracks include: track width, maximum gradient, surface drainage, scrub clearance, the types of facilities permitted and guidelines for the conduct of commercially guided tours (see Appendix A). The Strategy's Classification Scheme also outlines the maximum usage and maximum party size for each class of track.

Purported to have been 'developed using LAC principles', the track classification scheme 'specifies indicators and acceptable impact limits' and 'appropriate levels of usage' (Brake 1996: 6). However, despite being designed as a prescriptive management tool, the Strategy undermines its regulatory intent by stating that 'the specifications ... [are] to be regarded as guidelines, not as rigid prescriptions' (PWS 1998b: 91). As such, the Strategy fails to establish a transparent mechanism to trigger management actions designed to ameliorate conditions in breach of the specifications/standards. Moreover, LAC style management strategies are only successful if they force action when impacts become unacceptable (Austin 1995).

The lack of clarity in the Strategy is further compounded by standards that are not expressed as probabilities or proportions, one of the characteristics displayed by rigorous standards, as discussed in Chapter 2 (Manning 1999; Manning & Lime 2000; National Park Service 1997; Whittaker & Shelby 1992). In fact, had the standards articulated in the Strategy been formulated with such characteristics it would have been more practical to implement in a truly prescriptive fashion. Indeed, as an example of the necessity for flexibility in the application of the specifications was that 'it would be impractical to ensure that every metre of every T3 track is less than 0.75 metres wide' (PWS 1998b: 91). If the standards had been properly bounded such flexibility would not have been required. An example of a properly written standard would be, no more than 10% of a one kilometre monitoring segment shall exceed 0.75 m in width.

In terms of the social conditions, the standards are not impact oriented (directed at the impacts that affect the quality of visitors' experiences); rather they are focused on the source of the impact or related management actions. For example, specifying the maximum usage standard to achieve the broad objective of managing 'levels of social impact' (PWS 1998b: 93). Similarly, the intent of providing a standard for the maximum number of encounters at a campsite has been translated into a standard for facility capacity. Such standards are clearly inadequate and do not exhibit the rigour described in Chapter 2.

Social research

The Strategy specifies the need for research into social impacts, usage trends and user characteristics, expectations, goals and attitudes. Focus areas include:

- the assessment of usage trends and demand;
- the identification of walkers in the TWWHA (by place of origin, and walking destination) that 'would be just as happy pursuing recreational activities outside it' (PWS 1998b: 85);
- the assessment of 'user response to management measures, eg permits, usage restrictions, various types of track surfaces and construction techniques' (PWS 1998b: 85);
- the occurrence, extent, location and impact of displacement;
- the assessment of 'social impacts, user characteristics and user attitudes in medium to low use areas in the [TW]WHA' (PWS 1998b: 85); and
- 'user attitudes to biophysical and social impacts' (PWS 1998b: 85).

Conspicuous in its absence among the social research agenda items recommended by the Strategy is the assessment of visitors' norms with respect to the standards they ascribe to biophysical and social conditions in the TWWHA. This omission is striking given the acknowledgment of its importance in the literature review contained in its third volume (PWS 1998d). Furthermore, despite recognising the need 'to encourage public involvement in decision-making process[es]', the Strategy also fails to outline a means by which this is to occur (PWS 1998d: 30).

Monitoring of bushwalking related biophysical impacts, use levels and social impacts

Based on the original inventory of walking tracks that was undertaken in 1990-91, a complex track monitoring methodology for biophysical impacts was developed by the PWS, with a

Track Monitoring Officer dedicated to the task. Commencing in 1994, over 400 monitoring sites have been established with measurements being taken at approximately four yearly intervals. Campsite condition is monitored using a Condition Class System based on that developed by Frissell (1978). High-resolution aerial photography is also being used to monitor unplanned development of tracks and campsites.

The Strategy also commits to the continued monitoring of user characteristics and attitudes as well as crowding and other social impacts. However, in the absence of clearly articulated impact focused social standards, discussed earlier, there are no criteria according to which assessments of acceptable or unacceptable change can be made. Furthermore, only use level, visitor origin, party size, and actual and intended route are monitored on a consistent basis by the PWS.

Prioritised track works program

Since 1993, the track works program has been guided by the various drafts of the Strategy as they have evolved. The majority of the works undertaken to date have aimed to control erosion in risk areas. All of the very high *priority erosion control*, or PEC, works listed in the Strategy (PWS 1998c) have now been completed (Wyatt, P. 2004, pers. comm., 25th October).

Introduction of a comprehensive permit system

Various quota systems to regulate bushwalking in the TWWHA have been suggested since the introduction of a permit system was first outlined in the 1992 Management Plan (DPWH 1992). At that time, quotas were envisioned only for specific tracks and areas in the TWWHA, and the extent of the permit system unspecified.

The proposal to introduce quotas and a permit system to manage bushwalking in the TWWHA was by far the most controversial of the Strategy's recommendations, 'attracting a mixture of support and vocal opposition from various groups and individuals' (Attwater 1998c). The PWS considered a permit system vital if it was to successfully address bushwalking related impacts in the TWWHA.

Recognition of the opposition to the implementation of a permit system resulted in the prescription for a TWWHA-wide permit system in the initial drafts of the Strategy being reworded to read 'comprehensive permit system' (PWS 1998b: 71) 'with restrictions on user numbers where necessary' (PWS 1998b: 3-4). This apparent concession to the opponents of the permit system failed to quell stakeholders' objections to a system that some simply did not want, and others felt 'would not work', was a 'restraint on freedom' or would not be cost effective (Attwater 1998a: 17). Despite clear opposition to the introduction of a permit system, the PWS continued to direct its resources to designing a suitable system (Attwater 1998a, 1998b, 1998c).

Walker education program

The walker education program has been highly successful in promoting MIB. In advance of the publication of the final Strategy, the walker education program was expanded in 1997 to promote the Strategy and to 'publicise and explain the need for management measures such as access permits, [and] usage restrictions ...' (PWS 1998b: 80). A brochure and video *Walking the Fine Line*, and a second brochure *Science Behind the Strategy* (PWS 1997a) were developed to foster support for the Strategy, and in particular, for the introduction of the permit system. A series of public presentations explaining the science behind the Strategy also supported the promotion and justification for the proposed permit system. The one such presentation I attended focused solely on establishing the rigour of the biophysical science that underpinned the Strategy.

To publicise and garner support for the Strategy and the permit system, the then Track Education Officer with the PWS, Tracey Diggins, wrote an article that appeared in the 1996 Summer edition of *Wild Magazine.* The article, *Walking the Fine Line*, outlined 'Tasmania's blueprint for walking-track management' (Diggins 1996: 45). In it, Diggins argued the necessity and importance of a permit system to address the 'rapid deterioration in the condition of walking tracks ... [and] other usage related problems such as crowding and unplanned, and damaging, track formation' (Diggins 1996: 45-46). Opposition to a permit system and quotas was again evident in letters to the editor in the subsequent edition of the magazine (Morgan 1996; Wootton 1996).

Voluntary publicity guidelines

Guidelines for the voluntary restriction of publicity of walking tracks and routes have been established, and are outlined within the Track Classification Scheme (PWS 1998b). The restrictions on the promotion of walking tracks, particularly in route guides, is intended to limit publicity to the more frequented resilient areas, and away from the less developed tracks and routes. The tactic was to provide decreasing levels of detail in accordance with the level of track development and infrastructure, and use level. However, according to Attwater (1998b: Management Objectives, 4), this strategy 'has met with only limited success. Articles and photographs of remote areas continue to appear in magazines, on the internet and in other media'.

The Tasmanian Wilderness World Heritage Area Management Plan 1999

Following a period of public consultation and public comment on the 1997 Draft Management Plan (PWS 1997b), the final Plan was completed and published in 1999, taking effect from March 17th 1999.

Overall management objective

The overall objective of management of the TWWHA is 'to identify, protect, conserve, present and, where appropriate, rehabilitate the world heritage and other natural and cultural values, and to transmit that heritage to future generations in as good as or better condition than at present' (PWS 1999: 30). A significant aspect of that overall objective is that the management obligation is extended beyond the natural and cultural values for which the TWWHA was listed. This objective specifically includes *other* values such as recreation and tourism and its economic value (discussed in Section 3.4).

In meeting its objective, a number of General Management Strategies have been developed by the PWS. Most pertinent to the management of bushwalking and walking tracks are the identification of Key Focus Areas in which management efforts are to be concentrated during the first five years of the Plan's implementation (1999 to 2004). Additionally, the TWWHA will be divided into zones in order to cater for appropriate levels and forms of tourism with the protection of the values they come to enjoy, and the management of wilderness.

Key Focus Areas

The Plan identifies a number of Key Focus Areas (PWS 1999: 51). These areas have been identified to focus management effort and to provide a strategic approach to putting the plan into action. Three of the areas targeted are enhanced community engagement, completing the Strategy's implementation, and monitoring and evaluating the performance of management in meeting its objectives.

Community engagement

Community involvement in planning and management is recognised in the Plan as being important because it 'usually results in better decisions being made by managing authorities and better community acceptance of those decisions' (PWS 1999: 63). The benefits from stakeholder involvement in planning are 'better understanding of community values and expectations' and an awareness of the issues that concern them (PWS 1999: 64; Smith, V. & Moore 1990). Furthermore, the Plan calls for the development of 'appropriate programs to address specific management issues and problems, and where possible collaborate with the community to find solutions to management problems' (PWS 1999: 64). Carrying capacity planning frameworks such as LAC, VERP and VIM, discussed in Chapter 2, are particularly suited to the incorporation of community engagement in assisting management achieve goals through the use of transitive planning techniques (Ashor 1986; Ashor *et al.* 1986; McCool *et al.* 1986).

The Strategy

The Plan considers the implementation of all the Strategy's components as vital to meeting the Plan's objectives. Much of the Strategy's prescriptions and recommendations had been implemented, but 'at the time of writing the major component still to be finalised is the walker permit system. [Therefore,] over the first three years of this plan [1999-1992], a major focus will be to have all the strategy's components in place' (PWS 1999: 53).

Monitoring and evaluation

One of the key focus areas of the Plan is the establishment of a system for monitoring and evaluating the performance of management with respect to achieving its objectives (PWS 1999). For each of the key desired outcomes the Plan specifies objective/s to be met, prescribes the manner according to which they are to be achieved, and details how management performance is to be measured and monitored.

TWWHA Zoning

As 'Tasmania depends heavily on the TWWHA as a drawcard for visitors to the State and there are increasing demands to give visitors a variety of first-hand experiences of the area's values' the area has been divided into management zones (PWS 1999: 54). Details of the management prescriptions for each zone are outlined in Table 3.11, and the zones illustrated in Figure 3.1. The PWS recognises the importance of the area and its values to Tasmania and its economy (discussed in Section 3.4) and understands that 'these uses have the potential to significantly affect the area's values over time' (PWS 1999: 54). As such, the zoning scheme (Figure 3.1) and its prescriptions (Table 3.11) are concerned primarily with the types and levels of activity and facilities that are permitted within the TWWHA.

Like the ROS (Clark & Stankey 1979b), the objective of dividing the TWWHA into zones is 'to maintain a spectrum of recreational opportunities from most developed for recreation and tourism in the Visitor Services Zones and Sites, to undeveloped in the Wilderness Zone consistent with the protection, conservation and presentation of the World Heritage and other natural and cultural values of the TWWHA' (PWS 1999: 55).

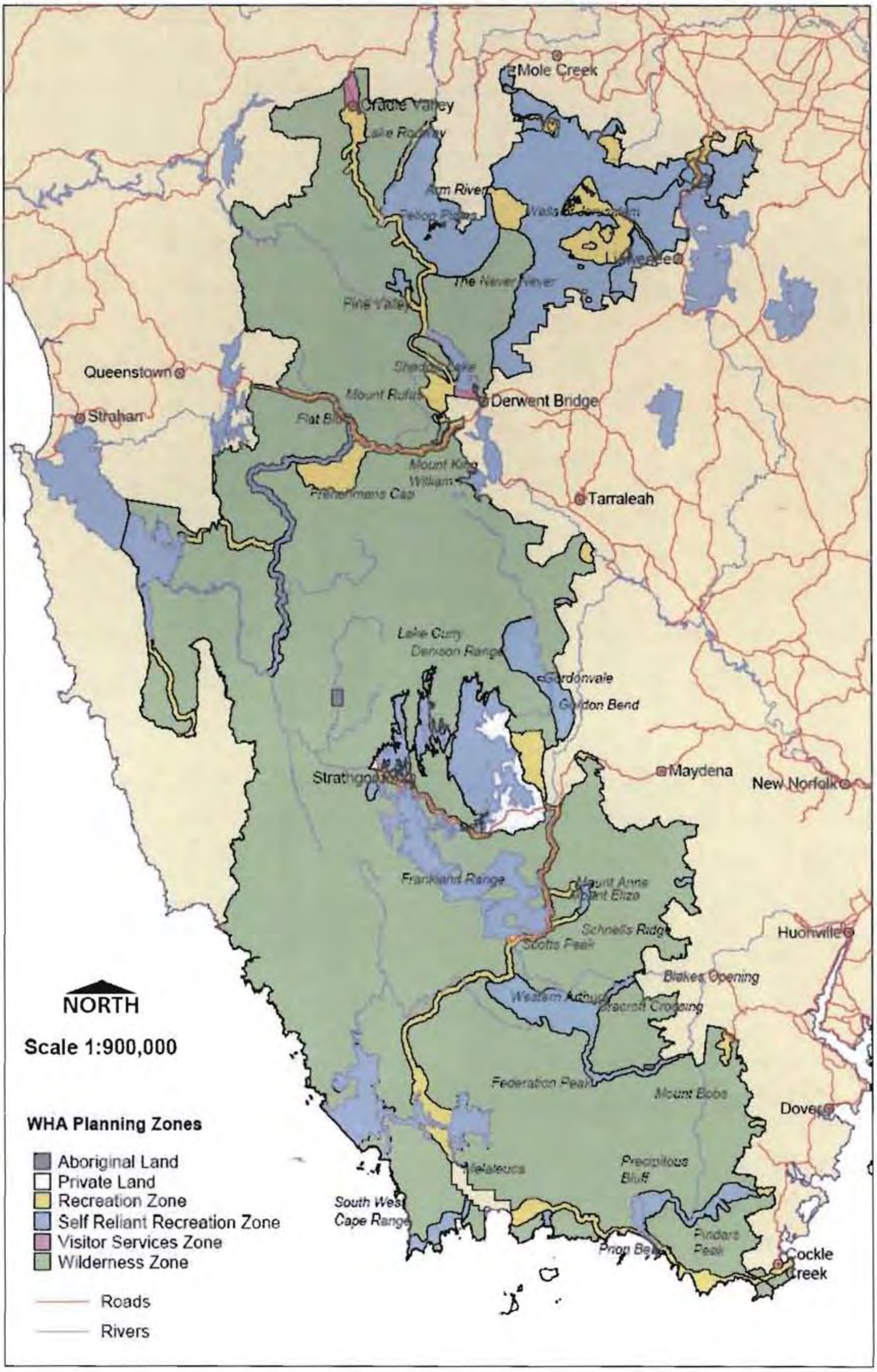

Figure 3.3 **Tasmanian Wilderness World Heritage Area Zoning (Ling 2000b)**

Table 3.11 Zoning – main prescriptions (Adapted from PWS 1999)

WILDERNESS	SELF RELIANT RECREATION	RECREATION
Wild country –limited recreation	**Challenging walking and fishing areas**	**Major walking, boating and vehicle areas**
No new **facilities** will be provided.	No new facilities except for environmental protection purposes.	Limited facilities for recreational and environmental protection purposes.
No new **walking tracks**, old ones managed as T4 or routes (WTMS*).	No new walking tracks, old ones managed as T3, T4 or routes, rerouting for environmental purposes only (WTMS*).	Potential for limited new walking tracks, old ones managed as T1 to T4 or route (WTMS*).
Mechanised access – None, except for management purposes and then only when no alternative.	Mechanised access limited to management purposes. [See below regarding additional aircraft landing sites.]	Major high volume overnight walking areas, motorised boating areas, vehicle access restricted to existing vehicle tracks.
Assess **structures** – Allow to decay or remove except where their cultural, recreational or management value outweighs impact on wilderness.	Assess structures – Allow to decay or remove except where their cultural, management or recreational value outweighs impact on wilderness. Central Plateau huts to remain.	Remote infrastructure eg huts, toilets, can be upgraded and replaced in accord with environmental prescriptions.
Management inputs – Minimal, for protection of natural and cultural values and essential safety purposes only.	Management inputs – Minimal, for protection of natural and cultural values and essential safety purposes only.	Management inputs – Moderate, for protection of natural and cultural values and recreation management.
Promote use – No.	Use not promoted but information provided on how to minimise impact.	Promote major walking, boating and vehicle access corridors.
Special events – No.	If in accord with WTMS*.	Special events – Yes.
Snowpoles – No.	Snowpoles – No.	Snowpoles - Acceptable (see WTMS*).
Plaques and memorials – Exceptional circumstances only.	Plaques and memorials – Maybe, under special circumstances.	Plaques and memorials – Maybe, in association with facilities.
Aircraft – Adopt flight guidelines and appropriate routes that may bypass this zone. No landings except for search and rescue and management.	Aircraft – Adopt flight guidelines and appropriate routes.	Aircraft – Adopt flight guidelines and appropriate routes.
Signs – Strictly for management and environmental protection purposes.	Signs – for management and environmental protection.	Signs – Yes in highly serviced areas, in association with facilities.
Interpretation - No.	Interpretation – No.	Interpretation – Yes in highly serviced areas, in association with facilities (eg OverlandTrack).

◄ increasing naturalness and remoteness

increasing infrastructure, development, recreation and tourism focus ►

* WTMS – Walking Track Management Strategy

Protection and management of wilderness

In relation to the management of wilderness quality, one of the concerns of the PWS is that:

> Increased visitor numbers may result in pressure for additional visitor facilities [including hardened campsites and walking tracks] which may impact on wilderness quality. Even existing levels of recreational use of bushwalking areas are degrading wilderness quality through deterioration of existing tracks and the formation of new tracks in previously trackless areas (PWS 1999: 93).

A *key desired outcome* of the Plan is to 'maintain or enhance wilderness quality' (PWS 1999: 34). The main strategy to achieve this outcome is the zoning of the TWWHA into management areas that provide for varying levels of protection, activity and development, as well as controlling impacts on wilderness and enhancing people's wilderness recreation experience.

Wilderness and the wilderness recreational experience

The Plan recognises a twofold meaning of wilderness. First, the Plan defines wilderness as an area that is:

- of sufficient size to enable long-term protection of its natural systems and biological diversity;
- substantially undisturbed by colonial and modern technological society; and
- remote at its core from points of mechanised access and other evidence of colonial and technological society (PWS 1999: 91-92).

Second, related to but distinct from wilderness is the *wilderness* that is perceived by people who visit the TWWHA (which shall be indicated from here on with *italics* or associated with the term 'experience'). The wilderness recreational experience 'is affected not only by the wilderness quality of the area but also by disturbance factors such as overcrowding or noise from boats or aircraft' (PWS 1999: 93). Consistent with the zoning of the TWWHA the Plan also notes that:

> Acceptable standards for disturbance will vary according to location; eg visitors in Visitor Services Sites accessing the TWWHA from their cars are more tolerant of disturbances than walkers who have ventured into trackless areas remote from evidence of modern technological society (PWS 1999: 93).

Management Objectives

In order to achieve the overall management objective, noted earlier, the key desired outcome of maintaining and enhancing the wilderness quality has been divided into subsets in acknowledgment of the twofold meaning of wilderness. These objectives are:

- to maintain and enhance wilderness quality; and
- to maintain and enhance the quality of the wilderness recreational experience for visitors to the [TW]WHA (PWS 1999: 93-94).

Management Prescriptions

Zoning is the predominant strategy for the management of wilderness in the TWWHA. Each management zone has a set of prescriptions that define the types of facilities, services and activities appropriate for the zone and how they are to be managed. Details of the prescriptions can be found in Table 3.11. Generally speaking, however, the zones can be described as ranging from the Visitor Services Zones and Sites where high levels of infrastructure and development are permitted with a recreation and tourism focus, through to the Wilderness Zone that is natural and remote.

In order to maintain and enhance wilderness quality and the quality of visitors wilderness recreational experiences, a number of management prescriptions have been outlined. These prescriptions include (PWS 1999: 94):

Control of Wilderness Impacts

To maintain or enhance the wilderness quality of the TWWHA the Plan directs the PWS to control wilderness impacts by:

- Ensure that management decisions regarding future activities, developments or actions take into account the degree to which those actions will adversely impact on, or alternatively enhance, wilderness quality, and give preference to those which maintain or enhance wilderness quality.
- Enhance wilderness quality by closing tracks where they are no longer required and they significantly reduce the remoteness or naturalness of areas or they degrade or pose a risk to the natural and cultural values of the TWWHA.
- Control unplanned development of tracks and routes (PWS 1999: 94).

Wilderness Recreational Experience

In order to maintain of enhance the quality of visitors' wilderness recreation experiences the Plan states the PWS will:

- Protect people's wilderness recreational experience by actively managing overflights, motorised watercraft and Boating (Motorised), and overcrowding.
- Identify key factors that degrade the wilderness experience of visitors and establish strategies to actively manage those factors to maintain or enhance the quality of visitor experience (PWS 1999: 94).

Visitor research undertaken by University of Tasmania postgraduate students (Calais 1981; Calais & Kirkpatrick 1986; Carlington 1988; Sawyer 1990) and the PWS (Brake 1996; PWH 1990, 1991; Sawyer 1998) has shown degraded tracks and campsites, the number of other people encountered along the track and at campsites, large groups, crowded huts and overflights to have detracted from the quality of visitors' experiences. However, it is unknown how important these factors are in determining the quality of visitors' experiences and whether any one factor is any more or less important than another.

Monitoring and Evaluation

In order to measure and evaluate the success of the prescriptions, outlined above, the PWS will:

- Document and map the factors affecting wilderness quality e.g. addition or removal of roads, structures, activities, development of unplanned walking tracks, areas of disturbance etc.
- Establish monitoring programs to record long-term changes in factors identified as adversely affecting the quality of visitors' wilderness experience.
- Monitor the impact on wilderness quality of recreational uses and take appropriate action, as necessary, to maintain wilderness quality.
- Monitor the level of satisfaction of a range of visitor types with their wilderness experience of the TWWHA and the key factors that affect the quality of visitors' wilderness experience (PWS 1999: 95).

The identification of key factors that shape the quality of visitors' experiences is a necessary precursor to establishing a monitoring program/s to determine whether changes in conditions are occurring. Furthermore, as discussed in Sections 2.4 and 2.5, the development of sound indicators is essential if changes in condition are to be measured reliably. Moreover, unless standards clearly articulate the amounts of change that are to be tolerated (see Section 2.5), no clear mechanism can be established to force the implementation of management actions designed to mitigate impacts on both wilderness quality and the quality of the wilderness recreation experience (Austin 1995).

Presentation: Ecologically sustainable management of human use and quality of visitor experience

One of the overarching objectives of the TWWHA is to provide people with opportunities to appreciate and enjoy its natural and cultural values in ways that are compatible with their conservation and that enrich the quality of visitors' experiences. In meeting this objective, plans and policies are to 'specify, amongst other things, appropriate visitor levels and/or limits of acceptable change for key parameters' (PWS 1999: 120). The PWS is to also 'ensure that all services and arrangements for visitors to the [TW]WHA contribute to the quality of visitors' experience' (PWS 1999: 120).

In order to monitor and evaluate whether the *key desired outcomes* are being met, the Plan prescribed that the following actions be undertaken:

- Establish ongoing programs to record and monitor the levels of use of visitor opportunities and facilities within and/or servicing the WHA.

- Monitor the level of satisfaction of a range of visitor types (including local community residents) with:
  - the number, type, and location of visitor opportunities and facilities within and/or servicing the WHA;
  - the quality of their experience in the WHA;
  - the operations and services provided by the Service, licensed tour operators, and concessionaires within the WHA; and
  - information, interpretation and education programs, activities, brochures, signage, information etc in various settings.
- Collate and monitor the nature and level of visitor comments and feedback at Visitor Services Sites and Zones, and other locations within the WHA.
- Document and monitor levels and trends of visitation, recreational activity and other use to and within the WHA.
- Monitor the level of compliance/non-compliance of visitors and other users with regulations (eg fuel stove only areas), minimal impact practices and other promoted management protocols such as *Phytophthora* washdown stations (PWS 1999: 121).

As noted in Chapter 2, indicators and standards form the basis for objectively and reliably determining whether social and biophysical conditions are maintained in a state that is acceptable to management. However, it has been shown earlier in this chapter that the specifications intended as limits of acceptable change for walking tracks outlined in the Strategy (Appendix A) are poorly defined. Further, it is unclear whether they encompass a sufficiently broad range of parameters in regard to the factors that effect the quality of visitors' experiences. Moreover, the monitoring prescribed by the plan stipulates the use of the subjective measure of visitor satisfaction with 'the quality of their experiences in the [TW]WHA' (PWS 1999: 121) rather than the specific, quantitative and objective measurement consistent with what many researchers have defined as the characteristics of reliable indicators and standards (Merigliano 1987, 1990; National Park Service 1997; Stankey *et al.* 1985; Whittaker 1992; Whittaker & Shelby 1992). Such sound indicators and standards are essential to monitor and assess whether the social and environmental conditions, and thus the quality of visitors' experiences are being maintained.

Presentation and management of walking and walking tracks

According to the Plan (PWS 1999: 172), monitoring of walking tracks and campsites in the TWWHA over recent years 'has shown escalating biophysical and social impacts throughout much of the region'. The deterioration of tracks and campsites and the development of new tracks in previously trackless areas are a major concern for the PWS. Additionally, crowding, pollution and widespread trampling damage has also become apparent. What follows is an excerpt from the Plan (PWS 1999: 173-175) detailing the objectives, management prescriptions and the methods that will be used to measure and evaluate their success.

OBJECTIVES

- The overall objective is to achieve the sustainable management of walking tracks and walkers throughout the TWWHA.
- To minimise the environmental impact and the impact on wilderness values of recreational walking throughout the TWWHA.
- To prevent further unplanned track and campsite development throughout the TWWHA.
- To prevent the deterioration of existing tracks and campsites in accordance with the management prescriptions of the Walking Track Management Strategy.
- To maintain and where possible enhance recreational walking opportunities in the TWWHA.

MANAGEMENT PRESCRIPTIONS

- Manage walking tracks to achieve the following specific outcomes:
  - ensure impacts on tracks are within the limits outlined in the track classification system;
  - encourage appropriate levels of publicity and promotion;
  - ensure track infrastructure is appropriate for the track classification;
  - implement party size restrictions to deal with social impacts;
  - implement use restrictions to limit environmental impacts and prevent unplanned track formation; and
  - ensure commercial use is appropriate.

  The Walking Track Management Strategy is designed to achieve these outcomes.
- Manage walking tracks and walkers in accordance with the management actions and guidelines listed in the strategy and in particular the track classification scheme (including any future modifications to the scheme).
- Continue to encourage and develop a statewide approach to walking track management. Central to this will be a Statewide Walking Track Strategy to be developed by the Service, Forestry Tasmania and Tourism Tasmania in an integrated manner with the TWWHA track strategy.
- Continue liaison and a co-operative management approach with Forestry Tasmania on jointly managed tracks and tracks which enter the TWWHA from State Forest.
- Consult with users regarding the implementation of the Walking Track Management Strategy.
- Examine opportunities for a hut-based circuit walking route in the Frenchmans Cap area. Consider the impact on the natural and cultural values of the TWWHA using the New Proposals and Impact Assessment process.
- Prepare a recreation zone plan for the Overland Track.

Quotas and Permits

- Divide the TWWHA into walking areas, each area having a quota specifying usage limits on a daily, weekly or monthly basis as appropriate.
- Set quotas and modify as necessary to ensure that the resulting biophysical and social impacts comply with the specifications listed in the track classification scheme.
- Enhance the monitoring of usage of the walking areas to monitor compliance with quotas.
- Finalise the development of the system with the active involvement of key stakeholders. Final approval for the system will be given by the Minister.

- Introduce the system in an educational form for one summer prior to the full system becoming operational the following summer.

Education

- Continue to develop and implement a walker education campaign with emphasis on minimal impact bushwalking principles and the need for the management actions proposed in the Walking Track Management Strategy.
- Continue to provide a mechanism for face-to-face education of walkers and other backcountry users in popular areas as a means of educating users.
- Discourage the publicity of tracks classified in the track classification scheme as T4 or 'route', and the publicity of areas accessible only by T4 tracks and 'routes'. See also Zoning,

Works

- Implement the track and campsite works program according to the priorities outlined in the Walking Track Management Strategy and detailed in track management plans.
- Maintain existing track and campsite infrastructure in accordance with the guidelines listed in the track classification scheme and the Track Management Manual.
- Give preference to methods of track construction that incorporate local materials and blend with the natural environment.
- Continue to develop new techniques for stabilising tracks and campsites, with emphasis on the use of local materials.
- Remove unauthorised track markers and close unauthorised marked and/or cut tracks after consultation with relevant groups and individuals.
- Where necessary, actively rehabilitate closed track sections and campsites.
- Encourage the involvement, where appropriate, of volunteers and partnership groups in implementing track and other works in accordance with the Walking Track Management Strategy.

MONITORING AND EVALUATION

Objectives of monitoring

The primary objective of the TWWHA track and walker monitoring program will be to ascertain the extent to which the biophysical and social impacts associated with recreational walking in the TWWHA comply with the Walking Track Management Strategy and the standards specified in the track classification scheme.

Monitoring Actions

- Continue to implement and develop programs for monitoring walking track and campsite impacts, unplanned track development and impacts in 'fan out' zones and trackless areas.
- Continue the high-resolution aerial photographic program to monitor unplanned track and campsite development, particularly in low-use alpine areas.
- Monitor walker numbers, use trends and walker attitudes and characteristics throughout the TWWHA by means of walker log books, surveys and pedestrian counters as appropriate.
- Continue the walker trampling trial program to ascertain the relationship between use levels and impacts in a range of environments.
- Develop indicators for assessing, and programs for monitoring, social conditions on walking tracks throughout the TWWHA.
- Compile a database of proposed and completed track and campsite works throughout the TWWHA.

- Modify management prescriptions (including permit quotas and track works) as necessary to ensure that environmental and social impacts throughout the TWWHA remain within the specifications listed in the track classification scheme (PWS 1999: 173-175).

Many of the objectives, management prescriptions parallel those contained within the Strategy. Similarly, the objective of the monitoring and evaluation described by the Plan is consistent with that required by the Strategy. Since these elements have been examined in the discussion of the Strategy earlier in this chapter it will not be repeated here. In short, however, the Plan reinforces both the strengths and weaknesses of the Strategy.

One of the monitoring actions prescribed by the Plan, when implemented, would enhance the PWS's ability to manage the quality of visitors' experiences under the Strategy through the identification of indicators and the development of a monitoring program to assess 'social conditions on walking tracks throughout the WHA' (PWS 1999: 175). If properly selected, the indicators of social conditions have the potential to form the basis of reliable monitoring program. Further, the definition of clear and rigorous standards will provide the PWS with the capacity to objectively and quantitatively assess the quality of the social aspects of the recreation opportunities they are providing.

3.6 Conclusion

The need for PWS to develop a greater understanding of the social dimensions of wilderness planning and the impact issue was introduced in Chapter 1. Chapter 2 provided an overview of the evolution of wilderness management and outlined how contemporary wilderness planning addresses social and biophysical issues through the integration of social values in the decision making process. In doing so, that chapter highlighted the role and characteristics of robust indicators and standards and how the results of normative research can inform managers' judgements.

This chapter has developed an understanding of the current knowledge of the social dimensions of the impacts of recreation in the TWWHA. In it I have also examined the management of the TWWHA, and the social research that underpinned it, in the light of the contemporary wilderness management practices, discussed in Chapter 2. It is apparent that there are social and biophysical issues arising from the recreational use of the TWWHA that the PWS must address if it is to enhance the quality of the wilderness recreation experience and meet its management obligations. In doing so, the PWS must strike a balance between the protection and conservation of the areas' natural and cultural values and the presentation of those values through the provision of a range of appropriate recreation opportunities. Furthermore, if tourism is to achieve its desired potential as a cornerstone of the Tasmanian economy, the protection and conservation of the qualities for which the TWWHA is known is vital.

Several key conclusions emerge from this chapter. First, the TWWHA management zones establish the broad framework for the provision of a range of recreation opportunities commensurate with the management obligations of the PWS. Second, within each zone a range of different recreation opportunities is provided at a site-specific basis by maintaining tracks to varying standards permissible within each zone. The track classifications form the basis for the provision of track-based spectrum of recreation opportunities. Third, the biophysical limits of acceptable change prescribed by the track classifications are not well defined and as a result have been specified as providing guidance only. Fourth, management must shift its focus from the design and implementation of a permit system to more clearly and specifically defining the limits of acceptable change. This step is essential in ensuring a transparent mechanism is established to trigger the implementation of effective management actions. Fifth, a broader understanding of the factors that affect the quality of visitors' experiences is required; and should include an appreciation of their degree of influence. Sixth, social indicators need to be developed that are impact focused. Seventh, visitors should be engaged in defining the limits of acceptable change for key parameters and their validity should be assessed. Finally, a quantitative and objective evaluation is required of the quality of visitor experience in the TWWHA. These conclusions provide the foundation for Chapter 4, in which a detailed description of the empirical research method adopted by this study is presented.

Chapter 4. Empirical research methods

The purpose of this chapter is to present the empirical methods adopted to achieve the study's aim. The chapter is divided into several sections. First, the study is situated within the context of the key insights that have emerged from the examination of wilderness recreation planning and management and the integration of social values (Chapter 2), and the review of the management of bushwalking and walking tracks in the TWWHA and the challenges faced by the PWS (Chapter 3). The aim of the study is then restated to highlight the purpose of the research, and the theoretical and methodological issues that were considered are outlined. Next, a brief discussion of the study areas and the data collection is presented, and the design of the survey instruments (questionnaires) is discussed. Finally, the research questions that were addressed and the analyses that were applied are presented.

This study adopted a normative approach to identify the factors that influence the quality of visitors' experiences, and highlight key condition indicators for the recreation setting. More directly, however, the normative approach was the method used to define visitor-based standards. The development of such insights is required by the PWS to inform the socio-political decision making processes, as discussed in Chapters 2 and 3 (Manning 1999, 2001; Manning & Lime 2000). This approach complements LAC and similar planning frameworks by providing data that are integral to such processes.

4.1 Key insights from previous chapters

A number of key insights have emerged from the previous chapters. First, the provision of a range of recreation opportunities is a recognised component of wilderness planning and management (Clark & Stankey 1979b; National Park Service 1997; Nilsen & Tayler 1997; PWS 1999; Stankey *et al.* 1985). Second, the best way to 'assure quality outdoor recreation' experiences is to provide settings that differ in respect to their biophysical, social and managerial character (Clark & Stankey 1979b: 4). Third, the provision and maintenance of a range of recreational opportunities are objectives of the TWWHA Management Plan 1999 (PWS 1999). Moreover, the PWS aims 'to manage visitor activities and infrastructure [including walking tracks] to provide a quality experience for users' (PWS 1999: 130). Fourth, to achieve these outcomes, the TWWHA Management Plan prescribes the adoption of a LAC approach to managing bushwalking and walking tracks and the identification of key factors that affect the quality of visitors' wilderness experiences. Furthermore, indicators for assessing and monitoring social conditions on walking tracks are to be developed. Fifth, the identification of indicators and definition of standards that specify the minimum acceptable conditions are recognised as the basis for monitoring the quality of visitor experience and are central to contemporary wilderness and natural area planning and management frameworks, such as LAC, VIM, and VERP (Manning & Lime 2000). Sixth, visitor research adopting a normative approach that 'developed in the disciplines of sociology and social psychology', and evolved in the field of outdoor recreation, has 'attracted considerable attention' and use in 'formulating visitor-based standards of quality' (Manning 2001: 22). Identification of such standards is essential to inform managers' judgements of the levels of impact are to be accepted, and at what point management actions designed to mitigate those impacts will be implemented (Manning 2001). Finally, the PWS approach to the planning and management of bushwalking and walking tracks in the TWWHA was largely not informed by an understanding of what visitors considered the maximum acceptable level of impact to the environment and to the quality of their experience (Chapter 3).

4.2 Aim

Building on the foundation of the insights that have emerged from previous chapters, this component of the study is primarily concerned with how the biophysical and social conditions that are the result of visitation, rather than the behaviours of the visitors themselves, influence the quality of visitors' experiences. As such, the focus is visitors' norms that describe the conditions the users think ought to exist (Manning 1999; Shelby *et al.* 1996). Such norms form the basis of visitors' evaluations of the quality of the biophysical and social conditions they experience when bushwalking and whether or not those conditions enhance or detract from the quality of those experiences (Shelby *et al.* 1996).

Thus, the aim of the study is to identify the parameters that affect the quality of visitor experience and to explore the development of visitor norms with respect to biophysical and social conditions in the TWWHA. To achieve this aim, the key factors that affect the quality of visitors' experience, and indicators thereof will be identified. Visitor-based standards of quality for the limits of acceptable change will also be explored and defined. Such information is essential if 'informed judgements' (Manning 2001: 21) are to be made by the PWS in regard to the management bushwalking and walking tracks and the quality of the experiences of visitors in the TWWHA.

In undertaking this normative exploration, a range of theoretical and methodological issues were considered. Moreover, these issues influenced the development of specific research questions and the design of the questionnaires.

4.3 Theoretical and methodological considerations

Researchers have identified a number of theoretical and methodological issues that need to be considered when employing a normative approach to the study of visitor-based standards in outdoor recreation. Several reviews of the literature on the use of the normative approach in outdoor recreation have been undertaken by others (Manning 1985, 1999; Shelby *et al.* 1996; Vaske *et al.* 1993; Vaske *et al.* 1986). An overview of the issues identified by these authors is provided here to facilitate an appreciation of these matters and to provide the foundation for discussion of the formulation and design of the questionnaire presented later in this chapter.

Non-response and salience

Two factors have been found to influence whether respondents report personal norms. First, in some instances the lack of importance of an indicator in shaping the quality of visitors' experiences explains why some respondents did not report norms (Roggenbuck *et al.* 1991; Shelby *et al.* 1996).

Second, questions should always be focused on impacts that are relevant to visitors and the quality of their experience and to the manner in which they are perceived. Respondents are more likely to report standards for indicators that are relevant to the quality of their experience. While encounter-related indicators appear to be less relevant to users of high use areas than users of low use areas (Roggenbuck *et al.* 1991), a higher number of responses might be solicited if indicators are tailored to the context/setting being examined (Martinson & Shelby 1992). In a low use area where users stay for more than a single day the number of people encountered over the course of a day while walking along the track is an appropriate indicator. However, in high use areas where visits are often measured in hours rather than days such an indicator may be less useful. Two examples of alternative measures for high use areas are the number of other people encountered at one time (Manning & Lime 1996; Manning, Lime & McMonagle 1995) and the number of persons per viewscape (Manning *et al.* 1997).

Visual, on site and written descriptive techniques

A number of studies have used visual techniques to measure visitors' norms (Heywood 1993; Hof *et al.* 1994; Manning *et al.* 1998; Manning, Lime *et al.* 1996; Manning, Lime, Hof *et al.* 1995; Manning, Lime & McMonagle 1995; Manning *et al.* 1993; Manning *et al.* 1997; Martin *et al.* 1989; Shelby & Harris 1985; Shelby *et al.* 1988) While some studies using visual depictions of impacts have yielded different results when compared to narrative descriptions (Manning, Lime *et al.* 1996), others have found 'considerable agreement between on-site [visual] evaluations and those based on photos and written descriptions' (Shelby & Harris 1985: 66).

Terminology and evaluative dimensions

Various evaluative dimensions have been used to measure peoples' norms for outdoor recreation setting conditions. Respondents have been asked to answer questions using a range of terminology including *preference*, *favourableness*, *pleasantness*, *acceptability*, and *tolerance*. These terms can be interpreted in various ways by respondents and can result in differing standards being identified (Hammitt & Rutlin 1995; Watson 1995a; Young *et al.* 1991). Studies that have incorporated the measurement of a combination of evaluative dimensions have found preferred standards for encounter related variables to be consistently lower than acceptable conditions (Hammitt & Rutlin 1995; Manning 2001; Watson 1995a; Young *et al.* 1991). Manning and Lime (2000) suggest that the measurement of more than a single evaluative dimension may enhance research findings by fostering a broad understanding of how different measures and their resulting standards compare. However, they caution that 'none of these evaluative dimensions may be more 'valid' than any others' (Manning & Lime 2000: 28). Therefore, examinations of more than a single evaluative dimension would be enhanced if comparisons of their validity were also undertaken. The issue of validity is discussed further in the sub-section on the subject of congruence presented on the following page.

Different response formats

Both short and repetitive question formats have been used to identify visitors' norms. Short question formats use a single question that asks respondents to provide a quantified response. An example of such a question is: what is the maximum number of people you would accept to encounter at a campsite? The respondent is then presented with a blank space in which to provide a quantified (numerical) response. In contrast, the repetitive question format presents respondents with a range of conditions which they are then asked to rate on a five-point scale ranging from, for example, *very unpleasant* through to *very pleasant* (Donnelly *et al.* 1992). A benefit of the short question format is the reduced response burden (time required to respond) compared to the repetitive question format (Shelby 1981). However, the short question format has been found to yield lower encounter related norms than the repetitive item question format (Manning *et al.* 1997; Manning *et al.* 1999). The latter format also provides greater detail of the range of encounter frequencies respondents consider acceptable (see Chapter 2).

Researchers adopting the short question format have also used a two-choice format that provides respondents with the option of indicating that the indicator did not matter to them;

or, a three-choice format that added a third option allowing respondents to state that an indicator is important but they are unable to provide a quantified response (Hall & Shelby 1996; Hall *et al.* 1996; Roggenbuck *et al.* 1991). While the three-choice format resulted in lower norm prevalence – the number of respondents reporting a norm – it also produced an increase in the level of agreement about the norm (Hall *et al.* 1996). However, studies by Hall and Shelby (1996), Hall *et al.* (1996), and Roggenbuck *et al.* (1991) have shown that the inclusion of such response options 'may not be an important consideration' (Manning & Lime 2000: 28) since they did not alter the values of the norms that were derived.

Consensus and crystallisation

The level of agreement or consensus amongst respondents for norms (crystallisation) has been commonly reported by quoting standards deviations (*SD*) of means and median values. The use of coefficients of variation (*CV*) and semi-interquartile ranges (*SIQR*) have been recommended by Hall and Shelby (1996) and Roggenbuck *et al.* (1991) to allow comparisons to be made across variables and to eliminate the influence of small numbers of extreme responses within datasets (Sokal & Rohlf 1995).

Where a high level of consensus exists, such findings can be confidently incorporated into decision making processes, but as yet, no statistical guidelines or conventions have been developed to guide interpretation or to determine whether a particular level of consensus or crystallisation is high or low (Manning & Lime 2000).

Congruence

Norm congruence, sometimes referred to as norm-impact compatibility (Shelby & Vaske 1991), addresses the question of whether the norms identified by research are valid. That is, when visitors experience greater encounters or more severe biophysical impacts than their stated norm they judge these negatively; such reactions are considered to be congruent and thus their norm is internally consistent and valid.

Congruency has been examined for a variety of activities, settings and indicators (Hammitt & Patterson 1991; Hammitt & Rutlin 1995; Lewis *et al.* 1996; Manning, Johnson *et al.* 1996; Patterson & Hammitt 1990; Ruddell & Gramann 1994; Vaske *et al.* 1996; Vaske *et al.* 1986; Williams *et al.* 1991). While numerous studies have determined varying levels of congruence or norm-compatibility, Patterson and Hammitt (1990) found only low levels of congruency in their study of backpackers' norms. In discussing their findings, Patterson and Hammitt (1990) hypothesised that the lack of congruence may have arisen because the study was conducted in a relatively high-use area, and the indicators examined may not have been important (salient).

Currently, no criterion has been developed or suggested in the literature that defines the point at which sufficient congruence exists for norms to be considered valid.

Statistics and the expression of norms

Different statistical methods have been used for measuring, analysing and interpreting norms (Shelby & Heberlein 1986; Shelby *et al.* 1996; Vaske *et al.* 1986; Whittaker & Shelby 1988). Means and medians are commonly used to report and describe norms. Median values have obvious appeal as they describe the point at which half of the respondents find a condition to be acceptable (Manning & Lime 2000). The simplicity of calculating mean values also makes them an often quoted measure, but one should be aware that they are subject to being skewed by extreme responses and are inappropriate in the case of multiple tolerance norms due to the multi-modal nature of their distribution (Manning & Lime 2000).

Norm curves provide graphical representations (Vaske *et al.* 1993), as do frequency distributions, that reveal the level of consensus among respondents across the range of conditions. These methods provide more detail than when norms are expressed as means or medians but are less parsimonious than when expressed as means or medians.

Methods to calculate and express consensus about the norm have been detailed in an earlier subsection.

Question format and wording

Various survey methods have been employed in the research discussed above. In particular, numerous forms of question wording and format are evident. Research in the field continues to examine the influence of varied wording and response formats. Manning (1999) and Vaske, Donnelly & Shelby (1993) recommend, where possible, the replication and/or adoption of standardised approaches to facilitate comparison between studies and study areas. While Vaske *et al.* (1992) have outlined a range of formats and wordings that may be adopted by researchers, Heywood (2000) urges researchers and managers to be cautious when adopting different techniques for measuring and interpreting norms/evaluative standards and applying the outcomes from such studies.

Generalisability

Is it possible to apply research findings from one area or activity to another? While it is evident that norms for social conditions can be generalised across different areas for some experiences; 'for example encounter norms for wilderness experiences tend to be quite low (about four or fewer in most cases)' (Vaske *et al.* 1993: 636); this is not always the case (Vaske *et al.* 1986). Thus, managers must assess the extent to which norms are applicable across different areas and settings to determine whether a spectrum of standards might be more appropriate to their task. Variation in norms among settings may indicate the existence of different recreation opportunities.

4.4 Study sites and sampling strategies

Two study sites, the Overland Track in the Cradle Mountain – Lake St Clair National Park and the Western Arthurs in the South-West National Park (Figure 4.1), were selected for this research to examine whether the results from one area could be generalised to the other. These areas represent contrasting levels of management, infrastructure, and visitor use. The biophysical character of the Overland Track and the Western Arthurs also differ. Chapter 5 provides detailed descriptions of the study sites.

Available budget, logistics and the contrasting characteristics of the study areas resulted in the use of two different methods of survey administration. The combined influence of these factors can be summed up as the accessibility of potential respondents, which directed the selection of the sampling strategies. As a result, the following sampling strategies were devised to allow both surveys to be concurrently implemented by one person with minimal assistance.

The Overland Track Walker Survey

The Overland Track has the highest visitation level of all overnight-walking tracks in Tasmania, with in excess of 6600 people walking the entire Overland Track annually since July 1999 (Rundle 2003). The track is also accessible from two major trackheads, at each end of its 86 km linear path.

After a random start to sampling, a systematic sampling procedure was followed (Babbie 1990). In all, 14 sampling events of 3 days in duration took place at ten-day intervals during the November to April peak use season. Sampling events alternated between Waterfall Valley, in the north, and Narcissus Hut, in the south, on the Overland Track. Between 8.00 am and 8.00 pm, all overnight visitors exiting the track were asked to participate, and willing respondents were handed a self-administered questionnaire. This strategy maximised access to potential respondents, ensured days of the week were evenly sampled across the study period and minimised the travel, cost and time required to commute to these locations from Hobart.

Completed forms were returned on-site to a locked return box or handed to me in person. Respondents could also return forms by post to a return address included on the form.

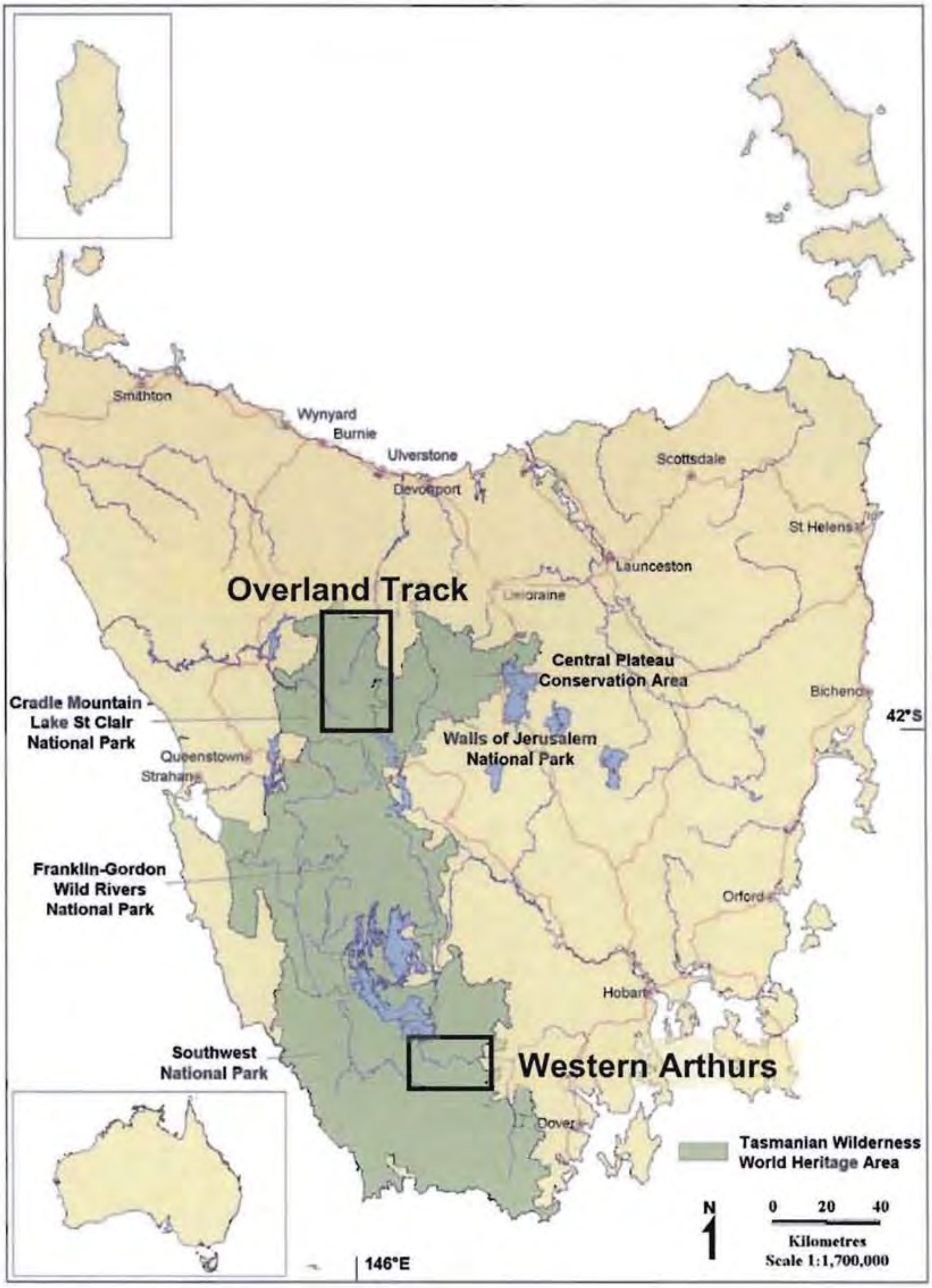

Figure 4.1 Location of study areas, the Overland Track and the Western Arthurs, within the Tasmanian Wilderness World Heritage Area (Adapted from Ling 2000a)

The Western Arthur Range Walker Survey

Low visitation levels (less than 700 visitors per year) and the remoteness of the trackheads precluded in-person distribution of survey forms in the Western Arthurs. Leaving survey forms for collection at the walker registration booth would have resulted in unknown response rates and potential loss of forms through vandalism (Carlington 1988). Furthermore, as much of the survey sought reflective responses of visitor experiences in the study area, there would have been no way to ensure visitors completed the survey at the end of their trip. Therefore, a self-administered mail-back survey was conducted.

The lack of a register of visitors' contact details, and the desire to monitor response rates and maximise the number of returned forms through follow-up mailings necessitated the development of a register of potential respondents as the basis for conducting the mail-back survey. Signs were placed at the walker registration booth at the main trackhead at Scotts Peak (Appendix D). These signs informed visitors of the study and its purpose, and requested that overnight visitors interested in the management of the Western Arthur Range register their willingness to take part in the study (Figure 4.1 & Appendix E). Registrations were collected during the peak use season between November 1999 and April 2000.

Source: Sue Rundle

Figure 4.2 Visitor registering his interest in participating in the Western Arthur Range Walker Survey at the Scotts Peak walker registration booth

The survey followed (but modified) an approach used by Dillman (1978). A survey package comprising a cover letter (Appendix F), self-administered questionnaire (Appendix C) and a reply-paid envelope was sent to all registrants within three weeks of them signing up for the survey. Two follow-up mailings, each at two-week intervals, were sent to registrants from whom a completed questionnaire had not been received. The first follow-up contained a cover letter (Appendix G), a blank questionnaire form and a return addressed reply-paid envelope. The second follow-up simply contained a letter reminding potential respondents of the importance of their participation in the study and urged them to complete and return the questionnaire (Appendix H).

4.5 Construction of the questionnaires

Two similar forms were constructed, one for the Overland Track and the other for the Western Arthur Range (Appendix C). The form content varied only where reference was made to a specific study site, or where site-specific information, such as the route taken, was to be elicited.

The questionnaires were designed to gather information on (a) visitor demographics; (b) level of prior bushwalking experience; (c) visit characteristics including route, trip duration, group size and type; (d) visitors' motivations; (e) attitudes, expectations and perceptions with respect to various indicators of social, biophysical and managerial conditions; and (f) attitudes toward the introduction of use limits within the TWWHA. The data from the questionnaire, with the exception of (d), are the focus of the empirical elements of this thesis. The development of the sections of the questionnaires pertinent to the current thesis is now discussed.

General questions

Questions about visitors' personal details, their previous bushwalking experience and trip information were contained in the 'General questions' section of the questionnaire. The basic demographic information sought from visitors was their sex, age, and their place of residence. The postcodes of Australian residents were also sought to provide confirmation of origin where residence was unclear. Visitors were also asked to give details of their prior overnight bushwalking experience in general, in Tasmania and at the study site. Details of the routes taken, duration of trip, and group size and type were also requested. Additionally, visitors were asked whether they experienced rain or snow during their trip; however, this information was not included in the analysis.

Influences of indicators on the quality of visitors' experiences

Gauging the importance of a range of potential indicators in determining the quality of visitors' experiences was the purpose of the third section of the questionnaire. A core set of 15 items was examined for both study sites. These were:

- the amount of litter I see;
- seeing and/or hearing aircraft;
- the presence of wildlife;
- eroded and muddy tracks;
- damage to vegetation around the campsite;
- amount of vegetation loss/bare ground at campsites;
- amount of noise associated with human presence and activity;
- the number of other people camped overnight at a campsite;
- the number of other people camping within sight or sound of my campsite;
- the size of groups I meet;
- the number of groups I see along the track
- amount of time other people are in sight when I'm on the track;
- total number of people I see along the track;
- on-site information about nature, history, and/or management; and
- directional signs and track markers.

One additional item ('the use of huts for accommodation') was included on the Overland Track questionnaire. With the exception of the aforementioned item, those examined were selected from, or informed by, the extensive range of potential indicators identified by previous researchers and reviewed by Manning (1999). Studies conducted by Roggenbuck *et al.* (1993) in the Cohutta, Caney Creek, Upland and Rattlesnake wilderness areas in the United States; Rutledge and Trotter (1995a) in Northeastern British Columbia, Canada; and Morin *et al.* (1997) in the Nuyts Wilderness in Western Australia, also helped determine which items to examine and include in the questionnaire.

Visitors were asked *how important are the following items in determining the quality of your experience*? (Rutledge & Trotter 1995b). Respondents indicated their responses by circling the appropriate number on a six-point Likert type scale that ranged from 'not at all important' at one extreme, through to 'extremely important' at the other (Roggenbuck *et al.* 1993; Watson *et al.* 1992).

Visitors were asked to nominate additional items if they desired. However, few respondents did so and an examination of the additional comments received suggested inclusion of these items was not warranted.

Expectations, actual experience and its effects, preferences and maximum acceptable limits

The remainder of the questions on the forms sought to elicit data with respect to a group of indicators. Items examined related to:

- the number of groups encountered along the track;
- the size of groups encountered along the track;
- the number of people encountered along the track;
- seeing and/or hearing aircraft overflights;
- the number of people camped within sight or sound;
- the size of groups encountered at campsites;
- directional signs and track markers; and
- the condition of campsites.

The Overland Track Walker Survey also contained questions relating to use of the huts provided by the PWS; these facilities are not provided on the Western Arthurs.

Track and campsite based encounters and seeing and/or hearing aircraft

Two evaluative dimensions were included in the questionnaire - preferences and maximum acceptable limits - so comparisons of their validity – congruence – as a basis for the development of visitor-defined standards could be made (Manning 1999; Manning & Lime 2000). To enable such comparisons, visitors were also asked to report the number of encounters they experienced and to indicate how these affected their experience (Whittaker & Shelby 1992). Questions were presented in a logical sequence and on the same page for each of the tracks and for campsite encounter indicators as well as for seeing and/or hearing aircraft. Presenting these questions in this fashion 'allows the respondent to see how these will be compared and respond accordingly' (Shelby & Vaske 1991: 175; also Whittaker & Shelby 1992).

Expectations

For each of the track and campsite-based encounters examined, as well as for seeing and/or hearing aircraft, visitors were asked a set of questions in common. Initially visitors were asked open-ended questions (Donnelly *et al.* 1992) about how many encounters they had expected or to indicate that they *had no expectation*. For example:

How many people had you *expected* to encounter along the track in a day?

_____ people in a day

☐ Had no expectation

Actual experience – user reported encounters

User reported encounters were used to measure the number of encounters the respondents experienced during their trips (Hammitt & Patterson 1991; Hammitt & Rutlin 1995; Patterson & Hammitt 1990; Roggenbuck *et al.* 1993; Williams *et al.* 1991). For example visitors were asked:

What was the greatest number of people you encountered along the track in a day?

_____ people

Next, using a five-point Likert scale visitors were asked *how did this affect your experience.* Response options ranged from *greatly detract* through *no influence* to *greatly enhance.* Space was also provided to allow visitors to make *additional comments.*

Preferences and maximum acceptable limits

Subsequently, both users' *preferred* and *maximum* acceptable limits were measured (Hammitt & Rutlin 1995; Watson 1995; Young *et al.* 1991). Initially, a graphical approach was considered, such as that used by Roggenbuck *et al.* (1993) and Watson *et al.* (1992), and illustrated in Donnelly *et al.* (1992: 49). Pilot testing of this approach on 15 experienced bushwalkers recruited from the staff and student body of the University of Tasmania, and a convenience sample of 35 bushwalkers on the Overland Track during February 1998 revealed a high proportion (42.5%) of incomplete or invalid responses. As a result, single item, or short form, open format questions were used to gather visitors' preferred number of encounters and what they considered to be the maximum acceptable. The short form format was also favoured because it reduced the time burden on respondents (Donnelly *et al.* 1992; Shelby 1981). As the following example illustrates, respondents were also provided with a 'don't care' option to assist in distinguishing between visitors with and without norms, and those who did not answer the question (Hall & Shelby 1996; Manning 1999).

How many people would you *prefer* to encounter along the track in a day?

_____ people

☐ Don't care

What is the *maximum* number of people you would *accept* to encounter along the track in a day?

_____ people

☐ Don't care

Some authors have recommended that evaluations, such as those illustrated above, 'be placed in the context of tradeoffs. For example visitors could be asked their opinion about a maximum acceptable number of encounters, given that this might result in restricted access' (Cole & McCool 1997: 65; also Cole 2001, Heywood 2000). However, given the sensitivity of the issue of the use of permits and quotas as a management tool in the TWWHA (Chapter 3), it was unclear how the incorporation of such a trade-off may impact on the integrity of the survey data. Thus, it was considered best not to directly associate the permit issue with the identification of respondents' personal norms. Rather, visitor support for use limitations as a potential management action was separately canvassed.

Campsite impacts

Three methods for collecting user evaluations of a range of campsite conditions were considered: site visits, photographs, and written descriptions. Since 'considerable agreement' has been found between these methods (Shelby & Harris 1985: 66; also Shelby *et al.* 1988), cost and logistics were the critical factors that influenced which measure of impact was adopted.

Written descriptions were favoured over on-site or photographic techniques for measuring the acceptability of ecological impacts at campsites for several reasons. These reasons included: the ease of integrating written descriptions within the structure and design of the questionnaire, cost effectiveness, and the practicality of survey administration over on-site visits to disparate campsites of varying impact (Shelby & Harris 1985). Additionally, the descriptive method has the benefit of focusing respondents' attention on specific impacts enabling assessment of ecological site impacts free of the confounding influence of background and other contextual features (Shelby & Harris 1985).

Development of the written descriptions was guided by the existing five-tier campsite impact definitions that underpin the PWS's Condition Class System (Dixon 1999a). Based on Frissell's (1978) impact rating system, the PWS Condition Class System 'consists of several statements, linked to a code, that describe increasing levels of impact' (Dixon 1999a: 14). The system and related written descriptions used by the PWS (Appendix B) have evolved after consideration of work by Cole (1989), Marion (1991) and Farrell and Marion (1998). While primarily guided by the existing PWS descriptions, consideration was also given to the written descriptions used by Shelby and Harris (1985) and Shelby *et al.* (1988) when developing the campsite condition descriptions used in the questionnaire.

As recommended by Shelby and Harris (1985), written descriptions were pre-tested for clarity and consistency of interpretation. Pre-tests were conducted with bushwalkers along the Overland Track and from within the University of Tasmania community. Field tests were also undertaken to ensure descriptions accurately conveyed the impacts for each of the five condition classes. This testing involved asking walkers to describe the condition of campsites of a known condition class according to the written condition descriptions provided. Walkers' responses were then compared to the known condition class of the campsites. Only minor changes to terminology were necessary to ensure consistent interpretation. As a result, visitors were asked to indicate whether they considered each of the five written campsite condition descriptions to be *acceptable* or *unacceptable* (Appendix C). The condition class descriptions were:

Condition Class 1	It is evident that people have camped there before but there is minimal damage. Some of the ground vegetation is flattened. There has been minimal disturbance of the sticks and leaves on the ground.
Condition Class 2	An obvious campsite. In the main use area (25% of the site), ground vegetation is worn away and the sticks and leaves on the ground have been trampled into small fine pieces. Little or no soil is exposed.
Condition Class 3	Ground vegetation has been lost and the sticks and leaves on the ground have been trampled into small fine pieces on most of the campsite (say between 25 – 75%). Bare soil is exposed in main use areas, but there is little or no soil erosion.
Condition Class 4	Near total loss of vegetation and bare soil covers more than 75% of the campsite. Soil erosion has exposed tree roots in some areas (less than 25% of the campsite).

Condition Class 5 Bare soil or rock covers most of the site. Soil erosion is obvious. Soil loss has exposed tree roots, stones, or bare rock on 25% or more of the campsite.

Directional signs and track markers

Walker evaluations of the number of directional signs and track markers in the study areas were examined. A single question format used by Roggenbuck *et al.* (1993) in their study of visitors to the Cohutta Wilderness in northern Georgia, in the United States, provided the impetus for this part of the study. The eight response options in the Cohutta study combined statements of the quantity of trail markings seen with an evaluation of the need, or otherwise, of more. Possible responses were:

a. saw no blazes, and none are needed;
b. saw no blazes and more are needed;
c. saw very few blazes, and the number is about right;
d. saw very few blazes, and more are needed;
e. saw very few blazes, and there were too many;
f. saw many blazes, and the number is about right;
g. saw many blazes, and more are needed; and
h. saw many blazes, and there were too many.

Following pilot tests of the single question format, a simpler two-question format was developed, each with three response options (Appendix C). The first question asked visitors, *how many signs/markers did you see?* Then, the second question asked, *what did you think about the number of signs/markers?* Response to pre-testing of both the single and two-question formats indicated visitors more readily understood the latter question format, and did not need to re-read the response options before answering.

Support for limiting use

As discussed in Chapter 3, a variety of studies have canvassed visitor support for permit systems and use restrictions as management actions to address social and/or biophysical impact issues in the TWWHA (Brake 1996; Calais 1981; PWH 1990; PWS 1995; Sawyer 1990). It is evident from that discussion that re-analysis of the most recent of these studies has led to doubts about the veracity of some claims with respect to the level of visitor support for a permit system (Brake 1996; Rundle 2000). Being independent of that work, this study provided the opportunity to explore whether visitors felt a limit was needed in the study area they visited. The question used in the survey made explicit the possibility that respondents' *own opportunity to walk the track may be limited in the future* and that they should take that into consideration when selecting their response. Furthermore, four response options were provided:

- *never, limits would never be appropriate*;
- *hold use at current level*;
- *reduce use*; and/or
- *support limiting use, but only at a time in the future when/if overuse occurs* (Appendix C).

Use and experience of the public huts along the Overland Track

While no huts are located in the Western Arthurs, a total of eleven huts are provided and maintained by the PWS for the use of visitors to the Overland Track (Chapter 3). A series of hut-related questions was, therefore, only included on *The Overland Track Walker Survey* form.

The following questions were formatted on a single page that was positioned before the questions asking visitors about their experiences and attitudes to the use and condition of the campsites.

First, a filter question was used to exclude visitors who did not make use of the public huts. Visitors who used one or any number of the huts along the Overland Track were instructed to proceed to the following question, while those who did not make use of the huts were instructed to proceed to the next page of the questionnaire (Appendix C).

Next, visitors were asked: *did you use the public huts in any of the following ways?* By checking the relevant *tick-box*, visitors were then asked to indicate whether they had used the huts *to shelter from the rain*, *to cook and/or eat in*, *to socialise*, or *to sleep in*. Further, if visitors had slept in the huts, they were asked to indicate whether they had relied upon the huts for accommodation by checking either a 'yes' or 'no'.

Visitors were then asked whether they had experienced any of five possible impacts and to answer by circling one of four response options that ranged from *I did not experience this* to it *bothered me a lot* (Appendix C).

The five possible impacts were:

1) *not having enough space in the huts*;

2) *having to rush in the morning for a place to sleep in the next hut*;
3) *seeing too many people in the huts during the evenings*;
4) *some people being too loud during the evenings*; and
5) *large groups dominating the space in the huts.*

Subsequently, visitors were asked: *did you feel crowded at any of the public huts?* Those visitors who indicated that they had not were instructed to skip the follow-up question and proceed to the next page of the questionnaire. A follow-up question asked visitors who had felt crowded using the huts to indicate which of the listed eleven huts they had felt most crowded, and to *briefly explain why.*

4.6 Research questions and analyses

A number of research questions flowed from the study's aim, outlined in Section 4.2, and the methodological and theoretical issues pertinent to research in the area of visitor norms in outdoor recreation described in Section 4.3.

