

Resilience and Social-Ecological Systems:  
The UNESCO Biosphere Reserve Program in Australia and  
Canada

by

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# Abstract

United Nations Educational, Scientific and Cultural Organisation (UNESCO) Biosphere Reserves (BRs) provide an example of an integrated sustainability framework that allows for connection between international, national, state / provincial and local levels of conservation and capacity-building. The three major functions of a BR are conservation of biodiversity, sustainable development and support for logistics. As coupled social-ecological systems, BRs explicitly acknowledge that human systems and ecological systems are inextricably linked, and have the potential to bridge ecological and social-political spheres that have been viewed as predominantly disparate entities, rather than as interconnected or nested systems.

The aim of this thesis is to identify the key features (assets, process and outcome) required to enhance the fit between governance systems and ecosystems using the UNESCO BR model, and develop a framework for establishing BRs as resilient working landscapes. By identifying features that seem critical for linking civil society, institutions and government dynamically across multiple levels, the research addresses the governance dimension of ecosystem management and the social factors that enable such management. The scope of the thesis is limited to developed country contexts.

Data are derived from focus groups, site visits, 52 key informant interviews and literature reviews. The research process utilised an emergent, naturalistic inquiry, characterised by abductive, deductive and inductive methods. Four Australian and four Canadian qualitative case studies support and demonstrate the three phases of the BR resilience conceptual framework developed herein.

UNESCO BRs originated in the early 1970s as international examples of biodiversity conservation and sites of scientific research and monitoring. Since this time, the international program has broadened to include more complex notions of social-ecological systems, reflecting shifts in environmental discourse and praxis. The Australian BR Program is characterised by government-initiated BRs and those generated through community-derived stewardship. Over the same period, the Canadian BR Program has consistently developed through community capacity and the Canadian Biosphere Reserve Association.

Capital assets and 'new governance' processes are two of the three key phases of developing a successful (resilient) BR. Adaptive capacity is a key component of the final phase; the achievement of a resilient working landscape. In the framework, evolution and devolution of a BR occurs in response to social and ecological variables. However, maintenance and renewal of capital assets are crucial to sustaining the first and most fundamental phase of BR resilience.

Specific guidelines for the application of the BR resilience conceptual framework are provided to inform individual BRs and their national programs more generally, and provide any party interested in the BR concept with a means to develop a resilient BR, from its inception. Avenues for future research are suggested, with a recommended focus upon harnessing greater understanding of resilience factors in social-ecological systems, and the relationship of these to BRs.

Keywords: UNESCO Biosphere Reserves, resilience, social-ecological systems, working landscapes, capital assets, new governance, adaptive capacity, Australia, Canada.

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# Acronyms

A2A	Alps to Atherton (Australia)
ABV	Australian Biosphere Volunteers (Australia)
ALT	Australian Landscape Trust (Australia)
BAG	Biosphere Advisory Group (Australia)
BR	Biosphere Reserve (UNESCO)
BPBA	Bruce Peninsula Biosphere Association (Canada)
BRIM	Biosphere Reserve Integrated Monitoring Program
BRP	Biosphere Reserve Program (UNESCO)
CALM	Department of Conservation and Land Management (Australia)
CBRA	Canadian Biosphere Reserve Association (Canada)
CBD	Convention on Biological Diversity
CBM	Community based monitoring
CBR	Clayoquot Biosphere Reserve (Canada)
CBT	Clayoquot Biosphere Trust (Canada)
CC / MAB	Coordinating Council of Canada / MAB (Canada)
CLARET	Clayoquot Alliance for Research, Education and Training (Canada)
CLM	Community Land Managers (Australia)
CMN	Conservation Management Network
CSBR	Clayoquot Sound Biosphere Reserve (Canada)
CSIRO	Commonwealth Scientific, Industrial and Research Organisation (Australia)
CSO	Civil Society Organisation
CZS	Chicago Zoological Society (United States / Australia)
DEH	Department of Environment and Heritage (previously Environment Australia)
DEWR	Department of Environment and Water Resources (previously DEH) - Australia
EA	Environment Australia (Australia)
EDO	Environmental Defenders Office (Australia)
EMAN	Ecological Monitoring and Assessment Network (Canada)
EMO	Environmental Management Organisation
ENGO	Environmental Non-Government Organisation
EPA	Environmental Protection Agency (Australia)
FAO	Food and Agriculture Organisation
FBG	Fitzgerald Biosphere Group (Australia)
FBMA	Fitzgerald Biosphere Marketing Association (Australia)
FRNPBR	Fitzgerald River National Park Biosphere Reserve (Australia)

FRNPA	Fitzgerald River National Park Association (Australia)
IBP	International Biological Program (UNESCO)
ICC	International Coordinating Council (UNESCO)
ICSU	International Council of Scientific Unions
ISKM	Integrated System of Knowledge Management
IUCN	International Union for the Conservation of Nature (World Conservation Union)
LPBR	Long Point Biosphere Reserve (Canada)
LPWBRF	Long Point World Biosphere Reserve Foundation (Canada)
MI	Mark I Biosphere reserves (government – derived) (Australia)
MII	Mark II Biosphere reserves (community – derived) (Australia)
MAB	Man and the Biosphere Program (UNESCO)
MABF	Mount Arrowsmith Biosphere Foundation (Canada)
MABR	Mount Arrowsmith Biosphere Reserve (Canada)
MDG	Millenium Development Goals (UNESCO)
MEAFEC	Mount Eliza Association for Environmental Care (Australia)
MISP	Multi-stakeholder Integrative Sustainability Planning
MLA	Main Line of Action (UNESCO)
MPSC	Mornington Peninsula Shire Council (Australia)
MPWPBR	Mornington Peninsula Western Port Biosphere Reserve (Australia)
MPWPBRF	Mornington Peninsual Western Port Biosphere Reserve Foundation (Australia)
NEBR	Niagara Escarpment Biosphere Reserve (Canada)
NEC	Niagara Escarpment Commission (Canada)
NEP	Niagara Escarpment Plan (Canada)
NEPA	Niagara Escarpment Plan Area (Canada)
NEPOSS	Niagara Escarpment Parks and Open Space System (Canada)
NGO	Non – Government Organisation
NHT	Natural Heritage Trust (Australia)
NRM	Natural Resource Management
OMF	Oceanside Monetary Foundation (Canada)
OPG	Ontario Power Generation (Canada)
RAIN	Ravensthorpe Agricultural Initiative Network (Australia)
RBR	Riverland Biosphere Reserve (Australia)
SCRIPT	South Coast Regional Initiative Planning Team (Australia)
SD	Sustainable Development
SEABRN	South-East Asian Biosphere Reserve Network
SES	Social-Ecological Systems

SI / MAB	Smithsonian Institute / MAB
SWBR	South West Biosphere Reserve (Australia)
TBR	Transboundary Biosphere Reserve
TWWHA	Tasmanian Wilderness World Heritage Area (Australia)
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCPA	World Commission on Protected Areas
WNBR	World Network of Biosphere Reserves
WSSD	World Summit on Sustainable Development
Y2Y	Yellowston to Yukon (United States / Canada)

Australian States / Territories		Canadian Provinces	
ACT	Australian Capital Territory	AB	Alberta
NSW	New South Wales	BC	British Columbia
NT	Northern Territory	MB	Manitoba
QLD	Queensland	NB	New Brunswick
SA	South Australia	NL	Newfoundland and Labrador
TAS	Tasmania	NS	Nova Scotia
VIC	Victoria	ON	Ontario
WA	Western Australia	PE	Prince Edward Island
		QC	Quebec
		SK	Saskatchewan

# Foreword

*The goal should be to seek not detailed knowledge of parts of the system, but improved understanding of the dynamics of the whole system.*

Carl Folke

*Each stage of human civilization is defined by our mental structures; the concepts we create and then project upon the universe.*

Edwin H. Land

*The seeds of the future are to be found in the extremes of the present. So our wildest ideas are the ones that give us insights into the surprises of the next few decades.*

Steve Cork

*Biosphere Reserves are places where nature nurtures the minds, hearts and bodies of the people, and the people strive to live gently and maintain vital processes to sustain themselves and the other species that share the biosphere.*

Canadian Biosphere Reserve Association

*A biosphere reserve is like a butterfly - if you open the cocoon for it, it is not going to fly. It has to struggle to get out.*

Jim Birtch

*I think there are some folks who just have experienced the power of working together, and when they get hold of that, it's kind of hard to forget it.*

David Spann

# 1 Introduction

*This chapter introduces the conceptual framework for the thesis, and discusses resilience and social ecological systems, connectivity conservation, capital and governance as integral parts of that framework. The contentions of the thesis are introduced and provide a context for the choice of topic, followed by the aims and objectives that set the direction and purpose of the research. The chapter concludes with an overview of the thesis contents and a discussion of the methodological logic.*

## 1.1 Background

Protected areas are central to the conservation of biodiversity, the protection of natural resources and the enrichment of human existence (Phillips 1997: 21). Throughout the world, protected areas, national parks and reserves remain the core and often only efforts to protect nature (Figgis 1999) and are regarded as the most cost effective solution to the problem of biodiversity maintenance (Thackway et al. 1996). As Lockwood et al. (2006: 677) state:

Protected areas are one of the most important land and sea uses on Earth. They are created out of human respect for, and desire to sustain, natural and cultural values. They provide critical elements of a response to the global environmental, social and economic challenges of contemporary societies. They conserve vital biodiversity and represent the variety of the Earth's landscapes and history. They offer one answer to how people can relate and engage with nature. They provide cultural, spiritual, social, economic and 'quality of life' benefits, and are one of the key mechanisms to sustain life on Earth. Protected areas play a critical role in sustaining the natural resource base that supports the livelihoods of people and the viability of economies and communities. Benefits that they offer city dwellers include education, health, watershed protection, scenic amenity, recreation opportunities and biodiversity conservation. Protected areas are sources of knowledge and offer educational experiences from connecting with nature that will become increasingly important as the world becomes more urbanised.

Despite dramatic growth in the number and extent of protected areas over the last 40 years, the current system of reserves falls far short of representing all terrestrial or marine areas, biogeographic regions or ecosystems (Beatley and Manning 1997; Rosendal 1991). Tress et al. (2005) have described pressures for change within the paradigm of protected area management, reflecting a need to better understand nature-society relationships and the way in which protected areas are conceived. So significant is this shift, it has been coined a new paradigm for protected areas. The IUCN World Commission on Protected Areas (2005: 2) articulated a vision for protected areas based on this new paradigm:

In this changing world, we need a fresh and innovative approach to protected areas and their role in broader conservation and development agendas. This approach demands the maintenance and enhancement of our core conservation goals, equitably integrating them with the interests of all affected people. In this way the synergy between conservation, the maintenance of life support systems and sustainable development is forged. We see protected areas as vital means to achieve this synergy efficiently and cost-effectively. We see protected areas as providers of benefits beyond boundaries—beyond their boundaries on a map, beyond the boundaries of nation-states, across societies, genders and generations.



This new paradigm for protected areas recognises that human-induced pressures will be so great in the future that exclusive reliance on these areas to maintain biodiversity and ecosystems is unrealistic (Phillips 1997), and maintenance of protected area conservation values in the face of these pressures is certainly problematic. If protected areas are to have a meaningful future and play their full part in the protection and management of the environment as a whole, a three-fold strategy is required (Phillips 1997: 2):

- expand the concept of protected areas, to include important parts of the working landscape;
- review the management of protected areas and widen the stakeholders from those of parks-related professions to include all those who have an interest in the future sustainability of such areas; and
- reconfigure planning and management of protected areas, to recognise the eco-region or bio-cultural region to which they belong.

The historical establishment of protected areas has generally been opportunistic and ad hoc (Bondrup-Nielson et al. 2002; Lane 2001; Figgis 1999; Brandon et al. 1998; Celecia 1994) and the need for robust systems of bioregional concern, planning and management continues. A critical requirement for conservation planning across the landscape, regardless of tenure, is widely recognised (Fitzsimons and Westcott 2005). Multi-stakeholder groups that foster cooperation to address ecological, cultural and economic issues at the landscape scale are indicative of the required change (Brunckhorst and Bridgewater 1997). The concept of working landscapes is increasingly important for meeting these conservation challenges and also to incorporate the expanded, new paradigm of protected areas. A working landscape is defined as:

... habitat areas that are inhabited or used by humans and used in such a way that native flora and fauna are able to continue to exist in the area. Native populations of organisms live in sustainable populations whilst landowners achieve economic gain. These areas successfully combine the ecological, social and economic parts of a landscape. Business and social activities are done in a way that minimises the disturbance of native plants and animals. A working landscape is an area where humans work as responsible members of an ecosystem. Ideally, all of the people within a working landscape are balancing their own needs with the needs of the environment. Striking that delicate balance is the achievement of sustainability, where needs are met in a way that will maintain the landscape for the future (Falk 2001: no page).

The relationship between sustainable development and working landscapes is a continuing process of integrating social systems into ecological systems (Deb and Srivastava 2003). Thus, human needs, partly based on social values and preferences, are an important indicator of sustainable development, and an inherent part of the working landscape concept. Attempts to put sustainable development into operation have often focused on the conditions to maintain the stock of natural capital and the inherent dynamics of natural resources. However, such efforts have remained intangible with regard to the actions and interactions of actors in their respective societal context. In contrast, integrated sustainability concepts combine the dynamics in both social and ecological systems to analyse conditions for their adaptation, compatibility, and conflict resolution.

According to Deb and Srivastava (2003), two goals are apparent in integrated sustainability concepts. First, *development* in the sense of unfolding the possibilities and abilities of individuals and social systems. Second, *conservation* of the natural basis of life, where development incorporates multi-

dimensional values and ensures the preservation of natural conditions and boundaries. Thus, development and conservation cause and enforce each other. The pre-eminent figure in the development of this idea has been the philosopher and social theorist, Murray Bookchin, through his work on social ecology. His work in ecological theory over 40 years has laid the foundations for integrated sustainability concepts. Social ecology proposes a principle of ecological wholeness, which Bookchin defines as 'a dynamic unity of diversity' in which 'balance and harmony are achieved by ever-changing differentiation' (Clark 1990: 5; Bookchin 1981). As a result, 'stability is a function not of simplicity and homogeneity but of complexity and variety' (Clark 1990: 5; Bookchin 1981). According to Bookchin, holistic, developmental understanding of organic systems and their evolution has enormous importance for ethics and politics. Indeed, only if the place of humanity in nature and natural processes is understood, can we adequately judge questions of value (Bookchin 1981).

Central to Bookchin's idea of social ecology is a reconstructive practice of fundamentally transforming people's relation to nature and to other people. The ultimate promise of social ecology is the reharmonisation of culture and nature. A vital element in that transformation lies in the connection between social ecology and community development (Clark 1990). True community development, from this perspective, must be a holistic process which integrates all facets of a community's life. Social, political, economic, artistic, ethical and spiritual dimensions must be seen as part of a whole. Bookchin asserts that the dominant culture has fragmented and isolated social life into distinct realms of experience (Bookchin 1981). The rediscovery of the organic ties between these realms is the starting point for the development process. Once they are recognised, it is possible to create holistic approaches to development that reintegrate all the elements of a community into a cohesive dynamic of cultural change.

But social ecology does not address key economic aspects required for such a shift. American ecological economist, Herman Daly, argued that some Western economies have entered what he calls the phase of uneconomic growth (Daly 2005) which he defined as growth whose environmental and social costs are greater than its benefits. For example, he argues that the real cost of chopping down a mahogany tree is not simply how much it costs to fell the tree and transport it to a sawmill, but also the cost of producing a new 200-year-old tree (Daly 2005). Such costs are real environmental costs, or externalities which were addressed by Daly, in an effort to integrate these costs as an integral part of economics. Social ecology and ecological economics have informed current thinking on integrated sustainability, but neither are, on their own, integrated sustainability concepts.

United Nations Educational, Scientific and Cultural Organisation (UNESCO) Biosphere Reserves (BRs) provide an integrated sustainability concept and allow for the connection between social ecology, economy and community development. BRs link protected areas (ecological systems) with their associated working landscapes (inclusive of social systems) (Ramsay and Whitelaw 1997), and participate in a bioregional program for conservation that also recognises the critical importance of

scientific, cultural, societal, economic, institutional and political inputs. BRs<sup>1</sup> form part of a larger internationally coordinated program, the World Network of Biosphere Reserves (WNBR), which included, as of 2008, 529 BRs in 105 countries.

BRs are areas of terrestrial and coastal ecosystems that promote solutions to reconcile the conservation of biodiversity with sustainable use, through civic engagement. They are internationally recognised by the UNESCO Man and Biosphere Programme (MAB). Each BR is intended to fulfil three complementary functions. These three functions differentiate a BR from any other type of integrated sustainability concept, as they provide both a mandate and spatial organisation around which the concept is arranged. A conservation function contributes to the protection of landscapes, ecosystems, species and genetic variation. A development function fosters economic and human development which is socio-culturally and ecologically sustainable. A logistic function provides support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development. These three functions combine with the spatial organisation of a BR, including a protected core area, buffer area and transition area (Batisse 1982). These three functions and zones are intended to be integrated via interdisciplinary approaches and interrelated objectives including local community participation, bioregional land use management, *in situ* conservation and restoration, regional planning and development, and environmental education and training (Batisse 1997; Brunckhorst 2000). The UNESCO describes the pertinence of BRs:

The global community needs working examples that encapsulate the ideas of conservation and sustainable development. These examples can only work if they express all the social, cultural, spiritual and economic needs of society and are also based on sound science. BRs offer such examples. Rather than forming islands in a world increasingly affected by severe human impacts, they can become the areas for reconciling people and nature; they can bring knowledge of the past to the needs of the future; and they can demonstrate how to overcome the problems of the sectoral nature of our institutions. In short, BRs are much more than protected areas. Thus, BRs are poised to take on a new role. Not only will they be a means for the people who live and work within and around them to attain a balanced relationship with the natural world, they will also contribute to the needs of society as a whole, by showing a way to a more sustainable future. This is at the heart of our vision for BRs in the 21st century (UNESCO 2004c: no page).

BRs are constituents of a bioregional program, because they are defined by the interplay of political and / or jurisdictional boundaries of mostly biological resources alongside the cultural, societal, institutional and political elements of their area (Lockwood et al. 2006). This is in contrast to an ecoregional conservation program, which is dictated by science-based criteria for systematic conservation planning of biodiversity- defined ecoregions (Lockwood et al. 2006). Ultimately, a BR aims to be a working example of conservation within a larger landscape context of rational resource use, supporting and informing interdisciplinary research, monitoring, capacity-building and

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<sup>1</sup> Throughout the thesis the term BR describes the local to regional scale which is distinct from the 'parent' scale of the operation of the Biosphere Reserve Program (BRP), analysed at national levels in Australia and Canada. The international UNESCO program is another level of hierarchy above, constituting the World Network of Biosphere Reserves (WNBR). Therefore, the three levels of BR, BRP and WNBR represent the local-regional, national and international scales for the operation of BRs.

educational activities, whilst showcasing sustainable development at an internationally designated site, enacted and stewarded voluntarily by civil society, in partnership with government and private interests.

Civil society is defined as '...the public space between the state, the market and the realm of family relations; it is an associational realm within society, based on voluntary and non profit affiliation (Beausang 2002: 5); and 'a vibrant community of voluntary associations, non-governmental organisations, student activists, scientists, researchers, professionals, and citizens' committees' (Beausang 2002: 5). A growing contingent of BRs are a type of Civil Society Organisation (CSO), defined as:

... any association or organisation formed voluntarily by the public. These can be small or large, officially registered or informal, representing the interests of specific groups or the public at large (Whitelaw et al. 2004: 22).

In the environmental field, CSOs have formed extensive networks in order to influence policy (Pollock 2004), where for example, they are often central to creating or re-defining issues based on scales other than traditional municipal and political boundaries. BRs are models of regional, multi-jurisdictional management and 'have the potential to bridge ecological and social-political spheres that are predominantly viewed as disparate entities rather than as interconnected or nested systems' (Pollock 2004: 37).

As Brunckhorst proposes, 'ecological and social systems are complex and entwined' where 'landscapes are shaped by the interaction of social and ecological systems' (Brunckhorst 2005: 1-2). These jigsaws of interacting human and natural systems operating at multiple scales (Brunckhorst, 2000, 2002) can be viewed as landscape mosaics (Forman 1995) or complex systems. Furthermore, Brunckhorst (2002) regards robust ecological, social and economic sustainability as founded on integrated planning and management of natural resources, ecological functions and primary production across anthropogenic landscapes, where realisation of this requires:

... changes to social norms, new institutions and organisational forms. Systems of natural resource use, community functions, local government and regional development need to be compatible with the dynamics of the ecological services and resources involved, and with the social and institutional characteristics of the communities to which resource users belong. These issues are best studied at a regional landscape scale to allow effective integration and redesign of human-dominated landscapes (Brunckhorst 2002: 111).

However, efforts to overcome the degradation of ecological resources are constrained by a lack of understanding of the interaction between social and ecological systems and the required eco-ethical change in human values (Legendre 2004; Cairns 2003). The interrelationships among natural, economic and cultural resources are not well recognised because of the pre-dominance of economic capital over other assets (Stratford and Davidson 2002) and learning and change often appear to be very slow in human society, especially in relation to social-ecological systems. However, cultural values and institutional arrangements are increasingly acknowledged as critical factors for promoting change towards sustainability (Brunckhorst, 2005; Gunderson et al. 1995). Learning and change in

conjunction with re-configured institutional arrangements in social-ecological systems are key to BRs, as will be elucidated later in the thesis.

By integrating on-the-ground lessons with consideration of BR theory to enhance development of that theory, this thesis responds to a call by Taylor:

Given the advances in theoretical concepts of the past two decades – coupled with the relatively long history of in-the-field implementation of the BR concept – it is likely worth exploring how the current conceptual framework of the BR might be enhanced by more directly considering some of that theory. In return, given the on-the-ground lessons that could be gleaned from the diversity of BRs around the world, it is worth considering how BRs might act as a useful international template on which to further enhance the development of theory (Taylor 2004: 80).

## **1.2 Social-Ecological Systems and Resilience <sup>2</sup>**

Folke et al. (2005), note that scholars have used concepts including 'coupled human-environment systems', 'ecosocial systems' and 'socioecological systems' to illustrate the interplay between social and ecological systems, but depending on the prefix of 'eco' or 'social', analysis may be compromised. Consequently, Berkes and Folke (1998) initiated use of the term 'social-ecological' system to emphasise the integrated concept of humans in nature and to stress that the delineation between social and ecological systems is artificial and arbitrary. The relationship between the individual citizen and the community is considered dynamic. The essential intent of the social-ecological system is, therefore, to try and readapt human social organisation to the natural cyclical laws of the biological life systems (Raberg 1997). Furthermore:

Deliberate progress towards the goal of long-term sustainability depends on understanding the dynamics of linked social and ecological systems, where the concept of social-ecological resilience holds promise for interdisciplinary synthesis (Cumming et al. 2005: 975).

Janssen et al. (2006) suggest that social-ecological systems are comprised of social nodes for human-related nodes and ecological nodes for nodes that are not related to humans. Typical social components in this context include individuals and / or organisations, as normally used in the social sciences. Typical ecological components are species, as in food webs, and / or individual patches of habitat in a landscape. Links in this system are directed or undirected, and they can depict relations of any chosen kind between the linked pair of nodes. The nature of the relations can be either entirely social, entirely ecological or a mixture of both social and ecological components. Human activities can create a social-ecological network by linking ecological nodes, i.e., independent ecological systems become connected by the activities of humans (Janssen et al. 2006). For example, livestock can be

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<sup>2</sup> The major themes of the thesis are introduced in the following four sub-sections. Whilst it is unusual to introduce major themes in the first chapter, the use of an abductive / inductive research approach, described in Chapter 2, builds the case for the conceptual development of resilient BRs throughout the thesis. Abductive study is the process of moving from lay descriptions to social science concepts and theories (Denzin 1978). Introducing the major themes here creates the 'lenses' through which the methods, data and findings of the work can be presented and understood. The major themes illustrated in the conceptual framework (Figure 2) are introduced below and abductively developed throughout the thesis. Chapter 10 provides a comprehensive discussion of the issues distilled regarding BR resilience.

moved around in a landscape, and previously unconnected areas of land then become connected. Such human / social components have direct implications for ecosystem management in terms of resilience. Alternately, social connections can be created via ecological connections, for example, rivers connect people from upstream and downstream, thereby creating a social-ecological network (Janssen et al. 2006).

The implications for analysis of social-ecological systems differ from those of analyses of social or ecological systems alone, where sustainable outcomes necessitate consideration of the social dimensions of resource use alongside (and equal to) an understanding of resource and ecosystem dynamics (Folke et al. 2005). Social-ecological systems have, therefore, been described in a multitude of ways, however less attention has been given to the precursors of, and features necessary to, sustain resilient social-ecological systems (Cumming et al. 2005); this is a central concern of this thesis.

The integrated capital assets approach described by Stratford and Davidson (2002) informs aspects of resilience in social-ecological systems through 'the interrelationships among natural, economic and cultural resources' where it affords a more nuanced understanding of interdependencies between human, social, physical and financial assets. Moreover, it transcends 'the arcane division of the biophysical from the socio-cultural, allowing an improved appreciation of the contribution of all capital assets – natural, social, human, physical and financial' (Stratford and Davidson 2002: 430). Also, the integrated capital assets approach indicates that sustainable systems accumulate stocks of assets while unsustainable systems deplete these stocks. Consequently, this approach shifts the focus of productive activity from inputs to assets such that land and ecosystem processes, social processes, or individual skills come to be viewed not as resources to be used up, but as assets to be maintained and renewed, indeed accumulated (Stratford and Davidson 2002; Brunckhorst 2001; Farina 2000; Pretty and Frank 2000; Brown and Ashman 1996; Coleman 1988). When capital is accumulated in this way, a system is more sustainable and hence more resilient.

Resilience is a multi-faceted concept, and was originally introduced by Holling (1973) as an ecological theory coupling resilience with stability, to describe models of change in the structure and function of ecological systems (Walker et al. 2006b). The notion of resilience is growing in importance as a concept for understanding, managing, and governing complex linked systems of people and nature (Figure 1, pg. 8). Figure 1 also represents the BR ideal of the inter-relatedness present between these three spheres, where 'L' (resultant landscape) could equally be 'Biosphere Reserve'.

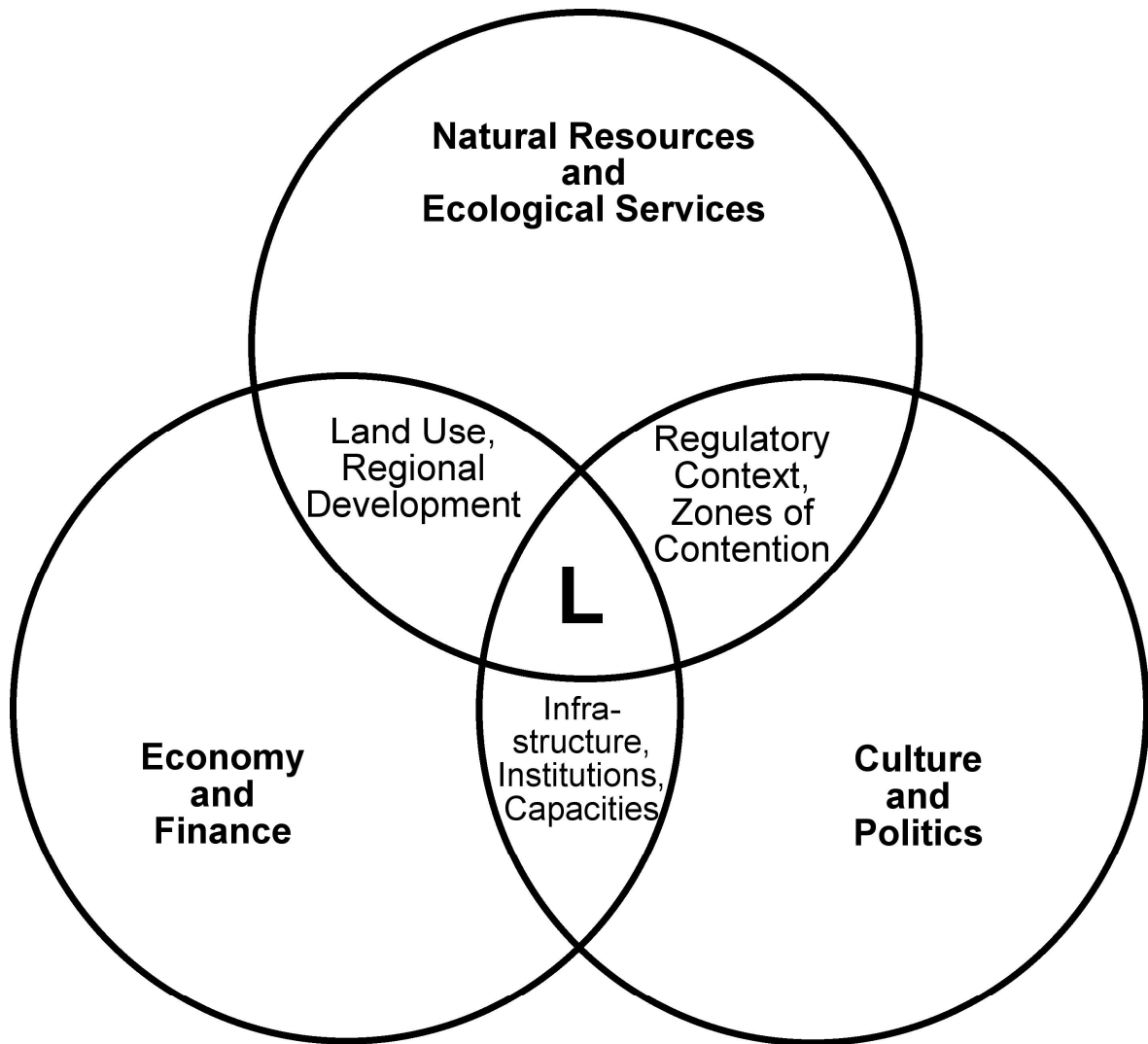
Humans depend on ecological systems for survival but continuously impact those systems from a local to a global scale. Resilience is a property of these linked social-ecological systems (Resilience Alliance 2007a). Resilience as applied to ecosystems, or to integrated systems of people and the natural environment, has three defining characteristics:

- the amount of change the system can undergo and still retain the same controls on function and structure;
- the degree to which the system is capable of self-organisation; and

- the ability to build and increase the capacity for learning and adaptation (Resilience Alliance 2007b: 1).

**Figure 1 The complex system that constitutes a landscape (L), shaped by human minds, activities and social systems through nature, economy and culture**

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**L = resultant landscape**

Source: Brunckhorst (2002): 109.

*Ecosystem* resilience is the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary (Resilience Alliance 2007a). The key to resilience in ecological systems is diversity (Resilience Alliance 2007a). Biodiversity plays a crucial role by providing functional redundancy. For example, in a grassland ecosystem, several different species will commonly perform nitrogen fixation, but each species may respond differently to climatic events, thus ensuring that even though some species may be lost, the process of nitrogen fixation within the grassland ecosystem will continue.

Resilience in *social* systems has the added capacity of humans to anticipate and plan for the future. Similarly, when the management of a resource is shared by a diverse group of stakeholders (e.g., local resource users, research scientists, community members with traditional knowledge and government representatives), decision making is better informed and more options exist for social learning, capacity-building, partnership and openness. Active adaptive management, whereby management actions are designed as experiments, encourages learning and novelty, thus increasing resilience in social-ecological systems. The essentials of adaptive management are (Miller et al. 1991: 931):

- Management interventions are made in an experimental manner so the outcome of the intervention can be used to reduce uncertainty about the system.
- Sufficient monitoring prior to and during the intervention enables detection of the results of the management intervention and thereby allows managers to learn from past experience.
- Management interventions are then refined, based on feedback to managers, communities and other constituencies.

Adaptive capacity is a crucial component of resilience for sustainability that reflects the processes of social learning, experimentation and innovation needed to deal with uncertainty in complex systems.

At least two key characteristics that provide for ecological resilience are important to social-ecological resilience: (i) openness and (ii) rigidity of institutions. Openness is the degree of connection with groups outside of the region of the managed system, whilst rigidity reflects, for instance, the degree of rules and norms in use (Walker and Salt 2006: no page). By having high openness and low rigidity, the use of multiple knowledges can be employed for multi-scale, multi-jurisdictional institutions in realising social-ecological initiatives.

From these reconfigured institutional relationships, connectivity conservation has arisen as a 21<sup>st</sup> century vision for the long term conservation of biodiversity and natural, cultural, economic and social assets, using multi-scale, multi-jurisdictional partnerships. Connectivity conservation advocates buffering and linking islands of protected areas into connected large-scale mosaics of lands or seas managed cooperatively by many owners – national, state and local governments, private land or water trusts, indigenous people, primary producers and corporations (Worboys et al. 2007). The concept has been emerging for many years and been referred to by many other names: whole of landscape, ecosystem networks, biodiversity corridors, or the bioregional approach. Worboys et al. (2007: 2) state:



While enhanced connectivity and buffering of important conservation areas is welcomed on all scales, the World Conservation Union sees the priority being connectivity conservation at a large regional or continental scale. It is a concept best applied strategically to significant and very large naturally interconnected land and sea areas. This is because ecological processes and biological permeability operate at many scales, including scales far larger than those usually considered in conventional management.

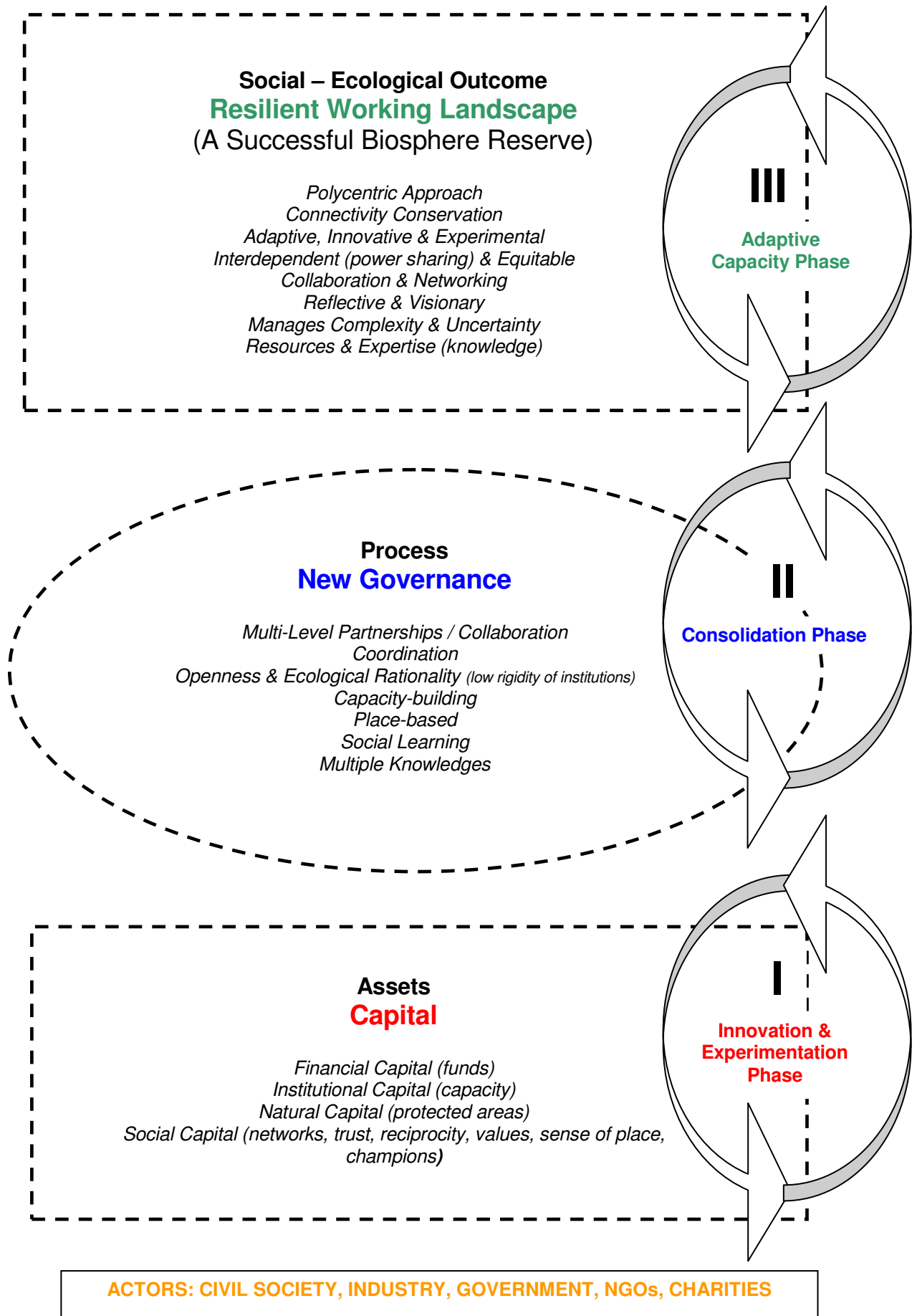
Importantly, connectivity does not refer to the simplistic notion of wildlife corridors. Through the implication of scale, tenure, land use, rehabilitation and people, these central concerns depict connectivity conservation as a social-ecological initiative under which BRs can constitute an important component. This requires motivating people and communities to achieve conservation and sustainable land use in preference to destruction and fragmentation of natural lands, where many people with many motivations can contribute to a broad societal goal (Worboys et al. 2007). Connectivity conservation recognises that in addition to protected areas as a core, greater emphasis is needed on non-reserve mechanisms in achieving a range of social, economic, institutional and governance objectives. Worboys et al. (2007: 4) state that:

This (connectivity conservation) approach will require cooperative leadership by government and non-government organisations. It will need to be supported through legislation and planning and will require the development of sponsorship and incentive schemes, and major advances in the development of true sustainable use. The concept will also require both high levels of science and planning to inform decisions about priorities for targeted investment.

This thesis contends that connectivity conservation is closely related to the BR concept but operates at a larger spatial scale and may be informed by resilient social-ecological systems found in successful BRs (see Aims and Objectives, Section 1.4), developed in Chapters 5 – 10.

Coupled with the integrated capital assets approach discussed, these concepts provide the basis for the original conceptual framework of social-ecological resilience developed herein (Figure 2, pg. 11). The following chapters develop the argument in support of this conceptual framework and its use in structuring the findings and recommendations of the thesis. Capital and governance (indicated in Figure 2) are introduced in the following sections, and developed in Chapters 7-10.

Figure 2 The BR Resilience Conceptual Framework



### **1.2.1 Capital**

Deb and Srivastava (2003) suggest that the productivity of societies can be measured by the degree to which they use, depend on, and develop various types of capital, including natural, institutional and social capital. There are numerous definitions for each of the types of capital, however for the purposes of this thesis encompass:

- Natural capital - nature's goods and services. Includes such aspects as food (both farmed and wild); wood and fibre; water regulation and supply; waste assimilation, decomposition and treatment; nutrient cycling and fixation; soil formation; biological control of pests; climate regulation; wildlife habitats; storm protection and flood control; carbon sequestration; pollination; and recreation and leisure.
- Institutional capital - concerned with consensus building for participatory development between different groups of civil society and government (also called deliberative democracy). The degree to which institutions adapt to and accept change is an important component of institutional capital.
- Social capital - the cohesiveness of people in their communities, at various scales. It comprises relations of trust, reciprocity and exchanges between individuals which facilitate cooperation; the bundles of common rules, norms and sanctions mutually agreed or handed down within societies; the connectedness, networks and groups which may be formal or informal, horizontal or vertical, and between individuals or organisations; and access to wider institutions of society beyond the immediate household or community (Brunckhorst 2001).

Additionally, financial capital is important for this thesis and arguably included as a part of institutional capital. This type of capital represents, for instance, the monetary exchanges of government, industry, NGOs and civil society.

Of particular importance to this thesis is the role of social capital, with emphasis on its role in sustaining natural capital and mobilising other types of capital. Coleman (1988) describes social capital as the structure of relations between actors and among actors, that encourages productive activities. Social capital is an essential indicator of the advancement of societies, as it is critical for the productivity and well-being of communities, the sustainability of their development, and facilitates coordination, cooperation, and conflict moderation in a society (Selman 2001; Taylor 2000). These aspects of social structure and organisation act as resources for individuals to realise their personal interests. BRs, as an integrated sustainability concept, aim to strengthen each of the different forms of capital and the links between them, particularly between natural and social capital. This concept is developed in Chapters 5 – 10.

### **1.2.2 Governance**

According to Folke et al. (2005: 449) 'the term 'governance' has recently become a catchword for various alternatives to conventional top-down government control, including collaboration, partnerships, and networks'. Issues of legitimacy and accountability are often stressed, and good governance of ecosystems has been interpreted as solving the trilemma characterised by tensions between effectiveness, participation and legitimacy (Folke et al. 2005). For the purposes of this thesis, governance describes the structures and processes used by a variety of social actors to influence and make decisions on matters of public concern (Stoll-Kleeman 2005). Thus, governance refers to both the organisation of governmental responsibility on the one hand, and the distribution of

power among the civil and governmental actors in a society on the other. Graham et al (2003: ii) define governance as:

The interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how citizens or other stakeholders have their say.

Stolle-Kleeman (Stoll-Kleeman 2005: 4) argue governance is:

... about power, relationships and accountability: who has influence, who decides, and how decision makers are held accountable. Governance may be used in different contexts – global, national and local, and social and institutional. Governance occurs wherever people organise themselves –formally and informally – to develop rules and relationships with each other in pursuing their objectives and goals.

Governance as applied to social-ecological settings gained importance in the last decade. Contemporary governance is characterised by collaborative arrangements such as networks, partnerships, and deliberative forums, used to coordinate and guide decision making (Davidson et al. 2006). This work is increasingly accomplished through formal institutions of government and informal arrangements among government and non-government actors from the private sector and civil society. Howlett and Raynor (2006) discuss 'new governance' as a descriptor for this mode of governing. This innovation means that some of the business of government is now conducted through partnerships between the public and private sectors or between the public sector and groups in civil society. 'New governance' as it applies to BRs is discussed in Chapter 7 and developed in subsequent chapters.

### **1.2.3 Resilience**

Much of the work on resilience as it is presented in this thesis has arisen from research programs of the Resilience Alliance, with the aim of understanding how resilience changes in regional-scale social-ecological systems, and how it might be increased, or lost, through management. This work and that presented here, builds on a rich history of empirical work and theoretical development by a number of earlier researchers, notably Holling and colleagues (2001; 1995; 1987; 1986; 1986; 1978), Olsson (2007; 2006; 2003; 2001), Gunderson (2002; 1995), Folke (2005; 2003; 2002) and Walker (2006a; 2006b; 2006; 2002). Others who have explored the complex systems basis of natural resource management include Checkland (1981), Francis (1988), Allen and Hoekstra (1992), and Levin (1998).

According to Walker et al. (2002), managers, engineers, activists, and researchers have developed a range of methods to deal with challenges in complex business situations (Checkland 1981), and yet others have developed approaches to cope with human-ecological situations (Kay et al. 1999). Many methods have been developed for working with stakeholders (Slocum et al. 1995), conceptualising complex situations, (such as work on 'learning organisations') (Senge 1992), and participatory integrated assessment (van de Kerkhof 2001). Yet, as Walker et al. (2002) suggest, there are few theories that deal with linked social-ecological system dynamics.

As Taylor (2004: 81) suggests, 'the ideas about resilience in ecological systems were first proposed ... about the same time as the first BRs were established' (Holling 1973). However, it has taken three

decades of development in theory and praxis to meld the two. This is due to three decades of often-failed management of social and ecological systems, resulting from mis-matched spatial and temporal scales and the associated structures and processes of these two complex systems (Pollock et al. 2008; Hawkins and Selman 2002; Ostrom 1998).

The evolving theoretical framework for social-ecological systems recognises that ecosystems are complex adaptive systems characterised by non-linear relations, threshold effects, historical dependency and multiple possible outcomes (Berkes et al. 2003; Folke et al. 2003; Gunderson and Holling 2002). Yet, the assets and processes affecting the organisation of a BR, as a complex system with these characteristics, are essentially the same as those encountered in any undertaking concerned with resilience. These assets and processes include capital assets (natural, social, financial, institutional), the management and communication of information, and uncertainty (Olsson et al. 2007; Ravindra 2004), which are all addressed in seeking resilience, but do not, *inter alia*, provide resilience. Rather, they are assets and processes involved in resilience development and sustenance.

The BR resilience conceptual framework developed here describes the vital components of a resilient social-ecological system as applied to BRs. Aspects of the BR resilience conceptual framework presented here draws on well-established literature on such complex systems, where several individual components of the framework are not new. However, this framework offers a further step toward achieving an integrated approach to understanding resilience and discovering where and how it occurs in linked social-ecological systems.

### **1.3 Contentions**

A number of contentions (below) arose out of literature reviews and assisted in framing the scope of this research. They are provided here to introduce the basic logic unpinning the research and hence frame the aim and objectives of the thesis.

First, UNESCO conducts the program for World Heritage Areas (WHAs), a relation, through a shared administration by UNESCO, of the Biosphere Reserve Program (BRP). Declared under the *Convention Concerning the Protection of the World Cultural and Natural Heritage*, and adopted by UNESCO in 1972, WHAs were conceived in the same era as BRs, but in contrast to BRs, have been widely accepted and promoted, particularly in Australia and Canada (Bridgewater 1999). As sites of universal cultural and natural significance, WHAs are concerned with preservation and conservation, not sustainable development. WHAs are internationally recognised and supported yet BRs do not have a similar international profile, and often there is little knowledge of them in civil society, despite the existence of a large World Network and over three decades of operation (Batisse 2000).

Second, Australia was one of the earliest countries to designate BR sites, yet there is no regular activity at a national level for the BRP (Matysek et al. 2006; Hyman 2005). In Canadian BRs, the national BRP program is comparatively more supported (Canadian Biosphere Reserves Association 2008; Francis and Whitelaw 2004). Australian and Canadian experiences of BRs can be analysed as

a sub-set of the WNBR to provide a blueprint for BR resilience in these two countries, and by extension, other developed countries.

Third, the literature on BRs and complimentary studies highlight a consistent theme. Through a BR, willing communities can voluntarily contribute to their local region in social-ecological ways, thus creating and participating in sustainable development where local organisations (non-government and government), learning centres, industry, commerce and other parts of civil society pursue local to regional projects consistent with the aims of the deliberated BR ideal (Bridgewater 2002; Celecia 2000; Batisse 1982). The aims of the BR are not limited to environmental pursuits, but are generally those commensurate with environmental sustainability, and can include both socially and economically-oriented projects. Indeed, a mix of social, economic and environment sustainability initiatives best achieves a BR mandate (Francis 2004a).

Fourth, BRs are located between the historically secular spheres of government, industry and civil society, and are reliant on all for success (Jamieson et al. 2008; Gregg 1984). BRs are inherently complex and therefore are subject to multiple, cross-disciplinary challenges, uncommon to the historically secular operation of their constituencies (Brunckhorst 2001; Peine 1999; Francis 1992). Fulfilment of a BR's multiple agendas (social, conservation, scientific, capacity-building) is often impeded (Parker 2004; Smith 2004; Taylor 2004; Sparling 2001), as will be highlighted throughout the thesis. As a voluntary initiative, BRs rely on civil society and / or industry and government champions (Kusova et al. 2007).

Fifth, within Australia and Canada the conservation function of a BR is the most robust, commonly because the core area is a national, state, provincial or other form of protected area (Canadian Biosphere Reserves Association 2008; Bridgewater 2002). Sustaining previously established conservation efforts and creating new means for conservation, aligned with the new paradigm of protected areas, depends on finding means to meet social-ecological challenges (IUCN WCPA 2005; Locke and Dearden 2005; Slocombe 2004; Jamieson 2003). BRs are one of few international programs<sup>3</sup> to address present and future social-ecological integration, and it is this aspect of the BRP is its most important and defining feature (Birtch 2004e; Bridgewater 2002; Batisse 2000; UNESCO 2000b).

Sixth, the BRP is complementary to, and would be useful in, contributing to Local Agenda 21, the United Nations Conference on Environment and Development (UNCED) directives, national, regional and local government action plans, and has the capacity to bridge the well acknowledged gap between protected areas and their surrounding landscapes, of particular pertinence to connectivity

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<sup>3</sup> Other programs such as the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP) are examples of other social-ecological initiatives. The mission of the UNEP is 'to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations' (UNEP 2007: no page). The UNDP is an organisation advocating for change and connecting countries to knowledge, experience and resources to help people build a better life (UNDP 2007). These programmes mostly work in developing nations to alleviate the environmental and social effects of poverty, whereas the BRP can be applied in any country, and is designed to be equally adaptable to circumstances in developed and developing nations.

conservation (Nauber 2005; Raberg 1997; International Council for Local Environmental Initiatives et al. 1996; Whitney 1994). The hitherto lack of national impetus given to the Australian BRP, in light of such contemporary issues, is surprising, given the concern surrounding sustainable development this decade (Kearns et al. 2006; Moore and Rockloff 2006).

Seventh, theories surrounding place and community have gained increasing empirical support and refined definitions in recent years (Parisi et al. 2004; Cheng et al. 2003; Stedman 2003; Wilkenson 2000). There has also been increasing understanding of the real role 'place' and 'community' play in influencing natural-resource politics and management (Brunckhorst and Reeve 2006; Carr 2004; Parisi et al. 2004; Schusler et al. 2003; Shannon 1998). A concept of 'social catchments' has developed in Australia (Hugo et al. 2001: 49) and is defined as 'the territory occupied by a group of households and individuals who are in some form of regular interaction and which the inhabitants identify as 'their' community or region'. With a focus on local and regional scales, BRs are a form of catchment resource management (Batisse 1982). As highlighted in Chapter 7, sense of place is a contributing theme to governance within an integrated sustainability framework (Dant Ewart Unknown; Robbins et al. 2002; Buckingham-Hatfield and Percy 1999; Brown 1997). A social catchment is derived from the role of place (Cameron et al. 2004) and therefore, is a central issue in the investigation of resilience for BRs in this thesis.

Eighth, Canada's BRs are successful in a variety of ways (Canadian Biosphere Research Network 2006; Canadian Biosphere Reserves Association 2005; Francis 2004a; Borodczak 1995), making the country a good example for research. As Australia and Canada are two countries with similar political, environmental, economic and social foundations, the approach and lessons of the Canadian BR experience are useful for illustrating opportunities and complexities for the Australian context and elsewhere. Both countries are democratic, divided into large provincial and state authorities, and have close reliance on their national governments. They are geographically large nations with abundant natural resources, with the necessity to balance the yield of such resources with their equitable and wise use. Despite similar constraints and challenges to Australia's BRs and BRP, some remarkable successes have been achieved in establishing and sustaining BRs in many parts of Canada (Nelson 2004), and providing effective national coordination (Canadian Biosphere Reserves Association 2008). Chapter 6 discusses the Canadian and Australian adoption of their respective BRPs in more depth.

#### **1.4 Aim and Objectives of the Thesis**

This research concurs with other seminal contributions identifying that the institutional and organisational landscape should be approached as carefully as the ecological landscape, in order to elucidate what builds adaptive capacity and contributes to the resilience of social-ecological systems (Walker and Salt 2006; Berkes et al. 2003; Olsson 2003; Kinzig 2001). As Olsson et al. (2007: 1) poignantly state:

The mismatch between ecological and social dynamics is referred to as the problem of fit. A major challenge concerning the problem of fit lies in addressing the governance dimension of environmental management and the social factors that enable such management. This includes factors that stimulate the development of institutions that

respond to environmental feedbacks and that maintain the capacity of ecosystems to generate services for human well-being. It also includes social factors for monitoring ecosystem change and for generating, accumulating and transferring ecological knowledge and understanding.

The aim of this thesis is to identify the key features (assets, process and outcome) required to enhance the fit between governance systems and ecosystems using the UNESCO BR model, and develop a framework for establishing BRs as resilient working landscapes. By identifying features that seem critical for linking civil society, institutions and government dynamically across multiple levels, the research addresses the governance dimension of ecosystem management and the social factors that enable such management. The scope of the thesis is limited to developed country contexts.

This aim will be addressed by meeting the following objectives:

1. analyse the BR concept including functions, zones, variations, steps in the designation process and benefits of successful BRs;
2. understand the associated discourses and key drivers relevant to BRs;
3. analyse the operation of Australian and Canadian BRPs with respect to their historical development and present contexts;
4. examine the relationship between capital, governance and social-ecological resilience;
5. identify capital requirements for successful BRs;
6. identify governance principles and practices for successful BRs;
7. identify lessons from case analyses to inform the future operation of BRs and the BRPs in Australia and Canada, and by extension, those of other developed countries; and
8. integrate lessons and insights from the case analyses (Objective 7) with theoretical understandings (Objectives 4 to 6) to support the framework for BR resilience.

## **1.5 The Structure of the Thesis**

This chapter has introduced the conceptual framework, major themes, contentions, and the aim and objectives of the thesis. The justifications for the study have also been presented.

Chapter 2 discusses the methods utilised in the development of this qualitative research project and describes why and how the methods are appropriate for fulfilling the research aim.

Chapter 3 explains the defining characteristics of BRs, including their functions, physical characteristics, and application. Variation of the BR in practice is discussed alongside the lexicon of UNESCO in terms of its influence on the perception and practice of BRs. The designation process and the benefits of BRs are then explored.

Chapter 4 explores the theoretical maturation of the BR and the MAB Program from the 1960s to 1980s, alongside salient events. By plotting and discussing the various influential environmental discourses over this period, the maturation of the BRP and BR ideal is illustrated.

Chapter 5 continues with examination of discourses and key drivers relevant to BRs and builds on the conceptual maturation of the WNBR from the previous chapter, examining some of the influential



discourses and events through the 1990s to present. The emergence of adaptive capacity is highlighted as a key element of social-ecological discourse during this period.

Chapter 6 details the current *modus operandi* of the BRP in Australia and Canada, including its history and development. Historical operation and implementation of BR ideas and practice at federal government levels is addressed, providing context for later discussions of this influence on individual BRs.

Chapter 7 elucidates the major themes and sub-themes of the conceptual framework, thereby establishing the lenses of analysis for the following two case study chapters. The scope of this chapter does not allow for an extensive review of all current related arguments in these fields. Rather, the objective is to highlight the reinforcing relationship between capital and new governance in building social-ecological resilience.

Chapters 8 and 9 present four Canadian and four Australian BR case studies. Both of these chapters are concerned with the background, implementation, problems, successes and opportunities of the BRs in local and / or regional contexts with an emphasis on capital and governance praxis. The main resilience aspects of each case are examined to highlight the aspects of each that support experimentation, innovation and adaptive capacity.

Chapter 10 identifies lessons from the case analyses to inform the future operation of BRs and the BRPs in Australia and Canada, and by extension, those of other developed countries. Praxis and theory are woven and consolidated, highlighting the key facets of resilient BRs. The proposed framework for establishing BRs as resilient working landscapes is elaborated, and recommendations are made concerning its application and implementation.

Chapter 11 offers conclusions with respect to lessons and insights from the case analyses, integrated with theoretical understandings in support of the BR resilience conceptual framework. Avenues for future research are suggested along with ways in which the findings can be utilised in pursuit of locally-derived social-ecological initiatives.

### **1.5.1 Methodological Logic of the Thesis**

This section details the relationship between theory and case studies, describing the purpose of the case studies in generating and testing the conceptual framework; and providing explanatory detail and justification for the development of the conceptual framework given in Figure 2.

#### **Presentation of the Conceptual Framework**

Presented at the front of the thesis, the conceptual framework orients the reader to the major contribution of the thesis from the outset and provides context for the empirical and theoretical data within the logic of analysis. The case for the framework is subsequently developed throughout the thesis. By taking this approach:

- the logic and origins of the conceptual framework can be tested throughout the thesis, cross referenced with the empirical and theoretical data;

- the guiding themes of the thesis are clear and organised according to the objective of social-ecological resilience and representation of a successful working landscape; and
- the conceptual framework for analysis is evident, creating transparency of analysis and argument between empirical data and theory.

### **Origin of the Conceptual Framework**

The research approach set out in Section 2.2 describes the methods used to develop the conceptual framework. The conceptual framework was generated as a result of integrating reviews of the literature and field research. The approach taken was deductive in that initial conception of the framework helped shape the approach to data collection; inductive in the sense that field observations were used to contribute to theory development and the ultimate form of the framework; and abductive in that lay descriptions were also used to shape the ultimate form of the framework. The framework depicted in Figure 2 thus reflects a congruence of theory and empirical data. It draws on the theoretical foundations of BRs, current literature on social-ecological resilience, and experience of the case studies. Case studies are then assessed in that context according to a phase (I, II or III).

The case for the conceptual framework is presented and tested through the following logic structure:

- Presentation of existing theory (see chapters 2-5);
- Development of related research (see chapters 6-7); and
- Delivery of evidence (see chapters 8-10).

### **Purpose of the Case Studies (Chapters 8 and 9)**

The role of the case studies is:

- to contribute to the conceptual development of the framework; and
- to test and validate the developed framework.

The case studies provide the empirical data of the conceptual framework. They:

- provided a learning experience to ground the research in empirical data (existing data and theory);
- allowed for observed dynamics and interactions of BR social-ecological systems (observation); and
- through the use of theory, observation and lay description, provided basis for relating 'real world' praxis to developing governance and resilience theory (building and testing evidence).

### **The Relationship between Theory and Case Studies**

The conceptual framework was not fully developed prior to the case studies, but rather the case study data was used to inform and test the validity and robustness of the emergent conceptual framework, in conjunction with the cross referencing and learning from relevant academic theory. Interestingly the theory area of resilience, has been developed using these same modes of inquiry, where observation, theory and lay description are used concurrently to describe complex system interactions and dynamics (Stockholm Resilience Centre 2009).

The introduction to the background theory occurs throughout Chapters 2-5, while Chapters 6 and 7 present the development of related research. The major themes discussed in Chapter 7 are woven throughout the case studies in italic text allowing empirical data to be analysed according to related theory.

### **The Three Phases of the Conceptual Framework**

The three phases of the conceptual framework are not mutually exclusive but describe the relationship between themes that emerged from the empirical data and corresponding theory areas. The phases illustrate the grouping of themes and their sequence of occurrence in relation to a resilient social-ecological system. Occurrence of a particular theme of one phase concurrent to a theme of another phase is likely given that the phases are not delineated absolutely, and are instead an attempt to describe the complex dynamics co-occurring in the process of building, or impinging on, resilience. For any given social-ecological system of a BR, changes within and between the phases can occur as shifts in the state of capital, new governance and adaptive capacity alters over time and space. These issues of resilience dynamics are considered, developed and supported through evidence in chapters 7-10.

### **Classification of Case Studies into Phases and BR Success**

The achievement of a successful working landscape for the purposes of this framework is assessed according to achievement of Phase III in the conceptual framework. This does not indicate a stasis where success is achieved absolutely, but rather, resilience is more likely given a high level of adaptive capacity derived from strong new governance and capital asset processes and attributes. The social attributes necessary for resilient governance of a given social-ecological system is the focus for assessment of success. Each BR is attributed to a phase in the conceptual framework based on the empirical evidence and the theory linkages presented throughout the case study (in-text italics show themes). On the basis of the empirical evidence highlighting particular themes, each case is attributed to a phase of the conceptual framework.

## 2 Research Design

*The objective of this chapter is to describe and justify the research approach and methods. The research approach reflects the naturalistic approach employed in conjunction with interview, case study and focus group methods, literature reviews and validation through peer-review.*

### 2.1 Researching BRs: Geographic Scale and Multi-Disciplinarity

The propositions, aim and justification of this thesis were discussed in the previous chapter, providing an introduction to the epistemology of the researcher. The research approach provides the means to understand the social-ecological dynamics manifest in specific BRs and hence examine the factors of capacity and resilience in these systems. The study of BRs requires consideration and discussion of multiple discourses and disciplines.

There is common recognition that many interesting and challenging intellectual debates occur at the interface between disciplines, and opportunities are increasingly opening up that allow these debates to be progressed in a practical sense (Atkins 2004). Interdisciplinary work encourages porosity in disciplinary boundaries and the osmosis of knowledge (Lau and Pasquini 2004), both of critical importance to BRs. The definition of interdisciplinarity is widely interpreted, as the positionality of the researcher and the researcher's understanding of interdisciplinarity are key and problematic aspects of its definition (Lau and Pasquini 2004).

As a BR operates at a local to bioregional scale,<sup>4</sup> BRP concerns are complex, intricately connected and inherently interdisciplinary. Bioregional boundaries are natural, not political boundaries. Watersheds, mountain ranges, coasts or valleys are likely measures, on a scale that is meaningful to regularly interacting inhabitants and / or communities. Bioregions evolve and alter; overlapping boundaries exist. A bioregion refers both to geographical terrain and a terrain of consciousness – a place and the ideas that have developed about how to live in that place (Berg 1996). New and emerging literature supports the idea of a locally-based and bioregion-based governance for successful consideration, planning and management of social influence in ecological processes (Folke et al. 2005; Gibson 2004; Starik 2004; Francis 2003; Brunckhorst et al. 2002; Raco and Flint 2001).

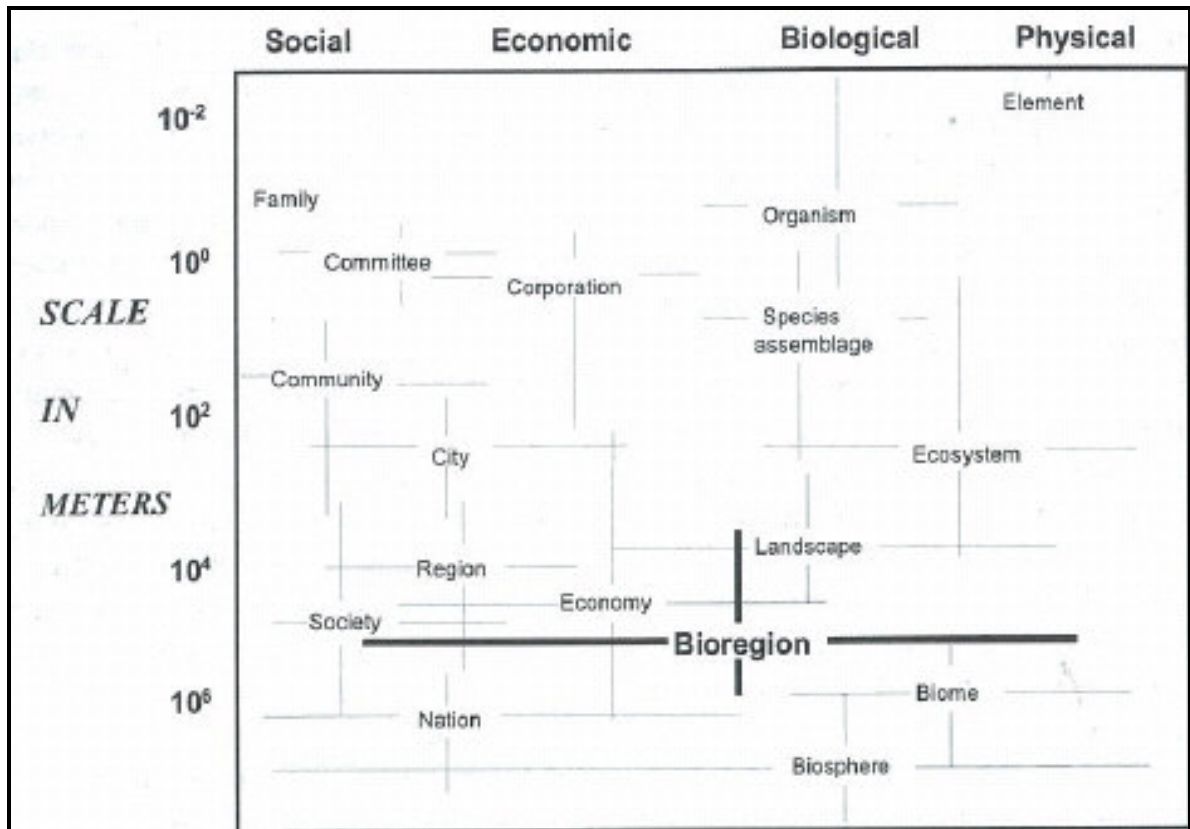
As indicated in Figure 3 (pg. 22), the spatial scale of the bioregion in relation to other social, biophysical, economic and physical scales that are often disparate, but still connected. The scale of BRs, located between community and bioregional scales contains multi- and cross-scale attributes so that human needs and activities are considered and integrated with ecological structural and

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<sup>4</sup> 'Bioregional' in this thesis reflects the use of the term as applied in social geography, derived from literature on bioregional management and bioregionalism (Dant Ewart Unknown; Thayer 2003; Brunckhorst 2000; McGinnis 1999; Dodge 1998; Wadland and Gibson 1997; Berg 1991). The term 'bioregion' is commonly associated within Australia with the Interim Biogeographic Regionalisation of Australia (IBRA) however this is a separate concern associated with spatial scales much larger than those discussed in relation to bioregions here. Within IBRA, 85 national bioregions and 404 sub-regions are reporting units for assessing the status of native ecosystems, their protection in the national reserve system and for use in the monitoring and evaluation framework in the Australian Government's current Natural Resource Management initiatives.

functional processes. In contrast, the common and less effective approach is to consider these scales separately, using a reductionist perspective, which does not draw together these attributes.

**Figure 3 A generalised view of the spatial scale of a variety of biophysical and societal features**



Source: Adapted after Slocumbe (1993) and Brunckhorst (2002: 112).

For example, Gibbs and Jonas (2000) suggest that it is increasingly evident that a local scale is not only an appropriate point of analysis in the environmental policy-making process, it is also a useful point of policy and political intervention. It offers a terrain whereupon interest groups mobilise, policy regimes begin to take shape, and the effects of regulatory processes become more readily apparent (Gibbs and Jonas 2000). It is at the local level where environmental policy regimes or other types of political regimes that incorporate or preclude environmental action can become fairly coherent and hence identifiable as relatively self-contained. The identification of the principal interests and groups, and their arenas of interaction, discourses and substantive policies, goes a long way towards identifying the 'boundaries' of a local environmental policy making systems, albeit that these may not correspond to already existing physical, property or even local jurisdictional boundaries (Gibbs and Jonas 2000).

## 2.2 Research Approach

The research process was exploratory and qualitative in nature, utilising a combination of inductive (observation to theory), deductive (theory to observation) and abductive (lay description to concept and theory) methods. The details of the thesis topic changed as ideas were refined and developed. In finding the scope and direction of the study, many theoretical and empirical paths have been

explored. In this way, the process of delineating the research topic, validation, collecting information and analysing have been highly iterative.

As a complex social phenomenon, BRs were suited to an emergent (abductive / inductive) research design that allowed the research to unfold rather than be constructed. Such scope was difficult to grasp from the outset of the project, and refinement of questions and directions for investigation were continual challenges. The research was open-ended and exploratory, around major themes, particularly at the outset. Some components of the research could be approached using a deductive method (theory to observation).<sup>5</sup> At times, the combination of inductive and deductive reasoning processes was necessary where a feedback cycle of theories to observations and observations to theories enabled patterns to be observed in the data, that led to the development of new theories. This process provided the basis for the findings presented in Chapter 10. The theory development is indicated by the refinement of the literature searches conducted, as described in section 2.3.2.

By utilising a variety of empirical methods: case study, personal experience (key informants), interviews, focus groups and text, a wide range of interconnected interpretive practices have been employed (Denzin and Lincoln 2000). The result is a better understanding of the subject matter. Each of these approaches to data collection has provided a specific perspective, for composing and producing a 'pieced - together set of representations that are fitted to the specifics of a complex situation ... an emergent construction, that changes and takes new forms as different tools, methods, and techniques of representation and interpretation are added to the puzzle' (Weinstein and Weinstein 1991: 4).

The qualitative, elite, snowballing data collection process employed during the research characterises what Gillham (2000) describes as a naturalistic inquiry utilising an emergent design and inductive theorising, with significant concern for process through finding phenomenological meaning. This suite of qualitative research characteristics stands in contrast to the experimental science approach which is 'ill-suited to the complexity, embedded character and specificity of real life phenomena' (Gillham 2000: 6). A completely deductive, or predetermined procedure of investigation, was not appropriate as *a priori* theoretical notions were not a feature that characterised the data in the early research stages. Until immersion in the data and contexts of the cases could be achieved, the appropriate explanations would not become clear.

Empirical evidence formed the basis for data, alongside sparse published material on BRs in Australia, and more plentiful information in Canada. At the outset of the research the informal and voluntary nature of Australian BRs supported this naturalistic approach. Many biologically-oriented studies have been conducted within BRs internationally and published, and these have aided the publicity of BRs and upheld an important function for BRs as stipulated by UNESCO. However, these

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<sup>5</sup> For example, in the later stages of case study visits, themes had become apparent that were represented at each BR. By this time, a theory was established that the themes would be present at subsequent BRs. By visiting these final BRs, the theory was validated as the themes appeared throughout the data collection process.

studies have not been a central concern of this thesis insofar as illuminating the issues of BR social-ecological resilience in Canada and Australia.<sup>6</sup> In utilising a naturalistic inquiry method, the research questions were framed around the axioms of that approach as discussed by Lincoln and Guba (Lincoln and Guba 1985). In a description of naturalistic inquiry, they suggest that research of this nature is undertaken according to a number of criteria, discussed below. These criteria were a central consideration in the development of the research approach and contributed to the methodological framework.

First, the research context was important, where research interaction took place in context where possible (on site of BRs) for fullest understanding. All BR case studies were visited and experienced. Second, capturing personal experiences of the key informants of BRs was the instrument for primary data gathering because these individuals were central to understanding BRs. Third, qualitative methods were selected because they were more adaptable due to greater sensitivity and adaptability to the many mutually shaping influences and value patterns that were to be encountered. Fourth, purposive sampling was a characteristic of the research, to access the scope of data required and enable adequate account of local conditions and local values. Fifth, inductive and abductive data analysis was employed to ensure that values could be an explicit part of the analytic structure.

These naturalistic inquiry criteria were utilised in conjunction with a grounded theory approach, defined as:

a general methodology for developing theory that is grounded in data systematically gathered and analysed. Theory evolves during actual research, and it does this through continuous interplay between analysis and data collection (Dick 2002: no page).

According to Dick (2002) what differentiates grounded theory from much other research is that it is explicitly emergent. It does not test a hypothesis, rather it sets out to find theory applicable to the research situation where the aim is to understand the research situation. As Glaser (1978) states, grounded theory aims to discover the theory implicit in the data. This approach was useful for interpreting the BR cases.

During the course of the research process, the opportunities afforded through a naturalistic, grounded theory approach, such as 'keeping an open mind' (Gillham 2000: 18) meant that many new insights were continuously gained. As a result, the research questions which essentially drove the direction and scope of the thesis changed in relation to regular discoveries, from both the literature and key informants. However through this emergent design and approach, multiple themes and issues associated with BRs were able to be identified and examined, closely tied to the themes of the literature. New information and key informants were constantly sought and analysed. Data collection and analysis often occurred together, in an iterative manner.

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<sup>6</sup> Research and monitoring are key functions of BRs in Canada and Australia, however their relevance to this research aim is limited. The overall role of research and monitoring programs in BRs is, however, considered important in supporting and demonstrating BR objectives.

The research approach recognised that the key informants are engaged in negotiated outcomes regarding data meaning and interpretation, and that they can best understand and interpret the influence of local value patterns through their lived experience. A case study reporting mode was chosen, as it is a method adapted to the description of latent meaning and it provides the basis for both individual 'naturalistic generalisations' and transferability to other sites based on similarities of themes. Caution regarding the application of findings to a broad context should be applied, depending on the empirical similarity between case study contexts. For example, Australian and Canadian BRs are comparable on the basis of key indicators such as democracy, economy and environment and are therefore suited to such analysis.

## **2.3 Methods**

### **2.3.1 Qualitative Research**

Qualitative research facilitates the study of issues in depth and detail. The researcher is not limited by present categories, but by a process that allows for depth, openness and detail in the qualitative inquiry. Qualitative methods do not isolate phenomena from their context and meanings are allowed to emerge (Creswell 1998). In comparison, quantitative research methods require the use of standardised measures, where 'the perspectives and experiences of people must fit into a limited number of predetermined categories to which numbers are assigned' (Patton 2002: 14). With this discussion in mind, Silverman's (2000: 12) suggestion regarding 'making pragmatic choices between research methodologies according to your research problem' was considered.

This research is located within the general understanding of qualitative research:

... a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them (Denzin and Lincoln 2000: 3).

The description below cites the difference between quantitative and qualitative study, highlighting the facets of a qualitative research type:

The word qualitative implies an emphasis on process and meanings that are not rigorously examined, or measured (if measured at all), in terms of quantity, amount, intensity, or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. They seek answers to questions that stress how social experience is created and given meaning. In contrast, quantitative studies emphasise the measurement and analysis of causal relationships between variables, not processes. Inquiry is purported to be within a value-free framework (Denzin and Lincoln 1994: 4)

### **2.3.2 Literature**

Expansive iterative literature inquiries were conducted on research ideas during initial investigations and throughout the research process. An explorative mode was necessary to gain as complete a



picture of the research as possible, given that the realm of the BRP covers international, national, regional and local concerns situated within environmental, social and economic sustainability. Sets of research themes evolved in response to the research process, and responded to the observations collected from empirical data collection phases and iterative literature reviews. The empirical data collection was guided by the literature (deductive) and findings from the empirical data also affected the literature searches (inductive) in a continuous feedback loop. The sets of themes below highlight the progression, development and specialisation of the research and associated literature.

**Set 1 (mid 2002 – mid 2003)**

- Biodiversity conservation;
- Global environmental crises;
- Protected Areas theory;
- Ecosystem services;
- Non-government environmental conservation programs such as Land for Wildlife;
- UNESCO Biosphere Reserves; and
- Australian government environmental conservation efforts.
- 

**Set 2 (mid 2003 – mid 2004)**

- UNESCO;
- Biosphere Reserves and Urban Biosphere Reserves theory;
- Ecosystem services;
- Urban Ecology;
- Canadian and Australian Biosphere Reserves;
- Bioregionalism;
- Institutional change;
- Urban sustainability; and
- Eco-cities.

**Set 3 (mid 2004 – mid 2005)**

- Urban Biosphere Reserves;
- Eco-Civic Regions;
- Civic Environmentalism;
- Community capacity-building;
- Working landscapes;
- Bioregional management and planning;
- Australian and Canadian approaches to Biosphere Reserves and conservation;
- Natural resource management;
- Bioregionalism; and
- Institutional change and capacity-building.