As a first step, general descriptive analysis of the demographic characteristics of respondents was undertaken to develop an appreciation of the characteristics of the visitors that participated in the study. These details included: sex, age, place of residence, prior bushwalking experience, the routes they walked, trip duration, group (party) size and type.

Expectations and how the conditions visitors encountered affected the quality of their experiences

A basic understanding of the quality of visitors' experiences in the TWWHA was achieved by identifying the types of conditions they expected and how the quality of their experiences was affected by the conditions they encountered. As such, the following questions were examined using basic descriptive techniques (frequencies, percentages, and averages).

1. What proportion of visitors had expectations?
2. What level of encounters did visitors expect to experience during their trips?
3. How many encounters did visitors experience during their trips?
4. How did the intensity of encounters visitors reported affect the quality of their experiences?
5. What proportions of visitors did or did not experience more encounters than they expected?

Chi-square tests[6] were also undertaken to assess whether there was any significant association ($P < 0.05$) between whether or not visitors had their expectations exceeded and how it affected their experience.

Use and experience of the public huts

As the use of the huts by visitors to the Overland Track was not the main focus of the research analysis was limited to description only. As such, basic frequency of response was used to calculate the proportions for each of the response options related to the questions about the use of huts and visitors' experiences of them.

The question that asked visitors *at which hut did you feel most crowded* (Appendix C, Q40) was not analysed, as the construction of the questionnaire was such that there was no individual measure of use for each of the individual huts. It was, therefore, not possible to ascertain how many visitors used any particular hut, and thus no meaningful comparative crowding measure could be developed for the 11 huts along the Overland Track.

Influences on experience quality: how important are they in determining the quality of visitors' experiences

In determining the quality of visitors' experiences both means and the medians have been calculated and used to indicate the salience of the indicators being examined. Paired *t*-tests were undertaken to ascertain whether the indicators examined were significantly different ($P < 0.05$) from one another in their level of importance in determining the quality of visitors' experiences (Roggenbuck *et al.* 1993; Watson *et al.* 1992). While the paired *t*-test assumes at least approximate normal distribution and homogeneous variation (Dytham 2003), the sample sizes were deemed large enough ($N > 30$), under the Central Limit Theorem[7], to permit the use of the test (Lah 2000; Weisberg *et al.* 1996). Differences in the importance of different indicators were further analysed using the Wilcoxon signed ranks test. This test makes no assumptions with respect to the distribution or variation of the data,

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[6] The Chi-square test 'is one of the most widely used statistical tests of all' (Dytham 2003: 165). The test uses contingency tables to explore the association between variables based on expected and observed frequencies of categories within those variables. 'It is used to test the hypothesis that there is no relationship between the variables in the population' (Weisberg *et al.* 1996: 277).

[7] According to *Central Limit Theorem* 'the means of any [sufficiently large] samples taken from any shape of parent distribution will themselves have a normal distribution' (Dytham 2003: 39; also Quinn & Keough 2003, Weisberg *et al.* 1996).

and tests for differences between the matched pairs by ranking them and assigning more weight to pairs with greater differences (Dytham 2003; Lah 2000).

Do visitors' norms vary in response to different evaluative dimensions?

Research has shown norms to vary as a result of the evaluative dimensions used by researchers investigating visitor norms in wilderness areas (Hammitt & Rutlin 1995; Watson 1995; Young *et al.* 1991). An obvious question then was whether respondents' personal norms differed in response to the two evaluative dimensions examined? Paired *t*-tests were used to assess if differences found were statistically significant ($P < 0.05$) (Dytham 2003).

Which evaluative dimension provides the soundest foundation for the development of social norms?

Prior to identifying social norms the two evaluative dimensions were examined to determine which of them provides the most solid foundation for the development of social norms. Because the soundest social norms will be based on the evaluative dimension that elicited the highest norm prevalence, the most consensus, and the greatest degree of congruence, an assessment of these characteristics was undertaken.

Norm prevalence

Norm prevalence is the proportion of visitors who reported a norm. No statistical tests were used in assessing whether there was any difference in the prevalence of norms between the two evaluative dimensions examined; rather simple percentages were used as the basis for comparison.

Expression and comparison of consensus

Whether or not one sees greater consensus for preferences than for maximum acceptable limits depends on which measure of variability one uses, the *SD*, the *CV* or the *SIQR*. However, the presence of significant differences in the means precludes the use of *SDs* as an indicator of consensus (Crovelli 1973; Roggenbuck *et al.* 1991). While the *CV* is useful for comparing the variability of different means (Dytham 2003; Sokal & Rohlf 1995), the presence of a small number of outliers within the data means they should be interpreted with caution (Hall & Shelby 1996). Due to the limitations of using the *SDs* and *CVs* the *SIQR* has been used to indicate the level of consensus among visitors. However, the *SD*, the *CV* and the SIQR have all been presented to allow readers to make comparisons in the levels of crystallisation or consensus for normative standards with past and future studies.

Congruence and the validity of visitors' personal norms

The premise underpinning the normative approach is that if visitors consider an indicator to be important – salient – in determining the quality of their experiences, then in cases where their norms are exceeded, they should indicate that those encounters detracted from their experience (Patterson & Hammitt 1990). If a substantial proportion of visitors report that their experiences have not been degraded, despite having had their personal norms violated, the validity of the social norms must be questioned. It is important then that social norms identified from research, such as those presented here, have their validity assessed if they are to inform the development of appropriate limits of acceptable change standards for the management of wilderness and visitor experience. Significantly, this represents the first comparative analysis of the congruence of norms generated from two different evaluative dimensions.

In order to determine which evaluative dimension generated the greatest level of congruence, respondents first had to be assigned to one of the following congruence categories according to their reaction (Patterson & Hammitt 1990):

a. didn't exceed – didn't detract (congruent);
b. didn't exceed – detracted (incongruent);
c. exceeded – didn't detract (incongruent); and
d. exceeded – detracted (congruent).

To sort respondents into the categories described above, comparisons were made between their personal norms and the actual number of encounters they reported experiencing. This comparison was undertaken on a case-by-case basis using the statistical software package SYSTAT (SYSTAT Software Inc. 2001). Once categorised, the congruence of the evaluative dimensions was compared for each of the six indicators examined to determine which was the most congruent.

Social norms: identification and the influences on the congruence of visitors' reactions

Identifying social norms

Medians (the second quartile – Q2) have been used to express social norms because they define the minimum acceptable standard for 50% of respondents (Manning & Lime 2000; Shelby & Heberlein 1986). In addition, the third quartile (Q3) has been used to indicate the encounter level that 75% of visitors will accept (Watson *et al.* 1992). Means have also been calculated and presented to allow readers to make comparisons with studies using this measure as an indication of normative standard should they wish to do so.

Influences on the congruence of visitors' reactions

Visitors' reactions to encounters are influenced by a range of variables (Manning 1999). To explore this issue, the following questions were examined:

1. Was congruence a function of visitors experiencing significantly ($P < 0.05$) more encounters, irrespective of their personal norms?
2. Was congruence a function of significantly different ($P < 0.05$) personal norms?
3. Was the type of encounter - indicator - significantly more important ($P < 0.05$) for visitors with congruent reactions than for those without?

The congruence categories described on the previous page provided the foundation for answering these questions. Using SPSS (SPSS Inc. 2001), Kruskall-Wallis with post hoc Mann-Whitney U tests were conducted to assess whether any differences existed between respondents in each of the congruence categories with respect to the number of encounters they experienced, the level of their personal norms and how important they considered the indicator to be in determining the quality of their experiences. These non-parametric tests were used because variances were non-homogeneous (Dytham 2003; Patterson & Hammitt 1990).

Additional comments provided by respondents were used to provide an insight into some of the reasons that were influential in shaping whether visitors reacted congruently to having their personal evaluative standards exceeded.

Acceptable campsite condition

Respondents were presented with a dichotomous response option (acceptable or unacceptable) for each of the condition classes. Visitors' opinions on the acceptability of each of the campsite conditions are presented as the proportion of respondents finding the particular level of impact acceptable and unacceptable. Similarly, as *SDs*, *CVs*, or *SIQRs* cannot be calculated as indicators of the level of consensus among respondents, the division of respondent opinion between the two response options necessarily implies the level of agreement.

Support for limiting use

Initial analysis of respondents' support for use restrictions was limited to comparisons of the proportion supporting each of the four response options. Chi-square tests were also carried out to assess whether there was any significant association ($p < 0.05$) between the frequency of responses across the response options presented and the route taken by respondents and their origin and group type.

Identifying potential indicators for measuring and monitoring the quality of visitors' experiences

Several criteria exist to guide the selection of indicators for incorporation into wilderness management (Chapter 2); of those salience has been identified as 'perhaps the most important' (Manning 1999: 126). Indeed, it is vital that the indicators considered for incorporation into LAC type management are important in determining the quality of visitors' experiences (Manning 1999; Manning & Lime 2000). However, if indicators do not differ significantly in their level of importance, other methods must be adopted to assist the selection of appropriate indicators.

Interrelated indicators and underlying factors that are important in determining the quality of visitors' experiences

A range of indicators shape the quality of visitors' experiences in wilderness and natural protected areas (Morin *et al.* 1997; Roggenbuck *et al.* 1993; Rutledge & Trotter 1995a; Watson *et al.* 1992). While such information is useful, understanding which indicators are the most important is of greater value to managers who desire an efficient and affordable monitoring program that uses a few key indicators to represent the overall condition of wilderness (Cole & Stankey 1985; Roggenbuck *et al.* 1993; Stankey *et al.* 1985; Watson *et al.* 1992). However, it can be difficult to determine which indicators are the most important. The simplest approach may be to choose a desired number of the highest ranked indicators based on the mean scores of the indicators examined. Such an approach, however, has its limitations (Roggenbuck *et al.* 1993; Watson *et al.* 1992). Although ranked, the difference in the level of importance of many of the indicators is often not statistically or substantively significant and thus, in a practical sense, rankings can be meaningless. On the other hand, if the data from the 6-point scale were to be treated in a strictly ordinal fashion, then the median responses indicate that many are considered at least *moderately important.* As such, this method also provides little direction for the selection of key indicators.

To examine the relative ranking and levels of importance of the indicators in determining the quality of visitors' experiences, means and medians were calculated and paired *t*-tests undertaken to assess which indicators were significantly more or less important than another (Roggenbuck *et al.* 1993; Watson *et al.* 1992).

As noted earlier, efficiency is a consideration that guides the identification of appropriate indicators. If two indicators were inter-correlated, it would be inefficient and unnecessary for managers to monitor both (Roggenbuck *et al.* 1993). Another issue is the extent to which managers can practically influence the condition of an indicator; for example, management might have little influence on *the presence of wildlife* (Watson *et al.* 1992) or *the amount of noise associated with human presence and activity*. Thus, indicators such as *the presence of wildlife* may be of limited use in a LAC management context.

A further issue is how to account for the multi-dimensional nature of visitors' experiences when determining which indicators should be adopted to manage the quality of visitor experiences. Setting-based management, such as the ROS approach (Brown *et al.* 1978; Clark & Stankey 1979b), seeks to provide the basis for the satisfaction of a range of outcomes, experiences and benefits through the provision of recreation settings with a diversity of attributes. Furthermore, physical, social and managerial setting attributes have been found to vary in the level of importance by people seeking different experiences (Manfredo *et al.* 1983). Thus, a small selection of the most highly ranked or most important indicators may not facilitate the provision and protection of a range of quality recreation opportunities (Roggenbuck *et al.* 1993) that is an objective of the PWS for the management of the TWWHA (PWS 1999).

Factor Analysis (FA) was performed to explore the underlying structure of the data. This statistical technique examines the pattern of correlations among a set of variables (indicators) and identifies a reduced number of factors that explain most of the observed variance in the data (Tabachnick & Fidell 2001). In addition to identifying the underlying factors, it also determines the factor loading for each item. The greater an item's factor loading, the more it is a genuine measure of the factor (Tabachnick & Fidell 2001). Or more simply, the technique identifies the main influences (factors) on the quality of visitors' experience and highlights those items (variables) that define each of these factors. The result of FA is a reduced number of experiential dimensions that can help managers better understand the underlying influences the quality of visitors' experience. Indeed, the identification of the 'key factors that degrade the wilderness recreation experience of visitors' is a prescription of the TWWHA management plan (PWS 1999: 94). Furthermore, variables (indicators) that best define those factors provide the foundation for a management strategy 'to actively manage those factors to maintain or enhance the quality of visitor experience' (PWS 1999: 94).

Principal components (PCA) extraction and orthogonal varimax rotation was performed on both Overland Track and Western Arthur Range datasets to reduce responses on the 15 indicators - items - examined (the Overland Track survey examined 16 items) to a smaller number of coherent factors (Shafer & Inglis 2000; Tabachnick & Fidell 2001). Since FA was used in an exploratory fashion to guide the identification of key indicators, assumptions about normality and the continuous nature of data were waived (Dytham 2003; Tabachnick & Fidell 2001). Cases with missing values were excluded in a list wise fashion. Factor solutions for each dataset were based on factors with eigenvalues of one or more, and items with loadings of 0.40 or greater were interpreted as being part of a factor (Tabachnick & Fidell 2001). Cronbach's alpha was used to test the internal consistency, and thereby the reliability of the resulting factors (Shafer & Inglis 2000; SPSS Inc. 1998).

4.7 Conclusion

A number of theoretical and methodological issues have been identified as being important considerations when conducting normative research. This chapter has presented these issues and shown how consideration of them has influenced the design of the questionnaire and the analysis and presentation of the data. This chapter, therefore, establishes the basis for the presentation of the results of the surveys of overnight visitors to the Overland Track and the Western Arthurs, conducted during the peak use season between November 1999 and April 2000.

Chapter 5. Study sites

Chapter 4 presented the empirical research method used to develop a greater understanding of the social dimensions of the impact issue. One of the theoretical and methodological questions identified by researchers is whether visitor norms can be generalised across recreation settings and opportunities (Vaske *et al.* 1986). To examine this question, two sites were selected to assess whether visitor norms were the same for tracks of different standard within different management zones.

Specifically, the Overland Track in the Cradle Mountain - Lake St Clair National Park in the north of the TWWHA, and the Western Arthurs in the South West National Park in the south, were the focus of this study (Figure 4.1). The purpose of this chapter is to provide a description of their location, as well as the biophysical, social and management settings in which the study participants recreated. As such, this chapter provides an understanding for the contexts within which the empirical aspects of this study are located.

5.1 The Overland Track, Cradle Mountain - Lake St Clair National Park

The 86 km long Overland Track traverses the Cradle Mountain - Lake St Clair National Park, between Waldheim (in Cradle Valley) in the north and Cynthia Bay in the south (Figure 5.1). Cradle Valley and Cynthia Bay are the gateways to the Cradle Mountain - Lake St Clair National Park. By road, Cradle Valley is situated 85 km from Devonport, 181 km from Launceston, and 359 km from the State capital Hobart. Cynthia Bay, on the southern shore of Lake St Clair is approximately 179 km by road from Hobart.

The Overland Track was first blazed and marked by Bert Nichols during the Easter of 1931, at the request of the Cradle Mountain Reserve Board (Bergman 1959; Giordano 1987). Since that time, the Overland Track has become a 'must do' tourist destination.

People who walk the track experience the TWWHA in intimate and unique ways. Rarely having prior in-depth knowledge of the area, they develop an experiential appreciation for the country they travel through. Whether it be the steep climbs and spectacular views, the wildflowers and clear mountain waters, or simply the comforting shelter of a hut in a snowstorm, all who walk the Overland complete their journeys with an enhanced appreciation of its character.

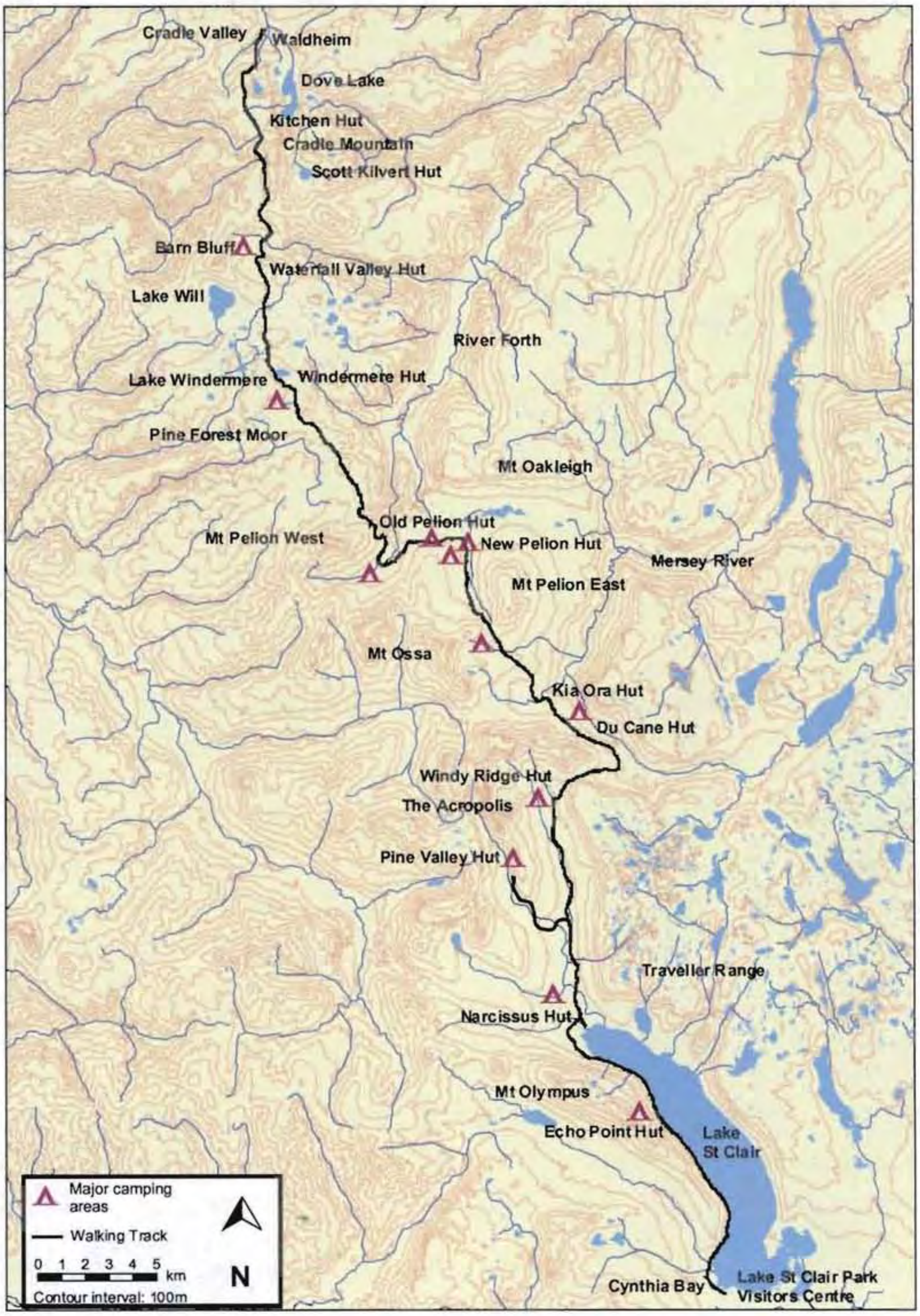

Figure 5.1 The Overland Track, Cradle Mountain – Lake St Clair National Park

Knowledge of the Park's character is essential to developing an understanding of the experiences of people who walk the Overland Track. The outdoor recreation setting can best be described according to the attributes that contribute to the quality of visitors' experience (McCool 1983). These attributes make up the physical, social and managerial settings in which visitors recreate, and they form the three major headings under which the following site description is organised.

Biophysical setting

From north to south, the Overland Track passes through the Cradle Mountain, Pelion, Du Cane Range and Lake St Clair regions. In the north, the Overland Track passes through an area characterised by forested valleys and deep gorges that dissect the heath, open moorlands and alpine sedgelands of the Cradle Mountain region. Myriad glacial lakes can be seen from the track on the walk to Waterfall Valley and on to Lake Windermere. Between Marions Lookout and Waterfall Valley the Overland is an exposed alpine plateau with little shelter, and care should be taken in bad weather, particularly along Cradle Cirque (LIS 1998).

To the south of Lake Windermere, the Overland passes through the Pelion region. This area of the Park is characterised by a central plain bordered by the mountains: Oakleigh, Pelion East, and Ossa (Tasmania's highest at 1617 m); as well as Mount Thetis, Mount Achilles and Mount Pelion West. The path of the Overland proceeds through Pelion Gap to the region of the Du Cane Range, with its many peaks averaging nearly 1500 m. Castle Crag, Falling Mountain, Mount Massif, Mount Geryon, and The Acropolis dominate the view from the track to the west. The waters shed from the range flow into the headwaters Mersey River to the north-east, the Murchison Valley to the west, and east into the Narcissus River that feeds Lake St Clair (LIS 1998).

Finally, the Overland Track emerges from the Narcissus River valley to greet Lake St Clair, the centrepiece of the southern end of the Park, flanked by Mount Ida and the Traveller Range to the East, and Mount Olympus on its Western shore.

This biophysical setting is the composite of the geology, geomorphology, climate, soil, fauna, flora, track construction, huts and campsites make up the physical character of the Overland Track. Details of these attributes are explored in the following sections.

Geology, glacial geomorphology and soils

The visual character of the Park is dominated by its mountainous topography, largely due to the geology and geomorphology of the area (DLPW 1988; Hannon *et al.* 1993). The Park's underlying structure is made up of three main stratigraphic units formed during the Precambrian 570 - 4000 million years ago (Ma), the Permo-Carboniferous and Triassic (195

- 280 Ma) and, most recently, the Jurassic (140 - 195 Ma). This basement rock includes schist, quartzite, phyllite, slate, granite and dolerite.

Within the Park three, or possibly five or more, glaciations occurred, with each episode becoming progressively less extensive (DLPW 1988; Hannon *et al.* 1993; Kiernan 1990). The most recent glaciation reached its peak about 18 000 years ago, and had melted by approximately 10 000 years ago leaving the topography much as it is seen today (DLPW 1988; TPWS 1996).

The movement of ice to the north east of Cradle Mountain rounded off the summits of Hansons Peak and Mount Campbell. Such ice action ground out a series of rock basins in the surrounding area, including Lake Rodway, Hidden Lake, Twisted Tarns and Lake Hanson (Kiernan & Hannon 1991; TPWS 1996). Under the ice, erosion created depressions such as Crater Lake. Lake Wilks and Dove Lake, to the north of Cradle Mountain. As the ice receded, these depressions became cirques at the heads of glaciers and enlarged under the eroding pressure of the ice (Hannon *et al.* 1993; LIS 1998).

Not all the Park was inundated by ice. '[T]he craggy character of the highest summits, including Mount Ossa, Mount Pelion West, Mount Pillinger, Mount Oakleigh, Barn Bluff, Mount Thetis and Cradle Mountain suggest that they were [left exposed above the ice as] nunataks during at least the last two phases of glaciation' (Kiernan & Hannon 1991: 161). These nunataks resisted erosion whilst their surrounds were worn down by ice action (Figure 5.2).

There has been a relatively short time since the last glaciation when erosion 'swept clear' (DLPW 1988: 19) much of the landscape, limiting the soil development to the last 10 000 years (Dixon 1991). The development of soil has been slowed by the area's climatic, topographic and geological character. Low temperatures have restricted chemical weathering, while the steep terrain has favoured erosional rather than depositional processes. Additionally, the parent materials from which soils form are highly siliceous and resistant to weathering (Dixon 1991; DLPW 1988).

Soils within the Park are dominated by alpine humus soils. Their texture varies from sand to clay according to the parent material and its profile and depth vary with drainage (ABM 1972; Dixon 1991; Nicolls & Dimmock 1965). On well-drained sites of low relative rainfall, the development of soil profile is commonly restricted to the incorporation of organic matter within the top 30 centimetres. In wetter areas soil profile tends toward that of moor peat with the increased presence of organic matter. Areas of moor peat are generally 40-50 cm deep, but can extend to 75 cm below the surface (Nicolls & Dimmock 1965).

Source: PWS

Figure 5.2 Barn Bluff (1559 m) rising above Waterfall Valley camping area (foreground), Cradle Mountain – Lake St Clair National Park

Source: PWS

Figure 5.3 Visible scar of the walking track that traverses Bluff Cirque above Waterfall Valley, Cradle Mountain – Lake St Clair National Park

Soils are notably absent or thin and poorly developed on many of the upper slopes and summits of the higher peaks, as well as plateaux where recent glacial sediments lie exposed (DLPW 1988; Nicolls & Dimmock 1965). Consequently, soils throughout the Park are fragile, with 'erosion and construction works of any kind often result[ing] in the formation of prominent scars on the landscape, especially where white siliceous material is exposed' (Figure 5.3; DLPW 1988: 20).

Climate

Situated between the latitudes of 41.6° and 42.1° south, and within 80 km of the Southern Ocean, the climate of the Park is classified as temperate maritime (ABM 1993). Seasonal variation in climate is strongly influenced by an anticyclonic belt. In summer this belt brings warmer air from the Australian mainland; in winter, the anticyclonic belt moves northward, exposing Tasmania to the influence of cold fronts from the west and south-west (ABM 1972; DLPW 1988).

During the summer, visitors can expect the weather to be more stable with mild temperatures and relatively low rainfall. The warmest months are December through March. Temperatures reach their peak in February, with an average daily maximum of 17°C at Cradle Valley in the northwest, and 18.8°C at Lake St Clair to the south-east (Figure 5.4). The weather seldom gets hot during the day, and it is rare for the temperature to climb above 30°C (ABM 1999a,1999b). During January overnight temperatures are around a minimum of 5.9°C and 7.5°C at Cradle Valley and Lake St Clair respectively, but have been recorded as low as -2°C (ABM 1999a, 1999b).

During February rainfall is at its lowest, occurring on an average of 12.5 to 14.2 days. Over the summer months mean rainfall drops to a low in February of 129.7 mm (Cradle Valley) and 74.5 mm (Lake St Clair) (ABM 1999a, 1999b). While summers are mild, and the weather more reliable than in winter months, visitors must be prepared for all seasons at all times. 'Fine weather may deteriorate rapidly to blizzard conditions at all times of the year' (DLPW 1988: 14). Although more common during winter, snow and frost can occur throughout the year; and snowdrifts can be visible around the higher peaks late into summer.

Temperatures cool in autumn and rainfall begins to increase (Figures 5.4 & 5.5). The weather becomes increasingly unstable, however occasional winds from the northeast bring periods of 'settled weather [which] provide ideal conditions for bushwalking' (DLPW 1988: 16).

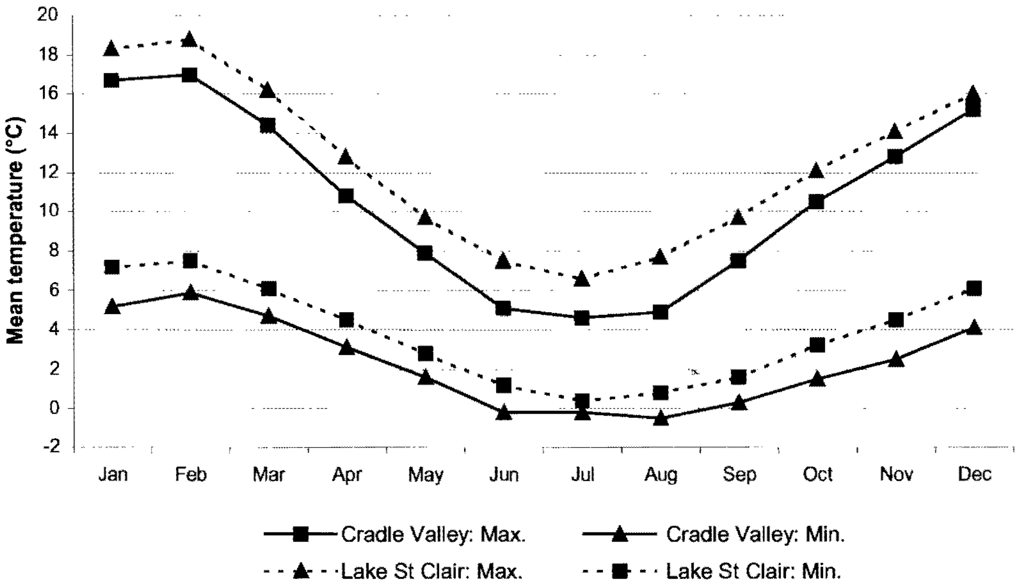

Figure 5.4 Mean Daily Maximum and Minimum Temperatures: Cradle Valley (Waldheim) and Lake St Clair (Cynthia Bay)

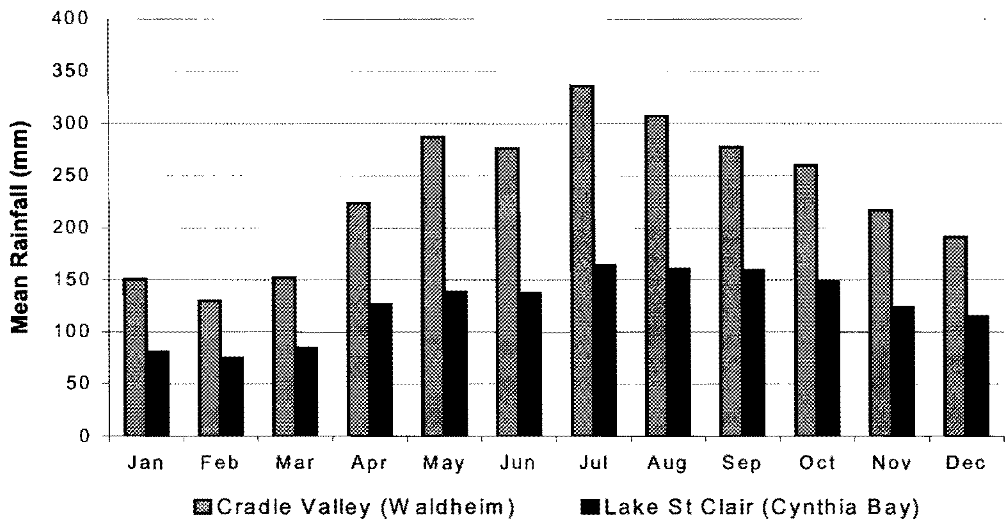

Figure 5.5 Mean Monthly Rainfall at Cradle Valley (Waldheim) and Lake St Clair (Cynthia Bay), (Adapted from ABM 1999a, 1999b)

During winter, the Park is predominantly cold and cloudy. There are very few clear days, with rain occurring between 19 and 25 days per month between June and August (ABM 1999a, 1999b). At this time of year, average temperatures at Lake St Clair range between 0.8°C and 7.2°C. At higher elevations however, it can be much cooler, 'even in summer [temperatures] often descend as low as -4°C' (DLPW 1988: 14). At Cradle Valley average daily minimum temperatures between June and August are below zero and at their maximum reach an average of 4.9°C. During this season, strong gale-force winds are common with heavy snowfalls and blizzards associated with cold fronts embedded in polar air masses from the south-west and south, blanket the Park's higher peaks and plateaux. Snow cover is usually brief, with the rain of lesser fronts causing it to melt (DLPW 1988). Winter is distinctively the wettest time of the year (Figure 5.5). During July rainfall averages of 336 millimetres at Cradle Valley, and 163.6 mm at Lake St Clair, are more than double those for February (ABM 1999a, 1999b).

In addition to seasonal variations in rainfall levels, prevailing northwest to westerly winds of the Roaring Forties produce a rainfall gradient which diminishes from the northwest to the southeast (ABM 1972). Figure 5.5 highlights the difference in mean monthly rainfall between Cradle Valley and Lake St Clair. A comparison of the mean annual rainfall clearly shows that the northern end of the Park is the wettest, receiving a yearly average of 2808 mm, almost twice that of Lake St Clair which averages 1511 mm per annum (ABM 1999a, 1999b).

Still changeable, the onset of spring (September to November) sees an increasing frequency of winds from the southwest and a reduction in the incidence of the gale-force winds experienced throughout winter (DLPW 1988). Temperature and sunshine increase as the cloud cover becomes less intense and the amount of rainfall lessens with the approach of summer (ABM 1999a, 1999b).

Flora

One of the Park's major attractions for visitors is the vegetation, which varies widely from the tall eucalypt forests of the Mersey and Forth Valleys, to the compact cushion plants that survive the climatic extremes on the Park's summits and plateaux. Almost a third of the vascular plant species in Tasmania are found within the Park and, of the more than 450 native higher plant species (which excludes ferns, mosses, liverworts, and fungi) recorded, 'at least 164 ... are endemic to Tasmania' (Kirkpatrick & Balmer 1991: 121).

The location and distribution of individual species and their broader communities are governed largely by a combination of climate, altitude, high relative relief, soil, fire-history and drainage (Kirkpatrick & Balmer 1991). Poorly drained plains with acidic soils, such as Pine Forest Moor and along the lower Narcissus Valley, are often too waterlogged for tree growth and support moorland vegetation. In better-drained, less acidic, deeper soils such as Cradle Valley and Pelion Plains, tussock grasslands dominate (Calais & Kirkpatrick 1986; Kirkpatrick & Balmer 1991).

Alpine vegetation is dominant at elevations over 1200 metres above sea level. Beyond the climatic tree line - 1300 metres above sea level - it is the only vegetation type that occurs (Calais & Kirkpatrick 1986; Kirkpatrick 1982). With little or no shelter from the cold and wind, much of the vegetation grows low or prostrate. Alpine shrubs, heath, herbfields and cushion plants are the hardy survivors in this environment, with many species growing in the lee of rocks, hollows and other sheltered locations.

In areas suitable for tree growth rainforests occur in areas of low fire frequency, grading to eucalypt forests with increasing fire intensity and frequency. Higher-altitude valley forests exist in areas of fire exclusion, such as beside small tarns; many are home to native pines.

Fauna

The diversity of topographical, climatic and floral conditions in the Park provides a wide variety of habitats for wildlife. More than 20 mammal species have been recorded, most of which are nocturnal. Most commonly seen are Bennett's wallaby (*Macrocarpus rufogriseus*) and the smaller Tasmanian pademelon (*Thylogale billardierii*), as well as the brushtail (*Trichosurus vulpecula*) and ringtail possums (*Pseudocheirus peregrinus*) eastern (*Dasyurus viverrinus*) and spotted-tailed (*Dasyurus maculatus*) quolls can be seen close to huts at night. Other larger mammals encountered less frequently include the Tasmanian devil (*Sarcophilus harrisii*), common wombats (*Vombatus ursinus tasmaniensis*). Smaller mammals include the dusky (*Antechinus swainsomii*) and swamp antechinus (*Antechinus minimus*), the white-footed dunnart (*Sminthopsis leucopus*), long-nosed potoroo (*Potorous tridactylus*), and the native broad-toothed (*Mastacomys fuscus*) and long-tailed (*Psuedomys higginsi*) rats (DLPW 1988; LIS 1998).

Both monotremes, the Echidna (*Tachyglossus aculeatus*) and the Platypus (*Ornithorhynchus anatinus*) inhabit the Park.

In excess of 80 bird species have been recorded as present in the Park. Of Tasmania's 12 endemic species, 11 inhabit the Park. During winter, few birds stay in the cold alpine and sub-alpine environments, and cuckoos, martins, and a number of other species migrate to the Australian mainland (LIS 1998). Many birds can be seen in the Park year round, including wrens (*Sericornis* spp.), thrush (*Zoothera dauma*), raven (*Corvus tasmanicus*), the endemic scrubtit (*Sericornis magnus*), thornbill (*Acanthiza ewingii*), and the dusky (*Melanodyas vittata*) and pink (*Petroica rodinogaster*) robins.

All three Tasmanian snake species are found in the Park, including the highly venomous tiger snake (*Notechis ater*), the copperhead snake (*Austrelaps superbus*) and the small white-lipped snake (*Drysdalia coronoides*). All species are encountered relatively frequently by visitors. Other commonly seen reptiles include the blue-tongued lizard (*Tiliqua nigrolutea*) and a number of smaller skink species (*Leiolopisma* spp.) (Chapman & Siseman 1998; DLPW 1988; LIS 1998; TPWS 1996).

A number of frog species (*Litoria* spp., *Ranidella* spp., *Geocrinia* spp., *Lymnodynastes* spp.) can be heard at dusk around the buttongrass plains, shallow streams, lakes and swamps. Crayfish (*Engaeus* spp., *Astacopsis* sp.), shrimp (*Anaspides* spp.), and galaxias (*Galaxias* spp.) that also inhabit the Park's waters (Chapman & Siseman 1998; DLPW 1988; LIS 1998; TPWS 1996).

Huts

Both huts and campsites can be found along the Overland Track. The PWS maintain thirteen huts - two of which are emergency shelters - along the Overland and its sidetracks. A concessionaire, Cradle Huts Pty Ltd, operates five private huts for the exclusive use of their clients; therefore, they will not be described further.

Eleven huts, fitted out with sleeping platforms (Figure 5.6), provide overnight accommodation with bunk-space designed to accommodate 205 people (Table 5.1). The accommodation capacity of the public huts ranges from between eight in the Old Waterfall Valley and Echo Point huts up to 28 at Narcissus hut (Table 5.1). The two public huts located in Waterfall Valley provide a combined total of 32 bunk-spaces, the largest number provided in any area along the Overland Track and its sidetracks.

Heating is provided in all but three of the public huts. Coal fuelled heaters are most common, while the more recent installations have favoured gas for ease of use and the absence of ash waste (Table 5.1). Huts vary in age and condition (Table 5.1). Many of the huts have been refurbished to differing extents, while others have replaced predecessors burnt down as a result of actions by careless visitors (Windermere 1974, Pelion 1949-50 and again in 1967, and Windy Ridge 1972). Narcissus Hut was rebuilt after being destroyed by bushfire in 1961 (Allnut 1987). Of the public huts, New Waterfall Valley is the most recent and comfortable, while New Pelion remains the most basic, being of ironclad prefabricated construction. Du Cane Hut (Figure 5.7) was built circa 1912 by Paddy Hartnett, and extensively restored in 1992 (Allnut 1987; LIS 1998).

Source: PWS

Figure 5.6 Interior of Windy Ridge Hut showing sleeping platform and coal heater

Campsites (their number, capacity and condition)

In 1999, the PWS conducted a census of campsites along the Overland Track and its associated sidetracks, recording 176 in total (Dixon 1999a). The report defines 'a campsite [as] an area on which camping and associated activities are undertaken. It includes both the actual tent-sites as well as social, cooking etc areas'. Campsite boundaries may be indicated by 'pronounced changes in vegetation cover, composition or disturbance, topography, scuffing or removal of [organic] litter and soil exposure. Hence, in one camping area there may be a large number of campsites...' (Dixon 1999a: 14).

Table 5.1 Public huts, capacity and heating as at May 2000

Public huts†	Bunks	Heating	Established (year)
Kitchen Hut	(emergency shelter only)	nil	
Scott-Kilvert Memorial Hut	20	Coal	1966
Waterfall Valley, Old	8	Nil	1958
Waterfall Valley, New	24	Gas	1994
Windermere	25	Gas	1975
Pelion, Old	8	Coal	1896
Pelion, New	12	Coal	1968
Kia Ora	24	Gas	
Du Cane	(emergency shelter only)	nil	c. 1912
Windy Ridge	24	Coal	1974
Pine Valley	24	Coal	1986
Narcissus	28	Coal	1963
Echo Point	8	Coal	1961

† Huts are presented in order of location from north to south along the Overland Track.

Adapted from LIS 1998 and Allnut 1987

Figure 5.7 Du Cane Hut, Overland Track

Many of these campsites are remote from the main camping areas and are known only to visitors with prior knowledge of the area. The quality and number of campsites vary in the main camping areas, as does the level of shelter and visibility from other campers and campsites.

Along the Overland Track, the estimated number of tents that can be accommodated in the hut-based camping areas ranges from a single campsite with a 'comfortable' camping capacity of five tents at Echo Point, to 32 tents accommodated across eight campsites in the New Pelion Hut area (Table 5.2). As many as 40 tents across 11 campsites can be comfortably accommodated in the Pine Valley area which is accessible on a sidetrack to the west of the Overland Track, between Windy Ridge and Narcissus huts. The campsite with the largest capacity (20 tents) is that which surrounds Old Waterfall Valley Hut (Dixon 1999b).

Table 5.2 Estimated 'comfortable' camping capacity at major camping areas on the Overland Track

Camping area	Number of established campsites	Estimated total tent capacity ('comfortable' camping)	Inferred camper capacity (not including huts)
Waterfall Valley	2	26	52
Windermere Hut area	6	25	50
Frog Flats	4	22	44
Old Pelion Hut area	4	11	22
New Pelion Hut area	8	32	64
New Pelion north area	2	17	34
Pinestone Valley	3	10	20
Ki Ora Hut area	6	21	42
Du Cane Hut area	5	13	26
Windy Ridge hut area	5	28	56
Narcissus Hut area	6	23	46
Echo Point Hut area	1	5	10
Pine Valley Hut area	11	40	80

Adapted from Dixon 1999b

The figures quoted in this table exclude closed campsites and those for which closure is foreshadowed in the near future. Also omitted are campsites (of Condition Class 1 and 2) where the lack of impact is assumed to indicate low use and demand; such campsites 'could readily recover if increased use was not promoted' (Dixon 1999b: 1). However, some campsites where little impact is evident despite long-term use have been included as they are considered to be resistant to present use patterns (Dixon 1999b).

Dixon determined *comfortable camping* 'by visually estimating how many tents could be properly pitched on the site without excessive [physical] crowding or necessitating the use of any sloping, seriously eroded, rocky or swampy areas. In terms of shape and ground area occupied, the standard tent has been assumed to be a Macpac Olympus, Minaret or similar style of tent' (Dixon 1999a: 15). The larger of these two tents, the Macpac Olympus, has a maximum footprint of 3500 mm x 1450 mm, plus guy-ropes (Macpac Wilderness Equipment Limited 2000: 40).

The estimated comfortable camping capacity of the large, generally hut-based camping areas along the Overland Track is shown in Table 5.2. Dixon presents these capacities as a guide 'which could form the basis for long term camping on the Overland Track' (1999b: 1). The number of people who a campsite can accommodate - inferred camper capacity - has been calculated by Dixon (1999b) assuming an accommodation rate of two people per tent. According to Dixon's specifications, up to 40 campers can be accommodated at Waterfall Valley, the single largest campsite along the Overland Track. The single largest camping *area* is that in the vicinity of Pine Valley Hut, where as many as 80 people can be accommodated on the 40 sites scattered about the hut's environs.

Campsite conditions vary throughout the Park. Dixon's (1999a) census of campsites classified their condition according to the PWS Condition Class system. The Condition Class system 'consists of several statements, linked to a code, that describe increasing levels of campsite impact' (Dixon 1999a: 14). The Condition Class system used by the PWS (Table 5.3) has been developed from Frissell's (1978) system of classifying campsites according to their condition, and has been further modified with consideration of Cole (1983; 1989), Farrell and Marion (1998), and Marion (1991).

Table 5.3 PWS Condition Class codes and descriptive statements

Code	Statement describing level of campsite impact evident at time of inspection
1	Campsite may be visually distinguishable but minimal physical damage. Ground vegetation may be flattened but not permanently injured. Minimal disturbance of organic litter.
2	Campsite obvious. Ground vegetation worn away and/or organic litter pulverised an primary use area (perhaps up to 25% of the site).
3	Ground vegetation lost and/or organic litter pulverised on most of campsite (say 25-75%). Litter may still be present in many areas. Bare soil exposed in primary use areas, but little or no soil erosion.
4	Near total loss of vegetation and/or organic litter. Bare soil obvious and extensive (say >75% of site). Some soil erosion may be apparent (eg. tree roots exposed on surface).
5	Bare soil or rock over most of campsite and obvious soil erosion (i.e. obvious soil loss, exposure of tree roots, coarse particles or bare rock), perhaps over >25% of site.

Adapted from Dixon 1999a

A census of campsites in the main camping areas of the Park, conducted in 1999, found that 35.6% of campsites along the Overland Track and in the Pine Valley - Labyrinth area had suffered a near total loss of vegetation and/or organic litter (Condition Classes 4 and 5, Table 5.3) (Dixon 1999a). Bare soil dominates these campsites (>75%), with obvious soil erosion evident on 8.1% of the campsites in the main camping areas (Table 5.4). Exposed tree roots, course particle soils or bare rock make up perhaps more than 25% of Condition Class 5 campsites. Of the campsites associated with the PWS huts, Kia Ora has the highest percentage of Condition Class 5 campsites, 42.9%, or three of a total of seven campsites (Table 5.4). In order to limit further soil erosion at Kia Ora, the PWS installed a number of raised timber tent platforms over the more impacted campsites in late 1999 (Figure 5.8). Campers pitch their tents on top of the platforms, securing them via a series of adjustable cable ties and/or hooks recessed between the boarding that forms top of the platform (Figures 5.9a & 5.9b).

Table 5.4 The number of campsites, by Condition Class, in the main camping areas along the Overland Track and the Pine Valley - Labyrinth area

Area	Condition Class					Total campsites
	1	2	3	4	5	
Waterfall Valley	4	2	3	1	1	11
Lake Windermere	-	1	5	1	-	7
Windermere Hut	-	1	2	4	-	7
Frog Flats	-	1	2	1	-	4
Old Pelion Hut	-	1	3	1	-	4
New Pelion Hut	5	4	5	4	-	18
Pelion Gap – Pinestone Valley	2	1	5	3	-	11
Kia Ora Hut	-	2	1	1	3	7
Du Cane Hut	-	3	1	3	1	8
Du Cane Gap area	-	1	1	4	1	7
Windy Ridge Hut	-	2	2	4	-	8
Narcissus Hut	-	2	1	3	2	8
Pine Valley	1	2	4	5	4	16
The Labyrinth	6	11	9	5	-	31
Echo Point Hut	-	-	-	1	-	1
Totals	18	34	44	41	12	149
(%)	(12.1)	(22.8)	(29.5)	(27.5)	(8.1)	(100)

Adapted from Dixon 1999a

Pine Valley has the largest number of Condition Class 5 campsites (four), and 9 (62.5%) out of a total of 16 campsites at or below Condition Class 4 in standard (Table 4.4). Fifty per cent or more of the campsites located around Windermere Hut (51.7%), Kia Ora Hut (57.1%), Du Cane hut (50%), Windy Ridge Hut (50%), Narcissus (62.5%), and Echo Point (100%) are at or below Condition Class 4.

Figure 5.8 Tent platforms installed at Kia Ora Hut during 1998-1999

a) **b)**

Figure 5.9 Fixing points for pitching tents on platforms at Kia Ora Hut: a) adjustable cable and clip, and b) recessed hooks

Social Setting

After blazing and marking the Overland Track in the summer of 1930-31, Nichols guided eight members of the recently formed Hobart Bushwalking Club along the Overland Track from Cradle Valley to Cynthia Bay at Lake St Clair (Bergman 1959; Emmett 1931; Giordano 1987). They were the first party recorded to traverse the Park from north to south along the Overland. Amongst their group was E.T. Emmett, then Director of the Tourist Bureau in Tasmania. It became the first of many summer journeys that Emmett led along the Overland (Giordano 1987). In the earliest years, however, 'Nichols always acted as guide for the five-day trek down to Lake St Clair, because it was rough going: wading through flooded creeks, climbing over slippery logs, squelching over buttongrass plains, fighting for a foothold on rugged mountain slopes' (Giordano 1987: 103). Nicolls, who advertised his professional guiding services (Figure 5.10), could be regarded as the Park's first commercial walking guide. At that time, the only huts along the track were Windermere, Old Pelion and Du Cane, all of which have been either burnt down and replaced or extensively renovated (Allnut 1987; Brearley 1933; Emmett 1931; Giordano 1987). By 1937, the cutting of the Overland was complete and additional accommodation huts had been built along the route (Giordano 1987).

Bert still Leads the Way!

Follow Bert across the Roof of Tasmania and see Mountains, Forests, Rivers and Lakes Galore. Unspoiled Nature and Wild Animal Life.

Spend the five most thrilling days of your life by walking through the–

Cradle Mountain-Lake St. Clair
Scenic Reserve

Arrange it with–

GUIDE BERT NICHOLS
LORINNA, TASMANIA

Figure 5.10 Bert Nichols advertisement that appeared in the Tasmanian Tramp 1933, v.2, 12.

Despite evidence of parties walking the Overland Track during the warmer summer months in the early 1930s (Brearley 1933; Emmett 1931; Giordano 1987), there is no official record of the number of visitors who undertook the journey. Prior to 1971-72, records for the number of people walking the Overland Track are scarce. Only five official annual tallies exist prior to 1971-72 (PWS 2000c). The earliest record - two people walking the track in 1930-31 - is questionable as other accounts of the time indicate that at least ten people walked the Overland in the summer of 1930-31 (Bergman 1959; Emmett 1931). Nichols also guided a party of 12 during the summer of 1932-33 (Brearley 1933). More recently, Giordano (1987: 103) has indicated that Nichols' and Emmett's first journey along the Overland in 1930-31 'was the first of many expeditions which Emmett [and Nichols] led through the reserve each summer'. Records show 600 people walked the Overland Track during the years 1941-42, 1951-52, and 1961-62; while in 1955-56, 300 visitors are said to have walked the Track (PWS 2000c).

Visitor numbers

Annual tallies of the number of visitors walking the Overland Track have been made since 1971-72, with the exception of 1983-04 and 1986-87 for which no data is available (DLPW 1988; PWS 2000c; Rundle 2004). In 1971-72, 1407 people registered to walk the Overland Track between Cradle Valley and Cynthia Bay, Lake St Clair (Figure 5.11). In the 28 years to 1999-2000, the year I conducted the Overland Track Walker Survey, the number of people registering to walk the Overland Track increased 511.7%, to 7200 (PWS 2000c). Despite some periods of decline in the number of people registering to walk the Track, such decreases have been short lived with an overall average annual increase of 208 visitors per year between 1971-72 and 1999-2000. Since the survey was conducted in 1999-2000, the number of visitors registering to walk the Overland Track has continued to increase, despite a drop in registrations recorded for 2003-04 (Figure 5.11). In 2003-04 a total of 7650 visitors were recorded, representing an increase of 6.3% over the four years since the survey.

The number of people who walk the Overland Track varies from month to month and a distinct peak-season is evident between the beginning of November and the end of April, as illustrated by the monthly registration figures for the 1999-2000 study period (Figure 5.12). Some 90% of the people who walk the Overland Track do so during the peak-season (PWS 2000c). November marks the start of the peak bushwalking season with a sharp 238% increase in the number of registrations, compared to the October total (215 visitors) during 1999-2000 (PWS 2000c, also Figure 5.12). A total of 6637 people walked the Overland Track during the 1999-2000 peak season, during which an average of 1106 visitors per month were recorded, ranging from a low in April of 704 to a January high of 1518.

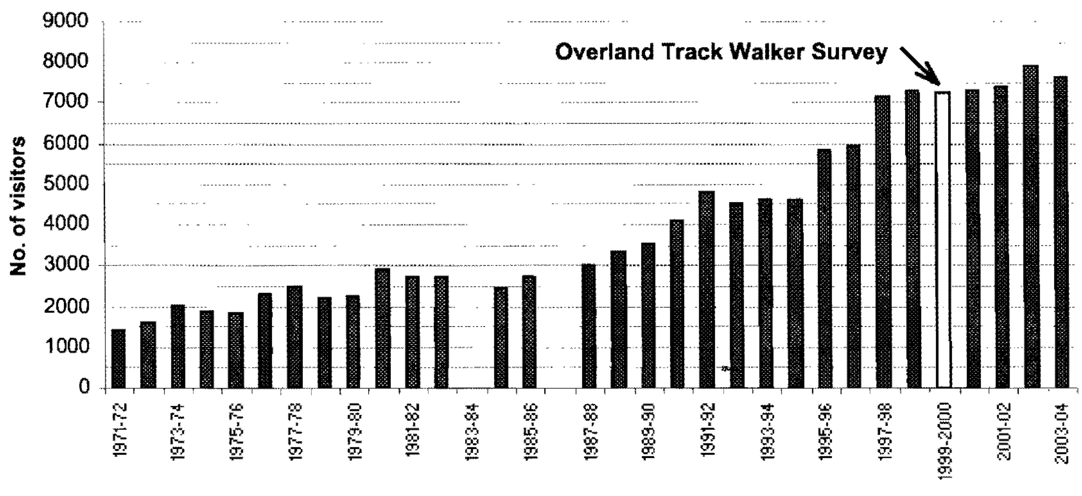

Figure 5.11 Annual Overland Track visitor registrations: 1971-72 to 2003-04

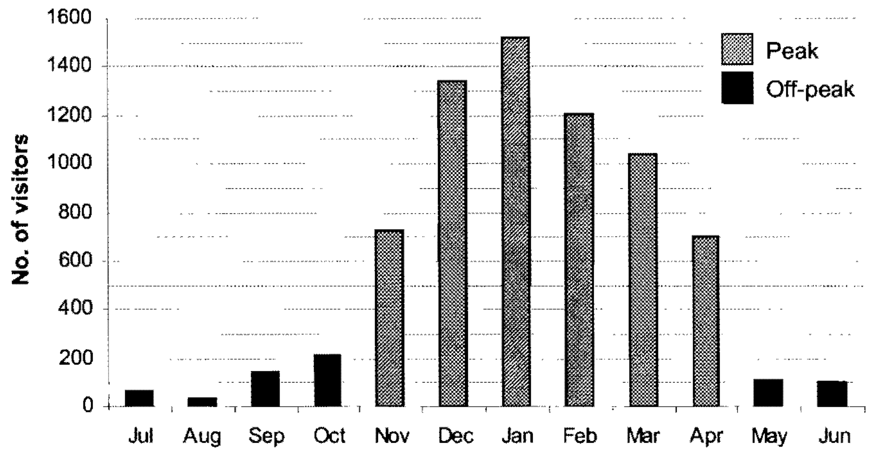

Figure 5.12 Monthly Overland Track visitor registrations: 1999-2000

May is the beginning of the off-season. Registrations for May 2000 fell to just 111 visitors, a decrease of 84% from the previous month's total (PWS 2000c). During the off-season only 663 people walked the Overland. August 1999 recorded just 28 Overland visitors, the fewest for any month during the year 1999-2000. An off-season peak of 215 people was experienced during October 1999, with an off-peak average of 110 visitors per month walking the track.

The number of people walking the Overland from month to month has a strong association with the prevailing climate (Figures 5.4 & 5.5). Registrations are highest during the summer months when temperatures are warmer and precipitation is less likely, while low temperatures, high rainfall levels, frequent gale-force winds and heavy snowfalls during winter dissuade all but the hardiest, most experienced visitors.

While climate is influential in shaping the monthly pattern in the number of people walking the Overland, the fact that many people elect to take their annual work vacations over the summer period must also play a role. Being situated in the mid to lower latitudes of the Southern Hemisphere, the coincidence of a benign summer climate and the Christmas-New Year holiday period contributes to the large number of visitors registering to walk the Overland Track from December to February.

During the year 1999-2000, Saturday 11th December was the busiest day for visitors commencing the Overland Track with a total of 101 registrations (PWS 2000c). Between November 1999 and April 2000, not a single day passed without a visitor beginning the traverse of the Overland Track. Saturday 29th April was the quietest peak season day with only a single visitor registering to walk the track. In contrast, there were 78 days during the off-season that no visitors registered to walk the Overland, with the track being traversed the least during July and August. No visitors were recorded commencing the Overland traverse on 19 of the 31 days of July 1999 and 23 of the 31 days of August. Just 28 departures were recorded for each of these months.

Being a non-circuitous route, visitors commence the traverse of the Overland Track from either Cradle Valley in the north, or Lake St Clair in the south. Of the choice of walking directions, the north-south route is by far the most popular. In 1999-2000, 82.1%, or 5909 visitors began their walk at Cradle Valley in the north (PWS 2000c). The ratio of southbound to northbound visitors is consistent during the peak and off-peak seasons. During the 1999-2000 peak-season 5441 people walked the Overland Track from north to south; representing 81.9% of people who walked the track between November and April.

Three factors are likely to explain the overwhelming popularity of the southbound journey. Firstly, many interstate and overseas visitors arriving by aeroplane or ferry in Launceston or Devonport (in the north of Tasmania) choose to incorporate the 86 km trip from Cradle Mountain to Lake St Clair into their journey south to Hobart or southwest to Strahan. Secondly, the northern section of the Overland Track is the highest and most exposed to the weather (Figures 5.4 & 5.5). Thus, a proportion of visitors may choose to walk south from Cradle Valley as they can be more selective about the weather conditions in which they traverse this exposed section of the walk. Finally, it is not uncommon to hear visitors on the Track say that the journey south is downhill with the northern end of the Track situated at approximately 914 m above sea level, and the southern end approximately 179 m lower at 735 m above sea-level.

Demographics: visitor origin, party size and type of group

Knowledge of the demographic details of Overland Track visitors is restricted to those collected via visitor registration logbooks located in Cradle Valley, at the northern end of the Track (PWS 2000c). Data collected at Lake St Clair in the south contain only: dates of departure, intended routes, party sizes and name of registrants.

Cradle Valley logbooks reveal 29 nationalities represented among the 5441 people who walked the Overland Track from north to south during the peak-season in 1999-2000 (Table 5.5). Non-Tasmanian residents dominated the peak season population of Overland Track visitors. Of the 5211 visitors who specified their origin, 2100 (40.3%) were residents of Tasmania, 2117 (40.6%) were from mainland Australia, and 994 (19.1%) from Overseas. Residents of Victoria and New South Wales made up 73.9% of the mainland contingent, with 801 and 763 visitors respectively.

The social setting of the Overland Track can accurately be described as cosmopolitan, with approximately 1 in 5 visitors being of overseas origin. Germany and the United Kingdom were the most frequently represented with 232 visitors (23.8%) and 200 visitors (20.5%) respectively, making up 44.3% of the overseas cohort for which a specific origin is known. Dutch and Canadian visitors represented a lesser but yet substantial proportion of the peak season Overland Track walking community, with 85 visitors (8.7%) from the Netherlands and 81 visitors (8.3%) from Canada. No other nationality accounted for more than 3.8 % of the peak season overseas visitor population for which a specific origin is known.

A total of 1877 groups traversed the Overland Track between November 1999 and April 2000 (PWS 2000c). Groups ranged in size between one and 22 visitors. Most commonly groups comprised two visitors in size ($N = 867$), making up 46.2% of the groups walking the Overland during the peak season. Less than 10% of the groups were larger than the PWS 'preferred maximum number' (LIS 1998) of six visitors. Only three groups, two groups of 14 visitors and one of 22 visitors, exceeded the maximum of 13 visitors per group stipulated in the Walking Track Management Strategy (PWS 1998b)

Private groups ($N = 1737$) (groups not declaring an affiliation when registering in the logbook) averaged 2.3 visitors in size; while commercially guided groups ($N = 131$) averaged 10.6 visitors, including guides (PWS 2000c). Only four groups of between three and 14 people were from a school, high school or secondary college.

Table 5.5 Origin of southbound Overland Track visitors: peak-season 1999-2000

Australia	No. of visitors	Overseas	No. of visitors
Australian Capital Territory	70	Austria	13
New South Wales	763	Belgium	14
Northern Territory	19	Canada	81
Queensland	208	China	2
South Australia	118	Czechoslovakia	1
Tasmania	2100	Czech Republic	6
Victoria	801	Denmark	16
Western Australia	138	Estonia	2
Unspecified	3	Finland	7
Total	**4240**	France	37
		Germany	232
Visitors of unknown origin	**207**	Ireland	26
		Israel	17
		Italy	7
		Japan	26
		Korea	1
		Netherlands	85
		Norway	2
		New Zealand	17
		Poland	1
		Slovenia	1
		South Korea	1
		Spain	4
		Sweden	18
		Switzerland	31
		Thailand	2
		UK	200
		USA	126
		Europe (unspecified)	15
		Unspecified	3
		Total	**994**

Adapted from PWS 2000b. Note: Where registrants have listed more than one point of origin in the logbook, only the first has been used in the data set compiled by the PWS.

On track encounters

The 4:1 ratio of south-bound to north-bound visitors suggests that visitors walking north to Cradle Valley are likely to experience four times as many on-track encounters than their south-bound counterparts. However, the number of encounters visitors are likely to experience along the track is influenced by many factors, among which are walking pace, number and frequency of rest-stops taken, side-tracks walked and the time of departure. Therefore, it is not possible to establish the number of actual or perceived encounters experienced while travelling between huts and campsites from the registration data gathered at either end of the Overland Track.

Huts and campsites: occupancy and encounters

The number of encounters experienced at huts and campsites is influenced by accommodation capacity (presented in the preceding discussion of the Overland Track's physical setting), occupancy and the level of intra and inter-campsite visibility. Intra-campsite visibility is usually open and unobstructed, and a greater frequency of encounters is likely at campsites with higher camper capacities. Additionally, the level of visibility between campsites varies with such factors as vegetation type and density, topography and proximity mediating the number of encounters that occur among visitors at campsites.

Influences upon inter and intra-site visibility vary from campsite to campsite. Some campsites and camping areas are more open than others leading to an increased likelihood of encounters with other visitors. For example, the campsites at Waterfall Valley are situated in an open valley amongst low alpine heath and button grass. While the two camping areas associated with the Waterfall Valley huts are located some 40 metres apart, the open nature of the vegetation may lead to a perceived connection between the two sites, thereby increasing the potential frequency of campsite encounters and perceived crowding. Other campsites are visually less open, due to vegetative screening and topography, and the potential for encounters or perceptions of crowding are reduced.

Where campsites and huts are co-located, the number of encounters experienced at camp is liable to increase as visitors using huts for accommodation encounter one another as they move about the hut environs and amongst the adjacent campsites. Additionally, an unknown number of campers venture into huts for shelter, to socialise, to make use of tables and benches, or to simply enjoy the warmth of a heater; thus, they are likely to encounter more visitors than campers who remain outside. Similarly, the number of encounters that hut-based visitors experience is influenced by the same factors that affect the number of encounters their tent based cohorts experience.

Currently, it is possible only to speculate about how many actual or perceived encounters visitors experience while staying at huts and campsites along the Overland Track. The only available data were collected by studies conducted during 1990-91 (PWH 1990) and 1991-92 (PWH 1991). Both studies followed a convenience sampling method, and did not produce results representative of the peak-season visitor population. More importantly, since 1994-95 there has been a 55.4% increase in the number of visitors registering to walk the Overland Track (Figure 3.11). Therefore, these studies provide no reliable information as to the social conditions visitors currently experience.

In the absence of reliable survey data pertaining to the number of encounters experienced by visitors on the Overland Track, occupancy rates provide the only insight into the potential frequency of encounters. Occupancy studies conducted prior to 1999-2000 by the PWS used track counters, door counters and logbooks in attempts to establish the amount of use different huts and campsites receive. These methods, however, proved to be ineffective in determining occupancy levels (PWS 2000a).

The *Overland hut and campsite study*, conducted by the PWS (2000a: 7) during the summer of 1999-2000, utilised a 'walker recorded survey ... designed ... to overcome the problems that had been encountered using previous methods'. This study examined the occupancy of the huts and campsites along the Overland Track between 24th December 1999 and 24th April 2000. The purpose of the study was to establish 'when and where the huts [and campsites] were near or over capacity' (PWS 2000a: 1). Using a diary approach, volunteers were recruited using a sign positioned in New Waterfall Valley Hut, that read 'Wanted, Overland Walkers to Lk St Clair to participate in a survey' (PWS 2000a: 7). Participants in the study were asked to conduct nightly counts of the number of tents at the campsite and/or the number of people staying overnight in the public hut at the location they stopped each night. Nightly counts and locations were recorded using waterproof diary sheets that outlined the procedure to be followed and provided a blank table in which to enter the data.

Results for the *Overland hut and campsite study* (PWS 2000a) are summarised in Table 5.6; only locations for which sufficient data were collected have been included. Records for Waterfall Valley huts and campsites are the most complete (94%) as volunteer hut wardens collected them stationed there over the study period. At other locations, the study produced data for 50% or less of the 129 day study period. Despite the sparseness of the data for the Windermere, New Pelion, Kia Ora and Windy Ridge sites, the comprehensive record for Waterfall Valley suggest that the data are 'reliable' (PWS 2000a: 7).

The results of the Overland hut and campsite study show that between 23rd December 1999 and the 24th April 2000, visitors experienced 'marginal [physical] crowding' (PWS 2000a:

1) in the huts at Waterfall Valley, Windermere, New Pelion, Kia Ora and Windy Ridge. Accommodation capacity was exceeded six times each at Waterfall Valley and New Pelion huts; while Windy Ridge hut was beyond its capacity on four occasions. Both Windermere and Kia Ora huts were subjected to only two nights where there were more visitors than available bunk-space. When accommodation capacity is exceeded visitors most often sleep on the floor, on benches, or on top of or underneath tables.

Table 5.6 Summary of the 1999-2000 Overland hut and campsite study findings

Location	Hut/s	Camping area	Median	Max.	Capacity	Times at >90% capacity	Capacity exceeded (days)	Days sampled ($N = 129$)
Waterfall Valley	✓		14.0	38.0	32.0	7.0	6	94.0%
		✓	7.0	40.0	26.0	dna	8	94.0%
Windermere	✓		10.0	31.0	25.0	3.0	2	44.0%
		✓	5.0	24.0	25.0	dna	0	43.0%
New Pelion	✓		10.0	18.0	12.0	19.0	6	45.0%
		✓	8.0	21.0	32.0	dna	0	48.0%
Kia Ora	✓		13.5	38.0	24.0	10.0	2	50.0%
		✓	5.0	18.0	21.0	dna	0	49.0%
Windy Ridge	✓		12.0	30.0	24.0	5.0	4	43.0%
		✓	3.0	12.0	28.0	dna	0	43.0%

Adapted from PWS 2000b. dna = data not available

Huts were at or above 90.0% capacity on an average of 6.0% of the nights sampled, compared to the average 3.4% of nights where capacity was exceeded (PWS 2000a). New Pelion hut was at or above 90% capacity 19 of the 57 nights counts were made, translating to 33.3% of the times participants gathered data (Table 3.6). However, due to the sparse nature of the data it is difficult to ascertain whether such findings are indicative of the conditions throughout the peak season. Data for Kia Ora hut shows that it was at or above 90.0% capacity on 10 nights, or 16.7% of the occasions occupancy counts were made (Table 5.6).

Of the five co-located camping areas detailed in The Summer 1999-2000 Overland Track Diary report (PWS 2000a) and Table 5.6, only one camping area - Waterfall Valley - had its capacity exceeded during the study period. Waterfall Valley's camping area accommodated more tents than its 'comfortable' camping capacity - 26 tents - on eight occasions, and at its peak accommodated a total of 40 tents (Tables 5.1 & 5.6).

Management Setting

The TWWHA management plan and the Strategy guide the management of the Overland Track. The general framework provided by these two documents has been discussed in Chapter 3 and will not be repeated here. Instead, the prescriptions specific to the Recreation Zone, in which the Overland Track is situated, and the track's T1 classification are discussed.

In general terms, the management objective for the Recreation Zone is 'to provide a range of recreational experiences in a moderately challenging, largely natural setting that suitably equipped people can use for recreation purposes' (PWS 1999: 59). Of particular relevance to the Overland Track is the objective 'to enable relatively high levels of active ... overnight recreation' (PWS 1999: 59).

To meet the objectives of the Recreation Zone, a series of management actions have been prescribed in the Plan. In particular, management is to determine 'the appropriate level of facilities, (eg huts, toilets, track standard), interpretation, marketing and commercial use' for the Overland Track (PWS 1999: 59). Further, in the zone, suitable tracks, and their associated toilets, huts and campsites are to be upgraded in accordance with the standards prescribed by the Strategy. Such tracks are then to be promoted by encouraging the publication of information on particular tracks 'where increasing use is not expected to have any major adverse effect' (PWS 1999: 59). Further, the intent is to focus commercial activity such as guided tours within the Recreation Zone. In addition to the use of helicopters for management purposes, private and commercial 'helicopter ... landings may also potentially occur at a limited number of sites in this zone following an investigation of impacts on other users and the area's values' (PWS 1999: 59). Aircraft operators will be required to comply with guidelines that include minimum flight heights and route restrictions when overflying the zone.

Like all other walking tracks in the TWWHA, the Overland Track has been prescriptively classified according to the specifications set out in the Strategy (PWS 1998a). It is important to recognise that the conditions prescribed by the Strategy do not necessarily reflect actual conditions. Rather the prescriptive classification sets the desired standard that is to be attained and/or maintained. In the case of the Overland Track, a T1 class track is to be provided (Appendix A). The provision of a track of that standard is intended to provide visitors with the opportunity to walk in a natural setting that is only slightly modified. The track is to be of a high standard and clearly marked to ensure that direction is obvious in all but extreme weather conditions. Some interpretive material is provided in association with facilities and existing structures such as huts to enhance visitors' appreciation of the area's natural and cultural values.

5.2 The Western Arthur Range, Southwest National Park

The Arthur Ranges, were named by George Augustus Robinson on the 12th March 1830 (Luckman & Davies 1978: 25). They are situated in the Southwest National Park, which is part of the greater TWWHA. Two ridges make up the Ranges, the 22km long Western Arthurs (Figure 5.13), and the shorter 9 km long Eastern Arthur Range situated to the southeast. Walking track access to the Ranges is gained via McKays Track from Scotts Peak Dam in the north-west, the Port Davey Track from Melaleuca to the south, and from the east via the Huon Track from the Tahune Forest Reserve or via Farmhouse Creek from the Picton Road.

Described as 'a fortress of jagged peaks guarded by terrain and tangled vegetation' (Collins 1990: 243), the Western Arthurs is one of the most awesome and challenging landforms in Tasmania's South West. The range's 40 or so peaks along its serrated ridgelines average 1000 m in altitude, offering 'undoubtedly the most spectacular walk in South-West Tasmania' (Chapman & Siseman 1998: 118; also Thomas 1995).

Visitors are drawn to the Western Arthurs for many and varied reasons. Some visitors, enticed by photographs taken by the renowned wilderness photographer Peter Dombrovskis, come to see and experience the Ranges rugged topography and dramatic landscapes. Other visitors are motivated by the physical and mental challenges that a walk in the ranges presents, while many seek solitude and/or an intimacy with nature. These are but some of the experiences that the Western Arthurs' physical, social and managerial settings affords its visitors. The following description of the character of these settings provides an insight into the nature of the recreation opportunities that are available.

Biophysical setting

Geology, glacial geomorphology and soils

The Western Arthurs consist of Precambrian metamorphic rocks, chiefly quartzite and quartz shists that have been folded and glaciated in prehistory to form a dramatic landscape of ice-erosion features (Collins 1990; Dixon 1996). Today, the more than 30 lakes of the Western Arthurs testify to the ice action of the past which was often so intense that ridges were cut back to sharp aretes by glaciers in opposing cirques (Collins 1990). Steep peaks, vertical head-walls, hanging valleys, and deep cirque lakes that characterise the Western Arthurs are the legacy of the Pleistocene glaciations (Figure 5.14).

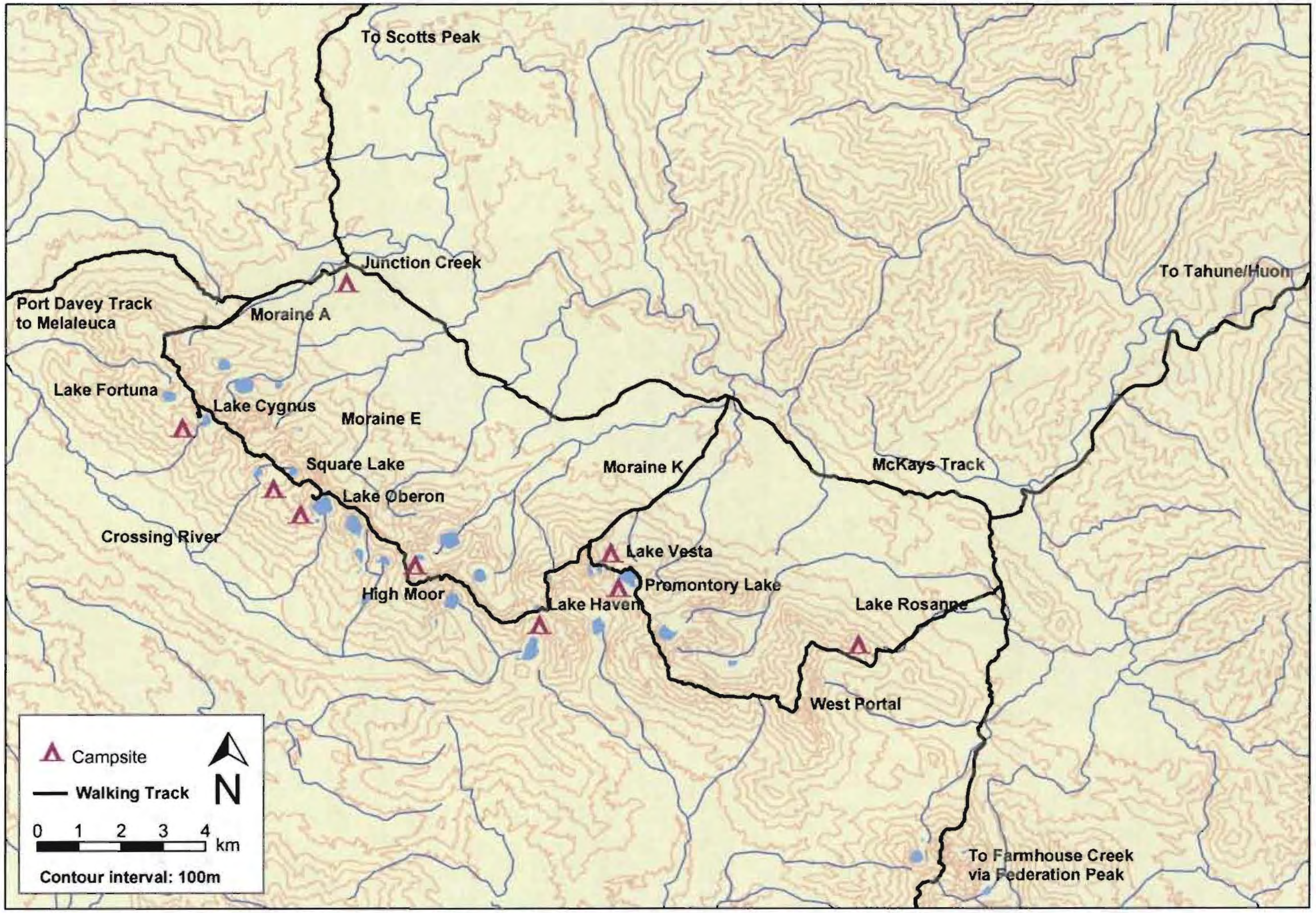

Figure 5.13 The Western Arthur Range, Southwest National Park

Organic soils are found in most areas throughout the region. A surface layer of peat commonly overlies quartzitic gravels and sandy mineral soils (Hannon *et al.* 1993). The high rainfall and the highly siliceous nature of much of the parent material mean that much of the soil is 'highly leached and may be low in nutrients' (Collins 1990: 41; also Edwards 1978). The thickness of the peat and/or mineral soils varies and is often thin in higher and exposed areas. Many of the peaks and ridgelines are characteristically rocky and free of soil.

Source: PWS

Figure 5.14 Lake Oberon, Western Arthur Range, Southwest National Park

Bare soil can be found in exposed locations where vegetation growth is restricted by the prevailing weather and in areas where the surface peat has been lost to fire and subsequent erosion (Dixon 1996a). Where peat soils occur on slopes they are vulnerable to erosion if the surface mat is broken. Such erosion can be particularly severe where walking tracks follow the fall-line (Dixon 1996a). Like the Overland Track (Figure 5.3), visual scaring can be seen from far off where tracks have worn through the organic surface layer and exposed the white quartzitic layer below. In some areas visitors are encouraged to fan out in order to spread and lessen their impact (Dixon 1996a).

Climate

The climate of southwest Tasmania is dramatic, intense and rapidly changing (Nunez 1978). Situated below 430° latitude the Western Arthurs lie directly in the path of the Roaring

Forties, a westerly airstream that blows uninterrupted for thousands of miles before hitting Tasmania. Guidebooks warn that 'weather conditions frequently are foul or worse ... [and] on average there are far more days of bad weather than good' (Thomas 1995: 224); and also, the 'Range is subjected to the worst weather the South West' (Chapman 1998: 118).

The weather in the Western Arthurs area, like that of the Overland Track some 115 km to the north, is influenced by the movement of an east-west belt of high pressure systems (anticyclones) at the northern extreme of the Roaring Forties (Collins 1990; DLPW 1988; Nunez 1978). While no climatic data are available specifically for the Western Arthurs, monthly averages exist for the temperature and rainfall of the South West (Collins 1990; Nunez 1978). The elevated and exposed nature of the Western Arthurs may well produce lower temperatures and higher rainfall than these figures suggest.

January and February are the warmest months in the South West, with average monthly maximum temperatures of 19.8°C and 20.4°C respectively (Figure 5.15). Overnight temperatures fall to an average minimum of 9.6°C in January and 10.1°C in February. Late summer and early autumn (mid-January to late March) provide the most reliable and stable weather for walking in the Arthur Ranges. Temperatures remain warm in March with an average overnight minimum of 8.8°C and an average maximum 17.6°C.

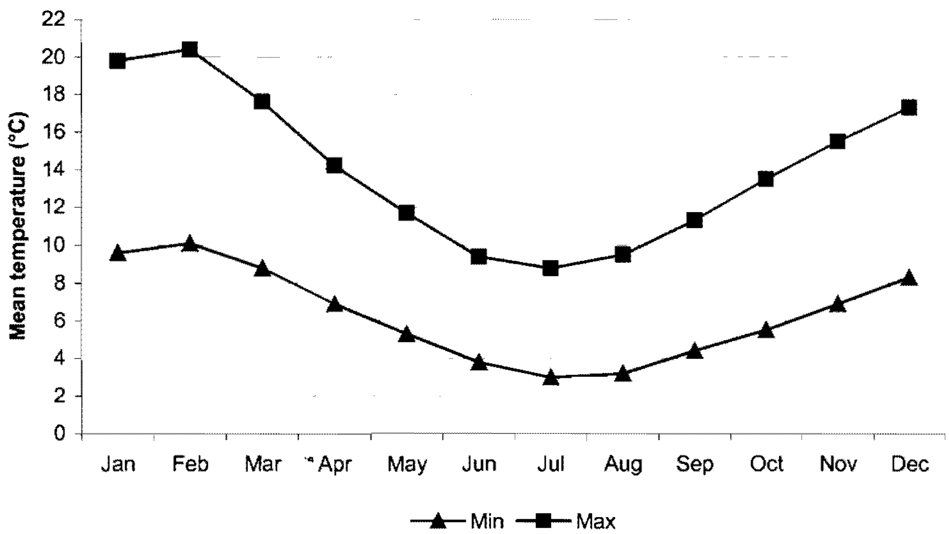

Figure 5.15 Mean monthly minimum and maximum temperatures for the South West, Tasmania

Rainfall is at its lowest between January and March, averaging between 101 mm and 143 mm per month (Figure 5.16). In April, the temperature cools and an average of 255 mm of rain can be expected. While hail, snowfalls and blizzards can occur at any time of year, the first significant snowfalls can be anticipated in May (Collins 1990; Nunez 1978). Wet-cold conditions are the norm in winter and walking on the exposed Western Arthurs at this time of year is ill advised. The days are characteristically short and 'rain, snow, sleet and severe frost can be expected at most elevations' (Collins 1990: 38). July is the wettest coldest month of winter with average temperatures dropping to a maximum of 8.8°C and a minimum of 3°C. Temperatures of minus 10°C are possible on the ranges and severe frosts and cold are not uncommon (Collins 1990).

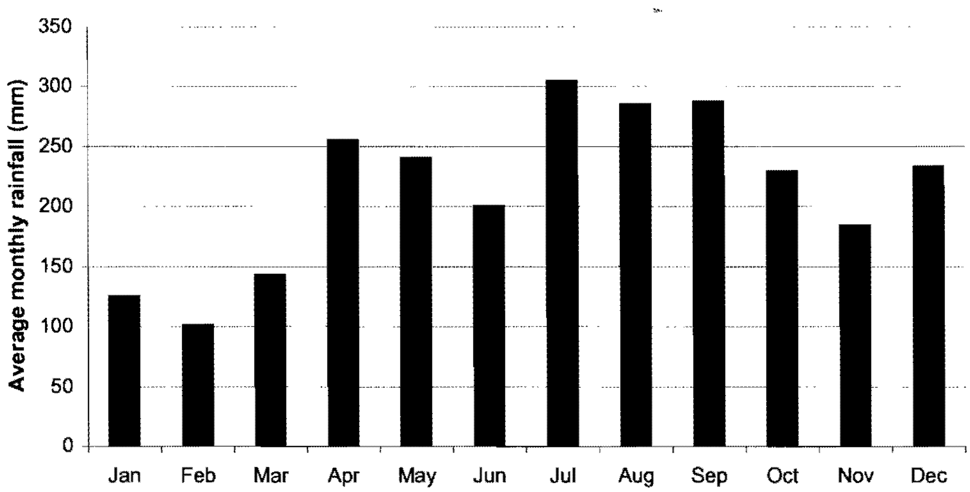

Figure 5.16 Mean monthly rainfall for South West, Tasmania

During winter, the dominant influence of the moisture-laden westerly airstream combines with the almost perpendicular alignment of the 1000-1200 m high Western Arthurs resulting in increased levels of precipitation compared to the lower lying areas (Nunez 1978). The vertical uplift of the moist westerly airstream as it travels over the Ranges results in orographic rainfall of over 3000 mm. Cold wet conditions prevail throughout winter with cold fronts from the Southern Oceans bringing heavy precipitation and cool temperatures (Collins 1990; Nunez 1978). July is the wettest month with an average rainfall of 304 mm, and average temperatures of between a minimum of 3°C and a maximum of 8.8°C (Collins 1990). While the temperature begins to warm in August, 'the heaviest snowfalls of the year are often recorded in that month' (Collins 1990: 39). A gradual warming continues throughout spring and precipitation decreases to a low November average of. The weather during September and October is unstable and 'swift, blustery westerly changes with rain and sleet are frequent' (Collins 1990: 39). Intense pressure gradients between successive high and low-pressure cells produce gale-force winds that can exceed 100 km/h.

November ushers in the return of more stable summer weather (Collins 1990). Despite an increase in rainfall for the month of December, temperatures continue to increase throughout the summer months. Although late-Summer is the best time to visit, visitors venturing into the Western Arthurs are well advised to be prepared for the inclement weather the Range is infamous for (Collins 1990). It is not uncommon for visitors to be 'prevented from any movement for several days, especially in the higher ranges' (Chapman 1998: 18). Once on the Range there are few escape routes from the exposure of the ridgelines.

Flora

In excess of 100 plant species have been found to grow in the Arthur Ranges, approximately 60% of which are endemic to Tasmania (Gilfedder 1992; Kirkpatrick 1980). Several factors have determined the pattern of vegetation that occurs on the Arthur Ranges today including aspect, altitude, rainfall, soil structure and its parent rock, and the history of burning (Collins 1990; Edwards 1978; Gilfedder 1992; Kirkpatrick 1980). Without fire the South West would have been dominated by rainforest complimented by 'small areas of high altitude moorland and sedgeland on sites too waterlogged to support tree growth' (Edwards 1978: 85). Instead, burning has favoured the establishment of 'eucalypt-dominated forests on the better soils and heath and sedge-dominated vegetation on the poorer soils' (Collins 1990: 119).

Buttongrass moorland occurs on the poorly drained lowland areas around the Ranges, such as in the Arthur Plains). The vegetation changes gradually with increasing altitude. Rainforest covers most of the Ranges' slopes to 800-900 m. The tree line is irregular with 'the trees become more and more stunted' with increased altitude and exposure (Edwards 1978: 86).

Above 800-900 m sparse vegetation and occasional shrubs grow on and among the quartzite cliffs (Kirkpatrick 1980). Heath and shrubs are the most common vegetation at this altitude, varying in stature from 10 cm high mat-heaths to thickets 2 m or more high (Gilfedder 1992).

Plants of the exposed high ridges and plateaux are usually ground hugging and pruned by the wind, except where they grow in the shelter of rocks and crevices (Edwards 1978; Gilfedder 1992). Above 1000 m, high-mountain cushion heath occupies exposed and treeless slopes on the Western Arthur Range (Collins 1990). Growing below snowpatches and in other damp areas, this community can also be found on drier ridges. On the Eastern Arthur range, mosaic cushion heath grows in wetter areas than that where the high-mountain heath grows on the western range. While the open nature of the high moors and open ridgelines enable easy walking, cushion plants, heath and other species in these areas are delicate and sensitive to disturbance and trampling by visitors (Chapman 1998).

Fauna

A suite of mammals similar to that around the Overland Track inhabits the Arthur Ranges area. Widespread are the Bennett's wallaby (*Macrocarpus rufogriseus*), pademelons (*Thylogale billardierii*), wombat (*Vombatus ursinus tasmaniensis*), and several possum species, including the ring-tailed (*Pseudocheirus peregrinus*), eastern pigmy (*Cercartetus nanus*), and little pigmy (*Cercartetus lepidus*) (Hocking 1978). The platypus (*Ornithorhynchus anatinus*) and echidna (*Tachyglossus aculeatus*) also inhabit the area.

Unlike Cradle Mountain - Lake St Clair National Park 'reptiles are not well represented in most habitats of the South West' (Collins 1990: 159). Requiring warmth to become active, the usually short, cool summers are less than ideal for these cold-blooded species, most of which hibernate between April and October (McIntosh & Andrews 1978).

According to Chapman (Chapman 1998: 18), 'the most easily seen residents of the South West are the birds' in a variety of habitats. The widespread buttongrass moorlands provide habitat for numerous species including the endangered orange-bellied parrot (*Neophoema chrysogaster*).

Campsites: their number, capacity and condition

A total of 59 campsites were recorded across the Western Arthurs during February 2000 (Dixon 2002). While these campsites are spread throughout the range, camping activity is largely focused in eight locations (Table 5.7). The number of campsites were those displaying some evidence of impact or past use, and is an artefact of historic use patterns rather than strategic planning on the part of the PWS. Moreover, the number of established sites, and thus their estimated capacity, is not necessarily indicative of occupancy at times of peak demand, but rather is likely due to sporadic campsite selection by visitors.

Inspection of the main camping areas along the range in February 2000 found almost a third of the campsites in the main camping areas to have lost nearly all their vegetation and/or organic litter (Dixon 2002). As a result, these campsites were characterised by exposed soil over more than 75% of their area, and in some cases exposed tree roots, coarse soil particles or bare rock accounted for 25% or more of their area – Condition Classes 4 and 5. At Lakes Cygnus, Oberon, and Haven the PWS have hardened a number of campsites to prevent further erosion, however, seriously impacted campsites remain in use (Table 5.7).

Table 5.7 Estimated 'comfortable' camping capacity at major camping areas on the Western Arthurs, February 2000

Camping area	Number of established campsites	Estimated total tent capacity†	Inferred camper capacity
Lake Cygnus	4	14	28
Square Lake	8	12	24
Lake Oberon	12	25	50
High Moor	6	12	24
Haven Lake	1	4	8
Lake Vesta	4	4	8
Lake Promontory	4	10	20
Lake Rosanne	4	7	14

† Estimated tent capacity was determined 'by visually estimating how many tents could be properly pitched on the site without excessive [physical] crowding or necessitating the use of any sloping, seriously eroded, rocky or swampy areas. In terms of shape and ground area occupied, the standard tent has been assumed to be a Macpac Olympus, Minaret or similar style of tent' (Dixon 2002: 21). The larger of these two tents, the Macpac Olympus, has a maximum footprint of 3500 mm x 1450 mm, plus guy-ropes (Macpac Wilderness Equipment Limited 2000: 40).

Note: The figures quoted in this table exclude closed campsites.

Adapted from Dixon 2002

Table 5.8 The number of campsites, by Condition Class, in the main camping areas along Western Arthurs, February 2000

Area	Condition Class						Total campsites
	H	1	2	3	4	5	
Lake Cygnus	3	-	-	-	-	1	4
Square Lake	-	-	1	4	3	-	8
Lake Oberon	3	-	6	-	2	1	12
High Moor	-	2	2	1	-	1	6
Haven Lake	1	-	-	-	-	-	1
Lake Vesta	-	-	1	-	2	1	4
Lake Promontory	-	2	-	1	-	1	4
Lake Rosanne	-	1	-	1	2	-	4
Totals (%)	7 (16.3)	5 (11.6)	10 (23.3)	7 (16.3)	9 (20.9)	5 (11.6)	43 (100)

Adapted from Dixon 2002

Social setting

Scant recordings of the early history of bushwalking in the South West provide a patchy insight into the growth of recreation in the Western Arthurs area. Bushwalking in the area is rooted in the exploration for timber and mineral resources that took place in the early 1800s (Gee 1978; Luckman 1948, 1998; McAulay *et al.* 1978). Tracks cut by early explorers - allowed many early settlers 'keenly appreciative of the wild scenery ... walking and camping in the bush' access to the wilds of the South West (Luckman & Davies 1978: 32). Many sections of track cut by the likes of free convict, Alex McKay and Surveyor James Calder during the early 1800's are still in use, such as the Port Davey and McKays tracks (Figure 5.13).

Articles in *Walkabout* (published by the Australian National Travel Association) and the Hobart Walking Club journal, *The Tasmanian Tramp*, provide accounts of early walking excursions in the Arthur Ranges area. According to Luckman (1948: 16), 'many parties explored the vicinity of the Western Arthurs [in the late 1800s], including H. Judd in 1872 [and] Brown, Ayre and Schnell in 1890 ...'. This exploration continued into the 1900s. For example, Jessie Luckman (1951) tells readers of the 1930 journey of Maida Watson, and her sister, to the Arthur Ranges. According to Luckman, they were the first white women to climb the West Portal, at the south-eastern end of the Western Arthurs.

Much of the Western Arthurs remained untrodden by visitors until the second half of the twentieth century, in no small part due to its rugged topography and fickle weather. In fact, it wasn't until December 1960 that the first successful traverse of the Western Arthurs was made by Conaghan, Higgins and Elliot (Davis 1963). With no official nomenclature for features in the Western Arthurs until after 1963, visitors and mapmakers used a peak numbering system, developed by Ronnie Smith of the Hobart Walking Club. Many of the names that were in use have since changed, for example; Lakes Davey, Arthur and Old are now known respectively as Fortuna, Oberon and Mars (Davis 1963; LIS 1997).

Today, guidebooks suggest that visitors allow at least 10 days to complete the skyline traverse (Chapman 1998; Collins 1990). Walking on the Western Arthurs is typically an arduous affair with guidebooks advising visitors that the:

> ... walking is very slow with continual scrambling over roots and branches and many short descents and ascents in precipitous gullies and cliff lines. There are a few places where most parties will need to use a rope to lift or lower packs and bushwalkers. Some of these are dangerous if a walker panics so all party members should be experienced with heights (Chapman 1998: 118).
>
> Generally, travel of four kilometres in the middle of the range is measured by six to seven hours (Collins 1990: .248)

As early as 1966, according to The South West Committee:

> ... the Western Arthurs have become known as 'classics' of the Australian bush ... The difficult terrain, the uncertain weather, and the dense vegetation combine to make such trips

> a severe test for any party, and offer a sense of adventure not to be found in other more developed National Parks (1966: 25).

Since the 1940s, the Western Arthurs has become increasingly accessible. Track-notes and maps of the area began to appear in print in the late 1940s with accounts of visitors' experiences, complete with maps, being published in *The Tasmanian Tramp* (Davis 1959, 1963; Luckman 1948). The availability of this information to the walking community made route finding and exploration easier, and no doubt lead to an increase in the number of people visiting the area during the 1950s and 1960s (Davis 1959, 1963; Luckman 1948). Access to the Western Arthurs area was gained via the Huon/YoYo Track or via a route from Maydena to Port Davey (Eklund 1959; Luckman 1951). The southern section of the Maydena to Port Davey route exists today as the Port Davey Track between Junction Creek and Joe Page Bay to the south. The opening of the Gordon River Road (to what is now Strathgordon) in June 1967 and the construction of the Scotts Peak Road, and the extension of forestry roads into the Picton Valley during the 1970s, reduced the isolation of the Western Arthurs and led to increasing visitation in the area.

John Chapman and Tyrone Thomas published the first dedicated walking guidebooks of the area in 1978 (Chapman 1978; Thomas 1978). Their series of well-known guidebooks have provided thousands of visitors with detailed descriptions of the routes, the environment and its history. These guidebooks have undergone several revisions and updates and are currently in the fourth edition (Chapman 1998; Thomas 1995), while Ken Collins (1990) has published a comprehensive natural history and visitor's guide to the South West.

Visitor numbers

Records of the number of people visiting the Ranges in the early years are sparse and often inaccurate. However, according to Kirkpatrick (1979: 21) 'the late sixties marked the start of an explosion of wilderness use in Tasmania'. Visitor registration data for the Western Arthur Range prior to 1990-1 are incomplete. According to Dixon (Dixon 1996a: 7), articles from The Tasmanian Tramp published during the 1960s suggest that 'visitation to both the [Eastern and Western Arthur] Ranges ... was no more than 50' people per year during that decade. However, analysis of remote area logbooks suggest that the number of people walking in the Arthur Ranges area during the 1960s would have exceeded this number, although by how much remains unknown (Allnut 1983).

Over the next two decades, the only records are for the years 1974-5, 1986-7 and 1988-9 (Dixon 1996b; PWS 2000b). These scant records do suggest a modest increase in the number of people visiting the Western Arthurs during the later half of the 1970s and 1980s (Table 5.8).

Table 5.9 Visitor registration records collected for the Western Arthurs during the 1970s and 1980s

	1974-75	1986-87	1988-89
Western Arthur Range	91	218	410

Adapted from Dixon 1996

A continuous record of visitor registrations for the Western Arthurs commenced in 1990-91, and is illustrated in Figure 5.17 (PWS 2000b). In that year, 638 people registered to walk in the Western Arthurs, the second highest number of registrations recorded in a single year for the 14 years to 2003-04 (PWS 2000b; Rundle 2004). A dramatic 44% reduction in the number of registrations is evident following the 1990-91 peak, with the only 357 registrations recorded for 1991-92. The reason for the dramatic downturn in visitation remains unknown.

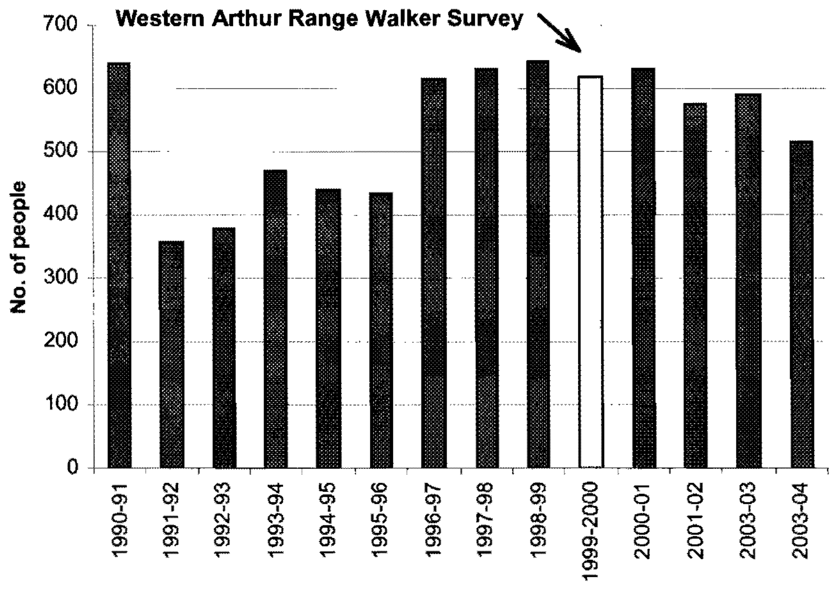

Figure 5.17 Annual visitor registrations for the Western Arthurs between 1990-91 and 2003-04

Accurate counts of the number of visitors visiting the Western Arthurs have been made since 1997-98 (PWS 2000b). These records are based on the route intentions of visitors as recorded in the visitor registration logbooks located at the Scotts Peak, Huon and Farmhouse Creek trackheads which are then cross-checked and compared with data collected from track counters. Despite some fluctuations, there was no substantial change in the number of visitors undertaking overnight trips in the Western Arthurs between 1997-98 and 2000-01. Annual visitation peaked during 1998-99 with 643 people visiting the Western Arthurs. In the year the Western Arthur Range Walker Survey was undertaken, 1999-2000, 619 people walked the Range[8] (PWS 2000b), a fall of just 3.7% from the previous decade's peak (Figure 5.17). Since that time, the level of visitation has fluctuated, with an overall 16.8% decrease in the number of visitor registrations evident since 1999-2000. A total of just 515 visitors were recorded in 2003-04; the lowest level of use recorded since 1995-96. Despite the downturn in the level of use following a peak in 1998-99, an increase (averaging 3.7% per year) in the number of people visiting the Western Arthurs has been experienced since 1991-92 (Figure 5.17).

Despite annual variations in the number of people visiting the Western Arthurs, a common seasonal distribution of use is evident in the monthly registration data from year to year (PWS 2000b). Like the Overland Track, there was a marked peak in visitor use when the Western Arthur Range Walker Survey was undertaken, between November 1999 and April 2000 (Figures 5.12 & 5.18). Of the 590 people who spent at least one night out in the area during 1999-2000, 93.6% (N = 552) did so during the peak-season, between November 1999 and April 2000 (Figure 5.18). Only 38 people (6.4%) visited the Range during the off-peak season (PWS 2000b).

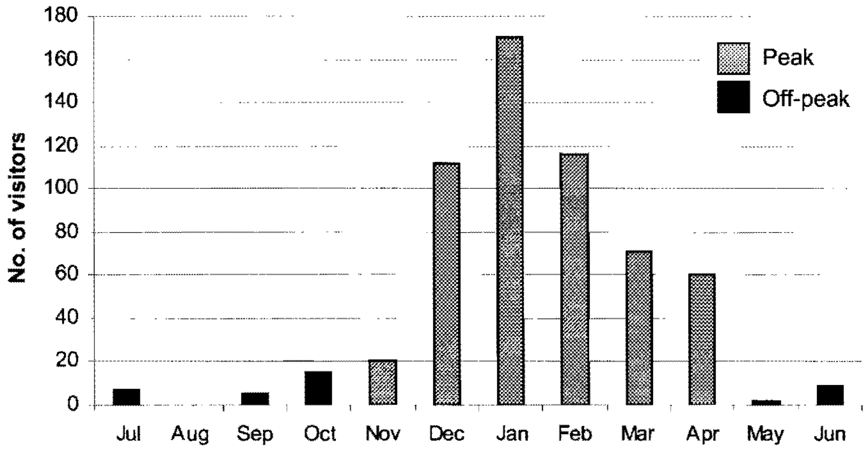

Figure 5.18 Monthly registrations for the Western Arthurs 1999-2000

Monthly registration totals for the Western Arthurs display an inverse relationship with both the monthly rainfall and temperature averages recorded in the South West (Figures 5.15, 5.16 & 5.18). It is evident that the majority of people choose to visit the Range during the November - April peak-season as warmer more stable weather conditions prevail. While the

[8] Of the 619 people who visited the Western Arthurs area during 1999-2000, 29 were day-walkers (PWS 2000b).

inclement and dominantly harsh climatic conditions of the off-season are such that all but a few hardy souls venture into the Western Arthurs during this time.

The onset of more stable summer weather during November leads to an increase in the number of people visiting the Arthur Ranges area. In November 1999 the 20 people undertook an overnight trip in the Western Arthur Range, the highest monthly total since the end of the peak-season the previous April (PWS 2000b). The warmer weather of summer and a concomitant rise in visitor registrations is evident during December and January (Figures 5.15 & 5.18). The number of visitors peaked at 170 people during January before tapering off toward the end of the season.

Approximately 72% of the peak-season visitation occurs during the warmer summer months – December, January and February – with visitor registrations remaining above 100 per month (PWS 2000b). Visitor registrations stayed at 60 or more visitors per month for the remainder of the peak-season, with March and April 2000 recording 71 and 60 visitors respectively (PWS 2000b).

Registrations remained below 10 visitors per month during the 1999-2000 off-season, with the exception of October when 15 people registered (PWS 2000b). No visitors recorded during August 1999 (PWS 2000b). Only 5.5% ($N = 48$) of visitors that walk in the Western Arthurs did so during the 1999-2000 off-season.

Access points

Virtually all (98.5% in 1999-2000) visitors to the Range enter via Scotts Peak, the Huon, and Farmhouse Creek (Table 5.10). Scotts Peak is the most frequently used access point. During 1999-2000, 94.4% of peak-season visitors, commenced their journey from this location, and 89.1% ($N = 491$) of these visitors exited via this same trackhead. Overall, 99.3% of visitors to the Western Arthurs used the Scotts Peak trackhead as an entry and or exit point during the 1999-2000 peak season (PWS 2000b).

Only 19 (3.5%) of the 551 people who visited the range used the Farmhouse Creek access during the 1999-2000 peak season, of whom only two also exited the same way (Table 5.10). A lesser proportion of peak-season visitors gain access via the Huon track-head. Just four people (0.7% of visitors) visiting the area entered via the Huon, three of whom exited via Scotts Peak and the other via Farmhouse Creek (PWS 2000b).

Table 5.10 Registration frequency at access points to the Western Arthurs area during the 1999-2000 peak-season

Access point/registration booth	No. of visitors ($N = 551$)	% of peak-season visitors	No. of visitors intending return trips (%)
Cockle Creek via Port Davey Track	8	1.5	-
Huon	4	0.7	-
Farmhouse Creek	19	3.5	2 (0.3%)
Scotts Peak	518	94.4	491 (89.1%)
Other	2	0.4	-

Adapted from PWS 2000

Routes

According to *intentions*, the most popular routes taken by people visiting the Western Arthurs are those that incorporate the high alpine lakes and tarns, or tackle the challenging full-traverse of the range (Table 5.11). Some 73.3% ($N = 404$) of people who visited the Western Arthurs during the 1999-2000 peak-season registered their intention to undertake one of four popular routes.

Table 5.11 Actual and intended visitor frequency on popular routes in the Western Arthurs 1999-2000

Route	Intended	Actual
SP– Lake Oberon return	64	92
SP – Moraines A – K return via McKays Track	156	132
SP – full traverse of WA range return via McKays Track	136	70
SP – full traverse of WA range – Federation Peak – return	48	13

SP = Scotts Peak, WA = Western Arthurs. Adapted from PWS 2000b

From the logbook data it is evident that visitors are often forced to reassess and alter their itineraries, commonly due to inclement weather impeding the safe progress of visitors along the exposed ridgelines, and/or the unexpectedly physically demanding nature of the terrain. Of the four popular routes, only one recorded a positive discrepancy between intended and actual visitor numbers during the 1999-2000 peak-season. Actual visitor numbers for the Scotts Peak (SP) – Lake Oberon return trip exceeded the number of visitors that registered their intention to do this route, increasing from 64 to 92 people (Table 5.11). As the outbound section of this route is common to all four of the most popular Western Arthurs routes, visitors forced to abandon their plans to traverse the Western Arthurs, or complete the

Moraine A – K circuit, served to increase the traffic recorded on this route. In fact, 44% (N = 212) of all people who visited the Western Arthurs, during the 1999-2000 peak season, did not venture beyond (further south-east than) Lake Oberon (PWS 2000b).

The Moraine A to Lake Oberon section of the Western Arthurs is the most heavily trafficked area of the entire Arthur Ranges (Eastern and Western). Approximately 50.8% of the 831 people who visited the Arthur Ranges during the 1999-2000 peak-season registered their intent to walk in the area between Moraine A and Lake Oberon (PWS 2000b).

Demographics: visitor origin, party size and type of group

Information about where visitors have come from, their party size and the type of group visiting the Western Arthurs has been collected via the logbooks located at the Scotts Peak, Huon and Farmhouse Creek track-heads. Place of origin data for people visiting the area are collected in the same manner as that for the Overland Track. As 'party leaders' are asked to register on behalf of their group, it is their place of origin that is listed in the logbooks, place of origin data is then extrapolated by attributing the number of persons in their party to the origin listed by the 'party leader' (PWS 2000b). When more than one place of origin has been listed in the logbook, only the first has been used in the dataset compiled by the PWS (PWS 2000b).

The logbooks show people from 11 different countries, including Australia, visited the Western Arthurs during 1999-2000 peak season (Table 5.12). During this period, visitors from mainland Australia (N = 293) outnumbered locals (N = 215). Of the mainland States and Territories, Victoria was most well represented with 129 visitors, or 44.0% of the mainland cohort. Visitors from New South Wales and the ACT were the second largest mainland group (N = 89, or 30.4% of mainlanders). As a proportion of the total number of peak-season visitors during 1999-2000, Victorians made up 23.4%, with 16.2% coming from New South Wales and the ACT (Table 5.12).

In terms of national representation, Australians made up 92.2% (N = 508) of the 551 people who visited the Western Arthurs during the 1999-2000 peak season, with the remaining 30 (5.4%) from overseas countries, and a small proportion for whom their origin is unknown (Table 5.12).

Of the known foreign nationalities represented, none constitutes more than 0.9% of the 1999-2000 peak season visitor population (Table 5.12). Five Canadians, plus five visitors from each the UK and the USA, and four from both Switzerland and Japan make up the bulk of the overseas contingent for which country of origin is known.

Table 5.12 Origin of people visiting the Western Arthur Range during the 1999-2000 peak-season

State/Country	No. of visitors	%
Tasmania	**215**	**39.0**
Mainland Australia		
Northern Territory	3	0.5
NSW & ACT	89	16.2
Victoria	129	23.4
Queensland	29	5.3
South Australia	29	5.3
Western Australia	14	2.5
Mainland total	**293**	**53.2**
Overseas		
Austria	1	0.2
Canada	5	0.9
Germany	2	0.4
Israel	1	0.2
Japan	4	0.7
Netherlands	2	0.2
Northern Ireland	1	0.4
Switzerland	4	0.7
UK	5	0.9
USA	5	0.9
Overseas total	**30**	**5.4**
Unknown	**13**	**2.4**
Peak-season total	**551**	**100%**

Adapted from PWS 2000b

Party sizes

A total of 249 groups visited the Western Arthurs between July 1999 and June 2000. Most groups (230 or 92.4%) visited during the peak-season. Only 19 groups (7.6%) visited the area during the off-season (PWS 2000b). During the 1999-2000 off-peak season party size did not exceed five visitors, and increased to a maximum of 11 visitors between November and April (PWS 2000b). Only three parties exceeded the maximum party size (8 visitors) prescribed by the PWS in the Strategy, and overall only four parties were larger than the 'encouraged' limit of six visitors per party (1998b: 99).

During the 1999-2000 peak-season, the most common (mode) party size in the Western Arthurs area was two visitors, making up 44.2% (N = 116) of the parties that walked in the area (Table 5.13).

Table 5.13 The size of bushwalking parties that visited the Western Arthurs area during the 1999-2000 peak-season

Party size	No. of parties (N = 230)	% of total no. of parties	Cumulative %
1	51	18.5	22.2
2	116	42.2	72.6
3	27	9.8	84.3
4	17	6.2	91.7
5	8	2.9	95.2
6	7	2.5	98.3
7	1	0.4	98.7
8	0	0.0	98.7
9	1	0.4	99.1
10	1	0.4	99.6
11	1	0.4	100.0

Adapted from PWS 2000b

Knowledge of the use of the area by bushwalking clubs (and/or their members), schools, community and/or other organised groups cannot be determined. According to the PWS (PWS 2000b), no commercially guided parties walked in the Arthur Ranges area between July 1999 and June 2000.

Track and campsite encounters

The location and frequency of encounters experienced by visitors in the Western Arthurs area is unknown. Only two studies conducted by PWS, during 1990-91 and 1991-92 (PWH 1990, 1991), examined encounter frequency and its impact on visitors' experiences. The findings of these studies have not been reported and the survey data can no longer be located.

Management setting

The overarching management framework for the TWWHA has already been outlined and discussed in Chapter 2; therefore the discussion here is limited to zoning and track classification prescriptions specific to the Western Arthurs. The Western Arthurs is located within the Self-Reliant Recreation Zone for which the management objective is 'to retain a challenging and relatively unmodified natural setting that suitably experienced and equipped people can use for recreation purposes' (PWS 1999: 58). This zone 'includes areas of environmental sensitivity and/or high wilderness quality as well as some areas that have been impacted, often as a result of relatively low levels of use. It encompasses some of the most challenging walking ... country in the WHA' (PWS 1999: 58).

The management plan for the TWWHA (PWS 1999) contains a series of prescriptions that, when implemented, are intended to ensure the natural and cultural values of the Self-Reliant Recreation Zone and the challenging nature of the recreation it affords are maintained. Broadly, the intent of the management prescriptions is for visitor use to be focused in the Recreation Zone (the zone in which the Overland Track is situated) where management activity and the presence of infrastructure are greatest. This is to be achieved by discouraging publication of and promotion of walking destinations and routes within the zone. Management in the zone is to be the minimum required and for environmental, monitoring and safety purposes only. The impacts of recreation are to be minimised, and where track work is undertaken it is to be for environmental purposes only and aesthetically sympathetic with the environment: 'in order to minimise or repair environmental degradation and/or to retain a sense of solitude, access may be controlled or managed' (PWS 1999: 58). Access within the Self-Reliant Recreation Zone is to be restricted to non-mechanised forms, primarily walking. However, mechanised access, which includes the use of helicopters, is permitted for management and search and rescue purposes. Overflights and landings are to be limited to approved flight paths and sites, and must operate within minimum flight height guidelines.

At the track specific level, management is guided by the Strategy (PWS 1998b). The major walking track corridor in the Western Arthurs area has been prescribed to meet the T3 classification (Appendix A). A track of this standard is intended to provide visitors with the chance to explore and discover relatively undisturbed natural environments along defined and distinct tracks with minimal facilities. Track work and the provision of hardened campsites and toilets in such areas are primarily for environmental purposes only. Since the Strategy (PWS 1998b, 1998c, 1998d) and the Track Classification Scheme (Appendix A) have already been examined in some detail in Chapter 2, they will not be discussed further here.

5.3 Conclusion

It is apparent from the descriptions of the Overland Track and the Western Arthurs that they provide contrasting recreation opportunities. The Overland Track is highly visited and more cosmopolitan than the Western Arthurs in terms of the substantial proportion of visitors from overseas that visit that site. Moreover, the Overland Track provides a developed recreation setting, unlike the Western Arthurs where visitors are expected to be self-reliant. And, while both areas can be subject to extreme weather, the Western Arthurs has a deserved reputation as a more rugged and demanding undertaking due to its topography and prevailing climate. These site descriptions, therefore, provide the contextual foundation and appreciation of the distinct biophysical, social and managerial settings that are the Overland Track and the Western Arthurs.

Chapter 6. The Overland Track Walker Survey

This chapter presents the results of the Overland Track Walker Survey. Basic visitor demographics including age, sex, origin and previous bushwalking experience are outlined prior to an examination of visit characteristics. The importance of a range of indicators in influencing the quality of visitors' experiences is also explored. Next, the underlying structure and influence of those indicators is outlined through the identification of key factors that shape visitors' experiences. Then, an examination of walker expectations and actual experiences is made for the six selected indicators. Finally, visitors' preferences are discussed and norms developed for the selected indicators.

Discussion of the results in relation to the broader research literature or specific conclusions has been reserved for Chapter 8 where the results from the surveys conducted at both study sites are brought together.

6.1 Response rate

Of the 1061 visitors asked to participate in the study only 13 declined. In total, 1048 participated in the study, producing 989 useable questionnaires for an adjusted response rate of 94.4%. Visitors walked a range of routes and their questionnaires were segregated according to the routes they took, with the frequency of people walking those routes outlined in Table 6.1.

Table 6.1 The Overland Track routes: frequency and proportion of visitor use (*N* = 987)

Route	Frequency	%
Entire Overland Track - North to South	715	72.4
Entire Overland Track - South to North	74	7.5
Northern section only	21	2.1
Southern section only	89	9.0
Pine Valley complex†	75	7.6
Eastern routes	11	1.1

† The Pine Valley complex encompasses the Labyrinth, the Acropolis, the Du Cane Range and Mt Gould

Since the focus of this study is the Overland Track, the forms gathered from visitors walking in the Pine Valley complex and routes to the east of the Overland Track have been excluded from the study.

Only a small proportion (2.1%) of visitors sampled reported undertaking a return journey at the northern end of the Overland Track. Comparison with PWS walker registration records suggests these visitors were under-represented in the sample since only visitors approaching the Waterfall Valley sampling point from the south were asked to participate in the study. A comparison of the frequency of respondents recorded for the northern section of the Overland Track and PWS (2000c) walker registration data bears this out. Therefore, the few questionnaires (N = 21) from people walking only the northern section of the Overland Track have been omitted from the remainder of this study.

Thus, this chapter presents the findings from the analysis of the responses of 878 visitors who walked the entire Overland Track (southbound or northbound) or its southern section only.

Further checks for sampling biases were undertaken by comparing the survey sample with the PWS walker registration data for visitors departing Cradle Valley and walking the southbound Overland Track route (PWS 2000c). The common variables within these data-sets were the origin of visitors in free-walker (non-commercial) groups, and party sizes for both free-walker and commercial groups. Using these data, two comparisons were made. First, the origin of respondents was compared to those of visitors who registered in the PWS logbooks and second, a comparison of group size averages for free-walker and commercial groups was made.

Comparison of visitor origins recorded by the PWS walker registration system and the Overland Track Walker Survey reveals some difference in the proportions of visitors from the different origins (Table 6.2). However, they do not appear to be significant given consideration of the limitations of the PWS data.

Table 6.2 The origin of visitors departing from Cradle Valley at the northern end of the Overland track recorded via registrations in PWS logbooks and the Overland Track Walker Survey: November 1999 - April 2000

	PWS walker registration data		**Overland Track Walker Survey**	
Origin	*N*	%	*N*	%
Tasmania	719	17.8	70	13.2
Mainland	2131	52.6	314	59.1
Overseas	992	24.5	147	27.8
Unknown	206	5.1	-	-

Adapted from PWS 2000

The discrepancy between the proportion of visitors from different origins between the two data-sets may be accounted for by the large number of visitors (*N* = 206, 5.1%) in the PWS data-set for whom origin is uncertain because they failed to register their origin within the PWS logbooks. Further, the PWS data is compiled on the basis of the origin entered into the logbook by party leaders and/or delegates, which may not accurately represent the origin/s of the party's members. Additionally, where more than one point of origin is written into the logbook, the first is entered as the origin of all members of the party into the PWS database. Thus, the PWS walker origin data should be interpreted with some caution. With these caveats in mind, there is no indication that the variation between the two data-sets is significant.

Next, a comparison of the party size averages for free-walkers and visitors travelling as members of commercial groups was made between the PWS walker registration data and data from this survey for departures from Cradle Valley. It is evident that there was no difference between the party sizes for either free-walkers or visitors in commercial groups at the median and mode (Table 6.3). Some difference is evident between the mean party sizes across the subgroups examined; however the *SDs* suggest that these differences are not significant.

Table 6.3 Party size averages of visitors departing from Cradle Valley at the northern end of the Overland Track recorded via registrations in PWS logbooks and the Overland Track Walker Survey: November 1999 - April 2000

	PWS walker registration data		**Overland Track Walker Survey**	
	Free-walkers	**Commercial**	**Free-walkers**	**Commercial**
Averages	*N* = 4047	*N* = 1394	*N* = 532	*N* = 181
Mean (*SD*)	2.3 (1.7)	10.6 (2.6)	3.7 (3.0)	11.4 (1.8)
Median	2	12	2	12
Mode	2	12	2	12

Adapted from PWS 2000

On the basis of the comparisons above, the high response rate and sampling design employed in conducting the Overland Track Walker Survey, the I consider the sample to be unbiased with respect to its representation of visitors who travelled the Southbound, Northbound and Southern Section routes of the Overland Track between November 1999 and April 2000.

6.2 Visitor characteristics

Age and sex

Visitors undertaking the various overnight routes associated with the Overland Track ranged from 16 to 76 years of age, with a mean age of 33.6 years (*SD* = 12.2 years). The median age of visitors was 31 years.

Making up 56.1% (*N* = 490) of respondents, males outnumbered female respondents who comprised 43.9% (*N* = 384) of the sample. A Mann-Whitney U test comparing the age of male and female respondents found no statistically significant difference (*P* = 0.369) in their median age.

Place of residence (origin)

Twenty-one different nations were represented in the sample. As could be expected, the vast majority of visitors were Australian residents (77.4%, *N* = 676). Of the Australian visitors, the large majority were from the mainland (*N* = 550, 63.0%); notably, Tasmanians were in the minority (*N* = 126, 14.4%).

Of the overseas visitors (*N* = 197), some 77.7% reside in one of five countries. The largest number of overseas visitors came from Germany, making up 26.9%. Visitors from the United Kingdom made up 20.3%, with the United States (15.2%), Canada (8.1%) and the Netherlands (7.1%).

Bushwalking experience

General bushwalking experience (N = 873)

Visitors were asked *how many overnight bushwalks have you done before this trip?* The results indicate that most visitors had prior general bushwalking experience (81.0%), however, a substantial proportion (19.0%) had no previous overnight bushwalking experience. Of those visitors who had overnight bushwalking experience, 32.9% had completed no more than 6 such trips, while 48.1% of all visitors had undertaken more than 6 overnight bushwalks prior to their visit.

Bushwalking experience in Tasmania (N = 857)

While most visitors had prior overnight bushwalking experience, some 67.2% had never undertaken an overnight bushwalk in Tasmania.

Bushwalking experience on the Overland Track (N = 866)

While the vast majority (84.4%) of people who walked the track were first time visitors to the Overland, a small proportion (14%) of them had walked the track between one to six times prior to the survey being conducted. It is also evident that a small group of people (1.6%) had visited the track on more than 6 occasions.

6.3 Visit characteristics

Type of groups

Visitors walked in a variety of different types of groups, of which friends and family groups were the most common (65.1%). The second most common group was the commercially guided hut-based groups (Table 6.4). These groups are accommodated in huts provided and maintained by a concessionaire for the exclusive use of their clients and guides. Solo visitors were the third most common group type (7.9%), and visitors in organised non-commercial groups (bushwalking/outdoor activity clubs and school/scout groups) made up 6.1% of the respondents. Tent-based commercial groups were the least common of the commercially guided walking groups (3.0%).

Table 6.4 The number and proportion of visitors travelling in different group types on the Overland Track

Group Type	Frequency ($N = 878$)	%
Solo	69	7.9
Friends/family	572	65.1
Bushwalking/outdoor activity club	15	1.7
School/scout group	39	4.4
Commercially guided – tent-based	26	3.0
Commercially guided – hut-based	157	17.9

In a management perspective, independent non-commercial groups may be aggregated and described as free-walkers. When all independent visitors are incorporated in the free-walker category they are the predominant user group (79.2% of all visitors).

Party size

Party size ranged between one and 15 people, with the most common size (mode) being two (Figure 6.1). The mean party size is 5.3 with a *SD* of 4.2. More than three-quarters (76.0%) of visitors were in parties of nine or less, and approximately half (50.7%) were in parties of three or less. Parties of 12 people constituted 10.4% of all visitors in the sample.

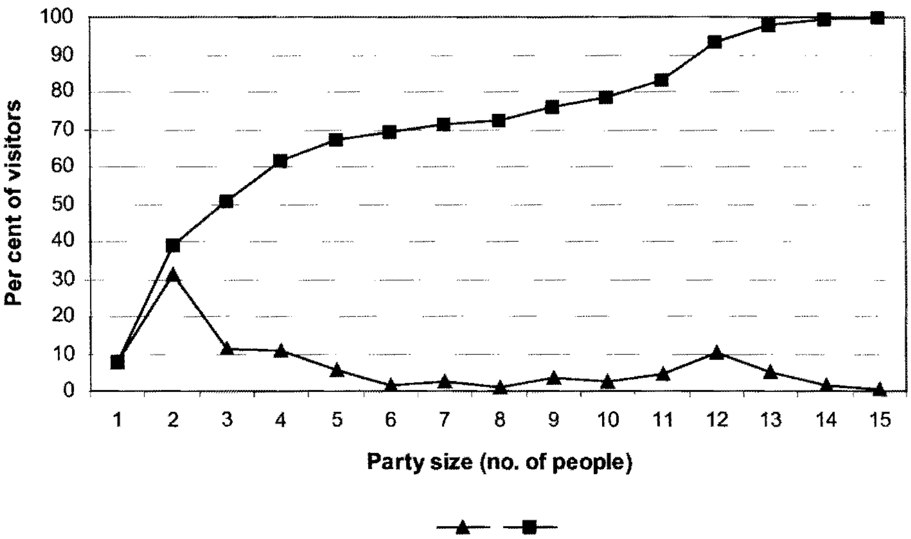

Figure 6.1 Party sizes of visitors who undertook an overnight walk on the Overland Track (*N* = 878)

Routes taken

Overnight visitors undertook various routes when visiting the Overland Track (Table 6.1). Of the routes examined in this study, 89.9% walked the entire Overland Track between Cradle Valley in the north and Lake St Clair in the south (Table 6.5). Of those walking the entire Overland Track, the vast majority of visitors (90.6%) began their journey in the north and headed south to Lake St Clair.

Table 6.5 The frequency and proportion of visitors who walked the southbound, northbound and southern Overland Track routes (*N* = 878)

Route	Frequency	%
Entire Overland Track - Southbound	715	81.8
Entire Overland Track - Northbound	74	8.4
Southern Section only	89	10.1

Some 10.1% of visitors walked the southern section of the Overland Track. This route is popular as it provides access to features such as Mt Ossa (Tasmania's highest mountain) the historic Du Cane Hut (Figure 5.7) and a number of spectacular waterfalls.

Duration of trip

Visitors completed a range of trips of varying duration, ranging from two to 14 days (Figure 6.2). The mean trip length was 5.9 days (*SD* = 1.64). The median trip length was six days, as was the mode. Only 14.3% of visitors extended their trip beyond seven days duration, and less than 1.0% of trips were 10 days or more.

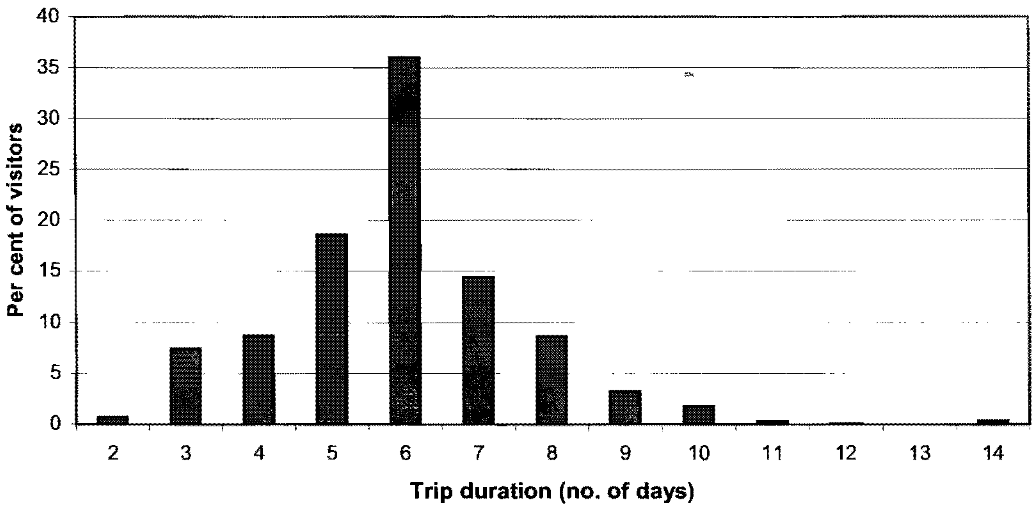

Figure 6.2 The proportion of visitors who undertook trips of different duration on the Overland Track (*N* = 877)

6.4 The influence of indicators on visitors' experiences

Visitors were asked to indicate how important each of the 16 indicators was in determining the quality of their recreation experience. Table 6.6 shows how visitors rated the indicators on a six-point categorical scale from *not at all important* to *extremely important.*

The most influential indicator of the quality of the visitors' overnight bushwalking experience on the Overland Track was the *amount of litter I see*, ranking *very* to *extremely important* (mean = 5.25). *The presence of wildlife* was considered the second most influential item (mean = 4.88) in determining the quality of respondents' experience. *Directional signs and track markers* were considered to be *moderately* to *very important* (mean = 4.63) perhaps reflecting the large proportion of relatively inexperienced visitors[9]. Indeed, most visitors had no prior bushwalking experience of Tasmania (67.2%) or the Overland Track (84.4%).

Table 6.6 Visitor ratings of the relative influence of indicators in determining the quality of their experience on the Overland Track (N = 862[†]).

Indicator[‡]	Median[#]	Mean[•]	*SD*	Mean Rank
Amount of litter I see	6[a]	5.25[a]	1.08	1
The presence of wildlife	5[b]	4.88[b]	1.07	2
Directional signs and track markers	5[c]	4.63[c]	1.33	3
Damage to vegetation around a campsite	5[c]	4.54[c]	1.19	4
Amount of vegetation loss/bare ground at campsites	4[d]	4.29[d]	1.24	5
Amount of noise associated with human presence and activity	4[d]	4.24[d]	1.31	6
On-site information about nature, history and/or management	4[e]	3.96[e]	1.41	7
The number of people camped overnight at a campsite	4[f]	3.79[f]	1.45	8
Eroded and/or muddy tracks	4[f]	3.70[fg]	1.38	9
The number of people camping within sight or sound of my campsite	4[f]	3.64[gh]	1.44	10
The amount of time other people are in sight when I am along the track	4[g]	3.56[hi]	1.53	11
The use of huts for accommodation	4[gh]	3.54[hijk]	1.71	12
Seeing and/or hearing aircraft	4[gh]	3.48[ijk]	1.63	13
The number of groups I see along the track	4[h]	3.44[jk]	1.50	14
The size of groups I meet	3[h]	3.43[k]	1.58	15
Total number of people I see along the track	4[h]	3.42[k]	1.47	16

† Minimum *N* size for all items in the table. Because of different item response rates, some items have a few more responses than indicated.

‡ Possible response categories on degree of influence: 1 = not at all; 2 = slightly important; 3 = somewhat important; 4 = moderately important; 5 = very important; and, 6 = extremely important.

• Means with different letters are statistically different from each other at $P < 0.05$ (paired *t*-test).

\# Medians with different letters are statistically different from each other at $P < 0.05$ (Wilcoxon signed ranks test).

Biophysical impacts appear to be of universal importance to wilderness recreators both in Australia (Morin *et al.* 1997) and overseas (Manning 1999; Rutledge & Trotter 1995a). Indicators of use impacts, as are *damage to vegetation around the campsite* and the *amount of vegetation loss/bare ground at campsites* were considered to be *moderately* to *very important* in determining the quality of free-walkers' experience with means equalling 4.54 and 4.29 respectively (Table 6.6).

The *amount of noise associated with human presence and activity* was deemed to be *moderately* to *very important* (mean = 4.24) in influencing the quality of visitors' experiences.

On-site information about nature, history, and/or management ranked seventh above *eroded and muddy tracks* (ninth) as being *somewhat* to *moderately important* influences on the

[9] Some 41.9% of visitors had completed no more than six bushwalks prior to their visit (Section 6.4).

quality of visitors' experiences. While *eroded and/or muddy tracks* are also recreation related impacts, such as *vegetation loss/bare ground at campsites* and *damage to vegetation around the campsite*, its lower ranking may be reflective of the predominantly hardened nature of the Overland Track [10].

The influence of social indicators ranked lower than those items related to the biophysical condition. Campsite related items proved the most influential of the social items tested. *The number of people camped overnight at a campsite* ranked highest (eighth), being considered *somewhat* to *moderately important* (mean = 3.79), and *the number of people camped within sight or sound of my campsite* came tenth in the ranking (mean = 3.64). The finding that campsite encounters were more influential than on-track encounters in determining the quality of respondents' experiences is in keeping with other wilderness research and is a very common finding (Lee 1977; Lucas 1980; Patterson & Hammitt 1990; Roggenbuck *et al.* 1993; Stankey 1973, 1980). One explanation for recreationists' sensitivity to campsite encounters is that while on- track encounters are brief, sharing a campsite with other people is an experience which is longer in duration, making one more conscious of other people's presence (Lee 1977).

When trying to identify which indicators are most influential in determining the quality of visitors' experiences, knowing their relative importance may be of limited assistance when, in cases such as that described in Table 6.6, their mean importance is not statistically different from items that rated lower (Roggenbuck *et al.* 1993). For this reason it is useful to develop an understanding of the structure that underlies the influence of these indicators. As such, further analysis was required to draw out the underlying patterns in the data to highlight which indicators may best represent the various dimensions of the visitor experience.

6.5 The key factors that affect the quality of visitors' experiences

One of the objectives of the Tasmanian Wilderness World Heritage Area Management Plan (PWS 1999: 34) is 'to maintain or enhance wilderness quality'. This objective is divided into two subsets, one that relates to the 'control of wilderness impacts', and the other regarding the 'wilderness recreational experience' (PWS 1999: 94). A Key Desired Outcome of this second subset is to 'identify [the] key factors that degrade the wilderness experience of

[10] Duckboarding, cording, and parallel planking are just some of the track hardening techniques that have been employed along the Overland Track.

visitors and establish strategies to actively manage those factors to maintain or enhance the quality of visitor experience' (PWS 1999: 94).

Using the method described in Chapter 4, factor analysis was performed to explore the underlying structure of the data. It is a statistical technique that examines the pattern of correlations among a set of variables (in this case the items presented in Table 6.6) and identifies a reduced number of factors that explain most of the observed variance in the data (Tabachnick & Fidell 2001). In addition to detecting the underlying factors, it also determines the factor loading for each item. The greater an item's factor loading, the more it is a genuine measure of the factor (Tabachnick & Fidell 2001). If an item loads on more than a single factor it is considered complex. Such cross-loadings indicate items that are related to more than a single dimension of the phenomenon being examined, which in the current study are the influences on the quality of visitors' experiences. The loadings within each factor highlight those items (variables) that best define them, that is, those that account for the greatest variability. The result of factor analysis is therefore a reduced number of experiential dimensions, the identification of which can help managers better understand the factors and individual items that influence the quality of visitors' experiences.

When the importance ratings of the items examined were analysed, four latent dimensions emerged with no cross-loaded items (Table 6.7). These groupings were examined and given labels that characterised the nature of the items that belonged to each group. Cronbach's alpha was calculated for each factor to test their reliability. Low alpha values (0.52 and 0.59) were recorded for two of the factors that had just two and three items in them. Despite the low values, the factors were kept as part of the factor structure since alpha values are often lower when smaller numbers of items are involved (Cortina 1993; Shafer, C.S. & Inglis 2000), and the factor themes are recognised as established components of visitors' experiences in wilderness and backcountry areas (Manning 1999; Roggenbuck *et al.* 1993; Watson *et al.* 1992).

As shown in Table 6.7, 'people encounters' accounted for the most variance in the data (27.68%). The items that made up this factor were considered somewhat important in determining the quality of visitors' bushwalking experiences on the Overland Track, with an unweighted mean rating of 3.65 across the seven items. 'Biophysical impacts' emerged as the factor that accounted for the second largest amount of variance (14.18%) among the visitors responses with an unweighted mean importance rating of 4.18. *Damage to vegetation around the campsite* was the most important item in that group. 'Infrastructure presence' was the third most important factor, making up 11.30% of the variance among the responses to the survey. The overall unweighted importance of this factor was 3.97, with the *directional signs and track markers* emerging as the key item in that group. Finally, the factor that accounted for the least variance in the data (10.20%) was that made up of items related to theme of 'natural sights and sounds'. *The presence of wildlife, amount of litter I see* and *seeing and or hearing aircraft* combined to form this factor with an overall unweighted mean[11] importance rating of 4.54.

Table 6.7 Factor analysis of the importance of items in determining the quality of visitors' experiences on the Overland Track (N = 878)

Factor and items†	**Factor loading (%VE§)**	**Mean importance‡ (overall factor*) items**	**α#**
People encounters	(27.68)	(3.65)	0.90
The number of groups I see along the track	.870	3.44	
Total number of people I see along the track	.829	3.42	
The size of groups I meet	.826	3.43	
The number of other people camping within sight or sound of my campsite	.803	3.64	
The amount of time others are in sight along the track	.793	3.56	
The number of other people camped overnight at a campsite	.784	3.79	
Amount of noise associated with human presence and activity	.505	4.24	
Biophysical impacts	(14.17)	(4.18)	0.73
Damage to vegetation around the campsite	.861	4.54	
Amount of vegetation loss/bare ground at campsites	.853	4.29	
Eroded and/or muddy tracks	.576	3.70	
Infrastructure presence	(11.30)	(3.97)	0.59
Directional signs and track markers	.788	4.63	
On-site information about nature, history, and/or management	.720	3.96	
The use of huts for accommodation	.677	3.54	
Natural sights and sounds	(10.20)	(4.54)	0.52
Seeing and/or hearing aircraft	.658	3.48	
The presence of wildlife	.646	4.88	
Amount of litter I see	.551	5.25	

† Factor Analysis using principle components with Varimax rotation with Kaiser Normalisation

‡ Mean values calculated on a six-point scale that ranged from 1 = *not at all important* to 6 = *extremely important*

\# Cronbach's alpha (internal reliability test)

* Unweighted factor mean

§ Per cent of variance explained by the factor

Factor analysis has been useful in developing an understanding of the key influences on the quality of visitors' experiences by reducing the 16 tested items to four underlying factors.