**Set 4 (mid 2005 – 2007)**

- Capacity-building and capital (community, social, human, physical, institutional);
- Complex systems thinking;
- Civil society environmental governance and eco-civic regions;
- Social-ecological systems;
- Environmental discourse 1960 – present;
- Resilience and adaptive governance in social-ecological systems;
- Governance and New governance;
- Adaptive management;
- Integrated sustainability approaches; and
- Panarchy theory.

Literature was sourced from journals (library editions and on-line); books; editorials; on-line articles and web pages; limited circulation internal documents; archives; theses; newspapers; reports; management plans; magazines; and personal and professional libraries. The majority of literature was obtained from the following institutions: University of Tasmania and affiliated national and international universities and libraries by the University of Tasmania Document Delivery Service; CSIRO Sustainable Ecosystems (Australian Capital Territory), through their national library database; University of Melbourne (Victoria); Department of Environment and Water Resources (Australian Capital Territory); Department of Tourism, Arts and Environment (Tasmania); Brock University (Ontario); University of Waterloo (Ontario); Wilfred Laurier University (Ontario); University of Toronto (Ontario); Simon Fraser University (British Columbia); University of British Columbia (British Columbia); and through various other smaller organisations during the research, for example, the

Fitzgerald Biosphere Group office library (Western Australia) and the Ecological Monitoring and Assessment Network library (Ontario).

### **2.3.3 Elite Sampling and Snowballing Technique**

The need to elicit personal experience on BR related matters meant that the type of subject appropriate for the study is described by the methodological literature as an elite type. Elite sampling<sup>7</sup> targets specific individuals based on pre-determined criteria, that are closely related to the research topic in some way. Knowledge, experience, historical involvement, or employment related to BRs in Australia and Canada were criteria in the selection of informants. In this research, a limited number of potential key informants was a defining aspect of the research, therefore targeting an elite sample was a valid method (Patton 2002).

Snowball sampling is a social science sampling method that allows the recruitment of subsequent key informants from an initial group of key informants (Denzin and Lincoln 2000). Interaction with preliminary key informants elicited new possibilities for other informants, usually within their own network, for example, government informants would suggest other government individuals of potential value for the research. The snowballing technique was particularly useful during the conduct of overseas and interstate interviews, as the networks of potential informants were not easily identified. The exception was within BRs, where it was possible to have informants suggest possible informants from other networks, which arose due to the multi-disciplinary nature of BR committees. These committees consisted of people from community, research, government, industry, education, non-government organisations and other sectors of civil society.

Sampling was conducted in a top-down as well as a bottom-up manner. In a top-down manner, government officials at the federal and state/ provincial level were identified, and they often suggested other potential informants. In a bottom-up manner, volunteers at BR committee meetings were targeted as informants, who often suggested other potential key informants. Through journal articles and books, potential academic informants were selected. Through the internet, activists and BR participants were identified. By attending national and international conferences, other informants in either BRs or parallel disciplines were approached and interviewed. All recruitment of key informants occurred through publicly available contact details, made accessible by affiliation in some way with an individual BR or the Australian or Canadian BRP.

A key criticism of snowball sampling lies in its tendency to produce a homogenous sample – people's professional and social networks are often constituted of others in similar positions (Mason 1996). However, since the aim of the project required information sourced from an elite sample group where knowledge and experience are concentrated amongst a small minority, the approach yielded data rich with insights, where the range of interests represented within the case BRs was indicative of BR communities more broadly.

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<sup>7</sup> Also known as purposive sampling.

Amongst the informants were those who came from many professions or employment backgrounds. For some key informants, the BR was an initiative that strongly represented their own beliefs and provided a means to become involved in their local communities. Natural sciences were strongly represented amongst key informants. In a number of BRs, key informants with a natural sciences background had become involved in the initiative as a result of their work, particularly in Canada. In other instances, the BR was recognised by key informants for its interconnection of social-ecological issues, providing a tool for change, of which they wished to be a part.

#### **2.3.4 Interviews**

Key informants involved in interviews were identified according to the elite snowballing technique described. One of the strongest advantages of elite interviews is that they enable researchers to interview first-hand participants of the processes under investigation, allowing for accounts from direct witnesses to the events in question (Dunn 2000). While documents and other sources may provide detailed accounts, there is often no substitute for talking directly with those involved and gaining insights from key participants (Hammer and Wildavsky 1989). The nature of interviewing also allows interviewers to probe their subjects, and thus move beyond written accounts that may often represent an official version of events, and gather information about the underlying context, and build up to the actions that took place (Huberman and Miles 2002). When interviewees have been significant players, when their memories are strong, and when they are willing to disclose their knowledge of events in an impartial manner, elite interviews will arguably be the most important instrument in the data collection toolkit (Tansey no date).

The selection of key informants and conduct of interviews was able to be continued throughout the research as new informants were identified through networks of contacts. Diversity of opinion was sought. Site visits provided ample opportunity for interview and in such instances, key informants were selected on the basis of their involvement (past or present) with the BR. At other times, more general specialists were sought, whose knowledge represented a broader and general expertise on BRs or protected area management. For example, national environmental department employees were chosen with several decades of intermittent national BRP involvement. A total of 52 key informant interviews were conducted. Of the data arising from these interviews, some is included verbatim in the thesis. All data informs the work, regardless of its inclusion in-text.

An inductive and abductive approach to observation and interviews helped shape the collection of data in the field. Locations of interviews were arranged in advance where possible and generally occurred within homes, offices, cafes or universities. Where formal interview appointments were not made (for instance, a chance meeting), a conversational type interview would ensue. Interview questions selected for the interview schedule were descriptive, knowledge-based, devil's advocate and opinion types, as outlined by Dunn (2000). Interviews followed a semi-structured format, allowing for the specific story of the key informant to be revealed through discussion, as influenced by their experience, involvement, employment or opinion of BRs. For instance, interviews would begin with an introduction and overview of the project and the aim of the interview. This would differ according to the key informant. Information sought from a federal government protected area manager was

different to the information sought from a local BR committee member, as their experiences and worldview had insights at different scales (national versus local). Interviews were often conversational, building upon the issues discussed and eliciting information that would have been masked using a structured approach. An example interview schedule and consent form is provided in Appendix A. As many interviews were informal, conversational types this interview schedule provides an indication only, and represents a semi-structured type.

Interviews were recorded but when a recording was not appropriate, for example due to noise, extensive notes were taken. Notes provided a useful benchmark for all interviews. Recorded interviews were transcribed verbatim. The interview data was de-identified using a code, to protect informant identity and offer consistency throughout the data presentation. Consistency of identification is an issue as not every informant agreed to be identified. The approach to grouping the informants was decided upon as most appropriate means to de-identify, but still provide indication of the informant's BR experience and background. The code categorises key informants into three groups for each country, which gives context to the knowledge base from which the comment or information is derived. Only Australian informants are referenced in the Australian case studies, and likewise, only Canadians in Canadian case studies due to the nature of expert knowledge encountered, which was found to be limited to national contexts. Multiple categories can be applied to an individual key informant, for instance if they fulfil an academic and a champion role. The codes used were:

- A – Academic (natural resources, planning, environment, ecology, sustainability);
- C – Champion (voluntary contribution to a BR and / or BRP, generally showing an outstanding level of commitment);
- E – Employee (works in relation to BRs, funded either directly by a BR or the Canadian Biosphere Reserve Association (CBRA), or indirectly, by related government sectors partnering in BRs); and
- P – Public servant (local, provincial/ state or federal government agency).

First-hand perspectives provide candid opinion that could be considered contentious. These perspectives can only be acquired through lived experience and dialogue with those who have that experience. Words and vernacular used by informants captured their individual views, describing their own experiences and perceptions. The key informant non-academic text conveyed their lived experiences and provided the best representation of their meaning. For this reason, direct quotes have been included in the thesis to illuminate these lived experiences that are often absent from the academic text and representation of theory around BRs.

The quotes provide a change of pace to the formal and impersonal literature data, enriching and aiding understanding of the mosaic represented by each BR: the people, place, networks, communities, environments and histories that make social-ecological places. The data, presented in this way, '... speaks, in the same sense that a poem speaks, about meaning, about thematic statements' (Lukiv 2004: no page).

### **2.3.5 Focus Groups**

Data from focus groups is not presented in-text but provided material for the researcher to better understand the nature and context of BR resilience. An opportunistic approach was taken in the conduct of focus groups. For example, at the end of BR committee meetings, knowledgeable individuals were already assembled, providing an opportunity for a focus group. Focus groups were held at: Mornington Peninsula – Western Port Biosphere Reserve; Fitzgerald Biosphere Reserve; Riverland (formerly Bookmark) Biosphere Reserve; Long Point Biosphere Reserve; the Canadian Biosphere Reserve Association; Clayoquot Sound Biosphere Reserve; and CSIRO Sustainable Ecosystems Urban and Regional Futures Group.

The flow of discussion was directed by an introduction to the research, then a general topic of discussion. Individual views were sought, from whence argument or general conversation flowed. If clarity was required on specific issues, questions would be posed to the group. But it was the inadvertent information arising from these discussions that proved to be most illuminating. Employing a semi-structured approach elicited rich insights from these groups, providing enough flexibility to go away from the question to address a related issue when required.

Groups consisted of six to 15, and sessions lasted approximately one hour. Interaction amongst group members was a key characteristic of this research method, and distinguishes it from the interview method where interaction is between interviewer and respondent (Cameron 2000). The dynamism inherent in focus group situations allowed for chains of responses. Group members would respond to the contributions of others, exploring different points of view, often reconsidering their own ideas and understandings or formulating new ones. Cameron (2000: 101) states ‘the interactive element makes focus groups ideally suited to exploring the nuances and complexities of people-place relationships’.

### **2.3.6 Case Studies and Site Visits**

Eight Australian and Canadian BR case studies were visited and presented a broad, representative profile of the state of Australian and Canadian BRs and their BRPs. The case studies are examples of local interactions of actors and their social-ecological environment, and illustrate various social mechanisms behind the BR concept and practice. The following cases were chosen on the basis of accessibility, costs of transport to the BR, and existing information available about the BR (i.e. limited or available information found through searches). Whilst these criteria represent constraints of the research and determined those BRs selected to those not, the cases selected represent each country's BRP as 8 cases in a total of 30 BRs in both countries (15 in each country). The case studies selected were:

1. Mornington Peninsula- Western Port Biosphere Reserve, Victoria, Australia;
2. Riverland Biosphere Reserve, South Australia, Australia (formerly Bookmark Biosphere Reserve);
3. South-West Tasmania National Park Biosphere Reserve, Tasmania, Australia (de-listed 2002);
4. Fitzgerald River National Park Biosphere Reserve, Western Australia, Australia;

5. Niagara Escarpment Biosphere Reserve, Ontario, Canada;
6. Long Point Biosphere Reserve, Ontario, Canada;
7. Mt. Arrowsmith Biosphere Reserve, British Columbia, Canada; and
8. Clayoquot Sound Biosphere Reserve, British Columbia, Canada.

Engaging with expert academics and individuals within the study scope produced prolific and unexpected findings and was a highlight of the research process. With its own unique history, a case study is a complex entity operating within a number of contexts – physical, economic, ethical, aesthetic, political, environmental and social.<sup>8</sup> These contexts are relevant and important to the description and storytelling of individual BRs.<sup>9</sup> Local meanings are important. Therefore, every case was experienced, by spending periods of time at the BR, in contact with activities and operations of the case, reflecting and revising on derived meanings and interpretations. The amount of time spent visiting each site was generally not pre-determined, but rather judged on the number of key informants available, the complexity of the case and the time available. The geographical limitations imposed by the choice of cases were considerable. The advantages of internet, email and regular telephone calls managed many of the issues of long-distance research. A lengthier stay in Canada would have been beneficial however the logistics of a deadline, cost, travel and reliance on others meant that this was not realistic.

The case study is a research strategy which focuses on understanding the dynamics present within single settings and is defined by interest in individual cases, not by the methods of inquiry used (Eisenhardt 2002). As a multi-aimed approach, using multiple case studies provided description and the generation of theory. The approach to the case studies follows Yin (1991a), as it offers simplicity, clarity, rigor and practicality of application. A case study is an empirical enquiry that:

Investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin 1991: 6).

The case study method is useful for examining what Yin characterises as how and why questions, as it can deal with operational links needing to be traced over time, rather than mere frequencies or incidence (Yin 1991b). Tracing such links was appropriate, as challenges and opportunities of the development and logistics functions common to the BRs was sought. Knowledge was built through experiencing each case based on its own context in terms of geographical location, local relations, regional linkages, relations to the national BRPs, specific and shared opportunities and challenges. Bradshaw and Stratford (2000:41) propose that cases are examples of more general processes or structures that can be theorised. For this study, the cases are indicative of BRs in Australia and Canada, and the local, regional and national circumstances that help or inhibit their operation.

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<sup>8</sup> Unique histories are the milieu of each BR, however from these, common themes emerge related to the struggle for resilience.

<sup>9</sup> Stake (2000) argues that the ethos of interpretive study, or seeking out emic meanings held by the people within a case, is strong. Storytelling can be one of the most common means of eliciting place-specific knowledge, and was critical in this data collection, as nearly all data from the case studies was not available in any other form than personal narrative, drawing from direct experiences and memories.

The cases represented what Stake (2000) describes as instrumental case studies, where a particular case is examined mainly to provide insight into an issue or to redraw a generalisation. An instrumental case study is one where specific contexts give rise to each of the different cases with their own unique characteristics. The case is of secondary interest as it plays a supportive role, and facilitates an understanding of greater BR context and challenges. Stake (2000) describes the collective case study, known as an instrumental case study extended to several cases. In this thesis, investigation centered on the phenomenon of BRs, and their general condition, and an instrumental case study approach has been extended to the suite of case BRs. Stake (2000) argues that the cases may be similar or dissimilar, redundancy and variety are each important. Indeed, the cases analysed exhibit these characteristics, as illustrated in Chapters 8 and 9.

Eisenhardt (2002) suggests that the temporary nature of salient milestones for the research are common in case study approaches, where no construct is guaranteed a place in the resultant theory, and research questions can shift during the period. Stake (2000) proposes that it is better to negotiate parts to be studied and parts not, and then do an in-depth study pursuing a few key issues. Furthermore, Stake (2000) states that the ordinary is too complicated to be mastered in the time available. These statements illuminate some of the problems of a multi-disciplinary multi-case study project like this one, where even simple tasks were constantly challenging. A highly reflexive and reflective approach on the part of the researcher was necessary.

### **2.3.7 Ethics**

Due to the involvement of human subjects in the research, ethical clearance was required under the University of Tasmania postgraduate research protocol. Requisite information pertaining to the conduct of the research was submitted at several intervals for examination by the Human Research Ethics Committee (Tasmania) Network. The ethically sensitive conduct of interviews and focus groups was addressed in these submissions. Approval was granted at each stage of ethics application submission and review. The data collected was treated with confidentiality. However through discussions with key informants, most demonstrated an ambivalence for de-identification of their data, owing to the negligible sensitivity of the topic. For anonymity, transcribed interview data has been de-identified. Permission by the key informant was attained where data identification was required in-text.

## **2.4 Analysis**

Empirical data (interviews and focus groups) was compared and checked against the literature using meaning categorisation, meaning condensation and meaning interpretation. Kvale (1996) describes these methods of interview analysis. The first main approach, meaning categorisation, coded the interview text into simpler categories, such as partnerships, for example. These categories were then further coded and divided into more specific categories. Meaning condensation compressed larger statements into shorter statements while maintaining the interviewee's original meaning and vernacular. This research used meaning interpretation in order to relate the empirical data analysed using these other two methods to broader frames of reference, similar to a critic's interpretation of a film (Denzin and Lincoln 2000). Coding the data is both an abductive and inductive process. Using

induction, particular empirical phenomena are explained or described by subsuming it under an already existing category or rule. Abduction also allows the researcher to find new, unknown concepts or rules based on surprising or anomalous events. So, possible theoretical preconceptions are expected and are revised when immersed in the data (Denzin and Lincoln 2000).

A striking feature of research that builds theory from case studies is frequent overlap of data analysis with data collection (Eisenhardt 2002). Much of the data were analysed immediately in an informal sense, through comparison with other primary and secondary data. As data took many forms depending on the key informant or source (literature, storytelling, visual, interviewing, focus groups), the data were first grouped according to form, and then later compared and contrasted within and between these data forms. However, the nesting of all of these data forms into each specific case was the most useful method, where detailed case-study profiles were constructed for each case. These included mostly descriptions and observations, and at later stages, other data forms were layered and woven throughout to enrich the preliminary notes. Intimate familiarity with the details of each case occurred as new and existing data was iteratively built upon. As more cases were investigated, commonalities of theme began to emerge.

Another approach selected to analyse the data, not only on each case, but in the theoretical context of BRs and its related subject areas, was to select themes and then seek out within-theme similarities and differences. The BR resilience conceptual framework was informed by these themes, which presented themselves at the final stages of the case investigations. Through the employment of these lenses, the data were again examined, eliciting another level of meaning and understanding.

The emergent themes, relationships and concepts were compared between cases. In the formulation of the thematic categories, the strongest and most repetitive themes from each of the cases were selected. Through an iterative and reflexive approach, the data became extensively known and understood. Unlike a quantitative undertaking, none of the steps taken in the context of analysing the BR data could be replicated, but rather was a journey taken and retraced in many places as new insights and questions arose.

Emergent concepts and theory were then compared with the literature. As a new area of inquiry however, the sources for comparison were limited. Searches under the general theme of BR turned up several new theses in related disciplines, and confirmed and offered additional insights into the same problems faced in these cases to those occurring in other countries, for example, South Africa and England. An interesting point of investigation was found in anti-BR sentiment arising principally from the United States.

By tying the emergent theory with the existing literature in this way, the internal validity, generalisability and theory-building from the case study research grew. Moreover, as a theory-building research type, Eisenhardt (2002) suggests that the linkages to the literature in this way are of crucial importance when a relatively small number of cases are used, (in this case the number of BR case studies compared to the size of the WNBR) (see Chapter 3). The number of cases were suitable as, with each new case, a higher degree of similarity of data occurred, or a reconfirmation of theory.



With each additional case, experiences became increasingly familiar, and reinforcement of data was high. Recurring themes became evident. At this point in the analysis, the decision not to undertake any new cases was thus appropriate.

## **2.5 Validation**

Transcripts were provided to key informants of interviews and focus groups for verification and validation. This method confirmed that the transcribed version of their data accurately represented their meaning. Cross-examination and theory building utilising literature to guide the emergent themes of the empirical data provided a safeguard and validation of the outcomes of analysis. Cross-checking, with established academic thought related to the themes, was also an important tool. Some aspects of theory and conceptual development have been checked with peers.

Validation of draft versions of the research<sup>10</sup> was provided by academic and interest groups of the project in Australia and Canada. Parties to the validation of this research included:

- host-university academics, including professors of protected area, sustainability and BR related disciplines;
- experts and interested individuals in the research theme areas (direct contact or by validation through their published work);
- other PhD students in related theme areas to this research;
- research supervisors of this PhD;
- conference attendees at presentations offering feedback and questions during discussion time, or cross-confirmation of this research approach/ paradigm through their own presentation on theory/ practice of theme areas;
- international journal referees for Matysek et al. (2006), a publication arising from this thesis and a submission to the Australian Capital Territory Standing Committee on Planning and Environment, Inquiry into the Australian Capital Territory (ACT) as a BR (Kearns et al. 2006);
- key informants, including BR champions; and
- CSIRO scientists.

## **2.6 Application to the Research**

This chapter has described and justified the qualitative emergent naturalistic inquiry research, using a multi-method approach to elicit the experiences and importance of BRs in the complex social-ecological framework within which they are immersed. Literature, elite snowball sampling technique, interviews, focus groups, case studies and continuous validation developed the data, iteratively building knowledge through inductive, abductive and deductive verification of BR resilience issues in Australia and Canada. Literature has guided the conceptual development and framework, providing a critical aspect to understanding and interpreting the empirical data of the case studies and interviews, and a lens through which to understand the subtleties of BRs. The next chapter will now turn attention to the BR concept, examining the attributes of the model and its application.

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<sup>10</sup> Draft versions of the research included brainstorming, presentations at conferences, journal articles, conceptual frameworks, theory development, empirical research results, chapter drafts, and thematic cross-checking.

## 3 Biosphere Reserves

*The objective of the chapter is to examine the defining characteristics of BRs. The overall concept, BR functions and the institutional framework of UNESCO / MAB are examined, followed by a discussion on the structure of MAB, the Seville Strategy and the Statutory Framework. The three zones of BRs are considered, followed by several different types of BRs and examination of Mark I and Mark II BRs. Connectivity conservation, as a related idea, is presented. The designation process of a BR is presented along with the examination of the sometimes problematic language of UNESCO. Some points on BR governance (elaborated in Chapter 7) and the general benefits of successful BRs are discussed.*

### 3.1 The Concept

BRs are both a concept and a tool used to achieve a sustainable balance between conserving biodiversity and promoting human development while maintaining associated cultural values (UNESCO 2002b). The concept and name Biosphere Reserve was coined in 1974, originating in the UNESCO MAB Program (UNESCO / MAB), which was established in 1971, following recommendations from the International Biosphere Conference held in Paris in 1968. The BR concept underwent significant revision in 1995 with the adoption by the UNESCO General Conference of the Statutory Framework and the Seville Strategy for Biosphere Reserves (UNESCO 2006a). A BR is often defined by the following, as:

[a]n area of terrestrial and coastal/marine ecosystems or a combination thereof, which are internationally recognised within the framework of UNESCO's MAB Program, in accordance with the present Statutory Framework (UNESCO 2006a: no page).

These areas are designed to reconcile conservation of biodiversity and biological resources with their sustainable use and the concept of a BR remains 'quite general so that it can be applied flexibly to the vast range of particular ecological, cultural and socio-economic conditions found throughout the world' (Francis 2004a: 5). Principally, BRs are an open system, looking out towards the management problems of their surrounding areas, and incorporating land-use management concerns of local populations (Brunckhorst 2000; Kriwoken 1989). The relationship between protected areas, including IUCN Category V protected areas, and BRs is investigated in Chapter 4. According to UNESCO (2003), the WNBR provides context-specific opportunities to combine scientific knowledge and governance modalities to:

- reduce biodiversity loss;
- improve livelihoods;
- enhance social, economic and cultural conditions for environmental sustainability; and

- contribute to the pursuit of the Millennium Development Goals (MDGs), in particular MDG 7 on environmental sustainability.<sup>11</sup>

BRs can also serve as learning and demonstration sites in the framework of the UN Decade of Education for Sustainable Development (DESD). The DESD coincides with the UN MDGs, where UNESCO is actively working to 'help countries implement a national strategy for sustainable development from 2005 to reverse current trends in the loss of environmental resources by 2015' (UNESCO 2003: 2).

### 3.2 Biosphere Reserve Functions

According to UNESCO (2007e), BRs should strive to be sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale. Each BR is intended to realise three mutually reinforcing functions:

- a conservation function (alternatively called an ecosystem function), to preserve genetic variation of species, ecosystems and landscapes;
- a development function (alternatively called a capacity-building function), to foster economic and human development which is socio-culturally and ecologically sustainable;
- a logistic function (alternatively called a research and monitoring function), to support demonstration projects, environmental education, training, research and monitoring related to local, national and global issues of conservation and sustainable development (Batisse 1982; Batisse 1997; UNESCO / MAB 2001; UNESCO 2004c).

Francis (2004a: 6) states that:

... the three main functions of BRs are conservation, promotion of sustainability for local or regional economies, and provision of logistic functions in the form of research, monitoring, education, training and demonstration projects directed to local and regional issues of conservation and sustainability. Organisational arrangements also have to be in place to coordinate or manage these obligations for a BR.

Through the conservation role, BRs have the potential to maintain the integrity of biological support systems, which are vital for humans and other species that form the natural world (UNESCO 2002a). According to the ideal, the conservation role of BRs is primarily served in the protected areas contained within the reserve, where biodiversity protection is the highest priority. These sites serve as reference points: areas undisturbed by continuous human influences, which can provide sites for baseline data to compare with modified adjacent lands (Birch 2004e). The conservation of biological diversity remains one of the key factors in BR site selection and management (UNESCO 2007e).

The development role of BRs is reflected in activities that help move towards more equitable and sustainable ways of using natural resources. This is accomplished with the cooperation of local communities, where partnerships, protagonists and place-oriented issues combine for socially meaningful local to regional scale conservation, economic, and development (or capacity-building) goals.

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<sup>11</sup> Millennium Development Goal 7 is 'to ensure environmental sustainability, by integrating the principles of sustainable development into country policies and programmes; reversing loss of environmental resources; reducing by half the number of people without sustainable access to safe drinking water; and achieving significant improvement in lives of at least 100 million slum dwellers by 2020' (UNESCO 2006c: no page ).

The logistics function of BRs is twofold. The first component provides valuable sites for research, and historically, biological monitoring has been a valuable contribution of BRs. However, with the advent of sustainable development, programs for biological monitoring have increased. For example, the Biosphere Reserve Integrated Monitoring (BRIM) Program is a collective of nations involved in the abiotic, biodiversity, socio-economic and integrated monitoring in the WNBR. Its goal is to provide a platform for the integration of the resulting information / data, thus contributing to a better understanding of the changes that take place in the areas being studied and of the factors triggering these changes. BRIM's functions include compiling a worldwide network of data to protect the cores of BRs; providing a rich resource for increasing knowledge of human-environment interactions, and suggesting options for planning and management (UNESCO 2007a). The second component of the logistics function is education and training which is conducted on behalf of, and for, stakeholders of the BR. Therefore, universities, schools, non-government organisations, government departments, and locals can have a role in the type, purpose and conduct of research, education and training.

The three roles (conservation, development and logistics) are intended to be flexible and applicable to differing contexts and local circumstances. In this way, they may be applied to suit the concerns of a region according to the embedded values, attitudes and goals. For example, some BRs are situated in productive agricultural landscapes whilst other BRs may be located in areas of high conservation significance. Therefore, each BR applies to specific local circumstances, responding to site-specific challenges and opportunities as identified by local BR champions and / or community committees.

### **3.3 The Institutional Framework of UNESCO/ MAB**

#### **3.3.1 The UN and UNESCO**

UNESCO is one of 18 specialised agencies within the United Nations System. Emerging from post World War II, UNESCO was formed by collaboration amongst an initial 20 founding nations in 1945 to 'embody a culture of peace and cooperation for international collaboration in education, the sciences, culture, and communication and information' (UNESCO 2007d: no page).

UNESCO is located within the Economic and Social Council of the UN, and works to create conditions for dialogue and exchange based on commonly shared values and respect for citizens and cultures. Also serving as a clearinghouse to its 191 member states and six associate members (as of 2007), UNESCO's ultimate goal is 'to build peace in the minds of men' (sic) (UNESCO 2007d: no page). Both Australia and Canada are currently member states to UNESCO. Both countries have maintained a historic involvement in UNESCO, becoming members on 4 November 1946.

UNESCO is the only UN agency to have a system of National Commissions in its member states, which form a critical path between civil society and the organisation, by helping to implement key initiatives including training programs, studies, and public awareness campaigns (Batisse 2000). There are over 800 UNESCO clubs, associations and centres throughout the world, for example the

Australian National University Centre for UNESCO.<sup>12</sup> BRs are conducted under the MAB Program, a subsidiary of the Division of Ecological and Earth Sciences, within the Natural Sciences Sector, which is discussed further in the next section.

UNESCO is made up of three bodies: the General Conference, the Executive Board and the Secretariat. The first is the primary decision making body and is comprised of representatives from all member states. The General Conference meets every two years to approve UNESCO's program and budget, as well as to elect the Director General every four years. The Executive Board is elected by the General Conference and meets twice a year, and comprises 58 member states. The main role of the Executive Board is to oversee effective execution of conference decisions, prepare the program of work of the General Conference, and assess the program and budget of UNESCO. The Secretariat is the organisation's administrative branch, based in Paris, and is responsible for the implementation of the programs adopted by UNESCO member states. The Secretariat consists of the Director-General, who is the executive head of UNESCO and staff (technical and administrative). A total of 174 member states have established permanent delegations to UNESCO in Paris. The Secretariat is responsible for overseeing designations of BRs and the WNBR. However, the General Conference oversees other aspects of the WNBR including the Seville Strategy.

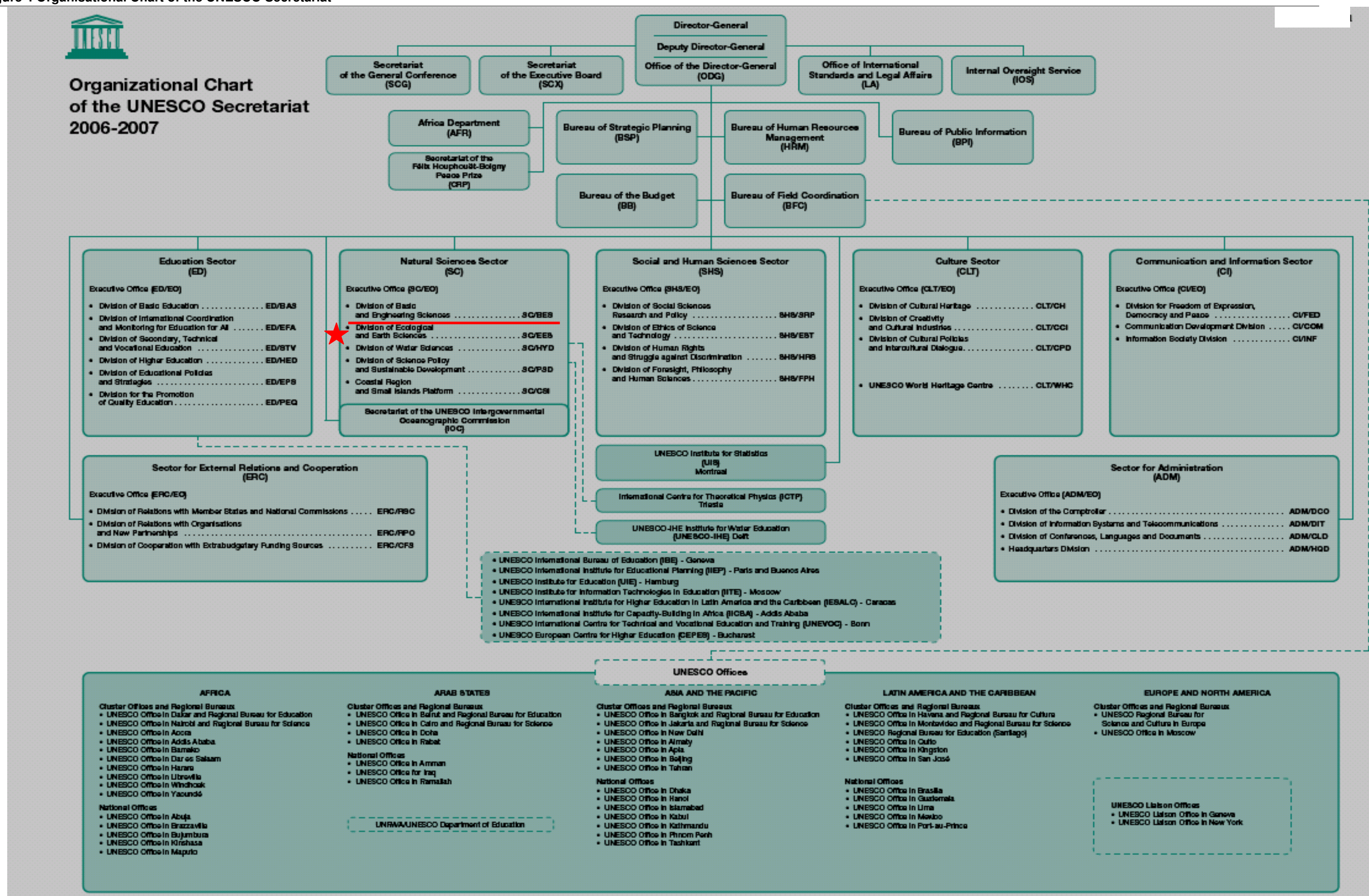
### **3.3.2 UNESCO, Natural Sciences Division, Programmes and Sub-programmes: Ecological and Earth Sciences for Sustainable Development**

Figure 4 (pg. 39) illustrates the situation of the Division of Ecological and Earth Sciences under the Natural Sciences Sector, which is one of five Major Programmes of the Office of the Director General within the Secretariat.

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<sup>12</sup> As a result of an agreement between the Australian National Commission for UNESCO, the Department of Foreign Affairs and Trade and the Australian National University (ANU), a Centre for UNESCO was established at the ANU in 1995. The Centre is associated with the Centre for Cross-Cultural Research at the ANU and collaborates with the UNESCO Secretariat in the Department of Foreign Affairs and Trade.

Figure 4 Organisational Chart of the UNESCO Secretariat



Source: UNESCO (2007d).

In the UNESCO Approved Programme and Budget 2006-2007, the Natural Sciences are referred to as the Major Programme II, within which the Division of Ecological and Earth Sciences comprises Programme II.1 (Science, Environment and Sustainable Development) and Programme II.2 (Capacity-building in Science and Technology for Sustainable Development). Both of these Programmes refer extensively to the role of MAB in collaborating to meet 2006-2008 Main Lines of Action (MLAs). However, within Programme II.1, Subprogramme II.1.2 provides the most intensive focus for the development of the BRs in 2006 to 2008. UNESCO (2007d) defines four MLAs for Subprogramme II.1.2 (Ecological and Earth Sciences for Sustainable Development):

**1) Research and capacity-building for ecosystem management**

- analysing links between global change, ecosystem management and biodiversity loss (targeting decision-makers);
- training of scientists;
- international cooperation on arid lands and humid tropics; and
- rehabilitating the Indian Ocean coastal ecosystems (via partnerships).

**2) Biosphere reserves: promoting environmental sustainability**

- improving coverage and functioning of the World Network of Biosphere Reserves;
- promote transboundary BRs;
- use BRs as learning sites for the United Nations Decade of Education for Sustainable Development;
- establishing a knowledge base on ecosystems management and monitoring in BRs; and
- optimising potential of BRs in conflict prevention and management.

**3) Enhancing linkages between cultural and biological diversity**

- establishing a knowledge base on cultural practices fostering sustainable use of biodiversity in small island developing states; and
- raising awareness about the role of sacred sites, cultural landscapes and intangible heritage in ecosystem management and sustainable use of biodiversity.

**4) Earth sciences and earth system monitoring**

- strengthening research of the earth system and scientific networks via interdisciplinary projects;
- increasing awareness of earth sciences and economic benefits of sustainable geo-tourism;
- establishing collaborative science policy-maker mechanisms to highlight value of global earth observation;
- establishing a network on use of space technologies for monitoring, conservation and capacity-building activities benefiting BRs and World Heritage sites;
- strengthening capacities on geological maps and technical documents based on information collected *in situ* and from space; and
- preparing earth science-related education and training materials as well as curricula, integrating results from space observation.

The following outlines the Strategic Approaches with respect to the UNESCO 2006-2007 MLAs for Subprogramme II.1.2 (UNESCO 2007c: no page):



Focus will be on consolidating a broad-based interdisciplinary research agenda with respect to the ecological, social and economic dimensions of biodiversity loss and its reduction. The WNBR ... provides context-specific opportunities to test approaches combining scientific knowledge and governance modalities to reduce biodiversity loss, improve livelihoods and enhance social, economic and cultural conditions necessary for environmental sustainability, thereby contributing to the pursuit of MDG 7. Biosphere reserves will also serve as learning and demonstration sites ... Capacity-building will be a key modality throughout the subprogramme, including the development of a network of learning centres for integrated ecosystem management. Emphasis will be placed on linkages between biodiversity conservation and socio-economic development in specific biosphere reserve contexts. The WNBR and its regional networks will be put in full motion and used as vehicles for knowledge-sharing and exchange of experience. Biosphere reserves will also be a locus for research and monitoring, education and training as well as for the testing of participatory decision making, thereby contributing to the emergence of 'quality economies' and to conflict prevention [MLA 2]. Furthermore, cultural landscapes and sacred sites, including those that are designated as World Heritage sites and / or biosphere reserves, will receive special attention and build knowledge about biological and cultural diversity interactions [MLA 3].

### **3.4 The Structure of MAB**

MAB's work over the years has concentrated on the development of the WNBR. The scope of work for MAB in 2006-2008 was outlined in the previous section and will be further discussed in Chapter 5.

The MAB governing body, the International Coordinating Council usually referred to as the MAB Council or ICC, consists of 34 member states elected by UNESCO's Biennial General Conference. In between meetings, the authority of the ICC is delegated to its Bureau, whose members are nominated from each of UNESCO's geopolitical regions. The ICC of MAB was set up by the General Conference at its 16th session to guide and supervise the MAB Programme. Therefore the ICC is the body that oversees BR nomination and review. In accordance with Article II, paragraphs 1 and 2, of the Statutes of the International Coordinating Council (UNESCO 2001b: no page):

1. The ICC shall be composed of 34 member states of the United Nations Educational, Scientific and Cultural Organisation, elected by the General Conference at its ordinary session, taking due account of the need to ensure equitable geographical distribution and appropriate rotation of the representativeness of these states from the ecological viewpoint in the various continents and of the importance of their scientific contribution to the international programme.
2. The term of office of members of the ICC shall begin at the close of the ordinary session of the General Conference at which they are elected and shall expire at the close of the second ordinary session of the Conference following it.

Although each member state has only one vote, it can send as many experts or advisers as desired to the ICC sessions. Observing parties can include UN Agencies such as the United Nations Environment Program, Food and Agriculture Organisation, United Nations Development Program, World Meteorological Organisation, World Health Organisation, the International Council for Science (ICSU), the International Social Sciences Council (ISSC) and the World Conservation Union (IUCN).

#### **3.4.1 Seville Strategy and Statutory Framework**

BRs are not the object of a binding international convention or treaty but are governed by a soft law - the Statutory Framework for Biosphere Reserves - adopted by the UNESCO General Conference



(UNESCO 2006b). Some countries have created legislation to address the establishment of BRs.<sup>13</sup> In other BRs, the core areas and the buffer zones are designated (in whole or in part) as protected areas under national law. Other national systems of protected areas are often present within a BR area (and is recommended as a legally protected component of the core area), such as national parks or nature reserves, and often, other international designations, such as World Heritage or Ramsar sites (UNESCO 2004a).

The UNESCO Secretariat does not have an enforcement function. Rather it is the responsibility of each participating country, through its MAB National Committee or Focal Point, to ensure that the BRs respond to the criteria and function properly (UNESCO 2004a). In most countries it is not necessary to enact special national legislation for BRs but rather to use the existing legal frameworks for nature protection and land / water management. However, some countries provide BRs with a special legal status, for example, Germany. Regardless, the Seville Strategy is a rigorous benchmark for all BRs

The Statutory Framework is intended to contribute to the widespread recognition of BRs and to encourage and promote good working BR examples. The Statutory Framework suggests the level (international, national, individual BR) at which each recommendation will be most effective. Given the large variety of different national and local management situations, these recommended levels of actions should be regarded merely as guidelines and adapted to fit the situation at hand. Article 3 stipulates the functions of a BR, which were described in Section 3.2.

Article 4 of the Statutory Framework provides the criteria for the selection of a BR, which stipulates (UNESCO 2007e: no page):

1. It should encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human interventions.
2. It should be of significance for biological diversity conservation.
3. It should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale.
4. It should have an appropriate size to serve the three functions of biosphere reserves, as set out in Article 3 of the Statutory Framework.
5. It should include these functions, through appropriate zonation, recognising:
6. a legally constituted core area or areas devoted to long term protection, according to the conservation objectives of the BR, and of sufficient size to meet these objectives;

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<sup>13</sup> In 1979, the IUCN Commission on National Parks and Protected Areas suggested that it is essential that each country afford adequate long-term protection for BRs under law, and provide the money and human capital necessary for management. However the opposing argument was that there should be no new legislation specifically for BRs, because it would likely harden the definition of the term, and be likely to assume different forms in different countries, each with differing legal meaning. This has happened to the term National Park (Commission on National Parks and Protected Areas 1979). For example, German BRs are a legally binding system of protected areas, similar to Australian national parks. Yet, many other countries in the WNBR maintain BRs without legally binding components.

7. a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place;
8. an outer transition area where sustainable resource management practices are promoted and developed.
9. Organisational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and carrying out of the functions of a BR.

In addition, provisions should be made for:

- a) mechanisms to manage human use and activities in the buffer zone or zones;
- b) a management policy or plan for the area as a BR;
- c) a designated authority or mechanism to implement this policy or plan; and
- d) programmes for research, monitoring, education and training.

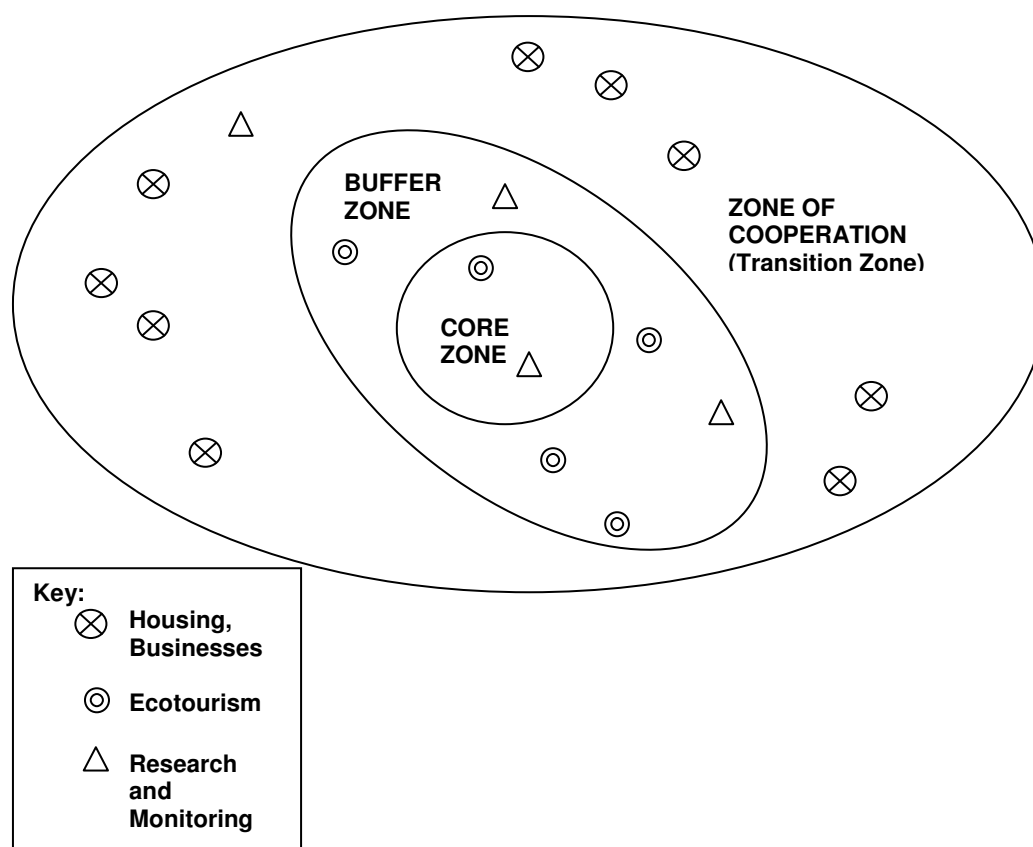
As the Seville Strategy provides recommendations for developing effective BRs and for setting out the conditions for the functioning of the World Network of Biosphere Reserves, it does not repeat the general principles of the Convention on Biological Diversity, nor Agenda 21. Instead it identifies the specific role of BRs in developing a new vision of the relationship between conservation and development. Thus, the document is deliberately focused on a few priorities.

The Strategy also includes recommended Implementation Indicators, i.e. a check-list of actions that will enable all those involved to follow and evaluate the implementation of the Strategy. Criteria used in developing the Implementation Indicators were: availability (can the information be gathered relatively easily?), simplicity (are the data unambiguous?), and usefulness (will the information be useful to reserve managers, national committees, and / or the network at large?). One role of the Implementation Indicators is to assemble a database of successful implementation mechanisms and to exchange this information among all members of the WNBR. The full Seville Strategy is listed in Appendix B and an interpretation of Articles 3 and 4 of the Statutory Framework, as applied in the Canadian context, is provided in Appendix C.

### **3.5 Biosphere Reserve Zones**

A three part ideal has been central to the planning and designation of BRs throughout their history. The simplest and ideal configuration is a concentric structure, where core, buffer and transition zones (also known as zone of cooperation) occur as shown in Figure 5 (pg. 44). At the centre is the core zone, essential for the protection of natural capital and biological diversity. The buffer zone is compatible with uses of low impact to the core, such as ecotourism, research, monitoring and education. A transition zone encapsulates the BR and is where initiatives for sustainable use of natural resources for the benefit of local communities occurs. The application of the BR occurs differently at every site, according to local circumstances such as abundance of core areas and availability of BR partners to provide suitable buffer and transition zones. According to Batisse (1982) as historical local and regional circumstances vary according to location, there can be no single system of zoning for BRs, and therefore, the structure described by UNESCO represents an ideal.

**Figure 5 An ideal BR where the natural values of the core zone are protected by a concentric structure**



Source: adapted from UNESCO / MAB (2001a: no page).

### 3.5.1 The Core

Each BR includes one or more core areas which are strictly protected according to well defined conservation objectives and consist of typical samples of natural or minimally disturbed ecosystems. A core is an area (or set of multiple areas) meant to secure long-term protection from development, ideally by legal means. Usually the core is a protected area (e.g. IUCN Category II Protected Area <sup>14</sup> (IUCN 2004). Occasionally, the core is not a legally enforced protected area, but is an area protected by other effective means. Private ownership is an alternative form of effective conservation of core areas. For example, the Mont Saint Hilaire Biosphere Reserve (Canada) has a core area owned by McGill University (the Gault Nature Reserve). Collectively these core areas should be large enough to be effective as *in situ* conservation units and whenever possible, have value as benchmarks for measurements of long-term changes in the ecosystems they represent (Batisse 1982). The size and

<sup>14</sup> Category II: National park: protected area managed mainly for ecosystem protection and recreation – natural area of land and / or sea designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible. IUCN categories are discussed further in Chapters 4 and 5.

the shape of the core area(s) depend on the type of landscape or aquatic / marine environment in which they are located and on the conservation objectives they are intended to meet. Core areas tend to be larger in regions of low human population density than in regions with heavier human pressure and less available land. The specific functions that the core and the buffer zones serve in integrating the multiple purposes of working landscapes is advantageous for BRs in achieving objectives of international conventions, as well as national targets for 'smart growth', biodiversity and environmental remediation (Smart Growth Network and International City / County Management Association 2002).

### **3.5.2 The Buffer**

The buffer zone(s) protect the values of the core area. One or more buffer zones surround the core and activities compatible with conservation are allowed. Both the core area and the buffer zone must have a clearly established legal or administrative status even when several administrative authorities are involved in its management. Only activities compatible with the protection of the core areas may take place in the buffer zone(s) such as ecotourism, education, training, research and monitoring, and also land-use activities undertaken in a controlled manner, such as forestry, grazing or fishing and historical indigenous practices. Besides its other functions, the buffer zone often serves to protect areas of land that could be used to meet future needs for experimental research.

### **3.5.3 Zone of Cooperation (or Transition Area)**

The promotion and practice of sustainable development occurs within the zone of cooperation, and it the development function. Notably, in this zone the normally autonomous groups and departments within civil society, industry and government can partner to steward and facilitate sustainable development activities. Regional initiatives can seek to create and sustain effective organisations that do not comfortably fit into the established framework of various levels of government (McKinney et al. 2002). Most often this zone is in a relatively populated part of the landscape. It may include experimental research areas, agricultural land, forestry and other industry, traditional-use areas and rehabilitation areas. Usually, the zone of cooperation as a whole is not strictly delineated and, depending on local arrangements, corresponds to a variety of both biogeographic and administrative limits. This zone normally extends the core and buffer zones into a larger and open area where efforts are made to develop cooperative activities between researchers, managers and the local population, with a view to ensuring appropriate planning and sustainable resource development in the region while maintaining the greatest possible harmony with the purposes of the BR. The management of this zone is usually the responsibility of a variety of authorities and therefore requires cooperation and partnership for achievement of the mandate for this zone.

The idea of the zone of cooperation is flexible but ideally, eco-socially innovative. Residential, commercial, agricultural and industrial activities are initiated, fostered and sustained for the benefit of the local region (socially, environmentally, economically) while maintaining a healthy environment (Batisse 1982). Various authors discuss suitable activities for transition area / zones of cooperation (Alfsen - Norodom et al. 2004; Francis and Whitelaw 2004; Whitelaw et al. 2004; Niagara Escarpment Commission and Canadian Biosphere Reserves Association 2002; Brunckhorst 2001; Sparling 2001;

Batisse 2000; Bonnes 2000; Parker 1993; Roots 1989). Some typical examples of ideal zone of cooperation initiatives include, but are not limited to:

- standards certification and Environmental Management Systems for business and industry, for example, forest stewardship, ISO 14001, Green Globe 21;
- permaculture, organic farming and related product branding and marketing;
- retrofit housing and community gardens;
- partnerships with community organisations and networks for social, environmental and economic innovation;
- restoration of ecosystems;
- broad plans with general feasibility assessments;
- recycling schemes for household, industry and office wastes;
- joint community / industry rehabilitation and carbon sequestration projects;
- sustainable futures programs in local municipal and / or regional planning developed through community forum;
- community action plans;
- socially responsible investing;
- community economic development;
- private land stewardship (e.g. covenants); and / or
- information exchange, for example, annual conferences on topics of local interest, eg. agriculture, ecotourism and research.

Box 1 provides some examples to illustrate the functions and zones of BRs.

## Box 1 Examples of some activities in the zones of selected Canadian BRs

### **Mont Saint-Hilaire Biosphere Reserve (Quebec, Canada)**

Demonstrating urban development that is in harmony with nature, a citizens committee helped the Town of Mont-Saint-Hilaire secure protective measures for the slopes of the mountain that constitute the heart of the Mont Saint-Hilaire Biosphere Reserve. The town is providing environmental stewardship by regulating lot size, municipal green spaces, tree cutting and planting.

Conservation work includes a study of the exceptional forest ecosystems and remarkable trees within the BR, many in areas that have never been logged. Drawing from this research, restoration activity in the core and buffer areas of the BR is occurring, including tree planting and closing of illegal trails. This work also links to an ongoing stewardship project that seeks to conserve and protect privately owned forests in the zone of cooperation. As a result, since 2001, 24 ha of woodland have been placed under legal protection and added to the BR's buffer zone.

The Centre de la nature du mont Saint-Hilaire is assisting regional government of the Richelieu Valley to characterise its existing agricultural areas. It is also facilitating the regrouping of scattered agricultural lands for conservation and sustainable agriculture. At the same time, the centre promotes local understanding of sustainable development through outreach on mining, urbanisation and wildlife protection issues. Local capacity-building for conservation and development is initiated through education. The Centre de la nature du mont Saint-Hilaire has released a CD on conservation in rural life, entitled *Nature et Ruralité*. It is also preparing a website that will enable users to embark on a virtual tour of the biosphere reserve, thereby getting to know their region better. To encourage active participation, the Centre has developed a program of 'skills and tools for social marketing' to enable the communities within the BR to improve current practices of conservation and sustainable agriculture. As well, it shares its knowledge of conservation and sustainable development outside of the biosphere reserve through conferences with other regional councils.

### **Waterton Biosphere Reserve (Alberta, Canada)**

With the support of Parks Canada, this BR is developing a network of regional stakeholders to partner in addressing ecological integrity around Waterton Lakes National Park. A small amount of funding is being used for communication and casual secretariat support. This funding is allowing the Waterton Biosphere Association (WBA) to address two important objectives: a) promote the sustainable ranching culture of the BR and b) help ensure that development does not impair the ecological integrity of the eastern slopes of the Rocky Mountains. Towards these objectives, it is taking part in the Alberta Government's Provincial Land Use Framework Initiative. A second project underway is an investigation of the feasibility of establishing an inventory of natural capital in the Waterton BR, possibly in partnership with the Miistakis Institute of the Rockies. Such an inventory will assist non-government organisations, local governments and companies to undertake planning and cumulative effects assessments. Another role of a BR is to provide forums for discussion and resolution of human-environmental issues. The WBA has been instrumental in the establishment of the Chinook Area Land Users Association (CALUA), a group of regional residents that is taking a collective approach to assessing the implications of 50 years of oil and gas development in the region. CALUA will be able to provide government and industry with advice and community input on development planning. Furthermore, a group of ranchers has eliminated pesticides, herbicides, artificial fertilisers, antibiotics and growth-promoting hormones to produce organic beef that it markets internationally.

### **Charlevoix Biosphere Reserve (Quebec, Canada)**

Discussions over 25 years between citizens, governments, and other local groups in the Charlevoix Biosphere Reserve led to the establishment of the Hautes-Gorges de la Rivière Malbaie Provincial Park. The park protects a fragile ecology while enhancing tourism and economic benefits for residents in the region. The Charlevoix Biosphere Reserve also views tourism as useful for conservation and development, and in 2005, a communications company was formed to link the local and international tourism industry of the region.

### **Southwest Nova Biosphere Reserve (Nova Scotia, Canada)**

With a building provided by Bowater-Mersey Paper and funding from Parks Canada and others, various organisations have developed a research centre in the Southwest Nova Biosphere Reserve. The Mersey Tobeatic Research Institution is the primary organisation promoting collaborative research and related public education in the BR. The centre is being used for environmental monitoring, research on rare and endangered species, promotion of habitat connectivity and public education. In 2006, it launched a long-term volunteer-based program called Loon Watch. There has been an exceptional response from more than 60 lakeside residents on 40 lakes who are interested in loons (*Gavia sp.*) and want to ensure the birds' breeding success.

Source: Canadian Biosphere Reserves Association (2007b).

### 3.6 Other Types of Biosphere Reserve

In practice BRs manifest in a variety of ways and over time, through international collaboration within the WNBR, the focus and development of the ideal has changed to reflect emerging concerns of environmental, social and economic sustainability. For example, the Seville Strategy for Biosphere Reserves, borne out of the Seville Biosphere Conference in 1995, enunciated an updated mandate for BRs to that of the 1960s version (discussion expanded in Chapter 4). Some BRs have kept pace with international developments like the Seville Strategy, whilst others have not. Despite these variations, all BRs are maintained with UNESCO endorsement through 10-year reviews to ensure compliance and relevance in the WNBR. However, to date there has been limited attention on the potential of all zones to contribute to the three functions of conservation, logistics, and capacity-building.

Examples of extant BRs that challenge the notion of the traditional (or ideal) BR include:

- Transboundary BR

As borders between nation states are often political and not ecological, ecosystems occur across national boundaries, and may be subject to different, or even conflicting, management and land use practices. A Transboundary Biosphere Reserve (TBR) provides a tool for cross-jurisdictional management (UNESCO 2000b). The process leading towards the official designation of a TBR can include many forms of cooperation and coordination among the existing areas on either side of a border. These serve as a basis for formalising the TBR proposal and should be encouraged. Although the BR provides a general framework for action in a transboundary location, flexibility and regular dialogue on the part of TBR committees is paramount to ensure the BR can coordinate across national boundaries (UNESCO 2000a).

- Urban BR

The most recent development in the WNBR relates to how the concept can be applied to urban areas and their hinterlands. According to CUBES (2004), in light of the world's growing urban population, an Urban Biosphere Reserve addresses a viable relationship between people, their cultural diversity, natural and built environments. The aim of an urban BR is not to conserve ecosystems in the traditional sense but to recognise and support sustainable urban interactions (UNESCO 2003). There is a need for raised awareness of urban links to, and impacts on, surrounding regions (Antrop 2006).

- Cluster BRs

The cluster concept is a combination of a number of neighbouring, but separate, areas that collectively serve BR functions. The parcels of land comprising a cluster BR may be administered by different organisations (UNESCO / MAB 1987). Coordinated, overall management of a cluster BR requires close cooperation between the authorities involved and local communities to achieve balanced, sustainable planning and stewardship of the whole BR. For example, the Great Smoky Mountains National Park was accepted as a BR in 1976 and in November 1988 was incorporated in the Southern Appalachian Biosphere Reserve; a distinct BR cluster comprising Great Smoky Mountains National Park, Coweeta Hydrological Laboratory and Oak Ridge National Environmental Park (Hinote 1999). Two additional units were added to the cluster in 1992, namely Mount Mitchell

State Park and Grandfather Mountain, making the total area 6 416 545 ha (Hinote 1999).<sup>15</sup> These areas are spatially disparate but through partnerships, a coordinated multi-jurisdictional environmental governance has been facilitated through the cluster BR model.

- Remote BRs

Some BRs contain few or no permanent inhabitants, rendering the development function, and arguably the transition area / zone of cooperation, obsolete for that designation (Copson 2004). Such circumstance is increasingly rare, however some designations are maintained despite the apparent contradiction of one of their BR functions (development / zone of cooperation). An Australian example is the Macquarie Island Biosphere Reserve, situated in the Southern Ocean, south of Tasmania, Australia. As a sub-Antarctic island national park, it is home to a wide array of flora and fauna, and has been a BR since 1977. Macquarie Island serves a principal role for globally significant research and monitoring, particularly in relation to air quality, climate change and sub-Antarctic flora and fauna. This research is vital in providing a sub-Antarctic component to the WNBR, despite its inability to have a development function. Tourism and research contribute strongly, along with conservation, to two of the BRs three functions in this remote environment.

### **3.7 Mark I and Mark II Biosphere Reserves**

This thesis introduces the terms Mark I (MI) and Mark II (MII) BRs to delineate between Australian BRs driven and directed in either a government, top-down (MI) or a community, bottom-up (MII) manner.<sup>16</sup> The terms are applicable to Australia's BRP, as it is punctuated with these two distinct groups of BRs. Conversely, Canadian BRs have always relied in large measure, upon community champions. In Australia, the MI group of BRs were designated in the early part of the MAB program during the 1970s and early 1980s. Starting in the 1990s, BR designations became largely a community-driven initiative, where all three levels of government endorsement was still required, however the whole process was driven at a local level. Since this shift to MIIs, BRs are increasingly fulfilling their mandate and maintaining relevancy in the WNBR (as discussed in Chapters 5 - 9).

Typically, those BRs historically implemented in a top-down manner have failed to reach the full capacity of their BR functions, particularly with respect to their development and logistics functions. Macquarie Island BR is an example of an MI designation. MII BRs are the primary focus for this thesis. MII BRs, whilst faced with similar issues in reaching BR objectives to MIs, gain a broader range of stewardship and partnership involvement as they are differentiated by the presence of 'organisational arrangements ... to coordinate or manage the obligations for a BR' (Francis 2004a: 6). In other words, MII BRs are associated with a governance arrangement, usually in the form of a BR committee that has voluntarily initiated for the purposes of the BR, and manages the functions of logistics and development. When protected area managers are also an important part of a committee, the core area is generally under government jurisdiction.

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<sup>15</sup> The area was also added to the World Heritage List in 1983.

<sup>16</sup> MIs represent the command and control or unicentric style of governance indicative of its era, whilst MIIs represent a new governance or polycentric approach analysed in Chapter 7.



The disparity between MI and MII BRs highlights the role of participation and partnership in BR development and logistics. For example, when government agencies control BRs unilaterally, in the case of MIs, they frequently emphasise resource development and management without regard to local social background. On the other hand, when BRs are managed by a local, citizen-based, long term participatory approach, as in the case of MIIIs, the maintenance of biological diversity and contribution to other BR functions may be easier (Zubrow et al. 1995). Both MI and MII BRs have contributed to the diversity present in the WNBR today, and provide lessons on the importance of governance and capital assets in effective BRs.

### **3.7.1 The Voluntary Nature of Biosphere Reserves**

As BRs rely on volunteers, this section provides a background to the drivers associated with voluntary effort. The scope of volunteering for environmental concern is a topic outside of the scope of this thesis, but some basic considerations related to voluntary capacity are discussed. As Wondolleck and Yaffee (2000) suggest, partnerships that involve volunteers provide an example of the way that collaborative arrangements can generate new resources for management. Partnerships involving volunteers range as broadly as the array of social and ecological issues and initiatives, however several axioms inform whether volunteers will be mobilised. These include (Clark 1990):

- the openness of the project or institution overseeing the work;
- the capital assets available in the community or domain of concern;
- capacity for innovation and experimentation;
- rigidity of the domain of concern;
- recognition of place (bioregional ethic); and
- value of partnerships and capacity-building.

As residents and organisations in a BR use a variety of activities to address conservation and sustainable development in ways that are meaningful for them, they also have opportunities to share their discoveries with others. This will often occur informally, as people in the surrounding region notice the development of community-based expertise in a BR and want to find out more about it. There are also formal networks for sharing information, such as the Canadian Biosphere Reserves Association. UNESCO supports this network and helps to share positive examples among countries. There are joint projects and studies at both national and international levels that are run by voluntary effort.

The use of volunteers to undertake inventory and monitoring is a historic practice and common in Canada. Many early naturalists were amateurs who observed and documented the natural environment. More recently, professionals have dominated monitoring. There has, however, been a recent resurgence of volunteer or community based monitoring (CBM) focused on an array of subject matter including water, air, landscape change, watershed, forest health, amongst others (Whitelaw et al. 2004; Ramsay and Whitelaw 1997). There are many documented reasons for this renewed interest:

- government cut-backs;

- citizens concerned governments are not dealing with the environment appropriately;
- a desire on the part of citizens to learn more about the environment; and
- a desire of citizens to participate in environmental protection activities (McLaughlin and Hiltz 1999).

CBM initiatives generated by BRs have the potential to generate comprehensive data to benefit participants through learning and to increase their ability to influence land use and environmental decision making (Stokes et al. 1990). CBM voluntary effort, like that of BRs, brings people in closer contact with their environment and results in the development of the stewardship ethic.

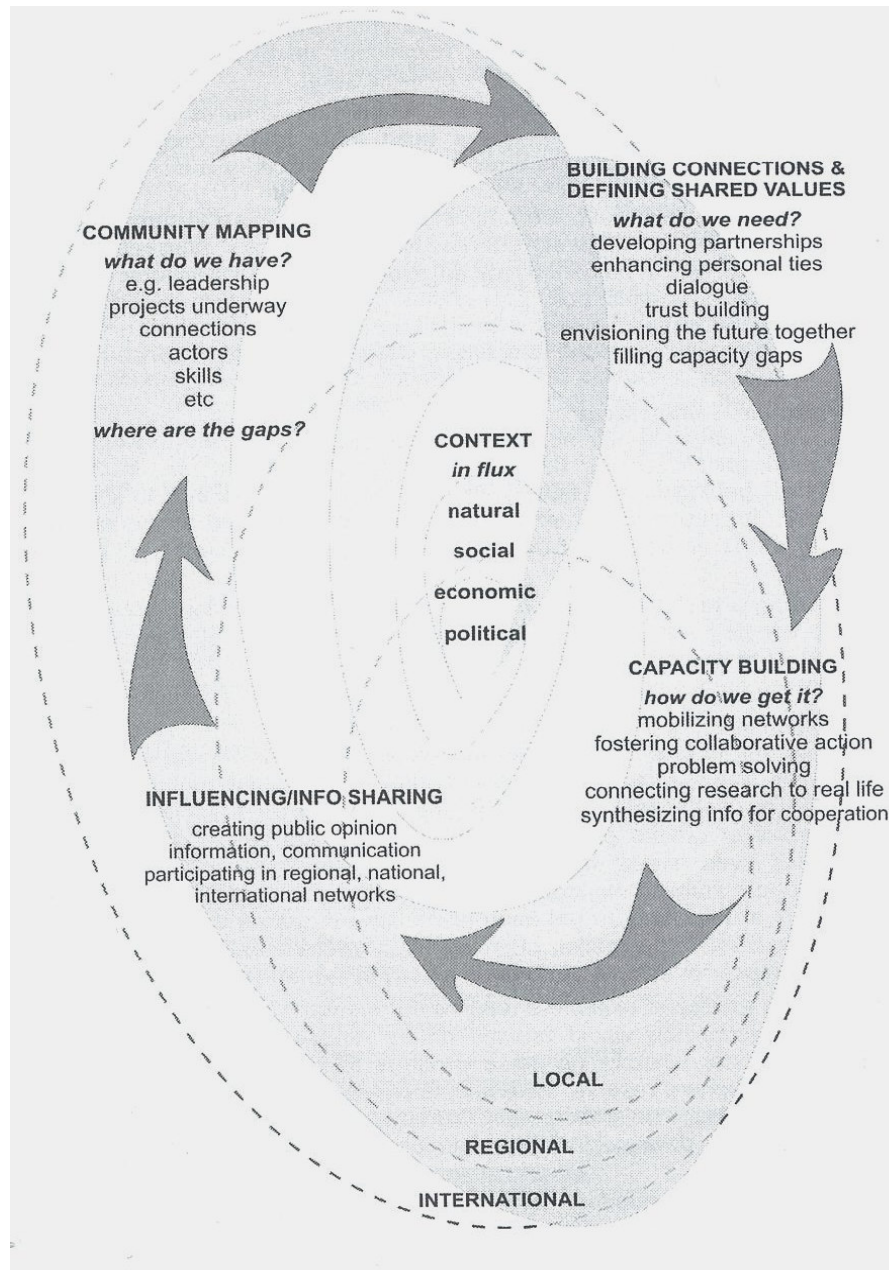
In areas where public lands are adjacent to dense population centres, collaborative arrangements that use volunteers have access to the talents and energies of a tremendous pool of, for example, young adults, retirees, and other citizens. This greatly enhances the potential of a BR to generate sustainable development and logistics outcomes.

Martinez and McMullin (2004) found the determining factors in decisions regarding volunteer activity were competing commitments and efficacy. Active members indicated that the efficacy of their actions was most important in their decision to participate, whereas non-active members cited the importance of competing commitments in their decision not to participate. Recruitment and retention of volunteers may be aided by increasing the awareness of volunteer programs; ensuring that programs provide results of which individuals are proud; requesting the participation of individuals on both local and national levels; and recognising volunteers for their contributions (Martinez and McMullin 2004).

### **3.8 Designation Process**

To constitute a BR as part of the WNBR, general criteria apply, as stipulated in Section 3.4.1. Much work is required on behalf of BR proponents of a potential designation. According to Whitelaw (2004), in Canada it takes an average of eight years for an area to be designated, where the process requires a rigorous collection of data and extensive public involvement. There are several initial requisites. Figure 6 (pg. 52) depicts the essential facets of BR development, which will be expanded on in Chapters 7, 8 and 9. As an overview the following steps depict the general process (based on Francis (2004a)). First, a group of individuals is required ideally representing civil society, industry and government, committed to conserving an area's natural and cultural features. Second, there needs to be a willingness to dedicate a number of years to the innovation, experimentation, networking, communication and collaboration activities that will promote capacity-building. Third, a model BR that fits the vision of the BR group needs to be developed. When these matters are addressed in detail, a basis exists for successfully furthering a BR proposal.

**Figure 6 Approach to BR designation and organising**



Source: Ravindra (2004: 52).

Proposed core areas should be significant for conservation (UNESCO 1996).<sup>17</sup> Buffer zones should be inclusive of present or planned research and monitoring activities, ecotourism and / or other ecologically low-impact activities (UNESCO 1996). Garnering strong community support is essential for the zone of cooperation (UNESCO 1996). The proposed BR may need to be extended to encompass more natural areas or population centers, in which case there is an opportunity for enlarging the network of people working on the proposal (UNESCO 2001a). In gathering support, major stakeholders of the area need to be targeted as the consensus of the general public is

<sup>17</sup> UNESCO prefers international conservation significance however this is not always necessary for a designation. For example, urban biosphere reserves would rarely contain internationally significant core areas.

important for successful UNESCO nomination (UNESCO 2001a). Obtaining the support of those associated with the core and buffer zones is particularly important, as protected area managers will have a central role in fulfilling multiple conservation initiatives in cooperation with the other aims and zones of the BR (Taylor 2004). This consultation process establishes networks and connects the silos of civil society and government that may have never before communicated at a regional scale, especially with the aim of building community input and capacity (Francis and Whitelaw 2004).

After the support of a BR has been established in principle, a formalised commitment should be established in the form of a coordinating committee (also called a BR community committee) (Canadian Biosphere Reserves Association 2005). Such a committee will normally provide the central hub for all BR activities. Therefore it is critical that a functional arrangement employing good governance is established from the outset (see section 7.2 for a further discussion of 'good governance'). The committee is a forum for multiple views, intending to facilitate exchange, workshop problems, opportunities and extend possibilities for future BR development and logistics. The gathering together of a committed group of people for place-related forum is indeed one of the most influential and positive facets of a BR, and this aspect alone can enact change in the social-ecological dynamic of a place. Some of the aspects that facilitate successful community committees include (Canadian Biosphere Reserves Association 2005):

10. strong community involvement;
11. a local resident, rather than a government official as Chair;
12. involvement of key stakeholders including government, indigenous groups (where applicable), non-government and business sectors;
13. open communication with communities and stakeholders through meetings, events, newsletters and articles published in the local press; and
14. resources in the form of staff support or financing from government, industry or non-government organisations.

The definition of boundaries and zones for the BR is one of the pertinent jobs of a newly established BR Community Committee (BRCC). Delineating the geographical extent of the proposed BR will determine which natural and cultural features are included. The groups, organisations, landowners and protected area managers committed to the BR idea will influence boundary delineation, and a significant period of time is often required in achieving this support, as well as for data gathering and public dialogue.

The objectives of a proposed BR may also be an important consideration of a BRCC in gaining support. Developing objectives helps to determine priorities in the areas of conservation, sustainable development and capacity-building. Francis (2004d) suggests a cooperation plan should be created to guide the work of a BRCC at this stage. A cooperation plan is standard for all Canadian BRs, for example the Niagara Escarpment BR Cooperation Plan (NEC and CBRA 2002). A template for a

Cooperation Plan document, along with BR profiles, upcoming events and blogs are accessible on the CBRA website<sup>18</sup> for BRCCs and interested parties. No such resource exists in Australia.

For UNESCO to approve a designation, the proposed BR will have initiated some of the functions of a BR prior to submitting the nomination. Ideally one or more projects stewarded by the BRCC will demonstrate the capacity of the proposal to meet UNESCO objectives. Completing the nomination form may take a year or more, therefore data and public support that will strengthen the nomination should be continued during this time, with the view to continuously building and diversifying support. In submitting the nomination, BRCCs, or whoever is responsible for the nomination, must work to UNESCO timeframes. Therefore, liaising with national UNESCO representatives can be imperative to coordinate the timing of the submission process.

The review of all BR proposals by UNESCO involves technical staff from the MAB Secretariat and members of the International Advisory Committee for BRs. The Advisory Committee makes recommendations to the MAB ICC. If the proposal is accepted, UNESCO forwards the BR charter through the appropriate national UNESCO or MAB office. The results of the review can take approximately five months. If the proposal is approved, the responsible BRCC ideally hosts a public ceremony for the official presentation of the BR charter to acknowledge efforts that have preceded the nomination and celebrate the achievements and potential of the new BR and its community.

### **3.9 The Language of UNESCO**

The language used by UNESCO is nebulous due to the need for applicability to a suite of international social, economic and environmental conditions. For example, the UNESCO (2004c) definition for BRs provides little clarity as to BR objectives, structure or purpose. Yet, this definition is deliberately open to enable the widest application of the concept in a range of international designations (present and future) where no two sites are alike. This use of expansive language provides a challenge for local application of the ideas.

Ironically, despite all attempts to be inclusive, the name 'biosphere reserve' is often narrowly perceived, associated only with an environmental discourse (despite a broader mandate) (Birtch 2004e). Fraser and Jamieson (2003: 295) state:

The phrase 'biosphere reserve' itself leads to misunderstanding and misrepresentation of the nature of UNESCO'S vision for these areas. The word 'biosphere' is technical jargon not immediately understood by the public. In Canadian common understanding, the term 'reserve' denotes a place set aside to preserve environmental values, not cultural and human values. The term 'biosphere reserve' then is a misnomer that leads to common assumptions that the area is a government-designated park with associated restrictions that will be enforced by authority and suggests regulations rather than participation. Under this title, the average person does not naturally appreciate the biosphere reserve process as an opportunity for the community to create its own vision of sustainability.

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<sup>18</sup> The Canadian Biosphere Reserve Association website is at [www.biosphere-canada.ca](http://www.biosphere-canada.ca).

Lerner (2004: 91), as a Canadian academic and steward of the BR idea, provides a useful, active definition for BR praxis:

... the concept of a BR has evolved from its original focus on conservation areas associated with research, monitoring and education. There is now increasing emphasis placed on the importance of linking the conservation of biodiversity to issues of the sustainable human use of resources and to fostering the cooperation needed to achieve a better balance between ecological and economic sustainability, especially at the community level. The development of effective local organisational arrangements to undertake the various tasks associated with this more extended concept of a BR are also emphasised.

Indeed, the role of UNESCO in relation to BRs will likely remain somewhat nebulous. The specificity of how UNESCO criteria are interpreted remains with the local champions and / or community who seek to implement it. Recently, attempts by UNESCO to specify purposeful aims has produced slightly more instructive information related to BRs. For example, UNESCO (2006c: no page) suggests that BRs:

[c]onstitute an innovative approach to governance at multiple levels: locally, they are a potent tool for social empowerment and planning; nationally, they serve as hubs of learning for replication elsewhere; internationally, they provide a means of cooperation with other countries, and also a concrete means of addressing international obligations such as Agenda 21, the Convention on Biological Diversity, the Millennium Development Goals, the Plan of Implementation of the 2006 World Summit on Sustainable Development and the UN Decade of Education for Sustainable Development.

Although the mandate of BRs is much broader now than in the 1970s, the above reference to international agreements such as the Convention on Biological Diversity, does not provide the lay-person with a tangible idea for understanding BRs. Better understanding may be derived from the Seville Strategy, yet Francis (2004a: 2) states that 'given its inherent scope, MAB ... looked as if it belonged to everybody or to nobody, and in large measure, the latter conclusion has prevailed now for over 30 years'.

As an internationally implemented program, local knowledge of UNESCO BRs is often surprisingly low. BRs are commonly confused with the 1991-93 Bionaut Biosphere 2 experiment in Oracle, United States due to a shared biosphere name. It seems likely that more people know about the experimental biosphere dome than the internationally implemented BRP.<sup>19</sup> The expansive nature of the UNESCO and BR lexicon, and its inaccessibility for local contexts may be a hindrance to gaining a broader understanding of the concept and praxis.

### **3.10 Benefits of Successful Biosphere Reserves and Biosphere Reserve Programs**

'A successful BR' is measured according to its fulfilment of the Seville Strategy and and Statutory Framework, within which the Implementation Indicators (discussed in Section 3.4.1) provide the criteria for that assessment.