[11] Unweighted means indicate the average importance of items loaded within a factor. Importance is rated on a six-point scale ranging from 1 = *not at all important* to 6 = *extremely important*.

When the importance of many indicators does not vary significantly, as shown in Table 6.6, an understanding of the underlying factors that determine the quality of visitors' experiences can inform the selection of indicators for incorporation into limits of acceptable change monitoring programs. How such knowledge informs the selection of indicators is discussed in more detail in Chapter 8.

6.6 Expectations, actual experiences and their affect on the quality of visitors' experiences

From the results presented in the previous section it is clear that visitors considered a range of indicators to be important in determining the quality of their experiences. With this in mind, six indicators were more closely examined to determine visitors' expectations, and assess whether they had been met. Further, the impact of the conditions encountered on the quality of their experiences was identified.

Depending on the particular indicator examined, between 36.6% and 48.7% of visitors had expected to encounter specific conditions on the Overland Track (Table 6.8). Notably, more than half the visitors had no expectations at all in this regard.

Table 6.8 Proportion of visitors who had expectations, no expectations or did not provide a number specifying the level of encounters they expected on the Overland Track

Item	Had expectation† %	Had no expectation %	No number‡ %
The number of groups encountered along the track in a day (N = 878)	39.2	59.4	1.4
The largest group encountered along the track (N = 878)	48.7	50.2	1.3
The number of people encountered along the track in a day (N = 878)	41.1	55.5	3.4
Maximum number of aircraft seen or heard in a day (N = 878)	36.6	61.8	1.6
Maximum number of other people expected to be camped within sight or sound of your campsite (N = 595)	39.1	59.1	1.9
The largest group encountered at a campsite (N = 595)	38.3	60.0	1.7

Note: Due to rounding some percentages do not add to 100

† Provided a quantified amount

‡ Neither indicated that they 'had no expectation' nor gave a number

Number of other groups encountered along the track in a day

Of the visitors who expected to encounter a particular number of other groups along the track (N = 340), more than half (58.2%) expected to meet less than six other groups, and more than three-quarters (87.9%) of them expected 10 or less (Table 6.9). In terms of their actual experience, overall more than half the visitors (57.1%, N = 476) reported meeting six or more other groups along the track in a day. Indeed, most visitors (81.9%, N = 682) stated that they had encountered four or more other groups in a day while walking along the track. Of the visitors with specific expectations for the number of other groups they would encounter along the track in a day (N = 333), some 60.7% reported encountering more groups than they had expected.

Table 6.9 Expected and reported number of groups encountered along the track in a day on the Overland Track

Number of groups encountered along the track in a day	Proportion of visitors (percentiles)		
	25%	**50%**	**75%**
Expected (N = 340)	≤ 3	≤ 5	≤ 10
Reported number encountered (N = 833)	≤ 4	≤ 6	≤ 10

Just under a quarter (24.2%, N = 209) of visitors reported that the number of other groups they encountered along the track in a day had *detracted*[12] from the quality of their experience. More than half (57.6%, N = 498) the visitors said it had *no influence* at all, and just 18.3% (N = 158) stated that it had *enhanced* the quality of their experience.

Maximum size group encountered along the track

Of the visitors surveyed (N = 878), just 48.7% had any expectation for the size of the largest group they were likely to encounter when walking along the Overland Track. Interestingly, visitors commonly rounded their maximum expected group sizes to even numbered groups such as two, four, six and so on to a group size of 12; a phenomenon known as 'digital preference bias' (Hammitt & Rutlin 1995: 257). Once the expected maximum group sizes expanded beyond 12 people, small concentrations of expectations appeared at maximum group sizes of 15 and 20 people.

[12] Visitors were asked to indicate the effect of the level of encounters they experienced on a five-point Likert scale for which possible responses were *greatly enhance*, *enhance*, *no influence*, *detract* and *greatly detract* (see Appendix C). When reporting the results the response options at either ends of the scale have been collapsed and are described in the text as *detracted* or *enhanced*.

More than half (52.8%) of the visitors with expectations thought the largest group they would meet would have fewer than eight people, and 39.0% expected groups to have no more than six people (Table 6.10). Overall, 80% of visitors expected to encounter no groups larger than 10 people when walking along the track. Just 9.2% of visitors expected to encounter groups larger than the maximum party size (13 people) recommended by the PWS (1998b: 97). In total, 53.4% (*N* = 227) of visitors who had expected specific conditions along the track reported that they had encountered a larger group than they had expected.

Table 6.10 Expected and reported maximum size group encountered along the track

Maximum size group encountered along the track	Proportion of visitors (percentiles)		
	25%	**50%**	**75%**
Expected (*N* = 340)	≤ 6	≤ 8	≤ 10
Reported number encountered (*N* = 833)	≤ 8	≤ 10	≤ 12

A similar pattern of rounding to that seen in the data of visitors' expectations of the maximum group size they were likely to encounter along the track was evident in the data of the reported maximum group sizes encountered. Comparison with respondents' party sizes, however, suggests this phenomenon might simply be an artefact of two persons being the most common group size for visitors on the track (Figure 6.1).

Of all the visitors (*N* = 833), 34.3% reported they had not encountered any groups larger than eight people in size along the track. Almost half (43.4%) the visitors, however, stated that they had encountered groups in excess of ten people in size. Only a small proportion of visitors (21.8%), said they met any groups larger than 12 people, and an even smaller proportion reported encountering a group larger then the maximum party size recommended by the PWS (1998b).

Few visitors (8.0%, *N* = 69) reported that the quality of their experiences was *enhanced* by the size of the largest party they encountered along the track. While 63.7% (*N* = 548) of all visitors reported that meeting the largest group they did along the track *had no influence* on the quality of their experience, more than a quarter of visitors (28.3%, *N* = 243) reported that such an encounter had *detracted* from it.

Number of people encountered along the track in a day

Visitors were asked how many people they had expected to encounter along the track in a single day. Of the visitors surveyed (*N* = 878), the majority (55%, *N* = 483) said *they had no expectation* about the number of other visitors they were likely to encounter along the track

(Table 6.8). Some 40.8% (N = 358) of visitors did have expectations for the number of people that they would be likely to encounter and provided a quantified response (Table 6.8). Commonly visitors' expectations were centred on multiples of five encounters with other people along the track, with higher concentrations at multiples of ten, which may suggest an element of estimation in formulating their responses, and the influence of digital preference bias (Hammitt & Rutlin 1995).

Less than a third of visitors (28.8%, N = 103) who had expected to encounter a specific number of other people along the track stated that they expected to meet a maximum of ten or fewer people in a day (Table 6.11). More than half the visitors (58.4%, N = 209) expected to encounter 20 or more people along the track during the day. Only 20.1% (N = 72) of visitors expected to encounter 30 or more other people along the track in any single day. Of the visitors who expected not to encounter more than a particular number of people along the track in a day, 61.0% (N = 217) of them reported encountering more people than they had expected.

Table 6.11 Expected and reported maximum number of people encountered in a day while walking along the track

Maximum number of people encountered in a day along the track	Proportion of visitors (percentiles) 25%	50%	75%
Expected (N = 340)	$\leq$ 10	$\leq$ 20	$\leq$ 30
Reported number encountered (N = 853)	$\leq$ 15	$\leq$ 25	$\leq$ 35

About one-quarter of visitors (26.6%, N = 213) reported encountering 15 or fewer people along the track in a day during their trip. Less than half the visitors (47.6%, N = 387) said they met fewer than 25 other people along the track in a day, and almost a quarter of visitors (24.2%, N = 194) stated they saw more than 35 people.

Of the visitors (N = 853) who were asked how the greatest number of people they encountered on the track in a day affected the quality of their experience, more reported the number of people they encountered along the track in a day *detracted* from the quality of their experience (27.8%), than said it enhanced (14.0%). Most visitors (58.3%) however, stated that the number of other people they encountered on the track *had no influence* on the quality of their experience.

Maximum number of aircraft seen or heard in a day

Visitors were asked what the maximum number of aircraft they expected to see and/or hear in a day. Visitors' expectations ranged from seeing or hearing none to as many as 12 overflights in that time. Only 36.6% (*N* = 321) of visitors had prior expectations with respect to the maximum number of overflights that they were likely to see and or hear in a day during their trip, while the majority (62.8%, *N* = 543) *had no expectation* (Table 6.8). More than half (53.6%, *N* = 172) of the visitors with expectations anticipated enjoying their trip free of the intrusion of the sight or sound of aircraft, and 86.9% (*N* = 279) of them expected to see or hear no more than two overflights (Table 6.12). Only 6.9% (*N* = 22) of visitors with expectations expected to encounter more than three overflights in any one day.

Table 6.12 Expected and reported maximum number of aircraft seen and/or heard in a day

Maximum number of aircraft seen and/or heard in a day	Proportion of visitors (percentiles)		
	25%	**50%**	**75%**
Expected (*N* = 321)	≤ 0	≤ 0	≤ 2
Reported number encountered (*N* = 779)	≤ 1	≤ 2	≤ 3

In all, 68.3% (*N* = 215) of visitors who expected to encounter no more than a specific number of aircraft in a day stated that they saw and/or heard more aircraft in a day than they thought they would during their trip. When visitors were asked *what was the greatest number of aircraft you saw/heard in a day*, they reported encountering between zero and 30 overflights in a day, although the proportion of visitors who said they had encountered in excess of ten overflights in a day was just 2.2% (*N* = 17). Some 95.5% (*N* = 744) of visitors stated that they saw or heard at least one overflight during their trip and 70.2% (*N* = 547) of visitors reported encountering two or more aircraft in a day during their trips (Table 6.12). Less than a quarter (22.3%, *N* = 174) of visitors said they saw and/or heard more than three aircraft in a day during their trip.

When asked how seeing or hearing the number of overflights in a day affected their experience 33.0% (*N* = 282) of visitors stated it had *detracted* from the quality of their experience, but most (59.4%, *N* = 507) reported it had had *no influence*. Just 7.6% (*N* = 65) of visitors felt that the number of aircraft they had encountered had *enhanced* the quality of their experience.

The following two subsections summarise findings about visitor experiences among those who slept in tents at some period during their trip on the Overland Track; a total of 67.9% of visitors (*N* = 595) did so. These visitors were asked about the number of people camped within sight or sound and the overall number of people camped at a campsite. Specifically, they were asked about their expectations, actual experience and how this affected the quality of their experience.

Maximum number of other people camped within sight or sound

Visitors who camped in a tent during their trip along the Overland Track were asked what was the maximum number of other people they expected to encounter camped within sight or sound of their campsite. While the majority (59.1%, N = 352) *had no expectation* for the number they were likely to encounter, 39.1% (N = 232) expected no more than a particular number of people (Table 6.8).

More than a quarter (28.9%, N = 67) of visitors with preconceived expectations stated they were likely to encounter no more than four other people camped within sight or sound of their campsite (Table 6.13). About half (49.1%, N = 114) the visitors thought it likely they would be within sight or sound of no more than eight other people at a campsite, and as much as three-quarters (75.4%, N = 175) of the visitors expected to share a campsite with no more than 12 other people.

Table 6.13 Expected and reported maximum number of people camped within sight or sound

Maximum number of people camped within sight or sound	**Proportion of visitors** (percentiles)		
	25%	**50%**	**75%**
Expected (N = 232)	≤ 4	≤ 10	≤ 12
Reported number encountered (N = 561)	≤ 6	≤ 12	≤ 25

A small proportion of visitors indicated that they expected but did not encounter any other groups at campsites. These data show it is possible to locate and make use of campsites away from other people and groups if desired, although this may not always be achievable. Almost a quarter (60.2%, N = 139) of visitors who had expected to encounter specific campsite conditions stated they had found themselves camped within sight or sound of more people than they had expected at some time during their trip along the Overland Track.

More than half (53.8%, N = 302) of the visitors reported that they camped within sight or sound of no more than 12 other people (Table 6.13). Less than a quarter (23.7%, N = 133) of all visitors stated that they had more than 25 other people camped within sight or sound. Close to a third (29.2%, N = 164) of visitors said they had camped with six or fewer other people within sight or sound of their campsite throughout their trip along the Overland Track.

For the majority (58.1%, N = 340) of the visitors who camped in tents, the number of other people camped within sight or sound had *no influence* on the quality of their experience. However, almost a third (30.2%, N = 177) of visitors stated that the number of other people that camped within sight and sound *detracted* from their experience, compared to just 11.6% (N = 68) of visitors who said it had a positive affect.

Maximum size group encountered at a campsite

Visitors who slept in a tent during their trip were asked what was *the largest group you expected to encounter at a campsite.* Sixty per cent (N = 357) of these visitors reported that they *had no expectation,* while some 38.4% (N = 228) of visitors provided an indication of the largest group they expected to encounter at a campsite (Table 6.14).

Table 6.14 Expected and reported maximum size group encountered at a campsite

Maximum size group encountered at a campsite	Proportion of visitors (percentiles) 25%	50%	75%
Expected (N = 228)	≤ 5	≤ 6	≤ 10
Reported number encountered (N = 556)	≤ 4	≤ 7	≤ 12

Of the visitors with expectations, more than half (52.2%, N = 119) did not expect to encounter any groups larger than six people at a campsite (Table 6.14), and 29.8% (N = 68) expected the maximum group size to be five people or less. Less than a quarter (18.9%, N = 43) of visitors with expectations felt it was likely they would encounter group sizes in excess of 10 people at campsites, and only 13.2% (N = 30) expected group sizes beyond the maximum of 13 set by the PWS (1998b). Of the visitors who had expected to encounter specific conditions at campsites along the Overland Track, 37.3% (N = 82) of them reported that they had encountered a larger group than they had expected to while at camp.

Overall, 30.8% (N = 112) of visitors reported encountering maximum group sizes of four or fewer people at campsites, while groups of eight or more people in size were reported by almost half the visitors (47.5%, N = 264). Some, 17.8% (N = 99) of visitors stated they had encountered groups of more than 12 people in size, and just 16.2% (N = 90) of visitors said they had encountered groups larger than the recommended maximum of more than 13 people (PWS 1998b).

Almost 70% (69.3%, N = 395) of all visitors reported that the largest group they encountered at a campsite had *no influence* on the quality of their experience. While 10.0% (N = 57) of visitors said encountering a group of that size *enhanced* their experience, more than twice their number (20.7%, N = 118) reported that the experience had had a negative impact.

General conclusions

Most visitors had no preconceived ideas of the specific conditions they would encounter on their journey along the Overland Track. It is not surprising then that most visitors stated that the conditions they encountered had *no influence* on the quality of their experiences. Indeed, in the absence of expectations there can be no dissonance between them and reality which means that negative and perhaps positive evaluations are less likely (Brehm & Cohen 1962; Festinger 1962). However, few visitors (between 7.6% and 18.3%) stated that the encounters they experienced had *enhanced* the quality of their trip. Further, a substantial proportion of visitors (between 20.7% and 33.0%) felt the encounters they experienced had *detracted* from its quality. Moreover, the large proportion of visitors whose experiences conflicted with their expectations is likely to have contributed to the negative impact on their experiences.

6.7 The hut experience

Eleven huts are provided by the PWS for use by visitors along the Overland and associated tracks. As outlined in Section 5.1, these huts vary in age, comfort, and capacity. Use of the huts is open to all visitors; however, their use for overnight accommodation is reserved for visitors in non-commercial groups.

Use of the public huts

About two thirds (65.6%, N = 574) of visitors made use of the huts in some way, and of these visitors, only a small proportion (7.3%) relied on them for overnight accommodation. Visitors who made use of the public huts were asked if they used the huts to 'shelter from the rain', 'cook and or eat in', 'socialise', and or 'sleep in', and their responses are reported in Table 6.15.

Table 6.15 How visitors used the public huts along the Overland Track (N = 574)

Type of use	Yes (%)	No (%)
To shelter from the rain	59.2	40.8
To cook and or eat in	76.6	23.4
To socialise	43.8	56.2
To sleep in	77.3	22.7

Although about one fifth of visitors used the public huts for purposes other than overnight accommodation, they were mainly used as a place to sleep (Table 6.15). Similarly, for most hut users the public huts served as a place to cook and eat. More than half the hut users sought refuge from rain, while a lesser although substantial number's of visitors used the huts as a place to socialise.

Crowding at huts and the impacts on the quality of the hut experience

Most (59.8%, N = 340) hut users reported that they had felt crowded at one or more of the public huts during their trip. A number of issues influenced the quality of the hut experience, including the number of visitors in the huts, their capacity, people's behaviour and the size of groups that used them. These impacts can become particularly apparent at times of peak use and inclement weather. Hut users were asked if and how five possible impacts affected the quality of their experiences. The impacts and visitors responses are presented in Table 6.16.

Table 6.16 Hut-based impacts and their affect on the experience of hut users

Possible impact	I did not experience this (%)	Noticed but not bothered (%)	Bothered me a little (%)	Bothered me a lot (%)
Not having enough space in the huts (N = 564)	37.6	26.4	23.2	12.8
Having to rush in the morning for a place to sleep in the next hut (N = 561)	63.3	19.8	11.2	5.7
Seeing too many people in the huts during the evenings (N = 562)	34.5	31.1	24.9	9.4
Some people being loud during the evenings (N = 562)	42.9	22.8	22.8	11.6
Large groups dominating the space in the huts (N = 563)	44.0	18.1	19.7	18.1

Note: Due to rounding some percentages do not add to 100

Although not all impacts bothered visitors, individually they bothered more than a third of all hut users. Of the five impacts examined, the least experienced was the need to 'rush in the morning for a place to sleep in the next hut'. Only a third of the visitors using the huts felt it was necessary to make an early start in an attempt to ensure they had a place to sleep in the next hut, and of these most were not bothered.

Of all the impacts, most hut users felt that there were too many people in the huts during the evenings, and most were bothered by it. Likewise, most hut users noticed a lack of space in the huts, and of these, the majority was bothered by it.

The impact that most negatively affected hut users experience however, was when large groups dominated the space in the huts. Almost two-thirds of visitors noticed this impact and more than a third of all hut users were bothered by it. A similar proportion of hut users reported that 'some people being loud during the evenings' had bothered them.

6.8 Defining social norms

It is evident then, for some visitors the conditions they encountered detracted from their experience, while for others it either had no influence or enhanced it. To build an understanding of the conditions visitors considered to be acceptable for the Overland Track, an examination of visitors' norms was undertaken for six social indicators. This section reports the results of that investigation.

Are the norms the same for the evaluative dimensions?

A comparison of the responses of visitors who specified both a preference and a maximum limit found that their preferences were for significantly fewer encounters ($P < 0.001$) than the maximum that they would tolerate for the six indicators examined. The comparisons presented in Table 6.17 provide an indication of how far visitors' norms, as defined by their maximum acceptable limits, were from their ideal or preferred setting condition. This suggests that visitors had a tolerance buffer that mediated the impact of experiencing more than their preferred number of encounters.

Table 6.17 Visitors' preferred and maximum acceptable limits for potential indicators

Indicator	Evaluative dimension†	*N*	Mean	*SD*	*CV*‡	Q2#	Q1*	SIQR§
No of groups encountered along the track in a day	Prefer	477	4.6	4.2	0.91	4	2	2
	Maximum	568	8.6	6.7	0.78	6	2	3
Maximum size group encountered along the track	Prefer	546	6.17	3.0	0.49	5	4	2
	Maximum	609	9.0	4.2	0.47	8	6	2
Maximum number of people encountered along the track	Prefer	499	17.4	15.6	0.90	15	10	5
	Maximum	546	27.9	21.3	0.76	20	12	14
Maximum number of aircraft seen/heard per day	Prefer	531	0.7	1.4	2.00	0	0	0.5
	Maximum	561	2.1	2.4	1.14	2	0	1.5
Maximum number of other people camped within sight or sound	Prefer	378	7.3	8.5	1.16	5	0	5
	Maximum	396	13.0	12.8	0.98	10	5	7.5
Maximum size group at a campsite	Prefer	357	5.7	3.5	0.61	5	4	2
	Maximum	400	8.1	4.3	0.53	8	5	2.5

† All preferences and maximums are significantly different at $P < 0.001$ (paired *t*-test)

‡ Coefficient of variation

Median: fifty per cent of respondents would accept this encounter level

* Seventy-five per cent of the respondents would accept this encounter level

§ Semi-interquartile range

Knowing that visitors will tolerate conditions that do not meet their preferences does little to help researchers and managers determine which evaluative dimension social norms, and thus standards, are to be based.

On which evaluative dimension should social norms be based?

Before defining social norms it is important to determine the evaluative dimensions on which they are to be based. Three essential questions must be answered. First, for which evaluative dimension were the norms most prevalent? Second, for which evaluative dimension was there the greatest consensus about the norm? Third, which evaluative dimension was the basis for the most congruent norms?

Norm prevalence

When asked to specify their personal norms for a range of potential indicators, at least a third of visitors either *didn't care* or did not quantify the preferred or maximum number of encounters they would accept (Table 6.18). The prevalence of norms based on visitors' preferences varied somewhat, ranging from a low of 41.3% for the largest group they would prefer to encounter at a campsite through to a high of 62.2% for the largest group they would prefer to encounter along the track. In comparison, the prevalence of personal norms was consistently higher when visitors were asked to state the maximum number they would accept than when asked for their preferred norm.

The prevalence of maximum based norms was fairly uniform across the six potential indicators, ranging from 62.5% for the maximum number of people encountered along the track in a day, to 69.7% for the maximum acceptable group size encountered along the track. Norm prevalence for this evaluative dimension was between 3.6% to 26.2% higher than that elicited by preference based norms.

Relationship between norm prevalence and importance (salience)

Visitors' assessments of the importance of the indicators were examined for those who had a norm, didn't care, and failed to provide a quantified norm. This was done to determine if visitors who stated that they didn't care about a norm were 'fence sitting' by opting for the response that didn't require them to quantify their norms; or whether they judged the indicator to be truly less important in determining the quality of their experienced than those who provided a norm did.

For both evaluative dimensions, significant differences ($P < 0.001$) were found in the median importance of each indicator across the 'had a norm', 'didn't care', and 'no number' categories. Moreover, visitors who 'had a norm' considered the indicators to be significantly more important ($P < 0.001$) in determining the quality of visitors' experiences than those who stated that 'didn't care'. The results were mixed for the 'no number' category. The level of importance visitors in the 'no number' category attributed to indicators varied from being significantly different ($P < 0.05$) from visitors who 'had a norm' or 'didn't care', to not differing from visitors in either category.

Table 6.18 Norm prevalence for potential indicators

Potential indicators	Evaluative dimension	Had a norm† %	Didn't care %	No number‡ %
The number of groups encountered along the track in a day ($N = 878$)	Prefer#	54.3^{a}	41.2^{b}	4.4^{c}
	Maximum#	66.2^{a}	29.9^{b}	4.4^{a}
The largest group encountered along the track ($N = 878$)	Prefer#	62.2^{a}	35.1^{b}	2.7^{ab}
	Maximum#	69.7^{a}	27.8^{b}	2.5^{a}
The number of people encountered along the track in a day ($N = 878$)	Prefer#	56.8^{a}	38.3^{b}	4.9^{b}
	Maximum#	62.5^{a}	32.3^{b}	5.2^{a}
The number of aircraft seen or heard in a day ($N = 878$)	Prefer#	60.5^{a}	29.5^{b}	10.0^{c}
	Maximum#	64.1a	24.5^{b}	11.4^{c}
The number of other people camped within sight or sound of your campsite ($N = 591$)	Prefer#	43.1^{a}	21.6^{b}	35.3^{a}
	Maximum#	67.0^{a}	28.4^{b}	4.6^{a}
The largest group encountered at a campsite ($N = 593$)	Prefer#	41.3^{a}	24.3^{b}	35.1^{ab}
	Maximum#	67.5^{a}	29.0^{b}	3.5^{b}

Note: Due to rounding some percentages do not add to 100

† Provided a quantified amount

‡ Neither indicated that they 'didn't care' or gave a number

Kruskal Wallis ($P < 0.001$). Proportions with different superscript letters indicate significant differences ($P < 0.05$) in the level of importance visitors in the 'had a norm', 'didn't care', and 'no number' categories attributed to the indicator (Mann-Whitney U post hoc tests)

Consensus

As discussed above, more visitors specified the maximum number of encounters they could tolerate than quantified what their preferred setting condition was. However, it would be unwise to base the development of social norms simply on the basis of prevalence without knowing for which norm (preferred or maximum) there is greater consensus.

What constitutes high or low consensus remains unclear and 'there are no statistical guidelines or rules of thumb' to guide researchers or managers (Manning 1999: 148). In the absence of such criteria the matter of consensus becomes a relative measure, that is, there is more agreement about the norms based on evaluative dimension A than evaluative dimension B.

Coefficient of variation (*CV*) and the semi-interquartile range SIQR have been used as measures of dispersion and as indicators of *crystallisation* (or shared agreement) about the norms that define what conditions visitors consider acceptable (Hall & Shelby 1996; Roggenbuck *et al.* 1991). Due to the presence of outliers, and other reasons discussed in Chapter 4, means and standard deviations are of little use and have only been presented because: a) they are widely cited by other authors, and b) to allow comparison with other studies (Manning 1999; Manning & Lime 2000; Roggenbuck *et al.* 1991).

In terms of the level of consensus amongst visitors, the *CV* indicates greater agreement about the maximum acceptable limits than for the preferred condition across the six types of encounters examined (Table 6.17). Like Hall and Shelby (1996), I am unwilling to use either the *SD* or the *CV* as measures of crystallisation due to the existence of a small number of large outliers within the data that affect these measures. As an alternative indicator of the level of consensus amongst visitors the *SIQR*, as used by Hall and Shelby (1996), revealed the opposite to be true for five of the six types of encounters. In practical terms however, the differences in variation as indicated by either the *SIQR* or the *CV* was insubstantial for all but the maximum number of people encountered along the track. Thus, in this case the relative degrees of consensus do not provide any useful guidance for determining the evaluative dimension upon which social norms should be based.

Congruence levels

Measures of congruence provide an indication of which evaluative dimension is likely to provide a sound foundation for the identification of social norms (Chapter 4). Congruence describes whether visitors have reacted in a fashion consistent with the assumptions of the norm construct. As such, where a norm was exceeded and it detracted from a visitors' experience or if their norm was not exceeded and it did not detract from their experience their reaction is considered to have been congruent. Alternatively, where a norm was exceeded and it did not detract from a visitors' experience or if their norm was not exceeded and it detracted from their experience their reaction is considered to have been incongruent. On this basis, the actual encounters and personal norms were compared on a case by case basis to determine whether or not their norms had been exceeded, then visitors were classified into the corresponding congruence category based on how it impacted on the quality of their experience. Based on these classifications, Table 6.19 highlights the proportion of visitors who had congruent reactions relative to the two evaluative dimensions examined.

Table 6.19 Indicators, evaluative dimensions and their relative levels of congruence

Indicator	Evaluative dimension	*N*	Proportion (%) of visitors with congruent reactions
Number of groups encountered along the track in a day	Prefer	490	65.1
	Maximum	576	80.0
Maximum size group encountered along the track	Prefer	546	56.8
	Maximum	598	73.8
Maximum number of people encountered along the track	Prefer	519	63.4
	Maximum	517	78.1
Maximum number of aircraft seen/heard per day	Prefer	529	63.1
	Maximum	523	75.9
Maximum number of other people camped within sight or sound	Prefer	387	64.3
	Maximum	381	72.2
Maximum size group at a campsite	Prefer	361	62.1
	Maximum	382	77.8

Congruence levels for visitors' maximum acceptable limits were consistently and substantially higher than their preferred limits. Across the six indicators examined, between 72.2% and 80.0% of visitors had congruent reactions. In comparison, congruence levels did not rise above 65.1% for visitors' preferred limits.

General conclusion

From the comparisons of norm prevalence, consensus and congruence for the two evaluative dimensions discussed above it is clear that the definition of social norms should be based on visitors' maximum acceptable standards. While little, if any, substantive difference in the levels of consensus was found between the two evaluative dimensions, a higher proportion of visitors reported personal norms based on their maximum acceptable limits than their preferences. Further, higher levels of congruence were recorded for the norms based on visitors' maximum acceptable limits indicating greater construct validity for that evaluative dimension.

Influences on the congruence of visitors reactions

To better inform managers involved in setting limits of acceptable change standards it is useful to discuss the reasons some visitors reacted in an incongruent manner to the encounters they experienced. In doing so, the following questions were investigated:

1. Was congruence associated with visitors experiencing different encounter levels, irrespective of their personal norms?
2. Was congruence associated with different personal norms?
3. Was the type of encounter (i.e. indicator) more important to visitors with congruent reactions than for those without?
4. What other influences were associated with the congruence of visitors' reactions?

These questions are now addressed in turn in the following sections. Unlike the earlier presentation of congruence in Table 6.19, visitors were classed into one of four categories on a case by case basis:

1. norm not exceeded – didn't detract from the visitor's experience (congruent reaction);
2. norm not exceeded – detracted from the visitor's experience (incongruent reaction);
3. norm exceeded – didn't detract from the visitor's experience (incongruent reaction); and
4. norm exceeded – detracted from the visitor's experience (congruent reaction).

Important: *When presenting congruence in this way, the relationships between congruence and the number of encounters are not unidirectional. For example, an increase in the number of encounters is likely to increase the frequency of congruent reactions in visitors whose norms have been exceeded, but incongruent reactions in those who have not had their norms exceeded (Figure 6.3).*

Figure 6.3 Influence of the number of encounters on the violation of visitors norms and the level of congruence of their reactions

Congruent (didn't detract)	– Norms not exceeded –	*Incongruent (detracted)*
Incongruent (didn't detract)	– Norms exceeded –	*Congruent (didn't detract)*
←		→
Fewer	– Number of encounters –	*More*

Was congruence associated with visitors experiencing more encounters?

Firstly, encounter levels for visitors in the four congruence categories were compared across six different types of encounters to determine whether congruence was associated with the encounter levels reported by visitors. Specifically, a) did visitors whose norms had been exceeded and reported that their encounter levels had detracted (congruent) from the quality of their experience report higher encounter levels than visitors who didn't (incongruent)?, and b) did visitors whose norms had <u>not</u> been exceeded and reported that their encounter levels had not detracted (congruent) from the quality of their experience report lower encounter levels than visitors who didn't (incongruent)?

Generally, visitors who stated that the level of encounters had detracted from the quality of their experiences reported significantly higher encounter levels than visitors who didn't, irrespective of whether their norms had or had not been exceeded (Table 6.20). Just two exceptions to this pattern are evident in the data. The first exception being for *the number of groups encountered along the track in a day.* While visitors who had had their norms exceeded and stated it had detracted from the quality of their experiences encountered more groups in a day than visitors who stated their encounter levels had not detracted from their experiences, the difference was not significant (Table 6.20). The second exception was for *the number of aircraft seen or heard in a day.* Despite no difference in the median level of encounters reported by visitors whose norms were not exceeded, some stated that the encounters had detracted from their experiences and others stated they had either had *no influence* or *enhanced* them.

Table 6.20 Median number of reported encounters for visitors whose personal norms (maximum acceptable limits) were exceeded and not exceeded, and stated that it detracted or didn't detract from the quality of their experiences of the Overland Track

		Norms Not Exceeded		Norms Exceeded	
Indicator	Encounter level	Didn't detract[C]	Detracted[I]	Didn't detract[I]	Detracted[C]
Number of groups encountered along the track in a day	Median†	5.50[a]	9.00[b]	7.06[b]	8.00[b]
	SIQR	3.30	2.00	3.50	2.50
The largest group encountered along the track in a day	Median†	8.00[a]	10.00[b]	11.00[c]	12.00[d]
	SIQR	2.00	1.38	1.75	2.50
Number of people encountered along the track in a day	Median†	20.00[a]	25.00[ab]	29.00[b]	30.00[c]
	SIQR	8.00	7.00	10.00	15.00
Number of aircraft encountered along the track in a day	Median†	2.00[a]	2.00[a]	2.00[b]	3.00[c]
	SIQR	0.50	0.50	1.50	1.50
Number of people camped within sight or sound	Median†	6.00[a]	10.00[b]	13.50[b]	22.50[c]
	SIQR	3.00	10.13	11.00	13.13
Largest group encountered at a campsite	Median†	4.00[a]	6.00[b]	10.00[c]	12.00[d]
	SIQR	2.00	3.00	4.38	4.00

† Kruskal-Wallis ($p < 0.001$). Medians with different superscript are significantly different ($P \leq 0.05$) by Mann-Whitney U post hoc tests

C Congruent reaction

I Incongruent reaction

Overall, there were significant differences between the encounter levels experienced by visitors in the different congruence categories within the norms exceeded and not exceeded groupings. The nature of these differences is such that an increase in the level of encounters is not associated with an across the board increase in the proportion of visitors with congruent reactions. Rather, there is an increase in congruence among visitors who had their norms exceeded, and a decrease among visitors whose norms were not exceeded, as illustrated in Figure 6.3

Was congruence associated with different personal norms?

Visitors' norms for each of the congruence categories were compared to see if there were any differences in the maximum encounter levels that they were prepared to accept. Visitors whose norms were exceeded had consistently and, in almost all cases, significantly lower norms than visitors whose norms had not been exceeded (Table 6.21). However, the results were mixed when visitors' norms were compared within the Norms Not Exceeded and Norms Exceeded categories. Although some significant differences were evident between the norms of visitors with congruent and incongruent reactions, in most cases their norms were either the same or not significantly different. These results indicate that for the visitors on the Overland Track, there was little relationship between the congruence of their reactions and the level of their norms. However, the level of their norms was significantly associated with whether their norms had or had not been exceeded.

Table 6.21 Median encounter norms for visitors whose personal norms (maximum acceptable limits) were exceeded and not exceeded, and stated that it detracted or didn't detract from the quality of their experiences of the Overland Track

		Norms Not Exceeded		Norms Exceeded	
Indicator	**Norm**	**Didn't detract[C]**	**Detracted[I]**	**Didn't detract[I]**	**Detracted[C]**
Number of groups encountered along the track in a day	Median†	10[a]	10[a]	4[b]	4[c]
	SIQR	5.00	5.00	3.25	1.75
The largest group encountered along the track in a day	Median†	10[a]	10[a]	6[b]	6[b]
	SIQR	1.50	1.38	2.50	1.50
Number of people encountered along the track in a day	Median†	30[a]	34[a]	20[b]	12[b]
	SIQR	13.75	12.50	5.00	5.00
Number of aircraft encountered along the track in a day	Median†	3[a]	2[bc]	1[b]	0[c]
	SIQR	1.50	2.00	1.00	0.50
Number of people camped within sight or sound	Median†	10[a]	13.5[b]	6[c]	8[c]
	SIQR	7.00	11.00	5.13	5.50
Largest group encountered at a campsite	Median†	8[a]	8[ab]	6[b]	6[b]
	SIQR	2.00	2.50	3.00	1.50

† Kruskal-Wallis ($p < 0.01$). Medians with different superscript are significantly different ($P \leq 0.05$) by Mann-Whitney U post hoc tests

C Congruent reaction

I Incongruent reaction

Was congruence associated with how important an influence the indicator was in determining the quality of visitors' experiences?

The congruence categories were compared to see if there was any difference in the importance of the indicators in determining the quality of visitors' experiences. Within the Norms Not Exceeded and Norms Exceeded categories, the importance of the indicators were significantly different for visitors who had congruent and those who had incongruent reactions in all but one instance (Table 6.22). The more important visitors considered the indicator was in determining the quality of their experience the more likely they were to state that the level of encounters they had reported had detracted irrespective of whether their norms had been exceeded or not.

Table 6.22 Median importance (salience) of the indicator in determining the quality of visitors' experiences for those whose personal norms (maximum acceptable limits) were exceeded and not exceeded, and stated that it detracted or didn't detract from the quality of their experiences of the Overland Track

		Norms Not Exceeded		Norms Exceeded	
Indicator	**Importance rating**[*]	**Didn't detract**[C]	**Detracted**[I]	**Didn't detract**[I]	**Detracted**[C]
Number of groups encountered along the track in a day	Median†	3^{a}	4^{b}	4^{a}	5^{c}
	SIQR	1.00	0.63	0.50	1.00
The largest group encountered along the track in a day	Median†	3^{a}	4^{b}	4^{a}	5^{b}
	SIQR	1.00	0.50	0.50	1.00
Number of people encountered along the track in a day	Median†	4^{a}	5^{b}	3^{a}	4^{b}
	SIQR	0.50	0.50	1.00	0.50
Number of aircraft encountered along the track in a day	Median†	3^{a}	4^{b}	3^{a}	5^{c}
	SIQR	1.00	0.50	1.50	1.00
Number of people camped within sight or sound	Median†	4^{a}	4^{a}	4^{a}	5^{b}
	SIQR	1.00	1.00	1.00	0.50
Largest group encountered at a campsite	Median†	4^{a}	5^{b}	4^{a}	5^{b}
	SIQR	0.75	1.50	1.50	1.00

† Kruskal-Wallis ($p < 0.001$). Medians with different superscript are significantly different ($P \leq 0.05$) by Mann-Whitney post hoc tests

[C] Congruent reaction

[I] Incongruent reaction

[*] 1 = *not at all important* to 6 = *extremely important*

Was the incongruence of visitors' reactions associated with any other influences?

A large body of outdoor recreation research, in particular that focused on crowding, provides evidence of myriad influences on visitors' evaluations of the impact of encounters on the quality of their experiences (Manning 1999). To explore these influences, the additional comments provided by visitors whose reactions to the level of encounters they reported were incongruent with their norms were examined. A variety of influences were found to shape visitors' reactions across the six indicators examined. These influences can be summarised as the characteristics of the visitor themselves, the characteristics of the people/groups they encountered, and situational variables (Manning 1999).

Visitor characteristics

Despite not having had their norms exceeded, some visitors still reported that the encounters they had experienced had detracted from the quality of their trip. From the additional comments provided by visitors it is evident that their expectations, preferences, and attitudes played a role in determining the impact of the encounters they reported and thus the congruence of their reactions. For example, the expectations of some visitors were found to have mitigated the potentially negative impact of them having their norms exceeded. For example, having encountered more groups in a day along the track than their norm, one visitor explained that s/he felt it was 'not as crowded as I had expected', and another said that s/he had 'expected to see a lot during Easter'.

In contrast, despite not having encountered more groups along the track in a day than their norm, one visitor stated that s/he 'prefer[red] to be alone' and another commented that 'everyone [was] pleasant, but sometimes you'd rather be alone'. Similarly, in response to *the number of other people camped within sight of sound*, one visitor explained that 'I prefer being with those I come with; but no, that isn't always possible'.

Visitors' attitudes also affected the way they evaluated the encounters they experienced. For instance, one visitor commented that the encounters had detracted from their experience because the track had seemed 'like a highway' rather than a wilderness area, despite not having exceeded their norm for the acceptable maximum number of groups encountered along the track in a day. On the other hand, one visitor was of the attitude that 'everyone should have the opportunity to visit the Overland Track' and thus despite having encountered more groups along the track in a day than their norm did not report that it had detracted from their experience. Another visitor explained that having encountered more people along the track than their norm, the encounters had not detracted from their experience because they believed that 'the more people visit [the Overland Track], the more likely it will be looked after'.

These and other additional comments provided by visitors (Appendix I) show that their expectations, preferences, and attitudes were influential in shaping the impact of encounters on the quality of their experiences.

Characteristics of people or groups encountered

From visitors' comments it is evident that the behaviour of those encountered, the type and size of group, and perceptions of alikeness influenced whether or not the encounter/s detracted or didn't detract from the quality of their experiences, and thus whether their reactions were congruent with their norms.

Behaviours displayed by the people that visitors encountered and interacted with clearly had a mitigating influence on the potentially negative influence of the number of groups encountered on the quality of visitors' experiences. Such behaviour included, for example, the 'exchange of info on tracks and huts'. Moreover, some visitors felt the groups they encountered were 'friendly and helpful [and] also considerate'. Similarly, being able to 'talk to and share experience [and] socialise' with other groups had enhanced one visitor's experience. Where there is the perceived alikeness of 'shared values and beliefs' among visitors the potentially negative impact of norm violation was found to be mitigated.

Noise was also cited as a reason why encounters had detracted from the quality of visitors' experiences despite not having had their norms exceeded (see Appendix I). However, where the people/groups encountered at campsites were quiet they were considered unproblematic. The behaviours described by these visitors explain why the encounters had not detracted from their experience despite having encountered more people or larger groups along the tracks or at campsites than they had specified in their norms.

For other visitors, the type and size of groups prompted negative and incongruent responses even though their norms had not been exceeded. For example, one visitor noted that while s/he had not encountered more groups along the track in a day than his or her norm, there were simply 'too many large school groups'. Another visitor stated that a large 'commercial group' had detracted from his or her experience despite the group not being larger than their norm for the maximum size group they would accept to encounter along the track.

Situational and contextual variables

A variety of situational and contextual variables were found to influence whether visitors' reactions to the encounters they experienced were congruent with their norms. For example, some visitors felt that the volume of people they encountered on the track was inconsistent with their notion of what the Overland Track experience should be. Some visitors also felt that the types of experiences are compatible with wilderness areas.

Periphery versus interior (when and/or where) encounters were experienced was also found to affect the congruence of visitors' reactions. One visitor noted that because the number of encounters decreased after the first day the number of people s/he encountered along the track on that day did not detract from the quality of his or her experience. Similarly, visitors' reactions to encounters on tracks and at campsites were different. As one visitor explained, despite having encountered a larger group along the track than the maximum they stated they could accept, 'sometimes talking to [other] groups on-track enhanced, but detracted at camp'. Likewise, another visitor felt that it was 'OK encountering [a group larger than the norm they had specified] along the track but [it was] bothersome at campsites and huts'.

Environmental considerations were also shown to prompt incongruent reactions. For example, concern about the accommodation capacity of the huts led one visitor to state that the largest group that s/he encountered along the track had detracted from the quality of their experience despite the sizes of the group not exceeding their norm. In contrast to the built environment, the ecological impact of visitors was also found to have been a concern. Such concern prompted one visitor to comment that 'in such a mossy environment human impact was obvious'. The impact and the number of people encountered camped within sight or sound in such an environment had resulted in an incongruent reaction despite the visitor's norm not being exceeded.

The context of the encounter experiences was also influential in determining the congruency of visitors' reactions; this was particularly evident in the case of seeing and hearing aircraft and the reason for the aircraft's presence. For example, some visitors who encountered fewer aircraft in a day than their norm stated that the level of encounters had detracted from the quality of their experiences because 'the airforce [should] practice somewhere else'[13]. Some visitors thought that 'tourist aircraft [were] quite revolting' and that overflights and landings should be permitted 'only in an emergency'. Many of the visitors whose norms for seeing and/or hearing aircraft were exceeded stated that their reaction 'depends on the aircraft's purpose' and 'if it is necessary'. In general, knowing that aircraft were used for emergency and/or essential management purposes mitigated their negative impact on the quality of visitors' experiences.

General conclusion

Together or individually, the characteristics of the visitor themselves and those of the people or situations they encountered were found to shape and influence the way visitors evaluated those conditions and whether their reactions were congruent with their stated norms. The additional comments provided by visitors (see Appendix I) illustrate the presence of a range

[13] Low level overflights by the Royal Australian Air Force are rare. The incident reported by visitors was a single occurrence, where a small number of fighter-jets traversed the southern half of the Overland Track at low altitude.

of influences that are consistent with the multi-dimensional nature of visitor experience (Manning 1999).

Acceptable campsite condition

Unlike the six indicators discussed in the previous section, the acceptability of campsite condition was assessed using a scale of five descriptive states which visitors were asked whether or not they considered them acceptable or unacceptable (Section 4.5). Visitors were asked to indicate whether they considered each of five campsite conditions to be acceptable or unacceptable. The campsite conditions examined ranged from sites where *it is evident that people have camped here before but there is minimal damage. Some of the ground vegetation is flattened. There has been minimal disturbance of the sticks and leaves on the ground*; through to sites where *bare soil or rock covers most of the site. Soil erosion is obvious. Soil loss has exposed tree roots, stones, or bare rock on 25% or more of the campsite.*

Of the 67.9% (N = 594) of visitors who slept in tents, some 95.3% (N = 566) provided their evaluations of which campsite conditions they considered to be 'acceptable' or 'unacceptable'. Due to the dichotomous nature of the data the level of consensus cannot be gauged via measures of central tendency such as the SD, CV or the SIQR. Instead, straight frequencies of responses show the variation in the views of visitors (Figure 6.4). An indication of the level of consensus amongst visitors has been gained, however, by comparing the proportion of visitors who considered each campsite condition to be acceptable or unacceptable. For example, Figure 6.4 shows almost unanimous agreement for the unacceptability of campsites in a condition consistent with condition Class 5, the most impacted of the condition classes.

There was greater agreement amongst visitors for conditions at either end of the spectrum in terms of the five impact levels examined. At the less impacted end of the spectrum, visitors were all but unanimous in their acceptance of campsites exhibiting impacts consistent with Condition 1, and more than 90% were accepting of Condition 2. Visitors were least united with respect to Condition 3 with just 65% of them finding the level of impact described as acceptable. In contrast, more than 80% of visitors found the impacts at Conditions 4 and 5 to be unacceptable.

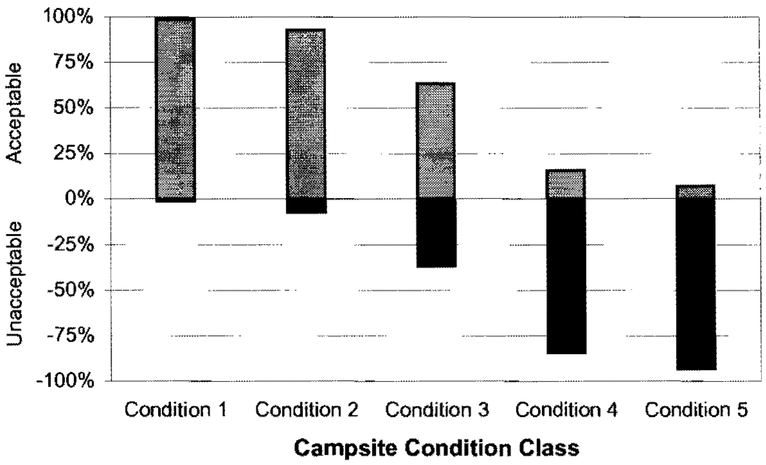

Figure 6.4 Acceptability of different levels of impact at campsites on the Overland Track (N = 566)

Signs/markers

Visitors to the Overland Track considered *directional signs and track markers* to be *moderately* to *very important* in determining the quality of their experiences. As such, visitors were asked how many signs/markers they saw and what they thought about the number of them they encountered along the Overland Track.

A high proportion of visitors (80.8%, N = 700) stated that they *saw many* signs/markers and just 18.9% (N = 164) reported seeing *very few*. Only two (N = 0.2%) of the visitors surveyed described seeing *no signs/markers* during their trip. A follow-up question was used to gauge visitors' opinions about the number of signs/markers they encountered and whether they thought *more are needed, the number is about right*, or *there were too many*. A high proportion (78.6%, N = 684) of visitors considered they encountered about the right number of signs/markers, but 17.2% (N = 150) of those surveyed felt more were needed. Only a small proportion (4.1%, N = 36) of visitors thought that they had seen *too many* signs/markers.

What are the social norms of the visitors on the Overland Track?

The identification of social norms via research, such as that presented here, can help wilderness planners and managers define appropriate limits of acceptable change standards for the condition of the recreation setting (Manning 2001; Watson *et al.* 1992). The definition of standards is made easier when there is broad agreement on what the acceptable conditions are. Where there is a lack of agreement, managers must decide what proportion of visitors they will strive to satisfy.

Like other researchers, I have presented social norms at two levels(Morin *et al.* 1997; Roggenbuck *et al.* 1991; Roggenbuck *et al.* 1993; Rutledge & Trotter 1995c; Watson *et al.* 1992). These social norms, presented in Table 6.23, represent the amount of impact that 50% and 75% of visitors will accept. These levels have been adopted because it is considered 'impractical to please all visitors' particularly where there is little consensus (Watson *et al.* 1992: 23). In general, the higher the level of consensus, the easier it is to set standards that will have broad support and satisfy a greater proportion of visitors.

The greatest differences in the level of impact 50% and 75% of the visitors consider acceptable are for the maximum number of groups and the maximum number of people encountered along the track in a day, and for the maximum number of people camped within sight or sound. The number of people that 50% of visitors would accept to encounter along the track in a day was double the number that was considered acceptable to be camped within sight or sound, with a similar difference also evident at the 75% level. These results show that visitors are more sensitive to encounters experienced at campsites than when travelling along the track.

Table 6.23 Social norms defined by the minimum acceptable condition that 50% and 75% of visitors to the Overland Track will accept

Indicator	*N*	50%	75%
The maximum number of groups encountered along the track in a day	568	6	2
The maximum size group encountered along the track	609	8	6
The maximum number of people encountered along the track in a day	546	20	12
The maximum number of aircraft seen or heard in a day	561	2	0
The maximum number of other people camped within sight or sound	396	10	5
The maximum size group encountered at a campsite	400	8	5
The minimum acceptable campsite condition class	566	3	2

Notably, there is some agreement about the maximum acceptable group size along the tracks and at campsites with 50% of visitors considering eight people to be the maximum acceptable group size at both locations. There is also close agreement among visitors at the 75% level with three-quarters of visitors considering maximum acceptable group sizes at campsites and on tracks to be five or six people respectively. The similarity between the social norms for the maximum acceptable group size at these locations suggests the potential to develop and adopt common standards.

The social norm for the number of aircraft seen or heard in a day ranged from a maximum of two aircraft in a day, which was considered the maximum acceptable by 50% of visitors, to no aircraft at all at the 75% level. Managing to such a standard would require a ban on all flights in the vicinity of the Overland Track, and careful consideration would have to be given to the use of aircraft for management purposes.

The final indicator for which social norms were identified was the minimum acceptable condition of campsites. It is evident that almost all visitors agreed that the least impacted campsite condition was the most acceptable (Figure 6.4). However, it would not be possible to maintain campsites in such a relatively untouched state. The campsite condition 50% of visitors would accept was Condition Class 3, while 75% of visitors would accept campsites to be impacted no more than Condition Class 2, a difference of just a single class (Chapter 4).

Support for restrictive management actions

One of the tools available to managers to address social and environmental impacts is the limitation of use. Visitors were asked if they felt a limit was *needed on the number of people walking the Overland Track, recognising that their own opportunity to walk the track may be limited in the future* (Table 6.24). A relatively small proportion of visitors stated that use limits would never be appropriate while almost 90% provided qualified support for restricting use, as indicated by the other three response options in Table 6.24. Significantly, more than half the visitors surveyed felt that limits should be introduced to 'reduce use' or that use should be held at current (1999-2000 peak season) levels. Approximately 40% of visitors stated that they supported 'limiting use in the future when/if overuse occurred'.

Table 6.24 Visitors' support for limiting the number of people walking the Overland Track with the recognition that their own opportunity to walk the track may be limited in the future (N = 865)

Support for limiting the number of people walking the Overland Track	%
Limits would never be appropriate	10.2
Hold use at current level	35.1
Reduce use	15.5
Support limiting use in the future when/if overuse occurred	39.2

6.9 Summary

This chapter has presented the results of the analysis of data collected via the Overland Track Walker Survey. The importance of a range of indicators has been examined, and the underlying factors that influence the quality of visitors' experiences have been identified. Further, the expectations, actual experience, and their impact on the quality of visitors' experiences of the Overland Track were also explored.

Importantly, a thorough examination of visitors' norms has been conducted, including an evaluation of two evaluative dimensions. That evaluation incorporated a comparative assessment of norm prevalence, consensus and the congruence of visitors' reactions to the encounter levels they reported. Moreover, the influence of encounters, the levels of the norms and the importance of the indicators were also explored to determine their influence on the congruence of visitors' reactions.

The social norms of visitors were identified for the amount of change in the social and biophysical conditions 50% and 75% of visitors will accept according to the indicators examined. Lastly, visitors' support for restrictive management actions was presented.

Specific conclusions and discussion of the results in relation to the broader field of outdoor recreation research have been reserved for Chapter 8. That chapter will also present a synthesis of the results of the Overland Track Walker Survey and the Western Arthurs Walker Survey which is presented in the following chapter.

Chapter 7. The Western Arthur Range Walker Survey

The purpose of this chapter is to present the results and analyses of the data gathered from the survey of overnight visitors to the Western Arthurs between the beginning of November 1999 and the end of April 2000. Like the Overland Track Walker Survey, this survey was undertaken to build an understanding of the character and experience of overnight visitors that walked in the Western Arthurs. This location has iconic status amongst bushwalkers in Australia as perhaps the most rugged and challenging tracked walks in the country, and it provides a stark contrast to the more developed and heavily visited Overland Track. The PWS has zoned the Range as a setting for self-reliant experiences. Concessions to walker comfort are minimal with infrastructure and works undertaken predominantly for environmental purposes.

This chapter is set out in a similar manner to that of Chapter 6 in which I presented the results of the Overland Track Walker Survey. An examination of the basic demographics and characteristics of visitors is outlined, including age, sex, origin, and level of previous overnight bushwalking experience, and the routes walked. Visitor ratings of the importance of a range of indicators in determining the quality of experiences are outlined before identifying the underlying factors that influence the quality of visitors' experiences. Next, a brief examination of visitors' expectations, the conditions they reported encountering, and the impact on their experiences is presented for six selected indicators. Two evaluative dimensions are then examined with respect to the relative prevalence of norms they elicited, the level of consensus among visitors, and the proportion of congruent reactions with respect to the conditions they encountered. Finally, the evaluative standards developed for the six indicators examined, and visitors' support for limiting use is presented.

In order to avoid unnecessary repetition, specific conclusions, and discussion of the findings in relation to the outdoor recreation research literature has been reserved for the synthesis and discussion that follow in Chapter 8.

7.1 Response rate

Some 256 people who visited the Western Arthurs between November 1999 and April 2000 responded to an invitation to participate in the survey. These visitors completed a registration slip (Appendix E) providing their names and postal addresses. Self-administered questionnaires were mailed out within two weeks of visitors registering their willingness to participate in the study. Mail-outs contained a cover letter, questionnaire, and reply-paid envelope. Two follow-up mailings at two-week intervals were undertaken resulting in the return of 194 useable questionnaires, a response rate of 75.8% (Chapter 4).

To check for sampling bias resulting from the volunteer self-registration sampling procedure the PWS walker registration data were used as a control for a comparison with the survey data to determine whether there was any inconsistency between the two datasets. Validation checks of the PWS walker registration data though compliance surveys, comparisons with track-based traffic counters, and cross referencing of trackhead logbooks indicate compliance rates of 90% or more (PWS 2003). As such, the PWS walker registration data are considered to be a reliable representation of the visitor population.

Comparisons between the two datasets were made for visitor origin, route, and party size. Table 7.1 shows the comparison between the PWS walkers registration data and the proportion of visitors recorded walking the Moraine A to Lake Oberon route, the Moraine A to Moraine K route, or the full traverse of the Range[14].

Table 7.1 The proportion (%) of visitors who walked the three main Western Arthurs routes: a comparison between PWS Walker Registration data (actual†) and the Western Arthur Range Walker Survey

Route	PWS Walker Registration (actual) % visitors on route *N* = 552	Western Arthurs Walker Survey % visitors on route *N* = 194
Moraine A – Lake Oberon	42.8	37.6
Moraine A – Moraine K	27.4	26.3
Traverse	29.9	36.1

† Data represents confirmed routes. Parties failing to provide route confirmation were assumed to have completed intended route. Adapted from PWS 2000.

Records of visitor origin were also compared to determine whether there was any departure from the proportions of visitors from Tasmanian and overseas recorded by the PWS walkers registration system. Table 7.2 shows differences of approximately 13% in each the Tasmanian and out-of-state visitor categories. This suggests local visitors are either under-represented in the survey sample, or out-of-state visitors over-represented, or a combination of both, but by exactly what proportion cannot be determined due to the different methods of data collection and processing. Visitor origin recorded via the PWS walker registration system is on a per-group basis, where the origin registered by the party leader or delegate is

[14] The Traverse category includes visitors who only walked in the eastern section of the Range beyond Moraine K.

assigned to all members of that group. Further, if more than a single place of origin was recorded in the registration logbooks, the first point of origin listed was assigned to the group and entered onto the PWS database (PWS 2000b). In contrast, all data collected by the survey were on a per visitor basis. As such, it is difficult to state with any certainty the extent of any bias with respect to visitor origin.

Table 7.2 **Visitor origin: a comparison between PWS Walker Registration data and the Western Arthur Range Walker Survey**

Route	PWS Walker Registration† $N = 576$	Western Arthur Range Walker Survey $N = 194$
Tasmanian	39.2%	26.3%
Out of State	60.8%	73.7%

† Actual routes taken by walkers and confirmed at the time of deregistration

Group size averages recorded by the PWS and the Western Arthur Range Walker Survey were also compared. The median and mode groups sizes were the same for both datasets. Both the median and mode group size was two persons. Moreover, differences in the mean group sizes and the *SDs* for the two datasets were minor. PWS walker registration data recorded a mean group size of 3.33 persons with a *SD* of 2.18 compared to a mean of 3.05 persons and a *SD* of 2.19 recorded by the Western Arthur Range Walker Survey.

Thus, most of the comparisons above show little, if any, difference between the survey sample and the PWS walker registration data. The only contrast in representation between the two datasets of any size was for the proportional representation of visitors of different origins. It is unclear what amount of variation in this respect was due to the method the PWS uses to collect and collate its data, or the what influence self-selection played as a result of the sampling strategy (Chapter 4). Therefore, comparisons of responses of Tasmanian and out-of-state visitors to six key variables[15] in the survey were undertaken to check for differences between the two visitor subsets. These tests revealed no statistically significant differences ($P > 0.05$) between the median responses of Tasmanians and visitors from out-of-state. Due to the high response rate and the high proportion of visitors surveyed (35.2% of

[15] Mann-Whitney U tests revealed no significant differences ($P > 0.05$) in the median responses for Tasmanians and visitors from out-of-state for the *maximum number of groups encountered along the track in a day, the maximum size group encountered along the track, the maximum number of people encountered along the track in a day, the maximum number of aircraft seen or heard in a day, the maximum number of people camped within sight or sound,* and *the maximum size group encountered at a campsite.*

the peak-season population[16] during the study period), the results presented in this chapter are likely to be representative of visitors to the Western Range at the time.

7.2 Visitor characteristics

Age and sex

Visitors' ages ranged between 17 and 65 years, with a mean age of 35.8 years (*SD* = 11.3 years) and a median age of 34 years. The result of a Mann-Whitney U test indicated no significant difference (*P* = 0.103) in the median age of males and females. There were more than twice the number of male visitors (*N* = 134, 70.5%) compared to female visitors (*N* = 56, 39.5%).

Place of residence (origin)

Every State and Territory of Australia was represented in the sample, as well as a number of overseas points of origin. Tasmanian residents (*N* = 51) were the largest in number by the slightest margin over Victorians (*N* = 50) and visitors from New South Wales (*N* = 44). Overall, visitors from these three States made up 74.7% of the sample. Visitors from Ireland (*N* = 1), the United Kingdom (*N* = 1), the United States (*N* = 3), Switzerland (*N* = 1) and Japan (*N* = 1) made up the overseas contingent.

From a management perspective it is often useful to group visitors from different origins into subgroups, in this case local Tasmanians, visitors from mainland Australia and those from overseas. Such groupings can be useful in targeting pre-visit information and educational materials to specific audiences. As such, when aggregated Mainlanders are the dominant group making up 70.1% (*N* = 136) of the sample. Visitors from Tasmania made up 26.3% (*N* = 51) of the respondents and those from overseas just 3.6% (*N* = 7).

Bushwalking experience

General bushwalking experience (N = 193)

Most visitors (99.5%, *N* = 192) were found to have undertaken more than six overnight bushwalks before visiting the Western Arthurs. Of the 194 respondents, only one (0.5%, *N* = 1) had no prior overnight bushwalking experience, while 11.9% (*N* = 23) had completed between one and six overnight bushwalks.

[16] The PWS recorded 552 people undertook and overnight trip in the Western Arthurs between November 1999 and April 2000.

Bushwalking experience in Tasmania (N = 192)

Not surprisingly, given the dominance of visitors from out-of-state (73.7%, *N* = 143), the proportion of respondents who had undertaken more than six overnight bushwalks specifically in Tasmania (36.5%, *N* = 70) was markedly less than the level of experience in general (87.6%, *N* = 169). However, about half the visitors (50.5%, *N* = 97) had completed between one and six prior overnight bushwalking trips in Tasmania, though some 13.0% (*N* = 25) had no prior Tasmanian overnight bushwalking experience.

Bushwalking experience in the Western Arthurs area (N = 192)

Almost two-thirds (65.6%, *N* = 126) of the respondents were first time visitors to the Range, while a lesser but substantial proportion (33.9%, *N* = 65) was found to have visited the Range somewhere between one and six times before. One repeat visitor (0.5%) indicated he had walked along the Range on more than six previous occasions.

7.3 Visit characteristics

Type of groups

Visitors reported belonging to a variety of different group types (Table 7.3). No commercial groups were registered as having walked on the Western Arthurs during the study period (PWS 2000b). Of the free-walker – non-commercial – groups, most walkers (73.2%) belonged to the *family and friends* category, and a small but substantial proportion walked *solo* (14.4%). The remaining visitors walked in as a part of an affiliated outdoor activity and or educational group.

Table 7.3 The number and proportion of visitors travelling in different group types on the Western Arthurs (*N* = 194)

Group Type	Frequency	%*
Solo	28	14.4
Friends/family	142	73.2
Bushwalking/outdoor activity club	21	10.8
School/scout group	3	1.5

* Does not equal 100% due to rounding.

Party size

Respondents visited the Western Arthurs alone or in parties as large as 11. Groups of two were by far the most common party size amongst the sample, making up 45.9% (*N* = 89) of visitors (Figure 7.1). Together, parties of two or those travelling *solo* constituted 60.3% (*N* = 17) of the sample. Overall, 94.3% (*N* = 183) of visitors were in parties of six people or fewer, the maximum party size encouraged by the PWS, and only 5.6% ($N = 11$) of visitors were in parties larger than the recommended maximum of eight persons (PWS 1998b).

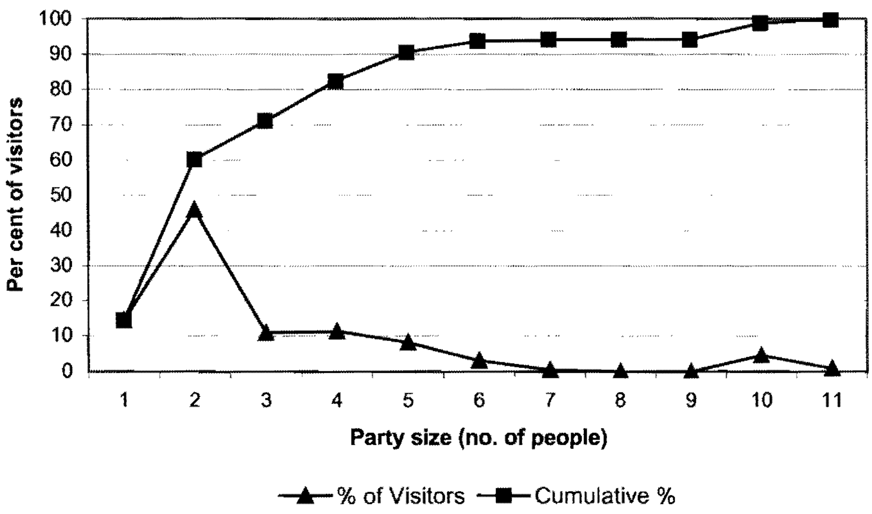

Figure 7.1 Party sizes of visitors who undertook an overnight walk on the Western Arthurs between November 1999 and April 2000 (*N* = 194)

Routes taken

The routes taken by visitors vary greatly and have been categorised with respect to the sections of the Range they encompass (Figure 5.14). Visitors undertook short return trips, such as those within the Moraine A – Lake Oberon section, as well as more challenging and longer circuitous routes possible in the Moraine A – Moraine K section and in the full traverse of the Range. Similar proportions of visitors travelled routes in the western Moraine A – Lake Oberon section of the Range as completed the full traverse (Table 7.4). A smaller, yet substantial proportion of visitors completed trips within the Moraine A – Moraine K section of the Range.

Table 7.4 The frequency and proportion (%) of visitors who walked the three main Western Arthurs routes (*N* = 194)

Route	Frequency	%
Moraine A – Lake Oberon	73	37.6
Moraine A – Moraine K	51	26.3
Traverse	70	36.1

Trip Duration

Just as the routes taken by visitors varied, so too did the length of their trips (Figure 7.2). Trip lengths ranged between two and seventeen days with the average (mean) duration being 6.9 days (SD = 2.9). Trips of eight days in duration were the most common (mode), while the median was seven days. Fewer than 10% of visitors spent more than 10 days on the range, and just two per cent of trips extended to 14 days or more.

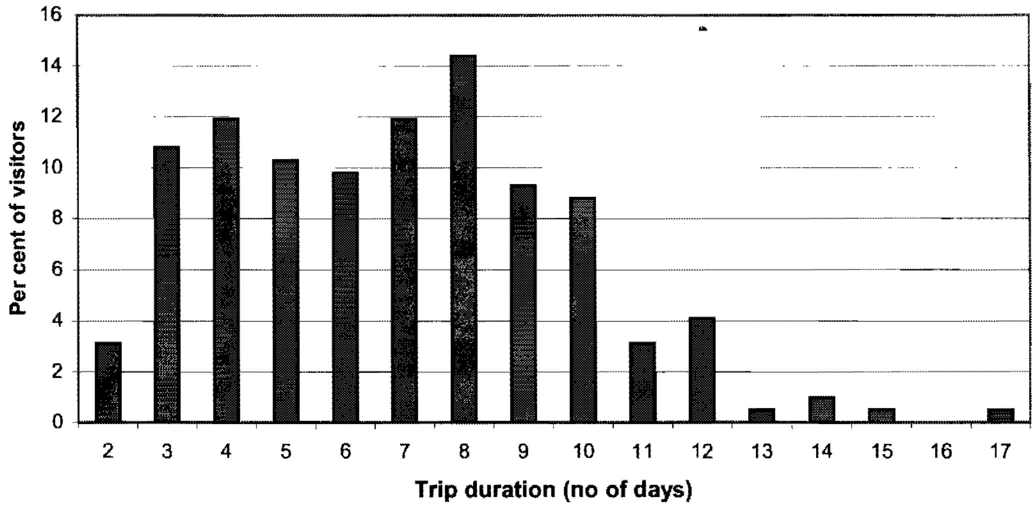

Figure 7.2 Proportion of visitors who undertook trips of different duration on the Western Arthurs (N = 194)

7.4 The influence of indicators on visitors' experiences

As discussed in Chapter 2, a key step in contemporary wilderness planning frameworks is the description and definition of recreational opportunities through the use of quantitative indicators of the quality or character of the biophysical, social and managerial setting. Like the Overland Track Walker Survey, visitors to the Western Arthurs were asked about the *things that affect the quality of your experience.* All but one of the indicators were examined in both the Overland Track Walker Survey and the survey of Western Arthurs visitors. Visitors to the Western Arthurs were not asked about *the use of huts for accommodation,* as there are none in that area. Visitors were specifically asked *How important are the following items in determining the quality of your experience?* Table 7.5 shows how visitors rated the importance of the indicators examined on a six point categorical scale that ranged from *not at all important* to *extremely important.*

The *amount of litter I see* was the most important of the fifteen indicators examined in determining the quality of visitors' experiences of the Western Arthurs. This indicator rated significantly as more important than any other ($P \leq 0.05$). The two indicators for biophysical impacts at and around campsites were similarly rated (means = 4.39 & 4.48) and considered by visitors to be *moderately* to *very important.*

Table 7.5 Visitor ratings of the relative influence of indicators on the quality of their experience (N = 192[†])

Indicator[‡]	Median[#]	Mean[*]	*SD*	Mean Rank
Amount of litter I see	5^{a}	5.09^{a}	1.22	1
Damage to vegetation around a campsite	5^{b}	4.48^{b}	1.13	2
Amount of vegetation loss/bare ground at campsites	4^{bc}	4.39^{bc}	1.15	3
Amount of noise associated with human presence and activity	5^{cd}	4.27^{c}	1.40	4
The number of people camped overnight at a campsite	4^{de}	4.11^{d}	1.33	5
Eroded and/or muddy tracks	4^{def}	4.07^{de}	1.25	6
The presence of wildlife	4^{efg}	3.93^{def}	1.25	7
The number of people camping within sight or sound of my campsite	4^{fg}	3.92^{ef}	1.34	8
The size of groups I meet	4^{fg}	3.84^{ef}	1.51	9
Directional signs and track markers	4^{gh}	3.68^{fg}	1.49	10
The number of groups I see along the track	4^{h}	3.62^{g}	1.31	11
Total number of people I see along the track	4^{h}	3.61^{g}	1.36	12
The amount of time other people are in sight when I am along the track	4^{h}	3.57^{g}	1.43	13
Seeing and/or hearing aircraft	4^{h}	3.55^{g}	1.5	14
On site information about nature, history and/or management	3^{i}	2.87^{h}	1.5	15

† Minimum N size for all items in the table. Because of different item response rates, some items have a few more responses than indicated

‡ Possible response categories on degree of influence: 1 = not at all; 2 = slightly important; 3 = somewhat important; 4 = moderately important; 5 = very important; and, 6 = extremely important

* Means with different letters are statistically different from each other at $P \leq 0.05$ (paired t-test)

\# Medians with different letters are statistically different from each other at $P < 0.05$ (Wilcoxon signed ranks test)

Like the indicators *damage to vegetation around campsites* and *amount of vegetation loss/bare ground at campsites,* that referring to *eroded and/or muddy tracks* is also an indicator of the biophysical condition of the recreation setting. *Eroded and/or muddy tracks* were deemed by visitors to be *moderately important* in determining the quality of their experiences. The lesser influence of this indicator, compared to the campsite impact indicators, may reflect the reputation of mud as part of the southwest Tasmania bushwalking experience. However, muddy tracks are still considered to be the sixth most important influence in shaping visitors' experiences.

The presence of wildlife was ranked just above midway (seventh) in the importance of the 15 indicators examined. Visitors considered this indicator to be *somewhat* to *moderately important* in determining the quality of their experiences.

Of the social indicators, the *amount of noise associated with human presence and activity* was considered the most important. This indicator was considered to be *moderately* to *very important.* The social indicators related to campsites, ranked fifth and eighth, were considered more important than the three indicators related to track based encounters, a common finding within the field of wilderness recreation research (Lee 1977; Lucas 1980; Patterson & Hammitt 1990; Roggenbuck *et al.* 1993; Stankey 1973, 1980). One possible explanation for this result is the intensity of campsite encounters which are characteristically longer in duration those experienced along the track (Lee 1977).

Visitors considered the presence of *directional signs and track markers* to be only *somewhat* to *moderately important.* The experience levels of the visitors, of whom 87.6% had undertaken more than six overnight bushwalks and a third had visited the range before (Section 7.2), may be associated with a lesser reliance on the provision of *directional signs and track markers.*

Seeing and/or hearing aircraft was regarded as a *somewhat* to *moderately important* influence on the quality of visitors' experiences. Aircraft are not generally permitted to overfly the range; however, the rugged nature of the area necessitates the use of helicopters, by the PWS, to transport materials for the maintenance of walking tracks and campsites.

On-site information about nature, history, and/or management was considered the least important indicator in determining the quality of visitors' experiences. Its low ranking reflects two factors. The first is the management zoning of the area, which permits only signs for management and environmental protection (Table 3.11). The second factor is the visitors' experience levels (Section 7.2). Experienced visitors may favour knowledge gained through personal research and pre-visit brochures, rather than that gained from interpretive signage imposed on the natural setting.

In short, visitors regarded the fifteen indicators examined as ranging from *slightly* to *moderately important* through to *very important* in determining the quality of their experiences. None of the indicators was considered *not at all important.* Despite overall variation in the mean levels of importance of each indicator, *t*-tests revealed few statistically significant differences between them. In general, biophysical impacts were considered more influential than social impacts and those related to the management setting were the least important.

7.5 The key factors that affect the quality of visitors' experiences

It is clear that a range of indicators of varying importance shapes the quality of visitors' experiences (Table 7.5). While such information is useful, it is difficult to determine which indicators are the most important when, like the Overland Track, individual indicators are often not significantly more or less important than those that ranked higher or lower.

Table 7.6 Factor names, items, loadings and importance of indicators (N = 192)

Items†	Factor loading (%VE§)	Mean importance‡ (overall factor*) items	α#
Social condition	(34.37)	(4.06)	0.91
Amount of litter I see	.460	5.09	
The number of groups I see along the track	.866	3.62	
The number of other people camping within sight or sound of my campsite	.840	3.92	
Total number of people I see along the track	.834	3.61	
The number of other people camped overnight at a campsite	.818	4.11	
The amount of time others are in sight along the track	.802	3.57	
The size of groups I meet	.801	3.84	
Amount of noise associated with human presence and activity	.739	4.27	
Seeing and/or hearing aircraft	.403	3.55	
Biophysical condition	(18.08)	(4.22)	0.76
Damage to vegetation around the campsite	.879	4.48	
Amount of vegetation loss/bare ground at campsites	.863	4.39	
The presence of wildlife	.631	3.93	
Eroded and/or muddy tracks	.578	4.07	
Infrastructure presence	(10.25)	(3.28)	0.62
Directional signs and track markers	.844	3.68	
On site information about nature, history, and/or management	.839	2.87	

† Factor analysis using principle components with Varimax rotation with Kaiser Normalisation, using SPSS
‡ Mean values calculated on a six-point scale that ranged from 1 = not at all important to 6 = extremely important
# Cronbach's alpha (internal reliability test)
* Unweighted factor mean
§ Per cent of variance explained by the factor

Factor analysis of visitors' ratings of the importance of 15 indicators (items) in determining the quality of their experiences revealed three underlying dimensions (factors) which have been labelled 'biophysical condition', 'social condition' and 'infrastructure presence' (Table 7.6). Cronbach's alpha was calculated to test the reliability of the resulting factors. Only one of the factors had a low alpha value (infrastructure presence) but was kept part as a component of the overall factor structure since low values often result when few items make up a factor (Cortina 1993; Shafer, C.S. & Inglis 2000).

The social condition factor accounted for the greatest degree of variation (34.4%) in the data of the three factors, and was found to be the most reliable. The items within the factor ranged from *somewhat* to *moderately important* and the overall unweighted mean[17] importance rating for the factor was 4.06 (Table 7.6). The biophysical condition factor accounted for 18.08% of the variance among visitors' responses. Like the social conditions, the importance of the biophysical condition items was rated from *somewhat* to *moderately important*. The overall unweighted mean importance rating was the highest of the three factors in the solution (4.22). The infrastructure presence factor explained the least variation in the data (10.25%) and rated as the least important based on the unweighted factor means (Table 7.6).

7.6 Expectations, actual experience and the effect on the quality of visitors' experiences

It is clear that there are various influences on the quality of visitors' experiences and that they differ in their level of importance though in many cases not significantly (Table 7.5). With these influences in mind, six encounter-based indicators were more closely examined to identify visitors' expectations for the conditions that they were to encounter, and to explore how the conditions they experienced impacted on the quality of their experience.

Visitors they were asked to quantify the number of encounters they had expected or indicate that they *had no expectation*. Table 7.7 summarises the proportions of visitors who had expectations and quantified the number, those who *had no expectation*, and those who failed to give any response for each of the six encounter indicators examined.

Most visitors had expectations for the conditions that they were to encounter on their trips, with the proportion of respondents with expectations ranging from 58.5% to 63.9% across five of the six indicators (Table 7.7). Between 34.1% and 56.7% of visitors *had no expectation*. The only indicator for which most visitors had no expectation for the specific conditions that they were to encounter was the *maximum number of aircraft seen or heard in a day*. Few visitors failed to provide responses to the questions asked about their expectations.

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[17] Unweighted means indicate the average importance of items loaded within a factor. Importance is rated on a scale ranging from 1 = *not at all important* to 6 = *extremely important*.

Table 7.7 The proportion of visitors who had expectations, no expectations or did not provide a number specifying the level of encounters they expected on the Western Arthurs (*N* = 194)

Item	Had expectation† %	Had no expectation %	No number‡ %
The number of groups encountered along the track in a day	63.9	34.1	2.0
The largest group encountered along the track	63.4	36.6	0.0
The number of people encountered along the track in a day	61.9	37.1	1.0
Maximum number of aircraft seen or heard in a day	42.8	56.7	0.5
Maximum number of other people expected to be camped within sight or sound of your campsite	58.5	40.4	1.0
The largest group encountered at a campsite	59.3	40.7	0.0

Note: Due to rounding some percentages don't add to 100

† Provided a quantified amount

‡ Neither indicated that they 'had no expectation' or gave a number

Visitors' expectations of their Western Arthurs trip, their actual experience, and the effect on the quality of their experiences are now presented for each of the six encounter types examined.

The number of other groups encountered along the track in a day

More visitors had expectations for the number of encounters with other groups that they would experience in a day than any of the six encounter types examined (Table 7.7). Although their proportion was not substantially greater than for several other of the indicators examined. Some 63.9% of visitors had expectations with respect to the number of other groups that they were likely to encounter along the track in a day, and only approximately 34.1% had no expectations whatsoever. Just two per cent of visitors failed to provide any response at all.

Of the 63.9% visitors who qnantified their expectations, few expected a trip free of any encounters with other groups along the track, and no one expected to encounter more than eight other groups in a single day. Some 59.7% of visitors expected to encounter two or fewer other groups along the track in a day, and just 15.3% of visitors expected to encounter more than four other groups (Table 7.8).

Table 7.8 Expected and reported maximum number of groups encountered along the track in a day on the Western Arthurs

Maximum number of groups encountered along the track	Proportion of visitors (percentiles) 25%	50%	75%
Expected ($N = 124$)	≤ 2	≤ 2	≤ 4
Reported number encountered ($N = 194$)	≤ 1	≤ 3	≤ 4

The reported maximum number of other groups encountered by visitors ranged between zero and nine. Some 7.7% of visitors encountered no other groups along the track during their visit, while almost half (49.5%) encountered fewer than two other groups (Table 7.8). Just 14.4% of visitors encountered more than four other groups along the track in a day.

On a five-point Likert scale that ranged from *greatly enhance* to *greatly detract*, visitors were asked to indicate how encountering the number of other groups they stated they did along the track in a day affected the quality of their experiences (Appendix C). Overall, only 14.0% ($N = 27$) of visitors reported that the number of groups they encountered along the track in a day had *detracted* [18] from the quality of their experiences. Some 43.0% ($N = 83$) of visitors stated that the number of other groups they encountered along the track in a day *had no influence* and the same proportion said it *enhanced* their experience.

The size of other groups encountered along the track

Notably, all visitors ($N = 194$) either indicated they had an expectation (63.4%) or *had no expectation* (36.6%) for the largest size group they were likely to encounter on the track during their trip to the Western Arthurs. All visitors responded to this question in the manner requested.

Visitors' expectations for the maximum group size along the track ranged between three and 11 people. The one visitor who expected to encounter a maximum group size of 11 people indicated that their expectation was based upon a discussion at the trackhead with a visitor exiting the area. During that discussion the exiting visitor told the respondent that they s/he had encountered a group of 11 people along the track during their trip.

Most commonly visitors expected four people to be largest group they would encounter along the track, and the next most common expectation was a maximum of six people. Few visitors expected to encounter a group along the track larger than the maximum of eight

[18] When reporting the results the response options at either ends of the Likert scale have been collapsed and are described in the text as *detracted* or *enhanced*.

people recommended by the PWS (1998b). Eighty seven per cent of visitors expected maximum group sizes encountered along the track to be six people or fewer (Table 7.9). While 39.8% of visitors expected the largest group they would encounter along the track on the Western Arthurs to be four or fewer people, a very small proportion of visitors (2.4%) expected the largest group that they would encounter to be three people.

Table 7.9 Expected and reported size of the largest groups encountered along the track in a day on the Western Arthurs

The largest group encountered along the track	Proportion of visitors (percentiles)		
	25%	**50%**	**75%**
Expected (*N* = 71)	≤ 4	≤ 5	≤ 6
Reported number encountered (*N* = 192)	≤ 3	≤ 4	≤ 6

The largest group encountered along the track was a group of 20 people, reported by one visitor, and another visitor reported encountering a group of 15 people. The overall proportion of visitors who encountered parties larger than 10 people in size was just 5.2% (*N* = 10) and only 11.5% of visitors (*N* = 22) encountered a group larger than the maximum party size of eight people recommended by the PWS (1998b). Most commonly, the maximum size group encountered along the track was four people, and fewer than half the respondents encountered a group larger than this (Table 7.9).

As an overall evaluation of visitors' experiences, the results show that for more than half the visitors (56.1%, *N* = 106) the size of the largest group they encountered along the track had *no influence* on the quality of their experiences. When the *no influence* responses were combined with those of visitors who stated that the size of the parties they encountered had *enhanced* the quality of their experience, the findings revealed that the size of parties encountered along the track was not problem for 83.1% of visitors (*N* = 157). As such, only 16.9% of visitors (*N* = 32) reported that the largest party they encountered along the track had detracted from the quality of their experience.

The number of people encountered along the track in a day

When asked h*ow many people had you expected to encounter along the track in a day?* only 1.0% of visitors failed to provide an answer and 37.1% stated that they *had no expectation* (Table 7.7). The majority (61.9%) did have expectations for how many other people they were likely to encounter along the track in a day. Some 3.3% of visitors (*N* = 4) stated that they expected to encounter no other people during the day along the track. More than three-quarters of visitors (78.3%, *N* = 94) expected to encounter 10 or fewer other people along the track in a day (Table 7.10). More than half the visitors (54.2%, N = 65) expected to encounter a maximum of eight other people in a day along the track. A little over a quarter of the visitors (26.7%, N = 32) expected to encounter four or fewer people along the track in a day.

Table 7.10 Expected and reported maximum number of people encountered along the track in a day on the Western Arthurs

Maximum number of people encountered along the track in a day	Proportion of visitors (percentiles) 25%	50%	75%
Expected (N = 120)	≤ 4	≤ 8	≤ 10
Reported number encountered (N = 192)	≤ 4	≤ 7	≤ 11

When asked *what was the greatest number of people you encountered along the track in a day?* 6.8% visitors (N = 13) stated that they had not encountered any other people along the track during their trips. About half the visitors (53.6%, N = 103) however, expected to encounter a maximum of seven other people or less along the track in a day. Less than a quarter (24.5%) of visitors encountered more than 11 other people along the track in a day, and few (3.1%, N = 6) encountered more than 20.

When asked how the number of people they encountered in a day along the track affected their experience, less than half the visitors (45.8%, N = 87) stated that it had *had no influence* on the quality of their experiences. More visitors (37.3%, N = 71) stated that the number of people they encountered along the track in a day had *enhanced* their experiences than said it had *detracted* (16.8%, N = 32) from them.

The number of aircraft seen or heard in a day

Less than half the visitors (42.8%, N = 83) had some expectation of the number of aircraft overflights they would encounter in a day while walking on the Western Arthurs (Table 7.7). Almost a third (31.3%, N = 26) of those visitors expected to see or hear no aircraft during their trip (Table 7.11). In fact, visitors who expected to encounter no aircraft overflights during their trip made up 13.4% of all the visitors surveyed. More than half the visitors with expectations (55.4%, N = 46) anticipated that they would encounter one or fewer overflights in a day during their trip, and more the three-quarters of visitors (79.5%, N = 66) expected to encounter fewer than three. Overall, a general inverse pattern is evident in the data, as the number of potential overflights increased the number of visitors expecting that number decreased.

Table 7.11 Expected and actual maximum number of aircraft seen or heard in a day on the Western Arthurs

Maximum number of aircraft seen or heard in a day	Proportion of visitors (percentiles)		
	25%	50%	75%
Expected (N = 83)	≤ 0	≤ 1	≤ 2
Reported number encountered (N = 167)	≤ 1	≤ 2	≤ 3

More than 10% of visitors (12.6%, N = 21) saw or heard no aircraft during their trip. Some 41.9% of visitors (N = 70) encountered just one aircraft or no aircraft in a day during their trip and almost 74.2% (N = 124) encountered two or fewer. Less than a fifth of the visitors (16.2%, N = 27) saw or heard more than three aircraft in a day during their trips. Only a small number (N = 7) of visitors reported encountering more than six aircraft in a day during their trip. The additional comments provided by visitors indicated that many of the overflights were helicopters transporting materials for track maintenance and construction.

More than half the visitors (51.8%, N = 99) indicated that the number of aircraft they saw or heard during their trip had *no influence* on their experiences. Just 13.6% of visitors (N = 26) stated that the number of aircraft they encountered during their trips had *enhanced* their experiences. However, more than a third of the visitors (34.5%, N = 66) stated that overflights had *detracted* from the quality of their experience of the Western Arthurs.

The number of other people camped within sight or sound

Visitors were asked *what was the number of people not in your group you expected to be camped within sight or sound of your campsite?* Some 58.5% of visitors (N = 113) quantified their expectations for this indicator (Table 7.7) ranging from those who expected to have the campsites to themselves (6.2%, N = 7) to those expecting to share a campsite with 30 other people (0.9%, N = 1). Most visitors (81.4%, N = 92) expected to encounter eight or fewer other people camped within sight or sound at a campsite during their stay on the Western Arthurs (Table 7.12), while more than half the visitors (70.8%, N = 80) anticipated encountering six or fewer. More than a quarter of visitors (39.8%, N = 45) did not expect to have more than four other people camped within sight or sound during their trips.

Seventeen per cent of visitors (N = 33) had campsites to themselves for the duration of their trips. A little more than half the visitors (53.6, N = 104) reported having had four or fewer other people camped within sight or sound, and 75.8% of visitors (N = 147) had six or fewer other people camped within sight or sound of their group (Table 7.12).

Table 7.12 Expected and actual maximum number of people encountered camped within sight or sound on the Western Arthurs

Maximum number of people camped within sight or sound	Proportion of visitors (percentiles) 25%	50%	75%
Expected (N = 113)	≤ 4	≤ 6	≤ 8
Reported number encountered (N = 194)	≤ 2	≤ 4	≤ 6

The number of people visitors encountered camping within sight or sound of their groups affected the quality of their experience to varying extents. Overall, 41.3% of visitors stated that the number of people camped within sight or sound had *no influence* on the quality of their experiences, and more visitors stated that their experience was *enhanced* (33.9%, N = 64) than *detracted* (24.9%, N = 47).

The maximum group size encountered at campsite

Some 59.3% of visitors (N = 115) had expectations for the size of the largest group that they would encounter at a campsite while on the Western Arthurs (Table 7.7). In response to the question *what was the largest group you expected to encounter at a campsite?* visitors reported that they had expected to encounter groups ranging from zero to 15 people in size. Most visitors expected to encounter groups of either four or six people at campsites, and just 5.3% of visitors expected to encounter a group larger than the maximum party size (eight people) recommended by the PWS (1998b). More than a quarter of visitors (42.6%, N = 49) expected the largest group they would encounter to be four people at a campsite, and at least half the visitors (51.3%, N = 59) anticipated the largest group to be less than six people (Table 7.13).

Table 7.13 Expected and actual maximum size group encountered camped within sight or sound on the Western Arthurs

Maximum size group encountered at a campsite	Proportion of visitors (percentiles) 25%	50%	75%
Expected (N = 115)	≤ 4	≤ 5	≤ 6
Reported number encountered (N = 192)	≤ 2	≤ 3	≤ 5

Contrary to their expectations, most commonly the largest group size encountered by visitors was two people, closely followed by visitors who encountered no other groups at campsites while on the Western Arthurs. Overall, the groups that visitors encountered at campsites were smaller than they had expected. Over half the visitors (56.3%, N = 108) reported that they had encountered no groups greater than three people in size at a campsite (Table 7.13). Only 10.4% of visitors ($N = 20$) encountered a group larger than that encouraged by the PWS (six people), and just 5.7% of visitors ($N = 11$) encountered a group larger than the prescribed maximum of eight people (1998b).

When asked how the largest size group they encountered at a campsite affected their experience, more than half the visitors (52.2%, $N = 97$) stated that it had *no influence*. However, for the remaining 47.8% of visitors ($N = 89$), almost twice the proportion of visitors stated that encountering the largest group they did at a campsite had *detracted* (31.1%) from the quality of their experience, than said it *enhanced* (16.7%).

General conclusions

Most visitors to the Western Arthurs had specific expectations for the conditions that they were likely to encounter during their visit. Overall, the majority of visitors reported that the conditions they encountered had either *had no influence* on the quality of their experiences or stated that it had *enhanced* them. Of the six indicators examined, the *number of people camped within sight or sound* and the *number of aircraft seen or head in a day* had the greatest negative impact on visitors experiences, with about a quarter (24.9%) and a third of visitors (34.5%) respectively reporting that the level of encounters they had experienced had *detracted* from the quality of their experience.

7.7 Defining social norms to inform the definition of acceptable standards

Are the norms the same for the evaluative dimensions?

To examine if and how different evaluative dimensions influenced visitors' norms, respondents were asked to specify both their preferred and maximum acceptable limits for the six social impact indicators examined. Table 7.14 presents both visitors' preferences and maximum acceptable limits and thus shows the difference between what visitors consider to be the preferred or ideal setting conditions and what they are prepared to tolerate.

Paired *t*-tests revealed visitors' preferences to be significantly different ($P < 0.001$) from their tolerable limits (maximums). In each instance, visitors' preferences were lower than their maximum acceptable limits. Such insight, however, provides an insufficient basis for determining upon which evaluative dimension social norms and thus standards should be based.

Table 7.14 Visitors' preferred and maximum acceptable limits for potential indicators

Indicator	Pref./Max.[a]	*N*	Mean	*SD*	*CV*[b]	Q2[c]	Q1[d]	SIQR[e]
Number of groups encountered along the track in a day	Prefer	159	2.3	2.0	0.87	2	1	1.0
	Maximum	174	4.6	3.1	0.67	4	3	1.0
Largest group encountered along the track	Prefer	171	4.3	1.6	0.37	4	4	0.5
	Maximum	182	5.9	2.0	0.34	6	4	1.0
Number of people encountered along the track	Prefer	159	6.2	5.4	0.87	6	2	4.0
	Maximum	167	12.3	8.6	0.70	10	6	4.5
Number of aircraft seen/heard per day	Prefer	151	0.8	1.8	2.25	0	0	0.5
	Maximum	156	2.4	2.7	1.12	2	1	1.0
Number of other people camped within sight or sound	Prefer	170	2.9	3.3	1.14	2	0	2.5
	Maximum	174	7.5	4.8	0.64	6	5	2.1
Largest group encountered at a campsite	Prefer	178	3.7	2.0	0.54	4	2	1.0
	Maximum	175	5.9	2.7	0.46	6	4	1.0

[a] All preferences and maximums are significantly different at $P < 0.001$ (paired t-test)

[b] Coefficient of variation

[c] Median: fifty per cent of respondents would accept this encounter level

[d] Seventy-five per cent of the respondents would accept this encounter level

[e] Semi-interquartile range

On which evaluative dimension should social norms be based?

As in Chapter 6, three questions were examined to determine upon which evaluative dimension social norms should be based. First, which evaluative dimension elicited the greatest norm prevalence? Second, for which evaluative dimension was there the greatest degree of consensus about the norm? And finally, which evaluative dimension was the basis for the most congruent norms?

Norm prevalence

The presence of norms was high among the visitors surveyed and varied between 80.4% and 93.8% across the potential indicators examined (Table 7.15). The presence of norms was least evident for the *maximum number of aircraft seen or heard in a day*, while the existence of norms was greatest for maximum group sizes at campsites and on tracks. Overall, relatively few visitors stated that they *didn't care* about the indicators, with the highest proportions being for the maximum number of people encountered along the track in a day and the maximum number of aircraft seen or heard in a day. Of the indicators examined for the presence of norms (Table 7.15), these two were considered the least important in influencing the quality of their experiences (Table 7.5).

Table 7.15 Norm prevalence for potential indicators (N = 194)

Potential indicators	Evaluative dimension	Had a norm† %	Didn't care %	No number‡ %
Number of groups encountered along the track in a day	Prefer#	82.0^{a}	13.9^{b}	4.1^{ab}
	Maximum#	89.7^{a}	8.2^{b}	2.0^{a}
Largest group encountered along the track	Prefer#	88.1^{a}	10.8^{b}	1.0^{ab}
	Maximum#	93.8^{a}	5.7^{b}	0.5^{ab}
Number of people encountered along the track in a day	Prefer#	82.0^{a}	13.9^{b}	4.1^{a}
	Maximum#	86.1^{a}	10.8^{b}	3.1^{a}
Number of aircraft seen or heard in a day	Prefer#	77.8^{a}	18.6^{b}	3.6^{ab}
	Maximum#	80.4^{a}	12.9^{b}	6.7^{a}
Number of other people expected to be camped within sight or sound of your campsite	Prefer#	87.6^{a}	11.3^{b}	1.0^{ab}
	Maximum#	89.7^{a}	9.8^{b}	0.5^{ab}
Largest group encountered at a campsite	Prefer#	91.8^{a}	7.7^{b}	0.5^{ab}
	Maximum#	90.2^{a}	8.8^{b}	1.0^{ab}

Note: Due to rounding some percentages don't add to 100

† Provided a quantified amount

‡ Neither indicated that they 'didn't care' or gave a number

Kruskal Wallis ($P < 0.01$). Proportions with different superscript letters indicate significant differences ($P < 0.05$) in the level of importance visitors in the 'had a norm', 'didn't care', and 'no number' categories attributed to the indicator (Mann-Whitney U *post hoc* tests)

For all but one of the six indicators, norm prevalence was highest for the *maximum acceptable* evaluative dimension, by between 2.1% and 7.7%. The exception was for *the largest group encountered at a campsite* which three fewer people (1.6%) provided a norm when asked to specify the largest group they would accept encountering at a campsite in the Western Arthurs area. Two of these visitors indicated they *didn't care*, while the other didn't provide a quantified norm.

Relationship between norm prevalence and importance (salience)

Comparisons of visitors' responses were undertaken to determine if there were significant differences in the level of importance visitors in the 'had a norm', 'didn't care', and 'no number' categories attributed to the indicators. Significant differences in the level of importance are identified by the superscript letters on the proportions in each category presented in Table 7.15.

For both evaluative dimensions, visitors who stated that they didn't care about the number of encounters they would experience considered the indicators to be the least important and significantly less so ($P \leq 0.005$) than those who provided a norm. This pattern was the same for each of the six indicators. Analysis also revealed that visitors in the 'no number' category attributed varying levels of importance to indicators. This ranged from not being significantly different ($P > 0.05$) to those who had norms but significantly more important ($P < 0.05$) than those that didn't care, to being not significantly different ($P > 0.05$) from visitors in either of the other categories.

Consensus

The *SD*, the *CV* and the SIQR have all been presented in Table 7.14 to allow readers to make comparisons in the levels of crystallisation/consensus for norms with past and future studies (Chapter 4). Whether or not one sees greater consensus for preferences than for maximum acceptable limits depends on which measure of variability one uses, the *SD*, the *CV* or the *SIQR*. In the case of the Western Arthur Range Walker Survey data, the presence of significant differences in the means precludes the use of *SDs* as an indicator of consensus (Crovelli 1973; Roggenbuck *et al.* 1991). While *CV* is useful for comparing the variability of different means (Dytham 2003; Sokal & Rohlf 1995), it is not an ideal measure due to a small number of outliers within the data and as such should be treated with caution (Hall & Shelby 1996). With this caveat in mind, the *CVs* show a greater agreement among visitors for the maximum acceptable limits for each of the six indicators than for their preferred condition. Due to the limitations of using the *SDs* and *CVs* the *SIQRs* may be the better measure of the level of consensus among visitors. In contrast to the *CV's*, the *SIQR's* show equal if not less consensus for the maximum acceptable limits than preferences for all but one of the six indicators examined. From a practical perspective, however, the differences in the comparative levels of consensus for each of the six indicators are relatively minor.

Congruence levels

The proportion of visitors who respond in a manner that is congruent with their stated norm for a particular indicator provides an indication of the validity of the social norm that is developed from data such as that presented here. The calculation of the proportion of visitors with congruent reactions was performed in the same way as it was for the analysis of the Overland Track Walker Survey (Section 6.9). Table 7.16 details the relative congruence levels for the two evaluative dimensions examined across the six potential indicators studied.

Congruence levels were substantially higher for visitors' maximum acceptable limits than for their preferred condition across five of the six indicators (Table 7.16). The difference between the congruence levels for these indicators varied between 11.0% and 21.1%. The only indicator for which congruence was not higher for visitors' maximum acceptable level of encounters was the number of aircraft seen or heard in a day. The difference between the congruence levels for this indicator was practically insignificant at just 0.1%.

Table 7.16 Indicators, evaluative dimensions and their relative levels of congruence

Indicator	Evaluative dimension	*N*	Proportion (%) of visitors with congruent reactions
Number of groups encountered along the track in a day	Prefer	159	63.9
	Maximum	173	85.0
Largest group encountered along the track	Prefer	171	71.5
	Maximum	174	90.9
Number of people encountered along the track in a day	Prefer	159	65.6
	Maximum	166	83.1
Number of aircraft seen/heard per day	Prefer	151	73.4
	Maximum	131	73.3
Number of other people camped within sight or sound	Prefer	170	67.9
	Maximum	174	83.3
Largest group at a campsite	Prefer	178	78.7
	Maximum	175	89.7

General conclusion

The examination of the relative levels of norm prevalence, consensus, and congruence for the two evaluative dimensions across the six indicators studied has shown that norms based on the *maximum acceptable* evaluative dimension are predominantly more prevalent among visitors. Furthermore, norms based on this evaluative dimension elicited similar and more frequently higher levels of congruence in the reactions of visitors and are therefore considered to have greater construct validity. However, little difference in the levels of consensus between the two evaluative dimensions is evident.

Influences on the congruence of visitors reactions

Four questions were examined to explore the influence of a number of variables on the congruence of visitors' reactions:

1. Was congruence associated with visitors experiencing different encounter levels, irrespective of their personal norms?

2. Was congruence associated with different personal norms?

3. Was the type of encounter – indicator – more important to visitors with congruent reactions than for those without?

4. Was congruence associated with any other influences?

Was congruence associated with visitors experiencing higher levels of encounters?

The encounter levels reported by visitors were compared across the four congruence categories for each of the six types of encounters to see whether they varied. First, the comparisons showed visitors who had their norms exceeded reported significantly higher encounter levels than those whose norms had not been exceeded (Table 7.17). Second, irrespective of whether visitors had had their norms exceeded or not, those who stated that the level of encounters had detracted from their experiences commonly reported higher levels of encounters than visitors who stated that it had not detracted (Table 7.17). Moreover, in many cases the reported encounter levels were significantly higher ($P < 0.05$) for visitors whose experiences had been degraded than for those it had not. Finally, as such, there is a clear and frequently significant association between the level of encounters reported by visitors and the congruence of their reactions. This association, however, is not linear (Figure 6.2). That is, in the Norms Not Exceeded categories congruent reactions (didn't detract) were significantly associated with visitors experiencing lower encounter levels than visitors whose reactions were incongruent (detracted). The inverse was true for the visitors in the Norms Exceeded categories.

Table 7.17 Median number of reported encounters for visitors whose personal norms (maximum acceptable limits) were exceeded and not exceeded, and stated that it detracted or didn't detract from the quality of their experiences of the Western Arthurs

		Norms Not Exceeded		Norms Exceeded	
Indicator	**Encounter level**	**Didn't Detract^{C}**	**Detracted^{I}**	**Didn't Detract^{I}**	**Detracted^{C}**
Number of groups encountered along the track in a day	Median†	2.00^{a}	3.00^{b}	3.50^{bc}	5.50^{c}
	SIQR	1.00	0.88	1.00	1.25
Largest group encountered along the track in a day	Median†	2.00^{a}	3.00^{a}	6.50^{b}	9.00^{c}
	SIQR	1.50	0.38	2.63	1.50
Number of people encountered along the track in a day	Median†	6.00^{a}	8.00^{b}	11.00^{b}	18.00^{c}
	SIQR	2.25	3.00	3.25	3.75
Number of aircraft encountered along the track in a day	Median†	0.00^{a}	1.00^{ab}	2.00^{b}	2.00^{c}
	SIQR	1.00	0.13	0.50	1.00
Number of people camped within sight or sound	Median†	3.00^{a}	6.00^{b}	7.00^{bc}	10.00^{c}
	SIQR	1.50	1.75	2.50	2.50
Largest group encountered at a campsite	Median†	3.00^{a}	3.00^{ab}	5.00^{b}	8.00^{c}
	SIQR	1.00	2.00	1.25	1.50

† Kruskal-Wallis ($P < 0.001$). Medians with different superscript are significantly different ($P < 0.05$) by Mann-Whitney U post hoc tests

^{C} Congruent reaction

^{I} Incongruent reaction

Was congruence associated with different personal norms?

Comparisons of the median encounter norms across the Norms Exceeded and Norms Not Exceeded categories show lower norms to be generally associated with visitors who reported encounter levels had exceeded their personal norms (Table 7.18). Moreover, in many cases, these differences were statistically significant ($P < 0.05$). However, there were mixed results when the median norms of visitors in the Detracted and Didn't Detract categories were compared. Only two statistically significant differences ($P < 0.05$) between these categories were evident, and in three cases the median norms were the same. Interestingly though, where there were differences between the median norms of the Didn't Detract and Detracted categories they were often the inverse of what was expected. That is, it was assumed that the norms of visitors who stated the level of encounters they reported had detracted from their experiences would be lower than the norms of visitors in the Didn't Detract categories. However, in 50% of cases this was not true.

Table 7.18 Median encounter norms for visitors whose personal norms (maximum acceptable limits) were exceeded and not exceeded, and stated that it detracted or didn't detract from the quality of their experiences of the Western Arthurs

		Norms Not Exceeded		Norms Exceeded	
Indicator	**Norm**	**Didn't Detract[C]**	**Detracted[I]**	**Didn't Detract[I]**	**Detracted[C]**
Number of groups encountered along the track in a day	Median†	4.00[a]	5.00[b]	2.00[c]	2.00[c]
	SIQR	1.50	2.50	0.50	1.25
Largest group encountered along the track in a day	Median†	6.00[a]	5.50[ab]	4.50[b]	6.00[ab]
	SIQR	1.88	0.88	0.88	1.00
Number of people encountered along the track in a day	Median†	10.00[a]	10.00[a]	6.00[b]	10.00[ab]
	SIQR	5.00	4.50	3.25	3.88
Number of aircraft encountered along the track in a day	Median†	2.00[a]	2.00[a]	0.50[b]	0.00[b]
	SIQR	1.25	0.38	0.00	0.00
Number of people camped within sight or sound	Median†	6.00[a]	8.00[a]	4.50[ab]	6.00[b]
	SIQR	2.50	2.00	2.38	1.00
Largest group encountered at a campsite	Median†	6.00[a]	6.00[ac]	4.00[b]	5.00[c]
	SIQR	1.50	1.00	0.25	1.00

† Kruskal-Wallis ($P < 0.01$). Medians with different superscript are significantly different ($P < 0.05$) by Mann-Whitney U post hoc tests

[C] Congruent reaction

[I] Incongruent reaction

Overall, therefore, there was no overall pattern of association between the norms of visitors and the congruence of their reactions. Rather, there was a greater and often significant association between the level of visitors' norms and whether their norms were exceeded or not. More specifically, visitors who had their norms exceeded most commonly had lower norms than visitors whose norms had not been exceeded.

Was congruence associated with how important an influence the indicator was in determining the quality of visitors' experiences?

Overall, there was little association between how important visitors considered the indicators in determining the quality of their experiences and whether or not their norms had been exceeded (Table 7.19). More often than not, however, visitors within the Norms Not Exceeded and Norms Exceeded categories, who stated that the level of encounters they had reported had detracted from their experiences rated the indicators as more important than did visitors who stated that the level of encounters had not detracted. In half these cases the differences were significant ($P < 0.05$). As such, there is an association between the level of importance attributed to an indicator by a visitor and the congruence of their reaction to the level of encounters they experience. Like the association between congruence and the level of encounters reported by visitors, reported earlier, the relationship in this case is also not linear. That is, while visitors who had congruent reactions[19] to having had their norms exceeded generally considered the indicator to be more important in determining the quality of their experience than did visitors who reacted in an incongruent fashion[20], the reverse was true for visitors whose norms were not exceeded.

Was the congruence of visitors' reactions associated with any other influences?

As shown above, a number of visitors had incongruent reactions to the levels of encounters they experienced. The additional comments provided by visitors (see Appendix J) gave an insight into a range of other influences that contributed to their incongruent reactions. These influences fell into three broad categories: visitor characteristics; the characteristics of the people/groups encountered; and situational and contextual variables.

Visitor characteristics

Visitors' additional comments show their preferences and attitudes helped determine how they reacted to the people or situations they encountered. For example, despite encountering fewer groups along the track in a day than their stated norm, one visitor explained that the level of encounters he experienced had detracted from his experience because he was 'walking solo [and] would have liked to have seen more'. Another visitor commented that while she hadn't encountered a larger group along the track than her stated norm, the sizes of

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19 Stated that having their norm exceeded had detracted from the quality of their experience.

20 Stated that having their norm exceeded had <u>not</u> detracted from the quality of their experience.

the groups she did encounter still detracted because she felt 'smaller groups are better'. Thus, it is evident that visitors' preferences and attitudes led to incongruent negative reactions to the encounters they experienced despite not having had their norms exceeded.

Table 7.19 Median importance (salience) of the indicator in determining the quality of visitors' experiences for those whose personal norms (maximum acceptable limits) were exceeded and not exceeded, and stated that it detracted or didn't detract from the quality of their experiences of the Western Arthurs.

		Norms Not Exceeded		Norms Exceeded	
Indicator	**Importance rating***	**Didn't Detract[C]**	**Detracted[I]**	**Didn't Detract[I]**	**Detracted[C]**
Number of groups encountered along the track in a day	Median†	4.00[a]	5.00[b]	4.00[ab]	5.00[b]
	SIQR	0.50	0.50	1.00	0.50
Largest group encountered along the track in a day	Median†	4.00[a]	4.00[ab]	5.00[b]	5.00[b]
	SIQR	1.00	1.13	0.88	1.00
Number of people encountered along the track in a day	Median†	3.00[a]	5.00[ab]	4.00[a]	5.00[b]
	SIQR	1.00	1.00	0.50	0.50
Number of aircraft encountered along the track in a day	Median†	4.00[a]	4.00[ab]	3.00[a]	5.00[b]
	SIQR	1.50	1.25	1.00	0.50
Number of people camped within sight or sound	Median†	4.00[a]	5.00[a]	4.00[a]	5.00[b]
	SIQR	1.00	0.50	0.38	0.50
Largest group encountered at a campsite	Median†	4.00[a]	5.00[b]	4.00[a]	5.00[b]
	SIQR	1.00	1.50	0.63	1.00

† Kruskal-Wallis ($P < 0.001$). Medians with different superscript are significantly different ($P < 0.05$) by Mann-Whitney U post hoc tests

C Congruent reaction

I Incongruent reaction

* 1 = *not at all important* to 6 = *extremely important*

Characteristics of the people or groups encountered

The additional comments provided by visitors show that the characteristics of the people or groups they encountered both mitigated the impact of the level of encounters they experienced when their norms had been exceeded and also prompted negative reactions when they hadn't (see Appendix J). 'Noisy/loud behaviour', people 'not following MIB [Minimum Impact Bushwalking]' practices, and 'groups [that] ignored signs [and] camped beside lakes and walked in revegetation areas' were just some of the actions and encountered behaviours that led to incongruent reactions (to the level of encounters experienced) even though their norms hadn't been exceeded.

In contrast, the behaviour of the people or groups encountered by visitors encouraged some to refrain from stating that the level of encounters they had experienced had detracted from their trip, even though their norms had been violated. A range of comments explained such incongruent reactions, for example: the 'people [were] interesting to talk to [and] good company', provided 'good conversation' or the encounter had allowed them to exchange 'info[rmation] on [the] track ahead'. Similarly, when the people or groups visitors encountered 'shared beliefs and values' they were perceived to be alike and did not detract from the quality of their experience. Alternately, the absence of interaction was considered positively as one visitor appreciated that the largest group they encountered at a campsite had 'kept to themselves'.

The type of people encountered was also found to be influential in transforming what may have otherwise been an experience that detracted from a visitor's trip. Although she had encountered more people along the track than her stated norm, one visitor reported that because the people were 'PWS trackies'[21] the experience had not detracted from her trip. The influence of such characteristics was also shown to extend to visitors' assessments of the number of aircraft they encountered. One visitor explained that because the aircraft (helicopters) were involved in the transport of PWS personnel and materials for trackwork, the number of flights encountered had not detracted from his experience, even though he had seen and heard more aircraft in a day than his norm permitted.

Situational and contextual variables

Situational and contextual variables were also shown to influence the congruence of visitors' reactions. Such variables included the type of area, the location within the area, and whether the encounter/s took place at the beginning, middle, or end of the visitors' trip. Several of the comments provided by visitors illustrate these influences (Appendix J). For example, the environmental variables led one visitor to state that because 'Moraine A was the busiest and most impacted section' of the Range the number of people he had encountered there had detracted from the quality of his experience even though his norm had not been exceeded. Another visitor explained that she considered the '[camp]sites were too close together' which had meant that although the number of people she had encountered camped within sight or sound had not exceeded her norm, it had detracted from the quality of her trip.

Temporal variables also influenced the congruence of visitors' reactions to the people or situations they encountered. For instance, one visitor reported that he had encountered a group larger than his norm along the track, but because it was the 'last day ... [he] didn't care'. The influence of temporal variables is not limited to whether the encounters occurred at the beginning, middle, or end of a trip, but also to the intensity or duration of the

[21] *Trackies* is a term commonly used to describe people employed by the PWS to undertake the maintenance and construction of walking tracks.

encounters. This was evident in the comment of one visitor who had encountered more people along the track in a day than his norm. The fact that the encounters were 'brief' and the people were 'going in the opposite direction' had meant that the experience had not detracted from his trip.

General conclusion

A range of variables was associated with the congruence of visitors' reactions to the level of encounters they experienced. Both the level of encounters visitors reported and the importance that visitors attributed to an indicator in determining the quality of their experiences were associated with congruence of their reactions. Visitors whose norms had been exceeded and stated that the level of encounters had not detracted from the quality of their trips generally experienced lower encounter levels and or considered the indicator to be less important than visitors who reacted in a congruent fashion. The inverse was true for visitors whose norms had not been exceeded but stated that the encounters had detracted from their experience. In contrast, the level of visitors' norms did not influence congruence but was associated with whether or not norms had been exceeded.

Examination of the additional comments provided by visitors has shown that the characteristics of the visitors themselves, as well as that of the people and or groups encountered influenced whether or not visitors reactions were congruent with their personal norms. Moreover situational and contextual variables were also found to explain the incongruent impact of the levels of encounters visitors experienced.

Acceptable campsite condition

The acceptability of varying levels of impact at campsites was evaluated by asking visitors to indicate whether they considered each of five impact condition descriptions to be *acceptable* or *unacceptable* (Chapter 4 & Appendix C). Condition 1 was the least impacted of the five condition classes and was considered to be *acceptable* by all but one visitor (Figure 7.3). At either end of the impact spectrum described by the five condition classes there was overwhelming agreement among visitors about their acceptability. More than 95% of visitors found Condition 1 (99.5%) and Condition 2 (95.3%) to be acceptable, while at the other end of the scale almost 90% or more of visitors found the impacts described by Condition 4 (89.4%) and Condition 5 (96.8%) to be unacceptable. However, while there was least agreement evident for the acceptability of Condition 3, most visitors (68.8%) found this level of impact to be acceptable at campsites on the Western Arthurs.

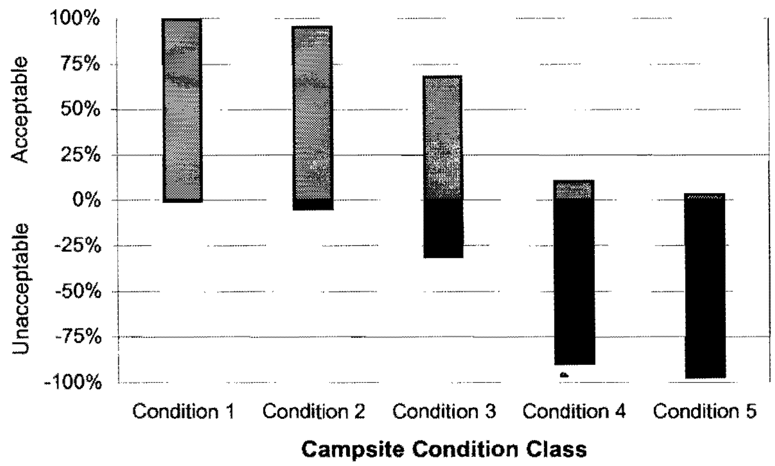

Figure 7.3 Acceptability of different levels of impact at campsites in the Western Arthurs area (*N* = 188)

Signs/markers

In addition to being asked how important they considered *directional signs and track markers* to be in determining the quality of their experiences[22], visitors were asked how many signs/markers they saw during their trip and whether they thought they were sufficient in number (Chapter 4 & Appendix C).

While a substantial proportion of visitors (42.5%, N = 82) stated that they *saw very few signs/markers*, most (57.5%, N = 111) felt that they had seen many signs/markers while visiting the Western Arthurs. No visitors reported seeing no sign or markers during their trip. When asked what they thought about the number of signs/markers they saw almost three-quarters of visitors (73.2%, N = 142) stated that they thought *the number is about right*, while about a fifth of the visitors (18.6%, N = 36) felt *more are needed.* Relatively few visitors were of the opinion that *there were too many* signs/markers in the area.

What are the social norms of the visitors to the Western Arthurs?

Social norms have been identified and presented at two levels, the first being the condition 50% of visitors will accept, and the second being the condition which 75% of visitors will accept (Table 7.20). The greatest difference between the two levels of social norms is for *the maximum number of people encountered along the track in a day.* To attempt to satisfy 50% of visitors it would be necessary to restrict the number of other people visitors encounter in a day along the track to 10 people or fewer. However, the number of people encountered along

[22] Visitors considered *signs and track markers* to be *somewhat* to *moderately important* in determining the quality of their experiences.

the track in a day would need to be restricted to less than half that number to satisfy 75% of visitors. The degree of difference between the two levels of social norms is less for the other indicators.

Table 7.20 Social norms defined by the minimum acceptable condition that 50% and 75% of visitors to the Western Arthurs will accept

Indicator	N	50%	75%
The maximum number of groups encountered along the track in a day	174	4	3
The maximum size group encountered along the track	182	6	4
The maximum number of people encountered along the track in a day	167	10	4
The maximum number of aircraft seen or heard in a day	156	2	1
The maximum number of other people camped within sight or sound	174	6	5
The maximum size group encountered at a campsite	175	6	4
The minimum acceptable campsite condition class	188	3	2

The norm for the number of people visitors will accept to encounter along the track in a day is almost double the maximum number of people 50% of visitors will accept being camped within sight or sound. This finding indicated that visitors are more sensitive to encounters at campsites than along the track. However, there was agreement with respect to the maximum size groups visitors considered acceptable at campsites and along tracks. In both situations, 50% of visitors considered group sizes of six people of fewer to be acceptable, and group sizes would need to be restricted to a maximum of just four people not to exceed the norms of 75% of visitors.

Finally, the minimum acceptable condition 50% of visitors considered acceptable was that where *ground vegetation has been lost and the sticks and leaves on the ground have been trampled into small fine pieces on most of the campsite (say between 25% - 75%). Bare soil is exposed in main use areas, but there is little or no erosion* (Condition Class 3). However, if the norms of 75% of visitors were not to be exceeded, it would be necessary to ensure campsites were not impacted beyond Condition Class 2.

Support for restrictive management actions

If the PWS is to manage conditions in the Western Arthurs to be consistent with the norms identified in the previous sections, the use of restrictive management actions may become necessary. Visitors were asked if they felt *a limit is needed on the number of people walking the Western Arthur Range, recognising that your own opportunity to walk the track may be limited in the future.* Almost 95.0% of visitors supported the use limits as a management tool at some point, and only a small proportion of visitors stated that limiting use *would never be* *appropriate* (Table 7.21). Of the visitors who provided qualified support for limiting use of the Western Arthurs, half were of the opinion that limits should be introduced to either *hold use at current level* (as at 1999-2000) or to *reduce use.*

Table 7.21 Visitors support for limiting the number of people walking in the Western Arthurs with the recognition that their own opportunity to walk the track may be limited in the future (*N* = 194)

Support for limiting the number of people walking the Western Arthurs	%
Limits would never be appropriate	6.2
Hold use at current level	28.9
Reduce use	21.1
Support limiting use in the future when/if overuse occurred	43.8

7.8 Summary

The analyses of the Western Arthur Range Walker Survey data have paralleled that conducted on the Overland Track Walker Survey data. This was done to allow comparisons between the two studies in the synthesis and discussion of the study's findings in the following chapter.

Chapter 8. Synthesis and discussion

Following on from the presentation of the results from the Overland Track Walker Survey and those from the Western Arthur Range Walker Survey presented in Chapters 6 and 7 respectively, in this chapter I compare those results, and highlight consistencies and contrasts between them. The chapter's purpose is to situate these comparative findings within the broader context of the body of knowledge present in the outdoor recreation research and related literature. Thus, I aim to advance the current appreciation of the various parameters that affect the quality of visitors' experiences within the TWWHA and contemporary understandings of the similarities and differences with other wilderness and natural protected areas in Australia and overseas.

This chapter is presented in a manner consistent with the preceding two chapters allowing cross-referencing between the results of the two surveys and the following discussion. Comparisons between the findings for the two study sites, as well as that with the broader literature, are made throughout. As such, visitor and visit characteristics are discussed prior to my examining the importance of a range of indicators in determining the quality of visitors' experiences. Factors that influence the quality of visitors' experiences are then compared before key indicators for the study sites are identified and discussed. Comparisons between the Overland Track and Western Arthurs visitors' expectations, the conditions they encountered, and their impact on the quality of their experiences are then presented for six selected indicators.

Next, the validity of the normative approach as a basis for the development of user-defined limits of acceptable change for the management of visitor experience in the TWWHA is discussed. This discussion evaluates two different evaluative dimensions in relation to norm prevalence, the conditions they prescribe, and the congruence of visitors' reactions to the conditions they encountered. The various influences on the congruence of visitors' reactions are also explored.

Further, the social norms for the Overland Track and the Western Arthurs are compared and the findings elaborated in relation to those identified for other backcountry and wilderness areas. Subsequently, conditions at the study sites are examined with respect to social norms. Finally, the level of support shown by Overland Track and Western Arthurs visitors for limiting use is discussed examined and compared to earlier studies of TWWHA visitors, as well as investigations that have been reported for other backcountry and wilderness areas in Australia and overseas.

General conclusions are variously integrated within the discussion or presented under their own heading; however, to avoid unnecessary repetition the conclusions emerging from the discussion have been reserved for the final chapter.

8.1 Visitor Characteristics

Age and sex

The age of visitors to the Overland Track and Western Arthurs fits with the general observation made by Manning (1999: 26) that 'visitors to … national parks and wilderness tend to be young to middle age'. The mean age of visitors (33.6 years and 35.8 years for the Overland Track and Western Arthurs respectively) was similar to the age of visitors to the Caney Creek, Cohutta, and Upland Island Wildernesses in the south of the United States studied by Watson *et al.* (1992), and comparable to the age of Nuyts Wilderness visitors in Western Australia (Morin 1996).

When the ages of male and female visitors were compared, their median age (31 years and 34 years for the Overland Track and Western Arthurs respectively) was shown not to be significantly different ($P > 0.05$) for either study site. Male visitors made up the greater proportion of visitors at both sites, and there was a clear predominance of males in the Western Arthurs ($N = 190$) where they comprised 70.5% of visitors, compared to the Overland Track ($N = 874$) where a greater balance between the sexes was evident (56.1% male and 43.9% female).

The proportional representation of the sexes in the areas examined by the current study is broadly consistent with studies in the United States that show a trend toward the predominance of males as the recreation setting shifts from developed to the wilderness end of the recreation opportunity spectrum. For example, Hartmann and Cordell (1988) found that males comprised almost 60% of all backpackers across a range of outdoor recreation areas across the United States, with greater balance evident between the sexes in developed camping activities. In wilderness areas, however, Roggenbuck and Lucas (1987) in a state-of-knowledge review of wilderness use and user characteristics found visitors were predominantly male, usually making up between 70% to 85% of all visitors. The predominance of males among visitors to the Overland Track and the Western Arthurs was, however, not as pronounced as that recorded by Watson *et al.* (1992) in their examination of the Caney Creek, Cohutta, and Upland Island Wildernesses where between 71% and 93% of visitors were male.

Place of residence (origin)

The Overland Track and the Western Arthurs were both dominated by visitors from out-of-state. The proportion of Tasmanians visiting the study areas was just 14.4% for the Overland Track and 26.3% for the Western Arthurs. On the Overland Track, Tasmanian visitors were in the minority with greater proportions of visitors from the mainland (63.0%) and overseas (22.6%). While there was proportionally more local visitors to the Western Arthurs, than to the Overland Track, visitors were still chiefly from the mainland states (70.1%), while only a small proportion of visitors was from overseas (3.6%). This finding stands in contrast to studies of other wilderness areas. Of the studies of 29 wilderness areas reviewed by Roggenbuck and Lucas (1987), only seven (24.1%) were dominated by visitors from out-of-state. Similarly, visitors to two of the three areas studied by Watson *et al.* (1992) were also predominantly local residents[23], as were those who visited the Nuyts Wilderness in Western Australia (Morin 1996). According to Morin (1996), just 11.0% of visitors to Nuyts Wilderness were from out-of-state, with just 7.0% of visitors coming from inter-state and 4.0% from overseas.

Like the Glacier National Park backcountry (Montana), Yosemite National Park backcountry (California), and the Weminuche wilderness (Colorado) in the United States, both the Overland Track and the Western Arthur Range are well known nationally (Roggenbuck & Lucas 1987). Within Australia, and particularly amongst bushwalkers, the study sites have icon status and are frequently featured in articles in Australia's premier rucksack sports magazine *Wild*. As such, their national prominence and popular recognition as bushwalking destinations is likely to have contributed to their popularity with out-of-state visitors. By comparison, the Nuyts Wilderness in Western Australia is relatively little known outside that State.

Bushwalking experience

Visitors to the Western Arthurs were more experienced than those on the Overland Track. All visitors to the Western Arthurs had some level of previous bushwalking experience, in contrast to those on the Overland Track where almost a fifth (19.0%, $N = 166$) had no prior bushwalking experience. Moreover, only 32.9% of the visitors ($N = 287$) on the Overland Track had completed between one and six bushwalks before undertaking their journey. In comparison, almost 90.0% of visitors (88.0%, $N = 169$) to the Western Arthurs had completed more than six previous bushwalks.

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[23] Local residents are those visitors who reside in the same State/s as the study area.

Unlike the Overland Track, the majority of visitors to the Western Arthurs had bushwalked in Tasmania before and a substantial proportion of them (34.4%, N = 66) had visited the Range on at least one previous occasion. By comparison, only 15.6% of visitors (N = 135) on the Overland Track had visited the site before. The proportions of repeat visitors on the Overland Track and the Western Arthurs are substantially smaller than that recorded by Morin (1996) at the Nuyts Wilderness in Western Australia, where 49.0% of visitors had visited the area on at least one previous occasion.

There is also a higher degree of repeat visitation to wilderness areas evident in the United States than was found to be the case for the Overland Track and the Western Arthurs. A review of visitors' previous wilderness experience in different areas has shown substantial variation. As much as 60.0% of visitors to some wildernesses such as Great Bear and Scapegoat (Montana), and Joyce Kilmer/Slickrock (North Carolina) had not visited the area before, while in other areas as much as 70.0% of people were repeat visitors (Roggenbuck & Lucas 1987).

8.2 Visit characteristics

Types of groups

The proportional representation of visitors in different group types was not consistent at the two study sites (Tables 6.4 & 7.3). More than one fifth (20.9%) of visitors on the Overland Track were members of a commercial group, unlike the Western Arthurs where no commercial trips were recorded by either the survey or the PWS (2000b), despite them being permitted by the TWWHA management plan (PWS 1999).

Overall, friends/family groups were the most common and made up a greater proportion of visitors on the Western Arthurs (72.3%) than on the Overland Track (65.1%). However, as a proportion of the non-commercial groups on the Overland Track they comprised 82.3% of free-walkers at that site. A greater proportion of Western Arthurs visitors travelled solo (14.4%) than did on the Overland Track (7.9%), and visitors in bushwalking/outdoor activity club groups were more prominent on the Western Arthurs (10.8% versus 1.7% on the Overland Track). School/scout groups had a greater albeit small presence on the Overland Track (4.4%) than they did on the Western Arthurs (1.5%).

The representation of different group types on the Western Arthurs was similar to that of the Nuyts Wilderness where 14.0% of visitors travelled solo, 77.0% were in family or friends groups and 10.0% visited as a member of a club or organised group (Morin 1996).

The proportion of solo visitors recorded at the two Tasmanian study sites falls within the range recorded across 22 wilderness areas across the United States (Roggenbuck & Lucas 1987). A comparison of the proportion of visitors in family and or friends groups though shows that they represent a higher proportion of the visitors to the wilderness areas in the United States reviewed by Roggenbuck and Lucas (1987) than they do for either the Overland Track or the Western Arthurs. Further, the proportion of visitors travelling with clubs or organised groups at the Tasmanian sites (5.9-11.7%), are within the range (0-11%) reported for wilderness areas in the United States reported by Roggenbuck and Lucas (1987).

Group size

Overall, 50% to 75% of groups visiting wilderness areas are small in size – between two to four people (Lucas 1990b; Roggenbuck & Lucas 1987). In this respect, the findings of the Overland Track and Western Arthurs surveys are consistent with other studies conducted across a range of wilderness and national park areas in the United States (Lucas 1990b), as well as in the Nuyts Wilderness in Western Australia (Morin 1996).

Two was the most common (mode) group size at both the Overland Track and the Western Arthurs, while the median groups sizes were three and two persons respectively. The mean group size was higher for the Overland Track at 5.3 people, than the Western Arthurs where the mean group size was 3.05 people.

The largest group sizes for the study sites were 11 people on the Western Arthurs, and 15 people on the Overland Track. Large group sizes were more commonly found on the Overland Track where commercial group sizes were significantly larger ($P < 0.001$) than the free-walker groups, with medians of 13 people and 3 people respectively. Although there is evidence of group sizes in excess of those recommended by the PWS (1998b) at both study sites, they were few in number (PWS 2000b, 2000c).

Trip duration

Trip duration on the Overland Track showed a marked concentration of trips of six days in length (Figure 6.2). In contrast, the data for the Western Arthurs showed a broader and more even distribution of trip length across the three to 10 day range (Figure 7.2). The mean, median, and mode trip lengths for the study areas reflect the longer trips that are characteristic of the Western Arthurs. The mean trip length for the Overland Track was 5.9 days, the median and mode six days, compared to the Western Arthurs where the mean trip duration was 6.9 days, and the median and mode seven days and eight days respectively.

A review of the use of more than 30 wilderness areas in the United States by Roggenbuck and Lucas (1987) found the average length of stay to be just two to three days. Further, only half of the wilderness areas in the west of the United States that were studied recorded trip lengths of longer than one week. While the average trip length during summer at the Boundary Waters Canoe Area (Minnesota), Bob Marshall (Montana), Great Bear (Montana), and Great Smokey Mountains (North Carolina and Tennesee) averaged four to five days, in general Lucas (1990b: 366), found most wilderness visits to be of short duration. Indeed, for many small and medium sized wilderness areas, in the United States, trips of just a single day are the majority (Lucas 1990b). 'Even in the very large Selway-Bitterroot Wilderness in Idaho and Montana, 48 per cent of all visits were for a day or less' (Roggenbuck & Lucas 1987: 214). Similarly, in Western Australia Morin (1996) found 55.0% of visitors to the Nuyts Wilderness were day-trippers, with the remaining visitors staying between one and three nights.

Comparisons between the findings from the Overland Track and Western Arthurs surveys and those discussed immediately above cannot be made since day-users were screened from the samples. Though the high proportion of day-visitors reported in the reviews undertaken by Roggenbuck and Lucas (1987) and Lucas (1990b), and the study by Morin (1996) suggest that if the day-visitors were excluded, the average trip duration of overnight visitors to the wilderness areas examined may not be great.

8.3 What indicators are important in determining the quality of visitors' experiences?

A range of indicators are important in determining the quality of visitors' experiences

The selection of indicators of biophysical and social conditions is a fundamental step in the application of the most commonly used wilderness planning and management frameworks, as outlined in Chapter 2 (Graefe *et al.* 1990; Manning 1999; Manning, Lime, Hof *et al.* 1995; Nilsen & Tayler 1997; Stankey *et al.* 1985). As such, understanding the importance of indicators in determining the quality of visitor experiences is a critical input into planning processes for wilderness areas. Furthermore, such insight is essential if the 'key factors that degrade the wilderness experience' are to be identified, a task that has been prescribed as necessary in managing the quality of wilderness recreation experiences in the TWWHA (PWS 1999: 94; Roggenbuck *et al.* 1993). Finally, the selection of indicators establishes the foundation for the definition of standards against which the quality of recreation settings and the experiences they afford can be measured.

The importance of a range of potential biophysical, social and managerial indicators in determining the quality of visitors' experiences was examined in relation to the Overland

Track and the Western Arthurs. Previous research and pre-testing of the questionnaires used in this study have shown these indicators to be influential in shaping the quality of visitors' experiences (Manning 1999; Merigliano 1990; Morin *et al.* 1997; Roggenbuck *et al.* 1993; Rutledge & Trotter 1995a; Watson *et al.* 1992).

All but one of the indicators examined was viewed as at least somewhat important by visitors at each of the study sites in determining the quality of their experiences. The exception was the indicator for *on-site information about nature, history, and/or management*, which visitors to the Western Arthurs considered least important among the fifteen indicators examined and only *slightly* to *somewhat important*. In contrast, on the Overland Track, visitors ranked this indicator seventh (among sixteen) and *somewhat* to *moderately important*. One possible explanation for the lesser importance of this indicator in the Western Arthurs is that the area is widely renown for its rugged, challenging and undeveloped character. Being zoned for self-reliant recreation, signs other than those provided for management and environmental purposes are considered inappropriate (PWS 1999). Moreover, visitors to the Western Arthurs were more experienced than those on the Overland Track (Section 8.1) and may have developed such knowledge and therefore have less need for it to be provided. In contrast, the Overland Track is Tasmania's most developed overnight walk, with interpretive and educative material provided at huts located along its route.

Like other studies (Roggenbuck *et al.* 1993; Rutledge & Trotter 1995a; Watson *et al.* 1992), the *amount of litter I see* was found to be the most important indicator among both Overland Track and Western Arthurs visitors (Tables 6.6 & 7.5). Indeed, the presence of litter is known to evoke particularly negative responses, with even small amounts prompting strong reactions among visitors (Lucas 1990a).

Overall, visitors to the Overland Track and Western Arthurs considered the biophysical conditions of the tracks and campsites to be more important than social conditions in determining the quality of their experience[24]. Similar opinions were found among visitors to the Nyuts Wilderness Area, in Western Australia (Morin 1996; Morin *et al.* 1997). From a local perspective, it is likely that the debate over the sustainability of the walking track network in the TWWHA, and statements from the PWS (1997a) that 'the current level of use is creating significant environmental problems including the deterioration of walking tracks,

[24] With the exception of the *amount of litter I see* which can be considered both a social and biophysical impact.

the degradation and proliferation of campsites' has elevated the importance of such factors in visitors' minds.

Morin *et al.* (1997: 261-262) suggested that the importance given to biophysical impacts by visitors to the Nyuts Wilderness, in Western Australia, 'probably reflects respondents' views that current use levels, although they may be leading to biophysical impacts, are not resulting in a decline in their social experience'. Although this assertion is probably true for a proportion of the visitors in the study presented here, it is evident that social encounters did detract from the experience of between 14.0% to 24.9% of visitors who walked Western Arthurs, and between 20.7% to 30.2% of visitors who walked the Overland Track, depending on the particular social indicator examined. Thus, despite the lesser importance of the social indicators examined in this study, the conditions encountered had detrimental impacts on the quality of the experiences of a substantial minority of visitors.

In contrast to these Australian studies, a study of visitors to the Fort Nelson Forest District, in Northeastern British Columbia, Canada, found social conditions more important than biophysical impacts in determining the quality of respondents' recreation experiences. (Rutledge & Trotter 1995a). A review of research conducted in the United States prior to 1979 found similar results (Lucas 1979). However, in 1985 a 'sharp increase in complaints about [the condition of] trails' in the Bob Marshall Wilderness Complex, in the United States, became evident (Lucas 1990a: 405-406). Since then, surveys elsewhere in that country have shown a shift in opinion toward biophysical impacts being considered more important than social impacts in determining the quality of visitors' experiences (Roggenbuck *et al.* 1993; Watson *et al.* 1992). Like the current study of visitors to the Tasmanian Wilderness, and that conducted in the Nyuts Wilderness in Western Australia (Morin 1996; Morin *et al.* 1997), surveys of visitors to the Cohutta, Caney Creek, Upland Island and Rattlesnake Wilderness areas in the United States showed that respondents considered impacts to vegetation at and around campsites to be more important than encounters with other *hikers* in shaping the quality of their wilderness experience (Roggenbuck *et al.* 1993). While this is so, I would caution against concluding that the lesser importance attributed to social impacts means that actual on-site conditions are not considered a problem by visitors. An examination of the social conditions reported by visitors to the Overland Track and the Western Arthurs, presented in Section 8.5, shows that encounters with other people or groups on tracks and at campsites detracted from the quality of a substantial proportion of the visitors' experiences.