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<sup>19</sup> Anecdotal observation during the course of the research.

Further discussion related to the positive outcomes of BRs will be elucidated throughout the thesis. This section provides a cursory overview of the major benefits. Table 1 indicates related benefits for the levels of the WNBR, a BRP and local BRs.

According to UNESCO, a successful BR meets its mandate as stipulated by the Statutory Framework and the Seville Strategy and produces many benefits (UNESCO 2001a; UNESCO 2000b; UNESCO Australia 1992). A major benefit of a BR is in the gathering of disparate groups for productive purpose that may not otherwise occur (Price 1996). For example in a BR meeting, dialogue is common between farmers, academics, natural resource managers, local government officers and aldermen, state government employees, teachers, indigenous members, conservationists, scientists, industry workers and managers. Although establishing mutually agreed purposes amongst such disparate areas (or silos) is often challenging (Birtch 2004a), the meeting of BR committees enable discussion and opportunity to pool and develop capacity and capital to work together, for shared regional initiatives (Birtch 2004a; Dempster 2004; Batisse 1997)

At international and national levels 'BRs are an important concept and tool for the international community in the actual or potential national implementation of the results of the UN Conferences on Environment and Development and the Convention on Biological Diversity (CBD)' (Nauber 2005: 11). Through national and international networks BRs can share experiences, information, expertise and support, whilst creating national and international recognition of BR communities as good places to live, work and visit (Canada MAB 2000; Francis 1992)

The flexibility and adaptability of the concept represents an important part of the BRP's value . This adaptability comes about through two means. The WNBR has evolved to allow individual BRs and national BRP's to develop in ways most pertinent to local and regional contexts, within the criteria required. In successful BRs, years of work by local BR champions provides the capital assets required for success and adaptation. Whilst these forms of capital are a result of a successful BR, they are also a precondition for success. In other words, a BR is unlikely to succeed without various forms of capital.

**Table 1 Synopsis of BR-related benefits at three operational levels (WNBR, BRP and BR)**

<b>International (WNBR)</b>	<b>National (BRP)</b>	<b>Regional/ Local (BR)</b>
An international sustainability – focused network	Sharing, collaboration of individual BRs through a national BRP	Capacity-building and collaboration in unique local forums
UNESCO endorsement (well recognised, respected)	Conservation representing new paradigm of protected areas in formal concept and practice	Ability to address shared local – regional concerns using multi-institutional resources, capital and capacity
International sharing of BR experience	Partnerships between Federal Government, states and civil society organisations and industry	Site for research and monitoring linked to international and national network
Conservation indicative of new paradigm of protected areas, which supports current trend in international conservation and sustainability recommendations	National system for examples of sustainable development sites	Sustainable development activities for local people to contribute to and participate in, for young and old
Working examples of sustainable development opportunities and challenges across the world	Opportunity to partake in regional UNESCO forums	Education opportunities and collaborations with schools, colleges, universities and the BR
Historical collaborative and formal research and monitoring sites in representative ecosystems across the globe	Natural and cultural heritage protected using multi-institutional resources, capital and capacity	Empowering, where local responsibility can be taken for sustainability instead of reliance on government action
A common working and conceptual framework for working landscapes – conceptualising and working toward social –ecological integration	Less reliance on Federal Government to provide all sources of nationally coordinated sustainability initiatives	Capital (social, human, institutional) creation and sharing
Highlights areas of value at national levels		Place-based attachment – engenders regional value for local people
		Civil society organisation allows interaction between otherwise siloed groups in the same region, often with similar purposes
		Social-ecological integration
		Communicates life-place and place-attachment
		Bioregionalism, specific to local setting

Source: by author, based on Celecia (2000); Batisse (1997); Price (1996); Parker (1994); and Krugman and Gregg (1988).

The multi-institutional governance structure and cooperative management systems required for successful management of core, buffer and transition zones of BRs means that BR activities involve iterative learning and adaptation. Also through the multi-institutional relationships of a BR, inductive processes of governance, organisational learning, capacity-building and change, occur. Representing a shift toward integrated sustainability, such processes are often also innovative precedents, due to scarcity of such integrative, capacity-building type activities in the market-driven societies of Australia and Canada. A seminal Australian author on sustainable social-ecological systems suggests that:

... enduring ecological, social and economic sustainability requires integrated planning and management of natural resources, ecological functions and primary production



across anthropogenic landscapes. This will require changes to social norms, new institutions and organisational forms' (Brunckhorst 2002: 110).

Capacity for such change is encompassed by MII BRs. As Ruttan (2004: 110) suggests:

When faced with an issue, our western world has taken an approach of specialisation and isolation ... As a result, most organisations and agencies deal more and more, about less and less. BRs by contrast are an integrating mechanism, acting as a rallying and organising point at the community level.

At an individual level, the Canadian Biosphere Reserve Association (2005) suggests that communities and partners of BRs can:

- expand their local capacity to direct their region's future;
- develop a common vision, increasing communication and cooperation among seemingly disparate groups;
- help to assure the ecological and economic sustainability of their region;
- address cultural, social and development issues for their people;
- increase business efficiency and sustainability of operations;
- implement government and non-government pilot projects for rural and economic development and other areas of interest; and
- achieve research and teaching goals with collaboration from educational institutions, for example, universities.

A successful BR is dynamic, and working properly, can become less a designation and more a way of life (Frost 2001). A BR strengthens from the local champions with a strong identity to their local area. Therefore place-attachment is important for both initiating a BR, but is also an outcome of the partnerships and reflection on significance inherent to it as a place. Local champions, in concert with their partnering civil society and government groups, determine and demonstrate how to meet their own needs while at the same time maintaining the health of their social-ecological system.

The present siloed operation of public, private, NGOs and community sectors highlights the need for BRs, but also presents one of their main challenges. The value of the program is certainly centred on connecting silos to achieve cooperative and integrative (public-private-NGO-community) networks. Motivating individuals within these silos to think outside of their own narrow directive to broader and shared goals is both the ultimate challenge and benefit of BR concept and praxis. In creating the opportunity for mainstreaming conservation and sustainable development, a BR works with non-conservation-oriented sectors and the adjustment of sectoral policies and different interests between political and civil society arenas.

Ruttan (2004) argues that social-ecological factors exist that may help to renew and reinforce the role of BRs and their benefits, with capacity to expand in meeting the challenges of social-ecological management. These factors include (Ruttan 2004):

- Desire for a mechanism for community-provincial-federal–international partnerships. Civil society lacks faith in the ability of a distant government to understand and resolve the problems of their local community. BRs with their local community knowledge provide an alternative.

- A need for better organisation of environmental and sustainability efforts in which the sustainable development program and community are seamlessly arranged. Conservation organisations exist at local levels, but these organisations are often unaware of others doing similar work in the same region, due to their sectoral creation and sustenance within either federal, state, municipal or non-government / business silos. A BR can act in the capacity of 'Chamber of Conservation and Sustainability' to help local organisations, businesses and agencies collaborate on projects of common interest, and / or provide common services, particularly to smaller organisations.
- Apathy of regional communities toward environmental NGOs despite their support for conservation. Such NGOs can be perceived as left wing, inactive, opposing and segregated from the community. In contrast, BRs are organised locally, oriented to local issues, and are intrinsically part of the community, for example, by comprising of community committees.
- A disintegrated and disorganised conservation effort, barely linked to social and economic realities of community. BRs help to bridge the gap between economy and ecology, drawing on various organisations and people in a community.
- Disengaged communities, and burnt out volunteers. BRs work to support not-for-profit organisations and capacity-building of communities, normally with a view to senescence planning, or replacing key volunteers that may ultimately retire.
- An assumption that authority is required to achieve change. But power doesn't always come from authority. The power in BRs can derive from the lack of any authority of any kind over any local community, combined with the ability to work with a local community to acquire and use knowledge, to facilitate community planning, to coordinate community steering, to encourage collaboration and to achieve what top-down authority cannot achieve.
- Small and disconnected parks and protected areas, along with fragmented landscapes. A foundation of BRs lies in practically and conceptually connecting protected areas to their surrounding working landscapes by getting stakeholder cooperation for disseminating the conservation ethics found inside core areas to surrounding regions. Boundaries of protected areas are arbitrary. BRs recognise this through the three-tiered zonation system, and in utilising and further mobilising this concept and praxis, have a future role to fulfil in connectivity conservation.

### **3.11 Application to the Research**

The BR idea provides a concept and a spatial design for the integration of conservation with other sustainable uses. The three major functions are designed to correlate with the spatial arrangement, however this is flexible, where all three functions can be influential in any part of the BR. The flexibility of these arrangements is reflected in some of the different types of BR, such as cluster or urban BRs. Whilst the MAB Program is the institutional body for the coordination of the WNBR, the organisation, with its Seville Strategy and Statutory Framework, has little influence on how a BR is achieved at a local level once designation is granted (with the exception of 10-year reviews).

The rise of MII BRs in Australia indicates changing social-ecological relationships, where local champions instigate BRs for local to regional social-ecological goals (see Chapter 5). However these champions face challenges. For example. the language of UNESCO is vague and provides little guidance for determining the means for achieving the stated BR goals. In Canada, the designation process is well understood due to a strong core of BR interest at a national level, and this experience in BR development provides a multitude of lessons for Australian BRs. Achieving a solid basis from which to build a BR is a first step in securing the manifold benefits of BRs in Australia. Capacity-building at international, national and regional / local levels is one of the salient benefits of both the BRP and individual BRs, which assists in meeting challenges of social-ecological management.

The next chapter charts the conceptual and theoretical development of discourses related to BRs, BRPs and the WNBR from the 1960s to the 1980s. It relates the current idea of BRs to their founding principles in order to understand the associated discourses and key drivers relevant to BRs from a historical perspective.

## 4 Science and Conservation: BRs 1960 – 1980s

*This chapter elucidates associated discourses and key drivers relevant to the BRP, prior to and during early development of the concept and practice. At their inception, BRs were quite different from those of the present. This chapter charts the theoretical maturation of the BR idea and the WNBR from the 1960s to the 1980s, and provides the rationale for BRs. Salient conceptual views and events are provided for each decade, highlighting those paradigms and initiatives arising as a result of shifting environmental awareness.*

### 4.1 The Sanctity of Science – 1960s Conceptual View

In the last 45 to 50 years, disciplinary based interpretations of environmental discourse<sup>20</sup> have developed. These interpretations have narrowed problems within the theory of that discipline hence environmental challenges have been viewed and approached through a growing and detailed mosaic of discourses.<sup>21</sup> However, in the case of BRs and other environmental issues, it is not sufficient to utilise a single approach, but rather input from a multiplicity of perspectives is needed. The variety of environmental perspectives and discourses that developed between 1960 and the 1980s gradually altered the development of the WNBR, and enabled it to diversify for application to social-ecological challenges in both developed and developing countries.

The 1960s was a period of significant societal change. A need for recognising and understanding the relationship between industrialisation and the biophysical environment became an issue of debate and political concern. Degradation and destruction of natural environments at a global scale were increasingly evident, however remained national, rather than international, concerns. Managing human impacts on the environment at national scales hardly figured as a concept in politics and policy-making in any country until the 1960s (Dryzek 1997). Other issues such as pollution and resource shortages were more common in political agendas, but not identified under a unifying term.

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<sup>20</sup> Hay (2002) suggests that the names of some environmental discourse including environmentalism and ecologism are highly contested, but of little matter. One reason is that those people central to the movements use the words interchangeably, as a language for common meaning. The other reason is due to the oscillating nature of the discourse of the environment, where commentators have yet to define the boundaries of key terms (environment, for example). For this discussion, environmentalism constitutes an activism in support of, and in alliance with, environmental politics, governance, policy, philosophy, ethics, economics and science.

<sup>21</sup> Dryzek (1997) suggests that complex situations engender multiple perspectives. Hence the abundance of terms and perspectives on environmental problems that have accompanied the development and diversification of environmental concern is of little surprise. Several works prior to 1960 are of note however, as they created a platform for some later discourses. These include but are not limited to works during 1948-1949 of Fairfield Osborn (*Our Plundered Planet*), William Vogt (*Road to Survival*) and Aldo Leopold (*A Sand County Almanac*). However in a post-World War era, these works were indeed relevant to their age but before their time in terms of political and social identification.

Modern issues of population, natural resources, and production were conceptually segregated, until Rachel Carson's seminal work.<sup>22</sup>

A distinct junction between nature and humanity was apparent for much of the 1960s. The concept of limits to earth's capacity highlighted the consequences of ignoring finite limits including misery, starvation and death resulting from unconstrained human procreation and consumption (Dryzek 1997). In 1968 Garret Hardin published his influential essay entitled *The Tragedy of the Commons* (Hardin 1968) which quickly became a central analytical part of scientific engagement with environmental problems. His work was disseminated in *Science* and employed a generalist's scope toward environmental problems, all approached from a relatively lay-perspective. As a result, his work was seminal when the widespread perception of environmental crisis arose for the first time throughout the developed world.

Through Hardin and others, a strong message was conveyed throughout developed nations that there was scientific importance in the natural environment, indicating a relatively fragile homeostasis where human interference was not commensurate with ecosystem health. However, at this time conservation was still considered a minority issue, as the impact of human populations on natural systems was approached as a largely scientific question. Conservation was considered a secondary priority (Martin 1988). But for Hardin, conservation was a central concern, and his critique detailed how the rational self-interested actions of individuals led to devastating collective consequences. Hardin recognised the necessity of natural resource utilisation alongside the limited capacity to utilise those resources indefinitely.

During this decade the notion of a coordinated international scientific environmental effort was spawned, directed at monitoring and research of ecological systems, with the aim of systematically cataloguing, and scientifically understanding, ecological systems. The spokespersons for the environment during this period were primarily scientists, particularly natural scientists. The kudos of sciences was indicative of the period of post-World War II when science was perceived as a source of panacea. Situated comfortably in the 'modern era', science, bureaucracy and technological expertise served as an orienting framework for cultural order and meaning (Campbell and Fainstein 2003). An unequal foundation was established where scientists with little political expertise were providing data and prognoses on a continuum from doom saying the future of human-kind to anthropocentric utilitarianism (Hay 2002).

As Hay suggests, some believed that 'politicised by the perceived urgency of the environmental crisis, the early proponents of the burgeoning environmental movement assumed that they simply needed to demonstrate the validity of their analyses, after which governments would take the required action to rectify matters' (Hay 2002: 173). The worldwide growth of protected areas driven by

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<sup>22</sup> Carson was preceded by a long history of nature sympathisers such as Porphyry, Baruch Spinoza, Thomas Malthus, Charles Darwin, Henry David Thoreau, George Perkins Marsh, Aldo Leopold, Murray Bookchin, Edward O. Wilson and many others. As influential and pedagogic as these individuals' arguments have proven for the discourses in environmentalism, the intention of this chapter however is to focus on the main currents of thought that arose close to, and along with the development of the BR ideal.

national governments and the establishment of an international coordinating program for conservation and science are testaments to this assumption.<sup>23</sup> Countries such as Canada and Australia had recognised since the 1850s the importance of protected scenic places for the public. Many other countries including South Africa, the United States and New Zealand similarly established numerous protected areas.

## **4.2 The Sanctity of Science – 1960s Events**

Preceding internationally coordinated effort for environmental issues, a resolution of the 27<sup>th</sup> session of the United Nations Economic and Social Council in 1959 recognised that 'national parks and equivalent reserves are important factors in the wise use of natural resources' (World Commission on Protected Areas 2007: no page). In response, led by the IUCN network of volunteer experts on protected areas, the International Commission on National Parks was established in 1960.

The first version of the UN list of Protected Areas was published in 1961<sup>24</sup> and presented at the First World Conference on National Parks in 1962. It was at this meeting that the first international attempt to clarify the nomenclature of protected areas was made, which addressed the disorder that had arisen from many nations establishing their own types of legally protected areas. The Conference was also the first wide-ranging parks forum that included contributors from all over the world (Lockwood et al. 2006). Issues discussed at the First World Conference on National Parks included: the effects of humans on wildlife; species extinction; the religious significance and aesthetic meaning of certain parks and wilderness; international supervision of boundary parks; the economic benefits of tourism; the role of national parks in scientific studies; and the practical problems of park management. There was consensus that some national parks were of international significance (Phillips 2007). By 1966, a simple classification of 'national parks', 'scientific reserves' and 'natural monuments' was used (Phillips 2007).

It was within this context that the International Biological Program (IBP) was created through partnerships of UNESCO, non-government scientific organisations and governments in developed nations. Given a ten year lifespan (1964 - 1974) by its sponsor, the International Council of Scientific Unions (ICSU), the IBP had two objectives: to promote and strengthen basic ecological research on the dynamics of relatively undisturbed ecosystems and research on human adaptations to difficult environments, and to encourage countries to establish systems of protected areas (IBP sites) which could be suitable for long term research and monitoring (Gregg and McGean 1985; Roots 1989). These natural areas supported ecological research and the IBP sites served as points of reference for research and monitoring.

Reflecting its era, the IBP was born from a scientific discourse, and from a requirement to better understand the limits, capacities and potential of natural and disturbed environments of the world.

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<sup>23</sup> The establishment of the earliest protected areas were generally a result of scenic, recreational and public health reasons, which pre-date the protected areas referred to in this context. The establishment of the IUCN in 1948 also pre-dates this discussion.

<sup>24</sup> The World Wildlife Fund was established the same year.

The IBP was a hallmark for international environmental agreements representing the first major international attempt to conduct biological research in an international, interdisciplinary capacity. The IBP program contributed greatly to bringing international respectability to ecology as a scientific discipline, through the collection of large amounts of basic data on major ecosystems and natural regions of the world (Taschereau 1985). At a UNESCO Biosphere Conference in 1968, the call for a program to extend the work of the IBP was proposed, in order to 'promote the rational utilisation and conservation of the resources of the biosphere' (UNESCO 1969: 6).

The IBP created unique opportunities and members recognised a need to continue with the work of the program beyond 1974. The outcome was the MAB program, born from a recommendation adopted by the Inter-Governmental Conference of Experts on the Scientific Basis for Rational Use and Conservation of the Biosphere, Paris, September 1968, also known as the Biosphere Conference (Batisse 1993). The Biosphere Conference was a landmark event, representing the first intergovernmental deliberation on the conservation of environmental resources alongside their use for human benefit, and an international governmental recognition of the mounting environmental threats that could only be tackled through international cooperation. MAB was initiated by a resolution passed during the Biosphere Conference (Batisse 1982). UNESCO endorsed 14 broad themes for interdisciplinary research, and thus in 1970, the program was launched.

In 1969 the IUCN General Assembly defined a national park as 'a relatively large area where one or several ecosystems are not materially altered by human exploitation and occupation' (Phillips 2007: 7). An internationally coordinated effort to accurately catalogue similar areas of natural significance was established, and national governments gradually realised the global value for national systems of protection. The resultant 'National Parks' provided valuable sites for the dual purposes of science and conservation that had, by this time, gained global political attention and national importance.

### **4.3 Expanding Environmentalism – 1970s Conceptual View**

Along with the positive aspects of the IBP, the spawning ecological sciences helped to establish a bleak and apprehensive mood in the early 1970s due to scientific verification of impending ecological crises. If in 1962 there was unease about the state of the environment, then by 1970 there was vocal – occasionally strident - insistence on change in a global society seemingly bent on self-destruction (Hay 2002). The concerns of a few scientists, administrators, and conservation groups grew into a fervent movement. Nature and natural resources were now no longer the sole concern; the new environmental movement addressed everything from over-population and pollution to the costs of technology and economic growth (McCormick 1989). New Environmentalism went beyond the natural world and challenged the very essence of capitalism (Dryzek and Schlosberg 1998).

One of the classic books written in response to growing interest in growth and industrialisation was the Club of Rome's *Limits to Growth*, published in 1972. The Club was founded by prosperous industrialists and sympathetic academics concerned with the predicament of mankind in 1968 (Dryzek 1997). The complex computer modelled population dynamics in *Limits* suggested that either a continuation of existing patterns of industrialisation and growth would lead to ecosystem collapse, or self-imposed restraints would be needed if such catastrophe were to be averted. This analysis

conferred empirical credibility on the argument that the biophysical and political thresholds of the human population and its copious desires had been reached (Davison 2001).

Due to the calls for harsh and restrictive government action in the face of forecast scarcity, this phase of the environment movement was dubbed by some as 'survivalist' (Eckersley 1992: 11-15). Dryzek (1997: 26) suggests that 'the discourse of limits and survival was not the sum of environmental thought circa 1970, but survivalism did set the apocalyptic horizon, giving the basic reason why care and concern about the environment were not just desirable, but also necessary'.

The first Earth Day on 20 April 1970 was the initial recognition for environmentalism as a household concern, with 300,000 participants in the United States (McCormick 1989). The idea of a finite earth had, although in an emergent form, reached popular culture. The Foundation for Environmental Conservation held the first International Conference on Environmental Future, Finland, in 1971 as a forerunner to the United Nations seminal Stockholm conference a year later. The Stockholm conference was a significant indicator of the status that environmental debate provided, especially amongst developed nations, experiencing the cumulative impacts of population growth and limited geographical and resource capacities. A concurrent publication that year, *A Blueprint for Survival* (Goldsmith et al. 1972) offered a clear indication of environmental change at that time, suggesting the breakdown of society and the irreversible disruption of natural life-support systems.

Under the emerging discipline of environmental ethics, the facets of the wilderness movement first inspired by Thoreau and Leopold in North America and Dunphy in Australia, also strengthened. Animal rights, intrinsic values and deep ecology were some of the more prominent arguments, propelled by the likes of Peter Singer, Baird Callicott and Richard Sylvan. Deep ecology, founded by Arne Naess, became popular during the mid 1970s. As a way of explaining the environmental crisis as a crisis of consciousness, Naess urged a change in the way that people thought about nature and their relations with it. With the creation of these and other theoretical underpinnings, groups such as Earth First! and Greenpeace arose, providing activist support and action. Proposed under this paradigm was a biocentric worldview that necessitated putting the Earth and its wildlands before human welfare in any political decision making, emphasising a change in personal lifestyles to do so (Dryzek 1997).

Bioregionalism, a concept highly commensurate with the BR concept, emerged from the principles of deep ecology, and encompassed the theory and practice of living-in-place. The idea was born out of the progressive Gulf Island societies of west coast British Columbia, Canada. The bioregional undertaking is to 'learn our region; to stay here and be at home in it; and to take responsibility for it, and to treat it right. And then to take pleasure in that' (Wadland and Gibson 1997: 52). The bioregionalist concept reasserted what indigenous populations had practiced for millennia. The modern take on the concept held that:

... a watershed, biotic province, biome, ecosystem – in short representations of a bioregion – can be restored and sustained if a society fosters the institutional capacity of communities to participate and cooperate to preserve the commons' (McGinnis 1999: 4).



Bioregionalism asserted recognition of the human place within, not outside of, or superior to the environment. Over nearly thirty years, this ambitious project of 're-inhabitation' has carefully evolved far outside of the usual political or intellectual epicenters of so-called civilisation (Wadland and Gibson 1997). The following, by Aberley (1999: 38) briefly accounts for some major tenets of the concept and praxis of bioregionalism:

As people reinhabit their home place, a remarkable integration of philosophy and political activity evolves. Place is perceived as irrevocably connected to culture. Culture is seen as connected to past histories of human and ecosystem exploitation. Constraints to achieving the alternative of a socially just, and ecologically sustainable future are identified, analysed and confronted. Processes of resistance and renewal are animated within, and parallel to, existing power structures.

Bioregionalism is a philosophy and praxis, too vast to examine here. However, through its application to the sustainable relationship between humans, culture and environment, bioregionalism is intimately related to BRs.

## **4.4 Expanding Environmentalism – 1970s Events**

### **4.4.1 Protected Areas**

The Second World Conference on National Parks was held in Yellowstone in 1972, to coincide with the centenary of the world's first national park (Lockwood et al. 2006).<sup>25</sup> Issues discussed included effective park planning and management; effects of tourism on parks; communicating park values to visitors and raising environmental awareness; providing international training opportunities; and expanding the global park and reserve system.

It was within this context that the early MAB Program was officially endorsed by Stockholm Conference delegates and became politically popular. The MAB program had affiliation of over one hundred member states (1987 data) and it represented a strong internationally coordinated effort for strategising the ecological sciences, headed by the 30 elected member states of UNESCO (Roots 1989). During an era of rising ecological uncertainty, MAB arrived as a prescription for obtaining 'hard science' at the nation level.

In 1972, the seminal Stockholm Conference caused 'environmental concerns to move from the margins to the centre of international politics' (Davison 2001: 18), and was the single most influential event in the evolution of the international environmental movement. It had four major results (McCormick 1989):

1. The conference confirmed the trend toward a new emphasis on the human environment, where humans are both creatures and creators of their environment. Thinking had progressed from the limited aims of nature protection and natural resource conservation to a more comprehensive view of human mismanagement of the biosphere.

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<sup>25</sup> By 1972, there were 1,200 National Parks worldwide.

2. Stockholm forced a compromise between the different perceptions of the environment held by developed and developing nations. Developed countries were encouraged to reinterpret the priorities of environmentalism, to take a broader view of the global inter-relatedness of many problems, and to begin to understand how many of these problems were rooted in social and political issues.

3. The presence and role of many NGOs at the conference marked the beginning of a significant role for NGOs in the work of governments and intergovernmental organisations. The conference allowed these groups to meet and realise common problems and solutions. In the decade following Stockholm, a rapid growth in the number and quality of NGOs occurred.

4. The most tangible outcome was the establishment of the United Nations Environment Programme (UNEP) which was a milestone for the era, despite some limitations of its mandate.

The first actions to implement BRs were led by a joint task force between UNESCO and UNEP in 1974, where the concept of a BR was cultivated. The notions of buffer zones, a zoning system, restoration of ecosystems, experimentation related to development and a world network, were mentioned (Batisse 2000). Thus, in 1974 the BR component became central to realising MAB's directive. At this point, the focus on conservation became more apparent for the 'intelligent use of the biosphere' (Slocombe 2004: no page).

By the mid 1970s, some influential changes included (Phillips 2003):

- protected areas were being established at an unparalleled rate;
- IUCN publications documented this growth in the number and extent of protected areas, but also revealed confusion over meaning of terms like national park and nature reserve;
- some people favoured a focus on national parks, while other types of protected areas were covered by catch-all phrases like 'equivalent reserves' or 'other protected areas' which indicated that they were considered of secondary importance;
- some conservationists advocated a variety of approaches to protected areas to complement the attention on strictly protected areas (for example, BRs);
- the agreements of the MAB Program, including BRs, the Ramsar Wetlands Convention (1971) and the World Heritage Convention (1972) were enacted; and
- a debate was underway on an agreed international terminology for all kinds of protected areas.

In response to the growing array of protected areas internationally and heightened attention to the concept, the Commission on National Parks and Protected Areas (forerunner to IUCN) developed a categories system for protected areas, which defined nomenclature. The IUCN protected area categories that resulted comprised 10 categories, each with specific purposes for management. The IUCN encouraged governments to use the system and to develop protected areas based on the categories, hence promoting a diverse protected area landscape mosaic across the world. Importantly, the system recognised that parts of civil society should be involved in the management of various categories of protected area (including a separate category for BRs, Category IX), but assumed that land in certain categories was likely to be owned and managed by governments (Peine 1999).

Concurrently, the ICC endorsed 14 broad themes for interdisciplinary research and by the mid-1970s, the MAB BR was launched. The early concept of BRs was formalised by a task force in 1974 and three primary objectives were delineated:

- to conserve the diversity and integrity of biotic communities of plants and animals within natural and semi-natural ecosystems, including those maintained under long-established land use and to safeguard the genetic diversity of species;
- to provide areas for ecological and environmental research; and
- to provide facilities for education and training (UNESCO 1974).

#### **4.4.2 Biosphere Reserves**

The General Conference of UNESCO endorsed the MAB program in 1970, establishing the ICC to guide and supervise the program, inviting UNESCO cooperating countries to form a National Committee for MAB. The broad purpose of MAB was to promote interdisciplinary ecological and environmental research and monitoring with related education and training activities, oriented towards resource and environmental policy and management issues (Francis 1991). Countries could choose to become involved in the MAB program, and then create national arrangements to pursue work on one or more of the various research themes developed through MAB. Nearly all UNESCO member states started national implementation immediately after the launch of the Program. By setting up MAB national committees, countries fulfilled an essential formal requirement for participation in the MAB Program (Walter 2005).

MAB was arguably the first deliberate international scale initiative to find ways to address an issue that would later be coined sustainable development. The concept of the WNBR was designed to include existing protected areas, but with the important difference of extending, in a systematic manner, protection for many plant and animal genetic resources that were not covered in protected areas (Batisse 1982).

In 1970, the first official definition of BRs was developed and stressed a role in research and logistic capacities, commensurate with the focus of the MAB program at that time:

the pursuit of the various studies called for in the Program will require the availability of undisturbed natural areas for scientific study as well as areas in which the conditions of disturbance are under careful control by the scientists involved in the research projects under the Program. It will be essential therefore for each Member State to designate within its boundaries 'BRs' containing representative areas of each of the major or otherwise relevant ecosystems within the nation's boundaries. These reserves would have as their primary purpose to serve as centres for research and, where appropriate, monitoring and observation called for in the MAB Program (UNESCO 1974: 8).

In 1971, when the first session of the MAB Council met and included BRs as one of the themes for discussion (Batisse 2000), BRs were still a relatively broad idea. A World Network of BRs was created in 1976, representing MAB's objective of achieving an international sustainable balance between the goals of conserving biological diversity, promoting economic development, and maintaining associated cultural values (UNESCO 2004a). BRs were developed as sites where these objectives could be tested, refined, demonstrated and implemented (Batisse 1982).

BRs formed a component of the MAB Project Area 8: 'Conservation of Natural Areas and the Genetic Material they contain' where their inclusion within this theme led to a concentration on scientific topics in the area now coined 'biodiversity' (Wilson and Peter 1986). The objective of the WNBR was to designate demonstration sites for MAB activities using each country's system of national parks and equivalent reserves but also including adjacent lands. In 1976 the first BRs were declared in many countries, including the USA, United Kingdom and Poland.

Batisse (2000) suggested that perhaps the idea of the BR had been too liberal in its formative stage as, when the first batch of BRs were designated by the MAB Council in 1976, most of them did not conform with the key ideas expressed in 1974. He reflected that these early designations were essentially sites proposed by the Member Countries, consisting of an already existing protected area (a national park in most cases) where ecological research was, or would be, conducted under the MAB label. But the presence of buffer zones was rarely included and the idea of cooperation with the local population was conspicuously absent.

However, the MAB ICC came to realise that to fit with the objectives of the program, greater emphasis should be given to the human uses of the designations. To meet this need, UNESCO in partnership with UNEP and the Food and Agriculture Organisation of the United Nations (FAO), organised a task force in 1974 on 'Criteria and Guidelines for the Choice and Establishment of BRs' (Price 1996). Through this initiative and others, the program grew during the 1970s into a strong international interest.

By 1977, the number of BRs worldwide had reached 118, in 27 countries. Canada's first two BRs were declared in 1978-79 which also coincided with the Sixth Session of the International Coordinating Council's Reviews for the Operational Phase of the Biosphere Reserve (Kriwoken 1989). Findings from this meeting suggested that construction of the WNBR was inconsistent. Different countries were applying the concept in a variety of ways and for differing purposes. As a consequence, a pragmatic, flexible approach was considered to be the best means to continue to develop the network (Robertson-Vernhes 1987).

Australia's first BRs were declared in 1977 amidst a government-led concern to bring international recognition to the country's outstanding national parks. By 1978, the national park was the most common method for the management of conservation areas, and alongside other distinct categories, provided a broad set of legal and managerial options for conservation land management. Within Australia, national parks, declared by state and territory government, were each employing their own definition of the term.<sup>26</sup> The objectives for establishing BRs in Australia reflected the goals of the MAB program at that time. Focusing on science for global environmental monitoring, Australia provided a contingent of sites to adequately represent a diversity of ecosystem types ranging from arid desert areas to temperate rainforest and alpine grasslands.

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<sup>26</sup> These parks are separate to other federal national parks unlike the United States, where national parks are all under federal jurisdiction.

The 1979 account by UNESCO of the BR concept described it as:

a broadly based ecological notion ... aiming to develop within the natural and social sciences a basis for the rational use and conservation of The Biosphere and for the improvement of the relationship between man and the natural environment (Kellert 1986: 102).

The designation of BRs continued apace in an effort to strengthen the MAB Research Program, as requirements to understand the complexity of natural systems increased. Batisse (2000) suggests that the resolve of the MAB research agenda may have been increasing, but the adherence to the principles of the BR concept as a tool in that agenda did not. Between 1976 and the Ecology in Action Conference, which celebrated the tenth anniversary of the operational launching of MAB in 1981, new BRs were created but only a limited number actually fulfilled their development and logistics functions (Batisse 2000).

#### **4.4.3 World Heritage Areas**

Identification, protection and preservation of cultural and natural heritage considered to be of outstanding value to humanity became a priority for UNESCO in 1971 (UNESCO 2004d). Embodied in an international treaty called the Convention Concerning the Protection of the World Cultural and Natural Heritage (commonly known as the World Heritage Convention), and adopted by UNESCO in 1972, internationally significant natural and cultural heritage was protected for the first time. Cultural heritage refers to monuments, groups of buildings and properties with historical, aesthetic, archaeological, scientific, ethnological or anthropological value. Natural heritage refers to outstanding physical, biological and geological formations, habitats of threatened species of animals and plants and areas with scientific, conservation or aesthetic value (UNESCO 2004d).

UNESCO's World Heritage mission is to:

- encourage countries to sign the 1972 Convention and to ensure the protection of their natural and cultural heritage;
- encourage state parties to the Convention to nominate properties within their national territory for inclusion on the World Heritage List;
- encourage state parties to set up reporting systems on the state of conservation of World Heritage properties;
- help state parties safeguard World Heritage properties by providing technical assistance and professional training;
- provide emergency assistance for World Heritage properties in immediate danger;
- support state parties' public awareness-building activities for World Heritage conservation;
- encourage participation of the local population in the preservation of their cultural and natural heritage; and
- encourage international cooperation in conservation of cultural and natural heritage (UNESCO 2004d: no page).

The differences between BRs and World Heritage Areas are summarised in Table 2 .

**Table 2 Key differences between BRs and World Heritage Areas**

<b>BRs</b>	<b>World Heritage Areas</b>
Designed to achieve biogeographical coverage	Uniqueness
Representative or typical ecosystem	Outstanding, universal value
Sites of significance for biodiversity conservation and use	Natural / cultural sites considered as part of the world heritage of human kind
Extends beyond the protected area concept	Chiefly deals with protected areas
A model of the bioregional approach to landscape / seascape planning	Cultural landscapes selected on the basis of outstanding universal value and capacity to illustrate a defined bio-cultural region
Only the core area usually protected by legal means	Adequate legal protection required to ensure integrity
Monitoring, scientific exchange and dynamic management (including boundary changes) part of the BR concept	World Heritage sites form the List of World Heritage properties – changes rare and only after detailed consideration
Periodic review of each property every ten years	Conservation status of properties monitored on a case by case basis

Source: Bridgewater (1999: 3).

Whilst both BRs and WHAs are administered by UNESCO, BRs are representative of the world's social-ecological systems whereas WHAs are areas of universal outstanding importance for cultural and / or natural reasons. This is why the World Heritage Convention is concerned with preservation, whereas in the WNBR, the main focus is worldwide sites of local sustainability in action (German MAB National Committee 2005). As both programs are overseen by UNESCO, it is interesting that World Heritage Areas have historically gained higher esteem and funding than BRs. Indeed, it could be said that both programs are about the incorporation and recognition of culture and human practice within landscapes. Yet, BRs remain relatively unknown compared to the WHAs, despite BRs practical social-ecological mandate and broad application.

#### **4.4.4 Ramsar**

The Convention on Wetlands of International Importance, signed in Ramsar, Iran, in 1971, provided an inter-governmental treaty for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 156 parties to the Convention, with 1676 wetland sites designated for inclusion in the Ramsar List of Wetlands of International Importance (Ramsar 2007). Wetlands included on the list acquire a status at the national level and are recognised by the international community as being of significant value not only for the country, or

the countries, in which they are located, but for humanity as a whole. The Convention established that 'wetlands should be selected for the list on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology' (Ramsar 1999: no page). The Convention's goal is to achieve Ramsar listing for as many wetlands throughout the world as meet the criteria of international importance. Ramsar sites can contribute to the valuable core area conservation function of BRs.

#### **4.5 The Fight of Conservation – 1980s Conceptual View**

During the early 1980s, there was an increasing focus on environmental and biosphere changes caused by human activities. Despite doomsayers being viewed as overtly pessimistic by the early 1980s, environmental issues became more highly publicised, which in turn fuelled political acknowledgement. As a backlash against the ecocentric philosophers of the 1970s, anthropocentric arguments became a significant discourse during the early 1980s (Hay 2002).

According to Dryzek (1997) the distinction between the two decades could not have been more distinct, with the arrival of the 1980s as the era of cornucopia, or denial of environmental limits. The term cornucopia encompassed unlimited natural resources, unlimited ability of natural systems to absorb pollutants, and unlimited corrective capacity in natural systems. The BRP, however, did not align with denials of environmental limits and continued with a precautionary approach centred on research. Other scholars including Lockwood (2007) suggest that this description of the 1980s is too negative, arguing that the largest expansion of Australia's protected area network occurred during this decade. However, the rapidity of protected area expansion arguably may have been an opposite and balancing response to heavy-handed development which Dryzek (1997) describes. Clearly, two opposing and equally important modalities were in co-occurrence: development on the one hand and conservation on the other.

This plurality was reflected in the BR lexicon concerning resource management and ecological community. Engel (1987) suggests that the two value-laden languages competed with each other. What the languages represented were the two distinct themes of humanity's relationship to the rest of nature, which could be traced back to the beginning of the conservation movement. At this time the language of resource management dominated. The language of BRs, along with most other United Nations and national government literature regarding the environment, reflected the resource discourse. Words such as management, production, control, objectives and systems were common, where 'the basic image of this language is the management of nature as a resource or means for sustainable human economic development' (Engel 1987: 23). Engel therefore suggested that the exclusive reason for biological conservation was for utilitarian purposes.

However, the discourse of ecological community was also present, at a deeper level, typically stressing the importance of local community representation in decisions affecting reserves, the equitable sharing of benefits by local communities, and the integration of cultures and bioregions (see (Gregg and McGean 1985; Batisse 1984; Halfpeter 1981). Krugman and Gregg (1988) argue that the WNBR thus became concerned with developing the knowledge, skills, and attitudes needed to integrate conservation and economic uses of ecosystems locally; to serve as hubs for regional

cooperation on scientific and educational activities; and contribute information for addressing multi-regional and global environmental problems.

Concurrently, the fight to defend the intrinsic value of wilderness continued throughout the 1980s. Hay (2002) proposed that wilderness-inspired environmentalism, from the outset, faced political challenge as proponents essentially argued against the public-good.<sup>27</sup> By suggesting that wilderness contained intrinsic value, without reference to its use-value for humans, a fundamental notion was challenged.<sup>28</sup>

Wilderness provided the centre-stage for a battle waged over a longstanding assumption within western thought: the planet and its bounty were the domain of human beings, with all other entities having little or no moral standing. Hay (2002) considers that the keystone of the environment movement may well be to defend the existential interests of other life forms. If true, the environment movement found firm establishment in the ethically-centred debate for wilderness in the early to mid 1980s.

Wilderness, or the variously contested meanings of nature at this time were well represented as the core zones of BRs. The designation of a core area signified the import of ecological communities, but also recognised the more abstract opportunity for entering into a dialogue with the natural order: a place to re-establish a sense of the human belonging in the ecological community. Buffer and transition zones provided different examples of community, perhaps through that of the garden, farm or town, each symbolising mixed communities of humans, animals and plants (Engel 1987).

The term sustainable development entered the international conservation lexicon in 1987, triggered by the Brundtland Report of the World Commission on Environment and Development. Lafferty (1998) iterated a widely held belief that the Brundtland Report was the first internationally sanctioned document attempting to elaborate a concept of physical-biological-social maintainability, attached to the relationship between nature, human welfare and society. However, BRs had been enunciating the very same agenda throughout the 1980s. Sustainable development was defined by the Commission as:

... development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of

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<sup>27</sup> By arguing for purist wilderness, disassociated from humans.

<sup>28</sup> Opposing discourses to globalisation were evident and provided the early and strong foundation for globalisation counter movements. These included an emerging ecological world polity, incorporating a sense of collective selfhood and solidarity, and imposed limitations on human society. Federalism, as the ideal of decentralised self-governing local polities, became more prominent within such discourses (Hay 2002). Other more religiously and ethically oriented discourses sought to disregard the global exchange economy and build more communally responsible patterns of human association. In this area of discourse, bioregionalism continued to grow as theory and practice, however, remaining place-specific rather than being recognised by the broader environmental movement.



technology and social organisation on the environment's ability to meet present and future needs (OCF 1987: 43).<sup>29</sup>

Importantly for BRs, the Brundtland Report called for non-conventional protected areas. By this time there were already 260 BRs established in over 70 countries. In fact, the new ideology of sustainable development in the Brundtland Report had been advocated almost 20 years earlier at an intergovernmental level by the 1968 Biosphere Conference. This remained largely unnoticed until the late 1990s.

A shift was evident, from the directive of the MAB Program, the intergovernmental discussions on 'sustainable development' and the emerging environmental discourses around globalisation, that the human component of environmentalism was not to be ignored. Yet, the focus on this human component was no longer the doomsayer version. Rather it was an information-seeking, technologically-supported positivism suggesting that economic growth, along with conservation could co-exist. Davison (2001:15) argues that the 1980s:

... affirmed not the existence of ecological and social limits, but the 'need' to wrest control of our future from arbitrary ecological forces, placing our destiny squarely in the hands of progressive, efficient global managers. *Our Common Future* undermined limits to growth arguments by placing at the centre of the language of sustainable development the following questions: How is economic growth and technological expansion to be sustained?

Commensurate with these ideas, urban ecology and the eco-city movement arrived at a timely nexus in the late 1980s. Roseland (1997a) suggests that urban ecology debuted with the 1987 publication of Richard Register's *Eco-city Berkley*, which discussed the ecological rebuilding of Berkley, USA. In fact, the discipline of urban ecology, and later of eco-cities, was the combined manifestation of a number of commensurate disciplines that had each been developing relatively independently, gaining particular relevance and support throughout the 1980s.

However, Pakulski and Tranter (2004) suggest, that by 1988 in Australia, the environment was not a major civil society concern. Rather, environmental concern was concentrated in a minority: young, educated city-dwellers. The role of the media was significant in changing the general perception of the environment. In 1989-90 a suite of incidences including oil spills, irregular weather patterns and toxic pollution reached front-page headlines of national newspapers. Moreover, the federal election campaign included environmental issues indicating that the political mainstream recognised the environment alongside the mainstay issues of health, education and defence. Suddenly, with environmental matters making headlines, issues that had been building for decades now appeared regularly in a variety of civil society arenas, for example as constituents of corporate reporting, best practice management and environmental accounting. However, such perception would soon change with coverage of the environment transitioning from sensational to mainstay.

According to Roseland (1997b), the following discourses became important during the 1980s, informing BRs and to some extent the WNBR and which remain today, significant in their own right.

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<sup>29</sup> In sum, sustainable development is a discourse of, and for, global civil society (Lafferty 1998; Dryzek 1997).

First, appropriate technology, uses the best modern knowledge that is both ecologically compatible with its local setting and utilises minimal resources. The technology is human-serving, supportive of self-reliance and local community. Examples include passive solar design and roof-top gardens. Second, community economic development, concerned with communities initiating and generating their own solutions to their common economic problems and thereby building long-term community capacity and fostering the integration of economic, social and environmental objectives. Third, social ecology (as introduced in Chapter 1) involves the study of both human and natural ecosystems, and particularly the social relations that affect the relation of society as a whole with nature. It advances a holistic world-view, appropriate technology, reconstruction of damaged ecosystems, and creative human enterprise. Fourth, the green movement, with four pillars of ecology, social responsibility, grassroots democracy, and non-violence. These translate into questioning many assumptions about the rights of land ownership, the permanence of institutions, the meaning of progress and the traditional patterns of authority within society. Fifth, bioregionalism, concerned with deep connections to place and bioregional practice is oriented toward resistance against the continuing destruction of natural systems. Bioregionalism considers people as part of a life-place that is organised around a bioregion considered the right size for human-scale organisation, contributing to a natural framework for economic and political decentralisation and self-determination. Sixth, sustainable development, as defined in *Our Common Future*, gave credibility to the concept, representing a hopeful new approach to ethics, politics and economics.

#### **4.6 The Fight of Conservation – 1980s Events**

The *Third World National Parks Congress* was held in Bali, Indonesia, in 1982 and focussed on the role of protected areas in sustaining society. Ten major areas of concern were recognised by the Congress. A key element was the need to expand the world network of protected areas in all biomes. Recommendations promoted developing a system of consistent categories for protected areas; linking protected areas to sustainable development; capacity-building for protected area management; promoting the true value of protected areas using economic tools such as cost benefit analysis; monitoring to ensure effective management and the needs of society are met; and creating a global program for protected areas using the IUCN network.

In 1983, at the First International Biosphere Reserve Congress in Minsk, the theme for discussion was 'conservation, science and society' (Batisse 1993). This Congress stated, '[p]eople should be considered part of a BR' (UNESCO/ MAB 1984: 2). Papers presented at the Congress enunciated the problem between the concept and practice of BRs. Batisse (1984) noted that one innovation of the BR was the linkage of conservation with human activities and rural development.

The Minsk Congress gave rise to an International Action Plan for BRs in 1984 that was formally endorsed by the UNESCO General Conference and by the Governing Council of UNEP. The International Action Plan was designed as a framework for improving the network and identified a series of goals: improvement and expansion of the network; development of basic knowledge for conserving ecosystems and biological diversity; and making BRs more effective in linking conservation and development (UNESCO/ MAB 1984). It also addressed the lack of ecosystem

diversity of BRs under the Udvardy classification system. Furthermore, only 1.4 per cent of the area reported in designations was newly protected, indicating that the BR designation was simply being overlain on existing parks and reserves.

Whilst the principles and objectives of the Action Plan were credible, it did not provide definitive criteria as to what a BR must represent to be worthy of the designation. Batisse (2000) states that the expected financial support from UNEP for its implementation did not come and IUCN paid only lip service to a new concept which did not correspond at the time to the conventional view of protected areas. Thus, the so-called 'Action Plan' remained inactive.

Also in 1984, UNESCO created an External Scientific Advisory Panel to review the MAB program and advise on future directions, which met in 1985-86. The panel's report, published and approved by the ICC in 1986, recognised the importance of considering local people and their socio-economic development in defining and managing BRs (Price 1996). The External Scientific Advisory Panel contributed to a shift in MAB's focus from conservation of ecosystems, to a program focused on rational, environmentally sustainable development, monitoring of the environment and harmony between human and natural systems (UNESCO / MAB 1987). In other words, the idea of Man *and* the Biosphere had evolved to one of Man *in* the Biosphere (UNESCO / MAB 1987). The Panel arrived at a clear definition of a BR, with three complementary functions (conservation, development and logistic support) which would be clear and flexible to be applicable everywhere in the world and thus facilitate a true network (Batisse 2000).

Up until 1984 the WNBR was in a preliminary phase. The emphasis was on the designation of areas to cement the concept. According to Gregg (1984) the primary emphasis of this time was on designating sites to build national and global networks rather than on developing the multiple functions of BRs. By 1987, there was a call for BRs to focus on participation rather than management, to create new forms of interdisciplinary research and development that would be holistic and community-oriented. This requirement largely arose from the 4<sup>th</sup> World Wilderness Congress for Worldwide Conservation, which focussed on the UNESCO BRs, recognising that:

... the BRP ... is being implemented under a wide variety of ecological, social, cultural, economic, and institutional situations ... provid[ing] an overview of the BR concept twelve years after UNESCO designated the first BRs, to demonstrate its remarkable flexibility in adapting to the needs of different nations and regions (Gregg Jr. et al. 1989: v).

Issues covered by the Congress included the role of BRs at a time of increasing globalisation; BRs and the development of sustainable production systems; coastal-marine BRs; experiences of BRs in developed and developing nations; and the evolution of the BR concept.

Despite a strong assertion for global coordination for sustainability initiatives and non-conventional protected areas, the late 1980s proved a difficult time for the MAB Program, with some of its major collaborators foregoing their support. For instance, the IUCN supported the idea of associating conservation with development but did not support BRs, considering them an unnecessary complication too closely associated with UNESCO (Batisse 2000). For UNEP, funding had been

reduced, causing other issues to take precedence over BRs (Batisse 2000). Furthermore, UNESCO faced the withdrawal of several countries, including the United Kingdom. It was a small number of strong supporters and the faith of the small MAB Secretariat in Paris that allowed for any continued development of MAB. Hence, by the end of the 1980s, BRs were not designated nearly as readily.

MAB devised the following four new research foci in the late 1980s, from the Scientific Advisory Committee's recommendations based on the best available international science:

- ecosystem functioning under different intensities of human impact;
- management and restoration of human impacted resources;
- human investments and resource use; and
- human response to environmental stress (UNESCO / MAB 1987).

Cooperation was generally recognised as one of the key integrators for these new research foci and the other functions of BRs. A UNESCO document stated in 1984 that cooperation provided the moral force behind the BR concept, as an essential part of the symbolism, and a key factor in fostering personal commitment (UNESCO / MAB 1984).

Yet, Engel (1987: 25) suggested a considerable difference existed if 'cooperation' were used as part of the resource conservation versus a community lexicon:

Cooperation in the language of resources means working together to use the environment to produce goods for human use and consumption. Cooperation in the language of community means nurturing mutually enhancing relationships with all persons and organisms with which one shares the interdependent web of life.

Hence, a tension had emerged in the MAB BRP. MAB arose in the 1960s from within the ecology paradigm, which was originally defined as the science of communities (Worster 1979), and by the 1980s, the science of human ecology was arising as a concern of equal importance. As an evolving program, the BR was now implicitly entwined with the multiple meanings of community through its lexicon and spatial design.

#### **4.7 Application to the Research**

As the guiding principles for the early version of the WNBR and the BR ideal, the importance of conservation for science was a defensible and respected mandate. This mandate altered over the period discussed in this chapter to include cooperation and institutional capacity to meet mounting demands on protected areas globally. BRs, from their inception, had recognised the implicit human aspect of conservation. However, by the late 1980s an emerging requirement for further engagement with the social-ecological complexities entwined with several discourses had become clear. These included: globalisation; sustainability discourses such as urban greening; the intrinsic value of wilderness; and the transition of governance from state to local and community levels.

UNESCO's response to these issues was to include a more human impact-oriented research focus within the WNBR with a newly targeted focus on multi-jurisdictional cooperation and capacity-building. These targets manifest in UNESCO's WNBR language, however such foci would remain

operationally untenable until the national and local governance arrangements required were realised at individual BR levels, or stewarded as a mandate by national coordinating committees such as CBRA. The requirement for such coordination at these local levels was testimony to the heightened influence of an emerging ecological community discourse, typically stressing the importance of local community and increased attention to the social aspects of ecological systems.

The next chapter outlines working landscape ideas and events that emerged throughout the 1990s and the new century, along with their relationship to BR development in theory and praxis. Influences such as post-modern theoretical shifts, coupled with increased international attention to environmental harm and responsibility catalysed change in the BR ideal and the WNBR.

## 5 The Working Landscape: BRs 1990s – 2007

*This chapter continues to map the associated discourses and key drivers relevant to BRs and builds on the conceptual maturation of the WNBR from the previous chapter, examining some of the influential discourses and events through the 1990s to present. This chapter goes into greater detail than the previous chapter, as it is more pertinent to the current context of BRs and the BRP. Developing environmental discourses during this period have resulted in the recognition of adaptive capacity as a key element of sustainable social-ecological systems. A present focus on landscape-scale connectivity conservation is establishing multi-jurisdictional adaptive capacity as a new aim, resulting from and facilitating, for example, greater mobilisation of civil society, private and public sectors.*

### 5.1 Recognising the Working Landscape – 1990s Conceptual View

The need for conservation planning across the landscape, regardless of tenure, became more widely recognised during the 1990s. As sustainability became the catch-cry of the decade, the concept was challenged in praxis and theory. Consequently, many new associated and more specific concepts became influential, in an effort to make sustainability operational, including the enunciation of the new paradigm for protected areas. BRs and the WNBR provided a framework commensurate with this shifting paradigm, however national support for UNESCO and international politics consistently challenged the implementation of international recommendations at a local level.

During the 1990s Wondolleck and Yaffee (2000) notes that literature on ecosystem management unanimously advocated management at broader geographic and temporal scales, where postmodernism was influencing this change. For example:

We are now moving into postmodern times in which the old 'certainties' and confidence or modernism are being superseded by more complex, diverse and dynamic understandings and behaviors. The postmodern sensibility is relativistic rather than absolute, pluralistic rather than segregated, richly chaotic rather than ordered. Knowledge belongs to particular social and historical contexts, and as such is relative and subjective. (Allmendinger and Tewdwr-Jones 2002).

Lockwood et al. (2006: 44) comment on the challenge of postmodern expression within protected area management:

Postmodernists reject the possibility of a monolithic 'public interest', replacing it with a plurality of voices and interests. Given that one of the traditional roles for protected area management is to serve 'the public interest', such thinking poses significant challenges to the role and place of protected areas in society. The new protected area paradigm is a way of meeting such challenges.

As Allmendinger et al. (2002) note, post modernity is modernity coming to grips with its contradictions and limitations, recognising that the modern dream of creating a perfect social order is ending and many problems are insoluble. Throughout the 1990s, conservation and protected areas ideas changed in response to this postmodern shift (Mol and Van Den Burg 2004; Campbell and Fainstein 2003; Dryzek 1997; Hajer 1995). Isolation of protected areas from their inhabitant communities, or

isolation only as wildlife conservation sites, was recognised. The variety of values inherent in conservation and protection became more explicit. A learning relationship was mooted at international congresses during this time, between industrial society and indigenous cultures and worldviews, as a means to recognise the embedded cultural and working landscape (Knudtson and Suzuki 1993).

A major concern of the early 1990s was the intrusion on the values of national parks and other protected areas, where 'protected areas are subject to many internal and external threats as they become increasingly island-like' (Slocombe 1993: 613). Some recommendations arising from the Fourth World Congress on Parks and Protected Areas in Caracas (1992) promoted a battenning down against the barrage of external threats to protected areas. In this view, protected areas remained as sanctioned spaces, recognising their role in the respective national social order, but not the social matrices of their locales.

The BR provided an alternative to this construct. Batisse (1997) suggested some proponents for traditional protected areas believed BRs diluted conservation values of protected areas, through their recognition and inclusiveness of multiple functions found in working landscapes amidst a core protected area – focussing more on the working landscape values and less on those of the protected area. However, protected areas have always been central to core areas and BR advocates suggested that the values of the protected area should infiltrate the broader working landscape, looking from within the protected area, outward (Batisse 1996). Hence an old versus new protected area paradigm tension was now evident.

Whilst global change and biodiversity provided the overarching themes at both Caracas and Rio, messages from the Congress were that communities wanted to be involved in decision making and management of protected areas. Political, social, economic and cultural issues were understood to be central to protected area concerns, not peripheral. Mutual respect between cultures was also acknowledged as an essential component of sound protected area management. Other major themes included addressing the bioregional context of protected areas, habitat fragmentation and securing the investment needed for effective protected area management.

Table 3 illustrates a gradually altered paradigm for international protected areas at each successive Parks Congress. By the mid 1990s the forces that had driven the change between old and new protected area paradigms had become increasingly evident and powerful. Peine (1999) suggests that the following forces, whilst complex and broad, have brought about a very different way of looking at conservation issues and the management of natural resources in general:

- scientific understanding;
- cultural and social awareness;
- the acknowledgement of human rights;
- political developments;
- general developments in management practice;
- technological advance; and

- economics.

Other forces, whilst important, remained relatively steady for developed countries such as Australia and Canada. The relatively stable national economies, pace of technological advance, protected area management authorities and import of scientific knowledge in Australia and Canada exerted comparatively less influence on changes to environmental discourse (Holland and Morton 1996). Over the following decade, political developments, namely approaches to governance in conservation, would become 'central to the conservation of protected areas throughout the world' (Dearden et al. 2005: 89). A government agency (top-down) approach was gradually combined with aspects of the working landscape approach to environmental discourse and practice. By extension, BRs now had a multi-faceted international importance, at least in theory. Not only were BRs significant for international conservation, research and monitoring, but opportunity now existed for their use in promoting the newly conceived aspects of the IUCN categories, related to human values (Bridgewater et al. 1996).

Tress et al. (2005) described pressures for change within the paradigm of protected area management, reflecting a shift in priorities initiated by the need to better understand nature-society relationships (Table 3, pg. 82). In developing bridging theories, a means for understanding and better representing patterns and processes across the nature-society interface would be created (Potschin and Haines-Young 2006). But globalisation,<sup>30</sup> in all its complexity, was changing the nature and permeability of protected area boundaries, providing arguably the most significant contemporary problem facing park managers (Smith et al. 2002). However:

... establishing narrow, impermeable buffer zones around parks that isolate them from the surrounding landscape is clearly not the solution to this problem. A more holistic solution would be to create a gradient buffer zone that mediates, rather than prevents, the interaction between the protected core and its surrounding working landscape, where it is recognised that such a transition would be gradual, since it would require a fundamental shift in underlying conservation philosophy (Smith et al. 2002: 166).

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<sup>30</sup> At the 4<sup>th</sup> International Conference on Science and Management of Protected Areas, at a workshop on Globalisation and Protected Areas: A stakeholders' roundtable discussion, proposed the definition of globalisation as 'the global changes occurring in economics, culture, politics, and biodiversity, and the mismatches of scale that exist among these areas' (Bondrup-Nielsen et al. 2002: no page). The definition was expanded to acknowledge two distinct paradigms of globalisation: one, characterised by a global take-over by transnational corporations, and the other by a global living system that functions with the efficiency of a healthy body. The group agreed that 'the global living system paradigm is desirable, but at present its adoption is unlikely because of the risk involved. This dichotomy is simplistic since it recognises only the economic and ecological dimensions of globalisation, when the worldwide changes in politics and culture are so vital' (Smith et al. 2002: 164-65). However, the definition is pertinent for this discussion, as it is both recent and representative of key stakeholders in the global protected areas forum.



**Table 3** Changing priorities for World Parks Congresses (1962 - 2003)

Topic	Number of recommendations adopted at (or proposed for):				
	1st (1962)	2 <sup>nd</sup> (1972)	3 <sup>rd</sup> (1982)	4 <sup>th</sup> (1992)	5 <sup>th</sup> (2003) <sup>31</sup>
Ecosystem Coverage (including marine)	1	5	3	3	3
Standards, definitions, information	3	2	1	2	3
Threats, pressures, global change	1	3	2	3	4
Biosphere Reserves		1	1	1	2
Technical assistance, finance	2	1	1	1	1
Interpretation, education	1	2	1		
Species, genetic resources, biodiversity	1		1	2	
Research, science	2	1			
Law, planning and management		1	1	1	
Training, capacity-building		1	1	2	1
Conventions, transboundary, etc.		4	3	1	2
Building support, partnerships			1	2	1
Development, bioregional scale, etc.			3	1	1
People (including indigenous peoples)			1	1	1
Ecological restoration				1	
Governance					1
Spiritual Values					1
Urban links					1

Source: adapted from Phillips (2003: 17).

<sup>31</sup> See Section 5.3

Various authors discussed how landscape ecology might provide scope for resolution of old versus new protected area paradigms (Botequilha Leitao and Ahern 2002; Selman 2002; Barnett 2001; Falk 2001; Naveh 2000; Brunckhorst et al. 1997; Dramstad et al. 1995; Francis 1992), to develop discourse on sustainable landscapes. A sustainable landscape was defined as those able to maintain the outputs of ecosystem goods and services, with key research focus for landscape ecology and understanding the biophysical, social and economic boundaries of the space in which such sustainability could be possible (Francis 1992). Yet Antrop (2006) proposed that as landscapes change continuously in a more or less chaotic way, the concept of sustainable landscapes could be viewed as a utopian goal. However, the meaning of the concept 'landscape' was still in a profound transition, as arguably it still is. Sustainable landscapes will remain utopian if too precise time horizons for landscape management are set (Antrop 2006). Again, this fits with the pragmatic view of BRs which suggest that sustainable increments can be made to improve the social, environmental and economic status quo, where sustainability per se is not an end point or destination, but a process of transition.

## **5.2 Recognising the Working Landscape – 1990s Events**

The Executive Board of UNESCO decided in 1991 to establish an Advisory Committee for BRs. There was growing recognition that many BRs did not, and appeared unlikely to, fulfil the objectives defined in 1986. This Advisory Committee considered that it was timely to evaluate the effectiveness of the 1984 Action Plan, to analyse its implementation, and to develop a strategy for BR development into the twenty-first century. The Committee was to face some challenging issues: notably, how to ensure that BRs included all possible objectives and that the activities taking place corresponded to those defined in 1986. This was a particularly difficult problem with respect to reserves that had been designated before 1984, when science-based goals had dominated (Price 1996).

The Biosphere Reserve Integrated Monitoring initiative (BRIM) was launched in 1991, and was implemented as part of MAB. The initiative went some way to reconciling a standard for BRs in relation to monitoring. BRIMs objectives included:

- standardising biological inventory measures for management and decision making purposes;
- integrating multiple databases related to monitoring;
- improving communication between BRs;
- promoting systematic exchange of scientific information;
- facilitating access to information on BRs;
- surveying the research and monitoring potential of BRs; and
- supporting interdisciplinary monitoring of BRs.

BRIM has also notably used the results emerging from research and monitoring in BRs for education and awareness purposes - thus addressing one of the goals of the Convention on Biological Diversity. Currently, BRIM data continuously enriches databases of the WNBR. BRIM is a partner of the Terrestrial Ecosystems Monitoring Sites endeavour, an activity implemented under the Global Terrestrial Observing System.

Futhermore, BRIM initiated:

- access to a directory of BRs, with characteristics, contacts, and inventory, monitoring, and research data sets (developed in 1993 by US-MAB and later completed at the level of the MAB Programme as a whole);
- Access 96, a detailed directory on permanent plots and monitoring (essentially compiled by Germany-MAB);
- MABFlora and MABFauna, a suite of microcomputer applications to create standardised databases of species occurrence information, derived originally from EuroMAB Biosphere Reserves (developed by the University of California); and
- BioMon, the Biodiversity Monitoring Database, a microcomputer application for records of monitoring data from permanent forest plots.

In other international coordination, the *Caracas Action Plan* provided strategic action over the decade between 1992 and 2002 for protected area professionals in four areas:

- integrating protected areas into larger planning frameworks;
- expanding support for protected areas by involving local communities and other interest groups;
- strengthening the capacity to manage protected areas; and
- expanding international cooperation in finance, management and development for protected areas.

The relevance of BRs was mentioned in the negotiations leading to the adoption of the 1992 Convention on Biological Diversity, which insisted on the links between protection, use and indigenous people (Batisse 1996). This convention was the UN General Assembly's response to a perceived need for trans-national institutional reform.

The Earth Summit in 1992 marked the twentieth anniversary of the Stockholm Conference, and a period during which environmental concerns moved from the margins to the centre of international politics (Davison 2001). Marking the largest gathering of heads-of-state up to that point, the Earth Summit focused on Agenda 21; the Rio Declaration, intended as an Earth Charter and an attempt to reconcile conflicts over many issues; a Statement of Principles on Forests; a Framework Convention on Climate Change, which began the process that led to the Kyoto Protocol;<sup>32</sup> and the Convention on Biological Diversity, to conserve biological diversity, plan for sustainable development and manage benefits of biodiversity.<sup>33</sup>

Of greatest relevance to BRs from the Summit was the 800-page action plan detailing Agenda 21. The United Nations Commission on Sustainable Development was established with a view to making Agenda 21 the principle framework for coordination of relevant activities within the United Nations. An important dimension of Agenda 21 was that implementation of its wide ranging scope depended in large measure upon action at a national, and more often, a local municipal level. Most of the program directed locally-based management of problems and solutions around local activities, with the

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<sup>32</sup> Australia did not ratify the Protocol, but Canada ratified, despite the United States decision not to participate.

<sup>33</sup> Again, the USA did not sign the convention.

participation of local authorities. This participation was designed to be a determining factor in fulfilling the Agenda's objectives, as local governance closest to the people plays a vital role in educating, mobilising, and responding to the public to promote sustainable development (Whitney 1994). This devolution of governance to the local level was also compatible with the evolving focus of BRs.

Despite the support created by the Earth Summit, there was little doubt that the immediate summit results fell well short of the outcomes anticipated. Agenda 21 for example, was designed to cover almost every conceivable issue relating to sustainable development (Whitney 1994). The relevance of Agenda 21 to BRs was not recognised by Australia or Canada in any formal sense. The relationship was, and remains nonetheless palpable due to concern in both programs for localised governance of civic-led environmentalism, within a social ecology view of economy and community. More important though, was the role that Local Agenda 21 could have fulfilled alongside BRs.<sup>34</sup> Within the Charter of Agenda 21, local authorities were given, for the first time, legitimate voice at the international environmental level. Previously national governments would regularly meet and commit to international conventions, without involvement of local authorities.

With the advent of Local Agenda 21, the adage 'think globally, act locally' was reinforced (Dryzek 1997: 131), which called for further citizen participation in environment and development decisions. As Brunckhorst (2000) suggests, understanding the complex functioning of the global biosphere is difficult for most people, and acting locally can help to effect social behavioural change, being both valuable and cost effective. As an established premise of BRs at this time, it was surprising that this commonality shared between Agenda 21, Local Agenda 21, and BRs was not more explicit in practice or theory.

During a 1993 meeting of the ICC, the Advisory Committee recommended that each designation undergo a regular review to deem whether it should remain part of the WNBR, based on an assessment of its effectiveness as a BR. The ICC chose not to adopt the proposal, however the General Conference of UNESCO, in a meeting later that year, deemed the proposal appropriate and required the 1995 International Conference on BRs to examine the 1984 Action Plan and to analyse and comment on draft statutes for the World Network (Price 1996). Implementation of the 10 year review has since proven a vital measure in maintaining the quality and integrity of designations in the WNBR.

IUCN management categories for protected areas were reconfigured into six categories in 1994. Categories I - IV fit comfortably within the definition and purpose of protected areas; as they focused on wild species and the ecosystems. The newer categories (V and VI) incorporating the human component of landscapes sought to recognise the value of the working landscape. Category V now recognised:

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<sup>34</sup> Numerous German local authorities together with several thousand cities and communities throughout the world are working towards Local Agendas. In particular, the relationship between sustainable development, Local Agenda 21 and BRs has been realised in Germany, with the German MAB National Committee committed to forwarding these concepts in unison. In this way, Germany represents a leader in an area which other countries, particularly Australia, are lagging. See German MAB National Committee (2005).

An area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area' (IUCN 2000: 14).

This category was created to deal with areas, such as those within the UK National Park system that did not fit well into categories I-IV. In doing so, opportunity arose for protected areas to demonstrate that a higher degree of protection was possible even in densely populated countries. Category VI encompassed 'area[s] containing predominantly unmodified natural systems, managed to ensure long term protection of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs' (Locke and Dearden 2005: 3). Category VI was the expression of a hitherto unrecognised relationship within international protected areas; one of linking conservation with development, particularly in developing countries.

The major step forward in the implementation and establishment of the WNBR took place in 1995. UNESCO organised the International Conference on BRs at the invitation of the Spanish authorities in Seville, Spain. The conference was convened in order to redress the role of BRs and the WNBR in light of new international understanding in science, environment and sustainability, such as that arising from the Convention on Biological Diversity. The preamble for the conference stated ... 'BRs should preserve and generate natural and cultural values through management that is scientifically correct, culturally creative and operationally sustainable' (UNESCO 2004c: no page). Attended by over 400 experts from 102 countries and 15 international and regional organisations, the conference aimed to examine past experience in implementing BRs and future emphases for the three functions of conservation, development and logistics (Batisse 2000).

In preparation for the conference, a draft Seville Strategy was prepared providing a framework for panel recommendations. One of the background documents was the 'Evaluation of the Implementation of the 1984 Action Plan for Biosphere Reserves' prepared by the IUCN (1995). Some of the key findings were:

- approximately fifty per cent of BRs consist of a national park with an additional buffer or transition zone;
- the majority of BRs are managed by people trained in the biological sciences who may be more adept at working on ecological rather than socio-economic issues. This had also led to an under-representation of the social sciences and development function;
- there was a critical gap of knowledge related to the unique management challenges of BRs; and
- local participation was a crucial component of BRs that had never received the attention it merited, where 'it is not enough to allow local communities to participate in BR management; they must also benefit from it' (Price 2000: 56).

A definition for a BR was revisited and confirmed, with the newly created Seville Strategy building on 25 years of international BR experience. The Statutory Framework, a text governing the BRP and its constituencies in soft law, was perhaps the most important outcome of the conference and provided greater international legitimacy, visibility and credibility. Together, these documents (the Seville Strategy and the Statutory Framework) would form the basis for criteria to delineate BRs, as well as

guidelines for the standard and conduct of the WNBR and its constituencies into the future. Such development of the Program was necessary in the mid 1990s, with new precedents being set for international attention and cooperation under the auspices for sustainable development. The ICC strongly supported the Seville Strategy in June 1995.

However, the ability of the reserves to perform successfully as instruments for sustainable development was questioned, particularly with regard to potential for conflict with the nature protection objective, in areas where the reserve designation had simply been overlain on park status (Peine 1999). Spanish and USA representatives for BRs suggested that the sectoral structure of institutions and the tendency toward scientific individualism were major obstacles to the multiple functions envisioned for the BRs.<sup>35</sup> Furthermore, BRs were still not considered to be a political priority either domestically (within Australia) or in many other countries.

Overall, the Seville Conference concluded that, in spite of the problems and limitations encountered with the establishment of BRs, the WNBR as a whole had been innovative and successful (UNESCO 2004c). In particular, the cornerstones of the WNBR would be as valid as ever in the near future. The following ten key directions were identified by the Conference and, to date, remain the foundations of the Seville Strategy (UNESCO 2004c):

- Strengthen the contribution which BRs make to the implementation of international agreements promoting conservation and sustainable development, especially to the Convention on Biological Diversity and other agreements such as those on climate change, desertification and forests.
- Develop BRs that include a wide variety of environmental, biological, economic and cultural situations, going from largely undisturbed regions and spreading towards cities. There is a particular potential, and need, to apply the BR concept in the coastal and marine environment.
- Strengthen the emerging regional, inter-regional and thematic networks of BRs as components within the WNBR.
- Reinforce scientific research, monitoring, training and education in BRs since conservation and rational use of resources in these areas require a sound base in the natural and social sciences as well as the humanities. This need is particularly acute in countries where BRs lack human and financial resources and should receive priority attention.
- Ensure that all zones of BRs contribute appropriately to conservation, sustainable development and scientific understanding.
- Extend the transition area to embrace large areas suitable for approaches such as ecosystem management, and use BRs to explore and demonstrate approaches to sustainable development at the regional scale. For this, more attention should be given to the transition area.
- Reflect more fully the human dimensions of BRs. Connections should be made between cultural and biological diversity. Traditional knowledge and genetic resources should be conserved and their role in sustainable development should be recognised and encouraged.

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<sup>35</sup> This observation is germane for all UNESCO countries. The siloed nature of civil society and government institutions has always been a facet that BRs seek to change, and is one of the most challenging and important goals of BRs and the WNBR.

- Promote the management of each BR essentially as a pact between the local community and society as a whole. Management should be open, evolving and adaptive. Such an approach will help ensure that BRs - and their local communities - are better placed to respond to external political, economic and social pressures.
- Bring together all interest groups and sectors in a partnership approach to BRs both at site and network levels. Information should flow freely among all concerned.
- Invest in the future. BRs should be used to further understanding of humanity's relationship with the natural world, through programs of public awareness, information and formal and informal education, based on a long-term, inter-generational perspective (UNESCO 2004).

Significantly, the ICC reiterated the statements of 1986, that 'BRs should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale'; and 'organisational arrangements should be provided for the involvement and participation of, inter alia, a suitable range of public authorities, local communities, and private interests in the design and carrying out the functions of a Biosphere Reserve' (Price 1996: 650). It was not until the Statutory Framework and Seville Strategy came into effect that a mechanism emerged for encouraging BRs to keep abreast with the evolving concept.

Other United Nations conferences confirmed the new theme of sustainable development as the centrepiece of environmental discourse at this time, whilst the Commission on Global Governance articulated the vision of global cooperation updated from that suggested by the Brundtland Report (Davison 2001). However, findings from the UNCED Earth Summit +5, held in 1997 were confronted with a different reality to global cooperation. Social and ecological circumstances were shown to have significantly worsened since the advent of Agenda 21 in 1992, perhaps because the implementation of the principles of the Agenda had languished. At the halfway point between each of the landmark UNCED conferences, global cooperation was in recession, with statistics indicating that sustainable development was accelerating away from the political will that had created it (Batisse 2000).

### **5.3 The New Century – Conceptual View**

In 2005, the World Protected Area database recorded 113 707 protected areas covering 19.6 million km<sup>2</sup>, equal to over 12 per cent of the planet's surface (Lockwood et al. 2006) with the vast majority occurring within terrestrial systems. A recent analysis using MPA Global, a spatial database of Marine Protected Areas, showed that approximately 0.5 - 1 per cent of marine habitats are protected globally with the most located along coastlines (Wood 2005).

The most recent IUCN World Parks Congress (also known as the World Commission on Protected Areas - WCPA), in Durban, South Africa was held in 2003. The IUCN Bulletin (IUCN 2003) summarised the Congress, declaring that the recommendations from the proceedings suggested it was evident that a wholly new paradigm of protected area, and their management, had emerged.

Locke and Dearden (2005: 1) suggest, however, that the main purpose of protected areas is compromised by this new paradigm, advising that under the new IUCN categories and influences of environmental discourse, protected areas are being 'recast as tools for social planning and income generation' and 'these new directions compromise their effectiveness as tools for the conservation of wild biodiversity' (Locke and Dearden 2005: 1).

Yet the analysis by Locke and Dearden does not account for a fundamental side-effect of protected areas, the boundary effect (Martino 2005). The boundary effect is the illusion that nature is retained inside protected areas, therefore freeing people to destroy the rest of the landscape because 'true nature' is already being protected somewhere else. Moreover, under this argument, the working landscape is devalued for it is not as magnificent and natural as that of protected areas (Cronon 1995) and further supports the notion that Francis (2004a) raises with regard to the 'entanglement of social-ecological systems'.