Campsite related impacts, whether biophysical or social, were considered more important than track-based impacts by both Overland Track and Western Arthurs visitors (Tables 6.6 &

7.5). This finding is supported by Stankey (1973; 1980) who also found respondents to be more sensitive to encounters at campsites than those experienced while travelling along the track. Just as wilderness visitors are more sensitive to social impacts at campsites, their increased exposure to biophysical impacts due to the intensity of time spent in a single location provides some explanation for its greater importance in shaping the quality of their experiences.

Findings from Morin *et al.'s* (1997) study in the Nuyts Wilderness Area are less clear. In that study, visitors considered track based biophysical impacts and those at campsites to be similarly important. While there is no mention of the actual condition of the Nuyts' walking tracks in their article, that and the fact that 'the main walk trail consists of an old vehicle track' rather than a narrower foot-path suggests their biophysical condition, compared to that of the camspsites, may have been such that their importance was elevated (Morin *et al.* 1997: 252).

Nonetheless, it is clear that indicators vary in their importance, but it has also been suggested that the importance of an indicator can vary from area to area. Manning (1999: 131) has proposed that 'visitors to more primitive areas may be generally more sensitive to a variety of potential indicators than visitors to more highly used and developed areas'. Support for his proposal is found in the current study's findings. Track impacts were significantly more important (P = 0.001) to Western Arthurs visitors than to those on the Overland Track which, by comparison, is highly visited and developed. Compared to the highly improved and hardened nature of the Overland Track, the track network in the Western Arthurs is less developed and priority erosion control works are still outstanding.

Other potential indicators were also found to be significantly more important ($P \leq 0.01$) by visitors on the Western Arthurs than those on the Overland Track. These were *the number of people camped overnight at a campsite*; *the number of people camped within sight or sound of my campsite*; and *the size of groups I meet.*

Both Overland Track and Western Arthurs visitors considered social impacts at campsites to be more important than social impacts experienced while travelling along the tracks. This finding is consistent with studies of visitors to the Nyuts Wilderness (Morin *et al.* 1997), and visitors to the Fort Nelson District in Northeastern British Columbia (Rutledge & Trotter 1995a). Similar findings were evident in two of the four wilderness areas (Cohutta and Rattlesnake) studied by Roggenbuck *et al.* (1993). Results for Caney Creek and Upland Island were less clear and were likely confounded by the influence of conflict between different types of recreation, such as hiking (bushwalking) and horse riding.

The findings of the current study partially support Shelby and Vaske's (1991) and Manning and Lime's (2000) similar propositions that the salience of encounter indicators – importance of encounters in determining the quality of visitors' experiences – might be lower for frontcountry areas than for backcountry and wilderness areas. Of the five encounter-related indicators for which salience was examined, two were found to differ significantly in terms of how important they were considered by visitors in the areas studied. *The number of people camped within sight or sound of my campsite* and *the size of groups I meet* were rated significantly more important ($P > 0.01$) by visitors to the lightly visited Western Arthurs than by visitors to the Overland Track, which is visited by more than ten times the number of people (Chapter 5). On the other hand, visitors in both areas considered the number of people or groups encountered on track and the number of aircraft seen or heard similarly important.

In many cases the importance of one indicator is not significantly different from another

A critical step common among the dominant LAC type planning frameworks is the selection of indicators that will form the basis for measuring and monitoring social and biophysical conditions (Nilsen & Tayler 1997). The number of indicators selected is necessarily influenced by the availability of resources to achieve the task and, as such, Cole and Stankey (1985: 6) have recommended the selection of 'a few' or a 'bundle' of important indicators to monitor the overall condition of an area.

Having identified and ranked the importance of a range of potential indicators, the intuitive approach to selecting indicators for application in a LAC management context might be to choose those ranked highest. It is clear that visitors to wilderness areas consider the importance of indicators to vary with respect to their influence in determining the quality of their experiences. However, as has already been established for other cases by Roggenbuck *et al.* (1993) and Watson *et al.* (1992), the differences in the importance of the potential indicators in this study are neither statistically nor practically significant (Tables 6.6 & 7.5). Thus, like those studies, the ranking of indicators from least to most important failed to provide clear guidance for the selection of a reduced number of key indicators for application within a LAC type management context for either the Overland Track or the Western Arthurs.

General conclusion

While the ranking of indicators provided limited direction with respect to the selection of key indicators, consideration of a number of other issues can provide useful guidance (Roggenbuck *et al.* 1993). Firstly, the condition measured by an indicator should be one that managers have influence over; if they don't, then despite its importance it is not a good indicator (Chapter 2).

Secondly, it is clear that not all visitors attribute the same importance to the same indicators in determining the quality of their experience. This variation is evident in the results from both the Overland Track and Western Arthurs walker surveys (Chapters 6 & 7). Indeed, works by Roggenbuck, *et al.* (1993) and Watson *et al.* (1992) in the United States, Rutledge and Trotter (1995a) in Canada, and Morin *et al.* (1997) in Western Australia, also show that wilderness visitors differed in how important they considered individual indicators to be in determining the quality of their experiences. These findings are consistent with those documented by Manfredo *et al.* (1983), who found that people differed with respect to how setting attributes (indicators), such as crowding-contacting others, crowding-seeing others, information, structures, trail impacts and soil-vegetation impacts affected the quality of their experiences.

Finally, despite these differences of opinion, Roggenbuck *et al.* (1993) and Watson *et al.* (1992) have found that correlations among a set of indicators can be explored to show that they are related to a single dimension of the visitor experience. Thus, it is possible to select a single measure, thereby increasing the efficiency of the supporting monitoring program without compromising its ability to detect unacceptable changes in wilderness conditions.

It is evident then that wilderness experience is multi-dimensional and shaped by a diverse range of attributes (Roggenbuck *et al.* 1993). As such, this characteristic should be taken into consideration when endeavouring to identify key indicators for the quality of visitors' experiences.

8.4 What factors are important in determining the quality of visitors' experiences?

Factor Analysis was in used to reduce the many influences on the quality of visitors' experiences to a smaller number of underlying factors (Roggenbuck *et al.* 1993; Shafer, C.S. & Inglis 2000; Watson *et al.* 1992). The indicators examined were the same at both study sites, with the exception of *the use of huts for accommodation*, which applied only to the Overland Track as no huts are present or permitted in the Western Arthurs. Factor Analysis identified a reduced number of factors that explained most of the variance in the visitors' ratings of the importance of the indicators in determining the quality of their experiences (Tables 6.7 & 7.6). The indicators and the factors that emerged from the Factor Analyses are outlined in Table 8.1.

Table 8.1 Items/indicators and factor names for the Overland Track and Western Arthurs

	Factors	
Items/indicators	**Overland Track**	**Western Arthurs**
Damage to vegetation around the campsite	Biophysical condition	Biophysical condition
Amount of vegetation loss/bare ground at campsites		
Eroded and/or muddy tracks		
The presence of wildlife	Natural sights and sounds	
Seeing and/or hearing aircraft		Social impacts
Amount of litter I see		
The number of groups I see along the track	People encounters	
The number of other people camping within sight or sound of my campsite		
The size of groups I meet		
Total number of people I see along the track		
The number of people camped overnight at a campsite		
The amount of time others are in sight along the track		
Amount of noise associated with human presence and activity		
Directional signs and track markers	Infrastructure presence	Infrastructure presence
On-site information about nature, history and/or management		
The use of huts for accommodation		N/A

Distinct similarities are evident in the factors identified for the Overland Track and Western Arthurs. Four underlying factors were discovered in the analysis of the responses from Overland Track visitors: *biophysical condition*, *natural sights and sounds*, *people encounters*, and *infrastructure presence*. The only difference in the factor structure for the Western Arthurs was the integration of the anthropogenic impacts within the *natural sights and sounds* dimension with the *people encounters* dimension, forming one factor labelled *social impacts*. A possible explanation for this integration is the direct link between the impacts and people.

Similarities can be seen between the factor structures identified for the Overland Track and the Western Arthurs and those developed by Roggenbuck *et al.* (1993) for Caney Creek, Cohutta, and Rattlesnake Wilderness users in the United States (Table 8.2). While factors sometimes coalesce, people encounters, biophysical/site impacts, and sight and sound intrusions are all featured dimensions of these studies. The major differences evident among the factors are the presence of specific horse and wildlife components in the results for Caney Creek, Cohutta, and Rattlesnake Wildernesses. No indicators relating to the use or impact of horses were examined by the present study since they are not permitted in the either of the study areas or within the majority of the TWWHA (PWS 1999).

Table 8.2 Summary of factor structures developed for the Overland Track and the Western Arthurs in the TWWHA; and, those developed by Roggenbuck *et al.* (1993) for Caney Creek, Cohutta, and Rattlesnake Wilderness areas in the United States

Overland Track, TWWHA	Western Arthurs, TWWHA	Caney Creek Wilderness	Cohutta Wilderness	Rattlesnake Wilderness
People encounters	Social impacts (combined people encounters and items from natural sights and sounds)	People encounters	People encounters	People on trails encounters
Natural sights and sounds		Wild animals	Wild animals	Wild animals
Biophysical condition	Biophysical condition	Horse encounters	Horse encounters	Horse and camp encounters
Infrastructure presence	Infrastructure presence	Site impacts	Site impact/sound and sight intrusion	Site impact/sound and sight intrusion
		Sight and sound intrusion		

Like the factors identified for the Overland Track and Western Arthurs, Roggenbuck *et al.* (1993) found encounters with other people and biophysical/site impacts to be coherent dimensions that influenced the quality of visitors' experiences at Caney Creek. Similarly, Cohutta also included a *people encounter* factor. At Rattlesnake, however, greater sensitivity to horse encounters than to people, and the heightened impact of encounters at campsites compared to those experienced along the trail/track is reflected in that area's factor structure (Roggenbuck *et al.* 1993; Stankey & Schreyer 1987).

Both Cohutta and Rattlesnake factor structures combined *site impacts* with *sound and sight intrusions* into a single factor in each area. In contrast to the current study, the *amount of litter I see* was integrated with site impacts rather than with social impacts (Roggenbuck *et al.* 1993).

Despite the differences between the factor structures identified for the study sites in the TWWHA and the three wilderness areas in the United States, no factor structure is considered more valid than another within the context of each specific study. Thus, in this study, Factor Analysis has been successful in grouping and reducing the range of potential indicators that represent the different dimensions of the visitors' experiences on the Overland Track and for the Western Arthurs. Furthermore, the similarities among the factor structures for these areas suggests that it is more likely than not that factor structures for other sites within the TWWHA, were they to be examined, would display similar characteristics.

8.5 Which are the key indicators of the quality of visitor experience, and are they the same for the Overland Track and Western Arthurs?

As it would be impractical and an inefficient use of finite and often scarce resources to monitor all indicators it is necessary to determine the indicator/s that best represent each dimension. In doing so, two characteristics to be considered when identifying which indicators to incorporate into a LAC type monitoring program are how highly an indicator loaded on a factor; and how important visitors consider it in determining the quality of their experiences (Roggenbuck *et al.* 1993; Watson *et al.* 1992).

As noted in the preceding discussion, similar factor structures emerged for the Overland Track and the Western Arthurs. Thus, similar sets of key indicators may be identified for both sites. The biophysical condition factors for the Overland Track and the Western Arthurs comprised three common potential indicators. The two campsite-related indicators loaded most highly, while *eroded and/or muddy tracks* had the lowest loading in both areas (Tables 6.7 & 7.6). All indicators were considered to be *moderately* to *very important*, with the exception of Overland Track visitors who considered *eroded and/or muddy tracks* of only *somewhat* to moderate importance, probably due to the high standard of the track over the length of the Overland.

In the case of the TWWHA, the PWS's track and campsite monitoring program measures indicators similar to the three biophysical track and campsite impact indicators examined in this study. The *amount of vegetation loss/bare ground at campsites* is measured via a modified Frissell (1978) condition class system (Dixon 1999a). Similarly, the condition of the walking track network within the TWWHA has been monitored via an extensive and ongoing program since the first track inventory was completed in 1991. The program utilises a range of measures that include track width, track depth, and width free of vegetation (PWS 1998b), while the extent of damage to vegetation around the campsite is monitored via aerial photography.

The appropriateness of biophysical impact indicators, such as those examined here, is reinforced by their wide adoption as potential indicators by other researchers and land managers (Manning & Lime 2000; Morin *et al.* 1997; Roggenbuck *et al.* 1993; Watson *et al.* 1992). Indeed, the same or similar biophysical indicators have been incorporated into the management of the Bob Marshall Wilderness Complex in the United States (Stankey *et al.* 1990), and forms the 'basis of a monitoring program for Nyuts' Wilderness in Western Australia (Morin *et al.* 1997: 264). However, if monitoring programs are to adequately monitor all dimensions of visitors' experiences a range of factors need to be examined (Roggenbuck *et al.* 1993).

The experiential dimension encompassed by the *infrastructure presence* factor is common to both the Overland Track and the Western Arthurs. The indicators that comprise this factor loaded highly for both areas (Tables 6.7 & 7.6). *Directional signs and track markers* had the highest loading for this factor and visitors considered it to be the most important indicator, but only the less-experienced visitors on the Overland Track considered it more than *somewhat* to *moderately important* (Tables 6.7 & 7.6). The presence of signs has also been found to be an important influence on the quality of visitors' experiences in the Nyuts Wilderness Area in Western Australia (Morin *et al.* 1997).

Overland Track visitors also considered *on-site information about nature, history, and/or management* more important than did visitors to the Western Arthurs. Signage along the Western Arthurs is restricted to that necessary for management purposes (PWS 1999), such as that advising visitors of tracks or campsites closed for revegetation, and therefore may not warrant incorporation within a LAC monitoring program for that area. On the Overland Track, however, monitoring visitors' attitudes to the quality, type and content of interpretive material may provide useful insights and help ensure that such materials are meeting the needs of visitors and managers who wish to enhance the quality of visitors' wilderness experience.

As discussed earlier, the indicator pertaining to *the use of huts for accommodation*, was not applicable to the Western Arthurs. Huts are not permitted within the self-reliant recreation zone of which the Western Arthurs is a part. In contrast, 11 huts are provided by the PWS along the Overland Track. These huts are used in various ways by about two-thirds (65.6%) of visitors and, of these, 7.3% rely on them for accommodation (Chapter 6). While *the use of huts for accommodation* is the least important of the indicators encompassed by the factor *infrastructure presence*, the level of use they receive and the proportion of hut users bothered by crowding[25] suggests monitoring visitors' hut experiences and management action are warranted. Indicators required for such monitoring were not examined in the present study, and thus will require further investigation.

For the Overland Track, *the amount of litter I see* and *seeing and/or hearing aircraft* combined to form the natural sights and sounds factor (Table 6.7). The sight or sound of

[25] Not *having enough space in the huts* bothered 36% of hut users, *seeing too many people in the huts during the evenings* bothered 34.3% of hut users; and, *large groups dominating the space in the huts* bothered 37.8% of hut users (Section 6.7).

aircraft was the indicator that loaded most highly on this factor but it was considered only *somewhat* to *moderately important* by Overland Track visitors. However, 33.0% of visitors reported that the number of aircraft they encountered had detracted from their experience, which suggests that this condition should be monitored (Table 6.7).

Flowing from the management plan for the TWWHA (PWS 1999), an understanding was reached between the PWS and locally-based scenic flight and charter flight operators to fly in accordance with the *Fly Neighbourly Advice* designed to minimise disturbance of visitors on the ground and wildlife. The PWS (1999: 135) also committed to 'continue to survey public views on overflight impacts both in high visitor use and remote areas' of the TWWHA, but none has been undertaken to date[26]. These findings suggest the need to initiate such research to assess the effectiveness of the *Fly Neighbourly Advice*.

The carry in – carry out guideline that encourages visitors to take responsibility for their own litter is part of the ongoing MIB education campaign conducted by the PWS. Despite a slightly lower factor loading than *seeing and/or hearing aircraft*, *the amount of litter I see* was the most important indicator of all those examined and, as such, the PWS may choose to monitor its occurrence, particularly along the busy Overland Track.

For the Western Arthurs, aircraft and litter indicators had the lowest factor loadings of all the indicators examined and combined with those related to people encounters to form the social impacts factor for that area (Table 7.6). Like visitors on the Overland Track, those on the Western Arthurs considered the litter indicator to be the most important in determining the quality of their experience, and thus it may be worthwhile monitoring. However, informal visual assessments of both study sites during the study period and a recent field inspection (November 2003) of six of the main campsites along the Western Arthurs found no litter present; this suggests that intermittent and informal monitoring may be adequate.

Indicators relating to encounters with other visitors all loaded highly on their respective factors in both study areas and so provide little guidance when selecting indicators for incorporation into a monitoring program (Tables 6.7 & 7.6). Similarly, no indicator stands out markedly in its level of importance. The common finding that visitors are more sensitive to encounters at campsites than to those experienced while travelling along tracks (Manning 1999), is reflected (though marginally) in the levels of importance attributed to track and campsite encounter indicators by visitors in both study areas. However, the slightly higher

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[26] The only overflight related discourse with the public has been in the form of public comment on a proposal by a concessionaire to operate helicopter tours, which involved overflying and landing in remote areas of the TWWHA.

level of importance attributed to campsite encounters is counter-balanced by fractionally higher factor loadings of some of the track-based encounter indicators. The differences, in either respect, are meagre, and provide little if any guidance in determining which indicators to monitor.

General conclusion

Thus far, the importance of the indicators has been identified and then they have been grouped into dimensions/factors that characterise different elements of the visitor experience. This has aided the recognition of which indicators might best be integrated into a management program to monitor and manage the quality of visitors' experiences. As we have seen, biophysical conditions have emerged as an important experiential dimension that influences the quality of visitors' experiences. The presence of existing indicators and established monitoring programs for biophysical track and campsite conditions provide valuable baseline data and a record of change over time and therefore should be continued. In contrast, the identification of key social indicator/s is likely to benefit from consideration of additional information. Where limited resources are available, management might best be focussed in areas where existing conditions are negatively impacting upon the quality of visitors' experiences. An understanding of visitors' expectations, the conditions they experienced, and how those conditions influenced the quality of their experience provides an insight into the quality of the recreation experiences afforded by the Overland Track and Western Arthurs (Section 8.6). This information also establishes the foundation for the evaluation of personal and social norms, discussed later in this chapter (Section 8.7).

8.6 Visitors' expectations, the conditions they experienced and their affect on the quality of their experiences

Six indicators were examined more closely to study visitors' expectations, the conditions they encountered, and how those conditions impacted upon the quality of their experiences at each of the two study sites. These indicators were:

- *the number of groups encountered along the track in a day*;
- *the largest group encountered along the track*;
- *the number of people encountered along the track in a day*;
- *the maximum number of aircraft seen or heard in a day*;
- *the maximum number of other people camped within sight or sound*; and
- *the largest group encountered at a campsite.*

A lesser proportion of visitors had expected to encounter specific conditions on the Overland Track than on the Western Arthurs

A comparison of the findings for the two study areas shows that a greater proportion of visitors to the Western Arthurs had expectations about the conditions they would encounter than did visitors to the Overland Track (Table 6.8 & 7.7). Generally, more than half the visitors to the Western Arthurs expected to encounter specific conditions in that area, with the proportion varying between 58.5% and 63.9% across five of the six indicators for which expectations were examined (Table 7.7). Seeing or hearing aircraft was the only indicator for which fewer than half the Western Arthurs visitors had an expectation. On the Overland Track, however, the majority of visitors had no expectation for the conditions that they would encounter for all six indicators (Table 6.8).

Based on West's (1981) concept of the *uninitiated newcomer*, such comparisons as noted above lead me to suggest that the differences in the proportion of visitors with expectations at either site are associated with their different levels of bushwalking experience (Section 8.1). As several researchers have suggested, 'some visitors who are new to an activity or area have little or no expectation about the conditions they will find, including use levels' (Manning 1999: 102; see also Nielsen & Shelby 1977, Nielsen *et al.* 1977). In the case of the Overland Track (Section 6.2), some 67.2% of visitors had never undertaken an overnight bushwalk in Tasmania and for 84.4% of visitors it was the first time they had walked the Overland Track. Thus, they had little basis for the formulation of expectations. In contrast, a greater proportion of Western Arthurs visitors had expectations for the conditions that they were likely to encounter; and, as would be expected if prior experience was a basis for the development of expectations, this cohort was more experienced than that on the Overland Track (Section 7.2). Indeed, the majority (87.6%) of visitors to the Western Arthurs had completed more than six overnight bushwalks and 87.0% had prior bushwalking experience in Tasmania. Moreover, it was a return trip for about a third of the visitors to that area.

Visitors to the Overland Track expected higher encounter levels than Western Arthurs visitors did

Overall, visitors on the Overland Track expected higher encounter levels than did visitors to the Western Arthurs (Table 8.3). The only indicator for which this wasn't the case was *the maximum number of aircraft seen or heard in a day*, for which the median number of aircraft visitors to the Western Arthurs expected to encounter in a day was one, compared to none for the Overland Track. Visitors expected to encounter more than double the median number of people along the track in a day along the Overland Track than in the Western Arthurs. This was also the case for the median number of groups visitors expected to encounter along the track. With respect to group sizes, visitors to the Western Arthurs expected to encounter a median maximum group size of five people both along the track and at camp. In contrast, Overland Track visitors expected larger group sizes, with the median maximum group size along the track (eight people) to be larger than that that they would encounter at a campsite (six people).

Table 8.3 Level of encounters (median) expected by Overland Track (OT) and Western Arthurs (WA) visitors, and the proportion of visitors who had their expectations exceeded: November 1999 – April 2000

Indicators	Study area	Expected level of encounters		Proportion of visitors whose expectations were exceeded	
		N	Median	*N*	%
The maximum number of groups encountered along the track in a day	OT	340	5	202	60.7
	WA	124	2	53	43.1
The largest group encountered along the track	OT	426	8	227	53.4
	WA	120	5	33	27.5
The maximum number of people encountered along the track in a day	OT	358	20	217	61.0
	WA	120	8	54	46.2
The maximum number of aircraft seen or heard in a day	OT	321	0	139	68.3
	WA	83	1	36	44.4
The maximum number of other people camped within sight or sound	OT	232	10	82	60.2
	WA	113	6	31	27.4
The largest group encountered at a campsite	OT	228	6	215	37.3
	WA	115	5	14	12.7

A greater proportion of Overland Track visitors had their expectations exceeded than did visitors to the Western Arthurs

Substantially greater proportions of Overland Track visitors, than Western Arthurs visitors, experienced higher levels of encounters than they had expected (Table 8.3). The majority of visitors on the Overland Track who had expected specific conditions experienced higher levels of encounters than they had expected for five of the six indicators examined, with the indicator for the largest group encountered at a campsite being the exception. In comparison, less than a half the visitors to the Western Arthurs had their expectations exceeded, across all the indicators examined.

For both study sites, the indicator that best met visitors' expectations was that for the largest size group they encountered at a campsite. For that indicator, 62.7% of Overland Track visitors and 87.3% of visitors to the Western Arthurs encountered groups of the same number of people, or fewer than they had expected at the campsites at which they stayed. The worst performing indicator, with respect to meeting visitors' expectations, was the number of aircraft Overland Track visitors saw or heard during their trip. More than two-thirds of visitors on the Overland Track had their expectations exceeded for that indicator. While on the Western Arthurs, the poorest performing indicator was the number of people encountered along the track in a day, with some 46.2% of visitors encountered more people than they had expected.

Reported encounter levels were higher for the Overland Track than for the Western Arthurs

Visitors reported higher encounter levels on the Overland Track than on the Western Arthurs for five of the six indicators examined (Table 8.4). Furthermore, for those five indicators the level of encounters on the Overland Track was reported to be at least double, and sometimes triple that for the Western Arthurs. It is quite likely that the higher encounter levels reported on the Overland Track are the result of the larger group sizes and the higher use level that are more characteristics of the Overland Track than the Western Arthurs (PWS 2000b, 2000c). In contrast, the reported number of aircraft seen or heard by visitors in a day was the same for both study sites.

Table 8.4 Reported encounter levels for visitors on the Overland Track (OT) and the Western Arthurs (WA): November 1999 – April 2000

Indicators	Study area	*N*	Reported encounter levels (percentiles) 25%	50%	75%
The maximum number of groups encountered along the track in a day	OT	833	≤ 4	≤ 6	≤ 10
	WA	194	≤ 1	≤ 3	≤ 4
The largest group encountered along the track	OT	833	≤ 8	≤ 10	≤ 12
	WA	192	≤ 3	≤ 4	≤ 6
The maximum number of people encountered along the track in a day	OT	853	≤ 15	≤ 25	≤ 35
	WA	192	≤ 4	≤ 7	≤ 11
The maximum number of aircraft seen or heard in a day	OT	779	≤ 1	≤ 2	≤ 3
	WA	167	≤ 1	≤ 2	≤ 3
The maximum number of other people camped within sight or sound	OT	561	≤ 6	≤ 12	≤ 25
	WA	194	≤ 2	≤ 4	≤ 6
The largest group encountered at a campsite	OT	556	≤ 4	≤ 7	≤ 12
	WA	192	≤ 2	≤ 3	≤ 5

Reported encounter levels had a more negative impact on the quality of visitors' experiences on the Overland Track than on the Western Arthurs

Visitors were asked how the level of encounters they reported had affected their experiences. On the Overland Track, visitors commonly reported higher levels of encounters and those encounters had a more negative impact than reported by visitors to the Western Arthurs (Tables 8.4 & 8.5). Western Arthurs visitors generally stated that the encounters they reported had either no influence or enhanced the quality of their experiences, while for the Overland Track, visitors mostly stated that the level of encounters had had no influence or had in fact had a negative impact. The only variation to this pattern was for the number of aircraft seen or heard in a day.

Table 8.5 Impact of the reported levels of encounters experienced by Overland Track (OT) and Western Arthurs (WA) visitors: November 1999 – April 2000

			Impact on quality of experience		
Indicators	**Study area**	***N***	**Enhance**	**No influence**	**Detract**
The maximum number of groups encountered along the track in a day	OT	865	18.3	57.6	24.2
	WA	193	43.0	43.0	14.0
The largest group encountered along the track	OT	860	8.0	63.7	28.3
	WA	189	27.0	56.1	19.9
The maximum number of people encountered along the track in a day	OT	853	14.0	58.3	27.8
	WA	190	37.3	45.8	16.8
The maximum number of aircraft seen or heard in a day	OT	853	7.6	59.4	33.0
	WA	191	13.6	51.8	34.5
The maximum number of other people camped within sight or sound	OT	585	11.6	58.1	30.2
	WA	189	33.9	41.3	24.9
The largest group encountered at a campsite	OT	556	10.0	69.3	20.7
	WA	189	31.1	52.2	16.7

The number of aircraft visitors reported seeing or hearing was the same for either study site (Table 8.4), and much the same proportion of visitors at either site stated that it had detracted from the quality of their experience. However, a lesser proportion of visitors to the Overland Track stated that the level of encounters they experienced had enhanced the quality of their experiences, than did on the Western Arthurs. The earlier findings that visitors to the Overland Track expected to encounter fewer aircraft than did visitors on the Western Arthurs (Table 8.3), and that a greater proportion of them had their expectations exceeded, help to explain why a lesser proportion of Overland Track visitors felt that the number of aircraft they encountered had enhanced the quality of their experiences.

Comparison of the results of the Overland Track Walker Survey and those from surveys conducted by the PWS at the beginning of the 1990s (Table 8.6), suggests that the quality of the visitor experience afforded by the Overland Track has deteriorated. While the results of the PWS surveys are not directly comparable to those of the current study due to differences in sampling, question format, and survey area[27], they do suggest a shift in the quality of visitors' experiences along the track and at the campsites.

Table 8.6 Impact of the number of walkers met by visitors on the Overland and Frenchmans Cap tracks: Results of the 1990-91 Wilderness Walker Survey and the 1991-92 Wild Area Users surveys

Did the number of walkers you met enhance or detract from your trip?	Survey	Enhanced %	No difference %	Detracted %
On the track	1990-91 ($N = 305$)	32.9	51.8	15.3
	1991-92 ($N = 421$)	32.5	53.0	14.5
At campsites	1990-91 ($N = 305$)	34.4	36.1	29.6
	1991-92 ($N = 421$)	30.8	37.7	31.5

Adapted from PWH 1990, 1992

In the current study, just 14.0% of visitors on the Overland Track stated that the number of people they had encountered while on the track had enhanced the quality of their experiences compared to more than twice that proportion recorded by the PWS in their 1990-91 and 1991-92 surveys (Table 8.6). Conversely, almost double the proportion of Overland Track visitors (27.8%) reported that the number of people they encountered along the track had detracted from the quality of their experience in 1999-2000 compared to visitors to Overland and Frenchmans Cap tracks in 1990-91 (15.3%) and 1991-92 (14.5%). The quality of visitors' experiences may also have deteriorated at campsites on the Overland Track. The results of the current study shows that a substantially lesser proportion of Overland Track visitors (11.6%) reported that the number of people they encountered at a campsite had enhanced their experience than is evident for the combined Overland Track and Frenchmans Cap cohorts more than a decade earlier (34.4% in 1990-91, and 30.8% in 1991-92). While the proportion of visitors who stated that the number of people they encountered at campsites

[27] PWS Track Rangers using a convenience sampling approach conducted the 1990-91 Wilderness Walker Survey and the 1991-92 Wild Area Users Survey. The only available results for those surveys are the aggregated responses of overnight visitors to the Frenchmans Cap and Overland tracks, of which approximately two-thirds were respondents from the Overland Track.

had detracted from the quality of their experience remained largely constant, the annual number of visitors walking the Overland Track, between 1990-91 and 1999-2000 has increased some 77.5% from 4078 visitors to 7240 visitors (PWS 2000c). Together, these findings support the hypothesis that the recreation opportunity and the experiences afforded by the Overland Track, with respect to the number of people encountered on tracks and at campsites, has substantially altered and has degraded since 1990-91.

Comparisons such as those just presented cannot be made for the Western Arthurs due to the way the data for the surveys conducted by the PWS during 1990-91 and 1991-92 have been aggregated. Therefore, it is not possible to assess what, if any, change has occurred in the quality of visitor experience afforded by the Western Arthurs. Thus, the findings of the current study provide baseline data for future examinations of visitors' expectations, reported conditions, and their impact on the quality of visitors' experiences in the Western Arthurs.

General conclusion

It is clear that the recreation opportunities afforded by the Overland Track and the Western Arthurs differed greatly. In short, the Overland Track afforded a more social experience than the Western Arthurs, in terms of the level of encounters visitors reported. Furthermore, visitors' evaluations of those conditions on the Overland Track were more negative than was recorded for the Western Arthurs. These findings highlight the need to define clear standards for types of conditions considered appropriate for these sites and to ensure that those standards are maintained. Moreover, increases in the level of encounters reported by Overland Track visitors since the early 1990s, and increasing levels of visitation to that site, suggests a greater need for management intervention on the Overland Track than appears to be warranted for the Western Arthurs, where visitation has remained largely static for the past decade. Finally, the quality of visitors' experiences may be enhanced by improving the management of visitor expectations to minimise the likelihood of conflict between expected and actual conditions (Brehm & Cohen 1962; Festinger 1962; Manning 1999). Pre-visit information containing details of the conditions visitors are likely to encounter will help them assess whether or not the recreation opportunities afforded by the study sites are likely to meet their expectations and afford their desired experience.

8.7 Has the normative approach been valid and fruitful?

The development of social norms has been examined from a variety of perspectives which have been the subject of a number of reviews (Manning 1999; Manning & Lime 2000; Shelby & Vaske 1991). Emerging from these reviews is evidence that salience, norm prevalence, congruence, crystallisation, and the use of different evaluative dimensions —

preferred and *maximum acceptable* — need to be considered in the course of developing valid and robust user-based standards. No study in the field of outdoor recreation, as reported in the research or related literature, has examined all of these issues in assessing the validity of the norms they have developed. With the exception of salience, which has already been discussed (Section 8.3), these issues will now be examined in relation to the current study and the broader research literature highlighting consistencies and areas where knowledge has been advanced and new insights gained.

Six potential indicators were examined in detail for the development of social norms for both the Overland Track and the Western Arthurs. These indicators were:

- *the number of groups encountered along the track in a day*;
- *the largest group encountered along the track*;
- *the number of people encountered along the track in a day*;
- *the maximum number of aircraft seen or heard in a day*;
- *the maximum number of other people camped within sight or sound*; and
- *the largest group encountered at a campsite.*

Norm prevalence

An understanding of the importance of an indicator provided the foundation for identifying the underlying factors that affect the quality of visitors' experiences (Section 8.4). Further, each of these factors is defined by a reduced set of indicators. But how highly does an indicator have to load on a factor and how important does an indicator have to be for it to be considered a good indicator and a suitable foundation for the development of an associated standard and monitoring program? To date, no threshold has been defined. However, discussions in the outdoor recreation research literature have associated salience with the presence of norms (Shelby *et al.* 1996). Indeed, unless visitors are able to specify their norms, the importance of the associated indicator becomes meaningless in the context of the development of user-based standards.

The proportion of visitors who are able to specify norms, sometimes known as 'norm prevalence', has been varied (Kim & Shelby 1998: 277). Some researchers have found norm prevalence levels to be high; for example, 72% - 100% in the Chiri-Mountain National Park in Korea, and 87% in the Boundary Waters Canoe Area Wilderness in the United States (Lewis *et al.* 1996b). Indeed, according to Lewis *et al.* (1996b: 129) 'to be useful, encounter norms should be specified by a majority of wilderness travellers'. Similarly, the large proportion (44% - 63%) of respondents who were unable to specify a norm in a study of river floaters in New River Gorge National Park, in the United States, led Roggenbuck *et al.* (1991) to question the existence of encounter norms for that area.

Several reasons for differences in norm prevalence have been cited, including the use of different evaluative dimensions, setting (frontcountry versus backcountry and wilderness) and levels of salience and response options (Hall & Roggenbuck 2002).

Norm prevalence and its relationship to different evaluative dimensions

Two evaluative dimensions, *preferred* and *maximum acceptable*, were examined in the current study. The prevalence of norms expressed for the *preferred* dimension ranged from 54.3% to 91.8%, compared to 62.8% to 93.8% for the *maximum acceptable* dimension (Table 8.7). The norm prevalence for *maximum acceptable* was consistently higher than those expressed for *preferred*, in all but one case. This exception was the Western Arthurs where 91.8% of walkers expressed a preference compared to 90.2% who stated a *maximum acceptable* amount. The difference here was marginal (1.6%) and the smallest recorded in the study (Table 8.7). These results suggest that the evaluative dimension *maximum acceptable* is the better measure from which to develop social norms. Considered within the context of the study participants, these results exceed Lewis *et al.*'s (1996b) criteria for the development of useful encounter norms, since a clear majority of respondents to either the Overland Track or the Western Arthurs surveys specified norms.

Table 8.7 Potential indicators and norm prevalence for two evaluative dimensions among Overland Track and Western Arthurs visitors

		Norm prevalence			
		Overland Track		Western Arthurs	
Indicator	**Evaluative dimension**	*N*	%	*N*	%
Number of groups encountered along the track in a day	Preferred	477	54.3	174	82.0
	Maximum	581	66.2	159	89.7
Largest size group encountered along the track	Preferred	546	62.2	182	88.1
	Maximum	613	69.8	171	93.8
Number of people encountered along the track in a day	Preferred	499	56.8	167	82.0
	Maximum	551	62.8	159	86.1
Number of aircraft seen and/or heard	Preferred	531	60.5	156	77.8
	Maximum	564	64.2	151	80.4
Number of people camped within sight or sound	Preferred	378	64.0	174	87.6
	Maximum	396	67.0	170	89.7
Largest group encountered at a campsite	Preferred	357	60.2	175	91.8
	Maximum	400	67.5	178	90.2

Relationship between norm prevalence and levels of visitor use and development

The prevalence of norms for either evaluative dimension was consistently higher for the Western Arthurs than for the Overland Track across the six indicators for which norms were examined. Like studies of river floaters in different parts of the United States (Roggenbuck *et al.* 1991; Shelby 1981; Shelby & Vaske 1991), the results here demonstrate that norm prevalence is greater for less developed low use experiences, such as that offered by the Western Arthurs, than it is for high use and more developed experiences such as the Overland Track. Interestingly, the association between low norm prevalence and increased levels of development is mirrored on a micro scale among the group types examined on the Overland Track. Significant differences ($P < 0.05$) were found in the levels of norm prevalence of free-walkers, visitors in tent-based commercial groups and hut-based commercial groups. Visitors in hut-based commercial groups were the least inclined of the three groups to specify a norm for social encounters along the track, while visitors in tent-based commercial groups had the highest norm prevalence. Adopting facility use as an indicator of comparative levels of development experienced by each of the three groups, the pattern of norm prevalence is consistent with the inverse relationship between level of development and norm prevalence evident in the comparisons of different study areas and experiences discussed earlier. Listed from the most to least developed experience are hut-based commercial experience, free-walker experience, and tent-based commercial experience. Visitors in hut-based commercial groups are accommodated in private huts, with showers and meals provided. Some 80.0% of free-walkers used the public huts for overnight accommodation. The least developed experience was that of visitors in the tent-based commercial groups of whom none stayed overnight in a hut.

Relationship among norm prevalence, salience, and response options

It has been suggested that the presence of personal norms is influenced by how important an indicator is in determining the quality of a visitor's experience (Manning 1999; Manning & Lime 2000; Shelby *et al.* 1996). Moreover, the lack of importance of an indicator has been proposed as a reason many people do not report an evaluative standard (Manning & Lime 2000; Shelby & Vaske 1991; Whittaker 1992). Like the results from a study by Kim and Shelby (1998), the findings of the present research support these hypotheses.

For both the Overland Track and the Western Arthurs, visitors who reported personal norms considered the indicators to be significantly more important ($P < 0.05$) in determining the quality of their experiences than did walkers who didn't[28] (Sections 6.8 & 7.7). Visitors who

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[28] Visitors who didn't report a personal norm in this context include both visitors who indicated they *don't care* about the indicator, and those that neither gave a number or stated they did not care.

reported personal norms (*maximum acceptable*) considered the indicators to be *somewhat* to *very important* while visitors who didn't report personal norms felt the indicators were only *slightly* to *moderately important*.

Like in the studies of Shelby (1981), Shelby *et al.* (1988), and Whitaker and Shelby (1988), visitors on the Overland Track and the Western Arthurs were explicitly given the choice of either specifying a personal norm or indicating that the indicator does not matter to them — *don't care*. This method was used to discourage the sort of 'fence sitting' that is possible in the three-choice response option that also allows visitors to state that the indicator is important but they cannot, or would rather not, specify a number. Hall *et al.'s* (1996: 200) findings suggest that 'the two-choice format encourages some who care about a condition but would rather not provide a standard to develop one, [and] this group apparently provides norms that are on average the same as those who state a norm under the three-choice format'. Indeed, it is evident from the current findings that visitors who stated a personal norm considered the indicator to be significantly more important ($P \leq 0.005$) than those who stated that they didn't care, irrespective of evaluative dimension.

While the 'sitting on the fence' option was not available in the two-choice question format used in the current study, the 'opt out' option of simply not answering the question was available. While such responses are commonly treated as invalid, in this case they prompted an examination of how important non-answerers considered the indicators to be. This analysis showed varied results. For both evaluative dimensions, in most cases non-answerers considered the indicators to be either as important as did those walkers who reported personal norms, or less so but still more important than did walkers who stated they didn't care. Where such differences were found, they were usually significant ($P < 0.05$). These findings show that while some survey respondents are able to specify a personal norm when forced, there are some who refrain from doing so despite considering the indicator important.

Are visitors' preference based norms the same as those based on their maximum acceptable limits?

A variety of evaluative dimensions have been employed by researchers in eliciting personal norms, including 'acceptability', preference', 'pleasantness', 'desirability', 'satisfaction', and 'tolerance' (Manning 2001). Recent studies have expanded researchers' understanding of the effects different evaluative dimensions can have upon the levels of norms. Manning and Lime (2000) have noted that different evaluative dimensions yield different normative standards. In fact, the difference between the resulting personal and social norms can be 'statistically significant and substantive' (Manning 2001: 23). Furthermore, a comparison by

Manning (2001) of a series of studies undertaken by him and his colleagues revealed an increase in the level of crowding norms as evaluative dimensions shifted from preferences, through acceptability and the incorporation of trade-offs and management actions, to absolute tolerance.

Comparisons of visitors' preferences and maximum acceptable limits, has shown them to be significantly different ($P < 0.001$) for both Overland Track and Western Arthurs visitors. Additionally, for both study areas, and for all six indicators examined, visitors' preferences were lower than their maximum acceptable limits. These findings are consistent with other studies conducted in the United States (Hammitt & Rutlin 1995; Manning 2001; Watson 1995; Young *et al.* 1991).

Judgements with respect to whether the differences in the current study might be considered substantive depend on the degree to which managers can influence the encounter experiences of visitors when the differences are small. For the Overland Track and the Western Arthurs, the greatest differences between 'preference' and 'maximum acceptable' based norms were for the number of other people encountered at campsites or along the track. Differences were notably smaller between the evaluative dimensions for campsites than the track based encounter norms. This finding reflects the heightened sensitivity to encounters with other people at campsites and the preference of most wilderness visitors to be camped away from others that has been documented by other researchers (Burch & Wenger 1967; Stankey 1973, 1980).

While it is clear that norms differ in response to the evaluative dimensions used, and that preference based norms have been shown to be consistently lower than those based on other evaluative dimensions (Manning 2001), researchers are yet to determine which evaluative dimension is the most valid as the basis for the development of norms. Indeed, Manning and Lime (2000) have urged caution in the application of study findings as it is unclear if any one evaluative dimension is any more valid than another. They proposed, that "if recreation norms are to be used in formulating standards of quality, research on norm congruence is important to test the internal consistency or 'validity' of such norms" (Manning & Lime 2000: 28). Moreover, determining the validity of norms is essential if managers are to defend decisions that modify or restrict use (Lewis *et al.* 1996b).

Which evaluative dimension is the most congruent?

With the exception of a study by Manning *et al.* (1996), congruence research has focused on the reactions of recreationists' who have had their norms violated. Such an approach follows the reasoning that 'if norms are standards that distinguish between the acceptable and the unacceptable, it seems logical to expect recreationists to express negative feelings when norms are violated' (Patterson & Hammitt 1990: 270). However, the inverse is also true. That is, it is also logical to expect recreationists *not* to express negative feelings when norms are *not* violated. Reactions consistent with this logic are also congruent. Together, these assumptions provide a sophisticated and thorough conception of congruence that has not previously been examined or reported by other researchers. Moreover, evaluating visitors' norms in such a way provides a more comprehensive assessment of their 'construct validity' (De Vellis 1991: 46).

Consistent with this more comprehensive approach to the assessment of congruence, visitors' in this study were categorised into one of four groups on a case by case basis. Visitors were first divided into two categories; those who had their norms exceeded or not exceeded, and then further sorted according to whether they had congruent or incongruent reactions[29]. This approach contrasts with those used by other researchers. For example, Lewis *et al.* (1996a; 1996b) excluded respondents with neutral reactions from their definition of congruent and incongruent. Alternatively, Williams *et al.* (1991) created three categories — those whose norms were not exceeded, moderately exceeded and highly exceeded — to examine how the degree of norm violation influenced the congruence of respondents' reactions.

In this study, the congruence of visitors' personal norms, based on their preferences and maximum acceptable limits, was examined for six indicator variables in the two study areas — Overland Track and the Western Arthurs. In all cases, norms defined by the evaluative dimension *maximum acceptable* were more congruent than those based on visitors' preferences (Table 8.8). While no other studies are directly comparable, due to different methods being used, indirect support is evident. Data from a study by Hammitt and Patterson (1995) show the impact on the level of privacy achieved by visitors was greater — more negative — when they encountered more people than the maximum they could tolerate, than when they encountered more than their ideal number.

These findings lead me to conclude that, due its higher congruence levels, the evaluative dimension *maximum acceptable* is the more valid of the two examined in this study and, as such, provides a more valid foundation for the development of user-based standards (Table 8.8). However, are the levels of congruence sufficiently high for the social norms to be considered valid? It is to this question that the discussion now turns.

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[29] Patterson and Hammitt (1990) recognised that recreationists who had not had their norms exceeded could also have congruent and incongruent reactions. However, they were unable to use these categories in their analysis due to low numbers of respondents.

Table 8.8 Comparison of the proportions of walkers on the Overland Track and in the Western Arthurs who showed congruent reactions for two evaluative dimensions across six indicators

		Congruence†			
		Overland Track		Western Arthurs	
Indicator	**Evaluative dimension**	*N*	%	*N*	%
Number of groups encountered along the track in a day	Preferred	477	65.1	101	63.9
	Maximum	449	80.1	147	85.0
Largest size group encountered along the track	Preferred	546	56.8	118	71.5
	Maximum	441	73.8	159	90.9
Number of people encountered along the track in a day	Preferred	499	63.4	103	65.6
	Maximum	404	78.2	138	83.1
Number of aircraft seen and/or heard	Preferred	531	63.1	94	73.4
	Maximum	397	75.9	96	76.7
Number of people camped within sight or sound	Preferred	378	64.3	112	67.9
	Maximum	275	72.2	145	83.3
Largest group encountered at a campsite	Preferred	357	62.1	133	78.7
	Maximum	297	77.8	156	89.7

† Proportion of walkers who had either their norms exceeded and reacted positively or didn't have their norms exceeded and reacted negatively

Validity and the proportion of visitors with congruent norms

Numerous studies have examined the issue of congruence in a range of different areas, activities, and indicators. Virtually all of the studies reviewed by Manning (1999: 148) supported the notion of congruence, finding that 'when conditions violate visitor norms, respondents tend to judge such conditions as less acceptable or more crowded and adopt behaviors to avoid them'. The exception was a study by Patterson and Hammitt (1990: 270) who found that 61.0% of their respondents 'whose encounter norms were violated did not express a negative reaction when actual encounters exceeded personal norms'. While a number of methodological issues were offered in explanation for the low congruence level (Patterson & Hammitt 1990), a critical question has remained unanswered by researchers in this field. That question is, what level of congruence[30] renders a social norm valid?

In the absence of a defined validity threshold, an attempt has been made to establish the relative validity of the current findings by making comparisons with congruence levels

[30] Overall congruence is the combined proportion of respondents whose norms were exceeded and had a negative reaction; and, the proportion of respondents whose norms were not exceeded and did not have a negative reaction.

reported by other researchers. Generally, however, researchers have not focused on determining the level/s of congruent reactions is amongst visitors to an area, nor on answering the question of how much congruence is enough. Despite these omissions, the results of two studies provide some insight into what might be considered examples of low and high levels of congruence. While direct comparisons are not possible due to differences in method, these studies do provide some relative perspective. Though not reported by Patterson and Hammitt (1990), it has been possible to calculate the overall congruence level from the results of their study of backcountry backpackers' encounter norms in the Great Smokey Mountains National Park, in the United States. Overall, just 46.6% of backpackers in that study showed congruent reactions to the number of parties they encountered. Explanatory reasons aside, this level of congruence is low compared to that found by Manning *et al.* (1996) among tour boat passengers in Glacier Bay National Park, Alaska. In that study, congruence levels ranged from 80.1% to 85.8%, and averaged 82.7%, for encounters with five different types of watercraft/aircraft.

Congruence levels for the current study were between 73.2% to 80.1% and averaged 76.3% for Overland Track visitors, and between 76.7% and 90.9% and averaged 84.7% for visitors in the Western Arthurs. If the congruence levels recorded by Patterson and Hammitt (1990) and Manning *et al.* (1996) are acceptable examples of low and high congruence, then the findings for the Overland Track can be considered moderately to highly congruent, and those for the Western Arthurs as highly congruent.

Influences on congruence

Where low congruence levels are evident, the reliability of visitors' personal norms as a basis for the development of social norms and user-based standards is questionable. Indeed, unless congruence levels are extremely high, an understanding of the reasons for incongruent reactions is useful, particularly if managers can shape the condition or character of those influences and thereby the quality of visitors' experiences. The influences examined in this study are the number of encounters experienced, the salience of the indicator, and the level of visitors' norms. The additional open-ended comments provided by visitors give added insight and explanation for their incongruent reactions.

Was congruence an artefact of the number of encounters experienced?

Comparisons between the reported encounter levels reported by visitors in each of the four congruence categories[31] showed that in practically all cases there were differences in the number of encounters experienced (Tables 6.20 & 7.17); and that many of the differences were statistically significant ($P < 0.05$). Furthermore, these differences were logically coherent. That is, visitors whose norms were not exceeded and reported that it had had *no influence – greatly enhanced* their experience reported fewer encounters compared to those who stated that the number of encounters had detracted. Inversely, visitors whose norms were exceeded and whom had congruent reactions (detracted) reported more encounters than those visitors who had reacted incongruently had.

As such, when congruence is conceptualised to include both norms exceeded and not exceeded categories, the relationships are not unidirectional. That is, an increase in the number of encounters is likely to increase the congruent reactions in visitors who have had their norms exceeded, but incongruent reactions in those who have *not* had their norms exceeded.

The current study's findings are supported by Williams *et al.'s* (1991) study of recreational floaters on the New River Gorge National River, in West Virginia, United States. These researchers found that 'the more encounters exceeded personal norms, the more respondents reported receiving a different trip than expected, seeing too many people, feeling disturbed by the number of people they saw, and taking some action to avoid encountering other people' (Williams *et al.* 1991: 169). Lewis *et al.* (1996a) also found similar results in their study of paddle canoeists' encounter norms in Minnesota's Boundary Waters Canoe Area Wilderness. Together, these findings support the notion that the greater the violation of norms the more likely it is that congruent reactions will result (Williams *et al.* 1991: 167).

The findings of a study of backpackers by Patterson and Hammitt (1990) contrast those of the current study. However, the differences might be because 'the effect of norm-encounter compatibility may not extend beyond perceptions of crowding to influence broader experience dimensions such as solitude' as used in that study (Williams *et al.* 1991: 170). As Patterson and Hammitt (1990: 271) note, 'solitude need not be the opposite of social crowding'.

[31] 1) norms not exceeded – didn't detract (congruent); 2) norms not exceeded – detracted (incongruent); 3) norms exceeded – detract (congruent); and, 4) norms exceeded – didn't detract (incongruent).

Was congruence an artefact of norms being lower?

Norms for each of the congruence categories were examined to see if there were any differences. The results for the Overland Track and the Western Arthurs were similar in pattern and with only slight variation (Tables 6.21 & 7.18). Visitors who had their norms exceeded had predominantly lower norms than visitors whose norms had not. But, within the *exceeded – not exceeded* categories, visitors' norms did not differ in the majority of cases, irrespective of whether or not they had congruent reactions. Overall, the current findings for the two study areas are consistent with Patterson and Hammitt (1990).

Was congruence an artefact of the indicator being more salient?

It has been shown that the more salient an indicator is to an individual, the more likely they are to have a congruent reaction if their norms are exceeded (Patterson & Hammitt 1990). Indeed, the findings for the Overland Track support this notion. Overland Track visitors who had their encounter norms exceeded, and who stated that it had detracted from the quality of their experience (congruent reaction) considered the indicators examined to be significantly more salient ($P < 0.01$) than did visitors who had incongruent reactions (Tables 6.22 & 7.19). The findings for the Western Arthurs were generally consistent with this pattern despite the differences being statistically significant ($P < 0.05$) for just two of the six indicators examined (Table 7.19).

Where norms were not exceeded, however, an inverse pattern was evident in the responses of visitors to either study area, as illustrated in Figure 8.1. The more important (salient) visitors considered an indicator in determining the quality of their experiences the more likely they were to report that the number of encounters they reported had detracted from their experience, irrespective of whether or not their norms had been exceeded. Thus, as defined in this study, congruence was not associated with higher levels of salience.

Figure 8.1 Influence of salience on the violation of visitors' norms and its impact on the quality of their experiences

Exceeded – ***Didn't detract***[I]	**— Congruence categories —**	*Exceeded* – ***Detract***[C]
Not exceeded – ***Didn't detract***[C]		*Not exceeded* – ***Detract***[I]
←		→
Not at all important	**— Salience —**	***Extremely important***

[I] Incongruent

[C] Congruent

Other reasons for incongruence?

Inability to accurately quantify norms

To the surprise of Lewis *et al.* (1996a: 155), 'seeing too many people' was commonly listed as a reason many canoeists disliked encounters 'despite personal encounter norms not being violated'. Similar findings were evident in the additional comments of respondents to the current study. For example, one visitor commented that the Overland Track was 'like a highway' despite not having his/her personal norm violated. Likewise, comments such as 'large groups' (Overland Track), 'large groups overbearing' (Overland Track), and 'smaller groups are better' (Western Arthurs) were noted by visitors who didn't have their personal norms for maximum group size violated but stated that the encounters had detracted from their experiences. These findings are consistent with the notion that some recreationists do not have well developed personal norms and that congruent reactions are neither certain nor consistent (Biddle 1986; Lewis *et al.* 1996a). Moreover, these findings suggest that researchers should be wary of forcing respondents to state a norm 'in which they have little confidence' (Manning & Lime 2000). It is for this reason that some researchers have adopted the three-choice question format that gives respondents the opportunity to indicate that 'the indicator is important to them, but they cannot specify a maximum number that is acceptable' (Manning & Lime 2000: 28).

In the absence of congruency checks and the analysis of additional comments, such as that undertaken in the current study, there is no means of gaining an insight into who has been 'forced' to state norms when they are not clear (two-choice response format), or who is 'fence sitting' (three-choice response format). Analysis of the additional comments provided by visitors on the Overland Track and the Western Arthurs indicates that qualitative characteristics of the people and situations they encountered were the dominant reason visitors had incongruent reactions, and that relatively few visitors norms were unreliable — from a quantitative perspective. That is, the majority of visitors' reactions to the levels of encounters they reported were consistent with their personal norms; and most of the visitors who reacted in an incongruent fashion did so for reasons other than the level of encounters they experienced.

Mediation of qualitative characteristics

Despite low levels of incongruence being evident in the findings for both the Overland Track and the Western Arthurs, judgements of how/if the norms are reliable as input into the development of standards that define the limits of acceptable change can be enhanced through deeper understanding of the qualitative characteristics of the people and/or situations encountered that mediate visitors reactions.

It is clear:

> that visitors' perceptions of crowding in a specific recreation setting are not always simply a function of the number of encounters with other visitors. Characteristics of others encountered — including type and size of the group, behavior, and perceptions of alikeness — often influence visitors' perceptions of crowding. Similarly, varying situational factors act to influence crowding perceptions (Lewis *et al.* 1996a: 155).

Moreover, the reactions of recreationists are also subject to variation from one individual to another depending on social, psychological and situational factors (Absher & Lee 1981; Ditton *et al.* 1983). Indeed, the body of literature on crowding research is vast and provides abundant testimony to these claims, much of which has been reviewed by Manning (1999) and Manning and Lime (1996).

In the current study, the additional comments provided by visitors who had incongruent reactions are consistent with previous research findings (Ditton *et al.* 1983; Manning 1999) and show that a range of qualitative influences has shaped their evaluations. For some visitors, it is clear that despite not having had their norms exceeded, influences such as noisy/loud behaviour (West 1982), competition for facilities (Womble & Studebaker 1981), biophysical impacts caused by large groups, type (commercial) and size of groups (Lime 1972; Stankey 1973), attitude and behaviour (West 1982), and location of encounters (Burch & Wenger 1967; Stankey 1973, 1980) have prompted negative evaluations of those encounters; and thus, they have detracted from the quality of their experiences. Similarly, expectations (Ditton *et al.* 1983), small groups (Lime 1972; Stankey 1973), short duration of encounters (Blumer 1936; Manning 1999), attitude and behaviour (West 1982), and proximity and type of overflights (Tarrant *et al.* 1995) were just some of the factors that mitigated the negative impact of norm violation. Together, these qualitative findings are consistent with the notion of encounter levels being an incomplete cause of crowding in backcountry areas (Absher & Lee 1981; Manning 1986a, 1999).

General conclusions

The understanding developed through the analysis of the congruency of visitors' evaluations of the encounters they experienced, together with the insight provided by additional qualitative data that clarifies the reasons for incongruent reactions, has established a solid foundation for the 'informed judgement[s]' managers must make with respect to the 'levels of impacts and related visitor use levels that are acceptable' (Manning 2001: 21) than simple identification of social norms. This is the first time such a comprehensive examination of visitor norms has been undertaken and presented. Furthermore, understanding the qualitative influences on the congruence of visitors' reactions provides insights that can enhance the ability of the PWS to manage the quality of visitors' experiences, beyond the direct management of the indicators' conditions.

8.8 What are the social norms?

From the preceding discussion it is evident that visitors' norms based on their *maximum acceptable* limits are more prevalent and congruent than their preference based norms, and thus provide a more solid foundation for the development of social norms. As such, the following discussion is focused on visitors' *maximum acceptable* limits for the six potential indicators examined. Means and medians are commonly used to express norms; however, like other researchers, I have used the median and the minimum conditions 75% of visitors will accept as the basis for the discussion of social norms (Roggenbuck *et al.* 1993; Rutledge & Trotter 1995a; Watson *et al.* 1992). From a management perspective these statistics are more intuitive than the mean as they define the minimum conditions that half and three-quarters of visitors will accept. Means, *SDs*, *CVs*, and *SIQRs* have, nevertheless, been included in Table 8.9 to allow comparisons with other studies.

Table 8.9 Comparison of Overland Track (OT) and Western Arthurs (WA) visitors' maximum acceptable limits and levels of consensus for potential indicators

Indicator	Site	*N*	Mean	*SD*	*CV*	Q2[a]	Q1[b]	SIQR
No of groups encountered along the track in a day	OT	568	8.6	6.7	0.78	6	2	3.0
	WA	174	4.6	3.1	0.67	4	3	1.0
Maximum size group encountered along the track	OT	609	9.0	4.2	0.47	8	6	2.0
	WA	182	5.9	2.0	0.34	6	4	1.0
Maximum number of people encountered along the track	OT	546	27.9	21.3	0.76	20	12	14.0
	WA	167	12.3	8.6	0.70	10	6	4.5
Maximum number of aircraft seen/heard per day	OT	561	2.1	2.4	1.14	2	0	1.5
	WA	156	2.4	2.7	1.12	2	1	1.0
Maximum number of other people camped within sight or sound	OT	396	13.0	12.8	0.98	10	5	7.5
	WA	174	7.5	4.8	0.64	6	5	2.1
Maximum size group at a campsite	OT	400	8.1	4.3	0.53	8	5	2.5
	WA	175	5.9	2.7	0.46	6	4	1.0

[a] Median: fifty per cent of respondents would accept this encounter level

[b] Seventy-five per cent of the respondents would accept this encounter level

Do social norms vary between the Overland Track and the Western Arthurs?

Encounter related norms

It is apparent from Table 8.9 that the norms of visitors on the Western Arthurs are predominantly lower than those of their Overland Track counterparts. However, unlike the five people related encounter norms, the norm for the number of aircraft seen/heard in a day — at the 50% level — was the same for both the Overland Track and the Western Arthurs. Fifty per cent of visitors at either study site would accept seeing and/or hearing a maximum of two aircraft in a day, and there was only slightly more consensus among the Western Arthurs visitors, as indicated by the SIQR.

Interestingly, however, at the 75% level the aircraft encounter standard was more restrictive for the Overland Track than the Western Arthurs. This finding is contrary to what was expected since the Western Arthurs has less visitors and is less developed and more 'wild' than the Overland Track (Manning & Lime 2000; Tarrant *et al.* 1995). Furthermore, salience (Tables 6.6 & 7.5), congruence (Table 8.8), and the proportion of visitors who reported the number of aircraft they had seen/heard during their trip had detracted from their experience were all similar for two study sites. A possible explanation for the less restrictive standard at the 75% level for the Western Arthurs is that visitors' expectations were more realistic than those of the visitors on the Overland Track. Western Arthurs visitors expected to see/hear more aircraft (mean = 1.7, median = 1) than did visitors on the Overland Track (mean = 1.1, median = 0). It is likely that because Western Arthurs visitors were more experienced, at both a general and site specific level (Section 7.2), than their Overland counterparts (Section 6.4), they had/have more accurate expectations.

Despite the preceding anomaly, however, the similarity between the two study areas with respect to their norms for seeing or hearing aircraft indicates a common view of the appropriateness of overflights in wilderness areas irrespective of the area's level of development and visitation. It is perhaps surprising that walkers would tolerate encountering any aircraft at all. I suspect that this level of tolerance is at least partly due to the realisation and acceptance of the use of helicopters for search and rescue work, as well as for logistical support for management in remote areas (Booth *et al.* 1997), including servicing and removing waste from remote toilets and the transport of materials for track maintenance and construction.

In contrast, the difference between the norms for people-related encounters, at the median level[32], for the Overland Track and the Western Arthurs reflect the tendency for norms to be lower at the wilderness end of the spectrum than at the frontcountry/developed end (Manning 1999; Manning & Lime 2000).

The largest differences between the two study areas were for the *maximum number of people encountered along the track in a day* and the *maximum number of other people camped within sight or sound.* At the median the differences between the two areas for these indicators were 10 people and 4 people respectively. As expected, a higher social norm was recorded for the Overland Track than for the Western Arthurs, and likely a reflection of higher use levels (Hall & Shelby 1996; Lewis *et al.* 1996a; Shelby, Vaske *et al.* 1988).

Acceptability of campsite impacts

Visitors' norms for the acceptability of varying levels of impact at campsites in both study areas were assessed by asking them whether they found each of five campsite conditions to be acceptable or unacceptable. Impacts ranged from Condition 1, where there is little evidence of previous camping activity and minimal damage and disturbance to vegetative matter, to Condition 5, which describes campsites where bare soil and rock covers most of the site and soil erosion is obvious (Section 4.5).

A greater proportion of Western Arthurs visitors preferred less impacted sites than did Overland Track visitors (Table 8.10). The biggest differences between the study site visitors were for the acceptability of the more impacted condition classes, with higher proportions of Overland Track visitors than Western Arthurs visitors considering conditions 4 and 5 to be acceptable. Overall, however, the acceptable campsite conditions that 50% and 75% of visitors stated they considered acceptable were the same for both study sites, at Condition 3 and 2 respectively.

Table 8.10 Proportion of Overland Track (*N* = 566) and Western Arthurs (*N* = 188) visitors who considered the spectrum of campsite conditions to be acceptable

Condition class	Overland Track (%)	Western Arthurs (%)
Condition 1	98.6	99.5
Condition 2	92.9	95.3
Condition 3	63.1	68.1
Condition 4	15.6	10.6
Condition 5	6.8	3.2

[32] Fifty per cent of walkers will accept this level or fewer.

Are the findings consistent with research in other backcountry and wilderness areas?

Encounter related norms

While this study found significant variation between the social norms expressed by visitors to the two study sites, other researchers have found 'surprisingly broad agreement across [different wilderness] areas on what are acceptable wilderness conditions' (Roggenbuck *et al.* 1993: 195; Watson *et al.* 1992). More interestingly, however, Roggenbuck *et al's* (1993: 188) findings reveal that this similarity of opinion exists across areas described as having use levels ranging from 'light' for the Rattlesnake Wilderness, to 'high' for the Cohutta Wilderness. Since norms have been found to vary in relation to use level the degree of agreement found by Roggenbuck *et al.* (1993) is unexpected (Hall & Shelby 1996; Lewis *et al.* 1996a; Shelby, Vaske *et al.* 1988).

Like many studies, the current findings show a tendency for norms 'to be lower (or less tolerant) in wilderness or backcountry areas [like the Western Arthurs] than in frontcountry or more developed areas' such as the Overland Track (Manning & Lime 2000: 22). Furthermore, overall the social norms of visitors on the Western Arthurs were more crystallised than those of the Overland Track visitors (Table 8.9), reflecting the increasing consensus — as indicated by the standard deviations — that Shelby (1981) found as recreation opportunities shifted from 'undeveloped recreation' through 'semi-wilderness' to 'wilderness'. Additionally, norm prevalence (Table 8.7) was also found to be higher among Western Arthurs visitors in the more natural and remote Self-Reliant Recreation Zone than the Overland Track visitors in the more developed Recreation Zone of the Tasmanian Wilderness (PWS 1999; Roggenbuck *et al.* 1991).

The ability to make comparisons between the level of specific social norms identified by the current study and those developed by other researchers is problematic. Differences in the methods employed, including differences in evaluative dimensions; whether visual, descriptive or on-site approaches were used; variation in question-response formats; and, the statistics used to measure and interpret norms often mean that direct comparisons of norms from one study to another should be treated with caution. Despite these limitations, the findings of several studies of bushwalkers'/hikers' norms are compiled in Table 8.11.

Of the studies and norms outlined in Table 8.11, the norms developed in the current study (Table 8.9) are most directly comparable to those of Morin *et al.* (1997) and Rutledge and Trotter (1995a). Despite contrasting sampling strategies, the social norms and indicators used by these researchers resemble those used by the current study most closely. As such they provide an insight into the norms of visitors across different backcountry and wilderness areas in Australia and Canada.

Table 8.11 Studies of bushwalking/hiking related indicators and their social norms

Study, Area, Evaluative Dimension	Indicator	Norm: Mean	Norm: Median
Patterson & Hammitt (1990), Great Smokey Mountains National Park, North Carolina-Tennessee, United States, maximum tolerable.	Size of party encountered on trail	3.9	4.0
	Size of party encountered at camp	3.2	3.0
	Number of parties encountered on trail	5.5	4.0
	Number of parties encountered at camp	2.7	2.0
Young, Williams & Roggenbuck (1991), Cohutta Wilderness, Georgia, United States, preferred level.	Number of groups of hikers seen on trail in a day	-	3.9
Williams, Roggenbuck, Patterson & Watson (1992); Four wilderness areas, United States, unacceptable.	Number of hiker groups I see along the trails in a day	8.7 – 11.6†	-
Morin, Moore & Schmidt (1997), Nyuts Wilderness, Western Australia, maximum acceptable.	Number of people seen on any one day (size of group) at campsites	-	6
	Number of people seen on any one day (size of group) on or beside trails	-	6
	The number of other groups seen or heard on any one day at campsites	-	4
	The number of other groups seen or heard on any one day on or beside trails	-	5
Rutledge & Trotter (1995b), Fort Nelson Forest District, North Eastern British Columbia, Canada, maximum acceptable.	Number of aircraft/helicopters seen or heard from trails per day	-	2
	Number of aircraft/helicopters seen or heard at campsites per day	-	1
	Number of encounters with other groups on trails per day	-	1
	Number of encounters with other groups at campsites per day	-	1
	Size of other groups encountered on trails per day	-	3
	Size of other groups encountered at campsites per day	-	3

† Range over four wilderness areas

A comparison of the Nyuts' Wilderness norms (Table 8.11) and those of the current study (Table 8.9) reveals the norm for the Western Arthurs and Nyuts to be the chiefly the same, at the median level, for the three indicators these studies have in common – the number of groups encountered along the track in a day, maximum size group encountered along the track, and the maximum size group encountered at a campsite (Morin 1996; Morin *et al.* 1997). Overall, the norms for the Overland Track visitors were marginally higher than for the Nyuts visitors'. From the information provided by Morin *et al.* (1997) the Nyuts Wilderness and the Western Arthurs appear generally similar with respect to levels of use and management intent, while the Overland Track is more heavily visited and developed.

While some consistency is evident in the norms of the Australian studies, with one exception, those of the visitors to the Fort Nelson Forest District in British Columbia, Canada (Rutledge & Trotter 1995a), stand in contrast (Tables 8.9 & 8.11). While the norms for the number of aircraft seen or heard in a day was chiefly the same for the Overland Track, Western Arthurs and the Fort Nelson Forest District, the Canadians' people related encounter norms were somewhat lower than those of the Australian recreationists. It is likely, however, that these differences are due to the high proportion of visitors (83.7%) undertaking hunting activities in the Fort Nelson Forest District as hunting relies on stealth and quite in the pursuit of prey. In contrast, hunting is not permitted in Overland Track and the Western Arthurs areas (PWS 1999; Rutledge & Trotter 1995a).

8.9 How do the conditions at the study sites compare to the social norms defined by visitors?

Comparisons between the social norms for the Overland Track and the Western Arthurs and the encounter levels reported by visitors during their visits to those areas provides an insight into the quality of visitors experiences afforded by those locations. Notably, conditions reported at both study sites during the study period violated the standard that 75% of visitors stated they would accept. Overall, the conditions in the Western Arthurs are within the limits prescribed by the social norms for that area at the 50% level for five of the six encounter-based indicators (Table 8.12). The exception was the indicator for the number of aircraft seen or heard in a day, which was at the level prescribed by the norm at the 50% level. Conditions on the Overland Track, however, already exceed the social norm at the 50% level for three of the six encounter-based indicators, and are at or close to the social norm at that level for the other three indicators.

As discussed in Section 8.8, Overland Track and Western Arthur Range visitors shared the same social norms for acceptable campsite conditions at both the 50% and 75% levels – Condition Classes 3 and 2 respectively. A census of the condition of the Overland Track campsites by Dixon (1999a), in March 1999, revealed 39.7% of the campsites to be in a worse condition – Condition Classes 4 and 5 – than that considered acceptable by 50% of the visitors. Furthermore, each of the major camping nodes had at least one campsite that was impacted to such a level; and only 28.2% of the 78 campsites at these nodes were of the condition considered acceptable by 75% of visitors (Table 8.13).

Table 8.12 Overland Track (OT) and Western Arthurs (WA) visitors' social norms and reported encounter levels

Indicator	Study site	50% Social norm†	50% Reported encounter level‡	75% Social norm#	75% Reported encounter level*
The maximum number of groups encountered along the track in a day	OT	6	≤ 6	2	≤ 10
	WA	4	≤ 3	3	≤ 4
The maximum size group encountered along the track	OT	8	≤ 10	6	≤ 12
	WA	6	≤ 4	4	≤ 6
The maximum number of people encountered along the track in a day	OT	20	≤ 25	12	≤ 35
	WA	10	≤ 7	4	≤ 11
The maximum number of aircraft seen or heard in a day	OT	2	≤ 2	0	≤ 3
	WA	2	≤ 2	1	≤ 3
The maximum number of other people camped within sight or sound	OT	10	≤ 12	5	≤ 25
	WA	6	≤ 4	5	≤ 6
The maximum size group encountered at a campsite	OT	8	≤ 7	5	≤ 12
	WA	6	≤ 3	4	≤ 5

† Fifty per cent of visitors would accept this encounter level

‡ Fifty per cent of visitors reported this encounter level or less

Seventy-five per cent of visitors would accept this encounter level

* Seventy-five per cent of visitors reported this encounter level or less

Table 8.13 Campsites at the major camping nodes along the Overland Track: their total number, by Condition Class, the number of hardened campsites, total number of campsites, and estimated useable number of tentsites and their inferred capacity

Year		Condition Class 1	2	3	4	5	Hardened campsites	Total number of campsites	Est. usable tentsites†	Inferred capacity (people)
1999	Totals	6	16	25	26	5	0	78	252	504
	(%)	(7.7)	(20.5)	(32.1)	(33.3)	(6.4)	(0.0)			
2003	Totals	8	23	24	13	0	15	83	209	418
	(%)	(9.6)	(27.7)	(28.9)	(15.7)	(0.0)	(18.1)			

† A standard two person tent is assumed. Estimated tentsite numbers assume comfortable camping – i.e. tents concentrated but pitched with reasonable separation. The estimated number refers to 'usable' tentsites because an allowance has been made for closed or seriously eroded (i.e. unusable) tentsites.

Adapted from Dixon 2003

A follow-up survey of campsites along the Overland Track undertaken in March 2003 (Dixon 2003). That survey showed that some of the most-impacted campsites at Windermere, Kia Ora and Windy Ridge have been hardened with the construction of tent-platforms over the impacted sites, while other sites have been closed and camping activity redirected to more suitable locations on newly constructed tent-platforms. These closures have resulted in a reduction in the total number of campsites at the major campsite nodes, as well as a decrease in the estimated number of useable tentsites (Table 8.13).

While Table 8.13 suggests an overall improvement in the condition of the in-use campsites between 1999 and 2003, campsite closures and a shift in use to previously little or unused sites indicates a shift in the location of camping activity. As a consequence, the total area showing signs of camping related impact will have increased. Despite some of the campsites within this footprint being closed or inactive, with respect to camping use, it is unclear how the increase in impacted area affects the quality of visitors' experiences.

In the Western Arthurs, the results of a survey of campsite conditions undertaken in February 2000 shows that almost half (48.8%, $N = 21$) of the campsites along the Western Arthurs are in worse condition than that which 75% of visitors find acceptable, that is they exhibit impacts commensurate with Condition Classes 3 to 5 (Table 5.7). Even if the social norm at the 50% level were to be adopted as the appropriate standard for campsite impacts, i.e. Condition Class 3 is considered acceptable, 32.5% ($N = 14$) of the campsites at the major camping nodes would still be considered unacceptable. Although several of the previously seriously degraded campsites at Lake Oberon and High Moor (tent-platforms installed during 2002) have been hardened, and many other sites have been closed to use since the survey was undertaken, 'seriously impacted campsites remain in use at all the other major camping areas' (Dixon 2002: 3-4).

8.10 Support for limiting use

The most controversial management action that can be employed by wilderness managers is the restriction of public access (Hendee *et al.* 1990; Manning 1999); this is evident in the management impasse that has existed between the PWS and a significant minority of the Tasmanian bushwalking community over the past decade (Chapter 3). From the surveys of visitors to Overland Track and Western Arthurs it is clear that only a small proportion of them (10.2% and 6.2% respectively) felt that limiting the number of people visiting the study areas was an inappropriate way to address overuse (Table 8.14).

Comparisons of the results of these findings with those of earlier studies in the TWWHA suggest an increase in support for use limitation as a potential management action. In his study of visitors to the Cradle Mountain – Lake St Clair National Park, during 1979-1980, for example, Calais (1981) canvassed support for a range of management actions to manage biophysical impacts and found that only 22.7% of respondents supported restricting use of the park. Calais found most Overland Track visitors (81.0%) supported the immediate upgrading of the walking tracks in the area. Later in 1981-1982, of four possible management actions, Carlington (1988) found more respondents (40.4%) felt that limiting the number of visitors was the best way to prevent damage from overuse, than did those favouring other strategies, such as closing areas (28.1%), site hardening (26.3%), or limiting time spent on site (5.3%). Four years later (1987-1988), Sawyer (1990: Appendix 2, 64) found that 42.0% of respondents supported limiting the number of people at any one time 'to prevent overcrowding and degradation of the Mt Anne area'. By the 1990s, PWS Track Rangers (PWH 1990) found that support for limiting the number of walkers to prevent or minimise environmental degradation in the TWWHA had increased to 70.3% (Table 3.8) with similar, if qualified, findings evident in a study conducted in the TWWHA during 1995-1996 (Brake 1996; Rundle 2000). While re-analysis of that study's data cast doubt over the reliability of its findings, the current study suggests that acceptance of use limitation as an appropriate management action has continued to increase. Approximately 90% or more of visitors who responded to the surveys of Overland Track and Western Arthurs visitors supported the introduction of use limitations in order *reduce use*, *hold use at current level*, or *at a time in the future when/if overuse occurs* (Table 8.14).

Table 8.14 Visitors' support for limiting the number of people visiting the study sites with the recognition that their own opportunity to visit the Overland Track (OT) or the Western Arthurs (WA) may be limited in the future

Support for limiting the number of people visiting the study sites	OT† (%)	WA‡ (%)
Limits would never be appropriate	10.2	6.2
Support limiting use in the future when/if overuse occurred	39.2	43.8
Hold use at current level	35.1	28.9
Reduce use	15.5	21.1

† $N = 865$
‡ $N = 194$

When the findings of the Overland Track and Western Arthurs surveys are compared, proportionally more Overland Track visitors (10.2%) than visitors to the Western Arthurs (6.2%) stated that *limits would never be appropriate*. At first glance, the greater opposition to use limitation among the Overland Track visitors is surprising since a larger proportion of them reported that the levels of encounters they experienced had detracted from the quality of their experiences (Table 8.5), and a greater proportion of them had experienced levels of encounters above their personal norms than was the case for visitors to the Western Arthurs (Table 8.12). However, lower norm prevalence (Table 8.7) and congruence levels (Table 8.8) among visitors to the Overland Track, compared to those in the Western Arthurs suggests that some Overland Track visitors are willing to trade higher encounter levels for unrestricted access. Furthermore, some visitors may consider it best to continue to accommodate increasing numbers of visitors on the Overland Track to avoid possible displacement of visitors to other lesser developed and visited areas of the TWWHA should they be unable to gain access if use limitations were to be implemented.

In relation to the Australian context, the current study's findings show greater support for use limitation as a potential management action among Overland Track (89.8%) and Western Arthurs (93.8%) visitors, than among Nuyts Wilderness visitors (71%) in Western Australia (Morin 1996). Comparison of the results of the current study with those of a survey of visitors to the Fort Nelson Forest District, in Canada, reveals just 49.0% supported limiting use if resource and/or experience quality were threatened (Rutledge & Trotter 1995b), a substantially lesser proportion than those recorded for either Nuyts Wilderness or TWWHA visitors, in Australia. The lower level of support for such a restrictive management action by visitors to the Fort Nelson Forest District may be because they 'felt that current conditions were, for the most part, good' (Rutledge & Trotter 1995b: 22). However, just 13% of Nyuts Wilderness visitors felt they had encountered too many other groups per day during their most recent visit to the area (Morin 1996). In either respect, both Nuyts Wilderness and Fort Nelson Forest District visitors showed greater support for management actions such as education about minimum impact use and rehabilitation of degraded areas, than for management actions aimed at limiting or modifying use (Morin 1996; Rutledge & Trotter 1995b).

While support for indirect management actions, such as educating visitors about MIB practices, were not canvassed by the current study, like Morin (1996) and Rutledge and Trotter (Rutledge & Trotter 1995a, 1995b) I concur that 'many studies indicate that, given the choice, visitors prefer indirect over direct management practices' (Manning 1999: 241-242). Moreover, wilderness managers generally favour indirect management practices where they are believed to be effective because, among other things, they are often less costly, less controversial and more consistent with the notion of unconfined recreation (Hendee *et al.* 1990; Manning 1999). Indeed, 'no single approach is so powerful, versatile, or acceptable in terms of costs to visitors or managers that it constitutes a panacea' (Hendee *et al.* 1990: 419). Rather, a management strategy that integrates a variety of approaches is necessary.

Chapter 9. Conclusions

The synthesis and discussion of the study results presented in the previous chapter situated the findings of this study within the broader context of the outdoor recreation literature. The purpose of this chapter is to present the conclusions with respect to the aim of the thesis as it was outlined in the introduction and reiterated below.

My aim in undertaking this study was to identify the parameters that affect the quality of visitors' experiences and thereby develop a greater understanding of the social dimensions of visitor-related impacts in the TWWHA (Chapter 1). In achieving the aim, the initial step was to complete a review of wilderness planning and management theory and research (Chapter 2). From that review it was evident that the character and condition of the social, biophysical and managerial settings in which visitors recreate shape the quality of their experiences. Moreover, managers should seek to provide a range of recreation opportunities that are consistent with the area's purpose and values. Further, to ensure that the quality of recreation experiences and the condition of the settings in which they take place are not diminished over time, recreation opportunities should be clearly defined using indicators and standards that prescribe the limits of acceptable change. Notably, these elements are fundamental components of contemporary carrying capacity frameworks such as LAC, VIM, and VERP that are most commonly applied to the management of wilderness and natural protected areas.

What is more, decisions about the maximum amount of change to be tolerated in an area's condition and about the quality of the visitors' experiences should be informed by a combination of science and values. That is, such judgements should be based on an understanding of the relationship between recreation and its impact on the environment in which it takes place and its affect on the quality of visitors' experiences, *as well as* an awareness of the levels of impacts considered acceptable by visitors. In this regard, normative research, as it has developed in the field of outdoor recreation, has proven to be a valuable tool for understanding the social dimensions of the impact issue.

Building on these fundamental understandings, the management of the TWWHA (Chapter 3) was then examined, highlighting the management context within which the study was situated and revealing a framework for the provision of a range of recreation opportunities. Critically, the absence of clearly defined limits of acceptable change, and the lack of social input into their definition via normative research, were identified as principal shortcomings of the PWS's strategy for the management of the walking track network in the TWWHA.

Significantly during the 1990s these shortcomings contributed to the impasse between the PWS and members of the bushwalking community as to how bushwalking and walking tracks within the TWWHA should be managed.

These failings highlighted the need to develop a greater understanding of the social dimensions of visitor related impacts in the TWWHA, and more specifically, to examine visitors' norms and the quality of their experiences. Furthermore, the 1999 Tasmanian Wilderness World Heritage Area Management Plan directed that the key factors that affect the quality of visitors' experiences be identified and that limits of acceptable change be defined. As such, within the context of the TWWHA the importance of this research is apparent, as it provides *new insights* that promote more informed decision-making regarding the use and protection of the area and its natural and cultural values.

To achieve the study's aim, a normative approach was adopted for the empirical research and various theoretical and methodological issues were addressed in the design of the research method (Chapter 4) and in the presentation and analyses of the data collected (Chapters 6 & 7). In particular, it was clear that in order to provide wilderness recreation managers within the PWS with robust information in which they could have confidence, a study such as this should not only identify visitors' norms but should also assess their validity. As such, I went beyond simply identifying the importance of a range of indicators in determining the quality of visitors' experiences and the norms they prescribed. Rather, I have developed a deeper understanding of the integrity of visitors' norms as a basis for the development of limits of acceptable change standards. This understanding was forged by assessing visitors' norms for two different evaluative dimensions; that is, their preferred condition and that which they considered to be the maximum acceptable. In particular, norm prevalence, the degree of consensus about the norm, and the congruence of visitors' reactions with respect to the conditions they encountered were examined.

Further, to determine whether the research findings from one area could be applied to another, two sites of contrasting character, the Overland Track and the Western Arthurs were studied. The finding that the characteristics of the people that visited the Overland Track and the Western Arthurs, as well as the character of their visits differed further reinforced the comparative distinctiveness of these two sites evident from their description in Chapter 5.

While other researchers have applied individual or combined aspects of the method, this is the first study to integrate them all in a single exploration of visitor norms either in Australia or internationally. Findings from such a study have not been reported in the research or related outdoor recreation literature. Therefore, this research advances our knowledge and understanding not only of visitors' norms in the TWWHA, but more broadly across the field of backcountry and wilderness recreation.

Within the context of this study then, the findings have shown that despite the differences between the Overland Track and Western Arthurs, there are some important similarities between these areas with respect to the quality of visitors' experiences. Notably, visitors considered biophysical conditions to be more important than social conditions in both track and campsite situations; they were also more sensitive to campsite-related impacts than those associated with walking tracks. Further, fulfilling an objective of the TWWHA management plan, I identified the factors that determined the quality of visitors' experiences and found them to be largely consistent between the two sites. Importantly, the similarity between the two factor structures will permit the adoption of a core set of indicators that are common to both sites. In fact, indicators for the biophysical condition of tracks and campsites are already monitored by the PWS across the walking track network within the TWWHA. In the case of social and experiential impacts, however, no monitoring is undertaken on either the Overland Track or the Western Arthurs, or for that matter at any location in the TWWHA[33]. As such, the findings presented herein provide a sound basis for the development of a social monitoring program. Further, the selection of supplementary indicators tailored to the management of site specific characteristics is recommended to augment the monitoring and management of the quality of visitors' experiences within a site-specific context. In particular, the results suggest such an indicator should be developed to monitor physical crowding in the huts managed by the PWS along the Overland Track.

Turning to visitors' expectations, the proportion of visitors expecting to encounter specific conditions during their visit to the Overland Track or the Western Arthurs was associated with their levels of bushwalking experience. That is, the more experienced the visitor the more likely s/he had expectations for the encounter levels that s/he would experience during their trip. As such, of the two areas examined, visitors to the Western Arthurs were the more experienced of the two groups and most of them had expectations for the encounter levels that they would experience during their trip. In contrast, the majority of their less experienced Overland Track counterparts had no expectations at all.

Consistent with the relative levels of visitor use of the study sites, generally higher levels of encounters were expected by visitors on the Overland Track than on the Western Arthurs. Despite this finding, in most cases visitors expected lower encounter levels than they

[33] The only social variables for which the PWS collects data on a regular basis in backcountry areas are the number of visits, the routes taken, and their duration, party sizes and the origin of visitors.

actually experienced along the Overland Track. On the other hand, in the Western Arthurs the levels of encounters were either consistent with, or fewer than those expected by visitors in the majority of cases.

The levels of encounters reported by visitors had a greater negative impact on the quality of visitors' experiences on the Overland Track than on the Western Arthurs. With one exception, greater proportions (20.7% - 30.2%) of Overland Track visitors felt that the number of people and/or the size of groups they encountered had detracted from the quality of their experience, than did (14.0% - 24.9%) visitors to the Western Arthur Range. In contrast, the impact of the number of aircraft visitors reported they saw or heard was similar for both the Overland Track and the Western Arthurs. Of the six indicators examined in detail, the number of aircraft seen or heard had the greatest negative impact, with about a third of visitors to the Overland Track (33.0%) and the Western Arthurs (34.5%) stating that it had detracted from the quality of their experience.

From a management perspective these findings suggest that there is a need for the PWS to provide accurate pre-visit information. Moreover, the need for such information is greatest for the Overland Track where reported encounter levels were generally at least twice and sometimes three times that reported by visitors to the Western Arthurs. Furthermore, the provision of accurate pre-visit information about the conditions people are likely to encounter during their visit is likely to improve their ability to self-select the recreation opportunity that best matches the experience they are seeking. Furthermore, better self-selection is likely to enhance the quality of the wilderness recreation experiences, as desired by the PWS (1999), by reducing the dissonance of un-met expectations. Similarly, there is evidence that the negative impact of seeing or hearing aircraft on the quality of visitors' experiences could be mitigated by the PWS advising people when helicopters are in use and that their use is essential for management. Such information is not currently provided, and may be as simple as placing notices on the PWS website and at relevant track-heads.

While it is evident that use levels in the Western Arthurs have been stable since 1997, for more than a decade the Overland Track has experienced a substantial and ongoing pattern of increase in the number of people visiting the area. Moreover, comparisons of the current findings with studies conducted by the PWS at the beginning of the 1990s suggest that, in terms of the impact of the number of visitors encountered along the track and at campsites, both the nature and quality of the Overland Track experience has diminished. Though no comparative historic data exist for the Western Arthurs, the stability of the use levels in that area suggests the quality of the visitor experience it affords (with respect to encounters with other visitors) is unlikely to have diminished.

A normative approach was used to develop an understanding of visitors' personal norms for the quality of the conditions at the two study sites. Two evaluative dimensions — *preferred* and *maximum acceptable* — were examined. This is the first study to report a comparative assessment of norm prevalence and congruence for more than a single evaluative dimension for a single activity in two different areas.

Norms defined by visitors' maximum acceptable limits were shown to be the most 'valid'. More visitors reported norms for their maximum acceptable limits than their preferred condition, and the proportion of visitors whose reactions were congruent with their reported norms indicated construct validity to be generally high, and greatest for norms based on visitors' maximum acceptable limits. Influences on the congruence of visitors' reactions included the importance of the indicator in determining the quality of the visitor's experience, the level of their norms, and the number of encounters they experienced. A range of qualitative factors was also found to have affected the congruence of visitors' reactions.

An evaluation of the quality of the visitor experiences provided by the study sites, as measured by the social norms, shows the social conditions in the Western Arthurs to be within the standard considered acceptable by 50% of visitors for all five indicators. However, despite upgrades to a number of the more seriously degraded campsites along the Range, the condition of many of them remains below the standard acceptable to 50% of the visitors to the area.

In contrast, social conditions along the Overland Track had breached two of the three track-based encounter standards, at the 50% level, and was at the standard of the third. Additionally, one of the two norms for the social conditions at campsites was also beyond the standard considered acceptable by 50% of visitors. In terms of the campsites along the Overland Track, a program of maintenance and upgrading has seen many sites hardened, some relocated and others closed for rehabilitation. However, while the number of campsites whose condition was in breach of the standards at the 50% level has decreased since the 1999-2000 peak season, their overall capacity has also decreased, and there are still many whose condition is unacceptable.

A variety of management actions, ranging from indirect to direct, have and continue to be employed by the PWS in the management of visitor-related impacts at the study sites, and more broadly across the TWWHA. To date, however, use restrictions have not been introduced in any area. However, despite an overriding opposition from within the bushwalking community to the use of permits and quotas to manage visitor-related impacts, support for limiting the number of people visiting the Overland Track and the Western

Arthurs appears to have increased since permits and quotas were first proposed by the PWS in 1992.

It is proposed then, that the findings presented in this dissertation provide a robust contribution toward more informed decision-making by the PWS with respect to the management of the Overland Track and the Western Arthurs. In particular, clearly articulated limits of acceptable change standards, developed from the norms of visitors outlined herein, will establish a foundation for a transparent mechanism for monitoring the conditions along the Overland Track and on the Western Arthurs. It is my considered opinion that the development of a management system with these qualities should alleviate the concerns of some stakeholders about the potential for the arbitrary introduction of use limitations and regulations; such a system will foster increased support from the broader bushwalking community.

Indeed, where governments and managers are entrusted with, and bound by, the dual obligations of protecting ecological integrity and providing opportunities for recreation, managers must integrate a range of views in formulating effective and achievable management objectives. In doing so, ecological and social priorities must be meshed with legal and political influences (Shindler 1992). Similarly, it should be recognised that the application of the findings of biophysical research — for example studies of trampling impacts on vegetation (Calais & Kirkpatrick 1986; Cole 1985; Dixon *et al.* 2004; Whinam & Chilcott 1999, 2003) — is ultimately subject to the influence of social norms, values, and ethical concerns when they are considered with regard to management (Rolston 1988, Shindler 1992).

However, in making their informed judgements, wilderness managers must be careful not to compromise solutions specific to environmental deterioration (Shindler 1992). Despite this risk, the integration of social perspectives into the maintenance and protection of an area's natural values remains essential if it is to be supported by stakeholders. However,

> … the management pendulum should not be allowed to swing too far toward the social preferences end of the spectrum at the expense of the natural resource. Too much emphasis on political process may obscure the importance of standards for environmental quality (Shindler 1992: 54).

With that cautionary note in mind, what would the implications be if the standards were set in accordance with the social norms? In the case of the Overland Track, the level of encounters with other people or groups reported by visitors was such that immediate management intervention is required to ensure the quality of the visitor experience is not further diminished, and is ultimately brought back to an acceptable standard. Therefore, it will be necessary to regulate the level and/or pattern of use to achieve and maintain the quality of the Overland Track visitor experience. Continued 'hands-off' management will allow growth in the level of use to continue unabated, and as a consequence the levels of encounters experienced by visitors is likely to increase. As a result, the changing nature of the recreation opportunity afforded by the Overland Track has the potential to promote a pattern of visitor displacement and succession where 'individuals dissatisfied with crowding or resource impacts ... move to other sites ... [only to] be replaced by individuals who are more tolerant' of such conditions (Shelby, Bregenzer *et al.* 1988: 275).

In contrast, the social conditions reported by Western Arthurs visitors indicated that they were within the standards acceptable to 50% of visitors. Therefore, if standards were defined at those same levels, there is no need to implement use limits at this time to manage the level of encounters with other visitors either along the track or at the campsites along the Range. However, it may be desirable to assess whether it might be possible to manage to meet the standards prescribed by 75% of the visitors.

From visitors' responses it is clear that the majority (89.8% - 93.8%) of them consider use limits to be an appropriate management tool to regulate the number of people visiting the study sites. Approximately half the Overland Track (50.6%) and Western Arthurs (50.0%) visitors supported the introduction of use limits to either hold use at current levels or to reduce it. These results suggest that if a clearly defined set of objectives and limits of acceptable change standards can be identified and accepted, by both the PWS and other stakeholders, a transparent mechanism for managing the quality of the recreation settings and the natural and cultural values visitors come to enjoy can be established. Thus, the majority of visitors are likely to accept the regulation of use should it become necessary to mitigate breaches of those standards.

I have been successful in achieving the aim of the study, but a number of critical questions that stem from it remain to be considered. First, with what precision can the PWS manage the condition of the social indicators discussed? While some latitude can be built into the expression of standards, through the incorporation of probabilities, are the differences between the social norms for the Overland Track and the Western Arthurs meaningful in the context of the capacity of the PWS to influence their condition? This connection between theory and practice remains a largely unexplored but vital area of research in determining whether the differences between the social norms for one area and another are of practical significance or of statistical significance only.

Second, while there are differences between the social norms for the Overland Track and the Western Arthurs, can they be generalised to other walking tracks of like classification and zoning? For example, are the social norms identified for the Western Arthurs, which is a T3 class track in the Self-Reliant Recreation Zone in the TWWHA, the same as those of other T3 tracks in that zone?

Finally, neither of the evaluative dimensions examined here incorporated trade-offs between desired conditions and the implementation of management actions. While research has found crowding norms based on evaluative dimensions incorporating the consideration of such trade-offs to be "consistently and substantially higher than 'preference' and 'acceptability'-based norms" (Manning 2001: 23-24), little is known, or has been reported, about the prevalence of those norms and/or their validity in terms of the congruence of visitors' reactions to actual conditions. As such, it is difficult to judge what influence the incorporation of trade-offs in the current study may have had on the social norms that have been identified.

In closing, the image of the TWWHA as an unspoilt wilderness is one of Tasmania's greatest attractions, and an invaluable asset to the State's tourism industry and economy. Every year more than a quarter of a million people from interstate and overseas visit the TWWHA and enjoy a range of recreation activities and experience the area's natural and/or cultural values. It is vital then, that the PWS develop strategies that both enhance the quality of visitors' wilderness recreation experiences and protect the area's Word Heritage values. This thesis is intended as a contribution to more informed decision-making with respect to the use and conservation of the Tasmanian Wilderness.

Appendix A. PWS Walking Track Classifications

PWS Track Classification Scheme for overnight walking tracks (Adapted from PWS 1998b)	
T1 Track	
Length	No limit for any tracks of T1 standard or lower.
Width	Min generally 0.5 m, generally at least 0.75 m. Max 1.2 m.
Max gradient	Mostly < 15° but may be steeper in places.
Surfacing/Drainage	"Boot" standard. May be rocky and uneven in places. Some mud and water to 10 cm is acceptable.
Scrub clearance	Mostly clear of scrub across width of track. Some fallen debris and other obstacles may be encountered.
Facilities	Track markers where necessary to ensure that route is obvious except under extreme conditions (eg blizzards, heavy snow).
	Snow poles may be installed on the Overland Track, the Kitchen
	Hut/Horse Track, the Walls of Jerusalem Track between Trappers Hut and the Pool of Bethesda, and the Hartz Peak track between the carpark and Ladies Tarn, but will not be installed on other T1 tracks.
	Bridges (with flat walking surface at least 0.5m wide) to be installed over all major creeks and rivers. Bridges with a walking surface less than 0.5m wide should incorporate a handrail or wire. Stepping stones acceptable; fords acceptable where water is generally less than 10cm deep.
	Monochrome (directional) signposts at start of track and at junctions with tracks of grade T3 or higher. Junctions with T4 tracks may be unsignposted; otherwise signposts should refer to the main (T1) track only.
	Duotone signposts ("cream" lettering on "ironbark" background) acceptable at trailheads.
	Interpretative signs are acceptable in existing structures such as huts.
	Signs may also be installed for management and safety purposes.
	Note: Users should be warned that routefinding and progress on T1 tracks may be difficult under extreme conditions such as blizzards, flooding or heavy snow.
Campsites	Visibly impacted sites for up to 20 tents, preferably dispersed in groups of up to four tents. Enclosed toilets to be provided at sites of more than 10 tents, or where necessary for environmental purposes.
Max usage	5000 per annum.
Max party size	13. (Note: this figure allows for commercially guided tours with ten clients and three guides.)
	Party sizes of less than 6 will be encouraged.
Publicity	No restrictions - may be included in maps, tourist brochures etc.
Routeguides	May be included in routeguides but routeguide authors will be encouraged to consult with the Service to ensure that published information and advice is compatible with management objectives.
Guided tours	Permitted but licences are required and numbers of trips may be restricted.

T2 Track

Width	Min 0.5 m but short sections < 0.5 m acceptable. Max 1 m.
Max gradient	Mostly < 20° but may be steeper in places.
Surfacing/Drainage	"Wet boot" standard. Stabilisation/hardening mainly for environmental purposes but some concessions to user comfort. Surface may be rough and/or muddy over extended sections. Mud up to 20 cm deep acceptable in places.
Scrub clearance	Mostly clear of scrub across width of track. Some fallen debris and other obstacles may be encountered.
Facilities	Track markers where necessary to ensure that route is obvious except under extreme conditions (eg blizzards, heavy snow in nonalpine areas). Snow poles may be installed on the Rufus Circuit, Cradle Mt summit track, Face Track, Twisted Lakes Track (assuming this retains T2 classification), Rodway Track (between Ranger Hut and Scott Kilvert Hut) and the Walls of Jerusalem Track between the Pool of Bethesda and the Dixons Kingdom area, but will not be installed on other T2 tracks. Bridges to be installed over all major creeks and rivers which are not normally safely fordable at a depth of less than 0.5 m. Bridges may also be installed to minimise erosion at creek crossings. Log crossings and cable bridges acceptable; flying foxes or swing bridges acceptable over larger rivers. Some fords may be flood-prone. Monochrome (directional) signposts at start of track and at junctions with tracks of grade T3 or higher. Junctions with T4 tracks may be unsignposted; otherwise signposts should refer to the main (T2) track only. Signs may also be installed for management and safety purposes. Note: Users should be warned that routefinding and progress on T2 tracks may be difficult under extreme conditions such as blizzards, flooding or heavy snow.
Campsites	Visibly impacted sites for up to 12 tents, preferably dispersed in groups of up to four tents. Toilets to be provided at sites of more than 10 tents, or where necessary for environmental purposes.
Max usage	2500 per annum
Max party size	13 (Note: this figure allows for commercially guided tours with ten clients and three guides.) Party sizes of less than 6 will be encouraged.
Publicity	Generally no restrictions, but some types of publicity may be discouraged if overall usage restrictions are necessary.
Routeguides	May be included in routeguides but routeguide authors will be encouraged to consult with the Service to ensure that published information and advice is compatible with management objectives.
Guided tours	Permitted but licences are required and numbers of trips may be restricted.

T3 Track	
Width	No minimum width. Maximum 0.75 m. May include sections of marked route with or without visible pad, eg staked route across moorland.
Max gradient	Limited by environmental considerations only.
Surfacing/Drainage	Minimal - for environmental purposes only.
Scrub clearance	Sufficient to facilitate fairly easy navigation under normal conditions. Fallen debris and other obstacles may be encountered.
Facilities	Track markers where necessary to ensure that route is obvious along most of track, although route may not be obvious in snow. No snow poles.
	Rough log bridges acceptable but not necessary. Flying foxes acceptable over rivers which cannot normally be forded, but some fords may be flood-prone.
	Monochrome (directional) signposts at start of track and at junctions with tracks of grade T3 or higher. Junctions with T4 tracks may be unsignposted; otherwise signposts should refer to the main (T3) track only. Signs may also be installed for management and safety purposes.
Campsites	Visibly impacted sites for up to 8 tents, preferably dispersed in groups of two or three tents. Toilets of minimal design to be provided where necessary for environmental purposes.
Max usage	1000 per annum.
Max party size	8
	Party sizes of less than 6 will be encouraged.
Publicity	Potential publicists (eg magazine editors) will be encouraged to keep publicity low-key. T3 tracks may be included on maps.
Routeguides	Routeguides are acceptable but should be sparsely written – routeguide authors will be encouraged to follow Service guidelines.
Guided tours	Permitted but licences are required and numbers of trips may be restricted. Advertising and publicity should conform to T3 guidelines – see 10.2.3.

T4 Track

Width	No minimum width. Maximum 0.5 m
Max gradient	Limited by environmental considerations only.
Surfacing/Drainage	Minimal - for environmental purposes only.
Scrub clearance	Minimal. As a general rule living woody vegetation will not be cut. Track clearing will generally not be undertaken by the Service but may be undertaken occasionally by volunteer groups with Service authorisation and under Service supervision. Clearance of vegetation will be prohibited on tracks classified (T4, R) and T4*.
Facilities	T4 tracks may be marked but markers should be low-key and tracks may be difficult to follow in places. No snow poles. Track marking will not be permitted on tracks classified (T4, R). No other facilities except where necessary for environmental purposes –eg "fan out" signs.
Campsites	Visibly impacted sites for up to 4 tents. Toilets of minimal design to be provided only where necessary for environmental purposes.
Max usage	250 per annum
Max party size	6 Party sizes of less than four will be encouraged. Parties of up to 8 acceptable on some T4 tracks in the Central Plateau SRRZ, subject to environmental conditions.
Publicity	All publicity to be discouraged. Not to be included on maps except for internal management purposes. Authors will be encouraged to keep route descriptions vague (eg in accounts of past expeditions). Photographers and publishers will be encouraged not to identify the precise location of photographs taken in areas accessible only by T4 tracks.
Routeguides	Inclusion of T4 tracks in routeguides will be strongly discouraged.
Guided tours	Licences may be issued on condition that guided parties conform to the recommended party-size limit and to the guidelines relating to the publicity of tracks and destinations (see 10.2.3).

R Route	
Note:	Applies to all trackless areas regardless of zoning.
Pad formation	Pads or tracks to be kept to an absolute minimum.
Width	Pads or tracks to be < 0.5 m.
Max gradient	No restrictions
Surfacing/Drainage	Minimal - for environmental purposes only.
Scrub clearance	None
Facilities	None except where necessary for environmental purposes - eg track markers to concentrate usage in bottlenecks on alpine traverses. Signs may be installed for essential management purposes .
Campsites	Formation of campsites to be avoided where possible, but visibly impacted sites for up to four tents, preferably at least partially vegetated, to be sanctioned where unavoidable or desirable for environmental purposes. No toilets provided unless essential for environmental purposes.
Max usage	100 per annum for identified major routes. For trackless areas usage limits to be set according to the predicted or measured environmental and social impacts on identified routes in those areas.
Max party size	4 Parties of up to 8 acceptable in some parts of the Central Plateau SRRZ, subject to environmental conditions including pad and track formation.

Appendix B. The PWS Campsite Condition Class System

The PWS Campsite Condition Class System:

consists of several statements, linked to a code, that describe increasing levels of campsite impact. They provide quick and useful, albeit fairly broad, indication of campsite condition. The system comprises five condition classes, which are defined as follows:

1. Campsite may be visually distinguishable but have minimal physical damage. Ground vegetation may be flattened but not permanently injured. Minimal disturbance of organic litter.
2. Campsite obvious. Ground vegetation worn away and/or organic litter pulverised on primary use area (perhaps up to 25% of the site).
3. Ground vegetation lost and/or organic litter pulverised on most of campsite (say 25-75%). Litter may still be present in many areas. Bare soil exposed in primary use areas, but little or no soil erosion.
4. Near total loss of vegetation and/or organic litter. Bare soil obvious and extensive (say >75% of site). Some soil erosion may be apparent (e.g. tree roots exposed on surface).
5. Bare soil or rock over most of campsite and obvious soil erosion (i.e. obvious soil loss, exposure of tree roots, coarse particles or bare rock), perhaps over >25% of site (Dixon 1999a: 14).

Appendix C. The Overland Track Walker Survey questionnaire

The Overland Track
Walker Survey
November 1999/April 2000

UNIVERSITY OF TASMANIA
School of Geography and Environmental Studies

We need your help!

Thank you for taking the time to complete this important survey. Your opinions are valuable. Your individual input will help make the Overland Track a better place for us all to visit.

This is an independent study being conducted by the School of Geography and Environmental Studies at the University of Tasmania.

General instructions

- Do not put your name on this questionnaire.
- Tell us what you think, your response is confidential.

Returning the completed questionnaire

Please return the completed questionnaire in one of the following ways:

- hand it to the researcher
- place it in one of the deposit boxes located:
  - outside New Waterfall Valley Hut; or,
  - at the walker registration points at Waldheim or Dove Lake carparks.
  - at the Cradle Mountain Visitor Centre

If you are mailing back the questionnaire:

- please return it in the post-paid envelope (addressed to Mark Poll, Wilderness Walker Survey, Reply Paid 25278, Hobart, Tas 7001). We would appreciate you returning the questionnaire within two weeks.

For more information contact Mark Poll on (03) 6226 7455 or mpoll@utas.edu.au; or at School of Geography and Environmental Studies, University of Tasmania, GPO Box 252-78 Hobart, Tasmania 7001, Australia.

General questions

Personal details

Q1. **Female** ☐ 1 **Male** ☐ 2

Q2. **Age** ________ years

Q3. **What State, Territory, or Country do you live in?**

1 ☐ ACT
2 ☐ NSW
3 ☐ NT
4 ☐ QLD
5 ☐ SA
6 ☐ Tas
7 ☐ Vic
8 ☐ WA
9 ☐ Other (please specify)

____

Q4 **If you live in Australia, what is your Postcode?** ____________

Previous experience

Q5. **How many overnight bushwalks have you done before this trip?**

1 ☐ None
2 ☐ Less than 6 overnight bushwalks
3 ☐ 6 or more overnight bushwalks

Q6. **<u>In Tasmania</u>, how many overnight bushwalks have you done before this trip?**

________ bushwalks

Q7. **How many times have you walked the Overland Track?**

☐ First time, *go to* Q10.

________ times

Q8. **In what year did you first walk the Overland Track?**

Year ________

Q9. **Prior to this trip, when did you last walk all or part of the Overland Track?**

Month ________ Year ________

Trip information

Q10. **On <u>this visit</u> which route did you take?**

1 ☐ Entire Overland Track – north to south
2 ☐ Entire Overland Track - south to north
3 ☐ Northern section only
4 ☐ Southern section only
5 ☐ Other (please specify)

____

Q11. **Duration of trip** (when completed)?

________ days

Q12. **Number of people in your group** (including yourself)?

________ person/people

Q13. **Type of group?**

1 ☐ Solo (by yourself)
2 ☐ Friends/family
3 ☐ Bushwalking/outdoor activity club
4 ☐ Scout/school group
5 ☐ Armed Forces/Military
6 ☐ Commercially guided – <u>tent based</u>
7 ☐ Commercially guided – <u>private hut</u>
8 ☐ Other, please specify

____

Q14. **On how many days did it rain or snow during your trip?**

________ days

0 ☐ It did not rain or snow

Office use only

Why you visited the Overland Track

Q15. People visit the Overland Track for different reasons. **How important were these reasons to you?** (*Please circle the appropriate number*)

Reasons for visit	not at all important	not very important	somewhat important	moderately important	very important	
To get away from the city	1	2	3	4	5	a
To be able to say 'I walked the Overland Track'	1	2	3	4	5	b
To view the scenery	1	2	3	4	5	c
To be in wilderness	1	2	3	4	5	d
To learn about nature	1	2	3	4	5	e
To observe/encounter wildlife	1	2	3	4	5	f
For physical exercise	1	2	3	4	5	g
For challenge	1	2	3	4	5	h
To camp	1	2	3	4	5	i
To develop my outdoor skills	1	2	3	4	5	j
For solitude	1	2	3	4	5	k
To get away from other people	1	2	3	4	5	l
To spend time with my companion(s)	1	2	3	4	5	m
To meet new people	1	2	3	4	5	n
To gain inspiration	1	2	3	4	5	o
To share an experience and spend time with my family	1	2	3	4	5	p
To enjoy outdoor activities	1	2	3	4	5	q
To be close to nature	1	2	3	4	5	r
To experience peace and tranquillity	1	2	3	4	5	s
To escape restrictions of everyday life	1	2	3	4	5	t
To be stimulated and excited	1	2	3	4	5	u

Please tell us if you had **any other reason for visiting the Overland Track** and indicate how important it/they were to you (as you did above).

Additional reasons for visit?	not very important	somewhat important	moderately important	very important	
______________	2	3	4	5	v
______________	2	3	4	5	w
______________	2	3	4	5	x

Things that affect the quality of your experience

Q16. How **important** are the following items in determining the **quality** of your **EXPERIENCE?** (*Please circle the appropriate number*)

ITEMS	not at all important	slightly important	somewhat important	moderately important	very important	extremely important	
Amount of litter I see	1	2	3	4	5	6	a
Seeing and/or hearing aircraft	1	2	3	4	5	6	b
The presence of wildlife	1	2	3	4	5	6	c
Eroded and/or muddy tracks	1	2	3	4	5	6	d
Damage to vegetation around the campsite	1	2	3	4	5	6	e
Amount of vegetation loss/bare ground at campsites	1	2	3	4	5	6	f
Amount of noise associated with human presence and activity	1	2	3	4	5	6	g
The use of huts for accommodation	1	2	3	4	5	6	h
The number of other <u>people</u> camped overnight at a campsite	1	2	3	4	5	6	i
Number of other <u>people</u> camping within sight or sound of my campsite	1	2	3	4	5	6	j
The size of <u>groups</u> I meet	1	2	3	4	5	6	k
The <u>number of groups</u> I see along the track	1	2	3	4	5	6	l
Amount of time other <u>people</u> are in sight when I'm on the track	1	2	3	4	5	6	m
Total <u>number of people</u> I see along the track	1	2	3	4	5	6	n
On site information about nature, history, and/or management	1	2	3	4	5	6	o
Directional signs and track markers	1	2	3	4	5	6	p

Please tell us if there was **anything else that affected the quality of your EXPERIENCE** and indicate how important these were (as you did above)

OTHER THINGS THAT AFFECTED THE QUALITY OF YOUR EXPERIENCE? (*please write in the spaces below*)	slightly important	somewhat important	moderately important	very important	extremely important	
	2	3	4	5	6	q
	2	3	4	5	6	r
	2	3	4	5	6	s

Walking along the track between campsites and huts

Important note: The questions on this page ask about your experience walking along the track between the campsites and huts.

The number of groups encountered along the track

Q17. How many groups had you *expected* to encounter along the track in a day?

__________ groups per day

98 ☐ Had no expectation

Q18a. What was the most number of groups you encountered along the track in one day?

__________ groups

Q18b. How did this affect your experience?

Greatly enhance.... ☐ 5
Enhance............... ☐ 4
No influence......... ☐ 3
Detract................ ☐ 2
Greatly detract...... ☐ 1

Additional comments: __________

Q18c.

Q19. How many groups would you *prefer* to encounter along the track in a day?

__________ groups

98 ☐ Don't care

Q20. What is the *maximum* number of groups you would accept to encounter per day along the track?

__________ groups

☐ Same as above (Q19.)

98 ☐ Don't care

The size of groups encountered along the track

Q21. What was the largest group you *expected* to encounter along the track?

__________ people in a group

98 ☐ Had no expectation

Q22a. What size was the largest group you encountered along the track?

__________ people in a group

Q22b. How did this affect your experience?

Greatly enhance.... ☐ 5
Enhance............... ☐ 4
No influence......... ☐ 3
Detract................ ☐ 2
Greatly detract...... ☐ 1

Additional comments: __________

Q22c.

Q23. What size groups would you *prefer* to encounter along the track?

__________ people per group

98 ☐ Don't care

Q24. What is the *maximum* size group you would accept to encounter along the track?

__________ people maximum per group

☐ Same as above (Q23.)

98 ☐ Don't care

Walking along the track between campsites and huts

Important note: ***The questions on this page ask about your experience walking along the track <u>between the campsites and huts</u>.***

The number of people encountered along the track

Q25. How many <u>people</u> had you *expected* to encounter <u>along the track</u> in a single day?

__________ people in a day

98 ☐ No expectation

Q26a. What was the greatest number of <u>people</u> you encountered <u>along the track</u> in a day?

__________ people

Q26b. How did this affect your experience?

Greatly enhance.... ☐ 5
Enhance............... ☐ 4
No influence......... ☐ 3
Detract................ ☐ 2
Greatly detract...... ☐ 1

Additional comments: ____

____

____

____

____ Q26c.

Q27. How many <u>people</u> would you *prefer* to encounter <u>along the track</u> in a day?

__________ people per day

98 ☐ Don't care

Q28. What is the *maximum* number of <u>people</u> you would accept to encounter <u>along the track</u> in a day?

__________ people per day maximum

☐ Same as above (Q27.)

98 ☐ Don't care

Aircraft overflights

Q29. What was the maximum number of aircraft you *expected* to see/hear in a day?

__________ aircraft per day

98 ☐ Had no expectation

Q30a. What was the greatest number of aircraft you saw/heard in a day?

__________ aircraft in a day

98 ☐ Didn't notice

Q30b. How did this affect your experience?

Greatly enhance.... ☐ 5
Enhance............... ☐ 4
No influence......... ☐ 3
Detract................ ☐ 2
Greatly detract...... ☐ 1

Q31. How many aircraft would you *prefer* to see/hear per day?

__________ aircraft per day

98 ☐ Don't care

Q32. What is the *maximum* number of aircraft you would accept to see/hear per day?

__________ aircraft per day maximum

☐ Same as above (Q31.)

98 ☐ Don't care

Additional comments: ____________________

____

____

____ Q30c.

Directional signs and track markers

Q33. How many signs/markers did you see?

Please tick one box only.

1 ☐ I saw no signs/markers
2 ☐ I saw very few signs/markers
3 ☐ I saw many signs/markers

Q34. What did you think about the number of signs/markers?

Please tick one box only.

1 ☐ More are needed
2 ☐ The number is about right
3 ☐ There were too many

The number of people walking the Overland Track

Q35. Do you feel a limit is needed on the number of people walking the Overland Track, recognising that your own opportunity to walk the track may be limited in the future?

1 ☐ Never, limits would never be appropriate at any time.
2 ☐ Hold use at current level.
3 ☐ Reduce use.
4 ☐ Support limiting use, but only at a time in the future when/if overuse occurs.

Using the public huts

Q36. Did you make use of the public huts in any way?

Yes ☐ 1 *Go to next question below,* Q37.

No ☐ 2 *Go to next page,* Q41.

Q37. How did you use the public huts in any of the following ways? *Please tick any that apply.*

To shelter from the rain... ☐ 1 Q37a.

To cook and/or eat in...... ☐ 2

To socialise.................... ☐ 3

To sleep in.................... ☐ 4 → **Did you rely on the huts for accommodation?** (ie. you did not carry or have access to a tent.) Yes ☐ 1 Q37b. No ☐ 2

Q38. At times of peak use the huts are often very busy places and this may affect peoples' experiences. For each item below, please circle the number that best describes your experience.

Possible impacts	I did not experience this	Noticed but not bothered	Bothered me a little	Bothered me a lot	
Not having enough space in the huts	1	2	3	4	a
Having to rush in the morning for a place to sleep in the next hut	1	2	3	4	b
Seeing too many people in the huts during evenings	1	2	3	4	c
Some people being loud during the evenings	1	2	3	4	d
Large groups dominating the space in the huts	1	2	3	4	e

Q39. Did you feel crowded at any of the public huts?

Yes ☐ 1 No ☐ 2 *Go to next page,* Q41.

Q40. At which hut did you feel most crowded?
Please tick one box only

Scott-Kilvert Memorial Hut ☐ 1

Waterfall Valley Hut......... ☐ 2

Old Waterfall Valley Hut... ☐ 3

Windermere Hut.............. ☐ 4

Old Pelion Hut................ ☐ 5

New Pelion Hut................ ☐ 6

Kia Ora Hut.................... ☐ 7

Windy Ridge Hut.............. ☐ 8

Pine Valley Hut................ ☐ 9

Narcissus Hut.................. ☐ 10

Echo Point Hut................. ☐ 11

Q40a.

→ Please briefly explain why: ____________

____

____

____

____

____

______________________________ Q40b.

Campsites

Q41. Did you sleep in a tent during your walk?

Yes ☐ 1 *If "Yes", go to next question below, Q42.*

No ☐ 2 *If "No", you have finished the survey. See the front page for details about returning the survey.*

Number of people at a campsite

Q42. What was the maximum number of __people__ not in your group you *expected* to be camped within sight or sound of your campsite?

_________ other people

98 ☐ Had no expectation

Q43a. Not including the people in your group, what was the *maximum* number of __people that camped within sight or sound of your campsite?__

_________ other people

Q43b. How did this affect your experience?

Greatly enhance.... ☐ 5

Enhance............... ☐ 4

No influence......... ☐ 3

Detract................ ☐ 2

Greatly detract...... ☐ 1

Additional comments: _________________

____

____

_________________________________ Q43c.

Q44. How many __people__ not in your group would you *prefer* to be __camped within sight or sound of?__

_________ people

98 ☐ Don't care

Q45. What is the *maximum* __number of people__ not in your group you would accept to be __camped within sight or sound of?__

_________ people maximum

☐ Same as above (Q44.)

98 ☐ Don't care

Group size at campsites

Q46. What was the __largest group__ you *expected* to encounter __at a campsite__?

_________ people in a group

98 ☐ Had no expectation

Q47a. What size was the __largest group__ you encountered?

_________ people in a group

Q47b. How did meeting a __group__ this __size__ affect your experience?

Greatly enhance.... ☐ 5

Enhance............... ☐ 4

No influence......... ☐ 3

Detract................ ☐ 2

Greatly detract...... ☐ 1

Additional comments: _________________

____

____

____

_________________________________ Q47c.

Q48. What __size groups__ would you *prefer*, to encounter __at campsites__?

_________ people in a group

98 ☐ Don't care

Q49. What is the *maximum* __size group__ you would accept to encounter __at a campsite__?

_________ people maximum per group

☐ Same as above (Q48.)

98 ☐ Don't care

Impact at campsites

An unavoidable consequence of recreation use is the impact it has on the environment. It is important for managers to know what visitors think about these impacts.

Q50. Different levels of impact can be seen at campsites along the Overland Track. Please tell us which of the campsite conditions, described below, you find *acceptable* or *unacceptable* along the Overland Track by placing a tick in the appropriate box.

Campsite condition descriptions	Answer here	
Campsite condition 1. It is evident that people have camped here before but there is minimal damage. Some of the ground vegetation is flattened. There has been minimal disturbance of the sticks and leaves on the ground.	**I find the conditions at Campsite 1** Acceptable ☐ 1 Unacceptable ☐ 2	a
Campsite condition 2. An obvious campsite. In the main use area (25% of the site), ground vegetation is worn away and the sticks and leaves on the ground have been trampled into small fine pieces. Little or no soil is exposed.	**I find the conditions at Campsite 2** Acceptable ☐ 1 Unacceptable ☐ 2	b
Campsite condition 3. Ground vegetation has been lost and the sticks and leaves on the ground have been trampled into small fine pieces on most of the campsite (say between 25 – 75%). Bare soil is exposed in main use areas, but there is little or no soil erosion.	**I find the conditions at Campsite 3** Acceptable ☐ 1 Unacceptable ☐ 2	c
Campsite condition 4. Near total loss of vegetation and bare soil covers more than 75% of the campsite. Soil erosion has exposed tree roots in some areas (less than 25% of the campsite).	**I find the conditions at Campsite 4** Acceptable ☐ 1 Unacceptable ☐ 2	d
Campsite condition 5. Bare soil or rock covers most of the site. Soil erosion is obvious. Soil loss has exposed tree roots, stones or bare rock on 25% or more of the campsite.	**I find the conditions at Campsite 5** Acceptable ☐ 1 Unacceptable ☐ 2	e

Thank you very much for completing the survey.
See the front page for instructions on "returning the completed questionnaire".

Appendix D. Western Arthur Range Walker Survey self-registration instruction sheet

Western Arthur Range

Walker Survey

UNIVERSITY OF TASMANIA

School of Geography and Environmental Studies

Attention
Western Arthur Range walkers
Your help is needed!

- All walkers undertaking an overnight walk in the Western Arthur Range are asked to participate in the 1999/2000 Western Arthur Range Walker Survey.
- Fill out a registration slip and have your say.

Your opinions are valuable.

All information is strictly confidential!

GPO Box 252-78 Hobart, Tasmania 7001 Australia. Telephone (03) 6226 7455 Facsimile (03) 6226 2989 Email: mpoll@utas.edu.au

Appendix E. Western Arthur Range Walker Survey self-registration form

Western Arthur Range

Walker Survey

Your participation is important!

UNIVERSITY OF TASMANIA

School of Geography and Environmental Studies

To participate in this study please provide the following details and place the completed form in the box provided. All information is strictly confidential!

Name: ____________________

Postal address: ____________________ *number and street*

____________________ *suburb*

____________________ *state*

____________________ *postcode*

____________________ *country*

Thank you for participating!

Appendix F. Western Arthur Range Walker Survey cover letter

Western Arthur Range

Walker Survey

UNIVERSITY OF TASMANIA
School of Geography and Environmental Studies

8 March 2000

Dear

On your recent bushwalking trip in the Western Arthur Range, in the Tasmanian Wilderness World Heritage Area, you indicated your interest in taking part in the Western Arthur Range Walker Survey. Recently a questionnaire seeking your opinion about the factors that affect the quality of your bushwalking experience was mailed to you. As of today we have not received your completed questionnaire.

We have undertaken this study with the belief that bushwalkers opinions are vital to the informed management of natural areas such as the Western Arthur Range.

You have the rare opportunity to have your say. The information you provide is essential to ensure the study results accurately represent the opinions of bushwalkers that visited the Western Arthur Range between November 1999 and April 2000.

If you have already completed and returned the questionnaire, please accept our sincere thanks. If not, please do so today.

Once you have completed the questionnaire, simply place it in the addressed Reply Paid envelope provided and mail it to:

Mark Poll
Wilderness Walker Survey
Reply Paid 25278
Hobart Tas 7001

Your cooperation is greatly appreciated.

Yours sincerely,

Mark J. Poll

For further information about this project please contact:

Dr Elaine Stratford (Chief Investigator), School of Geography and Environmental Studies, University of Tasmania. Phone (03) 6226 2462 Email: Elaine.Stratford@utas.edu.au

Mark J. Poll (PhD candidate), School of Geography and Environmental Studies, University of Tasmania. Phone (03) 6226 7455 Email: mpoll@utas.edu.au

Appendix G. Western Arthur Range Walker Survey first follow-up letter

Western Arthur Range

Walker Survey

UNIVERSITY OF TASMANIA
School of Geography and Environmental Studies

Thank you for registering your interest in taking part in this important survey during your recent visit to the Western Arthur Range, in the Tasmanian Wilderness World Heritage Area.

We would appreciate it greatly if you would complete and return the questionnaire within two weeks. Once you have completed the questionnaire, simply place it in the addressed Reply Paid envelope provided and mail it to:

Mark Poll
Wilderness Walker Survey
Reply Paid 25278
Hobart Tas 7001

Thank you!

For further information about this project please contact:

Dr Elaine Stratford (Chief Investigator), School of Geography and Environmental Studies, University of Tasmania. Phone (03) 6226 2462 Email: Elaine.Stratford@utas.edu.au

Mark J. Poll (PhD candidate), School of Geography and Environmental Studies, University of Tasmania. Phone (03) 6226 7455 Email: mpoll@utas.edu.au

Appendix H. Western Arthur Range Walker Survey second follow-up letter

Western Arthur Range
Walker Survey

UNIVERSITY OF TASMANIA
School of Geography and Environmental Studies

Recently a questionnaire seeking your opinion about the factors that affect the quality of your bushwalking experience was mailed to you. If you have already completed and returned it to us please accept our sincere thanks. If not, **we would appreciate it greatly if you would complete and return the enclosed questionnaire within two weeks.**

Your input is vital in ensuring the study results accurately represent the opinions of bushwalkers visiting the Western Arthur Range.

Once you have completed the questionnaire, simply place it in the addressed Reply Paid envelope provided and mail it to:

Mark Poll
Wilderness Walker Survey
Reply Paid 25278
Hobart Tas 7001

Thank you!

For further information about this project please contact:

Dr Elaine Stratford (Chief Investigator), School of Geography and Environmental Studies, University of Tasmania. Phone (03) 6226 2462 Email: Elaine.Stratford@utas.edu.au

Mark J. Poll (PhD candidate), School of Geography and Environmental Studies, University of Tasmania. Phone (03) 6226 7455 Email: mpoll@utas.edu.au

Appendix I. The Overland Track Walker Survey: additional comments

This Appendix provides details of the additional comments visitors provided to explain the impact of the encounters they experienced while on the Overland Track, in the Cradle Mountain – Lake St Clair National Park.

I.1 The number of groups visitors encountered along the track in a day

Forty-six visitors reported that the number of groups they encountered along the track in a day had detracted from the quality of their experiences despite not having had their personal norms exceeded. Eleven of these visitors provided additional comments that give some explanation for their incongruent reactions. These comments are outlined in Table I.1.

Table I.1 Additional comments provided by Overland Track Walker Survey respondents who did not encounter more groups along the track in a day than their personal norm but stated it had detracted from the quality of their experience

Comment	Frequency
'Large groups.'	1
'Quality not quantity – attitude and behaviour greater influence.'	1
'Worried about the implications for hut space.'	1
'Too many large school groups.'	1
'Large family group very noisy and distracting.'	1
'Prefer to be alone.'	1
'Everyone pleasant, but sometimes you'd rather be alone.'	1
'OK if groups spread out a little.'	1
'Felt that groups denied the principle of the track.'	1
'Who would pay $1500 for this, They're crazy and should just go and camp in their backyards (not a real experience?).'	1
'Like a highway.'	1

Eighty-two visitors encountered more groups than their personal norm but said the experience either had no influence or enhanced the quality of their experience. Thirteen of these visitors provided additional explanatory comments for their incongruent reactions (Table I.2).

Table I.2 Additional comments provided by Overland Track Walker Survey respondents who encountered more groups along the track in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Exchange info on tracks and huts.'	1
'Friendly and helpful. Also considerate.'	1
'Enhanced when not too many (more would detract).'	1
'Talk to and share experience, socialise.'	1
'Depends on group size.'	1
'No. of encounters decreased after first day.'	1
'Walking north – south, only brief encounters not noticed so much.'	1
'Not as crowded as I thought it might be.'	1
'Everyone should have the opportunity to visit the Overland Track.'	1
'Enjoyed meeting other people.'	1
'It was good to see people along the way, and even the same people. But would have enjoyed the experience with or without them.'	1
'Nature of the walk lend itself to lots of people.'	1
'Expected to see a lot during Easter.'	1

I.2 The largest size group encountered along the track

Thirty-two visitors did not have their personal norms exceeded but still said that the experience had detracted from the quality of their experience. Just seven of those visitors provided additional comments that gave an insight into their incongruent reactions (Table I.3).

Table I.3 Additional comments provided by Overland Track Walker Survey respondents who did not encounter a group larger than their personal norm along the track but stated that it had detracted from the quality of their experience

Comment	Frequency
'Large groups.'	1
'Large groups overbearing.'	1
'Larger groups seem very noisy.'	1
'Concentrated impact by one large group.'	1
'Commercial group.'	1
'Worried about the implications for hut space.'	2

Overall, 134 visitors encountered groups larger than their personal norm but said the experience either had no influence or enhanced the quality of their experience. Twelve of these visitors provided additional explanatory comments for their incongruent reactions (Table I.4).

Table I.4 Additional comments provided by Overland Track Walker Survey respondents who encountered a group larger than their personal norms but either stated it had no influence or enhanced the quality of their experience

Comment	Frequency
'Exchange info on huts and tracks.'	1
'Friendly and helpful people. Also considerate.'	1
'Talk to and share experience, and socialise.'	1
'Sometimes talking to [other] groups on track enhanced, but detracted at camp.'	1
'Quality and quantity – experience also affected by behaviour and attitude.'	1
'Well equipped and prepared.'	1
'OK encountering along the track but bothersome at campsites and huts.'	1
'Can avoid by going faster or slower.'	1
'Family group'	1
'We just waited patiently till they passed.'	1
'Scout group well spread out.'	1
'One group of 5-6 people doesn't matter, but 5-6 groups of 5-6 people does.'	1

I.3 Number of people encountered along the track in a day

Five of the 31 visitors who didn't have their personal norms exceeded but still said it detracted from the quality of their experience provided additional comments that give some explanation for their incongruent reactions. These comments are outlined in Table I.5.

Table I.5 Additional comments provided by Overland Track Walker Survey respondents who did not encounter more people along the track in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Like a highway.'	1
'Quality not quantity – behaviour and attitude greater influence.'	1
'Saw most people when climbing peaks – to and from points of interest.'	1
'Ok if not too many.'	1
'OK when spread out, big groups, particularly slow ones, eg. Cradle Huts [commercial groups] do detract.'	1

Some 114 visitors encountered more people than their personal norm but said the experience either had no influence or enhanced the quality of their experience. Eleven of these visitors provided additional explanatory comments for their incongruent reactions (Table I.6).

Table I.6 Additional comments provided by Overland Track Walker Survey respondents who encountered more people along the track in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Exchange of info on tracks and huts.'	1
'Shared values and beliefs.'	1
'Once off, so fine.'	1
'Expected more.'	1
'Nice enough people, polite and friendly.'	1
'Depends on noise level.'	1
'The more people visit, the more likely it [the environment] will be looked after.'	1
'Nice to say g'day to others.'	1
'Enjoyed meeting other people.'	1
'As long as they are moving in opposite direction.'	1
'Easter [holiday]'	1

I.4 Number of aircraft encountered in a day

Overall, 61 visitors stated that the number of aircraft they saw or heard had detracted from the quality of their experience despite not having their personal norms. Of these visitors, seven provided an additional comment that gives an explanation for their incongruent reactions (Table I.7).

Table I.7 Additional comments provided by Overland Track Walker Survey respondents who did not see or hear more aircraft in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Disturbed the peacefulness of the environment.'	1
'Only in emergency.'	1
'Make the airforce practice somewhere else.'	1
'Pretty light aircraft traffic [compared] to other areas I [have] hiked.'	1
'Detracted from the wilderness feel and relative isolation.'	1
'Experience in Alaska leads me to believe aircraft is the greatest detractor in wilderness.'	1
'I find the tourist aircraft quite revolting. It has really spoilt the magic of NT [Northern Territory] and Kimberleys.'	1

Some 108 visitors saw and or heard more aircraft than their personal norm but said the encounters either had no influence or enhanced the quality of their experience. Eleven of these visitors provided additional explanatory comments for their incongruent reactions (Table I.8).

Table I.8 Additional comments provided by Overland Track Walker Survey respondents who saw of heard more aircraft in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Emergencies OK.'	1
'Trackwork and materials – heli[copter] lifts.'	3
'Track maintenance is essential, as such helicopters expected in summer.'	1
'Depends on aircraft's purpose.'	1
'Depends on if it is necessary.'	1
'Prefer them off to one side than directly overhead.'	1
'Low level intrusive, high OK. A few small/quiet and low level also OK.'	1
'Maintenance helicopter.'	1
'Important to see them (helicopters) so if you are in trouble they can come and save you.'	1

I.5 Number of people camped within sight or sound

Thirty-four respondents stated that the number of people camped within sight or sound of their campsite had detracted from the quality of their experience, despite not having their personal norms exceeded. Of these visitors, 10 provided additional comments that provide some explanation for their incongruent reactions. These comments are outlined in Table I.9.

Table I.9 Additional comments provided by Overland Track Walker Survey respondents who did not see or hear more aircraft in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Noisy and loud.'	2
'I prefer being with those I come with; but no, that isn't always possible.''	1
'I could have camped elsewhere.'	1
'Always sought to select a campsite away from others.'	1
'Some conversations can be enjoyable but I felt inhibited in my activity at times, eg. Playing my bamboo flute.'	1
'Sometimes distressing to see so many people.'	1
'In such a mossy environment human impact was obvious.'	1
'Lack of serenity.'	1
'Nota major problem, most of the people in tents were quiet.'	1

Some 85 visitors encountered more people camped within sight or sound of their campsite than their personal norm but said the experience either had no influence or enhanced the quality of their experience. Of these visitors, only six provided an additional explanatory comment for their incongruent reactions (Table I.10).

Table I.10 Additional comments provided by Overland Track Walker Survey respondents who saw of heard more aircraft in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Good to talk with and gain their experience.'	1
'Camaraderie'	1
'Windermere – Large camping areas.'	1
'I prefer to see no one but realise that this cannot be achieved without establishing new areas.'	1
'At New Pelion Hut'.	1
'Generally well set out except Windy Ridge.'	1

I.6 The maximum size group at campsites

Twenty-five visitors didn't have their personal norms exceeded but still said it detracted from the quality of their experience. Of these visitors, nine provided additional comments that provide some explanation for their incongruent reactions. These comments are outlined in Table I.11.

Table I.11 Additional comments provided by Overland Track Walker Survey respondents who did not encounter a group at a campsite larger than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Large noisy group.'	1
'Noisy and loud.'	3
'They take up too much room and make too much noise.'	1
'Lack of space.'	1
'They were a really quiet group.'	1
'Slight detraction because we prefer solitude, but we still had a most pleasant position.'	1
'With large camping groups who chose to camp on separate sites it can be difficult for remaining hikers to find open [vacant] sites.'	1

Seventy-five visitors encountered a group larger than their personal norms but said the encounters either had no influence or enhanced the quality of their experience. Four of these visitors provided additional explanatory comments for their incongruent reactions (Table I.12).

Table I.12 Additional comments provided by Overland Track Walker Survey respondents who encountered a group at a campsite larger than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'It is to be expected at Waterfall and Narcissus Huts.'	1
'Family and friendly.'	1
'Depends on noise level and ability to find a suitable camping spot.'	1
'They monopolised the huts a little, but whatever.'	1

Appendix J. The Western Arthur Range Walker Survey: additional comments

This Appendix provides details of the additional comments of visitors provided to explain the impact of the encounters they experienced while on the Western Arthur Range, Southwest National Park.