Administrative and legal systems that deal with specified ownership, detailed plans and precise boundaries have been developed to provide clarity and certainty and to control influence. However entanglement among socio-ecological systems is a fact of existence. In consequence, the connections between ownership and control, boundaries and influence, are increasingly recognised as tenuous, paradoxical or just plain non-existent. Impacts and influences – including ecological, social, political and economic ones – occur across small and broad scales and arise from synergistic and often surprising interactions (Francis 2004a: 96).

As Folke et al. suggest:

At the dawn of this millennium human use of natural resources is changing the world – its atmosphere and climate, its human and non-human inhabitants, its land surfaces and waters. We face different, more variable environments with greater uncertainty about how ecosystems will respond to inevitable increases in levels of use. At the same time we are reducing the capacity of systems to cope with disturbance. The combination of these two trends calls for a change from the existing paradigm of command-and-control for stabilised 'optimal' production, to one based on managing for social – ecological resilience (Folke et al. 2002: 2).

And,

To understand and address the challenges facing humanity, new perspectives, concepts and tools about the dynamics of complex systems and their implications for sustainability are now developing in parallel, influencing not only the natural sciences but also the social sciences and humanities, through the work of many people and groups (Folke et al. 2002: 5).

Within a single decade, the new paradigm for protected areas has managed to strongly alter environmental discourse (and visa-versa), promoting a similar agenda that BRs had advocated for over four decades. With the new paradigm of protected areas, a commensurate relationship with the BR concept emerged. The new paradigm has taken conservation biology outside of 'pristine wilderness' and into the working landscape, and in doing so, contributed to understanding how native species behave in the matrix, and how production practices affect biodiversity outside of protected areas (Martino 2005). Instead of viewing IUCN categories V and VI as excluding conservation biologists, present environmental discourse is providing an understanding for these categories to be seen as further validation of 'the working landscape' and social-ecological systems. Moreover, the paradigm shift need not necessitate a dilution of the vital role of protected areas in the preservation of remaining biodiversity and natural heritage. Rather, the best aspects of multi-actor integration can improve existing protected area governance where:

... actions to sustain ecological systems, flows and functions must be integrated across regional landscapes. Such regions encompass natural areas, human living places



(including rural and oceanic) and a mosaic of other land uses. Therefore, action to sustain ecological systems, flow and functions must be integrated across both the human and the ecological dimensions for regional landscapes (Brunckhorst 2002: 109).

Linked systems of people and nature, especially with the extent and interconnections of current populations, technologies, and human activities, behave as complex adaptive systems (Levin 1998). Complex systems theory challenges the perspective of a world in steady state or near-equilibrium and the discourse that has dominated resource and environmental science, and policy during the latter part of last century (Gunderson et al. 1995). Complex systems thinking is used to bridge social and biophysical sciences to understand, for example, climate, history and human action, assessments of regions at risk, syndromes of global change and how to link social and ecological systems for sustainability. It underpins many of the new integrative approaches, such as ecological economics, and sustainability science (Levin 1998).

Assessing and evaluating sustainability in the context of complex systems requires a shift in thinking and perspective (Ludwig et al. 2001). The complexity of social-ecological systems makes it necessary to abandon the perception of a global steady state. Instead, managing complex, co-evolving social-ecological systems for sustainability requires the ability to cope with, adapt to and shape change without losing options for future development. Social-ecological landscapes are those that provide an integrative spatial context for applied research, policy analysis, future planning, and importantly, implementation of strategies and actions by communities that have a strong attachment to their place and who may wish to engage in shaping a more sustainable future (Brunckhorst 2005). Scientists, policy makers, sectoral industries, and government departments often work in compartmentalised subject areas and are often encouraged to remain narrowly focused. But a social-ecological system requires resilience – the capacity to buffer perturbations, self-organise, learn and adapt. When massive transformation occurs, resilient systems contain the experience and the diversity of options needed for renewal and redevelopment (Resilience Alliance 2007b).

Managing for social-ecological resilience requires understanding of ecosystem dynamics, incorporating also the knowledge and wisdom of local users and interest groups (Folke et al. 2002). Consequently, the spread of ecological illiteracy in contemporary society needs to be counteracted. Outdated perceptions of humanity as decoupled from, and in control of, the processes of the biosphere will foster vulnerability, large-scale surprise and counteract sustainability (Folke et al. 2005). Instead, technological development and economic policies need to contribute to building resilience, founded on perception of co-evolving social-ecological systems from local to global scales (Folke et al. 2002).

Brunckhorst (2005) states that the interactions within complex social-ecological systems affect future landscape change, contributing both positive and negative consequences for sustainability. Non-metropolitan landscapes are the major theatre of social-ecological interactions where large-scale alteration can occur. In these locations, relatively few institutions shape future landscapes by influencing how social systems, resource users, governments and policy makers perceive regional landscapes and their future (Brunckhorst 2005).

According to Folke et al. (2002), policy should stimulate the creation of arenas for flexible collaboration and management of social-ecological systems, with open institutions that allow for learning and to build adaptive capacity. Policy frameworks with clear directions for action towards building adaptive capacity and thus social-ecological sustainability are required in this context. They create action platforms for adaptive management processes and flexible multi-level governance that can learn, generate knowledge and cope with change. Such systems generate a diversity of management options of significance for responding to uncertainty and surprise. The BR and BRP fit this concept.

#### **5.4 The New Century - Events**

As of year 2000, 368 BRs were designated in 91 countries. The next milestone in BR coordination and development was the Seville +5 International meeting of experts on the implementation of the Seville Strategy for BRs held in Pamplona, Spain, October 2000. The main objective of the meeting was to take stock of the implementation of the Seville Strategy for the first five years, with the specific objectives of:

- identifying priorities for attention in the overall Seville Strategy;
- identifying obstacles to implementation at the international, site and national levels, and means to overcome these; and
- identifying emerging issues of importance for the future of the WNBR (UNESCO 2004c: no page).

At the meeting, Michael Batisse<sup>36</sup> presented the current state of BRs. He cited the development of the Seville Strategy, Statutory Framework, Advisory Committee and initiation of 10 year periodic reviews as innovations that allowed the program to work efficiently. New designations were being put forward at a significant rate. If measured by these indices alone, the Program and the idea of the BR had evolved significantly in light of three decades of socio-environmental thought.

In 2003, the Vth WCPA Congress, in Durban, South Africa was entitled 'Benefits beyond Boundaries', recognising that protected areas cannot exist in isolation from the surrounding land and sea. The congress included seven workshop streams:

- linkages in the landscape/seascape;
- mainstreaming protected areas – building awareness and support;
- governance – new ways of working together;
- capacity-building – building the capacity to manage;
- management effectiveness – maintaining protected areas for now and the future;
- finances and resources – building a secure financial future; and
- comprehensive global systems – building a comprehensive protected area system and reconciling gaps in the system.

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<sup>36</sup> Michael Batisse was party to the BRs inception and was the longest serving champion of the idea, through his work for UNESCO MAB. He died in 2004.

The Congress highlighted that the number of protected areas and their total extent had more than doubled since 1992, with over 100,000 protected areas covering 18.8km<sup>2</sup> of the globe – or 17.1km<sup>2</sup> (11.5 per cent) of the Earth's land surface (Croft et al. 2004).

Despite some positive developments in the decade following the IVth WCPA Congress, the extent of problems related to protected areas had seemingly increased. These problems were denoted by myriad issues and indicators. For instance, the majority of development ignoring sustainable use and careful management of natural resources and natural processes; major gaps in the global system of protected areas, where freshwater systems and the high seas remained largely unprotected; damage and fragmentation to species, habitats and landscapes, natural systems, processes, and cultural diversity; declining freshwater flows and quality as a result of diversion, dams and other barriers, agricultural runoff, and pollution; rising demand for wild animals and plants, and their products, threatening not only rare and endangered species but also formerly common ones, even in protected areas; and under-investment by governments in protected areas resulting in failure to meet their conservation and social objectives.

The Vth Congress delivered the Durban Accord, a declaration for the future of protected areas; an Action Plan, with specific outcomes and targets for the next decade; a set of recommendations; and a message to the meeting of the Convention on Biological Diversity. The Durban Accord provided a declaration of celebration and intent by the 3000 participants from 154 countries. The Durban Action Plan provided the mechanism to realise the goals of the Durban Accord, requiring action from the many stakeholders involved in and around protected areas, and other parts of government, civil society and industry, to work together in a committed way at global, national and local levels.

Five years after the Seville Conference, Batisse highlighted issues in need of attention for the BR and its program to prosper further (Batisse 2000). Of pertinence to Australia was the growing size of new BR designations which were tending to the scale of bioregions and thus raising practical considerations of governance and coordination. At this larger scale however, BRs were now recognised as a significant tool for regional planning. Over 30 years of the Program, Batisse suggested that governance of designations had shifted significantly from the realm of protected area managers, to an integrated network of civil society in cooperation with government:

... the manager of the core area may well be given such a leading role in consultation with other stakeholders [but] ... has generally no mandate, no authority and little practical interest in taking up this additional task. If he/she is to assume this role, he/she must be given the authority and incentives to do so ... which implies negotiation and consent by all legitimate stakeholders (Batisse 2000: 15).

According to UNESCO, the Seville +5 recommendations were addressed by MAB National Committees, the regional BR networks, and BR managers / coordinators and the MAB secretariat. However, as Batisse (2000) suggested, the lack of mandate or incentive for the majority of BRs

overseen by national park management authorities meant that the recommendations from Seville +5 may also have languished.<sup>37</sup>

Whilst the pursuit of updated BR principles either flourished or flailed in specific countries, the MAB program and the WNBR continued to strengthen and diversify, signalled by the increasing number of international congresses, meetings and other initiatives. For example, in October 2001, MAB launched a meta-database for BRs, MABNet, where current information on all designations was collated online, and queries by country, BR, major habitat or ecosystem, research or monitoring activities could be performed. In another effort, the first meeting of the UNESCO MAB Task Force on the Development of Quality Economies in BRs was held in March 2002, which has since brought attention to the social and economic capacity-building component in need of attention in many BRs. In May the same year, MAB held an international workshop on Ecotourism and Sustainable Development in BRs, Canada. As an activity commensurate with the objectives of buffer zones, articulation of ecotourism practice and paradigm at this level is pertinent, considering the common misrepresentation and confusion surrounding nature-based tourism and ecotourism, amongst both tourists and operators (Matysek 2001).

At the 17<sup>th</sup> session of the MAB Council, recommendations regarding the visibility of MAB and BRs at the UNCED conference were discussed, alongside MAB's capacity-building activities and partnerships. At this session, four BRs were withdrawn from designation, due to poor performance in 10-year reviews.

A workshop held on 'The Role of Wetlands in Biosphere Reserves' in the Czech Republic, October 2002, was indicative of the BR diversity by this time and explored:

- wetlands as sources of biodiversity in BRs;
- buffering effects of wetlands on water budget and water quality in BRs and the role of water resources (including groundwater) in wetland maintenance;
- management (also including restoration) of wetlands for sustainable functioning in BRs; and
- resolution of conflicts between economic use and environmental quality of wetlands in BRs: towards the application of the 'wise use' concept.

The workshop gave key recommendations for furthering MAB / Ramsar cooperation including:

- more coordination between MAB and Ramsar, for example application of the Seville Strategy to Ramsar wetlands, and Ramsar Wise Use principles to BRs;
- existing guidelines (e.g. Ramsar Wise Use, MAB Seville Strategy) made accessible to BR managers;
- creating site-specific management committees with links to administrative authorities and committees at national levels;
- outreach programs of information, communication, and education to increase public awareness;
- exchange visits and on-the-job training;

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<sup>37</sup> Australia's address to the Seville +5 recommendations were arguably negligible. This will be discussed further in Chapter 6.

- financial support and international assistance seeking, and multilateral project proposals;
- regular revisions of BRs and Ramsar site networks are encouraged to be carried out rigorously; and
- a grant program for the management and restoration of wetlands in BRs that are listed as Ramsar sites, developed jointly by MAB and Ramsar and made accessible to all participating sites.

These synergies between Ramsar and BRs are important. The two programs share some similar objectives of establishing national networks for biodiversity recognition and conservation; fostering cooperation between stakeholders, and utilising the network as a tool to promote national, supra-national / regional, and international cooperation. Ramsar sites, when included in a buffer or transition zone, form a valuable component to any BR and both can contribute to connectivity conservation.

In response to the Seville +5 recommendations, the Guiding Principles for Projects in BRs was formulated in March 2003 to direct research, monitoring, and other forms of sustainable development initiatives. Similarly, in April 2004, the Methodological Handbook for the Establishment and Management of BRs was produced, providing a set of guidelines for the implementation of the Statutory Framework and the Seville Strategy. Such initiatives have been recommended by the ICC, but were well overdue, almost a decade after the enunciation of the Seville Strategy. Most recently, in memory of the fundamental role played by Michel Batisse in the creation of the MAB Program and in the implementation of the WNBR, the MAB Bureau instigated the Michel Batisse Award for Biosphere Reserve Management. This award is unique within the WNBR, and will serve to highlight the goals and models the WNBR will aim for in the future.

The Conference of the Parties to the Convention on Biological Diversity (COP) is the highest decision making body of the Convention, and is the governing body of the Convention that advances its implementation through the decisions it takes at its periodic meetings (UNEP - CBD 2007a). In February 2004, Kuala Lumpur, the 7<sup>th</sup> ordinary meeting of COP made reference to MAB in the context of a multitude of programs outside IUCN. For example, in COP 7, an Elaborated Programme of Work on Marine and Coastal Biodiversity was suggested to:

Promote and implement joint work plans with other relevant agreements, organisations and initiatives, including the Commission on Sustainable Development, FAO, regional seas conventions and action plans, regional trade and economic organisations, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, International Coral Reef Initiative and the Man and Biosphere Programme. In particular, assess and coordinate activities that have been agreed within multilateral environmental agreements about coral reefs.

Specific reference was made to BRs in COP 7 Guidelines on Biodiversity and Tourism Development, where it was stated that governments may also wish to consider:

- (a) measures to ensure that sites designated at international level, such as Ramsar or World Heritage sites or Biosphere Reserves, are accorded appropriate legal recognition and government assistance at the national level; and
- (b) establishing reserves based on the biosphere reserve concept and incorporating sustainable-development objectives, generating income and employment opportunities

for indigenous and local communities, and promoting appropriate product development (UNEP - CBD 2007b).

The result for BRs from this COP suggests that the profile of BRs is not highly significant outside other types of protected area management, and yet, a stand alone reference (b) is made to highlight an opportunity to develop BRs with the support of governments. In light of international statements for required innovative new paradigm conservation mechanisms, it is surprising that BRs were not issued greater priority. Reference to the role of BRs, the WNBR and MAB in biodiversity research is also significant but not a new statement of pertinence regarding BRs historical role or potentiality.

In his closing remarks at the 3<sup>rd</sup> World Conservation Congress in Bangkok, 2004, IUCN's President, Mr Valli Moosa, said: 'We need to engage, involve and reach out to more people: young, old, rich, poor, urban, rural, scientist and layperson. It is from diversity that we gain our strength and political niche, and our unique moral authority'. (IUCN 2007b: no page). The Congress showed an unprecedented level of business sector participation, highlighting recent progress in garnering multi-party stewardship and capacity. The Congress unveiled many important new initiatives in furtherance of IUCN's mandate (IUCN 2007b):

- an information-sharing agreement between NASA and IUCN opens the door to the use of satellite data to advance worldwide conservation efforts;
- a US\$3 million donation from Oracle to the Species Information Service will transform environmental decision making through better information systems;
- an unprecedented meeting of Mekong Region Ministers and civil society representatives resulted in an open dialogue about the challenges of transboundary water politics and reported signs of increasing cooperation;
- the development of a framework for transboundary conservation management was noted as a priority by the Thai Ministry of Natural Resources and Environment;
- a coalition of leading environmental organisations committed to sharing data, information and knowledge via a Conservation Commons initiative; and
- business association with environmentalists came to the fore in the presentation of the One Planet Living initiative, a proposal to create major new sustainable communities whilst conserving and recovering thousands of hectares of woodland and wildlife habitat.

From 7-11 May 2007, IUCN-WCPA held a major meeting on the IUCN Protected Area Management Category system in association with the IUCN Centre for Mediterranean Cooperation and the IUCN Programme on Protected Areas (IUCN 2007a). This Summit was a step in a broader consultation process that started in preparation for the Vth IUCN World Parks Congress and led to the passing of a resolution at the IUCN World Conservation Congress seeking the review and update of the 1994 guidelines for the application of the Category System with the following objectives:

- clarify the existing problems on the guidelines governing the application of the system;
- find consensus on solutions; and
- come up with recommendations, which will be considered initially by the WCPA Steering Committee and then by the entire IUCN membership at the World Conservation Congress in 2008 (IUCN 2007a).

The Summit brought currency to the definition and categories for protected areas, by defining ways to improve the application of the updated system, including through capacity-building.

The following sub-sections examine seminal new century theoretical and practical developments that have had a specific roles in the development and evolution of BRs and the WNBR.

#### **5.4.1 The MAB Urban Group**

The application of the BR concept to urban areas was discussed by the Advisory Committee for BRs at the 5th meeting (7-10 July 1998). As a result, a group of MAB experts charged with examining this issue was suggested, with a view to explore the application of BRs to urban areas and their hinterlands (UNESCO 2003). The MAB Council subsequently recommended in December 1998 that the MAB Secretariat set up an ad hoc working group to further explore this application. In a MAB circular letter the Secretary of the MAB Program, Peter Bridgewater, invited MAB National Committees to submit names for a MAB Roster of Experts on the BR concept and urban issues (UNESCO 2003).

Based on the names submitted, the MAB Secretariat established the MAB Urban Group. The first meeting of the MAB ad hoc Working Group to Explore the Application of the Biosphere Reserve Concept to Urban Areas and their Hinterlands (the MAB Urban Group), was held in Paris on 9 November 2000. The group addressed the following tasks:

- contributions that the BR concept could have or could make in urban planning and management, including in the context of the Convention on Biological Diversity with its focus on the ecosystem approach;
- if there is, or should be, a place for urban areas and cities in the WNBR (beyond use as transition areas);
- alternative ways and means of recognising selected cities, or parts thereof, as sites that exemplify the BR model; and
- discussion within MAB and with relevant partner institutions and organisations, on the development of an agenda for possible future MAB activities in this area (UNESCO 2001: no page).

At present, there is much debate surrounding the issue of urban BRs. Some believe that they would be a valuable addition to the WNBR, whilst others are skeptical, and argue that applying the concept to urban areas will only serve to further confuse the mandate of BRs. The position of UNESCO with relation to urban BRs is currently unclear. UNESCO and interested parties are investigating through collaboration and discussion whether there is a role for the BRP as it stands, in urban centers, or whether an alternate program under MAB would be more appropriate (Birtch 2004b; Birtch 2004c).

However, UNESCO (2003) have proposed that the underlying key objectives for which a BR is established could also be defining characteristics of an urban BR. The urban BR context includes conservation of urban biodiversity, promoting sustainable urban development and reduced urban footprints and city networking, to name a few. A working definition of an urban BR is:

a BR characterised by important urban areas within or adjacent to its boundaries where the natural, socio-economic and cultural environments are shaped by urban influences and pressures, and set-up and managed to mitigate these pressures for improved urban and regional sustainability (UNESCO 2003).

The concept of urban BRs is in its infancy. There are many issues to be considered with relation to this topic. To illustrate the early stage of this concept, the Secretary to UNESCO, Peter Bridgewater, stated at a meeting of the MAB Bureau, Paris, in July 2003 that:

On the question of Urban BRs or not, we could argue ... if it would work or not, and we would all hold our different views on that. I think I hold still firmly to the view that we should do for [urban BRs] what we do for all BRs. If somebody wishes to nominate, then we look at the nomination and we measure it in the normal way we would measure any BR, and if somehow it passes the test, it passes the test, si non c'est non (if not it is no) ... I don't think it is healthy to rule in or rule out whether we should have urban areas because there may well be some urban areas that could work. Many, we think, won't (sic) (UNESCO 2003: no page).

The majority of the world's human population lives in large urban and urbanising areas, and almost no culture or ecosystem is immune from their influence. Any discussion of the interrelationships between biodiversity and society therefore must include consideration of cities, their impact on biodiversity, and their role in the planet's natural processes (Solecki and Rosenzweig 2001: no page).

Columbia University and UNESCO MAB launched the Joint Program on Biosphere and Society in 2002, the first joint partnership between Columbia University and the United Nations. Its mission is to assist local communities around the globe in adapting to environmental and societal change and to share information between societies facing similar challenges. They are currently investigating the potential of New York City as an urban BR.

#### **5.4.2 Networks of the MAB Program**

The growing frequency of regional management for MAB BR initiatives is another way that the program is continuing to evolve. The regional focus is strengthening the WNBR, by bringing shared lessons and useful information to regional forums, gaining experience amongst neighbouring countries (Table 4). According to UNESCO (2004a) these regional offices also play a vital role in the everyday implementation of its activities. Table 4 (pg. 98) illustrates the diversity of regional networks in operation, however Australia's absence in a regional network is palpable.



**Table 4 Regional networks of MAB**

AfriMAB	This network was created by the 'Regional Conference for Forging Cooperation on Africa's BRs for Biodiversity Conservation and Sustainable Development' which took place in Dakar (Senegal) in 1996. The network aims at promoting regional cooperation in the fields of biodiversity conservation and sustainable development through transborder projects.
ArabMAB	A network officially launched in Amman (Jordan) in 1997. The overall objective of ArabMAB is to promote cooperation between MAB National Committees in order to strengthen the MAB program in the Arab Region, including through the establishment of BRs.
East Asian Biosphere reserve Network (EABRN)	Consists of China, the Democratic People's Republic of Korea, Japan, Mongolia, the Republic of Korea and the Russian Federation. This network, initiated in 1994, has three subjects as priority for cooperation: ecotourism, conservation policy and transboundary conservation. It also serves as a mechanism to facilitate information exchange, training and site-to-site cooperation.
EuroMAB	Founded in 1987 EuroMAB covers 30 countries in Europe and North America. It is the largest of the MAB Networks, with a vast diversity of socio-economic and ecological conditions, cultural backgrounds and languages. Over 200 BRs are in the EuroMAB region including 'old' sites and 'new generation' BRs showing innovations in the implementation of the concept. Due to its size and diversity, EuroMAB functions through groups of countries and BRs which have a common interest in a given theme, for which a site or a country takes the lead.
IberoMAB	The Ibero-American MAB Network was established in order to reinforce the MAB Program in Latin American countries, Spain and Portugal. Its first meeting took place on the occasion of the World Parks Congress in Caracas (Venezuela) in February 1992. The priorities which had been established at that time included reinforcing the World Network by including ecosystems and under-represented methods of resource sustainability as well as promoting the establishment and governance of management plans in each BR.
The Ibero-American Program for the Development of Science and Technology	A thematic network on BRs established within the larger framework of this regional development program. One of the projects is on biodiversity and the idea is to accomplish actions that will generate an effective cooperation between BRs and promote activities that will make the BRs sustainable. The network meets every year.
The Northern Sciences Network (NSN)	A collaborative initiative between MAB National Committees of Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden, United Kingdom and United States of America.
REDBIOS (Spain)	Comprises Canary Islands (Spain), Cape Verde, Mauritania, Madeira and Azores (Portugal), Morocco and Senegal. The network fulfils an inter-regional mandate in enabling countries from the Macronesian Region to cooperate and to exchange their experiences.
South East Asian Biosphere reserve Network (SeaBRnet)	SeaBRnet, as a sub regional network was proposed by China, Cambodia, Indonesia, Laos, Japan, Philippines, Thailand and Vietnam and it was officially launched at the Can Gio Regional MAB Workshop in October 1998. Important tasks for SeaBRnet in 2004-2007 included: establishment of new BRs; transboundary and cluster cooperation using BRs; quality economies for BRs; ecotourism development; economic valuation of ecosystems and environment; rehabilitation of degraded ecosystems and identification of conservation value of rehabilitated ecosystems; long-term integrated monitoring; cooperation inter-MAB, especially on eco-hydrology for BRs.
South and Central Asia MAB Network (SACAM)	MAB representatives from Bangladesh, Bhutan, India, Iran, Mongolia, Nepal, Pakistan and Sri Lanka met in Dehra Dun (India) in February 2001 for the first Regional Meeting of Co-ordinators of MAB National Committees and BRs in South and Central Asia (UNESCO 2004b). The network operates principally on the context of BRs and similarly managed areas and focuses on local knowledge, biodiversity conservation, forest ecosystems, land degradation and rehabilitation in vulnerable areas (such as wetlands, dry lands and mountains), and waste management (UNESCO/SACAM 2002).

Source: UNESCO (2004b; 2004e).

An Oceania branch or an extension of the SeaBRnet into Australia would provide a valuable opportunity for growing potential of MAB initiatives, including BRs. Moreover, as party to a regional MAB network, accountability and responsibility would necessitate further attention to MAB initiatives in Australia than is presently the case (Birtch 2004e).

#### **5.4.3 Connectivity Conservation**

The concept of connectivity between protected areas, private land and other types of reserves has been recently employed in Australia, following from examples of similar projects in the United States and Canada, including the Yellowstone to Yukon (Y2Y) initiative. The purpose of creating connectivity in the landscape is manifold, but stems from the necessity to allow genetic and habitat connectivity between otherwise isolated protected areas, or lands containing significant biodiversity (Commonwealth of Australia 2001). A BR incorporates the importance of connectivity and conservation as derived from the protective function of the buffer zone for the core area, and the adaptability of the idea to incorporate multiple core areas, connected through buffer zones. This section illustrates two major connectivity projects, and serves to provide a context for later discussion on the governance arrangements of connectivity conservation and that of BRs. The degree of support that has been acquired for connectivity conservation as opposed to BRs is a major discrepancy between the two frameworks.

Insofar as it is a biologically-oriented initiative, connectivity conservation is also an initiative that is conceptually (versus literally) reconfiguring previously rigid institutions for collaborative conservation governance. Sparling (2001) suggests that implementing ecosystem based management approaches necessitates heroic amounts of coordination among agencies and other publics, requiring that management initiatives cross traditional boundaries. Yaffee (1996) recognises the challenge and suggests that maintaining the most realistic and perhaps best measure of progress in ecosystem-based management is the extent to which collaboration amongst stakeholders occurs, as workable human communities must emerge. The greater the interdependence, the more likely a stakeholder is to negotiate a collaborative approach. Gray (1989), writing on collaboration, indicates that for domain-level challenges such as ecosystem-based initiatives, impasse generally occurs due to difficulties in conceptualising and organising in order to address the problem.

In the case of connectivity conservation, conceptual and organisation difficulties are reduced. Knowledge of the desired outcome is definite; a continuous linkage of natural and protected areas from one point to another is envisaged (Pulsford et al. 2007; Worboys et al. 2007). The requirement and necessity to achieve the linkage is scientifically proven, well understood, and ethically appropriate. Organisation is the remaining component, which is, as the cases below illustrate, a matter of collaboration.

Authors studying the process of collaboration describe it as the most constructive outcome where organisations must address problems beyond the scope of what any of them can address alone (Wondolleck and Yaffee 2000). Identifying domain-spanning problems that require the joint effort of normally insular groups, may give relations among the group a chance to improve. Sherif (1958) determined that a focus on 'superordinate' goals facilitated the reduction of inter-group conflict, by

bringing common interests to the foreground while de-emphasising differences. The goal, meanwhile, must have compelling value for all groups involved (Yaffee 1996). In the case of Y2Y and the cases described below, a compelling value is present, both for its purpose and grandeur of scale, alongside the benefits accruing to the organisations involved through increased public exposure and capacity-building. The following examples highlight synchronicities with BRs, but on a far larger scale and jurisdictional cooperative.

### **Yellowstone to Yukon**

The Yellowstone to Yukon Conservation Initiative is a joint Canadian-U.S. network of over 800 organisations, institutions, foundations, and conservation-minded individuals who have recognised the value of partnerships to restore and maintain the unique natural heritage of the Yellowstone to Yukon region (YYCI 2007).

The initiative dates to late 1993, when a group of top scientists and conservationists met near Calgary, Canada, to talk about the possibility of applying the principles of conservation biology to the Rockies of Canada and the northern U.S. The discussion continued intermittently for the next three years, with an ever-expanding group of participants. In 1996, the group declared itself an operative network and hired a coordinator. A small office was opened in Canmore, Alberta, in January 1997.

Presently, scientists, conservationists and others are working together to promote the Yellowstone to Yukon mission and to enable, energise, and inspire the efforts of individuals, civil society organisations and communities who support that mission (YYCI 2007). By creating new tools to support conservation work, and by fostering the exchange of ideas and the coordination of action among its network participants, Y2Y opens new possibilities for ensuring the continued presence of North American wildlife and wildlands (YYCI 2007). By expanding and linking protected areas, physical and genetic movement of species is possible, contributing to the health of ecosystems, and hence economic sustainability and community vitality.

The approach for Y2Y conservation is broadly inclusive, through working with communities and individuals in stewardship programs that encourage good stewardship. To become a reality, the Yellowstone to Yukon needs to create positive capital accrual for both human and natural communities.

### **Alps to Atherton Initiative**

At the November 2006 meeting of the Environment Protection and Heritage Council of Australia and New Zealand (EPHC), the NSW Minister for the Environment presented a proposal to establish an Australian Alps to Atherton (A2A) Connectivity Conservation Corridor (Pulsford et al. 2007). The proposal was keenly received and Environment Ministers from the Commonwealth, New South Wales, Queensland, Victoria and the Australian Capital Territory agreed to cooperate and to establish a working group to further develop the concept.

A2A aims to achieve landscape conservation connectivity for more than 2,800 km along the Great Dividing Ranges from the Australian Alps to Atherton Tablelands and beyond. This can be achieved

through support of a vision, and leadership by government and the community. It aims to improve resilience of ecosystems and species to adapt to significant threats such as loss of critical habitats, climate change, changed fire regimes and invasion by pests and weeds (Pulsford et al. 2007). This can be achieved through better coordination and management of knowledge, tools, science, planning and funding - to increase awareness and improve connectivity conservation management across all land tenures.

The NSW Environment Trust Fund has allocated AU\$ 7million over three years to establish the A2A in NSW. A business plan, communication and community involvement strategy and collaborative research partnerships are key strategies required to implement the program (Pulsford et al. 2007). The program will investigate ways to integrate and harness the conservation benefits of a wide range of policies, partnerships and mechanisms including voluntary conservation agreements, stewardship payments, carbon credits, BioBanking and property vegetation planning. It will build on lessons learned from other landscape scale conservation projects (Pulsford et al. 2007).

### **Gondwana Link**

Gondwana Link is working to reconnect natural ecosystems over 1,000 km of south-western Australia (Figure 7, pg. 102). A number of non-government groups are leading the work to meet this challenge. Each group has a long and distinguished record of achievement in environmental protection and management. Through a wide range of work experiences and interests, particular skills are contained within each group and agreement to take on specific tasks along the Link has meant that, as well as building on each group's strength, this integrated approach minimises duplication.

Some areas are bushland managed as conservation estate while others are primarily restoration zones. On-ground work has started in the Stirlings to Fitzgerald section, with planning underway for other areas (Gondwana Link Coordination Unit 2007). The work of achieving the Gondwana Link includes:

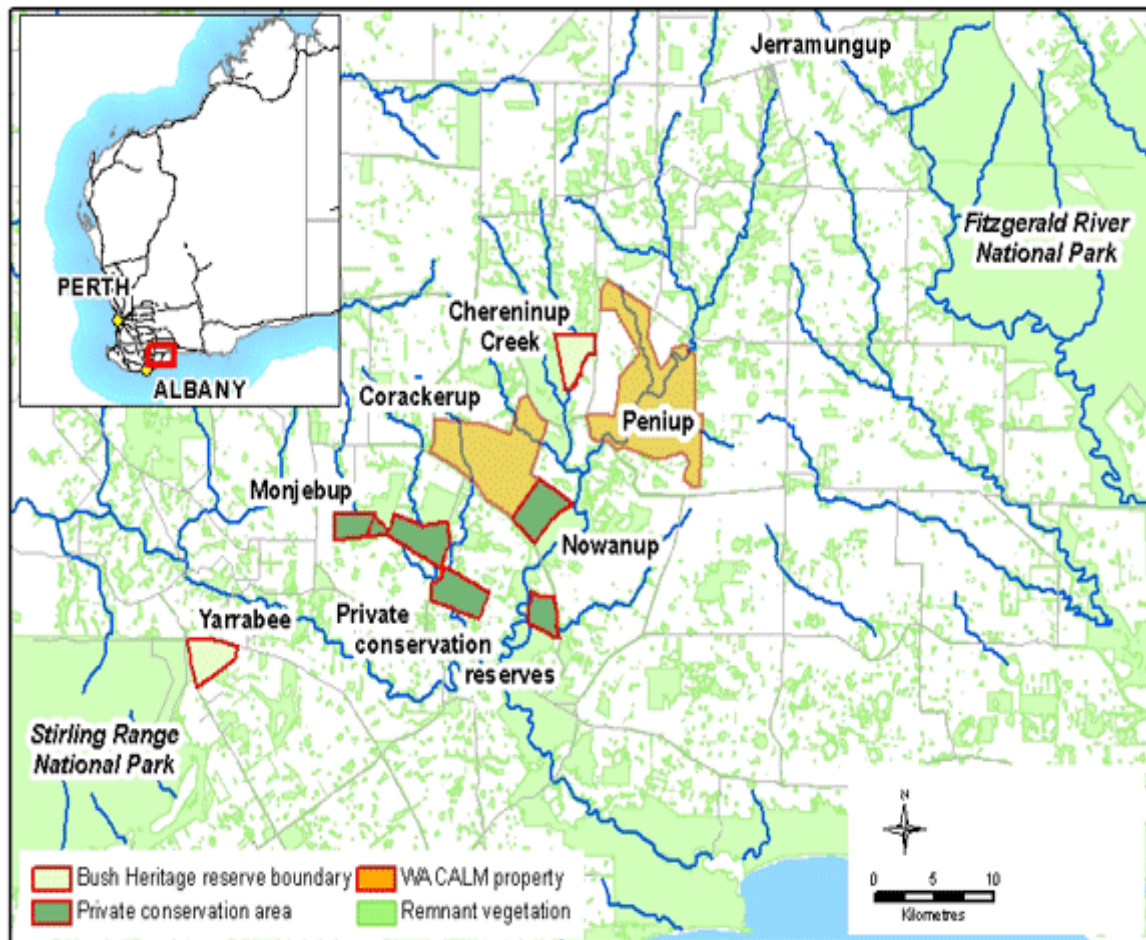
- lobbying for stronger protection of the public land estate;
- providing incentives for better land management, such as fencing and restoring bushland;
- purchasing bushland to protect and manage it;
- revegetating large areas of cleared land;
- developing ecologically supportive industries, such as commercial plantings of local species; and
- improving the science behind planning (Gondwana Link Coordination Unit 2007).

Gondwana Link builds on an array of ongoing regional efforts. Over the past thirty years local champions and groups have combined with state, national and international bodies to:

- secure the largest National Parks and Nature Reserves in south-western Australia;
- activate, with UNESCO, the Biosphere Reserve incorporating the Fitzgerald River National Park;
- halt state government plans to clear an additional 3 million ha of bush for marginal farm land;

- lead the development of landcare in rural Western Australia, with groups formed as early as 1983, and still current; and
- develop a strong regional landcare network that supports and integrates these efforts (Gondwana Link Coordination Unit 2007).

**Figure 7 The reserves protected so far in the Gondwana Link project**



Source: Bush Heritage Australia (2007: no page).

A simple working arrangement for the project means that each group continues their core work whilst also seeking opportunities to collaborate with other groups for progress to be accelerated. This arrangement rests on the strong working relationship that has been built between the cooperating groups. Regular contact and meetings ensure planning and coordination of activities and celebration of successes (GLCU 2007).

Many other groups are supporting work needed to achieve the Gondwana Link vision. A series of activities, employing a variety of strategies are occurring across the link. In the south coast region there are dozens of groups involved in sustainability and environmental work (Chambers 2004). Together with key state agencies and local councils, they meet regularly as the South Coast Natural Resource Management group to integrate this effort. Curtin University through the Alcoa Research Centre for Stronger Communities, are contributing by working towards the cultivation of responsive

and responsible links with the wider community, emphasising service, practical relevance, social justice and ethical behaviour. Also, a collective of emerging and established artists from Albany are implementing independent, challenging and innovative art activity in the region (GLCU 2007). The involvement of the community has been integral to many of their projects through engagement in workshops and exhibitions.

In Denmark, at the forest-end of Gondwana Link, is one of Western Australia's most active and successful environment centres (Bush Heritage Australia 2007). Recognising the need for local research, the region has established a Centre for Excellence in Natural Resource Management, linked to the University of Western Australia. There are many community and volunteer groups doing valuable research and monitoring in the region. For example, Birds Australia (WA) is involved in a number of projects for the monitoring and conservation of birds in the state. Two of the current projects focus on *Calyptrorhynchus latirostris* (Carnaby's Black Cockatoo) and the *Pezoporus wallicus flaviventris* (Western Ground Parrot) (GLCU 2007). Both species were once common in the region but are now listed as endangered and critically endangered respectively. It is anticipated that more groups will be involved in the work to achieve the Gondwana Link vision in the near future (GLCU 2007).

## **5.5 Application to the Research**

The last two chapters have built understanding of the associated discourses and key drivers relevant to BRs, and have illustrated international efforts to meet challenges in linked social and environmental issues and resultant shifts in praxis and theory for the WNBR and its constituent BRs. A number of conceptual and institutional shifts are of critical importance to the WNBR and BRs as they continue to evolve. First, there is now a reconfigured theory and praxis of conservation, to realise the inherent and growing complexity of the nature-society interface. Second, the capacity of science to describe the complexity and uncertainty of dynamic social-ecological systems is limited and uncertain, therefore a precautionary approach to the total landscape is emphasised through connectivity conservation and increasing adaptive capacity, using governance as a means to meet multi-scale, multi-jurisdictional challenges. Moreover, institutional roles are shifting as landscapes are increasingly recognised as complex systems, allowing for innovation, experimentation and collaboration to meet multi-scale, multi-jurisdictional objectives. The heightened role for local knowledge in creating and sustaining complex systems is paramount. Third, urban, spiritual, ecological restoration, bioregional and partnership themes (social-ecological themes) are increasingly influential, as evidenced by the prevalence of these themes at the recent World Parks Congress. Fourth, actual and potential international links for knowledge-sharing, capacity-building and collaboration between and within regions in the WNBR are now prevalent as challenges, uncertainty, opportunities and innovation increase. Finally, simultaneous competition and disconnect are evident between government-led and civic / NGO-led approaches, such as Local Agenda 21 and Gondwana Link where similar inputs are sought, however limited capital exists.

The conceptual and practical basis for a broader application and inclusion of BRs into regular NRM and social-ecological discourse exists. The ensuing chapter highlights historical and current

Australian and Canadian national responses to this growing imperative, through examination of their respective BRPs, illustrating disparity between the two countries, given similar opportunities and constraints.

## 6 National BRP Contexts: Australia and Canada

*This chapter analyses the operation of Australian and Canadian BRPs with respect to their historical development and present contexts. Historical operation and implementation of BR ideas and practice at federal government levels are addressed, along with current trends and developments providing context for later discussions of these influences at an individual BR level.*

### 6.1 Australia: Historical Context

The BRP was established in Australia through the Federal Government and its relationship with UNESCO (Parker 1993). In 1975-76 Australia's Man and the Biosphere Committee approached state and federal authorities, seeking suggestions as to prospective BRs throughout the nation (Davis and Drake 1983). State and federal national park services were the only parties approached on the matter. The outcome was the nomination of protected areas of importance or significance. Queensland was the only state that did not provide a nomination, due to their political opposition to UNESCO at the time.<sup>38</sup> The MAB Bureau formally approved Australia's first nine BRs in 1977. Another three Australian BRs were successively approved in December 1982.

MI Australian BRs were established under the passive and science-based goals for the development of a network for global environmental monitoring, preservation of key examples of the world's distinctive ecosystems and the conservation of genetic diversity contained within those systems (Parker 1993). When the UNESCO Minsk Action Plan was circulated in 1984, the scientific goals were integrated with a local community focus including regional landscape planning; sustainable use of the community's resources; and a partnership between the management of BRs and the local community's goals for land use and conservation. Australia's response to the Minsk Plan was insignificant, and no new designations were added that could reflect these new BR developments.

*Australia's Biosphere Reserves: Conserving Biological Diversity* called for the establishment of 'an expert working group ... to advise the MAB Committee and help formulate policy' (Davis and Drake 1983: 43). A decade would pass before any action was taken on this recommendation. The result was the convening of the Working Group on BRs in the early 1990s, comprising managers of each of Australia's BRs and the then Department of the Environment and Heritage.

In 1992-93 Australia initiated a strategy for its BRP, entitled *Biosphere Reserves in Australia: A Strategy for the Future* (Parker 1993), which was a tardy government-initiated response to recommendations from the Minsk Plan. The strategy included a list of actions required to fulfil the requirements of the BRP. At that time, a 'Review of Australian BRs by the Scientific Advisory Panel for BRs' was undertaken, and the Australian Nature Conservation Agency and the Commonwealth Department of Foreign Affairs and Trade agreed to apply a joint approach to develop two model BRs, in a Memorandum of Understanding.

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<sup>38</sup> Queensland's first BR was declared in Paris, October 2007.



The chosen sites for model BRs were Dangalli Conservation Park (now Riverland Biosphere Reserve) in South Australia and the Fitzgerald River Biosphere Reserve in Western Australia. These model BRs were to serve as leading national demonstration projects to showcase the value of the Program and were initiated to provide examples, not only to other BRs, but to the broader NRM community of the mandate and potential of the Biosphere Reserve Action Plan (Parker 1993). Ultimately the governance systems for the model reserves have enabled staff to meet more criteria of the BRP than is the case at, for instance, MI BRs, which have continued to be managed only as protected areas (Matysek et al. 2006). However, in Fitzgerald BR, success has resulted not from any role that the government had in supposed support, but rather from development and logistics capacities built by local communities and champions. As shall be illustrated in the case studies, Riverland, the other model BR, has become debilitated by ineffective governance.

The Department of Foreign Affairs and Trade, responsible for international relations, oversaw the coordination of BRs at a federal level until 2000, through its representation on the Australian Commission to UNESCO. At this time Environment Australia (now Department of the Environment and Water Resources), the federal agency for the environment, acquired BR responsibility, which was delegated to the division responsible for protected area management. This transfer was due to Environment Australia's planning and management role in protected areas, the strong geographical relationship between these sites and BRs, and the introduction of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Focal point responsibilities previously held by the UNESCO National Commission Secretariat in the Department of Foreign Affairs and Trade were transferred, however, the Secretariat retained the broader responsibilities for both UNESCO activities and the MAB Program in Australia. Environment Australia commenced production of the *Australian Biosphere Reserves News* newsletter, given its responsibility as the focal point for BRs.

In 2001, the role and function of the Biosphere Reserve Working Group was reviewed and revised in line with the goals and objectives of the Seville Strategy (Department of Environment and Heritage 2004). The roles of the Working Group on BRs were promoted through the Environment Australia website and the *Australian Biosphere Reserve News* as:

- a forum for discussion of technical issues related to BR management;
- a focal point on BR management matters;
- an information exchange between managers; and
- a coordination point for information flow on BRs between agencies and organisations.

The Working Group stated that it would use its expertise and experience to:

- oversee the development and implementation of technical procedures and approaches to the management of BRs;
- coordinate and advise on capacity development and training for BRs;
- identify opportunities for exchange of information and ideas on BR management practices and procedures;
- advise on technical solutions to management problems and issues;
- support the development and management of Australian BRs;

- review, analyse, assess and advise on BR technical and management issues; and
- support and advise on the development of new BR nominations (Environment Australia 2002b).

Although their scope was laudable, the role of the Working Group was not realised. The purpose of the Working Group was, and remains, necessary for national BR integration and information sharing. However a lack of integration between individual BR stakeholder networks with the federal environment agency in national BR coordination has resulted in intermittent and ineffectual attempts to coordinate and build BR networks at a national level. For example, the National Biosphere Reserve Working Group Meeting on Kangaroo Island in 2001 was one of the only attempts at national BR capacity-building and coordination. No formal records of any other National Biosphere Reserve Working Group meetings exist on the website. In 2004, when questioned about this matter, the responsible federal representative stated that funding for the working group meetings was not available<sup>39</sup>

Even in the presence of a number of BR-related developments, (the EPBC Act and the transfer of BR responsibility to a conservation-oriented department), one Australian BR became moribund. The South-West National Park Biosphere Reserve (Tasmania), declared during the establishment of the BRP in Australia, was revoked by UNESCO in February 2003. This BR was the first in Australia de-listed. One of the major problems of the South-West BR was the exclusive reliance on protected areas staff to buoy the designation in the absence of a community to drive the development and logistics functions. Government protected area managers viewed the designation as problematic, given the BRs limited capital input and perceived redundancy given existing national park and WHA status (Copson 2004).

In a review of Australian multi-tenure reserve networks, Fitzsimons and Westcott (2005) suggest that while the Commonwealth government has a national strategy on BRs (Parker 1993), this is in need of review in light of more recent advances in cross-tenure conservation mechanisms, of which BRs are a part. Such a review only seems appropriate at a scale that can assess both the theoretical and practical challenges to governance, coordination, and competing issues: a national scale review, using the coordination and intellectual capital of a national BR working group (Fitzsimons and Westcott 2005). This review, and the group required to conduct it are critical to the future resilience, and relevance, of the Australian BRP.

## 6.2 Present Context

As of 2008, the area of BRs nationally represented approximately 0.77 per cent of Australia's landmass, or 5,942,505 ha. Ten of Australia's 14 BRs consist almost entirely of protected areas, managed by government conservation agencies, in nine cases by state authorities and in one case by the Commonwealth (Table 5, pg. 109). The remaining four (Mornington Peninsula - Western Port, Noosa, Barkindji and Riverland) comprise a different structural arrangement. As MII BRs, they have

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<sup>39</sup> This was indicated during an interview in 2004. By mid 2008, funding for this purpose remained unavailable.

been active in the aspects of development and logistics within the Australian BRP, due to diverse stakeholder groups and capital assets, and incorporate a range of land tenures.

**Table 5 Australian Biosphere Reserve details**

	Biosphere Reserve	Established	Area (ha)	Land Tenure	Governance Authority
1	Barkindji Biosphere Reserve (NSW) <sup>40</sup>	2005	100 000	NSW and Victorian Crown land; Trust for Nature land	Australian Inland Botanic Garden (Mildura)
2	Croajingolong National Park (VIC)	1977	101 000	Victorian Crown land, under the <i>National Parks Act 1975</i>	State Government; statutory cooperation between NSW National Parks and Wildlife Service and Parks Victoria
3	Fitzgerald River National Park (WA)	1978	329 039	Uncleared vacant West Australian Crown land, and Crown land under the <i>Conservation and Land Management Act 1984</i>	Western Australian Department of Conservation and Land Management on behalf of the Conservation Commission of Western Australia
4	Hattah – Kulkyne and Murray – Kulkyne National Park (SA)	1981	51 500	South Australian Crown land, under the <i>National Parks Act 1975</i>	Parks Victoria (Department of Sustainability and Environment)
5	Kosciuszko National Park (NSW)	1977	625 525	New South Wales Crown land, under the <i>National Parks and Wildlife Act 1974</i>	New South Wales National Parks and Wildlife Service
6	Macquarie Island World Heritage Area (TAS)	1977	12 785	Tasmanian Crown land, under the Tasmanian <i>National Parks and Wildlife Act 1970</i>	Tasmanian Department of Tourism, Arts and the Environment
7	Mamungari Conservation Park (previously Unnamed Conservation Reserve) (SA)	1977, renamed in 2007	2 132 600	State Government reserve, under the <i>National Parks and Wildlife Act 1972</i>	Department of Environment and Heritage South Australia
8	Mornington Peninsula – Western Port Biosphere Reserve (VIC)	2002	214 200	Victorian Crown land, under the <i>National Parks Act 1975</i> Private land	The Mornington Peninsula - Western Port Biosphere Reserve Foundation (includes, amongst others, private landholders, State Government, local government and industry)
9	Noosa Biosphere Reserve (QLD)	2007	150 000	Queensland National Parks, under the State's <i>Nature Conservation Act 1992</i> Forest reserves; Conservation parks; Nature refuges; state forests; state freehold managed for conservation; Private freehold managed for conservation; Queensland Crown land; private freehold land	Environment Protection Agency/Queensland Parks and Wildlife Service, Noosa Shire Council, Noosa Biosphere Reserve Association (Inc)
10	Prince Regent River Nature Reserve (WA)	1977	633 825	West Australian Crown land, under the <i>Conservation and Land Management Act 1984</i>	Western Australian Department of Conservation and Land Management
11	Riverland (Bookmark) Biosphere Reserve (SA)	1977, extension in 1995	900 000	State conservation reserves; game and forestry reserves; pastoral leases; private land	Under review
12	<u>Delisted</u> South-West National Park (TAS)	1977, delisted in 2002	403 240	Tasmanian Crown land, under the Tasmanian <i>National Parks and Wildlife Act 1970</i> but partly subject to the rights of the Hydro Tasmania	The Tasmanian Wilderness World Heritage Area Ministerial Council (overarching administrative authority); Tasmanian Department of Tourism, Arts and the Environment
13	Uluru-Kata Tjuta National Park (formerly Ayers Rock – Mount Olga National Park) (NT)	1977	132 550	Commonwealth Crown land, under Commonwealth <i>EPBC Act 1999</i>	National: Environment Australia (Parks Australia North) Local: Board of Management, Anangu traditional owners
14	Wilsons Promontory Marine Park and Marine Reserve (VIC)	1982	49 000	Victorian Crown land, under the <i>National Parks Act 1975</i>	Parks Victoria reporting to the State Government of Victoria
15	Yathong National Park (NSW)	1977	107 241	New South Wales Crown land, under the <i>National Parks and Wildlife Act 1974</i>	New South Wales National Parks and Wildlife Service
TOTAL			5 942 505		

<sup>40</sup> See Appendix D, provided as supplementary information on this recent Australia MII BR.

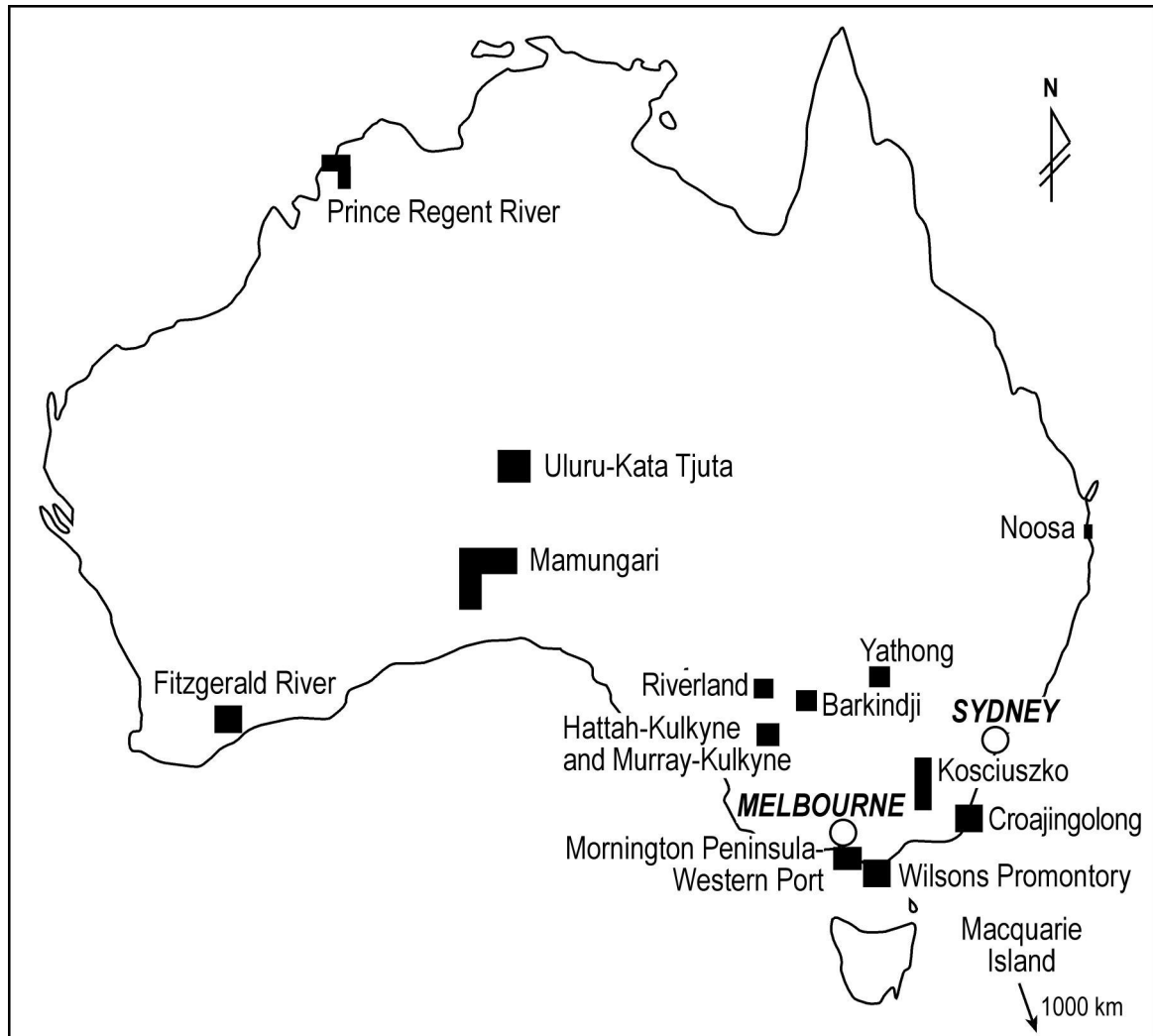
Australia is not currently a member of the MAB ICC. The decision not to renominate for a seat was made around the same time as the transfer of responsibility to Environment Australia, where a preference was made to 'concentrate on the [R]egional network role' (Environment Australia 2001: 3). However, despite the Federal Government assertion to progress Australia in the South East Asian Biosphere Reserve Network, this component of the Australian BRP does not exist. The regional role, which necessitates an extant BR National Working Group, is not feasible given that there has been no formal meeting of the Working Group in the last seven years. According to the Federal Government BR website, the Working Group convenes annually, however, there has not been a record of a meeting since August 2001. Without a representative body at the national level that actively progresses the BRP, Australia cannot contribute to the international or regional BR dialogue. The South East Asian Biosphere Reserve Network does not, to date (2008), include Australia thus compounding the issue of an international and regional role for Australian BRs.

Australian BRs vary widely in fulfilment of logistics and development functions. Many of the MI style BRs maintain important conservation functions. These functions are significant to the broader aims of MAB but these BRs are limited by geography in their ability to fulfil development and logistics capacities (Parker 1993), usually due to a sparse population and limited civil society interest. MIs are therefore characterised by limited capital assets, partnerships, stewardship and adaptive management .

One example is the Mamungari Conservation Park BR (Figure 8, pg. 111). Mamungari is Australia's largest BR. As a wilderness reserve in the Southern Great Victorian Desert and northern Nullabor Plain, the BR is 200 km west and 450 km northwest of its nearest populations centres, Maralinga and Ceduna, respectively. The park is managed jointly by the traditional owners, the Maralinga Tjarutja and the Pila Nguru communities and the South Australian Government environment department. The park may only be visited by those who have obtained the minimum impact code and can demonstrate experience using that code. Permits are required to travel to the park and take 4 - 6 weeks to arrange. With these stringent guidelines, along with the remote location, Mamungari does not have a BR community committee. This is an example of the remote location of one Australian MI style BR, and its strong representation in the cultural and conservation aspects of a BR.

With significant variations in local circumstances such as land use, tourist visits to core areas, local population distributions and characteristics, and local governance, Australian BRs present a myriad of logistics and development challenges. The degree to which the development and logistics capacities are i) recognised locally as a part of the BR; and ii) contributed to; are greatly influenced by the local population, and any presence or otherwise of local BR champions.

**Figure 8 Location of Australian BRs**



The lack of national coordination has not assisted MI BRs. At the 16th Session of the ICC, the Australian National Report noted that the concept, scope and potential of BRs in Australia is not widely appreciated (Bridgewater and Muldoon 2000). The report also stated that the Australian Government is supporting the future development of BRs in a number of ways (Bridgewater and Muldoon 2000). However, to date, there is scant evidence of such support.

### **6.2.1 The EPBC Act and BRs**

The EPBC Act protects the environment, particularly matters of National Environmental Significance. It streamlines national environmental assessment and approvals processes, protects Australian biodiversity and integrates management of important natural and cultural places. The EPBC Act was enacted on 16 July 2000. It stipulates Commonwealth assessments and approvals for actions that are likely to have a significant impact on matters of national environmental significance, for example, Ramsar wetlands, listed migratory species, nationally listed threatened species and ecological communities (Environment Australia 2002a). The Act can also apply to areas listed on the National Heritage List. These provisions can apply irrespective of whether or not an area is designated a BR.

The EPBC Act stipulates the requirement for all BRs to have BR management plans. The Act provides that the management plan can be developed and implemented cooperatively by the Australian Government Minister for the Environment and the state or self-governing territory. The plan must be consistent with the Australian Biosphere Reserve Management Principles described in Schedule 7 of the EPBC Regulations as follows:

1. A management plan should be prepared for each Biosphere reserve.
2. A management plan for a Biosphere reserve should state:
  - (a) the values for which the reserve is established; and
  - (b) the extent of the reserve; and
  - (c) any zoning that provides for the following functions:
    - conserving genetic resources, species, ecosystems and landscapes;
    - fostering sustainable economic and human development;
    - supporting demonstration projects, environmental education and training, and research and monitoring related to local, national and global issues of conservation and sustainable development; and
  - (d) the role of the reserve in contributing to a national coverage of ecological systems representative of major bioregions;
  - (e) the strategies for biodiversity conservation in the reserve, including those that:
    - protect it from disturbance and threatening processes; and (ii) minimise potential adverse effects on its natural, cultural and social environment and surrounding communities; and
  - (f) how the plan will provide for:
    - exploring and demonstrating approaches to sustainable development on a regional scale; and
    - ensuring that the health, diversity and productivity of the environment in the Biosphere Reserve are maintained or enhanced for the benefit of future generations;
    - ensuring that decision making is consistent with the precautionary principle;
    - setting out an appropriate policy and management framework; and
    - programs for research, monitoring, education and training.

3. A management plan for a Biosphere reserve should provide for public consultation about planning for, and proposed actions in, the Biosphere reserve.

The management plans for BRs stipulated under the Act do not have a prescribed format, but as noted above, must include seminal information on, for instance, governance, threats, conservation significance and zoning. The management plan does not have to be highly detailed and prescriptive, but it should be developed consultatively and provide opportunity to partner and streamline with other local and state government plans.

The EPBC Act requires that the Australian Government take all reasonable steps to ensure that it exercises its powers and performs its functions in relation to a BR consistent with the Australian Biosphere Reserve Management Principles or a written plan made by the Minister. The Act also provides that the Commonwealth may give financial or other assistance for the protection or conservation of a BR to the state or self-governing territory in which the BR is situated, or any other person, subject to such conditions as the Minister sees fit (DEH 1999).

To date no Australian BR designation has such a Management Plan. Without national BRP coordination, there has been little impetus or reason to establish such plans. The absence of a national response to these legal stipulations indicates that they are not being taken seriously. This inaction exists despite the Act enhancing the Commonwealth Government's capacity to implement Australia's obligations under the Convention on Biological Diversity through, inter alia, the preparation of BR bioregional management plans and promotion of cooperative management of these areas (Bridgewater and Muldoon 2000).

### **6.2.2 MII Style BRs**

Since 2000, there has been some renewed interest in Australian BRs, with several new declarations. As introduced in Section 3.7, MII BRs are derived from a local, citizen constituency and employ a long-term participatory approach, where the maintenance of biological diversity is strongly coupled with the requirements for logistics and development in that goal, recognising pre-existing uses and aiming for economic, social and environmental capacity. The newest additions to the network are the Barkindji BR, declared in 2005 (see Appendix D) and the Noosa BR, declared in 2007. These BRs are two of only three new designations in the Australian BRP since the early 1980s. Significantly, Barkindji and Noosa illustrate the new community-driven and stewarded approach to Australian BRs of the MII style, and have piqued interest with other potential BR sites across the country, where innovative solutions beyond typical local or state government NRM strategies are sought. For example, between 2005-2007 the following proposals for BRs have arisen, in an MII style:

- D'Aguilar Range and Brisbane Forest Park BR proposal (Qld): initiated by South East Queensland Catchments Ltd.; Pine Rivers Shire Council; Brisbane City Council; University of Queensland;
- Australian Capital Territory BR proposal: initiated by ACT Department of Territory and Municipal Services; Conservation Council of the South East Region and Canberra Inc.; Nature and Society Forum; CSIRO Sustainable Ecosystems; and Legislative Assembly for the ACT Standing Committee on Planning and Environment;
- Wilson Inlet Catchment BR proposal (WA): initiated by Green Skills; Denmark Education and Innovation Centre; and Shire of Denmark;
- Pilliga/ Warrumbungle BR proposal (NSW): initiated by the Western Conservation Alliance (a consortium comprised of Armidale Environment Centre, Central West Environment Council, Central West Wilderness Society, Dubbo Field Naturalists and Conservation Society, Friends of the Pilliga, Mudgee District Environment Group, National Parks Association of NSW Tamworth Branch, National Parks Association of NSW Central West Branch, National Parks Association of NSW Armidale Branch, National Parks Association of NSW Macquarie Valley Branch, Orange Field Naturalists, Rylstone District Environment Society, Colong Foundation for Wilderness, National Parks Association of NSW, Nature Conservation Council of NSW, The Wilderness Society, and Total Environment Centre; and



- Woolumbin (Tweed Heads) (NSW): initiated by Big Scrub Environment Centre; Byron Environment Centre; Caldera Environment Centre; Gold Coast Environment Council; Nimbin Environment Centre; and the Sustainability Research Institute.

Additionally, since 2000, the following areas have been discussed as potential BRs in multi-stakeholder forums, however no major developments have occurred to date:

- Kangaroo Island (SA);
- West Port Phillip Conservation Area - Geelong (Vic); and
- Daintree / Wet Tropics (Qld).

### **6.2.3 Australian Biosphere Volunteers (ABV) Inc.**

Following the successful chartering and constitution of the Mornington Peninsula and Westernport Biosphere Foundation Ltd. (MPWPBRF) in November 2003 (examined in Section 9.4), some members realised the need for a national grassroots organisation to coordinate all the volunteers and effort in Australian BRs. ABV attracted 30 members at the outset, and its committee consisted of a range of local civil society members involved in the MPWP BR.

The aims of the group are to:

- enhance relationships between BRs, the community, industry and federal, state and local governments;
- create a national network of enthusiastic and credible volunteers working towards BR objectives that will continue in the long term;
- assist with the development of stakeholder's positions in relation to the Third World Conference on Biosphere Reserves (2008);
- encourage the designation of BRs in Asia and Oceania;
- discuss the costs and benefits of BR designation and celebrate achievements;
- recognise the input of volunteers and provide support and assistance to all volunteers within BRs;
- review potential for country-wide community grassroots actions for the ultimate amelioration of the challenges to a sustainable Earth; and
- identify and develop actions that foster membership and grassroots support (Australian Biosphere Volunteers Incorporated 2007: no page).

At the ABV Inc. annual general meeting in 2006, the membership elected its committee from existing ABV members and other individuals representing local business, conservation and academia. According to the ABV website, it 'refers other communities nationwide to the success of the MPWP BR, providing positive advice and increasing its membership across the nation' (Inc. 2007: no page). ABV is presently acting to acquire federal government funds for these purposes.

For example, the 2006 ABV Committee developed a proposal to create a network of BRs across the nation and suggested that:

... such a network would allow easy communication and interaction and remove the isolation felt by communities living and working in far-flung Biosphere Reserves. Further, this would enable the objectives of the Man and the Biosphere Program and the Seville Strategy to be achieved, as described in the UNESCO review of Australia's Biosphere Reserves released in 2003 (Inc. 2007: no page).

The group regards the convening of an Inaugural National Biosphere Reserves Workshop for Volunteers as an immediate priority. Such a workshop would establish national dialogue amongst community volunteers in all BRs, led by facilitators, national authorities on BRs and other civil society BR representatives.

It is anticipated that following the proposed National Workshop, additional funding will be required to implement outcomes from the workshop, including a means of maintaining communications between the various Australian BRs, as well as expanding awareness of the BRP to a wider audience, thus attracting more community involvement. According to ABV (2007a: no page):

... that would require a national interactive, multi-linked website enabling rural and remote Australians to remain in touch, as well as promoting Australian Biosphere activities to other countries and communities around the globe, as a demonstration of excellence in community involvement. The website will form the core of the national network, delivering information via newsletters to both Members and the general public. Funds will be required for development and on-going operation and maintenance, as well as any software required.

The ABV presently distributes information via a website. Other initiatives planned include a Biosphere program link to all community radio and TV stations nationwide. An active national membership is envisaged, along with a newsletter, DVD and presentation distribution system. Personal contact with community groups and associations in regional and country Australia through local ABV representatives is a further idea, as is local and municipal newspaper reporting of BR related articles and activities. A National Biosphere Conference is considered a priority, to engage interested people from all existing and proposed BRs in Australia and potentially overseas. To date, ABV is yet to realise these goals.

### **6.3 Multi-Tenure Reserve Networks**

As discussed in Chapter 5, connectivity conservation represents a major contribution to the new paradigm for protected areas. Multi-tenure reserve networks are a type of connectivity conservation. According to Fitzsimons and Westcott (2005) Barkindji BR offers some innovative examples of social-ecological capacity-building through mutually beneficial alliances for local integrated sustainability, and is probably one of the first examples of a transboundary, multi-tenure reserve network in Australia.<sup>41</sup> In managing various threatening processes such as salinity, erosion, deforestation and remediation in concert with sustainable agriculture and tourism, the Barkindji BR is partnering with the relevant stakeholders implicit in the management of these region-wide issues, creating institutional capacity and resilience. Drawing on a wide range of capital assets from a variety of sources, the Barkindji BR is not solely reliant upon government support and endorsement to achieve its objectives, unlike its MI counterparts.

This type of multi-tenure reserve network is relatively new in Australia. There has been an increased interest in the multi-tenure approach to conservation, particularly in the last decade, with a number of

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<sup>41</sup> Both the Fitzgerald River BR and the Mornington Peninsula - Western Port BR are multi-tenure reserve types, introduced in Table 6. However, in both cases, the inclusion of these other tenures can be termed notional rather than formally recognised as part of the BR (Watson and Sanders 1997).

new networks established and many others in the formative stages of development (Fitzsimons and Westcott 2005). Along with BRs, such networks are characterised by Conservation Management Networks (CMNs). Whilst pertinent to discussion of BRs, it is not the intent of this thesis to discuss the arrangements and multiplicity of issues regarding multi-reserve tenure networks, therefore a brief discussion of the basic axioms follows.

A CMN is a network of native vegetation remnants managed for conservation, their managers and other interested parties. The CMN model essentially provides a coordinating or umbrella body to help facilitate the protection and management of fragmented ecological communities across a range of tenures and with a variety of protection mechanisms (Fitzsimons and Westcott 2005; Thiele and Prober 1999; Binning and Young 1997). The model was in part necessitated by a perceived lack of mechanisms to quantify the contribution of the non-government sector to achieving nature conservation objectives (Fitzsimons and Westcott 2005; Binning 2000).

Multi-tenure reserve networks, such as CMNs, as on-ground means for implementing cross-tenure ecosystem management in Australia are increasing (Fitzsimons and Westcott 2005). The involvement of NGOs acts to strengthen existing networks in two ways: i) by increasing the profile of the network and ii) by acting or being perceived as a respected and impartial land manager linking public and private land managers. Moreover, as was the case in the Barkindji BR, the purchase of land within a region can also act as a stimulus for the formation of new networks. The involvement of NGOs owning conservation lands is likely to increase if overseas trends are followed in Australia (Fitzsimons and Westcott 2005). Some other examples of multi-tenure reserve networks are presented in Table 6 (pg. 118).

**Table 6 Some other multi-tenure reserve networks operating in Australia**

Network Name	Description
Fitzgerald River Biosphere Reserve	Located on the southern coast of Western Australia and based around the core Fitzgerald River National Park which constitutes half of the BR's notional area of 1 355 000ha. Other public protected areas, and vegetated and cleared private lands managed for sustainable agricultural production comprise the remainder (Watson et al. 1995). The Gondwana Link proposal plans to link the BR with other large protected areas in the landscape.
Mornington Peninsula - Western Port Biosphere Reserve	Located southeast of Melbourne, it claims to be the first BR to incorporate an urban area. Initiated by the community and local government, its core area is based around French Island and Mornington Peninsula National Parks, with sustainable production and urban living its focus.
Southern Tablelands Grassy Ecosystems CMN, Monaro Grasslands CMN	Based on the Grassy Box Woodland CMN model, the NSW National Parks and Wildlife Service has recently established two more CMNs (with assistance from the World Wide Fund for Nature) in the south-east of the state to coordinate the protection of remnants of heavily cleared and fragmented grassy ecosystems of these regions.
Broken-Boosey CMN	Proposed by the former Victorian Environment Conservation Council (ECC 2001) and based around the recently declared Broken-Boosey State Park. Initiated by the Trust for Nature prior to the government's acceptance of the proposals and originally referred to as a Biodiversity Management Network.
Northern Plains Grasslands CMN	Formed by the Trust for Nature and based around the purchase of the Korrak Korrak and Glassons Grasslands by that organisation. Intent to focus on other Victorian Northern Plains grassland remnants on private land.
Wedderburn-Wychitella CMN	Proposed by the Environment Conservation Council (2001) and based around the expanded, but fragmented, Wychitella Nature Conservation Reserve. Originally referred to as a Local Habitat Conservation Network. Significant areas of box ironbark and Mallee vegetation types on private land link blocks of public reserve. A facilitator was appointed by the Victoria Department of Sustainability and Environment.

Source: Fitzsimons and Westcott (2005: 93).

The Commonwealth Government document *National Objectives and Targets for Biodiversity Conservation 2001–2005* formally recognised the concept of informal protected area networks, however no definition was provided (Commonwealth of Australia 2001). A recent attempt to have a nationally accepted framework for the establishment and definition of CMNs (Thiele et al. 2002) has yet to be accepted by government institutions. Nonetheless, the CMN concept is broadly accepted by both New South Wales and Victorian State Governments and is utilised as a mechanism for conservation planning at a catchment (Corangamite CMA 2005) and landscape (Ross et al. 2003; ECC 2001) level in Victoria and for threatened community recovery planning in New South Wales (Fitzsimons and Westcott 2005; Dobbie 2004; Environment ACT 2003). This adoption and implementation gives formal acknowledgement as a means for integration of management across different land uses and tenures, and particularly conservation lands. Barkindji BR represents this type of approach and provides an example for further development of MII style BRs, which provide some of the most recent developments in Australian multi-tenure reserve networks.

## 6.4 Canada: Historical Context

As a consequence of the Biosphere Conference in 1968, a Canadian government cabinet decision deemed that Canada should seek a seat on the ICC, which at the time was designing and coordinating the establishment of the WNNBR. Canada was subsequently elected for the first time by the UNESCO General Conference in 1970.

The eight member Canadian delegation contributed to the identification of the 13 original MAB project themes. These themes were recognised as a compromise between the strictly natural / physical scientists, many of whom had been heavily involved in the IBP, and recognised the human concerns and pressures within protected areas. This meeting laid the basis for activity involving human and social sciences on an equal basis with the natural and physical sciences within the program (Ecological Monitoring and Assessment Network 1998).

Initially Canada / MAB activities were coordinated from the Science Secretariat in the Privy Council Office. From 1974 - 1979, Environment Canada provided the Canada / MAB Secretariat with financial support in the order of CA\$300 000 (Roots 1989). In 1979 Environment Canada reduced its support and the Canada / MAB Secretariat was transferred to the Canadian Commission for UNESCO, but with no allowance of funds for the operation of the program.

Projects under Canada / MAB were carried out through working groups – special groups of experts or managers convened by the Canada / MAB committee to work in the project areas of MAB. These groups relied on volunteers to promote MAB in Canada, who had their minor expenses covered. Special working groups were convened for BRs, including MAB / NET (environmental education, training and communication), the Human Ecology of Coastal Areas (culminating in the production of an inventory of local level resource management activities on a regional basis), and the MAB Northern Sciences Network.

A Working Group for BRs was established by the Coordinating Council of Canada / MAB (CC / MAB) in November 1980, with Dr George Francis as Chair. The task set for this group was:

- to review the basic concept of BRs as it had evolved within UNESCO / MAB (Project 8);
- to identify actions to implement a system of BRs in Canada in such a way that they would complement and help strengthen on-going work by a number of government agencies and private groups towards protecting natural landscapes for various purposes; and
- to suggest a role for CC / MAB which would facilitate Canadian activities under MAB Project 8 (Francis 1981: 2).

Due to the limited operating budget of the Working Group, all of the work undertaken was voluntary. An example of the initiatives addressed by the Working Group during the early 1980s included:

- preparation of information material pertaining to Canada / MAB and BRs;
- feasibility studies for a centralised information system through cooperation with the Federal-Provincial Parks Conference and the Canadian Committee for IUCN;

- preliminary feasibility studies for the establishment of BRs in various locations in Canada, to serve as examples of the program;
- consultations with representatives of the former IBP in Canada to determine how the BR idea might best serve the IBP; and
- a workshop on the theme of the 'Compatibility of Canadian Ecological Land Classification Schemes with Reference to the Global System of Biogeographic Provinces, UNESCO / MAB Project 8' (Francis 1981: 5).

During the 1980s, the work of Canada / MAB was funded through the Commission by the Canada Council, and supplemented periodically by special allocation from other agencies such as Indian and Northern Affairs Canada, Fisheries and Oceans Canada, and Environment Canada (through Parks Canada) (Roots 1989). In the early 1980s Parks Canada made a commitment to contribute CA\$15 000 per year to the Canadian Commission to UNESCO, to be allocated equally between the two BRs containing protected areas at that time (Waterton and Riding Mountain BRs) and the Working Group. Those BRs without a protected area were left to create their own funding partnerships.