J.1 Number of groups encountered along the track in a day

Six of the twelve visitors who didn't have their personal norms exceeded but still said it detracted from the quality of their experience provided additional comments that provide some explanation for their incongruent reactions. These comments are outlined in Table J.1.

Table J.1 Additional comments provided by Western Arthur Range Walker Survey respondents who did not encounter more groups along the track in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Noisy/loud behaviour'	1
'Encountering such a number diminished the experience of solitude and wilderness'	2
'Told of very large parties on the track (10-12 [persons])'	1
'Walking solo – would have liked to have seen more'	1
'Same people all trip doing the same route'	1

Fourteen visitors encountered more groups than their evaluative standard but said the experience either had no influence or enhanced the quality of their experience. Five of these visitors provided additional explanatory comments for their incongruent reactions (Table J.2).

Table J.2 Additional comments provided by Western Arthur Range Walker Survey respondents who encountered more groups along the track in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Shared beliefs and values'	1
'Small groups'	1
'Depends on the situation, generally the less the better'	1
'We gained info about the track ahead, conditions, walking time'	1
They were the 'only people we encountered all day'	1

J.2 Largest size group encountered along the track

Four visitors did not have their personal norms exceeded but still said it detracted from the quality of their experience. None of them provided additional comments.

Twelve visitors encountered groups larger than their evaluative standard but said the experience either had no influence or enhanced the quality of their experience. Six of these visitors provided additional explanatory comments for their incongruent reactions (Table J.3).

Table J.3 Additional comments provided by Western Arthur Range Walker Survey respondents who encountered a group larger than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Exchanged info on track ahead'	1
'Interesting people, good to talk with'	1
'Last day so didn't care'	1
'Didn't have to camp with them'	2
'Smaller groups are better'	1

J.3 Number of people encountered along the track in a day

Four of the six visitors who didn't have their personal norms exceeded but still said it detracted from the quality of their experience provided additional comments that provide some explanation for their incongruent reactions. These comments are outlined in Table J.4.

Table J.4 Additional comments provided by Western Arthur Range Walker Survey respondents who did not encounter more people along the track in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Moraine A was the busiest and most impacted section'	1
'Walking solo – would have liked to have seen more [people]'	1
'All in one large group'	1
'All encountered on the last day [near the track head], not much in common. We were finishing after 10 days, they were starting'	1

Twelve visitors encountered more people than their evaluative standard but said the experience either had no influence or enhanced the quality of their experience. Five of these visitors provided additional explanatory comments for their incongruent reactions (Table J.5).

Table J.5 Additional comments provided by Western Arthur Range Walker Survey respondents who encountered more people along the track in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'Good conversation with others enhances'	2
'Last day so didn't care'	1
'Brief encounter – going in opposite direction'	1
'PWS trackies[1]'	1

J.4 Number of aircraft encountered in a day

Twenty-three visitors stated that the number of aircraft they saw or heard had detracted from the quality of their experience despite not having exceeded their personal norms. Of these visitors, only four provided any additional comments (Table J.6).

Table J.6 Additional comments provided by Western Arthur Range Walker Survey respondents who did not see or hear more aircraft in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Flights spread throughout the day'	1
'Four planes in 1½ hours a bit much'	1
'A pleasing surprise to see few airline trails'	1
'Not a great concern as long as they don't get too low or too close. Other people have a right to see the Arthurs too.'	1

The first two comments in Table J.6 reveal how spacing of the overflights throughout the day had a negative impact on the experiences of two respondents. The second two comments quoted in Table J.6 show two instances where encountering more aircraft than preferred can detract from the quality of visitors experiences despite not having exceeded their maximum acceptable limits. In these cases, the overflights encountered by respondents detracted from their experiences even though one respondent was pleased that they saw few high altitude vapour trails, and another felt that overflights are a legitimate way to experience the Western Arthur Range

Eight visitors saw and or heard more aircraft than their evaluative standard but said the encounters either had no influence or enhanced the quality of their experience. Only two of

[1] *Trackies* is a term commonly used to describe PWS workers involved in the maintenance and construction of walking tracks.

these visitors provided additional explanatory comments for their incongruent reactions (Table J.7).

Table J.7 Additional comments provided by Western Arthur Range Walker Survey respondents who saw of heard more aircraft in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'PWS heli[copter]-lift trackwork'	1
'Flights were distant'	1

J.5 Number of people camped within sight or sound

Twenty-one stated that the number of people camped within sight or sound of their campsite had detracted from the quality of their experience, despite not having their personal norms exceeded. Of these visitors, eight provided additional comments that provide some explanation for their incongruent reactions. These comments are outlined in Table J.8.

Table J.8 Additional comments provided by Western Arthur Range Walker Survey respondents who did not see or hear more aircraft in a day than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Noisy/loud behaviour.'	3
'Big party [carousing].'	1
'Sites too close together. Lack of co-campers at other campsites enhanced.'	1
'One [person] gave me the shits, the others were fine.'	1
'Not following MIB.'	1
'Walking solo. Liked to have met more [people].'	1

Eight visitors encountered more people camped within sight or sound of their campsite than their evaluative standard but said the experience either had no influence or enhanced the quality of their experience. Of these visitors, only one provided an additional explanatory comment for their incongruent reactions (Table J.9).

Table J.9 Additional comments provided by Western Arthur Range Walker Survey respondents who saw of heard more aircraft in a day than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'People interesting to talk to. Good company.'	1

J.6 The size of groups at campsites

Eleven visitors didn't have their personal norms exceeded but still said it detracted from the quality of their experience. Of these visitors, two provided additional comments that provide some explanation for their incongruent reactions. These comments are outlined in Table J.10.

Table J.10 Additional comments provided by Western Arthur Range Walker Survey respondents who did not encounter a group at a campsite larger than their personal norms but stated it had detracted from the quality of their experience

Comment	Frequency
'Groups ignored signs [and] camped beside lakes and walked in revegetation areas.	1
'Would've been nice to camp with another person - [rather than] on my own.'	1

Five visitors encountered a group larger than their personal norms but said the encounters either had no influence or enhanced the quality of their experience. One of these visitors provided additional explanatory comments for their incongruent reactions (Table J.11).

Table J.11 Additional comments provided by Western Arthur Range Walker Survey respondents who encountered a group at a campsite larger than their personal norms but stated it either had no influence or enhanced the quality of their experience

Comment	Frequency
'They kept to themselves.'	1

References

ABM 1972. *Climatic survey, Midland: Region 4, Tasmania.* AGPS, Canberra.

ABM 1993. *Climate of Tasmania.* AGPS, Canberra.

ABM 1999a. *Climate averages: Cradle Valley (Waldheim).* http://www.bom.gov.au/climate/averages/tables/cw_096005.shtml [Accessed 25th August 1999].

ABM 1999b. *Climate averages: Lake St Clair.* http://www.bom.gov.au/climate/averages/tables/cw_096015.shtml [Accessed 25th August 1999].

Absher, J. 1994. Beyond carrying capacity. *Ranger* (Spring): 30-32.

Absher, J. & Lee, R. 1981. Density as an incomplete cause of crowding in backcountry settings. *Leisure Sciences*, 4: 231-247.

Alldredge, R. 1973. Some capacity theory for parks and recreation areas. *Trends*, 10 (Oct-Dec): 20-30.

Allnut, P. 1983. Federation Peak - Ascents in 31 years. *The Tasmanian Tramp*, 24: 73-81.

Allnut, P. 1987. History of huts along the Overland Track. *The Tasmanian Tramp*, 26: 121-128.

Angus, M., ed. 1975. *The world of Olegas Truchanas.* Olegas Truchanas Publication Committee, Hobart.

Ashor, J. 1986. Criteria and guidelines for using the transactive planning approach in wilderness management planning. In: Lucas, R. comp. *Proceedings - National Wilderness Research Conference: current research, July 23-26, 1985, Fort Collins, Colorado.* General Technical Report INT-212. USDA Forest Service, Intermountain Research Station, Ogden, UT: 550-552.

Ashor, J., McCool, S. & Stokes, G. 1986. Improving wilderness planning efforts: Application of the transactive planning approach. In: Lucas, R. comp. *Proceedings - National Wilderness Research Conference: current research, July 23-26, 1985, Fort Collins, Colorado.* General Technical Report INT-212. USDA Forest Service, Intermountain Research Station, Ogden, UT: 424-431.

Attwater, C. 1998a. *Overnight walker permit system for the Tasmanian Wilderness World Heritage Area.* Final report, December 1998. C. Attwater & V. Thorp, Bellerive, Tasmania.

Attwater, C. 1998b. *Overnight walking permit system workshop information package.* C. Attwater & V. Thorp, Bellerive, Tasmania.

Attwater, C. 1998c. *Proposed overnight walker permit system for the Tasmanian Wilderness World Heritage Area.* Draft report for review, June 1998. C. Attwater & V. Thorp, Bellerive, Tasmania.

Austin, J. 1995. *Visitor Experience and Resource Protection - Lessons. Volume 2. Social science technical issues.* United States Department of Interior, National Park Service, Denver Service Center, Denver, CO.

Babbie, E. 1990. *Survey research methods.* Wadsworth Publishing, Belmont, CA.

Beard, J. & Ragheb, M. 1980. Measuring leisure satisfaction. *Journal of Leisure Research*, 12: 20-33.

Bergman, G. 1959. *Gustav Weindorfer of Cradle Mountain.* Mercury Press Pty Ltd, Hobart, Tasmania.

Biddle, B. 1986. Recent developments in role theory. *Annual Review of Sociology*, 12: 67-92.

Birch, W. 1981. The ecology of metaphors - Spacing regularities for humans and other primates in urban and wildland habitats. *Leisure Sciences*, 4: 213-230.

Blumer, H. 1936. Social attitudes and nonsymbolic interaction. *Journal of Educational Sociology*, 9: 515-523.

Booth, K., Jones, N. & Devlin, P. 1997. *The effects of overflights on recreationists in natural settings.* Department of Human and Leisure Sciences, Lincoln University, Canterbury, New Zealand.

Brake, R. 1996. *User regulation in the Tasmanian Wilderness World Heritage Area: a report on walking permit systems and their application in Tasmania (Draft).* Parks and Wildlife Service, Hobart.

Brearley, A. 1933. Cradle Mountain- Lake St Clair: Christmas - New Year, 1932-33. *The Tasmanian Tramp*, 2: 5-16.

Brehm, J. & Cohen, A. 1962. Expectations and inequity: a dissonance approach. *Explorations in cognitive dissonance.* John Wiley and Sons, New York: 178-187.

Brown, M. , Hoggins, D. & Bayly-Stark, H. 1977. *Conservation of Flora in Tasmania, Wildlife Division Technical Report 77/4.* National Parks and Wildlife Service, Hobart.

Brown, P., Driver, B., Burns, D. & McConnell, C. 1979. The outdoor recreation opportunity spectrum in wildland recreation planning: development and application. In: *First annual national conference on recreation planning and development: proceedings of the specialty conference, Washington DC, Volume 2.* Society of Civil Engineers, Washington DC: 1-12.

Brown, P., Driver, B. & McConnell, C. 1978. The recreation opportunity spectrum concept and behavioral information in outdoor recreation resource supply inventories: background and application. In: Lund, H., LaBau, V., Ffolliott, P. & Robinson, D. eds. *Integrated inventories of renewable natural resources: Proceedings of the workshop. January 8-12, 1978. Tucson, Arizona.* General Technical Report RM-55. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO: 73-84.

Brunson, M., Shelby, B. & Goodwin, J. 1992. Matching impacts with standards in the design of wilderness permit systems. In: Shindler, B. comp. *Defining wilderness quality: the role of standards in wilderness management - a workshop proceedings, April 10-11, 1990, Fort Collins, Colorado.* General Technical Report PNW-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 101-106.

Bultena, G. & Klessig, L. 1969. Satisfaction in camping: a conceptualization and guide to social research. *Journal of Leisure Research*, 1: 395-409.

Burch, W. & Wenger, W. 1967. *The social characteristics of participants in three styles of family camping.* Research Paper PNW-48. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Burns, R., Graefe, A. & Titre, J. 1998. Customer satisfaction at US Army Corps of Engineers administered lakes: A compilation of two years performance data. In: *Proceedings of the Northeastern Recreation Research Symposium, April 6-8, 1997, Bolton Landing, New York.* General Technical Report NE-24. USDA Forest Service, Northeastern Forest Experiment Station, Radnor, PA: 12-13.

Calais, S. 1981. *Analysis of visitor impact on the environments of the Cradle Mountain - Lake St Clair National Park and implications for recreational management.* Unpublished MA Science thesis. Department of Geography, University of Tasmania, Hobart.

Calais, S. & Kirkpatrick, J. 1986. Impact of trampling on natural ecosystems in the Cradle Mountain - Lake St Clair National Park. *Australian Geographer*, 17: 6-15.

Carhart, A. 1961. *Planning for America's wildlands*. The Telegraph Press, Harrisburg, PA.

Carlington, B. 1988. *Franklin river rafters and other Western Tasmanian Wilderness Parks users: their characteristics, experiences and attitudes as inputs to management*. Unpublished Ph.D. thesis. Centre for Environmental Studies, University of Tasmania, Hobart.

Chapman, J. 1998. *South West Tasmania*. 4th, John Chapman, Melbourne.

Chapman, J. & Siseman, J. 1998. *Cradle Mountain, Lake St Clair and Walls of Jerusalem National Parks*. Pindari Publications, Blackburn, Victoria.

Clark, R., Hendee, J. & Campbell, F. 1971. Values, behavior, and conflict in modern camping culture. *Journal of Leisure Research*, 3: 143-159.

Clark, R. & Stankey, G. 1979a. Determining the acceptability of recreational impacts: an application of the outdoor Recreation Opportunity Spectrum. In: Ittner, R., Potter, D., Agee, J. & Anschell, S. eds. *Recreational impact on wildlands conference proceedings,* October 27-29, 1978, *Seattle, Washington.* No. R-6-001-1979. United States Forest Service and National Parks Service, Pacific Northwest Regions, Seattle, WA: 32-43.

Clark, R. & Stankey, G. 1979b. *The Recreation Opportunity Spectrum: A framework for planning, management, and research.* General Technical Report PNW-98. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Cole, D. 1983. *Monitoring the condition of wilderness campsites.* Research Paper INT-302. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Cole, D. 1985. *Recreational trampling effects on six habitat types in western Montana.* Research Paper INT-350. USDA Forest Service Intermountain Research Station, Ogden, UT.

Cole, D. 1989. *Wilderness campsite monitoring methods: a sourcebook.* General Technical Report INT-259. USDA Forest Service Intermountain Research Station, Ogden, UT.

Cole, D. 2001. Visitor use density and wilderness experiences: A historical review. In: Freimund, W. & Cole, D. comps. *Visitor use density and wilderness experience: proceedings, June 1-3, 2000, Missoula, Montana.* RMRS-P-20. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 11-20.

Cole, D. & McCool, S. 1997. The Limits of Acceptable Change process: modifications and clarifications. In: McCool S. & Cole, D. comps. *Proceedings - Limits of Acceptable Change and related planning processes: progress and future directions, May 20-22, 1997, Missoula, Montana*. General Technical Report INT-371. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 61-68.

Cole, D., Peterson, M. & Lucas, R. 1987. *Managing wilderness recreation use: common problems and potential solutions.* General Technical Report INT-230. USDA Forest Service, Intermountain Research Station, Ogden, UT.

Cole, D. & Schreiner, E. 1981. *Impacts of backcountry recreation: site management and rehabilitation - An annotated bibliography.* General Technical Report INT-121. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Cole, D. & Stankey, G. 1985. Role of research in applying the limits of acceptable change system. In: Watson, A. ed. *Proceedings: Southeastern recreation research conference, February 28 - March 1, 1985, Myrtle Beach, South Carolina.* Georgia Southern College, Department of Recreation and Leisure Services, Statesboro, GA: 1-15.

Cole, D. & Stankey, G. 1997. Historical development of Limits of Acceptable Change: conceptual clarifications and possible extensions. In: McCool S. & Cole, D. comps. *Proceedings - Limits of Acceptable Change and related planning processes: progress and future directions, May 20-22, 1997, Missoula, Montana.* General Technical Report INT-371. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 5-9.

Collins, K. 1990. *South-West Tasmania: A natural history and visitor's guide.* Heritage Books, Hobart.

Connelly, N. 1987. Critical factors and their threshold for camper satisfaction at two campgrounds. *Journal of Leisure Research*, 19: 159-173.

Cortina, J. 1993. What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78: 98-104.

Crandall, R. 1980. Motivations for leisure. *Journal of Leisure Research*, 12: 45-54.

Crovelli, R. 1973. *Principles of statistics and probability.* Prince, Weber, & Schmidt, Inc., Boston, MA.

Dana, S. 1957. *Problem analysis: Research in forest recreation.* USDA, Washington D.C.

Dasmann, R. 1964. *Wildlife Biology.* Wiley & Sons, New York.

Davis, B. 1959. Federation Peak - The challenge. *The Tasmanian Tramp*, 14: 23-40.

Davis, B. 1963. The Western Arthurs Traverse. *The Tasmanian Tramp*, 16: 15-23.

De Vellis, R. 1991. *Scale development: Theory and application.* Sage, London.

Devall, B. & Harry, J. 1981. Who hates whom in the outdoors: The impact of recreational specialization and technologies of play. *Leisure Sciences*, 4: 399-418.

Diggins, T. 1996. Walking the fine line: Tasmania's blueprint for walking-track management. *Wild*, 59: 45-47, 49.

Diggins, T. 1999. Wildfire: Letters to the Editor. *Wild*, 71: 7.

Dillman, D. 1978. *Mail and telephone surveys: the total design method.* Wiley, New York.

Ditton, R., Fedler, A. & Graefe, A. 1983. Factors contributing to perceptions of recreational crowding. *Leisure Sciences*, 5: 273-288.

Dixon, G. 1991. *Earth resources of the Tasmanian Wilderness World Heritage Area: A preliminary inventory of geological, geomorphological and soil features. Department of Parks, Wildlife and Heritage, Occasional Paper No. 25.* Department of Parks, Wildlife and Heritage, Hobart.

Dixon, G. 1996. *Draft track management plan for the Western Arthur Range.* Parks and Wildlife Service, Hobart.

Dixon, G. 1999a. *Location and condition of walker campsites on the Overland Track and in the Pine Valley Labyrinth area, Cradle Mountain - Lake St Clair National Park, Tasmanian Wilderness World Heritage Area.* Tourism and Recreation Section, Parks and Wildlife Service, Hobart.

Dixon, G. 1999b. *Overland Track campsite capacity.* Internal Memorandum, 19th June, File Reference 50-58-94. Department of Primary Industries, Water and Environment, Resource Management and Conservation, Hobart.

Dixon, G. 2002. *Walker related impact monitoring in the Western Arthur Range, 1994 - 2002.* Internal Memorandum. Parks and Wildlife Service, Hobart.

Dixon, G. 2003. *Overland Track campsites: summary of conditions, 1999-2003.* Internal Report. Parks and Wildlife Service, Hobart.

Dixon, G., Hawes, M. & McPherson, G. 2004. Monitoring and modelling walking track impacts in the Tasmanian Wilderness World Heritage Area, Australia. *Journal of Environmental Management*, 71: 305-320.

DLPW 1988. *Cradle Mountain - Lake St Clair National Park Management Plan: Western Tasmania World Heritage Area 1988.* Department of Lands, Parks and Wildlife, Hobart.

Dombrovskis, P. 1981. Discovering the Franklin: Peter Dombrovskis. In: Green, R. ed. *Battle for the Franklin: Conversations with the combatants in the struggle for South West Tasmania*. Australian Conservation Foundation, Melbourne: 100-104.

Donnelly, M., Vaske, J. & Shelby, B. 1992. Measuring backcountry standards in visitor surveys. In: Shelby, B., Stankey, G. & Shindler, B. comps. *Defining wilderness quality: The role of standards in wilderness management - a workshop proceedings, April 10-11, 1990, Fort Collins, Colorado.* General Technical Report PNW-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 38-52.

Donnelly, M., Vaske, J., Whittaker, D. & Shelby, B. 2000. Toward an understanding of norm prevalence: A comparative analysis of 20 years of research. *Environmental Management*, 25: 403-414.

Dorfman, P. 1979. Measurement and meaning of recreation satisfaction. *Environment and Behavior*, 11: 483-510.

DPWH 1992. *Tasmanian Wilderness World Heritage Area Management Plan.* Department of Parks, Wildlife and Heritage, Hobart, Tasmania.

Driver, B. & Brown, P. 1978. The opportunity spectrum concept and behavioral information in outdoor recreation resource supply inventories: a rationale. In: Lund, H., LaBau, V. , Ffolliott, P. & Robinson, D. eds. *Integrated inventories of renewable natural resources: proceedings of the workshop. January 8-12, 1978. Tucson, Arizona.* General Technical Report RM-55. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO: 24-31.

Driver, B. & Toucher, R. 1970. Toward a behavioral interpretation of recreational engagements, with implications for planning. In: Driver, B. ed. *Elements of Outdoor Recreation.* University of Michigan Press, Ann Arbor, MI: 9-31.

Dytham, C. 2003. *Choosing and using statistics: A biologists guide.* 2nd edition, Blackwell Science, Oxford.

Edwards, I. 1978. Vegetation. In: Gee, H. & Fenton, J. eds. *The South West Book: A Tasmanian Wilderness.* Australian Conservation Foundation, Melbourne: 85-92.

Eklund, B. 1959. The rucksack express. *The Tasmanian Tramp,* 14: 70-72.

Eldorado National Forest and Lake Tahoe Basin Management Unit 1998. *Desolation Wilderness management guidelines: Final environmental impact statement and record of decision.* USDA Forest Service, Pacific Southwest Region, Albany, CA.

Emmett, E.T. 1931. The beauty of Tasmania's lake country. *Weekly Courier*. Hobart: 12.

Environment Australia 2001. *Australia's World Heritage Properties - Legislation*. http://www.environment.gov.au/heritage/wahg/worldheritage/legislation [Accessed 19th April 2001].

Environment Canada and Park Service 1991. *Selected readings on the Visitor Activity Management Process*. Environment Canada, Ottawa, ON.

Ewert, A. 1998. A comparison of urban-proximate and urban-distant wilderness users on selected variables. *Environmental Management*, 22: 927-935.

Ewert, A. & Hood, D. 1995. Urban-proximate and urban-distant wilderness: An exploratory comparison between two "types" of wilderness. *Journal of Park and Recreation Administration*, 13: 73-85.

Farrell, T. & Marion, J. 1998. *An evaluation of camping impacts and their management at Isle Royale National Park*. Research/Resources Management Report. USDI National Park Service (Isle Royale National Park), Houghton, MI.

Festinger, L. 1962. *A theory of cognitive dissonance*. Stanford University Press (Original work published in 1957 by Row, Peterson and Company), Stanford, CA.

Floyd, M., Jang, H. & Noe, F. 1997. The relationship between environmental concern and acceptability of environmental impacts among visitors to two U.S. National Park settings. *Journal of Environmental Management*, 51: 391-412.

Foster, R. & Jackson, E. 1979. Factors associated with camping satisfaction in Alberta Provincial Park campgrounds. *Journal of Leisure Research*, 11: 292-306.

French, G. 1998. Walking permits. *Wild*, 70: 53-55.

Frissell, S. 1963, *Recreational use of campsites in the Quetico-Superior canoe country*. Unpublished Masters thesis, University of Minnesota, St Paul, MN.

Frissell, S. 1978. Judging recreation impacts on wilderness campsites. *Journal of Forestry*, 76: 481-483.

Frissell, S. & Stankey, G. 1972. *Wilderness environmental quality: search for social and ecological harmony*. In: *Proceedings of the 1972 national convention, October 1-5, 1972, Hot Springs, Arkansas*. Society of American Foresters, Washington D.C.: 170-183.

Gee, H. 1978. Governor Franklin's journey, 1942. In: Gee, H. & Fenton, J. eds. *The South-West book*. Australian Conservation Foundation, Melbourne: 37-39.

Gilfedder, L. 1992. Flora of Federation Peak. *Wild*, 43: 45-46.

Giordano, M. 1987. *A man and a mountain: The story of Gustav Weindorfer*. Regal Publications, Launceston.

Graefe, A., Kuss, F. & Vaske, J. 1990. *Visitor impact management: the planning framework*. National Parks and Conservation Association, Washington D.C.

Graham, R. & Lawrence, R., eds. 1990. *Towards serving visitors and managing our resources - proceedings of a North American workshop on visitor management in parks and protected areas*. University of Waterloo, Waterloo, ON.

Gramann, J. 1982. Toward a behavioral theory of crowding in outdoor recreation: An evaluation and synthesis of research. *Leisure Sciences*, 5: 109-126.

Green, R. ed. 1981. *Battle for the Franklin: Conversations with combatants in the struggle for South West Tasmania*. Fontana Books and the Australian Conservation Foundation, Melbourne.

Haas, G., Driver, B. & Brown, P. 1980. *Measuring wilderness recreation experiences*. Wilderness Psychology Conference, Durham, NH.

Hall, T. & Roggenbuck, J. 2002. Response format effects in questions about norms: Implications for the reliability and validity of the normative approach. *Leisure Sciences*, 24: 325-337.

Hall, T. & Shelby, B. 1996. Who cares about encounters? Differences between those with and without norms. *Leisure Sciences*, 18: 7-22.

Hall, T., Shelby, B. & Rolloff, D. 1996. Effect of varied question format on boaters' norms. *Leisure Sciences*, 18: 193-204.

Hammitt, W. & Patterson, M. 1991. Coping behavior to avoid visitor encounters: Its relationship to wildland privacy. *Journal of Leisure Research*, 23: 225-237.

Hammitt, W. & Rutlin, W. 1995. Use encounter standards and curves for achieved privacy in wilderness. *Leisure Sciences*, 17: 245-262.

Hannon, D., Banks, M., Kiernan, K., Pemberton, M. & Williams, E. 1993. Physical environment - geology, geomorphology and soils. In: Smith S. & Banks, M. eds. *Tasmanian Wilderness - World Heritage Values*. Royal Society of Tasmania, Hobart: 16-27.

Hartmann, L. & Cordell, H. 1988. An overview of the relationship between social and demographic factors and outdoor recreation participation. In: Watson, A. ed. *Outdoor* *recreation benchmark: Proceedings of the national outdoor recreation forum, Tampa, Florida. January 13-14, 1988.* General Technical Report SE-52. USDA Forest Service Southeastern Forest Experiment Station, Asheville, NC: 255-274.

Heatley, D. 1999. Wildfire: Letters to the Editor. *Wild*, 72: 9.

Heberlein, T. 1977. Density, crowding and satisfaction: Sociological studies for determining carrying capacities. *Proceedings: River recreation management and research symposium, Minneapolis, Minnesota. January 24-27, 1977.* General Technical Report NC-28. USDA Forest Service, North Central Forest Experiment Station, St Paul, MN: 67-76.

Heberlein, T., Alfano, G. & Ervin, L. 1986. Using a social carrying capacity model to estimate the effects of marina development at the Apostle Islands National Lakeshore. *Leisure Sciences*, 8: 257-74.

Helman, P., ed. 1981. *Wild and scenic rivers: A preliminary study of New South Wales.* New South Wales National Parks and Wildlife Service Occassional Paper No. 2. National Parks and Wildlife Service, Sydney.

Hendee, J. 1974. A multiple-satisfaction approach to game management. *Wildlife Society Bulletin*, 2: 104-113.

Hendee, J., Stankey, G. & Lucas, R. 1978. *Wilderness Management.* Miscellaneous Publication No. 1365. USDA Forest Service, Washington, D.C.

Hendee, J., Stankey, G. & Lucas, R. 1990. *Wilderness Management.* 2nd edition, Revised, North American Press, Golden, CO.

Heywood, J. 1993. Behavioral conventions in higher density, day use wildland/urban recreation settings: A preliminary case study. *Journal of Leisure Research*, 25: 39-52.

Heywood, J. 2000. Current approaches to norms research. In: Cole, D., McCool, S., Borrie, W. & O'Loughlin, J. comps. *Wilderness science in a time of change conference - Volume 4: Wilderness visitors, experiences, and visitor management, May 23-27, 1999, Missoula, Montana.* Proceedings RMRS-P-15-VOL-4. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 260-264.

Hill, R., Carpenter, R., Jordan, G. & Smith, S. 1993. Past environments and the Gondwana connection. In: Smith S. & Banks, M. eds. *Tasmanian Wilderness - World Heritage values.* Royal Society of Tasmania, Hobart: 38-48.

Hocking, G. 1978. Mammals. In: Gee, H. & Fenton, J. eds. *The South West Book: A Tasmanian Wilderness.* Australian Conservation Foundation, Melbourne: 120-125.

Hof, F., Hammitt, W., Rees, M., Belnap, J., Poe, N., Lime, D. & Manning, R. 1994. Getting a handle of visitor carrying capacity - A pilot project at Arches National Park. *Park Science*, 14: 11-13.

Hof, M. & Lime, D. 1998. Visitor Experience and Resource Protection Framework in the National Park System: rationale, current status, and future direction. In: McCool, S. & Cole, D. eds. *Proceedings - Limits of Acceptable Change and related planning processes: progress and future directions, May 20-22, 1997, Missoula, Montana.* General Technical Report INT-371. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 29-36.

Jackson, J. 1966. A conceptual and measurement model of norms and roles. *Pacific Sociological Review*, 9: 35-47.

Jacobi, C., Manning, R., Valliere, W. & Negra, C. 1996. Visitor use and conflict on the carriage roads of Acadia National Park. In: Dawson, C. comp. *Proceedings of the 1995 Northeastern Recreation Research Symposium, April 9-11, 1995, Saratoga Springs, NY.* General Technical Report NE-218. USDA Forest Service, Radnor, PA: 109-112.

Kiernan, K. 1990. The extent of late Cenozoic glaciation in the Central Highlands of Tasmania, Australia. Arctic and Alpine Research, 22: 341-354.

Kiernan, K. & Hannon, D. 1991. Glaciation of the upper Forth River catchment, Tasmania. *Australian Geographical Studies*, 29: 155-173.

Kim, S. & Shelby, B. 1998. Norms for behavior and conditions in two national park campgrounds in Korea. *Environmental Management*, 22: 277-285.

Kirkpatrick, J. 1979. *Hydro-electric development and wilderness in Tasmania.* Department of the Environment Tasmania, Hobart.

Kirkpatrick, J. 1980. Tasmanian high mountain vegetation - A Reconnaissance survey of the Eastern Arthur Range and Mount Picton. In: M. Banks ed. *Papers and proceedings of the Royal Society of Tasmania*, 114. Royal Society of Tasmania, Hobart: 1-20.

Kirkpatrick, J. 1982. Phytogeographical analysis of Tasmanian alpine floras. *Journal of Biogeography*, 9: 225-271.

Kirkpatrick, J. & Balmer, J. 1991. The vegetation and higher plant flora of the Cradle mountain - Pencil Pine area, northern Tasmania. In: Banks, M., Smith, S., Orchard A. & Kantevilas, G. eds. *Aspects of Tasmanian Botany - A tribute to Winifred Curtis.* Royal Society of Tasmania, Hobart: 119-148.

Kirkpatrick, J. & Brown, M. 1984. A numerical analysis of Tasmanian higher plant endimism. *Botanical Journal of the Linnean Society of London*, 88: 165.

Kliskey, A.D. 1998. Linking the wilderness perception mapping concept to the recreation opportunity spectrum. *Environmental Management*, 22: 79-88.

Krumpe, E. & McCool, S. 1997. Role of public involvement in the Limits of Acceptable Change Wilderness Planning System. In: McCool, S. & Cole, D. eds. *Proceedings - Limits of Acceptable Change and related planning processes: progress and future directions, May 20-22, 1997, Missoula, Montana.* General Technical Report INT- 371. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 16-20.

Lah, K. 2000. Developing social standards for wilderness encounters in Mount Rainier National Park: manager-defined versus visitor-defined standards. In: Cole, D., McCool, S., Borrie, W. & O'Loughlin, J. comps. *Wilderness science in a time of change conference - Volume 4: Wilderness visitors, experiences, and visitor management, May 23-27, 1999, Missoula, Montana.* Proceedings RMRS- P-15-VOL-4. USDA Forest Service Rocky Mountain Research Station, Ogden, UT: 134-141.

Lee, R. G. 1977. Alone with others: The paradox of privacy in wilderness. *Leisure Sciences*, 1: 3-19.

Lewis, M., Lime, D. & Anderson, D. 1996a. Paddle canoeists' encounter norms in Minnesota's Boundary Waters Canoe Area Wilderness. *Leisure Sciences*, 18: 143-160.

Lewis, M., Lime, D. & Anderson, D. 1996b. Use of visitor encounter norms in natural area management. *Natural Areas Journal*, 16: 128-133.

Lime, D. 1972. *Large groups in the Boundary Waters Canoe Area - Their numbers, characteristics, and impact.* Research Note NC-142. USDA Forest Service, North Central Forest Experiment Station, St Paul, MN.

Lime, D. 1974. Locating and designing campgrounds to provide a full range of camping opportunities. *Outdoor recreation research: Applying the results.* General Technical Report NC-9. USDA Forest Service, North Central Forest Experiment Station, St Paul, MN: 56-66.

Ling, R. 2000a. Location of the *Tasmanian Wilderness World Heritage Area (Digital Map).* Spatial data supplied by Land Information Systems, Department of Primary Industries, Water and Environment, Hobart.

Ling, R. 2000b. *Tasmanian Wilderness World Heritage Area Zoning (Digital Map).* Spatial data supplied by Land Information Systems, Department of Primary Industries, Water and Environment, Hobart.

LIS 1998. *Cradle Mountain - Lake St Clair National Park: Map and notes.* Land Information Services, Department of Environment and Land Management, Hobart.

Lloyd, R. & Fischer, V. 1972. *Dispersed versus concentrated recreation as forest policy.* Paper presented at the Seventh World Forestry Conference, Buenos Aires, Argentina.

Lucas, R. 1964. *The recreational capacity of the Quetico-Superior Area.* Research Paper LS-15. USDA Forest Service, Lake States Forest Experiment Station, St. Paul, MN.

Lucas, R. 1979. Perceptions of non-motorized recreational impacts: a review of research findings. In: Ittner, R., Potter, D., Agee J. & Anschell, S. eds. *Conference proceedings: Recreational impacts on wildlands, October 27-29, 1978, Seattle, Washington.* No. R-6-001-1979. USDA Forest Service, Pacific Northwest Region, Seattle, WA: 24-31.

Lucas, R. 1980. *Use patterns and visitor characteristics, attitudes and preferences in nine wilderness and other roadless areas.* Research Paper INT-253. USDA Forest Service Intermountain Forest and Range Experiment Station, Ogden, UT: 91.

Lucas, R. 1990a. Chapter 15. Wilderness recreation management: A general overview. In: Hendee, J., Stankey, G. & Lucas, R. eds. *Wilderness Management.* 2nd edition, revised. North American Press (Fulcrum Publishing), Golden, CO: 401-422.

Lucas, R. 1990b. Chapter 14. Wilderness use and users: trends and projections. In: Hendee, J., Stankey, G. & Lucas, R. eds. *Wilderness Management.* 2nd edition, revised. North American Press, Golden, CO: 355-398.

Luckman, J. 1948. Federation Peak. *The Tasmanian Tramp,* 8: 16-23.

Luckman, J. 1951. Ladies first. *The Tasmanian Tramp,* 10: 27-29.

Luckman, J. 1998. Fifty years of Federation Peak. *The Tasmanian Tramp,* 32: 43-38.

Luckman, J. & Davies, K. 1978. They called it Transylvania. In: Gee, H. & Fenton, J. eds. *The South-West Book: A Tasmanian Wilderness.* Australian Conservation Foundation, Melbourne: 23-36

Luckman, J., Gee, H. & Fenton, J. 1978. Chronology of events. In: Gee, H. & Fenton, J. eds. *The South-West Book.* Australian Conservation Foundation, Melbourne: 275-277.

Luther, H. & Rzoska, J. c.1971. *Project Aqua: A source book of inland waters proposed for conservation. IBP Handbook No.21, IUCN Occasional Paper No.2.* Blackwell Scientific Publications, Oxford.

Macpac Wilderness Equipment Limited 2000. *Macpac Summer 2001 Catalogue.* Macpac Wilderness Equipment Limited, Christchurch, New Zealand.

Manfredo, M., Driver, B. & Brown, P. 1983. A test of concepts inherant in experience based setting management for outdoor recreation areas. *Journal of Leisure Research*, 15: 263-283.

Manning, R. 1985. Crowding norms in backcountry settings: A review and synthesis. *Journal of Leisure Research*, 17: 75-89.

Manning, R. 1986a. Density and crowding in wilderness: Search and research for satisfaction. In: Lucas, R. comp. *Proceedings - National Wilderness Research Conference: Current research, Fort Collins, Colorado.* General Technical Report INT-212. USDA Forest Service, Intermountain Research Station, Ogden, UT: 440-448.

Manning, R. 1986b. *Studies in Outdoor Recreation: A review and synthesis of the social science literature in outdoor recreation.* Oregon State University Press, Corvallis, OR.

Manning, R. 1999. *Studies in Outdoor Recreation: search and research for satisfaction.* 2nd edition. Oregon State University Press, Corvallis, OR.

Manning, R. 2001. Carrying capacity as "informed judgement": The values of science and the science of values. In: Freimund, W. & Cole, D. comps. *Visitor use density and wilderness experience: proceedings, June 1-3, 2000, Missoula, Montana.* RMRS-P-20. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT: 21-28.

Manning, R., Jacobi, C., Valliere, W. & Wang, B. 1998. Standards of quality in parks and recreation. *Parks and Recreation*, 33: 88-94.

Manning, R., Johnson, D. & Vande Kamp, M. 1996. Norm congruence among tour boat passengers to Glacier Bay National Park. *Leisure Sciences*, 18: 125-141.

Manning, R., Lawson, S., Newman, P., Laven, D. & Valliere, W. 2002. Methodological issues in measuring crowding-related norms in outdoor recreation. *Leisure Sciences*, 24: 339-348.

Manning, R. & Lime, D. 1996. Crowding and carrying capacity in the National Park System: Toward a social science research agenda. In: Lime, D. ed. *Crowding and congestion in the National Park System: Guidelines for management and research.* Department of Forest

Resources and Minnesota Agricultural Experiment Station, University of Minnesota, St Paul, MN: 25-65.

Manning, R. & Lime, D. 2000. Defining and managing the quality of wilderness recreation experiences. In: Cole, D., McCool, S., Borrie W. & O'Loughlin, J. comps. *Wilderness science in a time of change conference - Volume 4: Wilderness visitors, experiences, and visitor management, 1999 May 23-27, Missoula, Montana.* Proceedings RMRS- P-15-VOL-4. USDA Forest Service Rocky Mountain Research Station, Ogden, UT: 13-52.

Manning, R., Lime, D., Freimund, W. & Pitt, D. 1996. Crowding norms at frontcountry sites: A visual approach to setting standards of quality. *Leisure Sciences*, 18: 39-59.

Manning, R., Lime, D. & Hof, M. 1996. Social carrying capacity of natural areas: Theory and application in the U.S. National Parks. *Natural Areas Journal*, 16: 118-127.

Manning, R., Lime, D., Hof, M. & Freimund, W. 1995. The Visitor Experience and Resource Protection (VERP) Process: The application of carrying capacity to Arches National Park. *The George Wright Forum: A Journal of Cultural and Natural Parks and Reserves*, 12: 41-55.

Manning, R., Lime, D. & McMonagle, R. 1995. Indicators and standards of quality of the visitor experience at a heavily-used national park. In: Vander Stoep, G. ed. *Proceedings of the Northeastern Recreation Research Symposium, April 10-12, 1994, Saratoga Springs, New York.* General Technical Report NE-198. USDA Forest Service, Northeastern Forest Experiment Station, Upper Darby, PA: 24-32.

Manning, R., Lime, D., McMonagle, R. & Nordin, P. 1993. *Indicators and standards of quality for the visitor experience at Arches National Park: Phase I research.* University of Minnesota Cooperative Park Studies Unit, St. Paul, MN.

Manning, R., Valliere, W. & Jacobi, C. 1997. Crowding norms for the carriage roads of Arcadia National Park: Alternative measurement approaches. In: Kuentzel, W. comp, ed. *Proceedings of the 1996 Northeastern Recreation Research Symposium, March 31-April, 1996, Bolton Landing, New York.* General Technical Report NE-232. USDA Forest Service, Northeastern Forest Experiment Station, Upper Darby, PA: 139-145.

Marion, J.L. 1991. *Developing a natural resource inventory and monitoring program for visitor impacts on recreation sites: A procedural manual.* Natural Resources Report NPS/NRVT/NRR-91/06. USDI National Parks Service, Denver, CO.

Martin, S., McCool, S. & Lucas, R. 1989. Wilderness campsite impacts: do managers and visitors see them the same. *Environmental Management*, 13: 623-629.

Martinson, K. & Shelby, B. 1992. Encounter and proximity norms for salmon anglers in California and New Zealand. *North American Journal of Fisheries Management*, 12: 559-567.

McAulay, I., Lancaster, K. & Saunders, R. 1978. Bushwalking - Three veiwpoints. In: Gee, H. & Fenton, J. eds. *The South-West Book.* Australian Conservation Foundation, Melbourne: 141-148.

McCool, S. 1983. Wilderness quality and wilderness solitude: Are they related? In: *The Bob Marshall Wilderness Visitor Study*. School of Forestry, University of Montana, Missoula, MT: 40-61.

McCool, S., Ashor, J. & Stokes, G. 1986. An alternative to rational-comprehensive planning: transactive planning. In: Lucas, R. comp. *Proceedings - National Wilderness Research Conference: Current research, July 23-26, 1985, Fort Collins, Colorado.* General Technical Report INT-212. USDA Forest Service, Intermountain Research Station, Ogden, UT: 544-545.

McDonald, C. 1996. Normative perspectives on outdoor recreation behavior: Introductory comments. *Leisure Sciences*, 18: 1-6.

McIntosh, B. & Andrews, P. 1978. Amphibians and reptiles. In: Gee, H. & Fenton, J. eds. *The South West Book: A Tasmanian Wilderness.* Australian Conservation Foundation, Melbourne: 110-111.

Merigliano, L. 1987, *The identification and evaluation of indicators to monitor wilderness conditions*. Unpublished M.S. thesis. Graduate School, University of Idaho, Moscow, Idaho.

Merigliano, L. 1990. Indicators to monitor the wilderness recreation experience. In: Lime, D. ed. *Managing America's Enduring Wilderness Resource: Proceedings of the conference, September 11-17, 1989, Minneapolis, Minnesota.* Minnesota Extension Service, University of Minnesota, St.Paul, MN: 156-162.

Millington, R., Jones, R., Brown, D. & Vernon, B. 1979. *Huon Pine - Endangered? Centre for Environmental Studies Occasional Paper No. 9.* Board of Environmental Studies, University of Tasmania, Hobart.

Morgan, H. 1996. Wildfire: Letters to the Editor. *Wild*, 61: 115.

Morin, S. 1996, *Defining indicators and standards for recreation impacts in Nuyts Wilderness Area in Walpole-Nornalup National Park, Western Australia.* Unpublished MA Environmental Science thesis. School of Biological and Environmental Sciences, Murdoch University, Perth.

Morin, S., Moore, S. & Schmidt, W. 1997. Defining indicators and standards for recreation impacts in Nuyts Wilderness, Walpole-Nornalup National Park, Western Australia. *CALMScience*, 2: 247-266.

Mosley, J. 1966. The Tasmanian national park system. *The Tasmanian Tramp*, 17: 37-49.

Mosley, J. 1981. The Pedder tragedy: Lake Pedder was to be inundated. In: Green, R. ed. *Battle for the Franklin: Conversations with combatants in the struggle for South West Tasmania.* Australian Conservation Foundation, Melbourne: 39-49.

Mosley, J. 1983. A Green Election - Beginning of a new era? *Australian Conservation Foundation Newsletter*, 15: 1, 3.

National Park Service 1997. *The Visitor Experience and Resource Protection (VERP) framework: A handbook for planners and managers.* USDI National Park Service, Denver Service Center, Denver, CO.

National Park Service 2001. *Zion National Park Generl Management Plan.* USDI National Park Service, Zion National Park, Springdale, UT.

National Parks and Wildlife Service 1975. *Southwest National Park Draft Management Plan 1975.* National Parks and Wildlife Service, Hobart.

Newsome, D., Moore, S. & Dowling, R. 2002. *Natural are tourism: ecology, impacts and management.* Channel View Publications, Sydney.

Nicolls, K. & Dimmock, G. 1965. Soils. *Atlas of Tasmania.* J. Davies, ed. Land Surveys Department, Hobart.

Nielsen, J. & Shelby, B. 1977. River running in the Grand Canyon: How much and what kind of use. In: *Proceedings: River recreation management and research symposium, January 24-27, 1977, Minneapolis, Minnesota.* General Technical Report NC-28. USDA Forest Service, North Central Forest Experiment Station, St Paul, MN: 168-177.

Nielsen, J., Shelby, B. & Haas, J. 1977. Sociological carrying capacity and the last settler syndrome. *Pacific Sociological Review*, 20: 568-581.

Nilsen, P. & Tayler, G. 1997. A comparative analysis of protected area planning and management frameworks. In: McCool, S. & Cole, D. comps. *Proceedings - Limits of Acceptable Change and related planning processes: progress and future directions, May 20-22, 1997, Missoula, Montana*. General Technical Report INT-371. USDA Forest Service Rocky Mountain Research Station, Ogden, UT: 49-57.

Noe, F. 1992. Further questions about the management and conceptualization of backcountry encounter norms. *Journal of Leisure Research*, 24: 86-92.

Nunez 1978. Climate. *The South West Book: A Tasmanian Wilderness*. In: Gee, H. & Fenton, J. eds. Australian Conservation Foundation, Melbourne: 67-69.

Outdoor Recreation Resources Review Commission 1962. *Outdoor recreation for America*. Government Printing Office, Washington D.C.

Parks Canada 1985. *Management process for visitor activities*. National Parks directorate, Visitor Activities Branch, Ottawa, Ontario.

Patterson, M. & Hammitt, W. 1990. Backcountry encounter norms, actual reported encounters, and their relationship to wilderness solitude. *Journal of Leisure Research*, 22: 259-275.

Payne, R., Carr, A. & Cline, E. 1997. *Applying the Recreation Opportunity Spectrum (ROS) for visitor opportunity assessment in two Canadian national parks: a demonstration project, Report prepared for Nilsen, P., Natural Resource Branch National Parks, Parks Canada Hull, Quebec*. http://parkscanada.pch.gc.ca/library/ros/english/main_e.htm [Accessed 25th March 2002].

Payne, R. & Graham, R. 1993. Visitor planning and management in parks and protected areas. In: Rollins, R. ed. *Parks and protected areas in Canada: planning and management*. Oxford University Press, Toronto, Ontario: 91-103.

Prosser, G. 1986. The Limits of Acceptable Change: An introduction to a framework for natural area planning. *Australian Parks and Recreation*, 22: 5-10.

PWH 1990. *Wild areas user survey 1990-91*. Parks, Wildlife and Heritage, Hobart.

PWH 1991. *Wilderness walker survey 1991-92*. Parks, Wildlife and Heritage, Hobart.

PWS 1994. *Draft walking track management strategy for the Tasmanian Wilderness World Heritage Area*. Unpublished internal PWS document, Hobart, Tasmania.

PWS 1995. *Walker survey 1995-96*. Parks and Wildlife Service, Hobart.

PWS 1997a. *Monitoring walker impacts: The science behind the strategy*. Parks and Wildlife Service, Hobart.

PWS 1997b. *Tasmanian Wilderness World Heritage Area draft management plan 1997*. Parks and Wildlife Service, Hobart, Tasmania.

PWS 1998a. *Threatened species, birds - Orange bellied parrot*. http://www.parks.tas.gov.au/esl/obp.html [Accessed 12th September 2001].

PWS 1998b. *Walking track management strategy for the Tasmanian Wilderness World Heritage Area. Volume 1. Main report*. Parks and Wildlife Service, Hobart, Tasmania.

PWS 1998c. *Walking track management strategy for the Tasmanian Wilderness World Heritage Area. Volume 2. Appendix A: Track conditions, local management actions and works priorities*. Parks and Wildlife Service, Hobart, Tasmania.

PWS 1998d. *Walking track management strategy for the Tasmanian Wilderness World Heritage Area. Volume 3. Appendices B-G and references*. Parks and Wildlife Service, Hobart, Tasmania.

PWS 1998e. *Wildlife of Tasmania, birds - Orange bellied parrot*. http://www.parks.tas.gov.au/wildife/birds/obp.html [Accessed 12th September 2001].

PWS 1999. *Tasmanian Wilderness World Heritage Area management plan 1999*. Parks and Wildlife Service, Hobart.

PWS 2000a. *The summer 1999-2000 Overland Track diary report - an investigation into bushwalker numbers, crowding, and user-opinions for future management of the Overland Track*. Unpublished report, Parks and Wildlife Service, Hobart.

PWS 2000b. *Walker registration records for the Arthur Ranges, Southwest National Park*. Unpublished data. Parks and Wildlife Service, Hobart.

PWS 2000c. *Walker registration records for the Overland Track, Cradle Mountain - Lake St Clair National Park*. Unpublished data. Parks and Wildlife Service, Hobart.

PWS 2003. *Walker use of the Western Arthur Range*. Unpublished report, Parks and Wildlife Service, Hobart.

Quinn, G. & Keough, M. 2002. *Experimental design and data analysis for biologists*. Cambridge University Press, Cambridge.

Reece, E. 1965. *Mercury*. Hobart: n.p.

Rickson, R., Field, D. & Nilsen, P. eds. 1995. *For the record: presentations at the second Canada/U.S. workshop on visitor management in parks forests and protected areas.* University of Wisconsin - Madison, Madison, WI.

Roggenbuck, J. & Lucas, R. 1987. Wilderness use and user characteristics: A state-of-knowledge review. In: *Proceedings - National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions, 1985 July 23-26, Fort Collins, Colorado.* General Technical Report INT-220. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT: 204-245.

Roggenbuck, J. & Schreyer, R. 1977. Relations between river trip motives and perception of crowding, management preference, and experience satisfaction. In: *Proceedings: River recreation management and research symposium, January 24-27, 1977, Minneapolis, Minnesota.* General Technical Report NC-28. USDA Forest Service, North Central Forest Experiment Station, St Paul, MN: 359-364.

Roggenbuck, J., Williams, D., Bange, S. & Dean, D. 1991. River float trip encounter norms: Questioning the use of the social norms concept. *Journal of Leisure Research*, 23: 133-153.

Roggenbuck, J., Williams, D. & Watson, A. 1993. Defining acceptable conditions in wilderness. *Environmental Management*, 17: 187-197.

Rollins, R. & Chambers, D. 1990. Camping satisfaction with Canadian Parks Service campgrounds. *Social Science and Natural Resource Management.* Westview Press, Boulder, CO: 91-103.

Rolston, H. 1988. Environmental ethics, duties to and values in the natural world. Temple University Press, Philadelphia, PA.

Ruddell, E. & Gramann, J. 1994. Goal orientation, norms, and noise-induced conflict among recreation area users. *Leisure Sciences*, 16: 93-104.

Rundle, S. 2000. *Do 70% of users support a permit system?* Unpublished report. Tasmanian Parks and Wildlife Service, Hobart.

Rundle, S. 2002. *2001/02 Overland walkers summary.* Unpublished report. Parks and Wildlife Service. Hobart.

Rundle, S. 2003. *Overland Track visitor use.* Unpublished report. Parks and Wildlife Service, Hobart.

Rundle, S. 2004. *Annual backcountry walker and rafter numbers: 1999/2000 - 2003/04.* Tasmanian Parks and Wildlife Service, Hobart: 1-3.

Rutledge, R. & Trotter, W. 1995a. *The 1993 Northeastern British Columbia Recreation Survey*. Ministry of Forests, Range, Recreation and Forest Practices Branch, Recreation Section, Fort St John, B.C., Canada.

Rutledge, R. & Trotter, W. 1995b. *The 1993 Northeastern, British Columbia Recreation Survey: Summary Highlights.* Ministry of Forests, Range, Recreation and Forest Practices Branch, Fort St. John, B.C., Canada.

Rutledge, R. & Trotter, W. 1995c. *The Northeastern British Columbia Recreation Survey 1993: A survey of forest recreation users.* Ministry of Forests; Range, Recreation and Forest Practices Branch; Recreation Section, Fort St. John, B.C., Canada.

Sawyer, N. 1990, *The management of wilderness bushwalking in the Tasmanian Wilderness World Heritage Area.* Unpublished MA Environmental Studies thesis. Centre for Environmental Studies, Department of Geography and Environmental Studies, University of Tasmania, Hobart.

Sawyer, N. 1991. Bushwalker impact on the Tasmanian Wilderness World Heritage Area. *The Tasmanian Tramp*, 28: 101-105.

Sawyer, N. 1998. *Report on Wild Area User Survey 1994/95.* Parks and Wildlife Service, Hobart.

Schomaker, J. 1984. Writing quantifiable river recreation management objectives. In: Popadic, J., Butterfield, D. & Popadic, M. eds. *Proceedings of the 1984 National River Recreation Symposium, October 31-November 3, 1984, Baton Rouge, Louisiana.* Louisiana State University, School of Landscape Architecture, Baton Rouge, LA: 249-253.

Schreyer, R. & Roggenbuck, J. 1978. The influence of experience expectations and crowding perceptions and social-psychological carrying capacities. *Leisure Sciences*, 1: 373-394.

Shafer, C.S. & Hammitt, W. 1994. Management conditions, and indicators of importance in wilderness recreation experiences. In: Clonts, H. ed. *Proceedings of the 1993 Southeastern Recreation Research Conference, February 10-12, 1993, Helen, Georgia.* General Technical Report SE-90. USDA Forest Service, Southeastern Forest Experiment Station, Asheville, NC: 57-67.

Shafer, C.S. & Inglis, G. 2000. Influence of social, biophysical, and managerial conditions on tourism experiences within the Great Barrier Reef World Heritage Area. *Environmental Management*, 26: 73-87.

Shafer, E.L., Jr. 1969. *The average camper who doesn't exist.* Research Paper NE-142. USDA Forest Service, Northeastern Forest Experiment Station, Upper Darby, PA,

Shelby, B. 1981. Encounter norms in backcountry settings: Studies of three rivers. *Journal of Leisure Research*, 13: 129-138.

Shelby, B., Bregenzer, N. & Johnson, R. 1988. Displacement and product shift: Empirical evidence from Oregon rivers. *Journal of Leisure Research*, 20: 274-288.

Shelby, B. & Harris, R. 1985. Comparing methods for determining visitor evaluations of ecological impacts: site visits, photographs, and written descriptions. *Journal of Leisure Research*, 17: 57.

Shelby, B. & Heberlein, T. 1986. *Carrying capacity in recreation settings*. Oregon State University Press, Corvallis, OR.

Shelby, B., Heberlein, T., Vaske, J. & Alfano, G. 1983. Expectations, preferences, and feeling crowded in recreation activities. *Leisure Sciences*, 6: 1-14.

Shelby, B. & Vaske, J. 1991. Using normative data to develop evaluative standards for resource management: A comment on three recent papers. *Journal of Leisure Research*, 23: 173-187.

Shelby, B., Vaske, J. & Donnelly, M. 1996. Norms, standards and natural resources. *Leisure Sciences*, 18: 103-123.

Shelby, B., Vaske, J. & Harris, R. 1988. User standards for ecological impacts at wilderness campsites. *Journal of Leisure Research*, 20: 245-256.

Shelby, B. & Whittaker, D. 1995. Flows and recreation quality on the Delores River: Integrating overall and specific evaluations. *Rivers*, 5: 121-132.

Shindler, B. 1992. Countering the law of diminishing standards. In: Shelby, B., Stankey, G. & Shindler, B. comps. *Defining wilderness quality: The role of standards in wilderness management - A workshop proceedings, April 10-11, 1990, Fort Collins, Colorado.* General Technical Report PNW-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 53-60.

Shindler, B. & Shelby, B. 1992. User assessment of ecological and social campsite attributes. In: Shelby, B., Stankey, G. & Shindler, B. comps. *Defining wilderness quality: The role of standards in wilderness management - A workshop proceedings, April 10-11, 1990, Fort Collins, Colorado.* General Technical Report PNW-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 107-114.

Shindler, B. & Shelby, B. 1995. Product shift in recreation setting: Findings and implications from panel research. *Leisure Sciences*, 17: 91-107.

Smith, R. 1936. *Examiner*. Launceston.

Smith, V. & Moore, S. 1990. Identifying park users and their expectations: A fundamental component in management plans. *Australian Parks and Recreation*, 26: 35-41.

Sokal, R. & Rohlf, F. 1995. *Biometry: The principles and practice of statistics in biological research*. 3rd edition. W.H. Freeman and Company, New York.

South-West Committee, T. 1966. *The South-West Committee: A committee for the preservation of south-west Tasmania. Submission covering conservation and development of South-West Tasmania*. The South-West Committee, Hobart.

SPSS Inc. 1998. *Survey research using SPSS*. SPSS Inc., Illinois.

SPSS Inc. 2001. SPSS, SPSS Inc.

Stankey, G. 1973. *Visitor perception of wilderness recreation carrying capacity*. Research Paper INT-142. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Stankey, G. 1980. *A comparison of carrying capacity perceptions among visitors to two wildernesses*. Research Paper INT-242. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Stankey, G., Cole, D., Lucas, R., Peterson, M. & Frissell, S. 1985. *The Limits of Acceptable Change (LAC) system for wilderness planning*. General Technical Report INT-176. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Stankey, G. & McCool, S. 1984. Carrying capacity in recreational settings: Evolution, appraisal, and application. *Leisure Sciences*, 6: 453-474.

Stankey, G., McCool, S. & Stokes, G. 1990. Chapter 9. Managing for appropriate wilderness conditions: The carrying capacity issue. In: Hendee, J., Stankey, G. & Lucas, R. eds *Wilderness Management*. Fulcrum Press, Golden, CO: 215-239.

Stankey, G. & Schreyer, R. 1987. Attitudes toward wilderness and factors affecting visitor behavior: a state-of-knowledge review. In: *Proceedings - National Wilderness Research Conference: Issues, state-of-knowledge, future directions, July 23-26, 1985, Fort Collins, Colorado. General* Technical Report INT-220. USDA Forest Service, Intermountain Research Station, Ogden, UT: 246-293.

Sumner, E. 1936. *Special report on a wildlife study in the High Sierra in Sequoia and Yosemite National Parks and adjacent territory.* US National Parks Service Records, National Archives, Washington DC.

SYSTAT Software Inc. 2001. SYSTAT.

Tabachnick, B. & Fidell, L. 2001. *Using multivariate statistics.* Forth, Allyn and Bacon, Boston.

Tarrant, M., Cordell, H. & Kibler, T. 1997. Measuring perceived crowding for high density river recreation: The effects of situational conditions and personal factors. *Leisure Sciences,* 19: 97-112.

Tarrant, M., Haas, G. & Manfredo, M. 1995. Factors affecting visitor evaluations of aircraft overflights of wilderness areas. *Society & Natural Resources,* 8: 351-360.

Tarrant, M. & Shafer, C.S. 1997. Condition indicators for distinct wilderness: Is there uniformity? *International Journal of Wilderness,* 18: 137-153.

Tasmania 1989. *Nomination of the Tasmanian Wilderness by the Government of Australia for the inclusion in the World Heritage List.* Commonwealth Department of the Arts, Sport, the Environment, Tourism and Territories and the Government of the State of Tasmania, Canberra, ACT.

Thomas, T. 1978. *100 walks in Tasmania.* 1st edition, Hill of Content, Melbourne.

Thomas, T. 1995. *100 walks in Tasmania.* 4th edition, Hill of Content, Melbourne.

Tourism Tasmania 2000. *Tasmanian Visitor Survey: 1999 Data Card.* Tourism Tasmania, Hobart.

Tourism Tasmania 2004. *Tasmanian Visitor Survey: Visitors to the Tasmanian Wilderness World Heritage Area. Special data request.* Unpublished data in possession of the author, Hobart.

Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1997. *Tourism 21, A partnership for tourism success - Strategic business plan for tourism 1997-2000.* Tourism Tasmania, Hobart.

Tourism Tasmania and the Tourism Council of Australia (Tasmanian Branch) 1999. *Tourism 21 Update, A partnership for tourism success - Strategic business plan for tourism 1999-2001.* Tourism Tasmania, Hobart.

TPWS 1996. *The Overland Track: A Walkers Notebook*. Tasmanian Parks and Wildlife Service, Hobart.

Trauer, B. & McIntyre, N. 1998. World Heritage listing as an entrepreneurial event: An Australian case study. *Australian Parks and Recreation*, 34: 44-47.

UNESCO 1972. *Convention Concerning the Protection of the World Cultural and Natural Heritage*. http://www.unesco.org:80/whc/world_he.htm [Accessed 20th July 2001].

USDA Forest Service 1997. *Management direction for the Ansel Adams, John Muir, Dinkey Lakes, and Monarch Wildernesses: Draft environmental impact statement. Ammending the Land resource Management Plans for the Inyo, Sierra, and Sequoia National Forests.* USDA Forest Service, Pacific Southwest Region, Albany, CA.

van Oosterzee, P. 1984. The Recreation opportunity Spectrum: Its use and misuse. *Australian Geographer*, 16: 97-104.

Vaske, J., Donnelly, M., Doctor, R. & Petruzzi, J. 1995. Frontcountry encounter norms among three cultures. In: Vander Stoep, G. ed. *Proceedings of the Northeastern Recreation Research Symposium, April 10-12, 1994, Saratoga Springs, New York*. General Technical Report NE-198. USDA Forest Service, Northeastern Forest Experiment Station, Upper Darby, PA: 162-165.

Vaske, J., Donnelly, M. & Petruzzi, J. 1996. Country of origin, encounter norms and crowding in a frontcountry setting. *Leisure Sciences*, 18: 161-176.

Vaske, J., Donnelly, M. & Shelby, B. 1992. Establishing management standards: Selected examples of the normative approach. In: Shelby, B., Stankey, G. & Shindler, B. comps. *Defining wilderness quality: The role of standards in wilderness management - a workshop proceedings, April 10-11, 1990, Fort Collins, Colorado*. General Technical Report PNW-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 23-27.

Vaske, J., Donnelly, M. & Shelby, B. 1993. Establishing management standards: Selected examples of the normative approach. *Environmental Management*, 17: 629-643.

Vaske, J., Shelby, B., Graefe, A. & Heberlein, T.A. 1986. Backcountry encounter norms: Theory, method, and empirical evidence. *Journal of Leisure Research*, 18(3): 137-153.

Verburg, K. 1977. *The carrying capacity of recreational lands: A review*. Parks Canada, Planning, Prairie Regional Office.

Wagar, J. 1963. *Campgrounds for many tastes*. Research Paper INT-6. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Wagar, J. 1964. *The carrying capacity of wildlands for recreation.* Society of American Foresters, Washington, D.C.

Wagar, J. 1966. Quality in outdoor recreation. *Trends*, 3: 9-12.

Wagar, J. 1968. The place of carrying capacity in the management of recreation lands. *Rocky Mountain - High Plains Parks and Recreation Journal*, 3: 37-45.

Wagar, J. 1974. Recreational carrying capacity reconsidered. *Journal of Forestry*, 72: 274-78.

Watson, A. 1995. Opportunities for solitude in the Boundary Waters Canoe Area Wilderness. *Northern Journal of Applied Forestry*, 12: 12-18.

Watson, A., Williams, D., Roggenbuck, J. & Daigle, J. 1992. *Visitor characteristics and preferences for three National Forest Wildernesses in the south.* Research Paper INT-455. USDA Forest Service, Intermountain Research Station, Ogden, UT.

Weisberg, H., Krosnick, J. & Bowen, B. 1996. *An introduction to survey research, polling, and data analysis.* 3rd, Sage Publications Inc, Thousand Oaks, CA.

West, P. 1981. *On-site social surveys and the determination of social carrying capacity in wildland recreation management.* Research Note NC-264. USDA Forest Service, North Central Research Station, St Paul, MN.

West, P. 1982. Effects of user behavior on the perception of crowding in backcountry forest recreation. *Forest Science*, 28: 95-105.

Whinam, J. & Chilcott, N. 1999. Impacts of trampling on alpine environments in central Tasmania. *Journal of Environmental Management*, 57: 205-220.

Whinam, J. & Chilcott, N. 2003. Impacts after four years of experimental trampling on alpine/sub-alpine environments in western Tasmania. *Journal of Environmental Management*, 67: 339-351.

Whittaker, D. 1992. Selecting indicators: Which impact matter more? In: Shelby, B., Stankey, G. & Shindler, B. eds. *Defining wilderness quality: The role of standards in wilderness management - a workshop proceedings, April 10-11, 1990, Fort Collins, Colorado.* General Technical Report PNW-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 13-22.

Whittaker, D. & Shelby, B. 1988. Types of norms for recreation impacts: Extending the social norms concept. *Journal of Leisure Research*, 20: 261-273.

Whittaker, D. & Shelby, B. 1992. Developing good standards: criteria, characteristics, and resources. In: Shelby, B., Stankey, G. & Shindler, B. eds. *Defining wilderness quality: The role of standards in wilderness management - a workshop proceedings, April 10-11, 1990, Fort Collins, Colorado.* General Technical Report PNW-305. General Technical Report PNW-GTR-305. USDA Forest Service, Pacific Northwest Research Station, Portland, OR: 6-12.

Williams, D., Roggenbuck, J. & Bange, S. 1991. The effect of norm-encounter compatability on crowding perceptions, experience and behavior in river recreation settings. *Journal of Leisure Research*, 23: 154-172.

Williams, D., Patterson, M., Roggenbuck, J. & Watson, A. 1992. The variability of user-based social impact standards for wilderness management. *Forest Science*, 37: 738-756.

Womble, P. & Studebaker, S. 1981. Crowding in a national park campground: Katmai National Monument in Alaska. *Environment and Behavior*, 13: 557-573.

Wootton, G. 1996. Wildfire: Letters to the Editor. *Wild*, 60: 111.

Wootton, G. 1999. Wildfire: Letters to the Editor. *Wild*, 72: 9.

World Conservation and Monitoring Centre 1997. *Descriptions of the Natural World Heritage Properties.* http://www.wcmc.org.uk:80/protected_areas/data/wh/taswild.html [Accessed 21st September 2001].

Young, J., Williams, D. & Roggenbuck, J. 1991. The role of involvement in identifyng users' preferences for social standards in the Cohutta Wilderness. In: Hope, D. III. ed. *Proceedings of the Southeastern Recreation Research Conference, February 14-16, 1990 Asheville, North Carolina.* General Technical Report SE-67. USDA Forest Service, Southeastern Forest Experiment Station, Asheville, NC: 173-183.

Personal communications

Helen Thyne, Bushwalking representative on the Tasmanian Wilderness World Heritage Area Consultative Committee. 27th October 2004.

Phil Wyatt, Track Management Officer, Strategic Asset Management Branch, Business and Asset Services, Parks and Wildlife Service, Tasmania. 25th October 2004.