By the mid 1980s, it was clear to the Canada / MAB committee and the Working Group on BRs that an expansion of the network in Canada would be necessary to increase awareness and understanding of the potential for BRs in sustainable development. Canada / MAB set three objectives in response to the call for national action plans by the UNESCO Minsk Action Plan of 1984:

- to establish at least one BR in each of the biogeographic regions of Canada;
- to meet the broad range of BR objectives and promote BR activities in Canada; and
- to contribute to the BR activities of other countries (Roots 1989).

In an effort to strengthen the Canadian program, Canada / MAB created the National Action Plan for BRs in 1987. The document was based on the collective experience gained from the establishment and management of Canada's BRs, the Canada / MAB committee and the Working Group on BRs. The objectives of the Action Plan were to improve and expand the knowledge of Canadian BRs; to utilise the network to increase basic understanding of ecosystem conservation and biodiversity; and to increase the effectiveness of BRs in achieving sustainable social benefits from natural resources by demonstrating the value of integrating conservation and development (Canada MAB 1987). The same year, Parks Canada employed Jim Birtch as the coordinator of Canadian BRs, in a liaison and advisory capacity, as an adjunct to his main role in Parks Canada<sup>42</sup> (Birtch 2004d).

As a public document, the Action Plan would facilitate detailed explanation of the concept to a wide audience. It would provide direction and action to be undertaken at various timescales. The Plan would also provide a framework for the Working Group on BRs to approach environmental interest groups and government departments, to illustrate similar interests and seek agreements to work toward mutual goals. The National Action Plan was distributed primarily by word-of-mouth and through the existing Canada / MAB mailing lists (Roots 1989).

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<sup>42</sup> As a policy officer for the regional integration of National Parks.

In 1989, Birtch was seconded from Parks Canada for a six month term to work for the Canadian Commission for UNESCO, as the MAB Natural Sciences Officer. For the first time, Canada had a designated individual for the purpose of forwarding the UNESCO MAB program, and it was here that Birtch provided a valuable role for national BRP facilitation, forwarding the MAB Program and BRs in Canada (Francis 2004b).

By the end of 1990, Canada had six BRs. The small number of designations at that time reflected the commitment of the Working Group on BRs to gain local support for, and understanding of, the concept prior to designation (Roots 1989). The Working Group recognised the importance of extensive research and interaction with local communities, voluntary groups, and industry as central factors to BR success. The preliminary frameworks for proposed BRs would be made years<sup>43</sup> prior to nomination being submitted to the Canada / MAB committee (Francis 2004b). The Working Group was very particular about the initiation of candidate BRs, restricting the speed at which future BRs could be assessed and nominated. Before expanding the BR network in Canada, a key issue for the Working Group was to ensure that a support structure would be in place to coordinate national efforts and international linkages.

With the appointment of a conservative federal political party in the early 1990s, the Canadian Commission to UNESCO, including the MAB Program, become relatively defunct (Roots 2004). The lack of government support represented a significant trend against the historical support of Canada in the MAB ICC. The government withdrawal from BR stewardship meant that official status and funding of BRs was non-existent. At local levels however BRs continued much as they had previously, under the stewardship of their respective communities. There were no new declarations from 1990 to 1999, partly due to political and financial uncertainties regarding the Canada / MAB program. Despite reductions and uncertainties in funding for Canada / MAB during the 1990s, the BRs Working Group continued to receive some support from Parks Canada. Further support has been provided since 1996 by Environment Canada's coordinating office, for the Ecological Monitoring and Assessment Network (EMAN), to assist with the development of biodiversity monitoring plots and associated activities in BRs.

In 1996 the Working Group, supported by representatives from the BRs, created a non-profit organisation to enhance the scope of support and program activities (Canadian Biosphere Reserves Association 2003). The Canadian Biosphere Reserve Association (CBRA) was the outcome of this initiative. A non-profit association, incorporated in 1997, it set out to provide support and create networking relationships to develop and maintain BRs throughout Canada. Since 1997, Jim Birtch has been part-time executive secretary to CBRA through Parks Canada's support. Through CBRA, it is intended that BRs maintain international and national relevancy, arrange and facilitate partnerships with other related organisations, collaborate on shared projects, and exchange local expertise among BRs in Canada and elsewhere. CBRA held its inaugural meeting in the Long Point Biosphere

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<sup>43</sup> Often 5-10 years prior to the nomination submission to UNESCO.

Reserve in August 1998, and continues to meet annually (Canadian Biosphere Research Network 2006).

In 2000 four proposed BRs developed during the 1990s were officially declared by UNESCO, including Clayoquot Sound (British Columbia), Redberry Lake (Saskatchewan), Lac Saint-Pierre (Quebec) and Mt. Arrowsmith (British Columbia). In June 2001, the CBRA Board of Directors produced a mission statement. The Board also directed three sub-committees to address strategic planning, fundraising and communications. In the mission statement, CBRA asserted to:

- actively support and advise BRs in fulfilling the Seville Strategy;
- collaborate, synthesise and exchange information and expertise between BRs, with society at large and with UNESCO / MAB;
- proactively obtain resources and funds in support of the objectives of CBRA and individual BRs;
- develop and maintain partnerships with relevant organisations and individuals; and
- help maintain the international designation of recognition received by Canadian BRs from UNESCO (Canadian Biosphere Reserves Association 2005).

During 2003 - 2004, in response to UNESCO recommendations and arising from CBRA's view to partner and build networks, Canadian BRs developed cooperation plans. By aiming to increase effectiveness through partnership and participation, the cooperation plans were developed by volunteers within CBRA and the residents, businesses and other organisations and institutions within, or associated with, BRs.

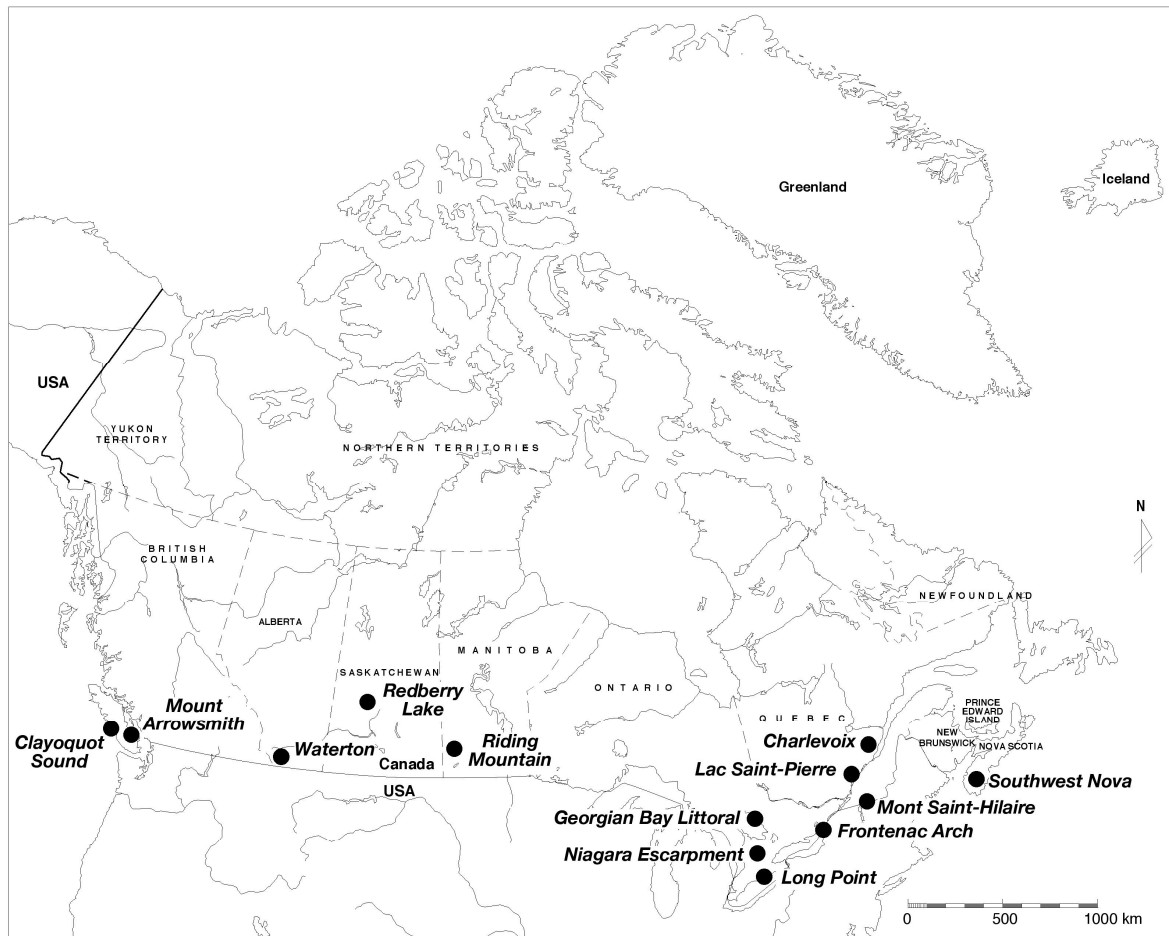
In the plans, goals for the three BR functions were developed to address the challenges and actions that best reflect local needs and desires. This cooperative approach has encouraged innovation, fostered pride in local achievements, and created a desire to share these experiences within Canada and with other countries around the world (Canadian Biosphere Reserves Association 2005). CBRA encourages these plans for every Canadian BR and oversees their development, providing assistance and knowledge as required. Instead of a prescriptive management plan, these plans focus on logistics and development functions, particularly with regard to developing partnerships, collaborations and capacity in the transition zone (hence 'zone of cooperation'). Existing and potential partnerships are outlined in these documents, along with historical backgrounds, opportunities and challenges, with the central priority of harnessing and building capital through partnerships, stewardship, collaboration, innovation, sharing and ultimately increasing adaptive capacity.

## **6.5 Present Context**

As of 2008, Canada had 15 BRs (Figure 9, pg. 122, shows 13 of the 15 BRs). Parks Canada and EMAN are important partners of CBRA. The area of BRs nationally represented 1 per cent of Canada's landmass, or 10 782 150 ha. Canada's BRs consist of a mix of protected areas and lands under a range of other tenure. Table 7 (pg. 124) provides an overview of the BRs and their designation year, land tenure types and governance authorities.



**Figure 9 Locations of Canada's BRs\***



\* Fundy and Manicouagan-Uapishka BRs not shown. Source: Adapted from Canadian Biosphere Reserves Association (2008: no page).

A number of Canadian conservation lands are represented in these BRs, however only those with a national park receive financial benefit. Parks Canada contributes CA\$2500 per year to BRs containing national parks, as well as CA\$10 000 for the annual meeting and the CBRA newsletter. EMAN is a department of Parks Canada and BRs are common sites for research and monitoring, providing data for both national and international science. A productive historical and present day collaboration between EMAN, Parks Canada and BRs has produced (Canadian Biosphere Reserves Association 2004):

- The Biosphere Reserve Information Database Project

This project aims to compile: i) a library of BR documents and papers; ii) a database and website interface for an inventory of monitoring and research activities in BRs; and iii) a database and website interface for BR data including biotic, abiotic and human cultural observations.

- Effects of Climate Change on BRs in Canada

This study aims to determine the effects of a changing climate on biological species and populations including birds, amphibians and mammals, as well as human development including land-use change, population, economy and tourism in Canada's BRs.

- The Biosphere Reserve Land Use Change Project

A history of land use change in each BR is being documented from historical survey information, air photos, and earth observation data. The availability, access and interpretation of these sources of information are being reviewed and compared. Documentation from this project provides one basis for developing a common information management system for CBRA and individual BRs.

- Biodiversity Monitoring Plots (SI / MAB)

Single or multiple biodiversity monitoring plots have been or are being established in all Canadian BRs using the protocol developed by the Smithsonian Institute (Washington, D.C.) for its 'Monitoring and Assessment of Biodiversity' (SI / MAB) program. EMAN protocols are also being tested in these plots.

These initiatives are instigated and conducted by volunteers within CBRA, along with financial and in-kind assistance by Parks Canada and EMAN. The partnerships formed in these projects with people from learning institutions, industry and the civil society draw on existing forms of capital, whilst also adding to the social, institutional, natural and financial capital of BRs. For example, the diversity of capital is a resource as well as a marketable asset. A broad repertoire of projects illustrates this capacity and the promotion of a going concern, thereby attracting other potential partnerships or interest, and hence further expanding capital.

**Table 7 Canadian Biosphere Reserve details**

	<b>Biosphere Reserve</b>	<b>Established</b>	<b>Area (ha)</b>	<b>Land Tenure</b>	<b>Governance Authority</b>
1	Charlevoix (QC)	1998	457 000	Principally provincial ownership with two main private commercial companies; the rest is public domain or in private ownership	Corporation de la reserve mondiale de la biosphere de Charle
2	Clayoquot Sound (CSBR) (BC)	2000	349 947	National park (1); Provincial Parks and Reserves (16); Clayoquot Sound Central Region Board; various community organisations (e.g. Iisak Forest Company); Nuu-chah-nulth First Nations*; District of Uqcluelet; private land	Ministry of Environment (Parks Canada); Clayoquot Biosphere Trust; Clayoquot Sound Central Region Board
3	Fundy (NB)	2007	432 000	National park (1), Provincial Parks, Reserves, Conservation Areas and Wildlife Areas (12); municipalities of Riverview and Dieppe (the Greater Moncton area); private land	In development, includes University of Moncton and Parks Canada
4	Georgian Bay Littoral (ON)	2004	347 270	National park (1) and Natural Environment or Nature Reserve Provincial Parks (5); Provincial Conservation Reserves (14)	Georgian Bay Biosphere Reserve Incorporated
5	Lac Saint-Pierre (QC)	2000	48 000	Provincial ownership; the rest is public domain or in private ownership. Urban areas	5 regional municipalities of the county (MRC); Provincial: Société de la Faune et des Parcs du Québec, Direction régionale de la Montérégie; Société de la Faune et des Parcs du Québec, Direction régionale de Lanaudière; Société de la Faune et des Parcs du Québec, Direction régionale du Centre du Québec; Société de la Faune et des Parcs du Québec, Direction de la Mauricie; Federal: Environment Canada, Service de la faune, Région du Québec
6	Long Point World (LPBR) (ON)	1986	40 600	National Wildlife Areas; Provincial Park and Crown Marsh; private land	Canadian Wildlife Service, Environment Canada; Long Point Company; a mix of private and public ownerships, notably the Big Creek National Wildlife Area, the Nature Conservancy
7	Manicouagan-Uapishka (QC)	2007	5 480 000	Monts Groulx (Uapishka) mountains, the René-Levasseur Island, nine hydro-electric installations, including the Daniel-Johnson Dam, and the City of Baie-Comeau	Local stakeholders, including large private companies in the forest, mining, energy and aluminium sectors. Elected officials, environmental groups, economic development organisations, the tourism industry, educational institutions, interest groups, citizens and First Nations representatives
8	Mont Saint Hilaire (QC)	1978	5500	Private land; municipal land	McGill University and the Mont Saint-Hilaire Nature Centre
9	Mount Arrowsmith (MABR) (BC)	2000	118 592	Provincial parks (6); Wildlife Management Area (1); National Wildlife Area (1); Municipal land; private land	Ministry of Environment; City of Parksville Town of Qualicum Beach Regional District of Nanaimo Regional District of Clayoquot-Alberni Islands Trust
10	Niagara Escarpment (NEBR) (ON)	1990	190 270	Multiple Provincial Parks; National Parks (2), the Provincial Niagara Escarpment Plan Area	Niagara Escarpment Commission (NEC)
11	Redberry Lake (SK)	2000	112 200	Federal Migratory Bird Sanctuary; Provincial Wildlife Refuges; Regional Park; Crown and private land	Redberry Regional Economic Development Authority Corporation
12	Riding Mountain (MB)	1986	1 331 800	National Park (1); 18 rural Municipalities; private land	Riding Mountain National Park; Riding Mountain Biosphere Reserve Management Committee
13	South West Nova (NS)	2001	1 546 374	Kejinkujik National Park and National Historic Site under the management of Parks Canada and the Tobeatic Wilderness Area Nova Scotia Department of Environment and Labour; Provincial land; (Department of Natural Resources); private jurisdiction (e.g. N.S. Power and Bowater Mersey Paper Company)	Southwest Nova Biosphere Reserve Association (SNBRA)
14	Thousand Islands – Frontenac Arch (ON)	2002 Expanded 2007	270 000	Mixture of public and private land; government environmental and heritage agencies; Federal, Provincial and Municipal nature and history parks; federal, provincial and municipal nature and history conservation agencies; Landowner's groups; Non-governmental environmental groups; Municipalities; Economic development corporations; Outdoor recreational group	1000 Islands-Frontenac Arch Biosphere
15	Waterton (AB)	1979	52 597	National Park; WHA; International Peace Park; private land; Provincial Parks; private land; United States jurisdiction on US side of border (Glacier National Park, also part of the Peace Park)	Waterton Lakes National Park Waterton Biosphere Association
	TOTAL		10 782 150		

\* **First Nations** is a term of ethnicity and the collective name for indigenous Canadian people who are neither Inuit nor Métis people.

Other projects currently being conducted by CBRA include (Canadian Biosphere Reserves Association 2008):

- Habitat Restoration Projects in BRs

Each BR has identified a major restoration project and is using community-based volunteer efforts to implement it. Examples include habitat restoration, erosion control, and other watershed protection measures. The major support for this project comes from the Canada Trust Friends of the Environment Foundation.

- World BRs Ecotourism Consortium

The purpose of the project is to develop distinctive, high quality ecotourism information packages along with accreditation and training that will help promote Canada's BRs as world-class ecotourism and / or adventure travel destinations. The major support for this project comes from the Canadian Tourism Commission.

- Community Guide to Canada's Biosphere Reserves

With the assistance of Parks Canada, CBRA published *Your Biosphere Reserve: Creating a Sustainable Future*. This is the first community guide to Canada's BRs, and it has proved both useful and popular (Canadian Biosphere Reserves Association 2007a). The eight-page folio explains the organisation, functions and benefits of a BR. Examples are drawn from Canadian and international BRs. Communities in Canada and elsewhere have reported that this is a much-needed guide and are using the eight steps to BR creation to direct their multi-year efforts (Canadian Biosphere Reserves Association 2007a).

- Television Series on Canada's Biosphere Reserves

In November 2006, the production company Fragar GT launched a 13 week television series on *Canal Évasion* about Canada's BRs. Each one-hour show explored the natural features, people and activities of a BR (Canadian Biosphere Reserves Association 2007a). The series provided an intimate portrait of each BR including how people have responded to the challenge of demonstrating sustainable approaches to work and life (Canadian Biosphere Reserves Association 2007a). A December 2006 survey of *Évasion* viewers garnered 50 per cent of the votes for 'Biosphère' as best series of the season (Canadian Biosphere Reserves Association 2007a).

- Brochure on Canada's Biosphere Reserves

In 2005, the Mont Saint-Hilaire Nature Centre produced an updated publication, *Canadian Biosphere Reserves – Model Areas for Conservation and Sustainable Development*. This broadsheet brochure contained general and individual descriptions of the BRs, plus a colour picture and a contact name for each (Canadian Biosphere Reserves Association 2007a). It has proven to be useful for mail-outs and public meetings.

- National Atlas includes Biosphere Reserves

In 2006, the Atlas of Canada launched an online series of electronic maps and text highlighting Canada's natural tourism features (Canadian Biosphere Reserves Association 2007a). This includes

a national map displaying BRs in relation to terrestrial ecozones, relief, rivers, towns, cities, and other features. The viewer can zoom-in to increase the scale of the map up to 1:1,000,000. This view provides a good outline of the area for all but the smallest of the BRs. Accompanying text defines the BRs and discusses their importance as tourism attractions (Canadian Biosphere Reserves Association 2007a).

#### **6.5.1 CBRA Business Plan**

In an effort to formalise its organisational image, CBRA have agreed on services that the organisation can offer through the contingent of Canadian BRs. The following outlines CBRA's core business and its future direction, with the overall aim of expanding capacities (Vaughan 2000) and providing unique products and services at local, regional, national and international levels that:

- contribute to the delivery of effective ecosystem conservation in working landscapes subject to a variety of distant stressors;
  - provide a mechanism to identify and resolve emerging threats to ecosystem sustainability arising from the conflicting goals, values and practices of stakeholders;
  - identify and communicate such threats articulating choices and tradeoffs based on appropriate consideration of environmental, social / cultural and economic aspects;
  - help develop an increasingly aware public, making informed decisions on sustainability; and
  - involve and equip Canadians in community-level stewardship.
- Vaughan (2000) states that associated benefits include consistent and coordinated:
- ecosystem monitoring methods and protocols, metadata, data-bases and interpretation;
  - contributions toward addressing biodiversity, atmospheric change, urbanisation, fragmentation, cumulative effects, ecological integrity, habitat degradation, invasive species, natural capital, ecosystem services and other areas; and
  - outreach, and community involvement among the Canadian BRs and partner agencies and programs.

In doing so CBRA aims to assist in fulfilling, in an apolitical way, the goals of various organisations and groups. Among these are Environment Canada (EMAN and other departments), national and provincial parks and other protected areas, communities (municipalities and urbanised areas), resource-based industries, natural resource agencies, researchers, tourism and outdoor recreation industries, educators, NGOs, community groups, MAB and UNESCO, development agencies in other countries, and Canadian foreign aid and advisory organisations (Vaughan 2000).

#### **6.5.2 Sixth Biennial Leading Edge Biosphere Reserve Conference**

The sixth biennial Leading Edge Conference of the Niagara Escarpment Biosphere Reserve, held 4-6 October 2006 in Burlington Ontario, drew 250 participants from across Canada and the United States. Delegates explored the crucial issues driving the public agenda in Ontario: smart growth and rural planning, transportation policy, foodland and countryside protection, municipal finance, energy, governance and media affairs. The conference's opening night reception, *Flavours of the Biosphere Reserve*, offered participants the opportunity to meet and network with conference delegates and enjoy local produce from Ontario's Niagara Escarpment. Leading Edge 2006 featured more than 50 international, national and local experts.

CBRA representatives and members of various Canadian BRs made presentations and led discussions on citizen involvement in landscape governance; the Escarpment across the Canada / US border; communities in action and sustainability; research, monitoring and conservation; and the realities of farm life at Riding Mountain. Leading Edge 2006 was presented by the Niagara Escarpment Commission, in association with Ontario's Ministry of Natural Resources, the Friends of the Greenbelt Foundation, the Ontario Heritage Trust, the Canadian Biosphere Reserves Association, and the Embassy of Sweden as well as 16 other key sponsors.

### **6.5.3 Annual Meeting - 2006 <sup>44</sup>**

This detailed illustration of a CBRA Annual General Meeting (below) is provided to highlight the context and content of CBRA governance, and in doing so, showcase the social and environmental dynamic this group works with and within. It provides insight into the content of the group's concerns and how it achieves national coordination of the Canadian BRP. This research data illustrates the group's application to BR management and, by building this context of practice, provides foundation for later theory analysis (Chapter 9 and 10).

The Board of the Redberry Lake Biosphere Reserve (Saskatchewan) hosted the 2006 CBRA annual meeting, beginning with a reception at the home of one local family, on 8 June, and ending with a supper at another, on 11 June. Participants stayed at the small western town of Hafford, Saskatchewan and met for Board and public meetings at the BR's Research and Education Centre on Redberry Lake. In its business meeting, the CBRA Board re-confirmed the executive it had elected the previous year. The Executive Secretary presented communications highlights, as well as a draft report on benefits and costs of BRs for national parks and a summary of BRs accomplishments, for the CBRA Business Plan. Suggestions were discussed on how to improve the CBRA website when resources are available. Discussions of the business plan ended with a resolution of strong support for the CBRA Executive to continue its work to market the plan, with emphasis on benefits for the environment, sustainable development and community health.

The CBRA general meeting included representatives of current and proposed BRs, researchers and three international visitors: Karl-Friedrich Abe and Reinhard Braun of the Rhön Biosphere Reserve, Germany, and Dr Jean-Eudes Beuret, a UNESCO researcher studying two Canadian sites. Dominique Potvin reviewed the work of the Canadian Commission for UNESCO – an important supporter of CBRA. Dr Fred Roots suggested some new roles for Canada MAB, including quick response to critical issues involving humans and nature. Reports were then made on those BR proposals that had been under development for the past three years, by: Peter Etheridge on Upper Bay of Fundy (New Brunswick), Jean - Philippe Messier on Manicouagan-Uapishka (Quebec), and Dr George Francis on Bras d'Or Lake (Nova Scotia) and Oak Ridges Moraine (Ontario).

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<sup>44</sup> The 2007 CBRA Annual Meeting was held at the Georgian Bay Littoral Biosphere Reserve, Parry Sound, Ontario from 31 May – 3 June, however minutes and proceedings of this meeting were not available at the time of writing.

Next, Don Gibson discussed Parks Canada's offer to support a national system study of BRs. Following that, Louis Gagné and Dr Roots outlined CBRA's international activities. Then, within a review of national projects, Dr Maureen Reed described the book she is writing on Canada's BRs. Diane Hawrysh provided background on UNESCO Associated Schools that are operating in Canada. To close the meeting, Richard Murzin presented CBRA's Spirit of the Biosphere award for 2006 to Eric Malka.<sup>45</sup> Saturday provided an education day with presentations on current and proposed Canadian BRs, the Rhön Biosphere Reserve (Germany), and workshops. Workshop topics included: Land Trust Funds, educational materials, native plant identification and display, agriculture in BRs, and an interpretive walking tour of Redberry Lake. The Sunday field day featured visits to an organic seed cleaning plant, a community pasture, a hearty Ukrainian lunch followed by a visit to a stand of genetically-mutated trees and a remediation site.

#### **6.5.4 Canadian Biosphere Research Network (CBRN)**

When CBRN was first established in 1999 as the Canadian Network for Biosphere Reserve Research and Thinking (CanBRAT) the intent was to stimulate a self-organising student network composed of those interested in, or already undertaking research and monitoring in BRs (Francis 2004d). In discussions in 2004, two main approaches were put forward to build on its capacities. One was to have CBRA take over the functions of CanBRAT, where CBRA would establish a database of information on BR research. The other approach was to use the CBRA network to find resources to make CanBRAT more functional, where CanBRAT had a pre-existing mandate for research. This was subsequently extended to cooperation with CBRA while liaising with BRs.

CBRN operates in parallel and in cooperation with CBRA. Its members are current and former student researchers interested in BRs. CBRN was originally set up by two Masters students who had studied BRs and had ambitious goals, to:

- share BR information and ideas, research methodologies and funding sources;
- link academic research to research needs of BRs;
- help researchers translate research into language useful to BRs;
- try to develop a code of ethics for research in BRs;
- develop a database of research on BRs; and
- create a publication series on BRs.

CBRN has fulfilled many of these goals by offering students who are conducting research on BRs a web-based service including a directory of student researchers, email notices about upcoming events and funding opportunities, access to publications produced by other students and CBRA, support and advice from successful graduates that have conducted studies in Canadian BRs, networking opportunities with directors and vital contacts in BRs, and opportunities to develop professional job skills.

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<sup>45</sup> The Spirit of the Biosphere is an annual award bestowed by CBRA. The award recognises longstanding commitment to the principles of the Biosphere Reserve; namely, conservation, environmentally sustainable development and capacity-building.

### **6.5.5 Champions**

The successful work of CBRA is the direct result of a number of dedicated BR and conservation champions of both long term and more recent origins. Their work has supported the program at both national and local levels. These people include: Dr Fred Roots (Canadian Commission to UNESCO), Dr George Francis (University of Waterloo), Jim Birtch (Parks Canada), Richard Murzin (Niagara Escarpment Commission), Brian Craig (Ecological Monitoring and Assessment Network, Environment Canada) and Dr Graham Whitelaw (formerly Ontario Ministry of Environment, currently Queens University), along with the representatives on the CBRA Board of Directors who have, in most cases, a long history of contribution and allegiance to their BRs. Cumulatively these individuals represent a critical component in the success of the Canadian BRP, providing a wealth of capital, time, commitment and critical institutional capacity for cooperative partnerships to form, and be sustained.

## **6.6 Application to the Research**

Several Australian initiatives have been developed during the Australian BRP including a working group, model BRs, various reports, some national administration, and inclusion within the federal EPBC Act. Despite these actions, the development and logistics aspects of MIs have not been supported. MIs in comparison, have been more successful due to their governance arrangements and multi-tenure reserve network approach, the presence of this being their differentiating characteristic, and central to the creation of these newer designations. The requirement for a national BR committee has been recently re-asserted by various local champions from MII BRs, resulting in the creation of the Australian Biosphere Volunteers Inc. group. If it can gain endorsement and financial support, including that of the Federal Government, the group will fill a vital BRP function that has been largely absent since the national working group terminated. The most critical role for ABV is to maintain openness, spur innovation in Australian BR discourse, collaborate across BRs and drive national administration of the BRP.

Historically, Canadian BRs have been developed as a result of place-based partnerships and collaborative efforts, with BR designations driven by a suite of academic, government and local partners. In this way, all Canadian BRs are MIs, as their governance arrangements relating to logistics and development functions have been central since the BRP began. Therefore, the multi-tenure reserve network approach has been developed and matured over a longer period in Canada due to a historical use of this approach, which has meant that BRs are a well accepted and recognised means to achieve the objectives of cross-jurisdictional social-ecological goals. CBRA and CBRN have supported and built efforts within Canadian BRs. The collaboration here has helped to achieve BRs that are resilient enough to adapt to, and address local conditions requiring management, in social, environmental and economic fields. The next chapter examines the relationship and significance of capital assets and new governance for effective BRs.



## 7 Capital and New Governance

*The previous chapter established the historical and present operation of the Australian and Canadian BRPs and the difference between the activity and attributes of Australian and Canadian BRPs, particularly in relation to current trends. This chapter elucidates major themes and their constituents within the conceptual framework and distils some of the knowledge presented in previous chapters, whilst establishing the lens of analysis for the following two chapters of case studies. This chapter highlights the reinforcing relationship between capital and new governance in building social-ecological resilience for BRs.*

### 7.1 Capital for BRs

Used in its broadest sense, the term capital refers to those goods or ideas with which something else can be created or established (Rydin and Pennington 2000). Economic systems at all levels, from farms, livelihoods, communities and national economies, rely on the value of services flowing from the total stock of four distinct types of capital – natural, social, institutional and financial (Gunderson et al. 1995).

Brunckhorst (2001) suggests that these four assets are transformed by policies, processes and institutions to give desirable outcomes, such as jobs, welfare, economic growth, a clean environment, sustainable use of natural resources and better health and education, amongst others. If achieved, these desirable outcomes then feed back to further build capital assets. When core assets are built up in an unbalanced manner, undesirable externalities, such as pollution or deforestation, or increased crime or social breakdown, erode all asset bases and reduce resilience. Asset accumulation that creates these undesirable externalities is unlikely to be sustainable.

Sustainable systems build up stocks of all capital assets. They increase the total, collective capital base over time. Conversely, unsustainable systems deplete capital, 'spending it as if it was income, so liquidating assets and leaving less for current and future generations' (Brunckhorst 2001: 21). Non-sustainable systems have emerged because natural capital and social capital are usually undervalued (Brunckhorst 2001). Conscious and deliberate investments in landscape health (natural capital), rather than its unwitting depreciation, are essential for the accumulation of other capital assets. However to maintain the resource base, investments in human capital – education and training, health, and nutrition; social capital – trust building and community cohesion; and financial capital are critical.<sup>46</sup>

The following types of capital manifest in successful BRs.

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<sup>46</sup> Human capital results from presence of other forms of capital in BRs, and therefore is not included as a specific capital asset in this analysis.

### **7.1.1 Natural Capital**

Natural capital encompasses, but is not limited to, landscape health; ecosystems services; protected areas; biodiversity; habitats; ecological integrity; connectivity conservation; intrinsic value; and existence value. One means that natural capital can be easily depicted is through the notion of ecosystem services. Ecosystem services are the functions performed by ecosystems that lead to desirable environmental outcomes. They include air and water purification, drought and flood mitigation, and the stabilisation of the climate (Murtough et al. 2002). Ecosystem services are distinct from, but not unrelated to, the goods harvested from ecosystems such as food, fibre, timber, and biomass fuels. For example, crops may be produced using the ecosystem services of salinity mitigation and climate stabilisation as inputs (Murtough et al. 2002). Hawken et al. (1999) state that these manifestations of natural capital provide the basis of all economic activities and are of immense economic value. Many are literally priceless since they have no known substitutes. Yet current business practices and public policies typically ignore their value and focus on the consumption of resources only.

An alternative to the ecosystem services concept for valuing natural capital is a landscape ecological principles approach toward sustainable development and landscape management. Antrop (2006: 191) suggests that the use of the natural capital concept links 'science to people living and using the landscape' and Haines-Young (2000) propose that natural capital forms the new paradigm for landscape ecology. In the geographical tradition, landscape science is seen as the interaction of natural and social sciences, or social-ecological systems as previously discussed. A landscape ecological principles approach proposes that natural capital can be increased if regenerative technologies matched to the ecological resource base are used that give a return, whilst improving the capital stock (Brunckhorst 2001). Therefore, natural capital, as it informs the landscape ecological principles approach, also informs BRs. Equally, ecosystem services also provide another mechanism to promote and value the irreplaceable functions and services implicit in healthy ecosystems, and provide another mechanism to argue for protection and value of natural capital assets within BRs.

Thayer sees natural capital in the sense of natural systems becoming metaphors for cultural coherence. This view is based on 'watersheds, similar plant and animal ecosystems, and related, identifiable landforms ... [and] the unique human cultures that grow from natural limits and potentials of the region' (Thayer 2003: 11). Learning and knowing the natural rhythms and biophysical components of a region or micro-region, developing biogeographical meaning and understanding, are cultural links to natural capital that can assist in the creation and replenishment of this, and other forms of capital.

Natural capital encapsulates functioning ecosystems, that in and of themselves, are biodiverse. Walker and Salt (2006) identify nine values essential to a resilient social-ecological system, three of which will be discussed in this section. First, diversity (including biological, landscape, social and economic), is recognised as a major source of future options and a system's capacity to respond to change and disturbance in different ways. Walker and Salt (2006) suggest that resilient social-ecological systems sustain and encourage systems to generate and protect diversity, and by extension, natural capital. Second, ecological variability is embraced in a resilient system, rather than

controlled or reduced. It is another derivation of natural capital, and one that has historically been controlled, resulting in many of the biggest environmental problems of the present day. Walker and Salt (2006: 146) suggest that 'resilience is only maintained by probing its boundaries'. Third, internalising ecosystem services is another central tenet to resilient social-ecological systems. These services are usually ignored or considered 'free', only appreciated when they are lost. Instead, the suites of such services (including pollination, water purification and nutrient cycling amongst many) are dynamic and fragile. 'A resilient world would include all unpriced ecosystem services [for instance in development proposals and assessments] (Walker and Salt 2006: 148).

### **7.1.2 Financial Capital**

Stocks of money and savings are the typical representations of financial capital. However, as a type of economic capital, Stratford and Davidson (2002) illustrate that the interrelationships among natural, economic and cultural resources are not well recognised because of the pre-dominance of such economic capital over other assets. Natural resources are valued largely as inputs and consequently their non-economic values, and the potential of these values as capital assets, are accorded minimal consideration (Stratford and Davidson 2002). Farina (2000) proposes that cultural capital once informed and maintained the relationships between economic activities and natural resource use, but it no longer has that mediating role because economic capital is over-privileged and natural capital used up and degraded.

Financial capital is the basis for supporting many of the functions of a successful BR. Whilst BRs are conducted through mostly voluntary effort, the presence of financial capital (funds) is essential for projects, workshops, part or full-time coordinator(s), information production and distribution, conferences, meetings and liaison. Successful BRs can operate from subsistence funds, however those that do not procure funds are unlikely to create a program of effective governance, as the initiatives of a BR require minimal, but continuous funding. The role of BRs to date has been hindered and ill-recognised due to a shortfall in funding available to both BRs and BRPs from civil society, government and industry.

### **7.1.3 Social Capital**

According to de Souza Briggs (1997), social capital describes resources that are neither traditional capital (money or the things that money buys) nor human capital (skills and know-how). Social capital refers then to resources stored in human relationships, whether casual or close. Trust, reciprocity, shared values, sense of place and champions are all descriptors for social capital in this thesis. It is not the same as civic engagement, though engagement in public life helps to generate social capital by successfully connecting people (de Souza Briggs 1997). Additionally, social capital constitutes the pre-existing elements of social structures, which social actors can use to obtain their objectives. As Coleman (1988: 98) suggests, the existence of social capital facilitates 'the achievement of certain ends that in its absence would not be possible'. Rydin and Pennington (2000) argue that social capital encompasses such things as:

- the extent of networks between individuals and groups;

- the density of relationships within networks;
- knowledge of relationships within networks;
- the existence of obligations and expectations regarding these relationships, i.e. promoting reciprocity;
- other forms of local knowledge;
- the level of trust between individuals and groups;
- norms of routine and behaviour; and
- the existence and use of effective sanctions to punish free-riding.

Networks of relationships between actors plus the sets of norms, values and common practices that those actors conform to are important components, as introduced in Chapter 1. A usual distinction between forms of social capital differentiates networks that are primarily concerned with building strong links within a community or group, and those that are concerned to build links between communities or groups of actors. These two types of social capital are distinguished as bonding and bridging capital, respectively. Bonding capital is the most common type used in literature. Empowerment, participation, associational activity and common purpose, supporting networks and reciprocity, collective norms and values, safety and belonging are all important aspects of this type of capital.

Olsson (2007) and Newman and Dale (2005) state that networks composed of bridging links, to a diverse web of resources, can strengthen a community's ability to adapt to change. Networks composed only of local bonding links, which can impose constraining social norms and foster group homophily, tend to reduce adaptability. Granovetter (1973) noted that weak ties, or the bridges between different stakeholder groups, may be the most valuable for generating new knowledge, identifying new opportunities, and thus create a macro effect. For instance, those to whom we are weakly tied are more likely to move in circles different from our own and will thus have access to information different from that which we receive (Olsson et al. 2007; Granovetter 1973).

Ritchey-Vance (1996) proposes that building social capital can be a mechanism for maintaining community involvement over time, and Brown and Ashman (1996: 1477) point to the role of social capital in fostering future problem solving, 'which will generate more social capital'. According to other researchers, the existence of social capital contributes to a project's effectiveness in achieving its specific objectives, so that building social capital may be important as an implementation tool (Rydin and Pennington 2000). Collective action is facilitated with this capital, but first, the structures that provide opportunity for political involvement are critical to the development of it. Certain regions display more vigorous political and social activity than others and this may produce feedbacks to build up other forms of capital (Pollock 2004; Young 1997). Such regional differences are relevant for the development and management of BRs in Canada and Australia.

According to Brown and Ashman (1996), in a study of 13 development projects, two types of capital were distinguished: the existence of local organisations and networks; and the existence of relationships or contacts across sectors or inequalities of power. The existence of one was found to remedy the absence of the other, however the absence of both types was associated with project

failure (Brown and Ashman 1996). They identified two different routes to project success based on social capital: grass-roots cooperation and cooperation mediated by NGOs. For instance:

Grassroots-based cooperation involves mobilising local resources and information to solve problems that require ongoing energy and attention from local groups ... In contrast, NGO mediated cooperation depends upon NGOs that act as bridges among donors, government agencies, and grassroots populations (Brown and Ashman 1996: 1476).

The presence of participatory decision making was more essential for grassroots based cooperation, where the building of local organisations and networks was the most important form of social capital. For NGO-mediated cooperation, there was a need for a greater emphasis on promoting intersectoral contacts across individual NGOs. In these circumstances, local champions or policy entrepreneurs could be very significant in determining outcomes (Rydin and Pennington 2000). As BRs cross both the areas of grass-roots cooperation and NGO mediated cooperation, the presence of participatory decision making and promoting intersectoral contacts between NGOs are both important.

Rydin and Pennington (2000) describe the issue of collective action as related to social capital. They suggest that, in general, the logic of collective action remains a troublesome problem. Even if relatively large numbers of individuals periodically do engage in collective action, public choice suggests that their commitment is likely to be highly unstable and active participation in the policy process rare. In relation to collective action problems and social capital, the role of the state is paramount:

For the program adopted by the state, at whatever level, is centrally important in determining the path chosen and the scale and nature of participatory activity that will result. If the state seeks to opt for direct provision, this may actually suppress the creation of social capital; these are alternative and not complementary strategies for any area of policy action (Rydin and Pennington 2000: 160).

This type of suppression of social capital by direct provision is highlighted in several case studies in Chapter 9. Ostrom (1990) explains this as a facilitator state and a controller state. A facilitator state allows considerable local autonomy for individuals and groups, but provides a supportive framework, including the provision of specialised information, arenas for conflict resolution and the capacity to enforce institutional rules. The emphasis here is on individuals and groups providing their own institutional arrangements to solve collective action problems with the state acting to support them in this particular role (Ostrom 1990).

Under a controller regime, the state, rather than helping communities to develop their own institutions for environmental planning, effectively takes over the task of managing the environment itself (Rydin and Pennington 2000). When the state acts in a controller capacity, individuals and groups who do not already have their own institutions in place, will simply wait for the government to handle their problems for them (Rydin and Pennington 2000). As Ostrom (1990: 213) argues, 'If someone else agrees to pay the costs of supplying new institutions then it is difficult to overcome the temptation to free-ride'. Under these conditions there is little incentive for individuals to build on existing mechanisms to build bonds of mutual trust or reputation, and thus to develop the conditions for effective community participation (Rydin and Pennington 2000).

Therefore, if positive social capital is to be developed, local communities must be encouraged to build up their own institutional arrangements for environmental planning and not have these institutions imposed from above. This process is characteristic of MII style BRs in Australia, where the shift from controller to facilitator states has marked the shift of the BRP from top-down to bottom-up. In these cases, social capital has accumulated through use, as suggested by Selman (2001), and could not have been built up unless suitable opportunity, such as a BR, provided opportunity for interaction. Policy initiatives which introduce prospects or even obligations to discuss, collaborate, and share concerns and visions, seem likely to provide arenas for social learning. However negative interactions can also conspire to reduce stocks of social capital: consequently, BRs must be careful to minimise the occurrences of adverse comment and community friction (Selman 2001).

Another important aspect of social capital, discussed by Stratford and Davidson (2002) is in relation to individual and community population characteristics directly and indirectly affecting NRM. The proportion of the Australian population aged over 65 years is expected to increase significantly, from 12 per cent of the total population in 1998 to around 25 per cent of the total in 2051 (Stratford and Davidson 2002). Youth and aged dependency ratios have significant implications for the amount of time and energy that people can give to building social capital through involvement in NRM and other environmental actions (Selman 2001). Furthermore, ideas about intergenerational networks have largely failed to stress the importance of social capital as a mechanism for what has been described as intergenerational flow of wisdom and, more specifically, a wisdom about the environment. This flow is critical for tracing changes in perceptions, and for understanding 'our place in nature and the practices we have adopted to manage the environment' (Stratford and Davidson 2002). Furthermore:

Given that intergenerational equity is a foundational principle of sustainability, it seems vital to foster better long-term communication among the generations, and NRM provides an important vehicle by which to achieve this, promoting the accumulation of human, social and natural capital assets through shared activities (Stratford and Davidson 2002: 436).

Many BRs are strongly represented by retired or retirement-age individuals who often underpin key facets of capital and new governance themes in the BR resilience conceptual framework. Their contributions of knowledge and various forms of capital fortify the functional aspects of many BRs, for instance, Mt. Arrowsmith BR (as discussed in Section 8.4). Several of the Canadian case study BRs have initiated senescence planning, through recruitment of younger BR committee members who learn from the experience of the senior members of the BR, helping to foster intergenerational communication. The demographics of obtaining young volunteers can be problematic. Retirement-age individuals tend to have particular ontologies and epistemologies, time and knowledge resources that assist in their involvement with a BR. Such characteristics are not as readily accessed in younger generations (Birtch 2004d).

Unlike conventional capital, natural and social capital tend to be public goods so rarely have a market value. Moreover, there is a tendency for individuals to overuse and under-invest in these forms of capital. The cost of under-investment generally does not accrue to the producers of the cost, but is borne by whole societies and ecosystems. Brunckhorst (2001) argues that both natural and social

capital can increase under certain circumstances. Part of the solution is matching, and often nesting, of ecological and social systems and appropriate scales of space and time.

Social capital is also self-reinforcing when exchanges and reciprocity increase connectedness between people, leading to greater trust, which in turn enhances collective decision making, confidence and capacity to innovate. The problem with gaining real value for natural and social capital then, lies in a form of governance that allows for this nesting of social and ecological systems at appropriate scales of space and time. A BR is an example where natural and social capital are valued due to the realised importance of these forms of capital contribution to functional social and ecological systems at a bioregional scale.

#### **7.1.4 Institutional Capital**

Institutions are the structures of governance that set the limit to human activities, where rules and constraints govern human behaviour. The range of institutional arrangements that allow for these regulations include:

- legislation;
- policies and guidelines;
- administrative structures;
- economic and financial arrangements;
- political structures and processes;
- historical and traditional customs and values; and
- key participants or actors (Davidson and Stratford 2000).

The assemblage of institutions, on which society relies to organise economic and social life and to regulate use of natural resources, may be conceived as a form of capital, institutional capital, which is a subset of social capital. Institutional capital can be defined as the stock of rules and underlying human organisational skills that coordinate human behaviour, and its interaction with natural resources.

In the context of NRM, institutions may be conceived of as the mediators of people-environment relations, where the sets of rules in use determine who is entitled to make management decisions about the use or non-use of resources; how these decisions will be implemented, monitored and evaluated; what information is needed; and what rewards / costs will be assigned to those individuals who, or organisations that, contravene the rules (Ostrom 1990).

## **7.2 Governance Overview**

The topic of governance was introduced in section 1.2.2. Governance principles are normative statements that make claims about how steering should happen, and in what direction – that is, how governance actors should exercise their powers in meeting their objectives (Kooiman 1993). Governance principles are therefore about both means (how power is exercised) and ends (the results of power) (Graham et al. 2003). Principles of good governance can also serve as standards by which to judge the quality of governance (Davidson et al. 2006; Francis 2003). The challenge is to

develop principles that adequately convey the particular qualities that governing arrangements should possess, while also serving as a basis for generating the indicators needed to undertake benchmarking, monitoring, and evaluation (Davidson et al. 2006).

Governance is used in several contexts such as corporate governance, international governance, national governance and local governance. An analysis of governance focuses on the formal and informal actors; decision making and implementing the decisions made; and the formal and informal structures that have been set in place to arrive at, and implement the decision. According to Starik (2004), governance has also been interpreted as a mode of governing alongside markets and bureaucracies. Markets, bureaucracies and governance are the main modes that modern societies rely on to steer towards common purposes. All of these have an influence on the occurrence, management and sustainability of protected areas and BRs, however for the purposes of this thesis, governance provides the major focus.

Lockwood et al.(2006) suggest that the first attempts at establishing a governance typology for protected areas were made in 2002-03 in preparation for the Vth IUCN World Parks Congress. The four major types of governance are identified below (Lockwood et al. 2006: 119-120). BRs in Australia and Canada represent a mix of governance typologies.

First, government protected areas are overseen by a ministry or park agency and report directly to a government body that holds the authority, responsibility and accountability for managing the protected area. This body also determines its conservation objectives (such as the ones that distinguish the IUCN categories) and management rules.

Second, co-managed protected areas encompass complex processes and institutional mechanisms employed to share management authority and responsibility among a plurality of actors: from national to sub-national and local government authorities; from representatives of indigenous peoples and local communities, to user associations; from private entrepreneurs to landowners. This governance arrangement can utilise collaborative management, joint management, or some other type of decision making authority reflecting another balance of power between, for instance, government actors and private landowners.

Third, a private protected area is a land parcel owned by individuals, communities, corporations or NGOs and managed for biodiversity conservation, with or without formal government recognition. In all cases, authority for managing the protected land and resources rests with the landowners, who are responsible for decision making, determine a conservation objective and impose a conservation regime.

Fourth, a community conserved area involves governance by indigenous peoples and local communities. Authority and responsibility rest with the communities through a variety of forms of ethnic governance or locally agreed organisations and rules. In many parts of the world, national legal systems grant no ownership rights to communities over lands and resources they collectively own



and manage through customary law.<sup>47</sup> In some other countries, including Australia, Indonesia and Colombia, these communities are recognised as private landowners, and the community conserved areas they have created are managed as a type of private protected area.

Francis (1988) distilled four key components of any governance system, where he used the conceptual perspective provided by organisational ecosystems to further explain how social capital is organised and used by civil society. This framework involves actors (or stakeholders); domains (a concept borrowed from organisational theory action and interaction); and regimes (a concept borrowed from international relations theory) (Pollock 2004; Young 1997; Francis 1988). These four components of any governance system, along with their interactions are described as:

- **Actors:** a generic term that refers to various government, private and civil society organisations, which each have a stake in a shared domain.
- **Domain:** a domain is defined as social space, as perceived and defined by the actors who share it. The focus of a domain can be a geographic area, a social or economic sector, or certain kinds of problems and issues. As a social construct, a given domain may have no firm boundaries because as actors come together within it, their perceptions of what should be included in it can change. Domains arise when actors within them become aware of their interdependence with similarly situated actors (Francis 2003).
- **Action and Interaction:** Actor system dynamics describes the social actions and interactions that go on among actors through networks. These include learning, generating and evaluating information, setting agendas, negotiating outcomes and so on. Actor network theory (ANT) assumes that social order involves constant struggle. Power lies not with the actors themselves but in the links that bind the actors together. The critical point here is that power is associative, invested not in entities (actors) but in relations (Pollock 2004; Woods 1997). Moreover, domain-based inter-organisational interaction often becomes 'self regulating rather than becoming imperial or remaining ineffectual' (Trist 1983: 270-71) and enables civil society to be strengthened at the domain level.
- **Regime:** Regimes are known as 'the system of rules (laws, regulations, customs) which regulate interactions...' (Francis 1988: 110). Regimes carry out a variety of institutional tasks: they may define regulatory codes in regard to some shared resource; agree on operating procedures for resource allocations; engage in joint collaborative projects; or develop shared understandings and agenda from which actors can then work together more closely (Pollock 2004; Young 1997). Regimes can exemplify generally accepted rule systems either with or without organisational capacities to foster compliance, for example, international treaties and accords, such as the Kyoto protocol.

The aggregate of actors, domains, action / interaction and regimes are the basis for governance. For the purposes of this discussion, good governance refers to current thinking on governance principles for regional NRM. Good regional NRM governance takes into account the numerous challenges of sustainable resource use amongst this interplay of governance components including: multiple uncertainties; diverse stakeholder constituencies; and novel demands on institutional and organisational arrangements; as well as legitimacy, accountability, participation / inclusion, transparency and effectiveness (Davidson et al. 2006; Howlett and Raynor 2006; Moore and Rockloff 2006). Table 8 provides a synopsis of principles from existing usage of good governance codes relevant to regional NRM governance, and of pertinence to BRs.

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<sup>47</sup> Representative of Europe, Africa and Asia.

**Table 8 Synopsis of principles from existing usage of good governance codes relevant to regional NRM governance**

<b>Governance Principles</b>	<b>Guidances for regional NRM governance principles</b>
Accountability	Clarifies roles and responsibilities Has a political purpose to control the abuse of executive power as well as securing effective operation Can extend beyond immediate stakeholders to the global community, future generations and to nature per se Can be formal and informal or vertical and horizontal Governing bodies have a responsibility to manage public resources effectively and fairly
Transparency	Is built on the free flow of information Requires openness of institutions Requires informed and transparent decision making Requires transparent decision making processes with relevant information, honest in consultation, adequate input opportunities, explanation and review
Inclusiveness/ participation	All stakeholders should be engaged in the formulation and implementation of decisions Interests and rights of all stakeholders are understood and addressed Interests of all stakeholders are respected through appropriate engagement processes
Effectiveness	Refers to government and policy effectiveness and efficiency Effectiveness is more than producing outcomes; it also relates to adaptive management strategies – providing policy learning and adjusting actions as needed
Efficiency	Processes and institutions produce results that meet needs while making the best use of resources Net benefits of the allocation, development and use of natural resources are maximised
Strategic vision	Leaders and the public have a broad and long-term perspective on good governance Effective leadership provides inspiration and vision for long-term commitment Informed strategic foresight is required, with planning, strategy-setting, resourcing and monitoring capabilities
Equity/ fairness	All men and women should have opportunities to improve or maintain their well-being Requires respect for Indigenous and traditional knowledge and rights, fair sharing of costs and benefits of management decisions
Compliance	Requires compliance with all relevant legislative and accountability requirements
Subsidiarity	Appropriate degree of decentralisation of decision making with appropriate powers and capacities
Consistency	Consistent with international conventions, national legislation/policy, and regional agreements Coherence of policy and action
Ethical behavior	Promotion of organisational values and demonstrating good governance behavior Board and management staff behave ethically, responsibly, transparently and accountably
Capacity-building	Appointed governors have the skills, knowledge and experience to be effective Board and management are competent to conduct business effectively and efficiently
Certainty	Timely and clear decisions within a predictable and understandable framework for certainty of resource management
Adaptive management	Ongoing learning and adaptation to change; openness to innovation for continual improvement Adaptive improvement as a decision making goal in the context of environmental uncertainty
Knowledge-based	Defensible and informed decisions based on scientific, local and traditional knowledge
Integration	Decisions integrate economic, environmental and social elements, and the interests of future generations Decision makers continuously gather and integrate ecological, social and economic information
Stewardship	Cooperation among Indigenous peoples, governments, academics, industry and NGOs in developing and implementing policies Access to environmental resources carries responsibilities to use them sustainably, efficiently and equitably Exercising responsibilities on behalf of the region and of its resources held in trust
Risk management	Mechanisms to identify and manage risks Decisions informed by well-tested scientific procedures for risk management
Scale-matching	Decisions on environmental resources (i) assigned to institutional levels that maximise ecological input (ii) ensure the flow of ecological information between institutions (iii) take ownership and actors into account (iv) internalise costs and benefits
Precaution	Decisions should err on the side of caution in the face of multiple uncertainties
	Source: Davidson et al. (2006: 17- 18).

### 7.3 Current Thinking on Governance for BRs

Governance broadens the perspective of biodiversity management and is therefore important to this thesis and to BRs worldwide. Good BR governance mirrors the general aspects of good governance already discussed. Good governance for BRs does require further analysis however, and is a complex subject of limited information both nationally and internationally. The extant literature on good BR governance suggests that it shares a suite of common attributes within developed nations (Starik 2004; Francis 2003). The purpose of this section is to highlight the criticality of such governance to BRs.

As described in Section 3.4.1, the Seville Strategy for Biosphere Reserves and the Statutory Framework provide the formal UNESCO statements of BR aims and requirements, and guide the international direction of the WNBR, national BRPs and the basic criteria of an individual BR. However these documents are largely unhelpful as a basis for individual BR governance by local champions.

As discussed in Chapter 1, the conservation function of a BR is generally the most robust, owing to the clear conservation objective of the core area. As the core is a legally protected area, or other form of conservation area, matters of social-ecological integration are few in Australia and Canada, limited to the management of the core as a conservation zone.<sup>48</sup> In contrast, the other functions and zones of a BR are where social-ecological systems, and their associated chances and challenges, manifest. Within the buffer and transition zones, governance directs the success or otherwise of the other two BR functions.

Pollock (2004) suggests that the research on regionalism, public participation and collaborative planning exposes the relationship between citizen engagement and place-based governance. Given the limitations of current political institutions to respond to bioregional needs and the loss of legitimacy of those same institutions in the eyes of their citizenry, it appears that a new approach to regional governance is required. Pollock (2004) proposes that BRs in Canada may be well suited to foster new governance due to their bioregional and cross-sectoral emphasis. Innovative institutional design that distributes responsibilities between authorities, provides clear boundary demarcation and absence of corruption or self-interest are critical.

In Canada, institutional partnership and matching socio-economic and ecological scales are paramount in good BR governance, as are adequate national conservation policies and programs (Moon unknown; Starik 2004; Francis 2003). Avoidance of counterproductive competing governmental programs is useful in promoting a clear idea of a BR, both within government and in civil society (Pollock 2004; Ploger 2001). Political support at all government levels, but especially local to regional levels, provides a stable institutional foundation for BRs (Matysek 2005; Pollock 2004).

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<sup>48</sup>Matters of social-ecological integration are central to Category II Protected Areas internationally, incorporating a multiplicity of socio-cultural and economic issues. National parks in Australia and Canada are cultural landscapes also, but the pressures of social-ecological integration experienced are less than that of the buffer zone of a BR for example, as national parks are mostly uninhabited in these two countries.

Deb and Srivastava (2003) discuss a co-management governance system, which illustrates some facets of good BR governance. They coin the term 'multi-stakeholder integrative sustainability planning' (MISP) to describe an interactive participatory approach based on a partnership between members of society and their environment, involving stakeholders in the formulation, monitoring, and follow-up of sustainable development strategies. Divergent interests are reconciled in an interactive and cooperative process. Concerned groups and levels of society are empowered in a manner that integrates and builds upon the dynamics of particular interests into an integrated whole. MISP is pursued in several steps, starting with situational analysis, goal setting, concept formulation, definition of working plans for implementation, and monitoring (Deb and Srivastava 2003).

MISP describes the social aspects of good BR governance. For instance, participation of actors in the socio-political interaction of a BR is a precondition to steer desired goals in a direction that meets actors' interests. Without participation, the relationship among actors, and thus social capital, is limited. Participation that strengthens cooperation, negotiation, and conflict resolution, and contributes to the formation of social capital, is a positive contribution to sustainable development, and hence, a BR. As a social-ecological integrated approach, based on participatory governance, complex demands are placed on management capabilities, partly because decision-makers are faced with several overlapping dimensions (Deb and Srivastava 2003). MISP does not integrate this axiom into its framework, nor the integral requirement for capital input. For instance, financial capital is a problem for most BRs, and critical to their sustenance. MISP requires a greater emphasis on this critical aspect.

Recognising the absence of a specific BR governance framework, a German-based research group, GoBi, recently formulated a set of indicators independently of UNESCO, for success in governance of BRs (Table 9, pg. 142) (Stoll-Kleeman 2005). The criteria and indicators were formulated from a German BRP perspective, where the program and concept of BRs is highly supported throughout the country by both national and regional governments, formalised as a means of both cultural and ecological conservation. Hence, some of the criteria below may be too rigid for application in the more informal Australian and Canadian BRPs.

**Table 9 GoBi criteria and indicators for success in governance of BRs**

<b>GOVERNANCE CRITERIA</b>	<b>INDICATORS</b>
Economic and income opportunities	Stakeholders receive resource and / or land benefits to compensate for their BR-related costs (e.g. guiding concessions, access and land use agreements)
	Amount of funding provided by the BR to support stakeholders conservation and development initiatives
Responsiveness to power sharing/ participation and representation of stakeholder interests	Existence and use of power sharing mechanisms: degree of participation of local people and other stakeholders in BR planning and management such as the attendance by elected / selected members at BR meetings in locations that favor local constituencies (for instance, in remote, rural environments versus meetings in towns / cities)
	Existence of joint initiatives between the BR and other bodies at regional and national levels (e.g. cross border initiatives, projects with private businesses and community organisations, inter-sectoral dialogues with forestry, tourism, fisheries and agencies)
	Length of time stakeholder groups have maintained relationships with BR
Implementation	Degree of implementation of the planned activities, e.g. for capacity-building and training, innovative policies
Accountability	Existence of independent public institutions of accountability
	Existence or absence of corruption
	Appropriateness and clarity of roles and responsibilities
Rules, rewards and sanctions	Existence and accessibility of written rules and regulations for BR
	Existence of concrete and appropriate rewards and sanctions to compensate good or negligent action
Enforcement	Percentage of budgetary expenditures dedicated to enforcement costs
	Clear and undisputed boundary demarcation
	Statistical analyses of BR rule offenders and related sanctions

Source: Adapted from Stoll-Kleeman (2005: 241).

These GoBi indicators have been used by the German research group to formulate a Criteria and Indicator Model (CIM). Governance criteria cover the institutional profile including legal foundation, governing bodies, rules and procedures and internal corruption (Stoll Kleeman 2006). Further sub-criteria are:

- participation (degree of participation, acceptance of process, strong civil society and institutional collaboration);
- accountability (transparency or existence of statutory documents); and
- political setting (rule of law, funding policy, existence / absence of corruption and distribution of government responsibilities).

Further management criteria (not included in the above table) incorporate areas such as management history, capacity (competence, existence of a capable leader and resources), management activities (planning, conflict management, enforcement, and distributing information) and the organisational structure of the BR including its general management approach and its efficiency. Other social, cultural and economic attributes of the BR are also considered in the CIM model. Whilst the CIM is current, it is not cited in Australia and Canadian BR contexts.

Best practice on BR governance derives from a strong academic base in Canada. A critical mass of BR academics in Canada also provides for much of the innovation and implementation occurring in this area (Mendis-Millard 2007; Francis and Whitelaw 2004; Pollock 2004; Taylor 2004). The roles for civil society, participatory democracy, governance issues and ecosystems dynamics are explicitly recognised, reflecting 30 years of experience and change toward the realised importance of these issues to BRs, and related fields.<sup>49</sup>

Pollock (2004), a Canadian BR academic, provides an excellent basis for enunciating the major drivers of successful BR governance, through an analysis of an emerging view of governance: one that combines ecological and political interpretations of space with sociological and cultural senses of place. Recent developments within the fields of public participation, community development and collaborative planning suggest that place-based governance creates opportunities for sustainability, by linking local and regional identities to processes that engage citizens, stimulate the development of social capital, and strengthen civil society (Pollock 2004).

## **7.4 New Governance**

Smismans (2006: 4) suggests that identifying new modes of governance is 'a risky undertaking as policy tools and modes hardly start from scratch'. Moreover, they may be discovered today as new simply because new conceptual lenses have been employed. Smismans (2006) notes that one should also be cautious and acknowledge that the emergence of new modes of governance does not necessarily imply the disappearance of old modes or even that they have become predominant over the old modes. Nevertheless, there is a widespread agreement that policy making and administration over the last 15 - 20 years has changed importantly:

One of the most common arguments about 'new governance' is that it is characterised by heterarchy rather than by hierarchy, creating horizontal modes of governance among a multitude of actors – public and private - involving all relevant stakeholders (Smismans 2006: 4).

According to Davidson et al (2006: 1), shifts from government to new governance have become increasingly apparent, where these changes have arisen in a climate of:

- increasing complexity, diversity and dynamic change such that no single actor has the resources or knowledge to respond to the complexity of current problems and / or opportunities;

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<sup>49</sup> Related areas include parks and protected areas, watershed and other resource management areas, community economic development, adaptive management strategies that respond to changing circumstances, and the evolution of effective collaborative governance at different geographic scales.

- non-linear or threshold effects in complex environmental systems that are a consequence of industrial activities and result in instability and unpredictability in global systems;
- reduced abilities of central governments to capitalise on opportunities or to solve so-called wicked problems – that is, those distinguished by definitional difficulties, persistence, ubiquity, complexity and irreversibility;
- shifts in power and authority from national to supra-national scales as apparent in the use of international agreements and conventions and downwards to sub-national and local scales via the devolution of formerly central government responsibilities; and
- simultaneous but contradictory tendencies to change / complexity and stasis / simplicity, the 'dynamics of which promote integration, centralisation, and globalisation on one hand, and ... disintegration, decentralisation, and localisation on the other'. One example is the slow food movement, intended to counter the proliferation of fast food outlets and bolster locally and regionally produced food, it is also meant to improve self-reliance in local and regional populations in the face of global economic restructuring.

Scott and Trubek (2002: 5-6) describe new governance as 'characterised by experimentation and knowledge creation, flexibility and revisability of normative and policy standards, and diversity and decentralisation leaving final policy-making to the lowest possible level'. According to this description, new governance includes the necessity for coordination of action and actors at many levels of government, as well as between government and private actors. This involves expansion of participation in novel ways by elements of civil society in policy-making and extending deliberation among stakeholders.

Blongrem Bingham et al. (2005) suggest that practice is leading theory in developing processes for new governance. Public agencies are now engaging in activities that range from legislative or quasi-legislative to judicial or quasi-judicial. Quasi-legislative processes in new governance include deliberative democracy, e-democracy, public conversations, participatory budgeting, citizen juries, study circles, collaborative policy making and other forms of deliberation and dialogue among groups of stakeholders or citizens. Fredrickson (1999: 702) has observed that public administration is moving 'toward theories of cooperation, networking, governance, and institution building and maintenance' in response to 'the declining relationship between jurisdiction and public management' in a 'fragmented and disarticulated state'.

A key feature of new governance is an increase in interdependencies among a wide range of actors, particularly in the environmental sector. Davidson et al (2006) suggest that these interdependencies have necessitated greater interaction among diverse actors from different regions, at multiple governmental scales:

To accommodate them, a range of collaborative governance instruments is being used to integrate and coordinate decision making, including multi-level, multi-sectoral and multi-organisational partnerships, 'joined up' government and policy networks (Davidson et al. 2006: 2).

To regulate activities among interdependent actors and facilitate decision making and problem solving among them, a range of horizontal arrangements for governing are emerging, including policy networks, partnerships, and communicative forums. Actors engage in cooperation, coordination and communication. This may involve collaboration among agencies of public government, private sector

businesses and groups in civil society, and may combine formal and informal governmental arrangements.

Collaborative arrangements do not always result in good examples of new governance. Rather, successful new governance arrangements require a careful, context-sensitive balance of public and private actors (Howlett and Raynor 2006). Private governance capacity can, to some extent, substitute for public capacity in steering towards policy goals (Howlett and Raynor 2006). These private capacities include data-gathering, information-sharing and general facilitation of policy learning, together with the ability to negotiate and oversee voluntary agreements between corporate actors and between corporate actors and third sector actors such as environmental NGOs or community organisations (Howlett and Raynor 2006). However, heavy-handed attempts to manipulate policy networks in a top-down fashion can quickly negate the benefits of new governance arrangements by driving out, or not including, civil society actors (Howlett and Raynor 2006), as illustrated by MI BRs.

Many of the key principles underlying ecosystem-based approaches also underlie new governance insofar as they both address and create, significant challenges for how human activities are organised. Central to ecosystem management is systems thinking, that is, focusing on the interconnections between a complex set of variables, ecological and social, taking place over time and space (Checkland 1981). A heightened understanding of the dynamism of systems, and the reality that change is constant and inevitable, leads to an expanded concern with uncertainty, and the need to view actions as experiments (Yaffee 1996). Capacity to respond, adapt to and anticipate system dynamics at appropriate spatial and temporal scales is a key feature of systems thinking and adaptive governance.

Olsson et al. (2006) suggest that adaptive governance is an expression of new governance and is, according to their analysis, critical to resilience and transformability in social-ecological systems.<sup>50</sup> Adaptive governance relies on polycentric institutional arrangements that are nested, quasi-autonomous decision making units operating at multiple scales (McGinnis 1999; Ostrom 1996). Spanning from local to higher organisational levels, polycentric institutions provide a balance between decentralised and centralised control (Imperial 1999). Olsson et al. (2006: 7) refers to such adaptive systems of governance as new governance and define it as:

A form of social coordination in which actions are coordinated voluntarily by individuals and organisations with self-organising and enforcing capabilities. Adaptive governance relies on networks that connect individuals, organisations, agencies, and institutions at multiple organisational levels.

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<sup>50</sup> Whilst Olsson, Carpenter, Holling, Folke and others are current authorities on resilience and social-ecological systems, their analysis is particularly focused on the transformability of social-ecological systems which is a highly technical field. Transformability is a subject outside of the scope of this thesis.



This form of governance also provides for collaborative, flexible, learning-based approaches to managing ecosystems, also referred to as adaptive co-management (Folke et al. 2003).<sup>51</sup> Olsson and Folke are seminal authors in this area, arguing for adaptive governance as a form of governance suitable for dealing with complex social-ecological systems and enhancing the fit between institutions and ecosystem dynamics (Olsson et al. 2007; Olsson et al. 2006; Folke et al. 2005; Folke et al. 2003; Olsson 2003; Folke et al. 2002).

All of these principles fly in the face of traditional administrative and political behaviour, and that is the reason new governance, including adaptive co-management and ecosystem management have not been norms in the past. A systems focus requires cross-jurisdictional problem solving and management, which violates norms relating to agency and government jurisdiction, leadership control, and organisation culture. It also focuses on issues and concerns that cut across traditional interests and coalitions that may affect long-standing political relationships among agencies, constituents and legislators. In addition, a systems focus requires multidisciplinary interactions that breach agency and professional norms about 'appropriate' expertise. The following sections distil sub-themes for new governance, which comprises Phase II of the BR resilience conceptual framework. These sub-themes are interdependent and difficult to segregate due to mutually reinforcing influence. Nevertheless, all are critical to creating and sustaining effective and enduring governance arrangements in BRs.

#### **7.4.1 Institutional Aspects: Ecologically Rational Institutions (low rigidity) and Openness**

While some public capacity is helpful,<sup>52</sup> the holistic and intersectoral nature of new governance arrangements means that the key strategic capacities are to be found in non-government actors. This is particularly where there is a strong civil society interest in the key issues, and a tradition of consultation and involvement (Lobel et al. 2006). The institutions that mediate complex interactions between social and ecological systems must have the ability to solve problems as they arise rather than displacing or ignoring them. Dryzek (1987) describes this as ecological rationality or the ability of social choice mechanisms to solve ecological problems, and the capacity of institutions to adapt to changing environmental conditions.

Institutions that work with and adapt to the complexity and heterogeneity of social-ecological systems are effective in managing natural resources at the nature-human interface. Institutions for successful governance of social-ecological systems must contend with complexity, non-reducibility, temporal and spatial variability, uncertainty, collective approaches and spontaneity (Dryzek 1987). Additionally

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<sup>51</sup> Adaptive co-management is distinguished from adaptive governance by Olsson et al. (2007), whereby the former combines the dynamic learning characteristic of collaborative management with the link characteristic of collaborative management, but does not provide an analytical framework for studying complex social-ecological interactions. Adaptive governance however, provides the capacity to deal with uncertainty and change by conveying the difficulty of control, the need to proceed during uncertainty and the importance of dealing with diversity and reconciling conflict among people and groups who differ in values, interests, perspectives, power, and the kinds of information they bring to situations (Olsson et al. 2007; Dietz et al. 2003).

<sup>52</sup> In the form of a competent lead agency with clear strategic mandate or institutionalised role towards inter- and intragovernmental coordination.

ecosystems possess a number of distinct features that need to be taken into account in institutional design, and problem solving must proceed with at least some regard for these features (Davidson and Stratford 2000), including: interpenetration (interconnected ecological systems with indefinite boundaries); emergent properties (non-reducible components); self-regulation (homeostasis and adaptiveness); and succession (changed species profiles over time). Openness is required for these components to be acquired, monitored, and developed by institutions, and thereby, for ecologically rational institutions to develop.

Ecologically rational institutions share a suite of attributes. According to Davidson and Statford (2000) the presence or absence of these attributes determines whether problems will be addressed adequately or whether they are ignored. The following characteristics in social choice determine the outcome:

- negative feedback mechanisms;
- coordination across different actors and different collective actions; and
- particular performance capacities of robustness and flexibility which enable institutions to respond adequately to changing internal or external conditions (Dryzek 1987).

Negative rather than positive feedback is a necessary capacity in social choice, as this kind of feedback provides alert signals that indicate impact on the least advantaged sector of the social-ecological system. This group is most likely to feel the effect of harmful environmental change and its economic implications. Coordinated feedback is required for negative feedback to work effectively and to make the necessary conclusions (Davidson and Stratford 2000).

As social-ecological problems are collective problems, they require coordination across numerous boundaries and actors. Davidson and Stratford (2000) suggest that negative feedback and coordination take care of uncertainty, complexity and non-reducibility in social-ecological system interactions. However these are insufficient in the context of spatial and temporal variability. This means that institutions, programs, projects and strategies, operating at different spatial scales must be either robust or flexible.

Robustness refers to the ability of the institution to function well across a variety of conditions such as the availability of information; the nature of problems being confronted (e.g. production, protection or waste-assimilation); and degree of social and human capital available. Robustness is the measure of steadfastness of performance across varying degrees of stress and varying conditions (Davidson and Stratford 2000; Francis 1988).

Flexibility refers to the ability of the institution to rearrange its internal structure in response to changes in internal or external conditions. A flexible institution would be able to respond to new signals arising from either social or ecological systems. This quality determines i) if the institution is able to develop new feedback mechanisms in response to changed circumstances and ii) if the institution can develop new forms of coordination to deal with these changed circumstances.

A view of the social and biophysical landscape that is a product of social and biophysical history; is transformative rather than static; and recognises that the landscape is constantly changing, enables an institution to change, and be in tune with the dynamism of social-ecological systems. Such processes of adaptation may be conceived as essentially processes of social and ecological renewal – renewal of institutions, knowledge systems, values and behaviours, and ecosystems (Davidson and Stratford 2000). BRs fit this typology by acting as a form of social renewal that addresses the collective issues that couple with natural resource problems including social, economic, commercial, legal, policy and institutional dimensions.

#### **7.4.2 Social Aspects: Partnerships and Capacity-building**

The literature on social capital addresses the linking aspect, or connectedness, and emphasises the importance of norms and networks for enabling people to act collectively (Rydin and Holman 2004; Taylor 2000; Brown and Ashman 1996). The literatures on deliberative democracy, participatory approaches and citizen engagement describe them as types of partnerships and capacity-building, however tend to be top-down, or at least instigated by centralised governance types in an effort to develop inclusiveness (Howlett and Raynor 2006).<sup>53</sup> Alternatively the arrangement and self-organisation of countless CSOs share some attributes with MII or Canadian BRs. CSOs, as bottom-up institutions employing adaptive governance, have devolved management rights and power sharing to promote participation (McCarthy et al. 2006).<sup>54</sup> However devolution of management rights does not automatically result in adaptive management (Folke et al. 2005). As is the case in MI BRs, any monocentric institution, whether at a community or federal government level will perpetuate a flat and inflexible governance unable to respond, experiment and adapt to change and / or innovation. Adaptive management requires social networks (partnerships).

Folke et al. (2005: 450) argue that in ‘times of change, informal social networks can provide arenas for novelty and innovation and enhance flexibility, all of which tend to be stifled by bureaucracies’. These social networks can be building blocks for further networks to be created. These network structures do not replace the accountability of existing hierarchical bureaucracies but operate within and complement them.

Olsson (2003: 12) discusses adaptive polycentric management and collaboration, proposing that:

Certain institutional structures can impede self-organisation processes including local initiatives and commitment that otherwise contribute to the diversity of ideas and solutions to environmental problems.

Conversely, polycentric, or multi-layered governance structures can nurture diversity for self-organisation. An advantage of the polycentric arrangement is that it provides an institutionally rich environment that improves prospects for resolving complex problems (Olsson et al. 2006). It can

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<sup>53</sup> For example, ‘citizen participation is a process, which provides private individuals an opportunity to influence public decisions’ (Scheffran and Stoll-Kleeman 2003: 320). This definition indicates that citizens can have a say in otherwise government-led decisions, which is not the approach of interest here.

<sup>54</sup> CSOs, whilst one type of adaptive governance, are not inclusive of the range of actors that are represented in BRs.

encourage partnership and capacity-building by allowing individuals and organisations to explore different ideas about solving problems (Imperial 1999). This approach stands in contrast to simple, large scale centralised governance units that do not, and cannot, have the variety of partnership opportunity (and hence response capabilities) that complex, polycentric, multi-layered governance systems can have (Olsson 2003). Polycentric structure requires institutional and social capital.

Polycentric governance is a way to match organisational and institutional structures with ecological dynamics at different spatial and temporal scales and address linkages between those scales (Holling and Meffe 1996). Such scale matching is crucial to ecosystem management (Lee 1993). In what is potentially the first formal paper of its kind to be produced by outstanding scholars in resilience (Olsson et al. 2007), a recent seminal contribution to this area has coupled BR management with resilience, adaptive management and matching scales. Whilst polycentric governance is an established component of NRM literature, particularly with the emergence of new governance, it has not been established prior to this seminal work in the realm of social-ecological resilience and BRs. This thesis, through the BR resilience conceptual framework, aims to contribute further to this relatively new area of praxis and theory.

#### **7.4.3 Intellectual Aspects: Social Learning and Multiple Knowledges**

Social learning is the 'theory of knowledge underlying radical practice where action is always primary ... the imperative of action always has priority over the equal imperative of knowing' (Friedmann 1987: 406).<sup>55</sup> Social learning is a most fitting paradigm in an era of multiple crises where all previous certainties are being undermined. Concerned with process rather than static relationships, social learning is a way of understanding change in highly dynamic social systems (Coleman 1988). As a model of iterative thought and action, social learning is particularly suited to conditions of strangeness and unpredictability, where learning must be a continuous process (Folke et al. 2005).

Social learning is attributed to be the theory of social dynamics which can 'complement the emerging theories of ecosystem dynamics to produce real understanding of the long-term, large-scale interactions of environment and development' (Clark 1995: 1). Facing complex adaptive systems and periods of rapid change gives the scientist a new role in decision making, from being an objective and detached specialist expected to deliver knowledge to managers, to one of several actors in the learning and knowledge generation process. Other actors include local groups with experience in resource and ecosystem management (Folke et al. 2005). Efforts are taking place to mobilise, make use of, and combine different knowledge systems and learning environments to enhance capacity for dealing with complex adaptive systems and uncertainty (Folke et al. 2005).

Stratford and Davidson (2000: 44) propose that:

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<sup>55</sup> This section draws extensively on the work of Davidson and Stratford (2000) due to their rare iteration that clarifies the suite of complexities and inter-relations related to institutions, social learning and sustainability. Their use of the term, natural resource management (NRM) is adapted to social-ecological system in this context, as NRM is a process and paradigm of managing a facet of the nature-society interface. The discussion here is related to social-ecological systems rather than NRM alone, hence the substitution of the term.

Sustainability demands the radical cognitive and affective-behavioral reconstruction of deeply held worldviews and their associated entrenched habits and routines.

This proposition indicates the shift required for sustainability to become 'a measure of the relationship between the community, as learners, and their environment, rather than some externally designed goal to be achieved' (Davidson and Stratford 2000: 46; Allen 1997).

Social learning thus generates the systems of knowledge needed to achieve different goals from those of the economic-social dominated system of the present day. The kind of knowledge needed to resolve sustainability issues is in short supply largely because our systems of knowledge have oriented to the achievement of different goals and objectives to those that lay at the social-ecological interface (Davidson and Stratford 2000). This orientation has generated a shortfall in the wisdom required to address social-ecological systems as sustainable systems. Social learning proposes new ways of looking at the world and new systems of knowledge by which to make sense of it. The means through which these shifts occur are through learning-by-doing or experiential learning (Lerner 2004). The required knowledge is generated by:

- revaluing existing local knowledge downgraded by the emphasis on scientific knowledge;
- improving communication flows by bringing fragmented local and scientific knowledge systems together;
- producing useful knowledge;
- developing new knowledge to fit the novel situations of sustainability issues; and
- incorporating ongoing learning and evaluative processes (Davidson and Stratford 2000: 45).

Through these means, social learning addresses a primary foundation for successful social-ecological systems: an appropriate learning environment. The appropriate learning environment for addressing sustainability at the human-nature interface is outside of any current, individual institutions' capacities, ideologies, and ability. Therefore:

we need new ways of looking at the world and integrating management and research. Soft systems methodologies explicitly recognise that NRM in the age of sustainability is not so much about problems that need to be solved but rather about issues that need to be resolved, inevitably requiring changes in attitudes and behaviors and ultimately new institutional arrangements (Davidson and Stratford 2000: 45).

The 'multi-stakeholder integrative sustainability planning' (MISP) approach discussed in Section 7.3 facilitates social learning. The recognition and facilitation of a wide involvement from a variety of interests, characterised by sometimes conflicting social perspectives, develops communication and understanding of other points of view. Davidson and Stratford (2000) use an Integrated System of Knowledge Management (ISKM) to demonstrate how a New Zealand rural farming community has developed community-based learning processes to address increasing complexity and social construction of agricultural problems.

The ISKM is an approach developed by Landcare Research, and is being utilised in the extensive grazing areas of New Zealand high country, to reconcile ecological and social problems. It is a soft-systems approach. Allen (1997: no page) describes ISKM as a process that:

... builds on principles of experiential learning and systems thinking, and is applicable to developing the knowledge and action needed to change real situations constructively. In practice, the process is cyclical and highly iterative.

ISKM shares the same fundamental social learning attributes as MII BRs. Both approaches embody the preconditions of ecologically rational institutions: they evaluate to foster negative feedback; flexibility is assisted by their learning processes; there is coordination across resource issues; and there is information dissemination and sharing. As integrative / collaborative arrangements they also possess a vision shared by their constituents; they legitimise local knowledge; they improve information flows and information sharing, and enable legislation to confer legal authority. In this environment of learning, the development of shared understandings, reduction of conflict, generation of useful and place-specific knowledge, along with the identification of opportunities, occurs readily. Both ISKM and MII BRs foster better communication processes to help groups better understand the complexities and diversity of values in relation to social-ecological systems. The drawback is that, as iterative, flexible, learning institutions seeking networked, collaborative, multi-stakeholder outcomes, they do not comfortably fit normative quick-fixes implicitly or explicitly sought by, for example, funding bodies.

#### **7.4.4 Bioregional Aspects: Place**

According to Thayer (2003), the idea of a life-place or bioregion connects natural place, awareness, knowledge, wisdom, affection, stewardship, sustainability and most important, action, as a fuzzy set of nested and covariant concepts. Embedded in the bioregional idea, therefore, is a very general hypothesis that a mutually sustainable future for social-ecological systems can best be achieved by means of a spatial framework in which people live as rooted, active, participating members of a reasonably scaled, naturally bounded, ecologically defined territory, or life-place (Inc. 2007; Thayer 2003; Aberley 1999). BRs are inherently a life-place, and MII BRs are a product of the capital generated from a citizenry motivated from place-attachment.

A simple set of axioms inform life-place:

People who stay in place may come to know that place more deeply. People who know a place may come to care about it more deeply. People who care about a place are more likely to take better care of it. And people who take care of places, one place at a time, are the key to the future of humanity and all living creatures (Thayer 2003: 6).

Mutual concern and action are engendering communities to act in defence of, and admiration for natural regions. Community is forming around the politics of place (Aberley 1999). The drivers for small groups to coalesce in strong identity with naturally identifiable regions cannot be certain, however Thayer (2003: 55) proposes:

... that the newly globalised and highly specialised society in which we now find ourselves embedded is not the evolutionary norm; rather, what sustains us are finite natural territories inhabited by small bands of humans. We establish groups working on behalf of river basins or mountain ranges simply because it feels quite natural for us to do so.

A life-place culture is preconditioned by a place-attachment or sense of place, and is an alternative mode for contemporary humanity that recognises the limitations and potentials of the immediate

regions in which people live. A life-place culture localises the affections and actions of inhabitants in a manner that is socially inclusive, ecologically regenerative, economically sustainable, and spiritually fulfilling (Malpas 1999). The culture of reinhabitation is life-place culture: the rediscovery of a way to live well, with grace and permanence, in *place* (Thayer 2003). Therefore life-place connects and values social and natural capital, allowing for representative worth and value to be placed on them, and allowing for asset accrual rather than undervaluing and disintegration.

According to Thayer (2003: 8):

... unless humans can find ways to consider ourselves residents of natural regions and to clearly identify with endemic dimensions, limitations, and potentials of land, water, and other life-forms, we will not be able to live sustainably, and we will continue to overestimate the carrying capacity of the regions we inhabit. It makes little sense to discuss 'sustainable development' at the global level if no thought is given to the local places and scales where human life actually takes place. The first step toward a regenerative future for humans is to reassess where we are.

Lipschutz and Mayer (1996) suggest at an international level, the disassociation between ecosystem boundaries and political, economic and social institutions is simply taken for granted. But the same poor fit is true at national and even local levels. For historical and economic reasons, the jurisdiction of most governments match poorly to nature. This suggests that environmental governance is problematic virtually everywhere. All local arrangements for dealing with natural systems are embedded in a larger common interest defined by the reach of ecosystems beyond localities (Lipschutz 1999; Lipschutz and Mayer 1996; Lipschutz and Conca 1993). Therefore local systems of production and action, which are the immediate sources of environmental damage, can be envisioned as nested within larger systems. These local resource regimes are part of the economic, cultural and social networks or resource users and polluters rather than being either discrete or totally aggregated arrangements. Such user networks are embedded in overlapping, but not necessarily coterminous – social, political, economic and physical spaces (McCloskey 1999).

Resource regimes constitute only a part of the material base of a community. Of more consequence is that they are not only material but also ideational, involving collective cognition, ideas and explanations. These regimes place resources and nature in a particular relationship to a community, thereby helping to constitute the meaning of the resource as well as the identity of the community, both historically and in the present (Pollock 2004). For instance, the identities of fishing and agricultural communities are bound up with their relationships to the resource. Resource regimes are, consequently, determined not only by the material conditions of production, they are also a consequence of the means of social reproduction, as well as being integral to such reproduction (Lipschutz and Mayer 1996).

Therefore, lifelaces can be conceived from a basis of either resource conservation, which is characterised by the watershed / bioregion scale and the sense of place derived from its inhabitants; or resource use, which is characterised by the area and its material production, ecological change and social interaction. BRs occur around both of these types of lifelaces, and in particular, MII BRs are bound to resource regimes. These BRs are a manifestation of a citizenry recognising the need to

address their relationships with their land as a collective, in an effort to evolve their resource regime with the changing conditions of their life-place.

Cameron et al. (2004) suggests that local environmental politics and education can be revitalised by the understandings and practices that come out of recent place literature, as an intercultural and storied approach to place can break through the entrenched environmental conflict. Additionally place responsiveness work can provide fresh perspectives for educators. At a general level, notions of place responsiveness and place story provide people with an inclusive language to talk about local matters that seem important but have not knowingly been expressed (Cameron et al. 2004).

A workshop study by Cameron et al. (2004) showcased examples of developing local agency and new 'narratives of action' through place relationship as expressed by Malpas (1999). The workshop was carried out as a case study in a region that combines part of the Sydney metropolitan area and the separate city of the Blue Mountains, and involved a consultative committee and then a meeting of conservationists, environmental educators and community workers. It found that:

- there is real value in convening multi-party intercultural regional events and involving as many parties as possible in the planning and design phases;
- place proves to be a useful organising principle for convening a multidisciplinary group that are not customarily in dialogue at the regional level;
- a bioregion is a useful way to define the geographical area and cut across political and social boundaries; and
- the presence of indigenous people was pivotal to the success of such events.

Recent developments within the fields of public participation, community development and collaborative planning suggest that place-based governance creates opportunities for sustainability by linking local and regional identities to processes that engage citizens, stimulate the development of social capital, and strengthen civil society (Pollock 2004). A key argument in this area is that ecosystem management is an information-intensive endeavour and requires knowledge of complex social-ecological interactions in order to monitor, interpret, and respond to ecosystem feedback at multiple scales (Olsson et al. 2007; Folke et al. 2003). This level of detailed knowledge is by necessity, place-based, and arises from interest, study and stewardship of a particular place. Olsson et al. (2007: 15) suggest that:

Because of this complexity, it is difficult if not impossible for one or a few people to possess the range of knowledge needed for ecosystem management. Instead, knowledge for dealing with SES dynamics, including uncertainty and abrupt change, is dispersed among individuals and organisations in society.

Therefore, through connectedness, knowledge-sharing and shared value, the basis for a network exists. Not only is such a network enabled through strong stewardship of place, but it contains a rich diversity of capacity, mobilised by common purpose and action. In dealing with social-ecological system complexity, the range of actors found within such a network enables, in the presence of other capital, diversity and thus adaptive capacity. Multiple knowledges and capacities will also bring conflicting views, however, a BR provides opportunity for unique deliberative forums for engagement in politics of place, where place-specific conflicts can be publicly expressed and deliberated.



## 7.5 Application to the Research

Natural, financial, social and institutional capital are critical to effective governance, which is built on these inputs and the interplay of action and interaction between actors, regimes and networks. MII and Canadian BR governance typifies that described in recent literature on new governance (Folke et al. 2005), characterised by many actors in the state-society complex, typically forming loosely structured governance entities that spontaneously emerge or self-organise, often in response to rigid governmental structures, to create polycentric, voluntary social coordination. A rare and explicit statement about the UNESCO MAB BR governance is made by Folke (2005). He suggests, and it is concurred here, that BRs govern complex adaptive ecosystems requiring adaptive managers supported by flexible institutions. These loosely connected horizontal and vertical networks are based on voluntary participation. The result is collaboration networks that can provide an arena where social capital is enhanced and where concerns are reformulated to generate innovation and nurture renewal in times of reorganisation. Informal collaboration dominates at the local level but may also span the regional and global levels (Folke et al. 2005).

An explicit premise of new governance is that citizens can and must play an important role in public policy and decision making. Citizens have the right to decide what is important to them and how they can best achieve their objectives (Blongrem Bingham et al. 2005). Capital assets provide a basis for integrating across disciplines, cognitive capacities, policy arenas and fields of practice for more effective, efficient and equitable governance (Stratford and Davidson 2002). Generating desirable BR outcomes implies that all stocks of assets are being accumulated. Conversely, when there are unacceptable or unsustainable levels of land and water degradation, not only is natural capital depleted but other social, financial and institutional assets are also threatened, either through diversion for remediation or as indirect losses to quality of life. Therefore, conscious and deliberate investments in landscape health (natural capital), rather than its unwitting depreciation, are essential to the accumulation of other capital assets (Stratford and Davidson 2002).

Whilst enunciation of BR governance is rare, it is most often highlighted in the context of singular BR case studies. The GoBi indicators for good BR governance are useful but overly top-down for Australian and Canadian BRs. BR governance as enunciated in this work, through the BR resilience conceptual framework, builds on the work of Pollock (2004), who suggests that successful BR governance combines ecological and political interpretations of space with sociological and cultural senses of place. The institutional, social, intellectual and bioregional circumstances of each BR are the foundation of new governance attributes. Coupled with a MISP approach, adaptive co-management helps to build adaptive capacity as these new governance attributes alter across space and time and between designations.

The next two chapters showcase the praxis of BRs in Australia and Canada, providing an illustration of individual BRs that collectively inform the chances and challenges of BRs as resilient social-ecological landscapes.

## 8 Canadian Case Study Biosphere Reserves

*The four Canadian case study BRs are Niagara Escarpment (Ontario), Long Point (Ontario), Clayoquot Sound (British Columbia) and Mount Arrowsmith (British Columbia). The cases cumulatively highlight the variation implicit in Canada's BRP and the range of approaches utilised to fulfill the BR functions according to local challenges and opportunities. Each case varies in the amount of information available, due to such factors as the number of agencies involved with each BR and thereby, information production and complexity of the designation. The environmental setting of each BR is presented, along with the history of the designation, written as a sequential timeline of events, followed by the two major themes of each case - capital and new governance, as they manifest.*

*With a long association between academics and BRs in Canada, the BRP has benefited from a theoretical understanding of BR praxis. For instance, George Francis a distinguished Professor Emeritus in Environment and Resource Management has championed BRs for over 25 years. He provides a pertinent introductory insight into the BRP through this time:*

The challenges faced in Canada of realising ideals associated with the concept [of BRs] have remained much the same since the first Canadian BR was recognised by UNESCO in 1978 to the most recent one. At the same time, theories about the role of civil society, participatory democracy, governance issues and ecosystem dynamics have changed considerably over the last 30 years of experience. These changes raise new questions about how best to realise BR ideals – questions that are not unique to BRs. There are opportunities for mutual learning from similar experiences associated with parks and protected areas, watershed and other resource management areas, community economic development, adaptive management strategies that respond to changing circumstances, and the evolution of effective collaborative governance at different geographic scales (Francis and Whitelaw 2004).

*The range of environments covered by BRs in Canada has resulted in a suite of participatory democracy, governance and ecosystem dynamics integrations, with the four cases here providing an indication of the inherent place-based challenges and opportunities. The venture for BR resilience is not explicit in Canada, but rather, exemplifies praxis seeking theory. The BR Resilience Framework informs praxis by providing an understanding of the common resilience elements. An overview of the four BR case profiles is provided in Table 10.*

### Note to reader:

Sub-themes are interwoven within the case studies and for this reason cannot be detached from their context or other sub-themes. Rather, they are italicised in-text to highlight their relationship with the narrative. Key informant data are indicated in bold font and coded according to the procedure discussed in Chapter 2.<sup>56</sup> All key informant data are derived from in-person or phone interviews as

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<sup>56</sup> The code is: A – Academic (natural resources, planning, environment, ecology, sustainability); C – Champion (voluntary contribution to a BR and / or BRP, generally showing an outstanding level of commitment); E – Employee (works in relation to BRs, funded either directly, by BRs or CBRA, or indirectly, by related government sectors partnering in BRs); and P – Public servant (local, provincial/ state or Federal Government agency).

explained in Chapter 2. The final section of each case elicits the functional resilience aspects of each BR.

**Table 10 Overview of Canadian Case Studies: BR profiles**

Biosphere Reserve	Year Designated	Population	Land Tenure Type	Area (ha)	Approx. % of BR (ha)	Governance Authorities	Basis of Governance
<b>Niagara Escarpment Biosphere Reserve (NEBR)</b>	1990	~ 120 000 (permanent) Up to 1,090,000 (2002 figure) including immediate region	Multiple Provincial Parks; National Parks (2), the Provincial Niagara Escarpment Plan Area	190 270	Core: 26 300 Buffer: 93 340 Transition: 87 600	Niagara Escarpment Commission (NEC)	No centralised NEBR Community Committee – Regional community committee (the Bruce Peninsula Biosphere Association); NEC; multiple CSOs involved in conservation work
<b>Long Point World Biosphere Reserve (LPBR)</b>	1986	~ 500 (permanent) >3000 (seasonal)	National Wildlife Areas; Provincial Park and Crown Marsh; private land	40 600	Core: 6250 Buffer: 34 000 Transition: 350	Canadian Wildlife Service, Environment Canada; Long Point Company; a mix of private and public ownerships, notably the Big Creek National Wildlife Area, the Nature Conservancy	The LPBR Foundation
<b>Clayoquot Sound Biosphere Reserve (CSBR)</b>	2000	< 3000 (permanent) half of which First Nations*	National park (1); Provincial Parks and Reserves (16); Clayoquot Sound Central Region Board; various community organisations (e.g. Iisaak Forest Company); Nuu-chah-nulth First Nations*; District of Uqcluelet; private land	349 947	Core: 110,281 Buffer: 60,416 Transition: 179 250	Ministry of Environment (Parks Canada); Clayoquot Biosphere Trust; Clayoquot Sound Central Region Board	Clayoquot Sound Biosphere Trust
<b>Mount Arrowsmith Biosphere Reserve (MABR)</b>	2000	~ 48 000	Provincial parks (6); Wildlife Management Area (1) National Wildlife Area (1) Municipal land; private land.	118 592	Core: 2092 Buffer: 1500 Transition: 115 000	Ministry of Environment; City of Parksville; Town of Qualicum Beach; Regional District of Nanaimo; Regional District of Clayoquot-Alberni; Islands Trust	The Mount Arrowsmith Biosphere Foundation

## 8.1 Case Study Data

The data for the case studies in this chapter were derived from:

- Ten interviews conducted at the biosphere reserves sites,
- Ten interviews in other locations such as Local and Provincial Government offices, universities, biosphere reserve-related conferences and cafes,
- Five iterative conversations over email, telephone, and in- person; and
- Three focus group discussions: Two conducted after BR committee group meetings and one after a conference.

## 8.2 Niagara Escarpment Biosphere Reserve, Ontario

### 8.2.1 The Environment

The Niagara Escarpment is often called the most prominent topographic feature of southern Ontario, Canada (Figure 10, pg. 160). It is a complex landform consisting of sedimentary bedrock formed between 425 and 450 million years ago and forms part of the Great Arc. The Niagara Escarpment contains more than 100 sites of geological significance including some of the best exposures of rocks and fossils of the Silurian and Ordovician Periods (405 to 500 million years old) in the world. The escarpment extends 725 km from the Northern Bruce Peninsula, between Georgian Bay and Lake Huron, to Queenston near Niagara Falls and the New York State border.

The Niagara Escarpment Biosphere Reserve (NEBR) contains a rich diversity of ecosystems from aquatic to cliff-face and slope (see Figure 11, pg. 161). The major ecosystem type is temperate broadleaf forests or woodlands. Mixed forests with sugar maple (*Acer saccharum*), red maple (*A. rubrum*), beech (*Fagus grandifolia*) and red oak (*Quercus rubra*) are common. Other major vegetation communities are escarpment rim woodland with eastern white cedar (*Thuja occidentalis*) and white birch (*Betula papyrifera*) along with ferns and bryophytes; lake shores characterised by *Thuja occidentalis*, willow (*Salix spp.*) and *Physocarpus opulifolius*; shallow lake vegetation with *Salix spp.*, *Cornus sp.*, *Scirpus sp.* and *Typha latifolia*; and bog complex supporting *Larix laricina*, *Thuja occidentalis* and *Rhamnus alnifolia*. Sugar maple (*Acer saccharum*), oaks (*Quercus rubra* and *Q. alba*) and pines (*Pinus strobus*, *P. sylvestris* and *P. resinosa*) characterise the forest communities of the NEBR. Remaining areas comprise limestone cliffs, crevices and talus slopes with ferns, caves, and agro-ecosystems with maize, mixed grains and fruits.

The unique topography of the escarpment creates a variety of microclimates and as a result, is home to a rich diversity of organisms including a number of endangered species. Certain segments represent some of the most species diverse areas in southern Ontario, itself the most biodiverse part of Ontario (Sparling 2001). Some 64 per cent of vascular plants in Ontario are found within it. The largest publicly owned park areas are the Bruce Peninsula National Park and Fathom Five National Marine Park at the northern end of the Bruce Peninsula (Niagara Escarpment Commission and Canadian Biosphere Reserves Association 2002). Substantial research, monitoring and education

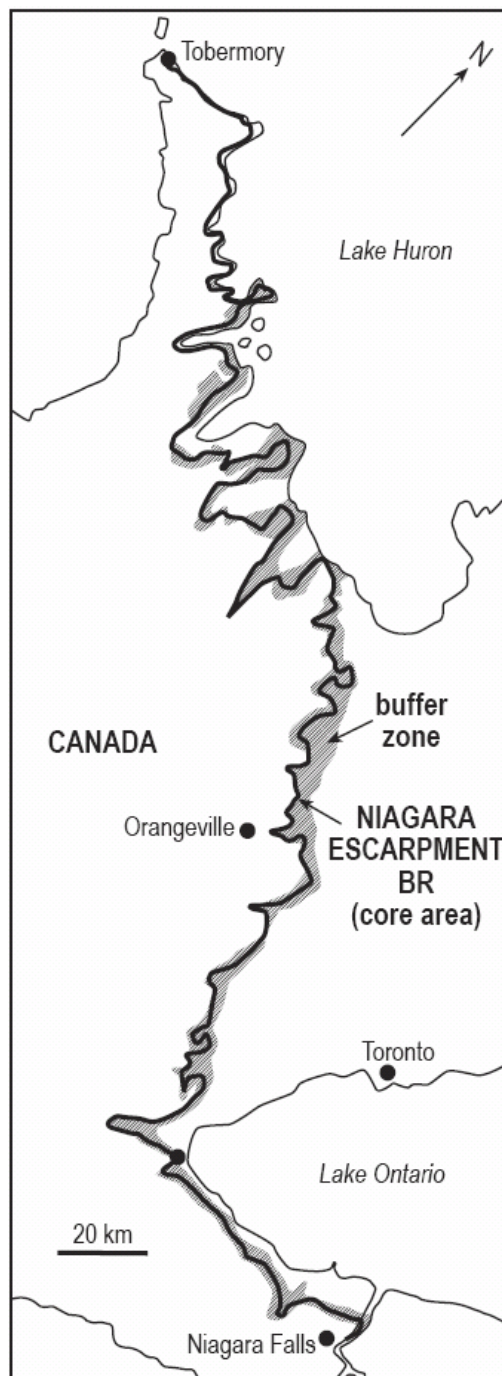
associated with the Niagara Escarpment has been undertaken<sup>57</sup> in areas such as archaeology, biological inventories, cliff ecology, conservation education, cumulative effects monitoring, demonstration projects for ecological restoration, policy analyses and watershed studies (Francis and Whitelaw 2002).

The escarpment area contains a population of over 120,000 people, with over 7 million within 100 kilometres of the escarpment (Coalition on the Niagara Escarpment 1998). Because of population density, this naturally and geologically important landscape is highly susceptible to impact from the densely populated surrounding region. An array of human intervention is evident where portions of the BR are situated in urban industrial landscapes. In contrast, the escarpment appears as an isolated green corridor. Other portions are unmodified natural areas or historically altered forest ecosystems protected to allow for natural restoration (Figure 11, pg. 161). In any case, it undoubtedly retains the highest biological importance for this part of southern Ontario.

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<sup>57</sup> Niagara Escarpment Commission and the Canadian Biosphere Reserve Association (2002: 3) suggest that 'in 1995, Ontario's Niagara Escarpment Monitoring Program (ONE MP) was developed to assess whether the Niagara Escarpment Plan, with its unique set of land use and environmental protection policies, is achieving its goal and objectives. The ONE MP is based on the Cumulative Effects Monitoring Framework development for the Niagara Escarpment and supports the Escarpment's designation as a UNESCO Biosphere Reserve through research and monitoring activities and by providing education and training to BR communities. Monitoring projects are implemented through partnerships with government and NGOs, academic institutions and community volunteers. The ONE MP monitors change over time using indicators of ecosystem health and status, including forest biodiversity, tree health, landscape connectivity, and species at-risk. The ONE MP has also been involved in habitat restoration activities. These projects include: restoration of rare oak savanna and prairie communities in the Dundas Valley; a tri-national bird habitat project to increase interior forest and prairie habitat for migrating bird species; and stream restoration in Grey County to improve water quality and habitat for cold water fish species'.

**Figure 10 The Niagara Escarpment Biosphere Reserve**



Source: Francis (2002: 7).

**Figure 11 A cliff-face within the Niagara Escarpment BR, in the Bruce Peninsula National Park**

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Source: By author.

Moss and Milne (1998) argue that the natural units within the Niagara Escarpment are only a loose collection of isolated spaces connected by administrative boundaries, as indicated in Figure 12 (pg.162), showing the city of Hamilton's conservation areas as highly fragmented. Albeit, the intact areas that constitute the Escarpment Natural zones are significant for biological conservation in an otherwise completely human-modified landscape. This map of Hamilton indicates, in green, where the loose networks of conservation areas occur. It is a particularly tenuous harmony between conservation of the Niagara Escarpment versus industry and development. Hamilton is the most industrial centre along the length of the NEBR.



**Figure 12 The region of Hamilton, a major city within the NEBR**



Source: Linschoten (2003).

### 8.2.2 History of the Designation

In the late 1950s, concerned citizen groups lobbied for preservation and control on land use planning and development surrounding the escarpment (Murzin 2004; Moss and Milne 1998). Due to the challenging topography, settlement did not happen as quickly or as intensively as the surrounding rolling countryside (Coalition on the Niagara Escarpment 2003; Coalition on the Niagara Escarpment 1998), however, development of surrounding regions meant that the escarpment was subject to increasing risk of impact.

In 1973 the Ontario Provincial Government passed the *Niagara Escarpment Planning and Development Act*, which created a 17 member Niagara Escarpment Commission (NEC) to administer the Act and a provincial plan for the entire Ontario portion of the escarpment. For more than a decade after the establishment of the NEC, plan proposals were subject to public debate and formal public hearings before the Niagara Escarpment Plan (NEP) was finally approved by the Provincial Government in June 1985 (Francis and Whitelaw 2002) and amended in 1990 by the Ontario Ministry of Environment and Energy (Moss and Milne 1998). The NEP constituted the first landscape-scale environmental land use plan in Canada, administered through a unique permit system that replaced municipal control. The NEP supports three major functions including administering land use designations and policies, setting development criteria and providing for the Niagara Escarpment

Parks and Open Space System (NEPOSS). The NEPOSS protects the significant natural and cultural features along the escarpment, and provides for recreation and appreciation of its features.

Informal work was conducted around the concept of a BR designation, initiated in 1989 through the former Working Group of Canada / MAB along with the NEC, and National Parks (Whitelaw 2004). A nomination was submitted to UNESCO in September 1989 (Birtch 2004d). Research and monitoring, education and information programs were underway at the time of BR nomination. In February 1990 UNESCO designated the NEP area as a BR.

The NEBR covers a 190 270 ha corridor,<sup>58</sup> which includes areas managed by the Niagara Escarpment Plan and the *Niagara Escarpment Planning and Development Act*. The NEP area covers portions of 23 local municipalities within eight regions and counties. NEPOSS enhances the NEP, providing for the establishment and coordination of 136 existing and proposed publicly owned parks that are linked by the Bruce Trail, the longest hiking trail in Canada (Niagara Escarpment Commission 2008).<sup>59</sup> Together with private lands along the Niagara Escarpment, the area constitutes the largest continuous forest in southern Ontario and forms a network of core areas within the NEBR.

The core areas of the BR include lands designated 'Escarpment Natural' under the NEP and all parks including the Bruce Peninsula National Park, provincial parks, other types of provincial Crown land protection and land trusts. The core, buffer and transition zones are congruent with the various levels of usage or conservation under the Niagara Escarpment Plan Area (NEPA) zone system. The land use zones within the 183 311 ha Plan Area correspond with BR core, buffer, and zone of cooperation areas (Table 11, pg. 164). Different development criteria and permitted uses apply to each zone, depending on the level of protection in that zone. **Core and buffer designations constitute 92.5 per cent of NEPA, which is significant and sizable in relation to most other BR core and buffer zones (AEC2).**

A special purpose body, the Niagara Escarpment Commission (NEC), implements the NEP. The NEC is composed of representatives from each of the escarpment's municipal counties and regions and from the public at large. Its strength lies in its legal foundations and ability to focus on the escarpment as a whole, across a wide range of political, government agency and stakeholder jurisdictions and interests (NEC and CBRA 2002). Whilst the NEPA and NEC are important to conservation on the escarpment, the role fulfilled by NGOs, community groups and land trusts is as important in mitigating mounting threats to the natural capital of the NEBR (Moss and Milne 1998).

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<sup>58</sup> This area includes the Niagara Escarpment Plan Area and the Fathom-Five and Bruce Peninsula National Parks.

<sup>59</sup> The Bruce Trail provides CA\$100 million per annum in revenue to local and regional economies through tourism (Niagara Escarpment Commission 2008).

**Table 11 Land use designations of the NEPA and the use of these zones as NEBR zones**

Escarpment Natural Area	Core (plus 2 national parks)
Escarpment Protection Area	Buffer
Escarpment Rural Area	Buffer
Escarpment Recreation Area	Zone of Cooperation
Urban Area & Minor Urban Centre	Zone of Cooperation
Mineral Resource Extraction Area	Zone of Cooperation

Source: Niagara Escarpment Commission (2008: no page).

### 8.2.3 Capital and Governance in the NEBR

From the outset of BR discussions, the NEC was recognised as the party to lead and strengthen the proposed NEBR and its activities, in association with government agencies and organisations. Today, it maintains this role, which confers to the designation a strong basis for *institutional*, *financial* and *social capital*. The Bruce Peninsula and Fathom Five National Parks act separately to promote activities consistent with the BR concept within those jurisdictions and these are augmented by a range of NGO initiatives. A staff member of the NEC represents the NEBR on CBRA. There are approximately 152 groups including government agencies (federal and municipal), conservation authorities, stewardship councils, non-government citizen's organisations or clubs involved with the protection of the Niagara Escarpment, from Queenston to Tobermory. Many of these groups participate in, and support the NEBR. The large number of institutions providing *capital* and *partnerships* for the BR indicates a *low rigidity of institutional arrangement* over this domain. The aim of the NEBR is to actively demonstrate that ecology, economy and a good life can come together, each a part of the other (NEC and CBRA 2002).

The Escarpment Biosphere Conservancy (EBC) is one of the major groups that support the goals of the NEBR through protection of core areas. The EBC established to maintain and manage a system of nature reserves on the Niagara Escarpment, unrelated to NEPOSS, and is a charitable land trust. EBC reserves protect 2428 ha, 11 km of the shoreline of the Great Lakes and at least 31 rare and endangered species through direct ownership of three quarters of 60 nature reserves (Escarpment Biosphere Conservancy 2007). These properties are acquired either by purchasing the land or receiving it as donation from landowners. Often, targeted cash donations assist with a particular purchase. Conservation agreements comprise the other quarter of EBC reserves with, for example, fourteen landowners cooperating through voluntary restrictions on future land uses. They use formal covenants to restrict new construction, severances and resource extraction in tandem with easements allowing the EBC to inspect and restore (if necessary) the land. Such agreements are usually donated for significant income tax receipts. The EBC now has seven farms under protection agreements (Escarpment Biosphere Conservancy 2007).

Amongst the range of *innovative* projects that the EBC uses to support conservation is a fundraising long distance telephone service known as Escarpment Telecom. **By using Escarpment Telecom for long distance calls, supporters are offered bargain call rates compared to the major**

telephone servers. The EBC receives 20 per cent of the total amount of all Escarpment Telecom phone bills for conservation work (C4). As the EBC is a volunteer-run organisation, revenue from the Escarpment Telecom *partnership* are used to pay for the costs associated with land acquisition for conservation of the escarpment (*natural capital*), such as land transfer, newsletters, lawyers, planners, appraisers and surveyors. According to the EBC, each dollar spent with Escarpment Telecom helps to conserve another square meter of the escarpment (Escarpment Biosphere Conservancy 2007). This *partnership* has contributed almost CA\$100,000 over the last eight years, which recently helped them acquire the Sauble River reserve (Escarpment Biosphere Conservancy 2007). Sources of funds for EBC activities are shown in Table 12.

**Table 12 Sources of EBC funding for conservation efforts within the NEBR region**

Source of funds for EBC projects	Donation value (CA\$)
Landowners within the Niagara Escarpment region	Land and agreements worth several million dollars
An anonymous foundation	Over \$1 000 000 to conserve the Bruce Peninsula
The Escarpment Biosphere Foundation	Close to \$2 000 000 for strategic projects
The Ontario government	\$580 000 to fund eight projects between 2001 and 2005
One former postal worker, Al Shaw	\$60 000 over a period of years
Several donors e.g. conglomerate of eight medical doctors; Ivor Simmons' donation of securities	Substantial donations to create specific nature reserves including Freer Point, Sucker Creek, the Lindenwood Reserve and Simmons Reserve
Charitable foundations	~\$100 000
Government foundations including the Trillium Foundation, Ontario Heritage Trust, EcoAction and EcoGifts - specific projects	~\$50 000 overall
Other private donors	more than \$100 000
<b>Total</b>	<b>&gt;CA\$6 089 000</b>

Source: Escarpment Biosphere Conservancy (2007: no page).

As the *collaboration* with the NEC forms an important NEBR allegiance, the NEC's recent financial stress has impeded some of the BR's work. Yet, it is encouraging that the important role of *information-sharing* has continued within the NEBR, despite these financial pressures (Murzin 2004). A most important event for supporting *social learning* and *multiple knowledges* has been the Leading Edge Conference Series, established to provide *openness* and *collaboration* between researchers, policy makers, academics, consultants, civil society organisations and the public to share their work on the Niagara Escarpment, to *network* and to celebrate the NEBR. Conferences convened in 1994, 1995, 1997, 1999, 2001, 2004, 2006 and 2008 have been organised around conservation, stewardship, monitoring, research, innovation, community and culture of the Niagara Escarpment (Whitelaw et al. 2004).

Many of the Leading Edge conferences have reiterated the need for greater and regular *collaboration between stakeholders* across the escarpment. According to Francis and Whitelaw (2002) the logistics of organising and supporting a BR committee that would be semi-detached from the Commission has been a pertinent topic for the NEBR. The NEC wants to increase *community leadership* in BR activities to *build capacity*. To this end, the NEC encourages volunteers to consider ways they could

become organised at the community level (*new governance*). A number of individuals in the Bruce Peninsula took up this challenge and, in the summer of 2000, began to develop community support for creation of a BR advisory committee. The Bruce Peninsula Biosphere Reserve Association (BPBA) was founded in 2000 and serves as an example of a BR community-derived committee arising from *strong place-attachment*, *social capital* and *partnership*, built around *shared value*. AEC3 expresses their view of the BPBA:

**... this concept of a BR and people working together for common goals in their community that involves human and environmental factors, energised them to the extent that a xenophobic, rural, slightly suspicious population has been able to achieve results and be able to look beyond where they are at, develop a vision and challenge themselves, and become excited about doing something themselves (AEC3).**

According to Reaney (2001), the guiding governance principles of the BPBA are to lead by example, adopt a positive and sensitive approach, maintain accountability, operate with courtesy, respect, openness and accessibility, strive for excellence, and support and promote stewardship. The BPBA agreed to prioritise community concerns and encourage full participation in problem solving. These efforts would *protect the community's physical and social capital* for future generations while perpetuating and *learning* from traditional forms of land use. Benefits of the BR that the BPBA have targeted include: improved land management skills; reduced conflict; increased pride in traditions; and increased *local capacity* for conservation and development. These targets are broad but feasible given the strong *capital assets* base inherent in the community.

The BPBA relies on the *social capital* present in the small community, along with the stewardship, foresight and energy of its *champions*, for example Carol Reaney. Carol is a highly respected member of the community with a long family history associated with the Bruce Peninsula. Residents of the Peninsula *trusted* in the ideas of the BR presented through community meetings by Carol and others. Much encouragement by those who understood the principles of the program was required during the initial stages of the community committee. The BPBA was built through a basis of *trust*, *reciprocity* and *shared value*. The support of Parks Canada was crucial in promoting and establishing activities in the BPBA. Carol has since retired as the chair of the BPBA but remains involved in the BR and as a community leader. According to one key informant:

**The Bruce Peninsula Biosphere Reserve Association was an idea I had in 1990 when the area was designated and I suggested to Richard (Murzin) that they have community committees in the north, south and central parts of the BR. There were lots of reasons why it couldn't be done and there was interest in it, but Richard was very busy, plus there was the CBRA idea that the initiative had to come from the communities. We just had to keep putting feelers out. We couldn't go out as individuals and make it happen. We were at the stage of saying this is a good idea does anyone want to do it and Carol Reaney came along and she said 'I want to do it'. She held a meeting and got 50 people to her meeting and that was in a snow-storm! A pretty good turn out for a regional town (AEC2).**

One of the resounding successes for the BPBA, largely brought about by the *innovation* of Reaney, was the establishment of the Provincial Envirothon. The Envirothon is a *place-based social learning* expo held annually in spring just prior to the start of the tourist season in the small town of

Tobermory, at the tip of the Bruce Peninsula. Over 100 high school students, their families and teachers convene for five days with learning and social events. Student teams of five, representing regional champions from high schools around the province, learn and socialise with competitors as they ask questions, put on shows, study, attend workshops, listen to Chippewan songs and stories, take outdoor environmental exams, give environmental presentations and work on legacy projects in the region (Birtch 2005). Previous legacy projects have included: schoolyard naturalisation; cattle exclusion from a riparian zone; re-establishment of a timbered plot; cold-water stream stabilisation; and endangered species habitat rehabilitation. An important contribution is made by a multitude of voluntary organisations, which each year *builds social capital* and *capacity*. When not otherwise engaged, volunteers are treated to mini-courses on topics such as wilderness survival and cultural woodcarving. Awards are made on a sunset dinner cruise and the awards ceremony is later broadcast on community television.

In recognition of the success of the 2004 Provincial Envirothon, the BPBA was awarded the Ontario Trillium Foundation's prestigious Great Grants Award. The BPBA was one of seven recipients selected from among 3800 competing organisations throughout Ontario. Presented by Ontario's Minister of Culture, the award pays tribute to non-profit organisations that strive to build healthy, vibrant and sustainable communities throughout the province. This award encapsulates renewal of social and natural capital by *supporting innovation* and *recognising capacity-building*.

The BPBA has generated the success of the Envirothon, and has created a *innovative* BR initiative. Similarly, *partnership, innovation, experimentation* and *capacity-building* arising from community involvement has produced other initiatives such as demonstration stream restoration projects and hiring of graduate interns for forest, benthic and salamander monitoring projects. Another major focus of the BPBA's work relates to promoting environmental education in schools, and linking these to the UNESCO Associated Schools Project Network (ASPNet). Through lobbying the Provincial Government, the BPBA under the chair of Reaney, was able to save a local school from closure. As a regional community, a closure of this school would have had a deleterious impact on the lifestyle of local children and parents, who would have had to travel more than an hour each day to reach the next regional school. Retaining the school saved many jobs and allowed Tobermory to maintain an important component of its *social* and *institutional capital*.

In early 2002, the Niagara Escarpment Commission, at the recommendation of CBRA, set-up a steering committee and began preliminary meetings to discuss the potential of a Biosphere Reserve Cooperation Plan. By establishing a Cooperation Plan, the NEBR could delineate potential and existing *partnerships* and services, thereby increasing *diversity, flexibility, knowledge-sharing, partnership, capacity, capital, learning* and *innovation* to support *BR resilience*. According to P1, the Cooperation Plan has been a step toward BRs providing a marketable function:

**A BR has to generate some sort of function that would otherwise not be generated and find the people who want to buy that function, and so far we haven't been too successful at that. What is the service that the BR could do? That is the function of the Cooperation Plan ... but I don't run an individual BR, and I don't have their problems and their problems are many, each different and**

**unique to each designation, depending on the experience inherent in the community (P1).**

The steering committee *collaborated* with other Canadian BRs to draft terms of reference for its advisory committee. A *diverse partnership* involving key individuals, including representatives from non-government organisations, conservation authorities, universities and municipalities, developed the Cooperation Plan framework by *sharing multiple knowledges*. Discussion focused on priorities such as natural diversity, sustainability, and improved community capacity and decision making through research, monitoring, education and information exchange.

A Cooperation Plan for the NEBR was produced in April 2002. The Plan has provided a preliminary attempt to define priorities and a critical starting point for moving ahead in a *coordinated* manner with a wide range of stakeholders, communities and *partners* and to focus the future *capital assets* of the NEBR. For many existing and potential *partners* in the NEBR, the Plan can be discussed, refined and implemented according to their needs in order to *match social and temporal scales* and *respond to negative feedback* (Niagara Escarpment Commission 2003). Ensuring continuity and growth of BR activities in this way, is vital.

Also in 2002, the NEBR undertook its 10-year review, with the assistance of CBRA, as required by MAB. The review provided for the first time a precise folio of NEBR information over its 12-year lifespan. A listing of threats and opportunities for the NEBR was described in the publicly available document (Francis and Whitelaw 2002) allowing for *knowledge-sharing and social learning* amongst all BR interests.

Given the mostly flat landscape of south-eastern Ontario, the Niagara Escarpment forms an attractive vista, well established in the minds of local people as an important aspect of the *place*. Now critical for conservation efforts, the escarpment serves a central role as one of very few remnant natural areas of open space for recreation and nature appreciation, research, monitoring, education and environmental services. The regional significance to its population is advantageous for BR governance, providing sources of existing and potential *social, institutional and financial capital*.

For instance, its aesthetic and natural amenity provides the escarpment region with a suite of protectors (*stewardship*), such as the Coalition on the Niagara Escarpment (CONE), a coalition of over 20 environmental organisations and hundreds of individual citizens. Formed in 1978, it has worked for the protection of the escarpment and its many values to Ontario society. The Coalition monitors development in coordination with local community organisations, as well as organising educational activities to heighten public understanding and appreciation of the escarpment. CONE developed the Niagara Escarpment World Biosphere road sign project and placed a series of signs on county and regional roads. The signage project provides public information that highlights the importance of the UNESCO World Biosphere Reserve designation, with the aim of building support among residents of the NEPA for the protection of the escarpment (Coalition on the Niagara Escarpment 2003).



The support of the Niagara Escarpment Commission as an administrative body, principally for the Plan area, which coincides with the BR area, is an important factor that supports the BR and its dissemination within the region. Similarly, the BPBA serves as a model for other potential escarpment BR community committees and has contributed greatly to *community capacity-building* and *social capital* in the northern Bruce Peninsula. The NEC is a formal institution, well recognised within the region and province for stewardship of the NEBR. The NEC enables *knowledge-sharing* and *institutional* and *financial capital* beyond what could have been capable by a community committee. However, the NEC support for the NEBR is principally due to a *local champion* of BRs, Richard Murzin, who has a long history with both the NEC and CBRA. Murzin has a personal interest in BRs and this has facilitated the role of NEC in supporting the NEBR. In some ways, however, it is a marriage of convenience between the NEC and the NEBR: there is a convenient application of BR values in the NEPA, that coincide well with the values of the NEP land use zones, allowing for the community-oriented pursuit of the conservation, logistics, and community development functions.

Due to recent funding cuts for the NEC, much of the work for the NEBR is now conducted voluntarily by Murzin and occasionally some other NEC representatives. Therefore, a shift from NEC *financial capital contribution* to a *social capital contribution* has occurred. EC3 states that: **since designation, the NEC has experienced massive budgetary cuts of 40 per cent, creating problems for fulfilling the logistics function of the BR.** The principle source of funding for activities such as BR signage, meetings and administration comes from the NEC, with some supplementary funding from Parks Canada. Small non-profit agencies and conservation groups also provide some *institutional and social capital* input. If the NEC were to disassociate itself from the NEBR, the keystone organisation for information distribution, financial and in-kind assistance, organisation of the Leading Edge series and other initiatives would be lost. With it, other smaller non-profit agencies and conservation groups would follow suit, due to loss of stewardship for the BR idea. Withdrawal of the NEC from the NEBR is a significant threat, with no prospect for an equivalent stewarding body. Similarly, local champions currently undertake much of the work of the NEBR, and these individuals are few. If they were to forgo their support, a significant vulnerability for NEBR activities may occur due to a loss of *institutional memory* and *social capital*. Due to the longstanding nature of the *collaboration* between the NEBR and the NEC however, it is uncertain whether that threat is credible, particularly because of the highly successful and renowned Leading Edge Biosphere Conference series, which has grown to represent the pinnacle of Niagara Escarpment regional interests biannually, and draws interest ranging from Federal Government to community groups.

An opportunity exists to increase the number of community committees, and hence, *partnerships*, for the NEBR (Birtch 2004a; Murzin 2004). Additional community committees like the BPBA would assist in fostering the BR idea (*knowledge sharing* and *social learning*) across the large region. As the Niagara Escarpment comprises eight regions and counties, it would seem appropriate to aim for a BR community committee in each of these, to reflect catchments of interest, and draw on the associated connection to place of communities within these catchments. A single group is insufficient, and only deals with a small portion of the NEBR (Birtch 2004a). If other groups were to form, a network of NEBR activity could arise and serve a much needed BR function in other areas of the escarpment.



Depending on *social and financial capital* to advertise and propagate such a network, schools, universities, industry, businesses and NGOs provide potential sources of *partnership, various types of capital*, and assist with *innovation* through *collaboration*. A diversity of *capacity* could be created in this way. Due to the surrounding population and highly urbanised nature of the region, integrating the NEBR into the curriculum of schools and universities would serve as a means to propagate *continuity of awareness, social memory, research capacity* and opportunity for involvement and *stewardship of the NEBR*.

In terms of *power sharing* and *devolution* of the NEBR from sole reliance on the NEC, there is opportunity for Parks Canada to pledge more funding, alongside other federal and / or provincial funds, for establishing it as a model BR. Through exposure and marketing amongst a group of residents that value the escarpment, the model BR could harness further *capital assets*. If the NEBR was promoted as suggested by Birtch (2004c) for a MAB Urban Demonstration Area, two functions could be addressed. First, it could test the idea of integrating urban components of the BR concept in Canada, which to date has not been undertaken in a targeted way. Second, a concerted effort could be instigated to boost *social capital* of the NEBR through specific *collaboration* with schools, universities, industry, businesses and NGOs in the surrounding region, all of whom could contribute and benefit by involvement. Such an initiative, however, requires a significant mobilisation of *social and financial capital*.

Although the NEBR contributes an array of initiatives within its three functions as a BR, the designation is viewed critically by some stakeholders due to its entire overlay by the NEPA, hence constituting a quasi-legal protected area through the provisions of the Act. In the view of P1:

**I would not consider Niagara Escarpment to be a good example of a BR – it is an exception and Clayoquot is another huge exception ... it came along as a last minute solution to irreconcilable problems (development versus conservation problems), and no one knew what a BR was. Niagara Escarpment is a top-down BR – community has hardly been involved in the NEBR decision making and it is very open to political manipulation. It existed before it became a BR. Every so often a developer will hire a few off duty policemen and will clear off a whole hill side of trees on the Niagara Escarpment, they get fined \$50 per tree – there isn't much in the way of implementation and enforcement. How do you protect natural capital in an area of private ownership? There is no incentive for agricultural land to stay that way when developers are offering 5 - 6 million dollars – it may take a generation to get people used to the idea that, yes you bought this farm and you may not be able to sell it for very much, as it is designated as natural capital – but at the moment, it is one of the biggest fights they have. In the wine region, they want to put up hotels and facilities, but they are not able to do that so who compensates for their inability to do that? We haven't dealt with that yet, but it is emerging very rapidly. So who controls the land values within a BR? (P1).**

Expanding development and urban pressures are constant challenges to the integrity of the Niagara Escarpment Plan and Act. There is increasing demand for permanent residences, especially along the southern portion of the Niagara Escarpment because of aesthetic appeal (Canada MAB 2000). These trends indicate significant loss of *connectivity conservation*, with no signs of abatement, as the lower surrounding regions around major centres are now growing at a rapid pace (Murzin 2004). In a 2000 Canada MAB publication (Canada MAB 2000), regional analysis of landscape patterns across

the southern Niagara Escarpment (where the density and pressures of population are greatest) identified changes in landscape conditions between 1976 and 1995, where interior forest habitat had rapidly decreased in the Halton region, and overall, the 1995 data indicated fragmentation of previously intact forest cover.

As *natural capital* is directly related to habitat size, shape, proximity and connectivity of the landscape, it is critical that the pressures of the bordering regions and counties are mitigated through enforcement of the Plan Area and Act for *connectivity conservation*. As some residential areas pre-date the NEPA and Act, some landowners argue that this has set a precedent for further development. Present land use zones provide much contention for the NEC, which must regularly defend planning decisions at tribunal hearings. However, when the livelihoods and development budgets of entrepreneurs are at risk, even the NEC may be challenged to make and enforce socially and ecologically robust decisions.

#### **8.2.4 Lessons for Resilience**

Based on the preceding data and the lessons articulated below, the NEBR is indicative of Phase I of the BR resilience conceptual framework. The legal protection of the core areas, conferred by NEPA, is critical to the *protection of its natural capital* due to its isolation in an urbanised landscape. It also provides a significant *connectivity conservation* function. The legislated protection of the escarpment's natural capital provides the BR access to the *financial, social and institutional capacity* of a provincial body; an equitable and interdependent association capable of fulfilling resources and expertise required by both parties. The NEBR provides the NEC with an avenue for devolution, whilst the NEBR has benefited from a *local champion* stewarding NEC's relationship with the NEBR, providing a formal association, but one with *openness, capacity-building, social learning, multiple knowledges, place connection* and *partnerships* as key aspects. The *interdependence* has been fostered particularly due to NECs requirement for *adaptive capacity*, as conferred through its obligations to uphold the Act.

Several local champions for the NEBR, from a variety of sectors in civil society and government also have institutional roles that provide *capital* from their respective institutions. Other capital is provided by Brock University, Parks Canada and the numerous agencies partaking in stewardship roles. *Partnerships* with industry within the NEBR area have the potential to grow. *Innovation and experimentation* allows for renewal and sustenance of *capital assets* whilst also promoting the emergence of *new governance praxis*.

As a part of this fragmented, political and threatened working landscape, the NEBR has formed numerous *institutional collaborations and partnerships*, based on *shared values*. This diversity of stewardship groups provides excellent and ample sources of *capital* and opportunity for *partnership*, but the associations may be tenuous as the flow of *information, knowledge* and *capacity* are disconnected through the vast scale of the BR, lack of a BR coordinator, lack of other community committees (outside of the BPBA) and diversity of *place-based* working landscape issues. Moving from Phase I to the consolidation of Phase II would require these issues to be resolved. With *capital assets, innovation and experimentation* coupled with *information management*, these issues could be

resolved. Mobilising actors (*champions*) within these contexts are often the means of initiating such change. For example, a *local champion* may mobilise *capital assets*, spur *innovation* and develop *information management*. This leads to a community committee, potentially a coordinator and *new governance* principles, characteristic of Phase II.

## 8.3 Long Point Biosphere Reserve, Ontario

### 8.3.1 The Environment

The Long Point World Biosphere Reserve (LPBR) is located on the north shore of Lake Erie in Norfolk County and was established in 1986 as an example of the Great Lakes coastal ecosystem (Figure 13, pg. 174). This region was one of the earliest to be settled in Ontario.

Long Point is an erosion deposit sand spit formation with habitats including woodlands and shrubs, sand dunes and bluffs, marshes and small ponds, lakeshore and beaches. Main species of the area include *Populus deltoides*, *Juniperus virginiana*, *Larix laricina*, *Thuja occidentalis*, buttonbush (*Cephalanthus occidentalis*) and dogwood (*Cornus spp.*). Inner Long Point bay supports musk grass (*Chara vulgaris*), Eurasian milfoil (*Myriophyllum spicatum*), wild celery (*Vallisneria americana*), and naiads (*Najas flexilis*). Vegetation communities include deciduous forest tracts characterised by wet red maple (*Acer rubrum*) and silver maple (*A. saccharinum*) swamps, American beech (*Fagus grandifolia*), sugar maple (*A. saccharum*) uplands, and oak (*Quercus spp.*) uplands.

The LPBR's core is the 6250 ha Long Point National Wildlife Area, protected since 1866 and managed by the Canadian Wildlife Service. The core area has a long tradition of sport hunting and fishing but also attracts thousands of naturalists and birders each year from across Canada and many parts of the world. The total BR area is 26 250 ha (Figure 14, pg. 175) and is administered by the non-profit Long Point World Biosphere Reserve Foundation (LPWBRF) which was granted charitable status in 1993 (Craig 2004).

Surrounding lands include privately owned and protected marshes, managed marshlands, provincial parks, cottages and marina developments. The mainland area (i.e. not the peninsula) is a mosaic of agricultural lands and Carolinian forest tracts with scattered rural development and a number of small towns. The Bird Studies Canada Headquarters is also located within the boundaries of the BR. Bird Studies Canada conducts programs in the Long Point area through the Long Point Bird Observatory and the Long Point Waterfowl and Wetlands Research Fund (Bird Studies Canada 2004).<sup>60</sup>

The surrounding remnant patches of Carolinian forest, which is the northern most limit of this deciduous forest type in North America, frames the Long Point complex, which is a staging area for migrating waterfowl, renowned for bass fishing and birding. This area is home to the greatest number of endangered, threatened and rare species in Canada (Whitelaw et al. 2004). With a history as a hunting reserve, some historical relics are evident including a homestead on the outer peninsula,

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<sup>60</sup> Long Point Bird Observatory (LPBO) was the first organisation of its type in North America. As a non-profit, research and monitoring station, LPBO involves Canadians in research directed at the conservation of wild birds and their habitats. LPBO programs focus on local avian breeding populations, migratory birds and promoting the participation of amateurs and volunteers in research. LPBO has been at the forefront of developing, coordinating and sponsoring a variety of volunteer based projects and is an important partner in the LPWBRF.

used as a private retreat for wealthy business people. As a result, the area has had some influential backing in support of its conservation status.

The Long Point ecosystem is changing because of increased human activity. Management problems for the BR are fishing, wildlife and wetland preservation, water quality, industrial agriculture, public access, commercial and residential development, forest fragmentation, exotic species invasions, shoreline alterations, and numerous recreational activities.

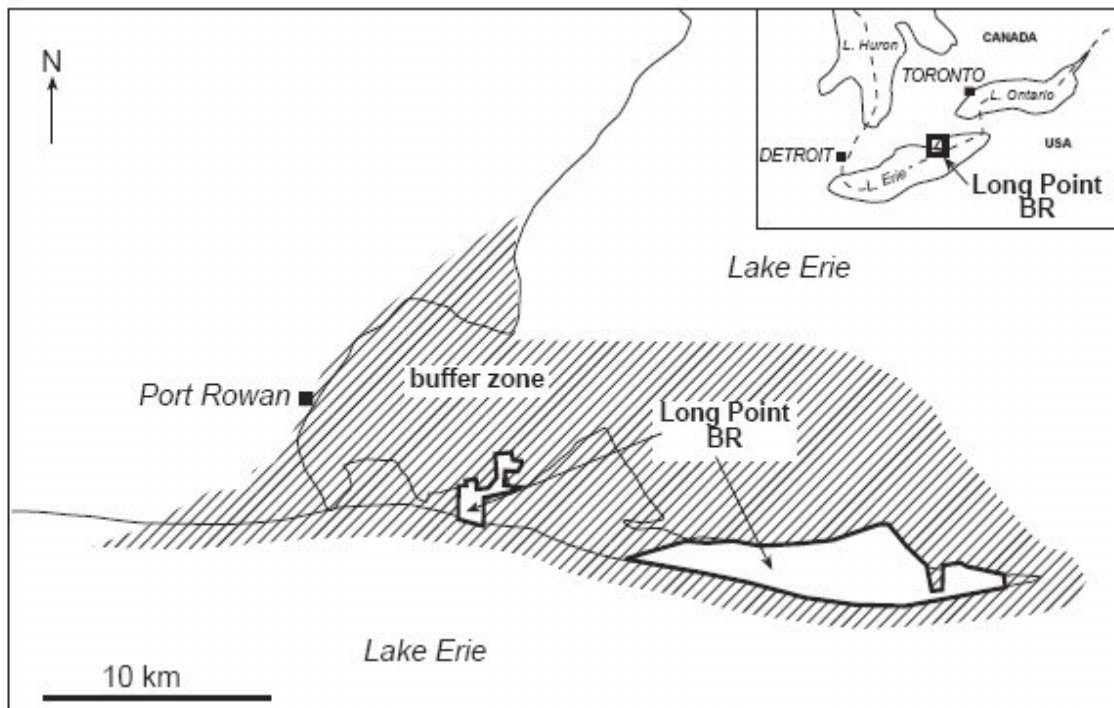
**Figure 13 Long Point**

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Source: Environment Canada (2007: no page).

**Figure 14 Long Point Biosphere Reserve area**



Source: Long Point World Biosphere Reserve Foundation (2004: no page).

### **8.3.2 History of the Designation**

The Long Point area was first settled around 1780 by united empire loyalists after the civil war (Craig 2004). In 1860 a group of wealthy hunters bought the point and managed it for over 100 years as a hunting reserve. In 1978 the group relinquished over half of the holding to the Canadian Wildlife Service in the agreement that the management practice for hunting remain, but with restricted access to the core zone of the LPBR. Outside of these core areas is a working landscape whose residents rely on export of natural resources and agriculture for the basis of their local economies.

Long Point is one of the largest protected areas in Southern Ontario, and includes a Ramsar site, a monarch butterfly site, and marshes renowned for ducks and fishing. During the retreat of the glaciers at the last ice age, a large amount of sand was spread over Norfolk County with poor soils for agriculture. Early farmers cleared large tracts of land and in some places the landscape is said to have looked like a desert. Reforestation took place during the early 1900s to combat human induced damage. The first forestry station in Ontario is located in the area, however it was the tobacco industry that provided the majority of income for the region. Tobacco is a very valuable crop, and was especially so during the 1940s-1970s. **Norfolk County is the only county in Canada to have paved back roads, attributable to the very successful economy once provided by tobacco. The world market for tobacco is now declining so farmers are seeking alternative crops, including ginseng and garlic, which have high returns per hectare (EC2).**

Long Point has long been recognised for its ecological and utilitarian value. The idea of a BR first occurred 28 years ago from an inter-university study identifying the main human-induced stresses affecting the area. The study also specified actions needed to lessen or remove the stressors,

identifying different government agencies with formal responsibilities to address these (Francis and Whitelaw 2001). This document laid theoretical basis for the establishment of the BR. From 1981-1984, the idea of a BR was discussed at several community meetings, led by local champions and CBRA, where core and buffer zones of the proposed LPBR were agreed. By 1985, a nomination was submitted to UNESCO / MAB, which was approved in 1986.

Gaining consensus amongst the community of Long Point for the best framework to organise and undertake the functions of the BR required consultation, particularly because there were some 30 local non-government organisations pursuing activities within the area with values of relevance to a BR (Craig 2004). As a particularly stewardship-oriented local community, there was a groundswell of potential collaboration between these groups, many of whom were eager to be involved (Birtch 2004a). Furthermore, although there appeared to be strong institutional arrangements for planning and management of the Long Point area, important opportunities for improving collaboration between agencies were recognised, whilst broadening public support for maintaining the biodiversity and ecosystem processes of the region (Francis 2004d).

The BR concept was raised as one of a suite of tools to undertake such actions, and one that would bring international recognition to the values of Long Point (Francis 2004d). Locally formed committees explored at least three different governance options between 1986 – 1989, and ultimately the BR model was chosen (Francis 2004d). A non-profit charitable association was settled as the best option, open for all to join (Craig 2004). The resultant Long Point World Biosphere Reserve Foundation (LPWBRF) hosted its inaugural meeting in 1990, where the local organisational arrangement was created as an open membership with a 15 member Executive Committee elected for 3-year terms, with one third of the committee eligible for election each year. Occasional part-time staff are employed through project funding (Craig 2004).

Many of the members of the LPWBRF work for government or NGOs and, through their professions, are involved with environmental and sustainability mandates. However, the members of the Board sit as individuals representing themselves. Having members with links to government and NGOs has proven worthwhile, enabling strong partnership development and an impressive project track record (discussed below and includes Forest Corridor Restoration Project, Duck Signage Project, SI / MAB Forest Biodiversity Monitoring Project) (Craig 2004).

A vision created by the LPWBRF was articulated during 2000 through a scenario building exercise, as a part of compiling the BR's Cooperation Plan,<sup>61</sup> which identified critical factors to a sustainable future for the area. The BR has been working on the protection of the Inner Bay through a balanced approach to recreational and agricultural development; sustaining biodiversity; promoting wildlife viewing opportunities and hunting opportunities; protecting and restoring Carolinian forest resulting in less fragmentation and improved habitat; and increasing volunteer participation (Craig 2004; Francis 2004d).

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<sup>61</sup> Long Point was one of ten (out of twelve BRs) that created the plan as recommended by CBRA.

In the LPWBRF ten year review, an extension to the BR's zone of cooperation was proposed, from the base of the point to the mainland, using watersheds as boundaries. This extension proposal was made to recognise that the majority of the logistics activities were focused on the mainland. The extension has since occurred as an informal one (i.e. not formally registered with UNESCO), based on acquiring new partners and landholders to work with the LPWBRF through shared values and resolution of common problems and / or social-ecological innovations.

### 8.3.3 Governance and Capital in the LPBR

The LPWBRF secures resources from various sources including government, private sector, foundations and the community. The management of the Long Point area is complex with some 19 government agencies administering 22 government policy and planning documents. In addition to the LPWBRF there are some 30 related CSOs *partnering* in Long Point governance (Whitelaw et al. 2004). This *cooperative* arrangement compliments the work of the LPWBRF, whose members clearly understand the importance of this type of *collaboration*. For instance, EC2 suggests:

**We define 'community based' as government agencies, institutions, academic organisations, NGOs and community all working together to collect information to deliver to decision-makers so that wiser decisions can be made. There is much misunderstanding about the term 'community based' and people think it is only based on volunteers.**

Studies have been conducted through a multitude of collaborations and partnerships in the LPWBRF. For example, a 1995 LPWBRF Forest Corridor and Restoration Project sought to educate landowners about forest resources and how they can be involved with restoration of areas for the benefit the ecological integrity, promoting *connected* forest ecosystems. The project arose from a University of Waterloo study which examined the forested areas of the Long Point region with respect to historic change and implications for strategic planning (Beazley 1993). The study found various opportunities to protect, enhance, and restore forested and natural areas as part of *connectivity conservation* planning for a regional natural areas system and resulted in an inventory of 967 ha with respect to plant community types (Hounsell 2001). A detailed forest corridor assessment report was prepared for the LPWBRF and landowners. Fifty-five landowners participated in the inventory along the corridor. A brochure *Restoring Forest Corridors to Benefit Agriculture and Wildlife* was prepared by the University of Waterloo, and distributed to local landholders. Since the inception of the Forest Corridor and Restoration Project, 66 ha have been restored (Hounsell 2001). The project is funded in part by Action 21, Wildlife Habitat Canada and the Ontario Ministry of Natural Resources, in conjunction with other partners.

According to Whitelaw et al. (2004), the need for a comprehensive Long Point State of the Environment (SOE) report has been acknowledged since the BR's designation, but inhibited by a lack of capacity <sup>62</sup> (Whitelaw et al. 2004). The UNESCO ten year periodic review raised the issue again

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<sup>62</sup> According to Whitelaw et al. (2004) some progress has been made to forward this objective through a SOE report by the Haldimand-Norfolk Health Unit on air quality utilising a comprehensive data set collected by the Nanticoke Environmental Committee over a period of 30 years. The Long Point Region Conservation Authority also completed a SOE report for one of the smaller watersheds in the LPBR.



and, in response, the LPWBRF identified monitoring as the main focus in its Cooperation Plan (Long Point World Biosphere Reserve Foundation 2002). Whitelaw et al. (2004: 68) suggest that:

The monitoring envisioned would be organised around a 'place-based' framework that would specifically contribute data necessary to produce periodic Long Point SOE reports. Currently, much research and monitoring in the Long Point area is conducted by government agencies at the federal, provincial, regional, and municipal level, and by CSOs. A survey commissioned by the LPWBRF in cooperation with the Ontario Ministry of the Environment identified 55 predominantly biotic, monitoring programs administered by four federal, four provincial, two municipal, six CSOs, three universities and one local industry association (Long Point World Biosphere Reserve Foundation 1996). The data and information generated from these monitoring programs is collected for specific purposes relating to the mandates of each agency and organisation, and is not readily accessible or usable for SOE reporting because there is no 'place-based' framework to guide collection, analysis and reporting.

The Foundation and local ecosystem researchers and monitoring specialists realised that the only possible means of producing an SOE report would be through *partnership*. The LPWBRF took the lead in organising a series of workshops to ascertain the commitment of the relevant government agencies and CSOs in the BR, to establish a community-based monitoring initiative, share data, and contribute resources to enable effective SOE reporting linked to local decision making.<sup>63</sup> Fourteen local ecosystem monitoring specialists, local municipal support staff, and stewardship volunteers, representing 10 federal, provincial, and municipal agencies, industry and CSOs were assembled based on a *collaborative* process to *share their experiences* and needs with respect to ecosystem monitoring and reporting (Whitelaw et al. 2004). The group reached consensus that a comprehensive, integrated, coordinated, community-based ecosystem monitoring and reporting initiative for the BR and Norfolk County was desirable and offered to serve on an advisory committee (Long Point World Biosphere Reserve Foundation 2002). Two subsequent meetings were held to identify gaps in present ecosystem monitoring, discuss appropriate monitoring frameworks, and develop a strategy for securing sufficient resources (Whitelaw et al. 2004). The LPWBRF supplied funds to complete a comprehensive proposal for use in securing private, foundation and government funding for the initiative. Although a challenge for a volunteer organisation, the LPWBRF is optimistic that financial and in-kind resources can continue to be raised in support of Long Point community-based monitoring.

According to Whitelaw et al. (2004), efforts are focussed on designing a monitoring program that builds on existing information, for example, the Long Point Folio (Nelson and Wilcox 1996) and existing monitoring programs (LPWBRF, 1996), and that ensures compatibility with existing planning and management processes. The objective is a monitoring program that contributes to decision making through SOE reporting and enhanced understanding of *place*. *Information sharing* and *communication* will be made a priority involving the broader community once funding has been secured, to further develop, implement and carry forward the initiative. A positive aspect of the entire

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<sup>63</sup> For the purposes of the Long Point initiative, community-based monitoring was defined as 'a process where concerned citizens, government agencies, industry, academia, community groups and local institutions collaborate to monitor, track, and respond to issues of common community concern' (Canadian Community Monitoring Network/ Citizen Science Network 2007).

effort has been the participation of Norfolk County. The County has taken the lead on an exercise that describes the community's sustainability vision and valued ecosystem components (Whitelaw et al. 2004; Norfolk County Planning Authority 2003). There are also efforts to embed a comprehensive adaptive ecological monitoring program into the Norfolk County Official Plan that will lead to timely reporting on ecosystem status and trends for informed decision making in the BR.

Other major research undertakings at present include:

1) The Community Action Plan - a publication intended for public use, and based on public input to outline the Long Point Bay area community's commitment to maintaining or improving the environmental health of the area. The 'Give Ducks Room Educational Project' is one example of a project arising from the Action Plan.

2) Forest Biodiversity Monitoring - a long-term project supported by Environment Canada's EMAN and the Smithsonian Institute, provides plant and animal data, to contribute to EMAN and the Smithsonian's global networks. This information allows scientists to monitor landscape response to global climate and other changes. Salamander monitoring is also conducted as a long-term initiative as a partnership between the community, various university researchers, EMAN, Parks Canada and the LPWBRF. EC2 highlights the *reflexive and adaptive* approach needed to engage community and academic researchers in relation to the monitoring programs:

**We got involved in ecological monitoring through establishing forest biodiversity monitoring plots in partnership with Environment Canada's EMAN. That was good, we had some student projects and were able to procure funding. Ontario used to have a CA\$50 000 000 program called Environmental Youth Core. NGOs and government agencies could apply to hire students at a minimum wage. But the federal leader Mike Harris cancelled this program. That took away our source of monitoring so we had to find other sources.**

3) Project CARE (Carolinian Action, Restoration and Education) - a joint project among the LPWBRF, Wildlife Habitat Canada, local high schools and youth groups. With community forestry as its main theme, local students are participating in the collection of native seed, propagation of seedlings and utilisation of their product in restoring lands to their native state.

These activities have arisen from a strong foundation of *social and institutional capital*, including academic contributions, that have laid the basis for scientific monitoring at Long Point, generating *shared value* of the *natural capital* of the region. Industry has, in turn, recognised the local importance of the area, and the potential to *partner* with the LPWBRF to achieve their own environmental goals. The following is part of a discussion with EC2:

**A few years prior to our cooperation plan, Dr Gordon Nelson at the Geography Department at the University of Waterloo suggested it would be a good idea to prepare an environmental folio for the Long Point Biosphere Reserve. So, we got a team of graduate students to prepare a series of reports on geology, history, culture, land tenure, reptiles, birds and fish, and forests. The forest report found that Long Point has the largest proportion of rare, threatened and endangered species of concern due to the diversity of the area. It is therefore a hot spot for biodiversity in Canada. The recommendation was that we really needed to look at**

increasing forest cover and connectivity. Because this did not fall under the mandate of the Ministry of Natural Resources or any other government agency - we saw this as an opportunity for the Long Point Biosphere Reserve to work with the different agencies and foundations to put this little project together. We got some money from Environment Canada to assess where the best places would be to establish corridors – this was an easy sell, because it didn't matter if you are a bird watcher or a hunter – corridors are good. Over the last 6 years, we have received about CA\$500 000 from Ontario Power Generation (OPG) for a carbon sequestration / biodiversity program to plant trees. They have a really forward thinking biologist with OPG. We were at the right place at the right time! OPG wanted a high profile project – and this biologist said – do I have a project for you! They gave him CA\$5 000 000. So he has established partnerships with conservation authorities and the BR to plant trees. We are not going to go out and just plant trees – we are going to plant them in the best place for biodiversity conservation. This is one of our flagship projects. Long Point Region Conservation Authority is in partnership with us on this project.

Through this partnership and others, the LPWBRF has earned high degrees of *respect*, *trust* and *reciprocity* (*social capital*) within the region. Each member of the diverse Board<sup>64</sup> brings a different set of skills to the committee, contributing to the conservation and preservation of Long Point through support the BR concept. Each of these people are local to the area or surrounding region and are employed in a variety of agricultural, academic or policy areas, often with some environmental focus and all share a strong sense of *place-attachment* to the region. Three-year terms on the Board are designed to prevent burnout but also retain *social memory* and *social capital* for a medium-length period.

The Foundation obtains *financial and other capital* from diverse sources. For example, fundraisers such as the LPWBRF annual Groundhog Day dinner and other *innovative* events such as sponsored adventure activities, help to raise awareness of, and capital for, the LPWBRF. The local profile of the LPWBRF is high due to the *networks* created by the committee, and the *capital* that has accrued allowing a suite of successes. E1 stated: **A number of alliances have helped the LPWBRF to build capital assets**. The precursor to the LPWBRF's alliances appears to have been the strength of *capital and governance* of the LPWBRF committee (Birtch 2004d).

The role of *BR champions* has been central to BR governance at Long Point (Birtch 2004a). Two *champions* have been particularly important assets, in academic and BR network capacities (Birtch 2004a; Roots 2004). Their long-standing commitment is a testament to their belief in the BR concept and has provided a solid basis for *information management* - central to effective BR partnership and stewardship at a local level. Getting good information to the right places at the right times and in the right amounts has been achieved in this BR and most other Canadian BRs by the involvement of a CBRA member at each local BR level. But it has been difficult to maintain critical parties in the BR, as **there are only a finite number of 'sustainabilists' in the size of a region like Norfolk County (EC2)**. Perhaps as a result of this scarcity, and in an effort to raise more support, committee

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<sup>64</sup> The LPWBRF consists of, amongst others, a nurse, ecological scientist representing National Wildlife Areas, director of the National Salamander Monitoring Program, two representatives from the Ministry of Natural Resources, a representative of Norfolk County Parks and Recreation, a retired Professor, a representative from the Halton County Healthy Environment Team, a local horticulturalist and an interested community member.

members' sense of stewardship has manifest in many *innovative* ways, including a LPBR board members' charitable swim from one end of Lake Erie to the other, clean-up days for areas of the Long Point spit, and bicycling events to raise awareness about renewable energy.

The Long Point Cooperation Plan was a very effective *capacity-building* tool, enabling both *reflection* and future *vision*, for delineating attributes, opportunities, strengths and strategy for the LPWBRF. In deciding that the focus of the Cooperation Plan should be on community monitoring and environmental reporting, the board focused its attention to a particular service area. By doing so, the BR provides a tangible product which serves as a basis for the acquisition of *partners* interested in the service area and / or product. The Cooperation Plan stated that:

... community monitoring is a significant undertaking and is expected to attract new partners and re-engage current partners. Community monitoring also has a number of characteristics that make it a useful tool to generate cooperation at the community level. The activity is neutral, may benefit both the community and government, generates quality scientific information with the potential to improve adaptive management and provides a tool for continuous learning for volunteers and community members (Long Point World Biosphere Reserve Foundation 2002: 5).

The cooperation plan delineated goals for the BR in the areas of biodiversity conservation, sustainable development and capacity-building (Long Point World Biosphere Reserve Foundation 2002). These are outlined below.

#### *Biodiversity Conservation*

- 1) Over the next five years the LPWBRF, Ontario Power Generation and the Long Point Region Conservation Authority will restore 162 hectares of Carolinian forest on both public and private lands.
- 2) Continue the Forest Biodiversity Monitoring Project that has been operating for the past five years involving local students. The project will be expanded to include a set of monitoring protocols (tree health, lichens, worms and decomposition etc.). The Project will be linked to State of Long Point Environment Reporting that will be developed as part of this cooperation plan.

#### *Sustainable Development*

- 1) The LBWBRF will work for the protection of the Inner Bay through a sustainable approach to recreational and agricultural development. The recreational component will be accomplished through the implementation of specific projects designed to increase recreational infrastructure in the transition area. For example, the first of a series of projects focused on improving recreation will involve increasing recreational viewing opportunities in the Inner Bay. Government and NGO partners will be secured, an inventory of existing viewing opportunities carried out, options to improve, or add new viewing opportunities developed, and then construction initiated. The agricultural component will be accomplished through monitoring of ground and surface water and promotion of sustainable agricultural practices.

2) The LPWBRF will work with Norfolk County to establish a Norfolk County Environmental Advisory Committee. The committee has included sustainable development principles in its Terms of Reference.

#### *Capacity-building*

1) The BR, with its partners, will establish a community monitoring initiative, building on previous work of the LPWBRF (monitoring survey, brochure and studies produced by the University of Waterloo).

2) The community monitoring project will generate the information necessary for the production of a periodic State of the Long Point Environment Report. The BR will facilitate the design of the report, funding, partnership development and communication of results.

3) The LPWBRF has identified a number of educational and communication initiatives designed to build internal and community capacity. These include the updating of the LPWBRF brochure, preparation of a comprehensive presentation package on the Biosphere Reserve, hosting of an annual research conference, continued development of the website, preparation of newspaper articles, photo contest and updating the Biosphere Reserve display.

Through these goals, the LPWBRF employs a *polycentric approach* to the Long Point landscape, providing a centrepiece for facilitating and *coordinating* existing *capital assets* whilst focusing *innovation* and *governance* to achieve *shared value* outcomes. In a retrospective moment, EC2 highlighted the importance of a *polycentric approach* and the process of *social learning*, in relation to the development of the BR over time:

**I've learnt much over the last 10 years and if I had the time over again, I think that we should have focused less on creating a presence in the community and more on being a facilitator for partnership development. One of the reasons we wanted to have that presence was to overcome some negativism that was coming from several people in the community. We should also have empowered the existing NGOs and groups within the community to do the work. That is where I see us going further in the future - playing a more facilitating role.**

A recent and significant local revitalisation project highlights the *innovation* derived from *local champions* within the Long Point BR. In March 2007, the LPWBRF awarded a CA\$40 000 contract to Ecoplans Limited to conduct a feasibility study of potential improvements to the causeway that links the Long Point Peninsula on Lake Erie with mainland southern Ontario. An estimated 10 000 animals die on the causeway annually, according to surveys by the Canadian Wildlife Service- Environment Canada. Most are leopard frogs but 99 other species of frogs, turtles, snakes, birds, and mammals have been run over including rare and endangered species. So many turtles are being run over at Long Point that the causeway is now ranked the 5th deadliest road in the world for this animal. The study examined mitigation alternatives along the causeway, within the neighbouring marsh and throughout the watershed, and how similar projects were undertaken across North America.

The LPWBRF worked with Ecoplans to incorporate public comments in the final report. The project was guided by partnership between the LPWBRF, Environment Canada, the Canadian Wildlife

Service, the Norfolk Land Stewardship Council, Bird Studies Canada, the Nature Conservancy Authority, the Long Point Country Chamber of Commerce, the Long Point Region Conservation Authority, the Long Point Anglers Association, the Long Point Area Fish and Game Club, and the Long Point Ratepayers Association. These and other local organisations committed around CA\$10 000 towards the study and the LPWBRF planned to raise additional funds for the completion of the study. Individuals or organisations were encouraged to pledge funds towards the project, through a website request and through networking by the LPWBRF directors and members.

In another initiative, the LPWBRF held a conference in November 2006 entitled 'Building a Sustainable Norfolk Community' to engage community in planning for sustainability. The conference sought to change a widely held belief that the BRs are only environmentally focused. The conference was preceded, in October 2006, by consultation with various sectors of the community, using focus groups on agriculture, conservation, business, and social services. Facilitator, Dr Graham Whitelaw, a Director of CBRA, guided the 50 participants in four workshops to identify community and sustainable development issues.

The conference featured local products and displays by local organisations; a guest presentation by the Environmental Commissioner of Ontario; a nature film of Long Point by a local photographer; comments by municipal, provincial and federal dignitaries; a summary of findings from focus groups; a presentation on Norfolk County's Vision and Official Plan; a keynote presentation by Ontario Power Generation Biologist and past president of Ontario Nature, on 'Sustainability within a Generation - Imagine the Possibilities'; and breakout sessions on sustainability in four thematic areas (Caring for your Land: Conservation in Action; Think Globally, Act Locally; Building a Case for Sustainable Tourism; and Agricultural Diversification & Greening the Market) (Canadian Biosphere Reserves Association 2007a). A field tour was conducted by bus, with commentary provided by volunteers from local stewardship groups. Participants stopped at a number of conservation and agricultural sites, including a historic forestry station and a sustainable farm operation. With financial support from the Ontario Trillium Foundation and in-kind support from several local companies, conference admission was kept to CA\$20 for the entire weekend. The conference received local media coverage. The LBWBRF plans to reconvene the conference annually. According to the LPWBRF, much was gained by the conference, successfully raising the profile of the BR and increasing public appreciation for the local environment and community sustainability. The LPWBRF learned that residents genuinely care for the future of the BR and understand that protection of local natural features, sustainable growth and healthy communities are all essential components of the region's long-term health and wealth.

Whilst numerous successes are evident in the Long Point BR, it faces challenges similar to other BRs including:

1. lack of secure financial capital;
2. changing markets that have, and continue to affect, the agricultural sector. These market trends are changing the structure of farming. Larger industrial farms appear to be replacing the family farm, causing community tensions (regime change);
3. migration to the Long Point area is resulting in an older age demographic. Many lots near the lake are being purchased or created for retirement real estate and / or recreational

development. Further partnership with these groups is required to share social learning on the BR, with a potential source of further capital in this group;

4. exotic invasions appear to be on the rise especially over the last decade. Invasive species are having observable effects on local ecosystems and habitat. Natural capital is at risk without further remediation effort;
5. industrial and economic development trends are resulting in increased development in the Long Point area. Increased development is having an impact on the integrity of the natural environment and potentially on municipal services;
6. public knowledge of the fragile nature of the sand spit and Carolinian forests of the Long Point area appears to be decreasing (social learning needs to be supported);
7. there is increased demand for tourism in the reserve, however, there is no long-range plan to balance new tourism with environmental or cultural protection. Demand is focused on waterfront property, marina development, resort development and hunting (management and planning needs to recognise and steward natural and social capital rather than just financial capital); and
8. reduced funding from government has resulted in fewer environmental projects and a reduction in local government concern for the environment. Development appears to be taking precedence over environmental protection. Partnerships are a key to reversing this trend (Francis and Whitelaw 2001).

Although there are numerous challenges, identification is a vital step in their resolution. Factors such as emigration and lack of strategic planning for profitable new sectors such as tourism have been recognised and documented by the LPWBRF. In doing so the LPWBRF differentiates itself as an insightful, concerned collective. The committee represents a significant *capital asset* when compared to communities of a similar size which are often lacking such comprehensive, big picture voluntary committees to evaluate the hindrances and assets of their local region.

#### **8.3.4 Lessons for Resilience**

It seems reasonable to predict that Long Point and the mainland to which it lends its name will be here for centuries yet to come. If Canadians continue their present course, however, present residents and their descendents cannot be assured of continuing health and prosperity with the same degree of certainty (Barrett 2000).

Based on the preceding data and the lessons articulated below, the LPBR represents Phase III of the BR Resilience Conceptual Framework, as it meets the requirements of a resilient working landscape. The LPWBRF has focused much of its logistics work on the transition zone (monitoring and stewardship), providing community leadership (especially in the area of monitoring), providing *collaborative* opportunities through neutral forums for the area's organisations and agencies to discuss issues, and in pursuing *innovation* and funding through *partnerships* and community events. Through *polycentric* arrangements, the BR has made efforts to collect, analyse and report information through the Leading Edge Conference Series, the local newspaper and the BR web site. The BR is also working toward a big picture tracking system and clearing house role to facilitate *interdependent and equitable information sharing* (Long Point World Biosphere Reserve Foundation 2004). This would further support existing *resources and expertise, information sharing and management*, joint research, *social learning*, and build *understanding and collaboration*.

The LPWBRF has taken a *polycentric approach* for the Long Point BR. Through their *interdependent collaborations* with local institutions including local government, industry, NGOs, user groups, management authorities (Parks Canada), universities and the community, a number of *capacities* have been built through *coordinating* efforts. This increased capacity allows for a greater degree of *reflexivity and adaptability*. Education of the public and institutions, resolution of disputes, sharing of management responsibility, making decisions through building support, solving common problems and building concurrence are some of the outcomes of this BR's governance approach, in which *complexity and uncertainty* are reduced.

The LPWBRF has been *innovative* in mobilising a diversity of *capital assets*, by obtaining funding through partnering with OPG whilst simultaneously fulfilling their own mandate as well as community, industry and environmental objectives. Their alliance with OPG provides a useful example of a positive relationship between large industry and community in the fulfilment of *shared value*, whilst creating *institutional change, openness, and interdependent partnerships* (industry supporting local civil society agencies). The search for these partnerships is led by the Board of Directors who are bolstered by experiences of success in operating the BR. From their incremental achievements, renewed energy is gained and further *capital* mobilised to support this BR's adaptive capacity.



## 8.4 Clayoquot Sound Biosphere Reserve, British Columbia

### 8.4.1 The Environment

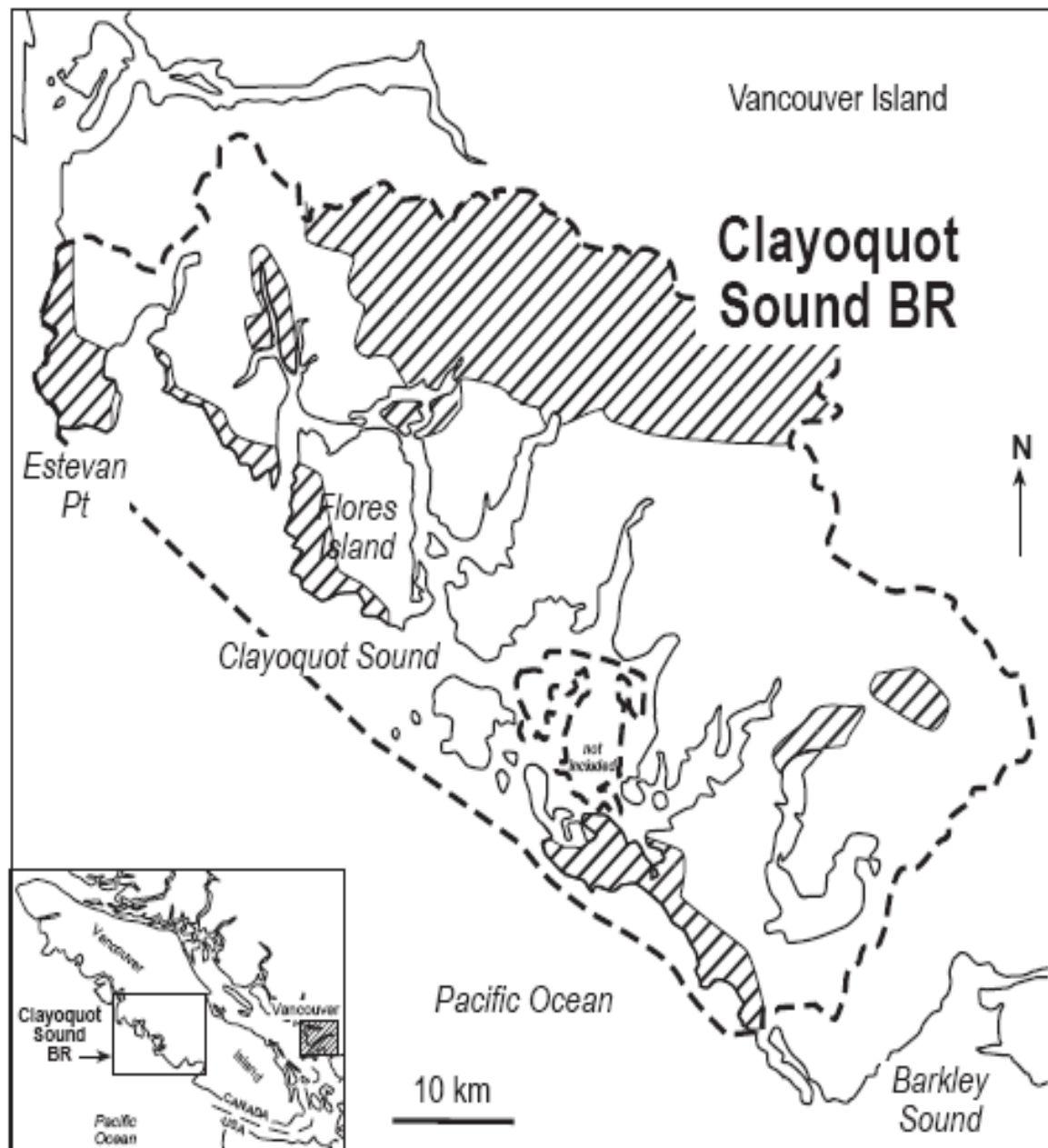
Through numerous land-use planning exercises and government policy initiatives, Clayoquot Sound has become defined geographically as a 350,000 ha collection of islands, fjords, beaches, mountains, forests, lakes, and streams. The Clayoquot Biosphere Reserve is situated in the central western region of Vancouver Island and covers nearly 350,000 ha (approximately the size of Prince Edward Island) (Figure 15, pg. 187). The BR contains large tracts of temperate rainforest, lakes, rivers and streams, alpine slopes, inshore marine areas, mudflats and wild coastal beaches. Core areas include the Long Beach Unit of Pacific Rim National Park Reserve and over 95 000 ha of Provincial Park.

Clayoquot Sound receives over 3000 mm of rainfall per annum, supporting a diverse range of over 4500 species of flora and fauna. The temperate rainforests of the area contain some of the world's largest and oldest trees, including the largest known living cedar tree in Canada. The region is also home to one of the largest remaining stands of old-growth temperate rainforest in the world. Vegetation communities of the region vary from coastal temperate rainforest dominated principally by western hemlock (*Tsuga heterophylla*), as well as western red cedar (*Thuja plicata*), amabilis fir (*Abies amabilis*), western yellow cedar (*Chamaecyparis nootkatensis*); to temperate rainforest over 900 metres above sea level, dominated by mountain hemlock (*Tsuga mertensiana*), western yellow cedar and amabilis fir; alpine tundra with a limited range of alpine plant species; as well as numerous streams, rivers and freshwater lakes; and marine coastal ecosystems including eelgrass (*Zostera marina*) and bull kelp (*Nereocystis luetkeana*).

The marine and terrestrial components of the BR, including protected core areas, provide habitat for a vast array of species, a significant number of which are endangered or rare. It also provides vital feeding, breeding and staging habitat for resident, migrating and transient populations of birds, marine mammals, fish and terrestrial mammals. As development in this region increasingly results in fragmentation of forest and alpine ecosystems and the loss of biological diversity in coastal rainforests, the core areas of the BR provide a refuge and centre for natural dispersion and re-establishment of species.

Described as 'the most complicated political ecosystem in the world' (Parks Canada 2004: no page), Clayoquot Sound has been the scene of heated clashes between environmentalists and forestry companies. The controversy has been over protection of ecosystems, visual aesthetics, tourism and large-scale industrial forestry. Although widely publicised for controversy regarding its old-growth forests, Clayoquot has also been the site of conflict over park development, aquaculture and First Nations treaty claims. The forests are part of the little remaining coastal temperate rainforest which once lined the west coast of North America. The communities of Tofino, Ucluelet and Port Alberni are the main population centres of the area, and have been extensively involved in the politics of Clayoquot Sound.

**Figure 15 Clayoquot Sound Biosphere Reserve**



**Note:** The dashed line at perimeter - boundary of the BR.  
 Diagonal striped zones - core zone area.  
 Short dashed area in centre - exclusion zone.  
 Remainder is combination of buffer and transition zones.

Source: Clayoquot Biosphere Trust (2004: no page).

#### **8.4.2 History of the Designation**

For decades, the wealth of natural resources and wilderness values in Clayoquot Sound resulted in conflict over resource uses. In 1993, the British Columbian Government made a land use decision that sought to ensure environmental protection and the economic health of local communities (Clayoquot Biosphere Trust 2004). Almost 900 square kilometres — 34 per cent of Clayoquot Sound — was reserved as provincial parks and ecological reserves. This core area forms a natural reserve linking the interior mountains to the ocean shore. It includes the largest intact watershed on

Vancouver Island, significant old growth forest, lake and river salmon spawning habitat, rare marine ecosystems and 29 rare plant species (Clayoquot Biosphere Trust 2004).

But the contention preceding this decision began in 1979 when the village of Tofino wanted to protect the integrity of its water supply and viewscape on Meares Island. The Pacific Rim National Park had been designated in 1972 and Tofino was slowly developing a tourism market. The forestry company, MacMillan Bloedel had finished clearcutting all of Barkley Sound to the south, and was moving up to Clayoquot Sound and Meares Island. A battle grew, overtaking concern for vistas and water supply, to the preservation of Clayoquot's old growth forests (Esakin 2001).

In 1991, the Clayoquot Biosphere Project was formed representing the first organisation to raise the idea of a BR for Clayoquot. In the summer of 1993, 10 000 people converged in Clayoquot Sound to protest and blockade against the forestry industry. Over 830 people were arrested, marking the occasion as the biggest case of civil disobedience in Canadian history, and later, the country's largest mass trial (Esakin 2001).

In an effort to ensure that British Columbian forest stewardship stood up to world scrutiny, in late 1993 the Provincial Government established an independent Scientific Panel for Sustainable Forest Practices in Clayoquot Sound (Boyчук 2004; Francis 2004b). The panel's recommendations were accepted by the Provincial Government, and implemented. But concern arising from the Nuuchahnulth Central Region First Nations regarding the land use decision led to extensive negotiations with the province. The parties signed an Interim Measures Agreement in 1994 which established the Central Region Board, a joint First Nations / Non First Nations management Board, to provide local consultation and decision making on resource related issues (Boyчук 2004).

Logging was stopped in the Sound between 1994 – 1998. In the summer of 1996, in response to Federal Environment Ambassador John Fraser, Premier Clark indicated that the Provincial Government was willing to consider a BR designation. This support was given on the proviso that there was significant local support and a BR would not disrupt existing planning initiatives and implementation of the recommendations of the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. But under the same Premier, limited logging was allowed to resume in 1998. McMillan Bloedel, the company involved in much of the forestry controversy, was engaged the same year in a difficult and protracted dispute. This dispute was one of many during years of conflict with environmentalists, local communities, native peoples, labor unions and government agencies over logging practices, and ultimately provided the impetus for federal government intervention.

A working group developed the BR nomination and consulted with local people and stakeholders on the proposed designation, through a series of public forums and workshops. The working group represented the Nuuchahnulth Central Region First Nations (the Ahousaht, Hesquiaht, Tla-o-qui-aht, Toquaht, and Ucluelet), the District of Tofino, District of Ucluelet and 'Area C' of the Alberni-Clayoquot Regional District. The Central Region Board, environmental organisations and private sector interests also supported the nomination process. The local community empowered the Clayoquot Sound Biosphere Nomination Working Group to move forward on securing a BR

designation, and provided initial contributions to a trust fund to support research, education and training in the region.

With this support, the BR designation was sought for Clayoquot Sound in recognition of regional initiatives to balance protection of the environment with support for sustainable local communities. In January 1999, the communities of Clayoquot Sound in partnership with federal and Provincial Governments officially applied to UNESCO through the Canadian Commission for UNESCO to nominate Clayoquot Sound as Canada's first marine-inclusive BR. All parties agreed that the designation would be based upon recognition, respect, and acknowledgement of:

- the rights, interests and stewardship responsibilities of First Nations and other local communities;
- the need for diversified local economies, including renewed and vibrant fisheries and forestry sectors, as well as tourism, aquaculture and new opportunities;
- the need to better understand natural and economic processes through the application of traditional and local knowledge and scientific research, inventory and monitoring efforts;
- the training and education requirements of local people, researchers and students from around the world; and
- the role of youth and elders in designing a sustainable future (Clayoquot Biosphere Trust 2004).

In May 2000 the Canadian Prime Minister, B.C. Premier Ujal Dusanjh and many other dignitaries and residents of local First Nations and local communities officially received the BR designation for Clayoquot Sound, and an unprecedented CA\$12 million Government of Canada grant for the Clayoquot Biosphere Trust (CBT).

The CBT was established to represent the region of the BR including those communities adjacent to the BR boundaries. Hence, the CBT became federally registered, British Columbia incorporated, non-profit charitable organisation, responsible for the spirit and intent of the BR (Clayoquot Biosphere Trust 2004). According to Esakin (2001) the CBT aims to promote and demonstrate a balance of four specific areas: the Nuu-chah-nulth First Nations, sustainable development, biodiversity conservation, and healthy communities. This is achieved through a Board of Directors comprised of representatives from local First Nations and communities, who are responsible for both managing an endowment fund and developing guidelines for program funding.

#### **8.4.3 Governance and Capital in the CSBR**

Interest accrued to the CBT-administered CA\$12 million donation from the Federal Government finances several offices with full time staff, including amongst others, a community liaison officer and executive director (Stan Boychuk). This massive injection of *financial capital* was the solution proffered by the Federal Government to resolve the political loggerhead between conservationists and industry. A BR was seen to be an apolitical solution, overseen by a representative board, applying UNESCO objectives and deliberating political issues locally. In doing so, a BR provided a *new governance* solution to a fraught political environment in a way not previously seen in Canada. It also created a BR perceived within the Canadian BR community, to be vastly different to other BRs,

due to its *financial capital* security and creation as a *formal institution*, somewhat disconnected from the common struggles and opportunities of BR governance.

The original inhabitants of Clayoquot Sound, the Nuu-chah-nulth people, have a guiding philosophy of Hishuk-ish ts'awalk, meaning 'everything is one' or 'interconnected'. They recognise that communities, cultures, economies and environments are interwoven and affect one another (*connectivity*): the same assertion implicit to BRs. As a region of great importance to First Nations, the culture is evident throughout the landscape - shops display local wares and artwork, interpretation centres tell of the local heritage and First Nations stories, and communities of First Nations tribes reside in their respective watersheds. First Nations comprise approximately fifty per cent of the population. The First Nations presence here has arguably facilitated and expedited the vision of a BR for the region (Francis 2004a). The First Nations culture has informed the BR through *multiple-knowledges, place-attachment, social learning, capital sources, collaboration, networking and partnerships*.

The offices of CBT cover three major centres (Tofino, Ucluelet and Victoria) providing an *institutional, financial and social capital resource* to individuals or groups seeking to undertake or participate in BR related activity. The Board of the CBT has 12 members with equal representations from Nuu-chah-nulth First Nations and local communities. Members on the CBT Board serve four year terms which may be staggered. There are ex-officio members from three federal departments, and a provincial agency. The Board can appoint additional ex-officio members. This arrangement is set in the context of ongoing Treaty negotiations with the First Nations.

The CBT mandate states that its task is to enable the Clayoquot Sound BR region community to be a model of ecosystem-based management and sustainable development and achieve this vision by providing funding and logistical support for research, education and training initiatives that promote these attributes. Therefore, the main difference between other BRs and the Clayoquot Sound BR is that its governance arrangement centres on the management of the CA\$12 million trust fund to provide *financial and other capital* to activities commensurate with the objectives of the BR. Thus, the governance arrangement of the CBT arose as a professional one, even necessitating a trade mark (Roots 2004).

The CBT seeks representation on its Board of Directors, but does not, as is the case with other BRs, need to maintain its sources of *financial capital* through *partnership and collaboration*. **The CBT arguably operates as the umbrella organisation to many of the CSOs, NGOs and other institutions in the region, where collaborations are based often on monetary assistance to these institutions, for dispersal of capital that meets the BRs objectives (EC2).** Therefore, the way in which *capital, collaboration and knowledge sharing/ building* arises in this BR is significantly different to other BRs (Jamieson et al. 2008).

CBT funds initiatives based on several criteria including: a strong preference for locally-based proponents and activities (*place-based*); matching resources (money and / or in-kind contributions); respect for local protocols (*social capital, knowledge sharing and social learning*); potential for

developing local capacity (*capacity-building*); communication of results locally (*information sharing*); assisting to achieve the goals of the CBT (*interdependent, partnerships*); and supporting the spirit and intent of the BR designation (*shared values*). Six different types of funding are available to projects that meet these criteria: scholarships, event sponsorships, executive director discretionary funding, athletic team sponsorship, committee funded projects and funds for an annual call for projects. Examples of the diverse projects funded by the CBT are shown in Table 13 (pg. 192) where *innovation* and *experimentation* are clearly hallmarks of the projects sought. Despite the CBT operating within its own set of governance tensions, the projects arising from the funding and collaborative ventures offered by it to other groups, consistently fulfil the various objectives of the BR.

**Table 13 A selection of CBT Project Grants – 2006**

<b>Project</b>	<b>Proponent</b>	<b>Description</b>
Youth and the Biosphere Program	Tofino Botanical Gardens Foundation	Development of a curriculum for a Sustainability Camp, a six-day camp for Grade 6-7 students. The goal of the camp was to increase youth knowledge and awareness about the environment with the hope that increased awareness will help to modify the behavior of future generations
Stellar Sea Lion Project	Pacific Rim National Park Reserve	Determine the seasonal abundance and movements of Steller sea lions in the Clayoquot Sound Biosphere region and sex and age classes at haul outs within and adjacent to the CSUBR region
Intertidal Education Material	Ucluelet Aquarium Society, Pacific Rim National Park Reserve, Raincoast Education Society	The creation, production and distribution of three related educational publications about the intertidal zone
Community Action Life Skills & Leadership Program	Outdoor Recreation & Sports Tourism	Wickaninnish Community School in partnership with School District 70 (Alberni) and the District of Tofino partnered to involve students from grades 5-7 in film making, a pre-teen advisory council, a mentoring program with grade 1 students, and a work experience program
Baseline Economic Data & Indicators	Tofino Business Association	Work with regional business organisations and communities to establish an economic data collection framework for the CSUBR. The results of this project supported the CBT's Measuring Community Health Initiative
Fish Mort & Offal to Biofuel Feasibility Study	BC Environmental Youth Alliance	An in-depth feasibility study for producing biofuel from waste generated by the aquaculture industry in the CSUBR
FN Cultural Digitising Project	Hesquiaht First Nation	Preserve historical materials containing cultural knowledge including recordings of Hesquiaht elders through digitisation. The materials secured through this process are now used as an educational tool in the Hesquiaht First Nation School
Nuu-chah-nulth Language Centre	Nuu-chah-nulth Central Region Language Group	A website serving as an outreach mechanism for individuals to access the Nuu-chah-nulth Barkley dialect language lessons, learning tools and heritage and culture reference library
Bear Smart Community Development Planning	West Coast Bear Aware Committee	Design a 'Bear Smart Community Planning' program with requirements necessary to prevent bear-human conflicts. Developers will be required to complete as part of their development proposal
Canopy Study - Arboreal Biodiversity across Spatial Scales	University of Victoria, Biology Department	Diversity patterns over multiple scales within and across old growth forest watersheds using hierarchical analysis to increase understanding of how alpha and beta diversity change across spatial scales (i.e. tree crowns to watersheds)

Source: Clayoquot Sound UNESCO Biosphere (2007b: no page).

For instance, the Clayoquot Alliance for Research, Education and Training (CLARET) was a unique *partnership* founded on forging creative links between the University of Victoria and the communities of Clayoquot Sound. The arrangement provides a forum in which community interests and needs become academic concerns, and makes education and training resources of the University more accessible in the region (*information sharing and social learning*). CLARET ran between 2001-2004 and represented a formal *collaboration* facilitating the research, education and training component of the Clayoquot Sound BR. The outcomes of CLARET are compiled in the CLARET Research and Document Database hosted on the CBT website.

A variety of other partnerships in the Clayoquot Sound BR region illustrate the development, sharing, fostering and stewardship of all forms of *capital* alongside *partnerships*, *institutional collaboration*, *openness*, *capacity-building*, *place-based social learning* and *multiple knowledges*. These include:

- a regional information system partnership with West Coast Vancouver Island Aquatic Management Board, allowing for community access to maps, reports, archives, and data;
- the Central Region Language Project, supporting the Nuuchahnulth Central Region Language Group;
- Iisaak Sustainable Forestry Project, which supports research, planning and training;<sup>65</sup>
- Wichanninish Community School adult literacy project; and
- the Protocols Project to ensure mutually beneficial research collaborations between local communities and researchers in ways that maximise benefits, share burdens fairly, minimise risks, support local participation and make research results more locally meaningful (Clayoquot Alliance for Research 2004).

At the time of the research visit to the Clayoquot BR in 2004, the governance arrangement of the CBT was different to its present form. Whilst the Clayoquot Biosphere Reserve appeared, on paper, to be an 'ideal' BR with *financial and institutional capital*, the participation of disparate sectors of the community with *multiple knowledges*, a wealth of *natural capital*, and a trust to oversee a complex governance environment, reality suggested otherwise. Although the envy of all other Canadian designations, the politics associated with the endowment is significant (as described below) (Birtch 2004d).

In an opportunity to observe a CBT board meeting, I found its operation to be fraught with tension and bias. In contrast to other BR committees, CBT was a business, concerned with conduct of the financial obligations associated with the trust and an associated *power struggle*. The operation of the board was very preoccupied with monetary matters and there was little mention of the BR per se. The operation of the BR and the operation of the trust were seen as two separate issues. The CBT's Director in 2004, Stan Boychuk, reflected that the role of the CBT was to allocate the funds and

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<sup>65</sup> The Iisaak Sustainable Forestry Project (ISFP), as a partnership between Iisaak and the Clayoquot Biosphere Reserve, shares the Nuuchahnulth values of Iisaak, respect, and Hishuk-ish ts'awalk, the interconnectedness of all things (Wilson 2002). Through training and professional development initiatives, the ISFP will provide to the Central Region Nuuchahnulth First Nations capacity-building opportunities. Based on Iisaak's 'Quadruple Bottom Line' (Wilson 2002) of economic, environmental, social, and cultural sustainability, the ISFP will expand upon the monitoring work of the Long Beach Model Forest. This monitoring program will aid in the determination of sustainable forest management for Iisaak, as well as the future management of the Zones of Cooperation within the Biosphere Reserve.



capital for BR related activities to other groups or institutions, providing a devolution role (Boyчук 2004). However, based on the strong personalities present, any attempt at cooperation between the members of the board, even on simple matters, was quite difficult. There was much discussion regarding the dysfunctional state of the board. One member left the aforementioned meeting due to an argument with another board member. A comment as he left the meeting suggested underlying *power sharing* problems:

a BR assumes that the committee is functional, to be direct, unbiased and open-minded, but this Board is not cooperating – how can we engage the sparring sectors of the community if we can't even agree? (Anonymous).

The Clayoquot Biosphere Trust (2004) states that in a region once fragmented by controversy over land use management, the BR initiative has united people and communities in a *shared vision* and common interest - an understanding of Hishuk-ish ts'awalk — and an abiding sense of caring for their surroundings and the future of their communities (*place-based*). However, if the operation of the CBT in 2004 was an adequate measure, it would seem that the endowment allocated to the region by the Federal Government, whilst creating many positive outcomes, also created new tensions and conflicts, causing a shift from a predominantly resource / conservation regime to a predominantly political / financial regime.<sup>66</sup>

Since this time, the CBT has worked to overcome internal tensions, through allowing greater *openness* by seeking volunteer input by the community. In spring 2005, the CBT Board agreed to a new approach to community consultation and engagement through the formation of five volunteer-based advisory committees. In the establishment of these committees the CBT aims to achieve broader community awareness and engagement with BR activities (*knowledge sharing, social learning*), more inclusive and active participation of community members (*capacity-building, partnerships*), informed input and advice on project proposals, spending priorities and input to the annual CBT business planning process (*capital assets*) (Clayoquot Sound UNESCO Biosphere 2007b).

Membership on the committees is determined through a public membership drive and through recruitment of local experts. The committees provide support and make recommendations to the Board of Directors for approval of community based research, education, training, and capacity-building. A major function of the committees is to build relationships in the communities through *collaborations* of people involved and through their individual *networks* of influence (Figure 16, pg. 195) (Clayoquot Sound UNESCO Biosphere 2007b). The committees represent the theme areas of Marine and Aquatic, Terrestrial, Education, Culture and Community Development.

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<sup>66</sup> Whilst the tension between the resource / conservation regime was still present, the predominant tension was one of a political (power sharing) / financial regime struggling to maintain its stated goals with its actual performance.

**Figure 16 A CBT Advisory Committee**

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Source: Clayoquot Sound UNESCO Biosphere (2007b: no page).

The Committees have an allocated budget for their operation and support staff to assist in their work. Limited discretionary resources are allocated by the CBT Board for each committee to undertake research, facilitate specific projects as agreed to by committee members, and support logistical requirements. Committees have the authority to spend discretionary resources on small or short-term research and / or projects in support of their planning and advising functions. The committees can invite ex-officio input to assist them in their work. This input is sought from experts capable of advancing the goals of the BR and the work of the committees. All committee meetings are open to the public and meeting dates, times and agendas are announced publicly. Meetings are scheduled throughout the BR region.

The BR, through its ability to fund a variety of research applications, provides facilities for community and scholarly use. For instance, in 2000 the CBT took possession of the Clayoquot Biosphere Project Research Cabins at Clayoquot Lake and Sydney Inlet. These cabins are available to scientists as a base for their work in the BR region (Figure 17).

**Figure 17 Sydney Inlet Biosphere Research Cabin**

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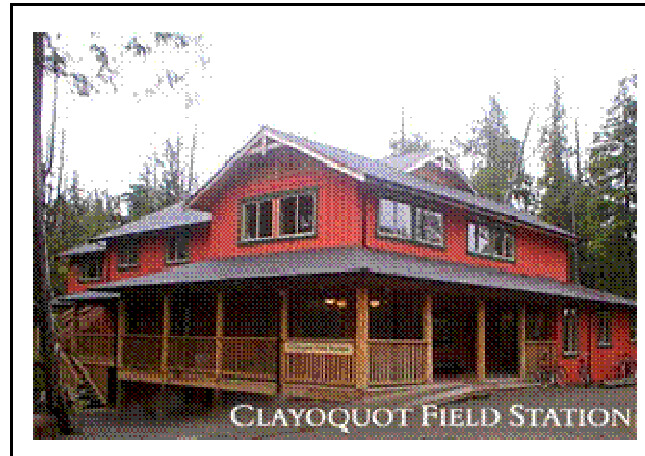
Source: Clayoquot Sound UNESCO Biosphere (2007a: no page).

A second facility, the Clayoquot Field Station, is located at the Tofino Botanical Gardens and operated by the CBT and Tofino Botanical Gardens Foundation. This dormitory-style facility opened in 2006 and can accommodate up to 32 people, providing an ideal setting for research and education in the region (Figure 18, pg. 196). The facility provides an affordable venue for students, researchers

and visitors engaged in learning and discovery. The Clayoquot Field Station is an interdisciplinary facility, which encourages interactions between students and researchers, writers, artists and philosophers (Clayoquot Sound UNESCO Biosphere 2007a).

**Figure 18 Clayoquot Field Station**

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Source: Clayoquot Sound UNESCO Biosphere (2007a: no page).

Other research related resources that the CBT has provided and jointly developed include the following:

1. Community Research Needs: CLARET compiled a list of community research needs related to aquaculture, community health, marine resources, and tourism, each identified collaboratively through a number of interviews, meetings and community events, to align academic research with community needs and concerns (Clayoquot Sound UNESCO Biosphere 2007b).
2. The Long Beach Model Forest Library Index Search: The Long Beach Model Forest Library was acquired jointly by the Clayoquot Biosphere Trust and the Nuuchahnulth Central Region Chiefs in 2000. This resource is housed at the Clayoquot Biosphere Trust office in Ucluelet (Clayoquot Sound UNESCO Biosphere 2007b).
3. The Clayoquot Archives: Located at the CBT office in Ucluelet, the archives are a collection of primary documents related to the politics of land-use in the Clayoquot region. The original collection was established in 1996-99. Documents were collected or copied from a wide variety of sources, including individuals, private organisations and government agencies (Clayoquot Sound UNESCO Biosphere 2007b).
4. The Clayoquot Documents: A selection of the most interesting documents in the Clayoquot Archive are organised into three volumes. The first and second volumes deal with the period from about 1988 to 1997, while a third volume of later documents has since been added (Clayoquot Sound UNESCO Biosphere 2007b).
5. Clayoquot Sound Biosphere Reserve Governance Related Publications: This bibliography, compiled by George Francis in 2005, comprises a number of publications that address resource management issues in Clayoquot Sound, especially the controversies around clear-cutting forests. Others use the BR region as a case example directly, or in passing, for discussion of some larger themes of policy, politics, and practice. Most have been

published within the past ten years. The list overlaps, but is not the same as the reference materials compiled by the CLARET project (Clayoquot Sound UNESCO Biosphere 2007b).

6. WCVI Information System Web Atlas: The West Coast Vancouver Island (WCVI) Information System is a cooperative project between the CBT, the Nuuchahnulth / West Coast Vancouver Island Aquatic Management Board and Uu-a-thluk. The purpose of the WCVI Information System is to increase access to, and sharing of, information about the communities, ecosystems and their uses along the west coast of Vancouver Island. The atlas, hosted by the British Columbian Community Mapping Network, contains a range of information about the region. The atlas is regularly updated with new information (Clayoquot Sound UNESCO Biosphere 2007b).

#### 8.4.4 Lessons for Resilience

Based on the preceding data and the lessons articulated below, this BR is indicative of a Phase III BR in the BR resilience conceptual framework. As the CBT was unprecedented and arose through a contentious cultural, conservation and resource disjunct, governance hurdles were always going to be a part of this BR's development. The fact that the CBT has been able to address and overcome some stagnancy issues by shifting to a increasingly *community-oriented* arrangement to be *equitable* and *representative*, suggests that *capacity* has been built, *openness* increased and *multiple knowledges* integrated. Clearly, the ability to disseminate resources and expertise is heightened from full time BR staff, who share the values of the BR and its cultural context. The high profile of First Nations and the familiarity of their beliefs to that of the BR mandate has helped enhance social-ecological understanding amongst the Anglophone community.

As one informant suggested, ... **if BRs want to make an impact, they can provide a unique model of community governance that transcends political boundaries (EC2)**. This BR has been successful in creating a bioregional solution, and despite a top-down instigation, the CBT has worked through a suite of governance issues to allow *cooperation* and *networks* across political boundaries. Through the CBT and the endowment, a foundation of existing, new and potential *capital assets* was created and a basis for understanding formed, with agencies and organisations developed and an *interdependent and equitable agency* established. Whilst the BR has certainty and *security of financial capital*, distributing proportions of that fund to CBT supported projects and agencies has, at times, proved difficult. Problems with regard to *collaboration and networking* (solving common problems, building concurrence and support, and coordinating efforts) were clear in 2004.

*Interdependency, equity, collaboration and networking* are evident since the establishment of community advisory committees. Through *place-based learning* (CBT to public and visa versa) these committees provide forums to: raise, discuss and resolve disputes and common problems related to social-ecological issues; the opportunity to *coordinate* effort across jurisdictions and agencies; increase concurrence and support; make wise decisions that are supported through mutual formation; and share management responsibility. Cumulatively, these changes have built *capital assets*, *new governance* outcomes, and *adaptive capacity*.

The result allows the BR to work on time horizons unavailable to those actors working alone. Alternatives are envisaged and facilitated by *knowledge sharing and social learning*. These activities

then *build staff and community capabilities*. For example, the Central Region Language Project and the Iisaak Sustainable Forestry Project are outcomes of these *new governance* arrangements.

The *power sharing* problems evident in 2004 appear, based on the changes to the governance arrangements discussed above, to have been overcome. The *partnerships* established for research, education, conservation and culture have resulted in a *polycentric network* of actors that is managing *complexity and uncertainty* through multiple joint arrangements, investigating the social-ecological parameters of their *place* through research and fact-finding. The BR, operationalised through these means is more efficient, *mobilises more capital assets* and *shares information*. Therefore, as long as the CBT maintains *ecologically rational institutions and relations*, initiates *innovation / experimentation* and stewards *new governance* principles, the CBT will continue to build *adaptive capacity*.

## 8.5 Mount Arrowsmith Biosphere Reserve, British Columbia

### 8.5.1 The Environment

Located on the east coast of Vancouver Island in British Columbia, the Mount Arrowsmith Biosphere Reserve (MABR) is situated in the Coastal Douglas-fir (*Pseudotsuga menziesii*) biogeoclimatic zone. The forests were heavily logged in the early 1900s and today the forest industry remains of economic importance to the region.<sup>67</sup> Covering a land and marine area of 118 592 ha, from alpine areas on Mount Arrowsmith at 1817 metres (Figure 19), to 300 metres depth in the Strait, the vertical range from mountain peak to seabed makes the MABR unique among Canadian BRs. The MABR, thus represents a diverse range of natural features, resulting in numerous biogeoclimatic zones and sub-zones as temperature, moisture and nutrient regimes change.

**Figure 19 Mount Arrowsmith in winter**



Source: Federation of Mountain Clubs of British Columbia/ The Alpine Club of Canada (2007: no page).

Rare flora and fauna within the MABR include the rare Garry Oak-Arbutus community and Shore Pine-Cladina-Kinnickinnick plant community. The composition of major species communities include alpine tundra with *Cassiope spp.*, *Phyllodoce spp.*, *Saxifraga spp.*; mountain hemlock dominated by *Tsuga mertensiana*, *Abies amabilis* and *Chamaecyparis nootkatensis*; coastal western hemlock dominated by *Tsuga heterophylla*, *Pseudotsuga menziesii* and *Thuja plicata*; coastal douglas-fir dominated by douglas-fir and *Alnus rubra*, *Acer macrophyllum*, *Abies grandis*, and *Arbutus menziesii*; estuarine with salt tolerant herbs and forbes; and marine habitat with *Nereocystis sp.*, *Zostera sp.*, and *Fucus sp.*

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<sup>67</sup> The other main sources of income for local residents include tourism, service industries and fishing.

The MABR is located on the Pacific flyway, and provides critical migration and wintering habitats for over 220 avian species. Over 100 000 migrating waterbirds, including Brant, American wigeon, Mallard, Goldeneye, and Harlequin duck use the estuaries and coastal areas annually. Furthermore, all upland mammal species found on Vancouver Island occur within the MABR. Five species of salmon and a species of trout are found in the Englishman and Little Qualicum Rivers, whilst many marine mammals live along the coast. Harbour seals are year-round residents, and California sea lions are particularly abundant during the winter and spring.

The MABR includes the City of Parksville, the Town of Qualicum Beach, and the smaller centres of Coombs, Dashwood, Errington, French Creek, Hilliers and Nanoose Bay, along with the rural areas in between (Figure 20, pg. 201). Approximately 38 000 residents live permanently in the area, with a seasonal increase of up to 43 000 (Mount Arrowsmith Biosphere Reserve Foundation 2004). According to Fraser and Jamieson (2003) the MABR has become a Canadian retirement destination and is presently experiencing tremendous population growth from people in older demographics. Forecasts suggest that the current population may increase by 50 per cent in the next ten years as the post-World War II population boom reaches retirement age. Due to the retirement focus, over 50 per cent of the MABR's population is over the age of 45, compared to a provincial average of just 33 per cent (Jamieson 2004). The area is under continuous urban development pressure, mainly from retirement developments and their associated service requirements.

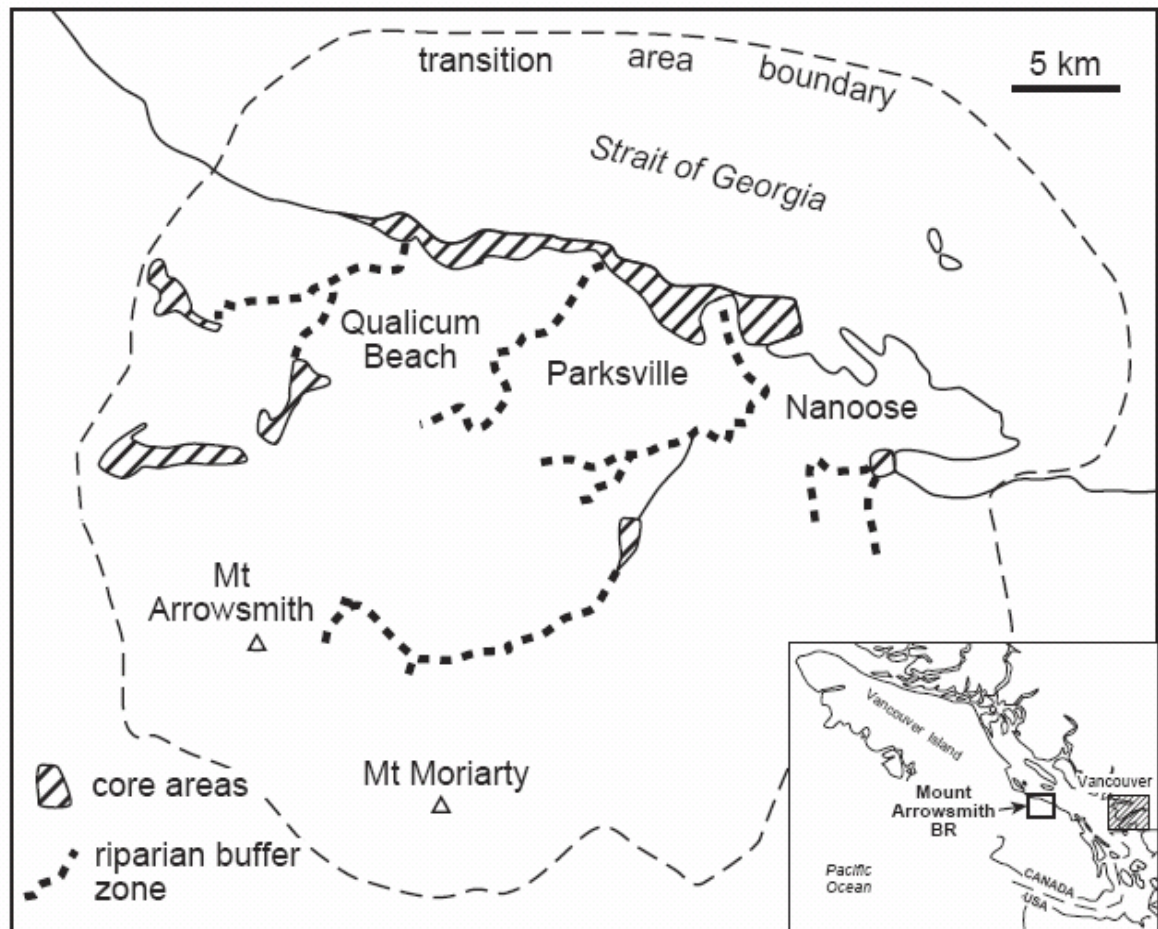
Most of the MABR is managed for forestry. Although there is no legally protected core area,<sup>68</sup> the MABR looks, to a layperson, to be a forested and undeveloped landscape. It is however, a highly modified working landscape, planted in mono-culture tree farms. Most forested land is privately owned and managed (partly due to the Esquimalt and Nanaimo Land Grant), making south-east Vancouver Island unique in the province by the almost complete absence of crown-owned forest land. The categories of land within the MABR are illustrated in Table 14 (pg. 202).

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<sup>68</sup> According to Fraser (2002: 9) 'Rather than the traditional concentric circular boundary design, the Mount Biosphere Reserve is centered around a number of small core areas, each in turn focussed on water features within the Mount Arrowsmith watersheds. The buffers represent riparian areas around the waterways within the reserve. The transition area boundary is an irregular line based on watershed boundaries and the waters flowing into the Strait of Georgia between Nanoose and Dashwood. The following core areas represent the conservation components of the MABR: Qualicum National Wildlife Area, which includes the Little Qualicum River, Nanoose Creek and Bonell Creek estuaries; Parksville/Qualicum Beach Wildlife Management Area, which includes the Englishman River estuary; 17 km of foreshore between Craig Bay and the Little Qualicum River estuary, and much of the riverine habitat up the Englishman River from the coast to Englishman River Falls Provincial Park; Englishman River Falls Provincial Park; Little Qualicum Falls Provincial Park; Rathrevor Beach Provincial Park; MacMillian Provincial Park; Spider Lake Provincial Park; Arbutus Grove Provincial Park and; Mount Arrowsmith Regional Park. The conservation function of each of these core area components differs based on the mandate of the management agency that established it'.



**Figure 20 The MABR area**



Source: Mount Arrowsmith Biosphere Reserve Foundation (2002: 1).

**Table 14 Categories of land within the MABR**

a) Federal Crown:	Qualicum National Wildlife Area
b) Provincial Crown:	Parksville/Qualicum Beach Wildlife Management Area Englishman River Falls Park Little Qualicum Falls Park Rathtrevor Beach Park MacMillan Park Provincial Forests Mount Arrowsmith Regional Park
c) Municipal Lands:	City of Parksville Town of Qualicum Beach Regional District of Nanaimo Regional District of Clayoquot-Albernie. Islands Trust
d) Native Lands:	No reserves, but local First Nation peoples are negotiating land claims with the government
e) Private:	Encompassing urban, industrial, agricultural and forested properties

### 8.5.2 History of the Designation

In October 1992, in response to three years of lobbying, 164 ha of the Englishman River estuary and adjoining forest land was purchased by The Nature Trust and the Ministry of Environment, Lands and Parks. The estuary and 17 km of adjacent marine foreshore were incorporated into the Parksville-



Qualicum Beach Wildlife Area in early 1993 (Fraser 2002). The idea for a BR in the Mount Arrowsmith area arose from this initiative and volunteer efforts to secure the BR designation began in 1993. Growing urban pressure became a focus issue for local environment groups. In turn, the plight of watersheds of the region became prominent, which were in need of greater protection, especially from upstream degradation and pollution.

**Community discussion, begun in 1993, addressing the concept of overall watershed management was promoted and a UNESCO BR was chosen as the appropriate vehicle for community aims. Further local support for the BR designation was gradually gathered (AC4).**

Following a series of informal meetings, the Mount Arrowsmith Biosphere Foundation (MABF) was registered in 1996 as an official non-profit society under the *Societies Act of British Columbia 1996* to facilitate financial support and accountability and to pursue the designation.

**We organised a series of meetings and found out that the community doesn't understand sustainable development. The meetings did not draw a large crowd and those that did come basically wanted the BR to provide a mandate for what to achieve rather than forming a collaborative idea of what we should do. The basic level of understanding was not there so we had to address that issue (AC4).**

The MABF initiated and coordinated dialogue between various BR stakeholder groups, including elected officials, government agencies, landowners and community groups. Communication between the parties regarding their objectives and the associated inter-relationships occurred, to design a consensual vision for the BR, where a bottom-up approach built ownership of the BR amongst stakeholders.

The MABR nomination was completed and submitted to the province in 1997, and resulted in a formal BR designation. Unfortunately, the lengthy nomination process resulted in a loss of community commitment, but the work of the MABF was recognised in April 2001 when the Mount Arrowsmith Biosphere Reserve was officially dedicated in Parksville during the Brant Wildlife Festival (Fraser 2002).

Subsequently, the MABF developed a governance statement, citing the mandate of the MABR as one concerned to:

... reconcile conservation of biodiversity and biological resources with their sustainable use by: promoting public awareness of resource management concerns facing residents of the Mount Arrowsmith Biosphere Reserve area, participating with area residents in developing projects to address local concerns, encouraging cooperative resource management practices between private landowners and governments by providing a forum for the exchange of information and values, and recognising, representing and promoting a long range balanced view towards planning, development and management (Fraser 2002: no page).

### **8.5.3 Governance and Capital in the MABR**

The governance structure is a general membership (the Foundation – general representation of the community) and a Board of Directors of 15 (eight are elected from members of the Foundation and

seven are appointed by local First Nations, elected municipals councils, and the forest industry). The Biosphere Management Committee (Executive Committee) is elected at Annual General Meetings of the MABF, and provides the administrative functions of the MABF. An employed position for a Coordinator / Manager is envisaged but not feasible due to a lack of funds. Other volunteer-based committees identified for the MABF cover the areas of policies and planning, research, education and communication, fundraising, and special tasks and events as required. These committees are ephemeral, due to the irregular nature of much of the projects or initiatives for the MABF (discussed below). As with every BR committee, the MABF aims to be a representative body for sustainable land, water and biodiversity management in the region. It cannot directly manage land, but rather, can oversee and provide advice and integrated, collaborative stewardship principles and support and/or create initiatives for such activities based on the BRP.

Fraser (2002) states that two forest companies, TimberWest and Weyerhaeuser, own 70 per cent of the land within the MABR, which is indicative of the heavy economic reliance on timber harvesting across Vancouver Island and the threat to *natural capital* from historical reliance on this resource regime. These two major industry stakeholders are not active participants within the MABF even though membership on the MABF Board of Directors is reserved for company representatives. Although they were active participants in initial discussions, the companies did not support the nomination effort (Birtch 2004d). As the largest landholder within the MABR, this lack of support for the MABR is surprising but indicative of *undervaluing of natural and social capital* in preference for *financial capital*, resulting in a lack of *capacity-building, knowledge sharing* and *social learning*. Identifying win-win projects to build *trust* and encourage a positive relationship (*social capital*) with the forest companies is a major challenge (Birtch 2004d), and their participation would be of great value to the BR. Their participation in the BR through support or creation of collaborative projects could aid both the corporate social responsibility aspects of their public relations efforts as well as provide the BR with much needed on-going financial input.

Noteworthy are the public statements of vision, mandate and operating procedures of TimberWest and Weyerhaeuser. Both companies embrace the concepts of sustainability, biodiversity conservation and community involvement in their public communication documents. This suggests that although they are not yet participating in MABF organised processes, their ideologies and visions may ultimately allow positive communications relating to the MABR if a relationship could be established. Rail Canada is yet another significant landholder in the region, due to an allocation of land from the Federal Government for rail freight corridors. These areas represent high natural value within the region (Birtch 2004d), however **the role of Rail Canada in any discussions with MABR has been limited (AC4)**.

Whilst major industry and infrastructure companies in the region are not yet party to the MABF, ... **the relationship of the MABR to its municipalities is a good one (AC4)**, indicating potential for further effective *collaboration, partnership* and *capacity-building*. The vision, mission and mandate of the MABF are echoed in the vision statements of the Official Community Plan (OCP) of The City of Parksville, Town of Qualicum Beach and the Regional District of Nanaimo (RDN) urban nodes Nanoose Bay and Errington-Coombs (Fraser 2002). Parksville and Nanoose utilise the Bruntland

Commission definition of sustainable development as a vision of the future, and all OCPs state that maintaining a high environmental quality is a community priority. Statements made by the MABF parallel the vision statements and goals of key stakeholders such as the RDN, City of Parksville and Town of Qualicum Beach, perhaps in part because elected representatives from these communities sit on the MABF Board of Directors resulting in *greater collaborative understanding built from partnership* on this Board. Whilst mission statements and mandates are a useful first step, further collaboration is required to meet these statements.

The MABR is not associated with any national park and thus does not receive *financial capital* input from Parks Canada. This presents a significant problem for day-to-day *financial, institutional* and *social capital* sources to maintain the MABF. The majority of land ownership by forestry companies means that there is a paucity of stakeholders and stewards in the region and the Foundation has had to be *innovative* at sourcing basic funding. Such effort required to find subsistence funds means that less effort is expended furthering BR projects, for which there are plenty of ideas.

Historical *partnerships* created by the MABF include Department of Fisheries and Oceans, Canadian Wildlife Service, Forest Renewal BC, BC Hydro, Mountain Equipment Co-op, Canada Trust's Friends of the Environment Foundation, The Brant Wildlife Festival, Islands Trust, the Department of National Defence and The Land Conservancy. The most regular MABF contributing partners include core area managers and engaged volunteers. Non-government and philanthropic *financial capital* sources are required every year to maintain the MABR. The *innovation* in creating many of these *partnerships* has been the work of a single *champion* of the MABR, Glen Jamieson,<sup>69</sup> also the longest standing champion of the designation from its inception to the present day, who single-handedly undertakes most of the work of the MABR.

Logistic efforts have focused on three areas with MABF partners: 1) implementation of initiatives that should facilitate donations from the general public and corporations, such as obtaining charitable tax status; 2) soliciting funds on a project-by-project basis from corporations and foundations that support the work of non-profit organisations in their area of interest, notably conservation and achievement of sustainable development; and 3) development of *innovative* initiatives that may over the long-term provide a source of *financial capital* (Whitelaw et al. 2004: 1). A number of projects indicate that the MABF has attempted to engage partners to establish projects that reflect these three issues, to provide mid to long term capital assets, and strive for self-sustainability. For example, an interpretive centre is a long-term initiative stewarded by the MABF that would educate tourists and locals about the area, present *multiple knowledges* and facilitate social, *place-based learning* about *capital assets* and the *social-ecological system* of the MABR.

In 2002, an Interpretive Centre Committee was formed to guide the process of studying whether such an idea might be viable. Federal funds and a contribution from the City of Parksville were approved to

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<sup>69</sup> Dr Jamieson is employed at Fisheries and Oceans Canada as a senior scientist, hence his background in ecological sciences has had an important influence in the MABR, particularly in relation to his ecological *knowledge and networks*.

conduct a pre-feasibility study. The committee hired local consultants to conduct the study, who determined a high degree of public and government support for the concept, with a potential market sizeable enough to support a world-class facility. Community support for the centre has been encouraging thus far. Possible funding sources, governance structures and the potential economic benefits of the project have been identified.

Presently the status of the Interpretive Centre is unclear, but if viable, the next step for the project will be a business plan. Although the committee believes the project's vision is exciting, it also recognises that for the project to become a reality, many challenges have to be met. For instance, the present lack of *social*, *financial* and *institutional capital* available to, or capable of being generated by the MABF is limited by a lack of stakeholders and stewards. The success of the Centre will require the mobilisation of many *capital assets* that are currently not available. The generation or access to these assets will require support from *local champions*, stewards, the MABF members and agencies over a sustained period.

In 2002, the MABF undertook a public consultation process to initiate dialogue around sustainable development with the goal of understanding local residents' concerns and priorities (knowledge-sharing), allowing identification of MABF action items that would be attuned to local needs (Fraser 2002). **Invitation for community input received a poor response, with participation largely limited to those already active in community environmental processes (AC4).** The broad cross-section of the population sought and required for true community involvement was not represented and subsequent follow-up indicated the topic of sustainable development was poorly understood (Birch 2004a).

**Those who participated expected to receive information about how the MABF intended to address specific issues, and were not equipped to offer suggestions on how the MABF might proceed with long-term sustainability projects. Participants felt that the entire community required more understanding of the issues before consultation and community dialogue could be effective. The inability of the process to address the needs and interests of the community highlighted the challenges of adapting the international BR concept to local concerns, and the embedded need for basic environmental education within the MABR's goals (AC4).**

Recognising this requirement for addressing the needs and interests of the community, the MABF developed what was hoped to be a socially and ecologically relevant educational tool, with respect to water issues in the region. Although the MABR is located within a relatively high rainfall area, most annual precipitation occurs during winter and typically summer manifests as a two to four month drought (Mount Arrowsmith Biosphere Reserve Foundation 2004). Water demands and changing water flow patterns arising from urbanisation are now exacerbating the drought-related stress of local species, even those better adapted to summer drought. A growing population and an associated expansion of suburban areas has contributed to the loss of species, that are either under habitat pressure, or less drought tolerant than other species. In an initiative to raise consciousness of the ecosystem effects of the drought and its anthropogenic amplification, the MABF attained funding for a three part television series on water issues in the MABR, called Liquid Assets. Canada Trust's Friends of the Environment and British Columbia Hydro funded the project. Whilst the video series

was intended for educational purposes, Liquid Assets has application beyond this, and could be used by the MABF to initiate partnership opportunities with education bodies and water-oriented associations.

In a different initiative, the MABR is one of 28 sites around the world to be involved in the Global Change Research Initiative in Mountain Biosphere Reserves (GLOCHAMORE). With support from the MABF, the University of Victoria, the Federal Department of Human Resources and Social Development, and the Municipality of Whistler, monitoring sites have been established on both Mount Arrowsmith and Whistler Mountain. This *collaborative, information sharing* initiative allows for comparative studies of the impacts of climate change on alpine plants, on both sides of the Straits of Georgia. A University of Victoria Master's student coordinates the research. The MABF has participated for five years in GLOCHAMORE.

The Oceanside Monetary Foundation (OMF) was another *innovative, experimental* project that increased the *capital assets* of the MABR, whilst also raising its profile. Oceanside Dollars (Figure 21, pg. 207) was a brainchild of Glen Jamieson who set out to follow the example of the nearby Saltspring Island community currency system, derived to raise money for environmental, business and cultural projects (*social and natural capital* oriented). With the assistance of Hewlett Packard, the first fully digitised currency in the world was launched. According to AC4:

**the purpose of the OMF is to raise funds for Oceanside community projects (the MABR), promote a sense of regional pride, and foster local economic activity and autonomy. An Oceanside gift certificate resembles a paper currency that can be bought and spent at par with the Canadian dollar at Oceanside places of business. All residents, visitors and businesses are able to purchase and redeem Oceanside currency at local Oceanside recognised financial institutions and businesses. To date, we have had very favorable responses from all the businesses approached, focusing initially on those local business that have greatest cash flow, for example, food stores (AC4).**<sup>70</sup>

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<sup>70</sup> As of 2007, the challenges in trying to get sufficient currency into circulation to make the program viable had burnt out volunteers, and the project was suspended (Jamieson et al. 2008).

Figure 21 The first issue of Oceanside dollars, released on 30 September, 2003



Source: Jamieson (2003: no page).

Since its inception, the MABF has struggled to develop and implement its vision of community environmental education while crafting its own identity and self-awareness (Fraser and Jamieson 2003). It was hoped that the UNESCO dedication would facilitate and coordinate existing community environmental education processes, however, the MABF discovered that promoting community environmental education within the BR concept presents a unique set of challenges. The international framework has both helped and hindered the delineation of local goals and objectives. The established UNESCO language for BRs has informed MABF members about MAB objectives and processes, but reliance on such academic definitions appears to be impeding understanding of BR principles by the local community, complicating identity issues for the MABF (Fraser and Jamieson 2003).

While some of its initiatives have not yet been entirely successful and some burnout of volunteers has occurred, the MABF is fortunate in retaining a steadfast *local champion* to continue the work of *capital* and *new governance*, spurred by ample *innovation and experimentation* when funds allow. The BR has two present priorities— establishment of both an on-going source of sufficient funding to allow for *coordination* and management of projects; and an on-going public education program that emphasises the economic and aesthetic benefits of having sustainable ecosystem management, including the role of protected areas in contributing to economic value in adjacent communities.

The number of other organisations actively engaged in various social-ecological initiatives in the region is large, and represents a source of potential *capital* and numerous *partnerships* for the MABF. Some of these organisations are competing with the MABR for *capital assets*, and in a region with limited knowledge of social-ecological sustainability, may in part, explain the basis for some of the problems faced by the MABF. However, given an array of over 31 groups working individually on similar projects, there is opportunity for a coalition, similar to that of the Coalition on the Niagara Escarpment, to reduce duplication of effort and combine resources and capacities, that would also include provincial government agencies. The majority of groups are predominantly not-for-profit or industry / government / NGO partnerships. Therefore potential is available to make *collaborations* and *partnerships* that are otherwise currently ignored or limited.

#### **8.5.4 Lessons for Resilience**

Based on the preceding data and the lessons articulated below, this BR represents Phase I of the BR resilience conceptual framework. The MABF provides many lessons in the creation of *resilience* in an extant BR. At present, private corporations and parts of civil society in this BR, are not *ecologically rational*, as they are either not prepared, or equipped, to contribute to open sustainability discussions (Fraser 2002).

However this BR is illustrative of a negative feedback loop where lacking *capital assets* propagates paucity of *new governance* attributes. If the single *local champion* of the BR could build *reciprocity* and *shared values* to *partner* with other potential *champions*, then a basis for a more *polycentric* BR committee would be established. This would provide a basis for consolidating existing, and building new, *capital assets*.

Raising awareness can facilitate *learning* within the MABR, as basic community knowledge of BR concepts is required to foster participation, and ignorance of a concept does not engender participation. Moving forward from discussion into conducting specific projects is necessary to *build new partnerships* and achieve MABF objectives with future potential *partners*, including local environmental interest groups, business organisations and the education sector. The MABF suggests that 'experience points out the real need for greater understanding of the BR concept before public consultation can be fully effective' (Mount Arrowsmith Biosphere Reserve Foundation 2004: no page). Initially, the MABF may need to establish key partnerships with local champions already extant in NRM and research fields, and employ the existing *networks* in these fields to create a basis of *capital assets* from which to proceed.

Although considerable resources have already been dedicated to awareness activities, this priority is likely to persist. Continual awareness work might be required due to total population growth, an aging population, and the high proportion of newcomers to the area. Initiating specific activities could create *partnership opportunities* and provide a focal point for awareness, thus building the understanding required for the community to participate further. The MABF is currently under-utilising an array of *partnership* opportunities due to a poor *capital assets* base.

Inaction of the MABF erodes *capital assets* because, as much as agencies and individuals may want to be included in the BR, most eventually lose interest in discussion unless some action is proposed. As stipulated earlier, support is often generated from demonstrated success, therefore the MABF may need to focus on achievable projects with the *capital assets* they already have, before broader support can be mobilised. Specific events around water quality in the Mount Arrowsmith area have proven that hundreds of people will attend a public forum if the issue is contentious and immediate. The MABF, as a non-partisan entity, has avoided the issues of water quality and land use so as not to alienate any potential *partners*. The MABF is committed to a bottom-up community-driven BR and thus is confronted with a common BR challenge: to balance time intensive *new governance*, with the swift action (*innovation, experimentation*) that can motivate the public to participate. Through garnering existing *capital assets* and *networks* in related fields such as NRM and research, *partnerships* would provide an opportunity for communication and *information sharing* and promote *social learning*, in turn building *new governance* arrangements.



## 8.6 Lessons from Canadian BRs and the BRP

*Partnership* history is strong in Canada. The dispersal and often geographic isolation of many communities, along with a reliance on resource regimes (e.g. forestry, agriculture), low reliance on government-derived assistance and relatively strong *place-attachment* has resulted in high *social capital* in communities such as Long Point and Bruce Peninsula. Assertions made by A2 and AEC4 concur with this observation:

**Canada is better than Australia in forming partnerships and collaborations and is often better off than Australia due to receptive government agencies. We do not have a patronising and generous central government so we have had to develop (often by necessity) partnerships with, for instance, NGOs around entrepreneurialism (A2).**

**Something about Canada is that it has a long history of cooperation – the cooperative movement has always been strong in Canada. The modern economy has weakened it a little but it is still quite important. With good cooperation going on, you have a setting for the kinds of activities that work a BR (AEC4).**

*Innovation* on the part of civil society and industry coupled with mobilised *social capital* (*trust, reciprocity, networks*) has built other *capital assets*. In turn, within some BRs, *new governance* attributes have arisen seemingly naturally, through *innovation* on the part of BR champions or committees, and directing attention to those capacities that strengthen *networks*. *Adaptive capacity* has resulted.

A historic relationship between Parks Canada and BRs has created an enduring *partnership*, where BRs are a recognised and respected means of supporting the suite of working landscape requirements inherent to managing Canadian protected areas. Often surrounded by other competing land uses, such as forestry, agriculture, indigenous use and urbanisation, a *collaborative* association between BRs and Parks Canada has benefited the BRP and disseminated a working landscape approach for protected area management. Legislated protection also provides security of core areas and *partnership* opportunities. The provision of subsistence funds for those BRs with a national park has imparted some certainty of *financial capital* each year (Niagara Escarpment, Clayoquot, Long Point). Those BRs without such *capital* also illustrated a paucity of *social and institutional capital* (Mt. Arrowsmith), although a lack of *capital assets* may also derive from a lack of *openness, ecologically rational institutions* and *innovation / experimentation*.

In the process of developing a BR, mobilising actors (*champions*) is vital to reach actual and potential *capital assets*. Local champions cited a strong sense of *place-attachment* and sense of stewardship duty in relation to their BR. This was derived from a concern for, awareness and value of local *natural capital*, as illustrated by Long Point, Niagara Escarpment, and Mt. Arrowsmith BRs and to some extent, Clayoquot Sound BR. Recognising that a basic public awareness and value of *natural capital* facilitates *place-attachment* in areas with such *capital* could assist BRs. If BRs aimed to generate public appreciation of *natural capital*, through promotion of inherent BR values (biodiversity, research, monitoring, tourism, recreation, environmental services), this may mobilise more *champions* who

learn the value of their local area's *natural capital*. *Shared value* then assists in building *trust*, *reciprocity* and a solid *capital assets* base.

By recognising a multitude of values related to *natural capital*, including its economic, cultural, social, educational, scientific, environmental, historic and spiritual values, some Canadian BRs benefit from *collaboration* and *partnership* with a range of civil society, government and industry parties who share an interest in these assets. For instance, universities recognise the value of BRs for research (University of Victoria, Clayoquot), industry recognises the opportunity to establish environmental rapport and community stakeholder dialogue within an existing framework (OPG, Longpoint) and government institutions recognise opportunity to manage competing use and land tenure in consultation with community (NEC, Niagara Escarpment).

This *polycentric* approach is important for BRs and is founded on mutual benefit and *interdependence*. For instance, a BR provides a devolution-of-power facility for regional institutions (e.g. NEC) creating an *interdependent*, mutually beneficial relationship. Community committees are central to creating a *polycentric* BR – they engender *shared values* and opportunity to make *collaborations* / *partnerships* across jurisdictions / political / socio-economic / cultural boundaries. These *partnerships* are most beneficial when established with organisations conducting similar work in the BR region, to create positive alliances, reduce duplication of effort and conflict, and strengthen *capital assets*. A *polycentric* arrangement is facilitated by *new governance* and it is essential to:

1. mobilise a diversity of resources;
2. share information and multiple knowledges;
3. speed social learning;
4. provide easy opportunity for joint research;
5. minimise duplication of effort;
6. build understanding and shared values;
7. spur innovation amongst agencies, organisations and community;
8. educate the public and institutions;
9. resolve disputes;
10. share management responsibility;
11. solve common problems; and
12. build concurrence and support.

*Coordination*, *reducing rigidity* and *increasing openness* of institutions is critical to creating and managing *new governance* arrangements of a *polycentric* BR. For this outcome, and for institutions to *trust* in other modes of governance; a number of attributes must be demonstrated. These attributes are all related to coordination, such as effective information management (distribution, flow), *shared values*, strong and equitable *partnerships*, tangible action and outcomes, and demonstrated benefit. CRBA fulfils this *coordination* role at a national level, and at local levels, *coordination* is achieved through community committees, therefore strengthening *new governance* and in turn, supporting *polycentric* BRs.

The case studies highlight a number of constructive lessons for the Canadian BRP and BRs. Additional community committees, like those of Long Point and the Bruce Peninsula, would support Canadian BR action, particularly in the NEBR. Community committees, convened in locations where social-ecological understanding exists, can create a network of support that provides a point-of-contact for others in the community, building BR activity, providing a valuable forum where existing capital assets can be harnessed, engaged, and built upon for BR objectives of that committee. A community committee and / or coordinator ensures a basis for regular action, where staff for the BR are a costly but effective way to propel *adaptive capacity* through regular and consistent communication (newsletters, meetings, liaison with partners, acquiring funding, proposal writing, education). Creating *partnerships* by focusing on particular services or products can help to market the BR as an agency capable of delivering these. However, action must follow *innovation*. Inaction depletes *capital assets*. Action should be centred on issues of immediate concern to the BR community whilst remaining apolitical.

BRs may be able to work as a clearinghouse for *information sharing*, where civil society, industry and government can share *multiple place-specific knowledges* for initiatives or problems. This clearinghouse mechanism is demonstrated at Long Point, Clayoquot and by the Leading Edge Biosphere Conference series of the NEBR. Given the amount of research and monitoring occurring within Canadian BRs, alongside actual and potential *polycentric* arrangements, a clearinghouse role of BRs in this way may yet prove to be one of CBRA's, and individual BR's, most effective and useful services. In this way, BRs and the BRP would reassert their actual and potential sustainable development modality based on *social learning*, explicitly acknowledging that sustainability is an iterative and complex problem to be addressed by building *adaptive capacity*.

## 9 Australian Case Study Biosphere Reserves

*The four Australian case study BRs are Riverland (South Australia), Fitzgerald River (Western Australia), South-West (Tasmania) and Mornington Peninsula Western Port (Victoria). A profile of these BRs is provided in Table 15 (pg. 215). The cases illustrate approaches utilised by MI and MII types to fulfill BR functions according to local, regional, state and national circumstances. The cases present indicators of BRs in various stages of the BR resilience conceptual framework and narratives highlighting the pathways to resilient working landscapes. As with the Canadian cases, each case varies in the amount of information available, due to such factors as the number of agencies involved with each BR initiative, information production and complexity of the designation.*

*Australia does not have a long history of BR champions, meaning that social learning from the successes and challenges of the BRP and individual BRs has not been shared, nor capacity strengthened. It is only recently that BRs have been raised in regional and state-level social ecological problem solving contexts. PC2 suggests that the historical context of the Australian BRP has been problematic:*

**When Australian BRs were nominated, no long-term plan was envisaged. They met the core zone function and that was sufficient for their requirements in that era of the BRP. But the WNBR has evolved to its current post Seville +5 status, which now contemplates the sustainable use of natural resources and a high level of community engagement. The transition of the WNBR has meant that a number of Australian BRs now find it difficult to fulfill their BR objectives, as many designations are predominantly national parks. It is in the historical establishment of Australian BRs that the problem lies (PC2).**

*This statement was made prior to the resurgence of the BRP through the MII BRs such as Barkindji, Noosa, and the ACT BR proposal.<sup>71</sup> The statement by PC2 suggests that the Australian BRP has not been supported from the outset, but does not take into account the powerful potential of change that can be brought about by explicit or implicit praxis of the BR resilience conceptual framework.*

### Note to reader:

The structure of the chapter follows that of the previous chapter. The environmental setting of each BR is presented, along with the history of the designation, written as a sequential timeline of events.

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<sup>71</sup> In November 2007, the Legislative Assembly for the Australian Capital Territory Standing Committee on Planning and Environment recommended that the ACT, including Canberra, be nominated as a BR by December 2008. It also recommended that the ACT Government develop and implement an effective communication and consultation strategy so that stakeholders better understand the aims of BR listings. The Committee cited the following reasons in their decision:

- BRs recognise landscape scale land use planning which helps sustain ecosystem services and ecosystem resilience under climate change;
- the Griffin Vision for a Sustainable Canberra, and Canberra's modern urban planning, warrant international recognition;
- it could encourage Canberra to become a more sustainable city and to respond to the challenges created by climate change;
- it may help in the growth of educational institutions, agencies and companies working on sustainability issues in the region; and
- it might promote greater respect for indigenous heritage values and other positive outcomes for the local indigenous community.

Sub-themes are interwoven within the case studies and for this reason cannot be detached from their context or other sub-themes. Rather, they are italicised in-text to highlight their relationship with the narrative. Key informant data are indicated in bold font and coded according to the procedure discussed in Chapter 2.<sup>72</sup> All key informant data are derived from in-person or phone interviews as explained in Chapter 2. The final section of each case elicits the functional resilience aspects of each BR.

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<sup>72</sup> The code is: A – Academic (natural resources, planning, environment, ecology, sustainability); C – Champion (voluntary contribution to a BR and / or BRP, generally showing an outstanding level of commitment); E – Employee (works in relation to BRs, funded either directly, by BRs or CBRA, or indirectly, by related government sectors partnering in BRs); and P – Public servant (local, provincial/ state or Federal Government agency).

**Table 15 Overview of Australian Case Studies: BR profiles**

Biosphere Reserve	Year Designated	Population	Land Tenure Type	Area (ha)	Approx. % of BR (ha)	Governance Authorities	Basis of Governance
<b>Riverland (Bookmark) Biosphere Reserve (SA)</b>	1977, extension 1995	<10 permanent (core) ~17 000 ~ 4600 visitors/year	State conservation reserves; game and forestry reserves; pastoral leases; private land	900 000	Core: 900 000 Buffer: unclear Transition: unclear	Under review but principally Australian Landscape Trust; private philanthropic environmental organisation; Australian Commonwealth Government, Riverland Biosphere Trust, Birds Australia, municipal councils	Australian Landscape Trust; Riverland Biosphere Trust; Australian Commonwealth Government
<b>Fitzgerald River National Park Biosphere Reserve (WA)</b>	1978	0 permanent (core) ~ 4000 (transition) ~ 36 000 visitors/year	Crown land; private land	329 039	Core: 329 039 Buffer: unclear Transition: unclear	Western Australian Department of Environment and Conservation, Ravensthorpe Agricultural Initiative Network, South Coast Regional Planning Team, Friends of the Fitzgerald River National Park	Fitzgerald Biosphere Group
<b>South-West Biosphere Reserve (TAS)</b>	1977, delisted 2002	0 permanent	Crown land but partly subject to the rights of the Hydro Tasmania	403 240	Core: 403 240 Buffer: 0 Transition: 0	Department of Environment, Parks, Heritage and the Arts (Tasmanian Parks and Wildlife Service)	None
<b>Mornington Peninsula Western Port Biosphere Reserve (VIC)</b>	2002	180 000, up to 270 000 (seasonal)	Crown land; Public land; Private land	214 200	Core: 9300 Buffer: 63 600 Transition: 141 300	Six municipal shire councils, Department of Sustainability and Environment, Parks Victoria, Royal Melbourne Institute of Technology, numerous CSOs	The Mornington Peninsula - Western Port Biosphere Reserve Foundation

## 9.1 Case Study Data

The data for the case studies in this chapter were derived from:

- Ten interviews conducted at the biosphere reserves sites,
- 13 interviews in other locations such as Local and State Government offices, universities, biosphere reserve committee meetings and cafes,
- Four iterative conversations over email, telephone, and in- person; and
- Two focus group discussions conducted after relevant meetings (one at a BR, one at CSIRO).

## 9.2 Riverland (Bookmark) Biosphere Reserve, South Australia

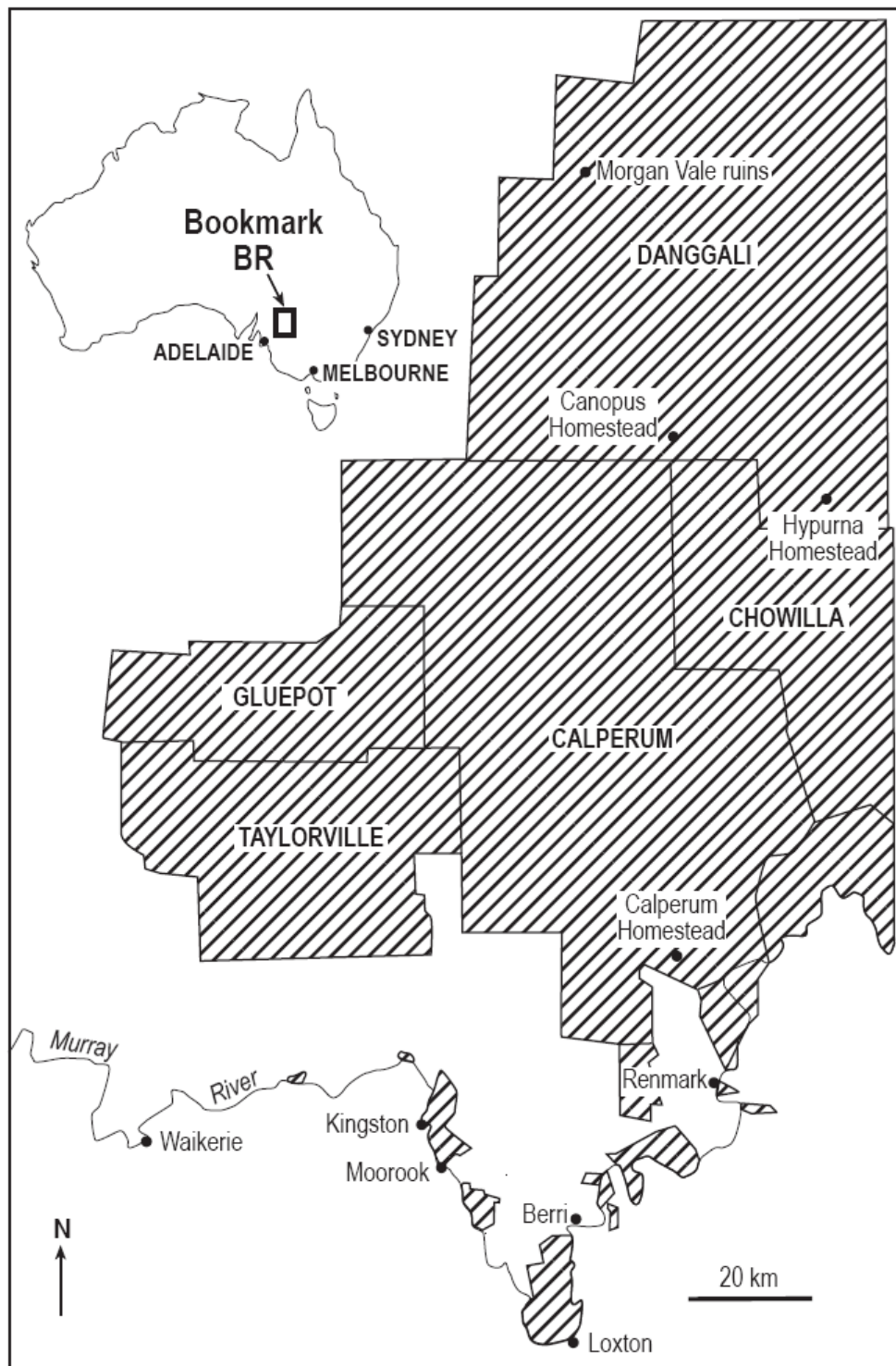
### 9.2.1 The Environment

The Riverland Biosphere Reserve (RBR) (previously Bookmark Biosphere Reserve) is located in south-central South Australia, near the borders of South Australia, New South Wales and Victoria (Figure 22, pg. 217). The RBR stretches along the Murray River near Renmark and Berri, up into the Mallee country on the New South Wales border, a region commonly identified as the Riverland. This area is a typical floodplain of an ancient river with large associated wetlands, lakes and adjoining creeks. Wetlands of the region are ephemeral but have been dry for the last few years due to an extended drought (UNESCO 2007c).

Warm desert and semi desert are the major terrestrial ecosystem types. Chenopod shrubland divides the floodplain from the Mallee country that makes up the greater part of the BR. Major ecosystem complexes include semi-arid habitats, Mallee woodlands dominated by *Eucalyptus sp.*, black oak (*Casuarina cristata*) woodlands, black box (*Eucalyptus largiflorens*) forests and river red gum (*Eucalyptus camaldulensis*) forests. The ancient Mallee of the RBR is one of the largest remaining continuous stands of the woodland left in the world and is home to a number of endemic, rare, and endangered species (UNESCO 2007c; Barnett 2000; Carter 1998). Over 275 bird species, including the endangered Black-eared miner (*Manorina melanotis*), 843 plant species and 79 reptiles and amphibians are recorded (UNESCO 2007c).

More than 17 500 people (2008) live in the surrounding region of the BR (UNESCO 2007c) although there are only several permanent inhabitants in the BR itself. The closest major town to the BR is Renmark, a town of approximately 8000 that services the expansive citrus and other farms within the region. Horticulture is the backbone of the district's economy and an economic boom in wine grape production boosted income considerably during the early part of this decade. The present national drought however, has adversely affected primary production. Past sheep grazing and extensive woodcutting for fuel and construction denuded areas near the floodplain. Factors including irrigation, vegetation clearance, drought, management of the river and land use patterns throughout the Murray Darling Basin have affected the floodplain and other low-lying areas are threatened from severe salinisation.

**Figure 22 Bookmark Biosphere Reserve area, including Calperum and Taylorville Stations**



Source: Colloff et al (2003: 11).

### 9.2.2 History of the Designation

In 1977 the Dangalli Conservation Area was designated as a BR, as one of the original suite of MIs, which was subsequently renamed and extended in 1995 under the new name of Bookmark Biosphere Reserve. It was again renamed in 2004 as Riverland Biosphere Reserve. The period from 1993 onwards is the focus of this discussion, as it forms the basis for development of the present day BR (i.e. involvement community and other institutions beyond government alone).



Previously managed by generations of family graziers, in 1993 Calperum Station (200 000 ha) was placed on the market. In a near-sighted attempt to make the farm profitable, the land had been overstocked for a long period, resulting in serious degradation. In total, only three families ever had a leasehold at Calperum, yet the extent of damage and environmental debt created through relentless grazing and absent land stewardship resulted in a salinised, desert landscape that did not resemble the largely intact Mallee community that existed prior to agriculture (Parker 2004). The 250 000 ha property became available for purchase at a time when it was struggling to break even (Parker 2004).

In the early 1990s, the Commonwealth Government commissioned two reports by Pamela Parker of the Australian Landscape Trust (ALT)<sup>73</sup> on the state of the BRP in Australia. The government subsequently acted on some of the reports' recommendations, creating two model BRs to serve as benchmarks for excellence in the program (see Chapter 4). Bookmark was targeted for this purpose.

Calperum Station was purchased in late 1994 by the Chicago Zoological Society (CZS), the Commonwealth Government, and some other donors. Its title was transferred from the CZS to the Office of the Director of National Parks via a Deed of Assignment specifying that the land be used for community involvement in restoration and conservation, and establishment of partnerships to explore sustainable uses of regional natural resources.

The purchase of the property caused concern in the local community (Smith 2004). Some individuals felt that the Station would be relegated to the status of an under-funded national park if Environment Australia (EA - now Department of Environment, Water, Heritage and the Arts) was to have sovereign management of the property (however, the intention of EA from the outset was to have direct community involvement) . A concerned collective of local community members formed in response to the situation (Smith 2004). Hence, local champions for the area were mobilised out of community concern regarding care and management of the land (Earthwatch Institute 2002) and a perceived shortage of resources for its management. **The tax base did not provide sufficient money for appropriate management by the community, and despite the land essentially being commons for the public we were not entitled to make our own arrangements regarding its management (C2).** Through discussions and negotiations between the ALT, the Commonwealth Government and the local community committee, a BR became the management arrangement favoured by all stakeholders, due to the BRP's explicit community aspect.

Since its purchase, the centrepiece of controversy for the BR has been Calperum Station. **Many in the local community thought it was an ideal property to display their dedication to rehabilitating the local environment (E2).** The Deed of Assignment stipulated that Calperum was to be a practical example of a community-led initiative for conservation, research, monitoring and education, in sum, a working example of sustainable development, well suited to the goals of a BR. Given this alignment of management goals, a nomination to extend the Dangalli designation was sent to UNESCO.

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<sup>73</sup> The Australian Landscape Trust is a philanthropic organisation that undertakes landscape-scale conservation works, through a combination of collaborative partnerships and private funding.

**To assist with the huge task of rehabilitating this property, ANCA (now Department of Environment, Water, Heritage and the Arts) appointed a ranger to work with the locals. So began a unique arrangement where the South Australian Parks and Wildlife staff, the Australian Nature Conservation Agency and the local community, worked together on a range of properties for ecological restoration and alternatives to agriculture (C2).**

This was part of the cooperative effort that led to the parcel of lands including Calperum, the Murray River National Park and Dangalli Biosphere Reserve being nominated and accepted as one BR, in what marked the beginning of the Bookmark Biosphere Reserve. The name Bookmark was chosen by the local committee, as it was the original name for station country that once encompassed both Calperum and Chowilla Stations. The area of the BR differs depending on how the BR is defined. According to UNESCO documentation, it comprises 900 000 ha, which includes Calperum Station. The unofficial area is now smaller, as Calperum and Taylorville Stations, under the management of the Australian Landscape Trust (ALT), has not been an active part of the BR in recent years.<sup>74</sup>

In 1994-95 the management of Calperum was conducted according to the terms of the contract, under the representative Calperum Management Committee (CMC), consisting of members from the South Australian Parks Service, the Australian Nature Conservation Agency and the community. From 1996 to late 2000, this governance arrangement changed to the Bookmark Biosphere Trust (BBT) and comprised the ALT, CMC (including South Australian Parks and Wildlife Service) and community members.

Under this governance arrangement, many positive projects were achieved. The housing of the BBT and its work occurred on site amidst the facilities of Calperum Station (multiple offices for staff, a common meeting / mess room, visitor accommodation, staff housing, catering facilities, several main houses). The arrangement also yielded plentiful funding, due to the innovative situation of a committee partnered with philanthropic / non-government organisation(s) and government, for the achievement of practical sustainability projects such as a floriculture farm and the Bookmark Guides. Furthermore, Natural Heritage Trust (NHT) funds provided approximately four full-time staff over 3 or 4 year terms, working on varied projects.

**The bottom-up approach to cooperative land management, with all partners sharing similar values, was lauded worldwide. UNESCO promoted Bookmark in publications as the ideal model for a sustainable future (AE1).**

**Volunteer groups from around the country visited Bookmark and contributed to the effort. Universities, various government agencies, local people, local schools, service clubs and other volunteer organisations became involved (E5).**

Bookmark set a precedent – a cooperative arrangement of federal, state and local government agencies working in partnership with private business and the local community, all striving toward sustainable projects for the rehabilitation and advancement of an expansive and severely degraded landscape. By this time, the BR was involved in major research projects on a variety of environmental

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<sup>74</sup> The ALT has separated from the other properties in the BR and conducts activities aligned with the concept of a BR, but is separated from the activities of the other properties. Whilst officially recognised as part of the BR, in practice, Calperum and Taylorville do not collaborate with their broader BR community.

issues, educational programs, joint agency – local grower projects and an international exchange program with a BR in China.

**Amidst the success and within the context of the local community actively stewarding Bookmark, the Commonwealth told the BBT that it was time for the management of Calperum to be contracted out. This idea was promoted by the private Foundations that had now joined into a single entity – the Australian Landscape Trust (C3).**

In 1998, the Federal Government contracted management of the property to ALT, supposedly to expand the scope of partnerships and to engage the wider Riverland community. It is unclear why the Federal Government sought to change this management arrangement, due to the successful operation of the existing partnership.

The decision was generally welcomed by the parties involved with the BR, with the view that all groups would continue to work together to manage Calperum in the cooperative manner the Federal Government had intended within the terms of purchase. Consequently, the ALT, Environment Australia and the CMC signed a joint agreement, to ensure the latter two groups worked together for the administration and management of Calperum. The BBT believed that, under this new set of conditions, it would have the opportunity to promote the program even more widely.

In 1999, the ALT, with assistance from the NHT, purchased the adjoining 92 000-hectare Taylorville Station which was assigned to the Director of National Parks. The environmental debt that had been created over years of degrading agricultural practice was seen by the Australian government as an opportunity to create a rehabilitation project alongside the momentum of community, for stewardship of the area. However, the changed governance arrangement, with the ALT as the contracted management authority, brought conflict. A rift occurred between members of the CMC and the BBT on one side, and the ALT and Environment Australia on the other.

**Attempts to resolve the conflict were unsuccessful as the CMC (which included a number of members of local communities) was not prepared to uphold decisions against the best interests of the communities it represented (C2).**

Hence, the CMC was excluded from consultation. The utility of Calperum's office facilities was no longer available to the CMC and the ALT took control over decisions regarding Calperum. All volunteers on Calperum were now excluded. **Only paid members of the ALT or paid employees through NHT project funds were on site at Calperum (C2).**

**BBT (comprised entirely of volunteers) established its own office in Berri and attempted to administer the BR independent of Calperum. There was conflict between the 'professionals' (such as ecologists) at the ALT - now totally responsible for Calperum, and the community committees which felt that they had been poorly treated and their involvement with the centerpiece of their BR was being denied. Some members of the CMC resigned. The BBT was finally put to rest when the South Australian Government withdrew its support (C2).**

ALT established its own community group to meet the requirements of the terms of the contract for the property, but was still directly responsible for the management of the property. This was generally

a positive step, however there were a few problems. First, an ALT initiated community group called Community Land Managers (CLM) was **created initially by invitation only (C2)**. Thus, the group was not representative of all community concerns. The CLM, in concert with the ALT, changed the major entry points for the property and restricted access by locked gates. Access was only available to those with keys (the ALT, the CLM, or through request at the main office at Calperum Station). As a property supposedly attempting to engender community stewardship, such controlled access was incompatible with its goals. Furthermore, at the time of the research visit for this case study, CLM included many gun enthusiasts, whose main interest in Calperum was the control by shooting, of pest animals on the property. Some of the individuals in CLM had established shooting ranges on their dedicated paddock, conducting hunting on motorbikes. Whilst the control of introduced pests was important, it was felt by one key informant that shooting occurring on the property was **just an excuse to get out on their trail bikes. Shooting is just the premise (C2)**.

Since the dissolution of the BBT, the RBR did not function as a BR, but rather a land trust administered by the Commonwealth through devolution to the ALT. Unfortunately, this **arrangement resulted in the exclusion of those who wanted to be involved in the BR, with only a selective involvement of community members made possible by the ALT (C1)**. It was evident through interviews with ALT staff that they believed they were effective in administering the BR. However, the governance arrangement was closed, with little sharing of multiple knowledges, low *ecological* rationality, very few partnerships and little capacity-building.

In 2004, the Riverland Biosphere Incorporated, which represented the community champions of the BR ousted from Calperum and Taylorville, provided the governance arrangement for community based BR activities and projects. The group comprised a small but enduring team of longstanding local BR champions. These people remain involved in the BR and include - Ed Cottam (farmer), Kevin Smith (retired, former headmaster of Berri High School), Jane Roots (Murray Darling Basin Commission) and Duncan McKenzie (retired, current director of Gluepot Birds Australia Reserve). Three of these local champions were a part of the extinct Bookmark Biosphere Trust, whilst one lives well outside the Riverland region (Adelaide).

### **9.2.3 Governance and Capital of the RBR**

Each property in the BR including Gluepot, Chowilla, Dangalli Conservation Park, Cooltong Conservation Park and Murray River National Park, secure individual funding arrangements. Chowilla remains a working farm.<sup>75</sup> Significant but episodic philanthropic funding and support from various State Government agencies has existed. Major *partners* are an important part of the operation of the Riverland BR, and Birds Australia and its many volunteers prove the strength of voluntary commitment at Gluepot. Banrock Station Wines is a major commercial *partner*, bringing the idea of the BR to the general public through an information centre and a commitment to best practice wine-

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<sup>75</sup> Chowilla Station today occupies ~ 93 000 hectares. The current lease is a crown lease (pastoral type) administered under the South Australian National Parks and Wildlife Act 1972. It includes all the areas of the Chowilla Regional Reserve and the Chowilla Game Reserve. The Robertson family's objective is to run the property on a sustainable basis whilst conserving its natural, historic and cultural values. Chowilla Station is primarily a sheep station. The aims and objectives of the RBR are compatible with the Regional Reserve objectives and structure, and this fits well with the objectives of Robertson Chowilla Pty Ltd. (Chowilla Station 2007).

making and sustainability. The councils of Renmark, Paringa, Berri and Barmera are now official *partners* in the RBR.

The ALT continues to manage Calperum and Taylorville Stations under a Management Agreement with the Commonwealth Director of National Parks. In 2003, the Management Agreement for Calperum and Taylorville properties between ALT and the Director of National Parks was renewed for a further five years. Under the current 2003-2008 agreement, the ALT stipulates that it provides a range of services including:

- engaging the community in the care of infrastructure, management of the landscape and operations of other programs at Calperum and Taylorville Stations;
- addressing the legacy of environmental debt, impaired functions of degraded ecosystems and losses of biodiversity on Calperum and Taylorville Stations;
- protecting Calperum and Taylorville Stations from the intrusion of unsustainable development and degradation through inappropriate use;
- carrying out natural resource inventory, monitoring, basic and applied research and adaptive management through partnerships with the volunteer, scientific, educational and other communities of the region; and
- offering education, training, support of voluntary work and other programs to encourage leadership within the community for stewardship of the landscape, wildlife and natural resources of Calperum and Taylorville Stations and elsewhere (Australian Landscape Trust 2007: no page).

According to the ALT, it has broadened its community input since 2004 and now allows for a greater degree of voluntary input (Australian Landscape Trust 2007). For instance, according to the ALT (2007: no page): 'volunteers are involved in activities that provide long-term benefits for the region's environment and communities, including wildlife and habitat surveys, monitoring endangered species, feral animal control, restoration of historical sites, revegetation and land restoration projects, infrastructure repair and maintenance, educational activities, research projects and reintroduction of native species'. Accommodation is available on Calperum Station for individual volunteers, school and university groups undertaking these activities.

During the flourishing period of Bookmark Biosphere, a gift of over AU\$1 million was received from an American philanthropist (McCormick) to build a centre which was to be the gateway to the BR. In addition to this gift, two grants were received together with assistance from the Renmark Council that raised the total funding to over AU\$2 million. Some AU\$400 000 was provided by the Australian Tourism Commission, as original plans for the centre outlined capacity to incorporate BR region accommodation bookings, regional information, tours and activities.

**BR community representatives envisaged a dynamic, interpretation and education centre [for McCormick], linked closely with the identity of the entire Riverland region, which would be of significance to its communities. The centre was to be situated on a main intersection of highways, but within close proximity to a wetland area, with the idea of creating an 'immersion experience' within the natural flora and fauna setting. Reflecting the issues and successes of the Riverland, the centre was envisaged by members of the community as a 'one stop shop' for visitors as well as locals. It should have incorporated interpretation, an education facility for schools providing environmental science learning, booking facilities for local accommodation, trips and tours and a café (C2).**

Since the demise of the two community groups (the Calperum Management Committee and the Bookmark Biosphere Trust), the ALT took ownership of the project and constructed a building a long way from the original community-collaborated vision, with no provision for tourist visitation. Instead, a centre exists on a minor roadway, far removed from a natural wetland setting and only serves school class groups which can utilise the extensive laboratory facilities. The centre is closed on the weekend – the time when the region comes to life with the activity of families. Moreover, community members from outside the Renmark region feel that they have missed out on an opportunity to appreciate and contribute to the centre, due to its location (Figure 23, pg. 224). In the view of C4:

**...the reason it is not a general interpretation centre for the whole of the Riverland region is due to politics and parochialism. It is dreadful, absolutely dreadful. However you look at it, it should have been a place with a café, and there was even talk of adding it to a winery to make people come in – come to the winery, buy some wine – the winery pays half the rent ... You have seen where they put it – do you think that it has a good passing trade? I rest my case.**

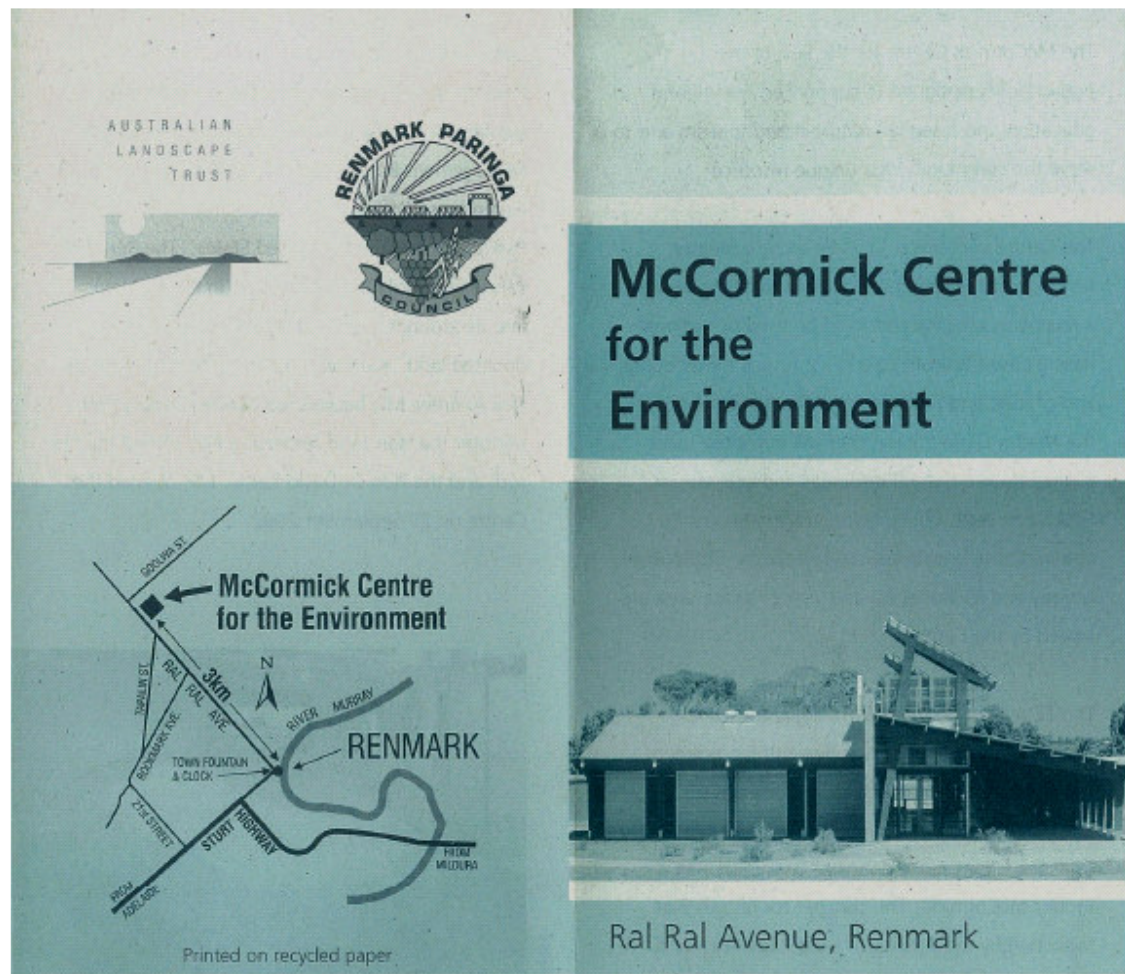
In contrast to the problems that have characterised the McCormick Centre for Environment, the success of Gluepot is impressive. Gluepot Reserve is part of the largest block of intact Mallee left in eastern Australia, inhabited by a high proportion of threatened species. The property is 54 390 ha and situated 64 km north of the Murray River and the town of Waikerie. The Reserve is listed on the Register of the National Estate and is part of Australia's National Reserve System, and forms an important component of the RBR. Gluepot Reserve is also the largest area of land covered by a Heritage Agreement in South Australia (Birds Australia 2004).

The property was purchased in 1997 by Birds Australia<sup>76</sup>, with the aim of **effectively managing a large, internationally significant area for biodiversity conservation (C2)**. Research, monitoring, tourism and community involvement are the core activities at the Reserve. All activities and management undertaken are the work of volunteers, including volunteer rangers who live on-site. In less than three years (late 2001 - mid 2004), volunteers contributed over AU\$500 000 worth of labour, tools and materials. The highly popular volunteer ranger position is filled for years in advance and requires a minimum stay of 2 months. Due to outstanding volunteer input, it costs only ~AU\$35 000 a year to run Gluepot Reserve.

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<sup>76</sup> Birds Australia is an independent, not-for-profit research and conservation organisation, whose mission is to conserve native birds and biological diversity in Australasia and Antarctica, through the study and management of birds and their habitats and the education and involvement of the community (Birds Australia 2004).

**Figure 23 The location, major sponsors and photo of the McCormick Centre**



Source: Australian Landscape Trust and Renmark Paringa Council (2003).

Nevertheless, obtaining these operating funds is one of the biggest challenges faced by the Gluepot Management Committee. Despite this uncertainty, the volunteers who comprise the committee and the property's *champions* are unwavering in their stewardship. In 2005, the value of donated time and mileage since Gluepot commenced operations in July 1997 was AU\$2 843 294 (Birds Australia 2005). The significant progress of Gluepot Reserve has been recognised repeatedly at international meetings. In particular, the work of a dedicated individual, Duncan McKenzie, has enabled the property to be recognised in recent years for more than 27 major national and international environmental and tourism awards.

A centrepiece of success was the acquisition of approximately AU\$100 000 by volunteers, from NHT and philanthropic sources to convert a shearing shed into an award-winning visitors' centre, completed in 2005. Local artists have donated time and materials to construct images and paintwork that reflect the flora and fauna of the property. Interpretation and education materials adorn the interior and visitors can choose from a number of activities on the property, outlined in visitors' pamphlets available at the centre. Entry fees are AU\$5 per vehicle and visitors can partake in camping, bird watching from a choice of five volunteer-built bird hides, bushwalking on mapped routes, or various other naturalist activities.

The magnitude of volunteer achievement is evident in the initiatives arising from 2005-2006. During this time, Gluepot received a further AU\$117 350 in project grants, donations and bequests; increased its freshwater holdings by 20 000 gallons; built a 19 metre steel storage shed; built a new accommodation block (funded by the South Australian Tourism Commission); installed an HF Repeater Station; installed an additional computer system for research and monitoring applications; and enhanced fire fighting planning and capacity (Birds Australia 2006; Birds Australia 2005).

In October 2006, a positive step occurred for the BR in the Renmark region when local landholders in the Riverland arranged to promote the RBR in a bid to raise awareness of the region's unique environment and natural produce. With the endorsement of the Parliamentary Secretary to the Minister for the Environment and Heritage, Greg Hunt, the Riverland Biosphere Incorporated became the Riverland Biosphere Trust (RBT). An initiative of the longstanding *local champions* of the BR, the RBT is working on consolidating its *capital assets* and creating new BR initiatives through *innovation* and *experimentation*.

The RBR now consists of nearly 40 different land partners (Pfueller 2008; UNESCO 2007c), including national parks, local government and grazing properties. This collaboration has come about through the work of the Riverland Biosphere Trust and the enthusiasm generated by board members with like-minded individuals in the region (Pfueller 2008). For example a group of citrus-growers from Renmark, (organic and conventional) opted to become land partners of the BR. The involvement was described as becoming part of a team with similar ideals and providing the opportunity to network with other partners (Pfueller 2008). The group of growers are developing a manual and auditing system, with the aim of promoting the use of management practices that improve the natural environment and foster community development.

In a recent *innovation* that enabled these *partnerships* to be showcased to the world, the RBR featured in a September 2007 Spanish television program, as one of six BRs filmed for a documentary shown at an international UNESCO meeting. C5 commented that:

**We think that this will give a good representation of the sustainability of the Riverland Biosphere. On one hand, you're looking at a large conservation reserve, which does a lot of education work and ecotourism ... to Banrock Station where you've got a major winery, working very sustainably with nature.**

Several new ecologically sustainable industries are being developed and implemented in the RBR; one of these is ecotourism, through the existing Bookmark Guides program. The concept of the Bookmark Guides was developed with community consultation in 1993 and the Bookmark Guides Association was established in 1997. This group of local tour operators focus on natural history, environmental awareness, hospitality and tourism and has received official endorsement by the RBT. The Guides offer a range of eco-experiences in diverse parts of the RBR, including traditional overnight bush safaris, boat tours, or simply a bush setting for tailored exploration trips. Other extant initiatives within the field of research and monitoring have recently been developed with RBR partners and include:

- wildlife surveys;
- watering point survey;



- vertebrate fauna survey;
- Mallee fowl research;
- groundwater monitoring;
- enclosure monitoring;
- wetland research and monitoring;
- Black Eared Miner monitoring;
- colonial bird nesting;
- nest box program;
- photopoint / vegetation survey;
- Reny Island Stone Curlew survey;
- fish rehabilitation;
- Reny Island possum survey;
- rain gauge monitoring; and
- Frogwatch.

#### 9.2.4 Lessons for Resilience

Based on the preceding data and the lessons articulated below, this BR is in Phase I in the BR resilience conceptual framework overall. However some community-driven components of the BR are more characteristic of Phase II, indicated by a number of factors. The change of title from Bookmark to Riverland BR reflects a collective desire by the longstanding local champions (not the ALT) to transcend the politics that have surrounded Bookmark. The reformation of the RBT following periods of inaction shows that *social capital* dormant in the region has been sustained despite set-backs. It is also a desire to see the BR concept and practice grow within the Riverland region, to become a project that resonates with, and attracts individuals, groups and businesses seeking to learn about, encourage and promote a sustainable Riverland future. Given the environmental challenges of salinity, desertification and sustainable production so critical to this part of the Murray-Darling Basin, the BR is needed to present practical examples of sustainable living, such as alternative forms of agriculture and market trials, that are relevant to the region.

The current arrangements, with ALT managing Calperum and Taylorville, and the RBT attempting to resurrect the former outstanding program, may be tenable for the short to medium term. However, Calperum and Taylorville really need to be active parts of the BR. Combined with the *capital assets* inherent in the ALT and the *initiative, partnership* and *champions* of the RBT, the potential for a united BR is immense. Unfortunately for the ALT and ultimately the RBR, individual personalities within the former have limited a broader potential, where *power sharing* problems have eroded the *capital assets* base, closed opportunities for *innovation* and *experimentation* thereby resulting in a lack of *assets, ecological rationality, openness, partnerships, collaboration, capacity* and *social learning*.

Despite their exclusion from the social-ecological dialogue at Calperum and Taylorville, the RBT has retained sufficient *capital assets* and *place-based* connection to redirect its efforts at social-ecological initiatives in their region, whilst retaining *openness*, drawing on *multiple knowledges* from the community, government, NGOs, and researchers. In doing so, the RBT is *building capacity*, strengthening current *partnerships* and proving that *resilience* is not **an absolute, it is about finding pathways. It is also developmental, iterative where at one point, all the qualities of resilience may not be manifest, but the capacity is inherent to continue in finding an appropriate pathway to reach a higher level of resilience (A4).** The RBT has illustrated *social learning*, sustaining the BR in the social memory of its champions and adapting to negative feedback cycles. *Capital assets* are being re-established in the wake of a dormant period preceded by divisive actions

on the part of a more formal, *closed institution*. A review commissioned by the Commonwealth in 2008 indicates that the governance issues of Calperum and Taylorville will be more closely monitored by the Department of Environment, Water, Heritage and the Arts. The review outlines a suite of findings and recommendations commensurate with achieving better governance outcomes.

In the future, the RBT will ideally seek to align more strongly with commercial and production partners similar to Banrock Station vineyard, which epitomises business-centric environmental stewardship, with a wealth of *capital assets*. This *partnership* is indicative of a *new governance* arrangement, in which the likes of the RBR need to invest. All forms of *capital*, coupled with *innovation*, *experimentation* and *new governance* attributes make Gluepot an outstanding aspect of the Riverland BR, and provides an excellent example of the inherent potential when these *resilience* components interact, are *championed* and stewarded. The transfer of management of Calperum Station back to a community-government relation<sup>77</sup> would be a beneficial step, where further projects like sustainable vineyard production and management could be conducted, thus providing an example and legitimate business options for other primary producers facing environmental challenges. The instigation of the Commonwealth's 2008 review recommendations may assist in catalysing such change. If the RBT can attract additional *partnerships* to build *capacity*, spur *innovation* and increase *experimentation*, realisation of Phase II across the BR is likely.

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<sup>77</sup> Using ALT as a partner, not sole management responsibility.

## 9.3 Fitzgerald River National Park Biosphere Reserve, Western Australia

### 9.3.1 The Environment

The Fitzgerald River National Park Biosphere Reserve (FRNPBR) is located in the central south coast region of Western Australia, situated between Bremer Bay and Jerramungup to the west, and Hopetoun and Ravensthorpe to the east (Figure 24, pg. 229). The BR is approximately 420 km southeast of the capital city, Perth. This region is known as soldier-settlement country due to the allocation of plots of land to the homecoming soldiers of the First World War by the Federal Government of the day (Thomas 1989).

The area of BR is 329 039 ha, which is entirely core area and that designated by UNESCO as the FRNPBR. However, the total informal BR area is larger than 1.3 million ha, including the buffer and zone of cooperation. The Fitzgerald River National Park was designated a BR in 1978 and incorporates upland plains, a former marine plain deeply incised by several rivers creating large valleys and tablelands, and a chain of small isolated peaks running close to the coast forming the distinctive Barren Ranges (Thomas 1989). The highest peak reaches 450 metres above sea level and rugged coastal cliffs are formed where the quartzite ranges meet the ocean. Sand dunes, inlets and rivers, swamps and ephemeral lakes also occur on the gently sloping marine plain (UNESCO 2007b).

The FRNPBR extends 60 km inland from the coast between Bremer Bay and Hopetoun. Its high biodiversity value is related to its size, diversity of habitat and the fact that it has been almost completely undisturbed, thus forms one of the most significant conservation areas in southern Western Australia (Watson and Sanders 1997). The high biological diversity of the region was first recognised in the early 1800s when botanical collectors visited the area and transported specimens to Europe (Watson and Sanders 1997). Vegetation communities include dry sclerophyllous woodland, coastal woodlands and heath. The reserve contains over 250 rare or geographically restricted plant and animal species, many of which are poorly known (Watson and Sanders 1997). Over 20 per cent of the state's total vegetation is represented within 'the Fitz', with approximately 1750 plant species, 75 of these endemic to the area (UNESCO 2007b). Fauna is also important to the FRNPBR conservation status. One of Australia's rarest birds, the Ground Parrot (*Pezoporus wallicus*) inhabits the area.

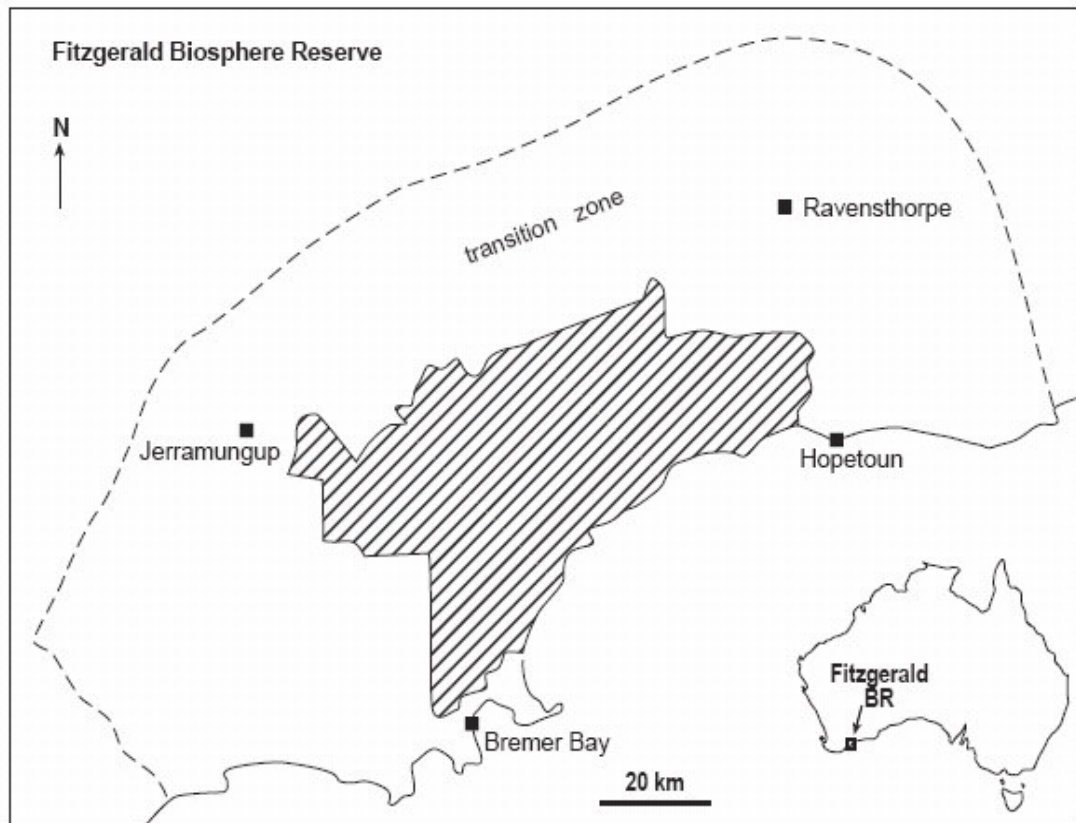
The human impacts that occur within the BR are mainly related to tourism and the development of visitor facilities. Some 36 000 people (2003) visit each year (UNESCO 2007b).<sup>78</sup> It is also affected by surrounding external agricultural land use practices. Many watercourses within the BR have their catchments within agricultural lands, thus chemicals and nutrients are washed downstream into the BR. The principal goal of the national park is the conservation of flora and fauna, particularly threatened species, and the provision of appropriate visitor access and facilities. Substantial areas of

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<sup>78</sup> 2005 tourist commission figures on visitor traffic into the Great Southern region suggest in excess of 500 000 visitors per year. Statistics of visitor volume into the Northern Shires of the Great Southern region remain un-recorded (Australian Bureau of Statistics 2007).

the park are zoned for wilderness (~78 000 ha) and special conservation protection (~70 000 ha). Access is prohibited to most of the mountain peaks in the wilderness zone to protect threatened flora, and reduce the risk of the introduction and spread of dieback disease (*Phytophthora cinnamomi*). A complementary role is to keep the landscapes free from visible human disturbance.

**Figure 24 Fitzgerald Biosphere Reserve Area**



Source: adapted from Fitzgerald Biosphere Marketing Association (2004: 1).

### 9.3.2 History of the Designation

The area was designated a national park in 1976. When the BR designation occurred in 1978, the aim was for the WA Department of Conservation and Land Management (CALM, now Department of Environment and Conservation) to work closely with local landowners to preserve and enhance the ecology of the natural area while improving the economic and commercial capabilities of surrounding agricultural land (UNESCO Australia 1992). At that time, the FRNPBR was well aligned with the MAB BR objectives of research and conservation. It was not until 1986 that the local community organised to recognise and support the buffer and transition zones of the BR. Watson and Sanders (1997) suggest that since this time, awareness of the BR concept and acceptance of a 'greater' BR has increased. The unofficial BR now includes four local shires: all of Jerramungup Shire, half of Ravensthorpe Shire and small portions of Lake Grace and Kent Shires (Watson and Sanders 1997).

Around the core area boundary, adjoining bushland provides a buffer zone interface with the largely cleared agricultural landscape beyond (Watson et al. 1995). The buffer zone extends into many narrower corridors, along fence lines, creeks and roads. The term zone of cooperation is now used

instead of transition zone amongst the local community, signalling their direct association with the BR area. This zone comprises a largely cleared agricultural landscape plus a few small towns, several hundred farms, road networks and remnant vegetation either in discreet isolated blocks, or in the narrower corridors of the buffer zone (Watson et al. 1995). Within this zone, the local community of around 3000 reside and **community efforts have been increased as farmers recognise the importance of remnant and re-established vegetation for nature conservation, production potential and economic viability (C3).**

Inspiration for the FRNPBR, and its subsequent development, arose from interest and action by local people, such as scientists, farmers, home keepers, managers, local politicians and tradespeople (UNESCO Australia 1992). In the mid 1970s, there was an increasing interest in enhancing the usage of land in the area but soil conservation was identified as a priority for the region due to unprecedented wind erosion, resulting from clearance of natural vegetation, intensive tilling agricultural practices and low rainfall (Watson and Sanders 1997). At this time, knowledge was required on landforms, soils, flora and vertebrate fauna. A public seminar was organised to coordinate activities and to provide advice and contacts for people interested in alternative, sustainable ventures (Thomas 1989).

The days of large-scale land clearing are unlikely to return to this part of Western Australia's south coast, due to the level of environmental stewardship now practiced by the majority of the local residents (Williams 2004). In achieving more sustainable farming practices, Land Conservation District Committees, farm improvement and integrated catchment farm planning groups were created. These land committees acted as the parent committees or umbrella organisations for the adoption of the Fitzgerald Biosphere Project.

Watson and Sanders (1997) suggest that the FRNPBR evolved to become a working biosphere over the period 1985 to present, and continues to evolve. The size of the gazetted area of the FRNPBR in 1985 was 242 739 ha and a biosphere project group consisted of a local conservation group, the Fitzgerald River National Park Association (FRNPA) and an *in situ* management staff of three rangers. Watson and Sanders (1997) proposed that it was not until 1984 that the park rangers arrived at an understanding of the additional benefits of a BR over and above normal park management practices. Whilst Watson considered this to be a late realisation, it precedes such realisation at any other Australian MI BR.

A major highpoint for the Fitzgerald Project was reached in 1987 with the Bush Comes to the City conference held in Perth.

This brought the story of our region and the BR to a much greater number of people. The overriding message of the conference, that conservation and development can and must proceed together if either is to succeed, has made the project an integral part of Western Australia's state conservation strategy (UNESCO Australia 1992: 14).

Most of the speakers were farmers or from farming families within the BR area. Without exception, they pointed to the dangers of big-scale agriculture and its associated exploitation of land. Such combined effort has built *social capital*, *networks* and *capacity* in relation to further BR activities. For

instance, Watson et al. (1995) illustrates that the Jerramungup Land Conservation District Committee (now the Fitzgerald Biosphere Group) has been successful in encouraging farmers to adopt management strategies that are both profitable and sustainable, in alignment with their own strong environmental commitment. An important factor in the success of the Jerramungup Land Conservation District Committee was the deliberate policy of maintaining ownership of the various programs with which the community had been involved (Chambers 2004). The group and its community-based action and involvement agenda have since spawned multiple projects under the new name of the Fitzgerald Biosphere Group (Deegan 2004).

The Fitzgerald Biosphere Reserve has been heralded as a success for most of its existence (Watson 2004; Watson and Sanders 1997; UNESCO Australia 1992; Thomas 1989). The momentum of the BR is attributable to a group of environmentally concerned members of the local community, attuned to the value of implementing BR status, and their decision to champion the BR despite a lack of *institutional or financial capital*.

### **9.3.3 Governance and Capital in the FRNPBR**

The FRNPBR committee has recognised the importance of social drivers in land management in the Fitzgerald region, where an outward from the boundaries approach has been adopted to manage multiple values of the working landscape surrounding the park. The BR model recognises these values and is a useful framework for their management (Watson 2001). Initiatives such as a 1996 Environment Australia funded project to produce an integrated vegetation management plan for the zone of cooperation has assisted the BR by establishing *institutional, social and financial capital assets*. Completed in March 1997, it identified important remnant vegetation patches, poorly conserved vegetation types and rare floral communities. Suitable areas were identified where corridors could be re-established to provide interconnected, east-west and north-south linkages. Within this aim of promoting *connectivity conservation*, individual farmers and local catchment groups are continuing to develop revegetation and cropping strategies to further combat rising groundwater salinity, and provide more localised vegetation corridors and protection of on-farm remnant vegetation (Watson 2001).

Although the conservation values of the region are high and recognised locally, regionally, nationally and internationally (Watson et al. 1995), it is the *networks* of local people that appear to engender conservation principles, and who constitute this BR. An interesting model for the successful BR is proposed by a local, long-term champion, John Watson (Department of Environment and Conservation). He proposes that a BR is essentially like a table: it relies on four legs for it to be stable (Watson, 2004). The four legs of a BR are: i) the local context ii) the state context iii) the national context and iv) the international context. According to Watson, the networks at these levels are critical and weakness in one area will necessitate greater load bearing in other areas, or inevitable instability of the structure.

The local and the state legs of the FRNPBR are strong. For instance, multiple committees work on projects related to BR values and include the Ravensthorpe Agricultural Initiative Network (RAIN) (previously the Ravensthorpe Land Conservation District, LCD) based in Ravensthorpe; the

Fitzgerald Biosphere Group (FBG) (previously the Jerramungup Agricultural Initiative Network); the Friends of the Fitzgerald River National Park (FOFNP); Department of Environment and Conservation (previously CALM); Natural Heritage Trust, Lotteries West, South Coast Regional Initiative Planning Team (SCRIPT) (the natural resource management regional body); and the Jerramungup Shire Council. The community that makes up the FRNPBR committee draws from the volunteers in the FBG, RAIN and FOFNP. Individuals representing SCRIPT and CALM are paid, and there are some paid members under FBG and RAIN. Whilst the FGB is the coordinating group for the BR, all parties contribute equally to the BR, by mobilising *capital assets*, *networks* and *capacities* to sustainability initiatives.

In collaboration with Landcare Australia, a computershare initiative called eTree is currently a major partner in the BR. The initiative provides an environmental incentive to shareholders of Australian companies to elect to receive shareholder communications electronically. In return, for every email address registered to a validated shareholding via the eTree website, a donation of up to AU\$2 goes to Landcare Australia.<sup>79</sup> Another major partner is the Nature Conservancy, in a project called Gondwana Link. As discussed in Chapter 5, this initiative aims to link the ecosystems of inland Western Australia with the wetter forests of the south-west corner and in doing so, restore ecological connectivity from the woodlands of WA's Goldfields, via five of the region's significant wild places, to the karri and jarrah forests of the Margaret River area (Gondwana Link Coordination Unit 2007).

The strength of the regional networks operating in the Fitzgerald region is surprising, given that distances between towns are long. However local residents rarely perceive them to be so. The relative isolation of both Jerramungup and Ravensthorpe from major centres (at least a 2-hour drive to either Albany or Esperance from each town respectively) engenders *interdependence* amongst the residents of the region. Moreover, **in two towns that have little to offer in the way of formal entertainment, individuals become involved in local issues through various committees as a means of social involvement and interaction (C3)**. This support at the local and regional levels maintains the *capital assets* base.

At the state level, the BR relationship is based on the management of the core area (national park) by the state conservation authority. There is no specific attendance to the BR requirements for funding or resources at the state level, beyond what is allocated to the core. However, the network formed through similar land and wildlife management units across Western Australia is a source of expertise in, for instance, research, dieback disease control, fire management, landscape and recreation planning and the establishment of trees on farms.

The national context is not sufficient in the governance of this BR, as a key network leg of the four required to maintain successful BR activity, according to Watson's four-leg model. Although the FRNPBR was singled out to serve as one of the two Australian model BRs, it did not receive any

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<sup>79</sup> To date, over 1.7 million trees have been planted in Australia, Canada, The United States, South Africa and the UK through the eTree program, and over 570,000 shareholders have agreed to receive their shareholder materials online (eTree 2007).

Commonwealth funds, as was the case with Bookmark (Riverland BR). **In fact, there was no assistance (in-kind or financial) offered to the Fitzgerald Biosphere Reserve resulting from selection as a model (APC1).** Despite an in-principle decision by the Commonwealth, no change occurred on the ground.

The international network role of the FRNPBR is relatively small, however, it has been utilised as a representative example of Australian BR success at UNESCO sessions (Bridgewater and Muldoon 2000). Several representatives from UNESCO and the IUCN have made visits to the BR and some funding from UNESCO has arisen for several projects in the core area as a result (Watson, Lullfitz et al. 1995). However, considering the recommendations from Parker's work (Parker 1994), the FRNPBR was expected to take a leading role in the BR context in Australia and internationally:

The designation of the Fitzgerald River National Park Biosphere Reserve as one of Australia's model programs over the next few years will also undoubtedly focus more world attention on the project (Watson, Lullfitz et al. 1995: 486).

Clearly, the four supporting legs of the FRNPBR have not been addressed equally within the last decade. The strength of the local and regional networks has allowed for the BR's successes. All initiatives have been the work of volunteers with the support of some local agencies and occasional funded staff. As APC1 points out:

**In the last few years [the FRNPBR] has faltered because of the Commonwealth. But the thing is that stability changes from time to time. The time factor is an important one – not rushing, and letting things happen. Opportunistic moves - it is important to capitalise on these to make incremental movements.**

Watson (2001: 344) suggests that:

The challenges, in light of unfulfilled Commonwealth statements, are to increase community awareness of protected area values; to extend that awareness to the expanded physical networks and linkages; and to encourage pride and support for working and living together in the total BR landscape.

The FBG has been active in these pursuits. For example, Revisiting the Biosphere held in August 2002 was a meeting to focus on priority issues for the FRNPBR. An outcome was identifying regional branding as an opportunity for regional renewal. The Fitzgerald Biosphere Marketing Association (FBMA) was created to explore thoroughly the concept of capacity-building for the region using the BR. FBG and RAIN united to act as parent bodies of the FBMA and owners of the Fitzgerald Biosphere logo, utilising FBMA as their 'marketing arm'.

In August 2002, the FBMA received funding from the Australian Government's Regional Solutions Program to employ a project coordinator for a two-year term. Since this time, the group has successfully encouraged cross boundary work to break down the barriers across the Fitzgerald BR region (i.e. between the shires, development commissions, tourism zones and local NRM and grower groups). Many partnerships have been made in the process of developing the marketing brand for the BR, including with Edith Cowan University. The FBMA has been seeking local products that will develop the Fitzgerald Biosphere brand, generating brand presence in the market, and growth



opportunities for the region (The Fitzgerald Biosphere Marketing Association 2004). The FBMA Business Plan completed in 2001 concluded that:

The Fitzgerald Biosphere Marketing Association has the potential to create a regional brand that inspires community members to produce responsibly within their environment. Research has clearly indicated that it would be possible to utilise the Fitzgerald biosphere to differentiate products from the region, both within the domestic and international markets (The Fitzgerald Biosphere Marketing Association 2004: 1).

The business plan helped to identify lamb, yabbies<sup>80</sup> and tourism as potential flagship products for a regional brand. As a direct result of these findings, the FBMA commissioned business consultants for a five-month period in 2004 to conduct a lamb and yabbie feasibility study and market assessment trial. The aim of the market trial was to test supply chains' and consumers' responses to a Fitzgerald Biosphere brand, promoting responsible agricultural production (Fitzgerald Biosphere Marketing Association 2004).

Agricultural land across the Fitzgerald region is facing several major challenges that threaten the long-term viability of an agriculture-based economy including declining terms of trade and land affected by soil acidification and salinity. It is within this context that the idea arose of preparing an Environmental Management System (EMS) for the FRNPBR, linked to the BR and its marketing brand. Complementary market and EMS trials undertaken as the core activities of this project provided a coarse assessment for implementation in the short to medium term. A number of specific outcomes were achieved in the project including:

- improved community understanding of EMS and environmental accreditation concepts;
- a framework for the cost effective implementation and delivery of EMS in the community;
- an EMS resource kit;
- increased support from the community for regional marketing initiatives;
- a Fitzgerald Biosphere brand in the marketplace;
- improved business management skills of participants;
- increased knowledge of lamb market requirements and supply chain management issues; and
- increased recognition and awareness within the community for the FBMA and its activities (The Fitzgerald Biosphere Marketing Association 2004).

The strategy to flow from this study involves an active partnership between the FBMA; its parent organisations, the Fitzgerald Biosphere Group and Ravensthorpe Agricultural Initiative Network; and the Department of Agriculture WA. While EMS-derived on-farm business efficiencies can justify modest investment in the short term to support adopting landowners, the strategy is ultimately aimed at positioning the region for market leadership, if and when environmental accreditation becomes a more prominent feature of the commercial landscape. **The strategy acknowledges the uncertainties associated with purported benefits of EMS and thus remains modest. After**

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<sup>80</sup> Yabbies are a type of inland freshwater crayfish found in Australia. They are a crustacean and their scientific name is *Cherax destructor*. Originally they were native to the Darling and Murray river catchment areas and other close smaller catchments.

**several years, an assessment will be made as to whether EMS investment should be increased, decreased, or abandoned (E1).**

The most recent work of the FRNPBR has been a collaborative effort between SCRIPT, CALM, Friends of the Fitzgerald River National Park, RAIN, the FBG, the FBMA and others from the community. The voluntary work has involved compiling a database of naturalist information, created and researched since designation of the BR and Fitzgerald River National Park. A full time officer (Paula Deegan) was employed for 1 year through a Lotteries West grant (the West Australian Lotteries Commission) to undertake the majority of the work. A comment by E2 suggests that *social capital, partnership* and *openness* allowed the project to proceed, producing *capacity*:

**The Friends of the Fitzgerald actually developed a project and wanted to get this collation of information done. Then because they are not an incorporated group, they got FBG to come in as a partner. Therefore, FBG actually administer the project. And CALM have been providing quite a bit of input into this project – they see it as a plus for them as well (E2).**

The project was completed in April 2005. It is available through Western Australian Public Libraries, and in an electronic format on the Internet. **It is expected to be of great interest to researchers, scientists and various levels of government, along with the public, such as local landowners who have allowed researchers access to their properties (E2).**

#### **9.3.4 Lessons for Resilience**

Based on the preceding data and the lessons articulated below, the FBR is at Phase II of the BR resilience conceptual framework, as it is in a consolidation phase relative to its *new governance* attributes. The FBR draws together a range of *capital, innovation* and *experimentation* to deliver greater regional *capacity* to address social-ecological issues, through *multi-level partnerships, knowledge sharing, openness, ecologically rational institutions, and place-based social learning*.

The *capital assets* of the FBR are high. A number of factors explain their occurrence. First, the remote location of the BR has led to a self-sufficient attitude in the local community, where *social capital* is created by the close *networks* of a small population engaged in an agricultural resource regime. People in the area face very similar challenges, arising from life in this arid landscape. Second, the livelihoods, and by extension, personalities and actions, found in the Fitz are strongly connected to the realities of this *place*. The tough livelihoods of those within the FRNPBR helps create a shared *sense of place* amongst the residents. Third, with few competing distractions and other networks, the committee of the FBR arose from recognition of the *mutually dependent* nature of this *social-ecological system*. The region is a global hot spot for biodiversity, which lends a greater significance to the *place* and to environmentally degrading practices occurring within it.

Historical mismanagement of the land has also informed the current population of residents' actions toward the landscape. Some farmers in particular, recognise the historical environmental debt, and a requirement for its repayment to secure future productivity. *Local champions* for the FBR have undoubtedly propelled initiatives in the region, with the assistance of state government

representatives, NGO conservation program officers and local farmers, sharing BR values and contributing to positive *partnerships* and *collaboration*.

Strong *social* and *natural capital* has formed a basis for the creation of *financial* and *institutional capital*. Recognition of the many parties required for the stewardship of the Fitz has allowed for a multiplicity of *partnerships* to be created. Initially, at a national level, the region was declared a national park, which was then recognised internationally by UNESCO. Later, further international attention was garnered when the Nature Conservancy recognised the Fitz as integral to Gondwana Link. National *institutional capacity* was again conferred through the NRM regionalisation of Australia, creating the SCRIPT. With rising national importance of NRM, Jerramungup and Ravensthorpe became central points for organisation of related projects, providing regional *social*, *institutional* and *financial capital* for FBR *partnerships*. With the support of the local government, the FBR attained *capital* through sponsorship of their office. Other *innovative* partnerships such as eTree have grown the *capacity* of the FBR, opening commercial conservation interest in the region. State and local representation on the FBR board has strengthened *institutional capital*, provided *multiple knowledges*, reduced *institutional rigidity*, increased *openness* and allowed for mutual *social learning* (local community from state and visa versa).

The strong *social* and *natural capital* of the FBR has contributed to the realisation of Phase II. However some opportunities have arisen out of fortuitous national political decisions targeting NRM development and devolution. For example, a number of partnerships created at the FBR have been assisted by the existence of NHT funding. Given Australia's current vulnerability to environmental problems including drought, salinity, degrading agricultural practices, soil erosion, and climate change, and the impact of these environmental problems on economic stability, increased future government funding will be a necessity if associated ramifications are to be managed. The FBR represents a modality to devolve some responsibility for managing these problems to local levels, where *multiple knowledges* can be accessed to inform *adaptive capacity*.

Political leadership in support of combined *multi-level partnership* NRM and social-ecological initiative as exhibited by the FRNPBR is needed at this time, and in the future. In the absence of a national BR coordinating body, an appropriate national forum to publicise the successes of the FBR has not occurred, and *knowledge sharing* is limited. Furthermore, without reliable subsistence funding (*financial capital*), *adaptive capacity* of this BR is yet to be realised. Regardless, the FBG is coordinating an impressive BR that innovatively engages with a suite of local and regional institutions to address social-ecological concerns.

## **9.4 South-West Tasmania National Park Biosphere Reserve, Tasmania**

### **9.4.1 The Environment**

The southwest quarter of the island state of Tasmania is a remote and largely inaccessible region and comprises part of the 40 per cent of Tasmania's protected landmass. This high proportion of protected area is largely attributable to the size of the Tasmanian Wilderness World Heritage Area (TWWHA) that constitutes 1.38 million ha, or 20 per cent of the state. The Tasmanian Wilderness was added to the World Heritage List for both its outstanding universal natural and cultural values. The TWWHA is located within the boundaries of six local municipalities – Central Highlands, Meander, Kentish, West Coast, New Norfolk and Huon Valley. The TWWHA includes six national parks: Walls of Jerusalem National Park, Cradle Mountain – Lake St. Clair National Park, Franklin – Gordon Wild Rivers National Park, Mole Creek Karst National Park, Hartz Mountains National Park and the South-West National Park. The South-West National Park was declared a BR in October 1977 and was placed on the World Heritage List in December 1982. The South-West National Park today is a much larger area than the national park recognised as a BR, which was enveloped within the confines of a newer boundary. The area designated as a BR was 402 240 ha, or the entirety of the former South-West National Park, prior to its extension in the 1980s and 1990.

The former BR extends from sea level to 1250 metres above sea level. A relatively large cool temperate wilderness with over 120 kilometres of coastline fronting the Southern Ocean, the South-West includes several offshore islands and a large enclosed waterway (Port Davey – Bathurst Harbour) (Figure 25, pg. 238) (Davis and Drake 1983). It is one of only three temperate wilderness areas remaining in the Southern Hemisphere. Despite the significant conservation values of the region, the South-West BR was delisted in November 2002.

Well known for its pristine wilderness and remoteness, the area is largely unaffected by humans. Although evidence shows Tasmanian Aborigines have visited for at least 25,000 years, and European settlers have made occasional forays into the park area since the 19th century, there has been very little permanent habitation and only minimal impact on the natural environment. The southern and western reaches of the park are far removed from any vehicular access. The only access is by foot, boat, or light aircraft.

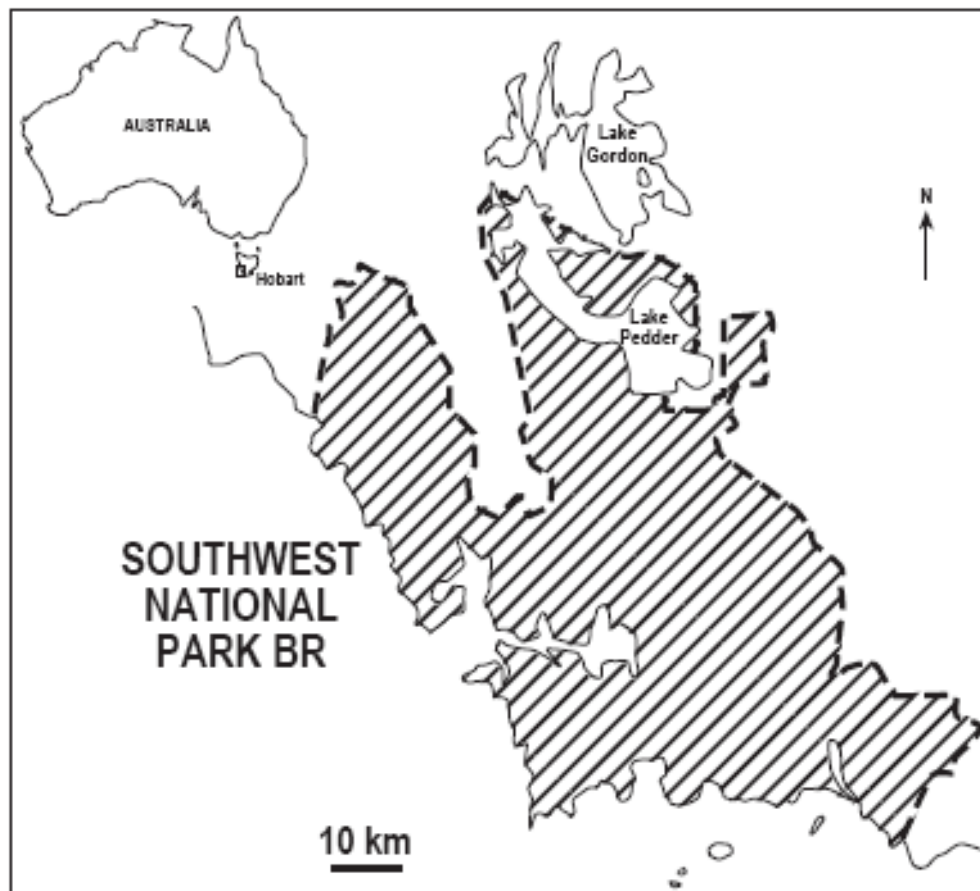
Characterised by extensive rugged mountain ridges and steep valleys, with deep mountain lakes and extensive wild moorlands, the South-West has a preponderance of dolerite and quartzite rock, with very little soil coverage over much of its area. This largely contributes to the observed features of the landscape, and the low utility of the area for agriculture or forestry. Remoteness, ruggedness and infertility are largely what led to its being unsuitable for settlement. Much of its landscape has been sculpted by relatively recent glaciation events.

The major vegetation communities consist of closed forest (temperate rainforest), open forest (eucalypt forest), buttongrass moorland and alpine communities. The flora occurs in a unique mosaic of Antarctic and Australian elements with the Antarctic element consisting of species descended from

the super continent of Gondwana. The exposed and more infertile areas, particularly around the extreme southwest, consist largely of native grasses such as buttongrass (*Gymnoschoenus sphaerocephalus*), heaths (various species), and melaleucas (*Melaleuca sp.*) (Reid et al. 1999). In more fertile areas, dense forests of eucalyptus (*Eucalyptus sp.*), native sassafras (*Atherosperma moschatum*) and myrtle (*Nothofagus cunninghamii*), wattle (*Acacia sp.*), and leatherwood (*Eucryphia lucida*) are found, with low growing ferns, climbing heath, bauera, mosses and lichen. The region is also host to stands of ancient Huon pines (*Lagarostrobos franklinii*) and celery-top pines (*Phyllocladus aspleniifolius*) (Reid et al. 1999). Because of the diversity of its vegetation, the region is recognised as an International Centre for Plant Diversity by the IUCN.

Fauna is typically Tasmanian, though population densities are not high, especially in the more infertile areas. Rivers can be rich with fish, such as giant trout (*Galaxias sp.*), as the area is not over-fished. Avian species include rosellas (*Platycercus sp.*), honeyeaters (*Melithreptus sp.* and *Lichenostomus sp.*), native wrens and robins (*Malurus sp.* and *Stipiturus sp.*), thornbills (*Acanthiza sp.*) and currawongs (*Strepera sp.*) (The Encyclopedia of Earth 2007). An area known as Melaleuca is home to summer breeding grounds of the highly endangered orange-bellied parrot (*Neophema chrysogaster*). Due to its remoteness, the wilderness is touted by some as a possible place for a breeding population of thylacines, or Tasmanian Tigers (*Thylacinus cynocephalus*) thought by some to have survived, despite their official extinction in 1936.

**Figure 25 The area of the South-West National Park and the Biosphere Reserve (delisted)**



Source: adapted from The Encyclopedia of Earth (2007: no page).

#### 9.4.2 History of the Designation

According to San Blas Alvarez (2002), islands, in whole or in part, serve as excellent sites to implement the objectives of BRs. In 2002, more than fifty island territories were part of the WNBR. The South-West BR would have constituted one such area. This designation was part of the MI BR declarations (see chapter 3). In the early phase of the MAB program, the designation of the South-West National Park as the BR was acceptable: it constituted a rare and important array of ecosystems with a strong potential for, as well as existing, research and monitoring capacities. The BR concept was seen as an important way of striking a balance at this site between conserving biodiversity, promoting research and maintaining associated cultural values.<sup>81</sup>

The TWWHA Ministerial Council was the overarching administrative authority for the BR, under the management jurisdiction of the Tasmanian Government (Tasmanian Parks and Wildlife). Protection of the representative core area was legislated under the *Tasmanian National Parks and Wildlife Act 1970* (now *Nature Conservation Act 2002*), and managed by the Tasmanian National Parks and Wildlife Service. The TWWHA Management Plan (incorporating South-West National Park and the BR) was approved in 1999. However, the plan did not incorporate BR management criteria. Management prescriptions commensurate with the multi-function three-level zoning of the BR concept were not included in either the pre-existing South-West Management Plan or the current TWWHA Management Plan. According to PC1, disconnection between BRs and their supposed management authority was long-standing:

**In the mid 1980s, the Tasmanian Government departments that could have served as leaders of the program at a state level were oblivious to the meaning or practice of BRs. What has been lacking over the years is an explanation to the public, politicians and so forth of what a BR is. That is why [the BRP] has never really got off the ground in most parts of Australia (PC1).**

Information about the purposes and practices of BRs was not forthcoming after the two 1977 Tasmanian BR designations (South-West and Macquarie Island), either from the state or federal governments, which left the managing authorities, as well as the public, unaware of the significance or potential of the designation. The intent in seeking a BR designation, in the first instance, was to bring a further recognition to an outstanding national park. It is doubtful if this occurred under such circumstances.

In November 2002, the South-West was de-listed by UNESCO as a BR at the request of the Tasmanian Government. The request mirrored the ambivalence in Australia regarding BRs, but especially at the state level, where no regard or concern had ever been shown for the designation, with the exception of a single champion. The three functions and zones of the BR were never apparent, and thus the listing as part of the WNBR was moribund.

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<sup>81</sup> According to Bryce (2002) since the dedication of the South-West, legislative changes have been introduced (particularly the state planning legislation) that promote the concept of sustainable development throughout the state. However, this is arguably government rhetoric. To a lifetime resident of Tasmania, governmental approaches to sustainable development are mostly imperceptible.

#### 9.4.3 Governance and Capital in the SWBR

The potential to fulfil the functions of the BR may have been realised had the state government chosen to explain and make the listing more public and apparent (Copson 2004). Outside of very limited government documents, the term Biosphere Reserve was not associated with the South-West. The state government should have fostered the program, as it was through its initiation that the designation existed (due to their nomination of the area to UNESCO). Due to the remoteness of the BR, it was the responsibility of government to promote awareness. As a MI BR fulfilling mainly functions of research, monitoring and conservation, the designation could have remained meaningful. However, since the Seville Conference and associated Seville Strategy of 1995, and Seville +5, the designation was not meeting new targets.

The lack of concern for the designation can in part be explained by the lack of ownership of the idea by any individual or group, compounded by the problem that PC1 described:

**The responsibility for the BR ultimately came to the regional manager for the South-West district within the Tasmanian Parks and Wildlife Service – problematic considering the high turnover of this position every two or three years. Thus, there was little opportunity for a manager of the region to become a champion of the concept when little information existed and where most would arrive at the position without prior experience or knowledge of the BR ideal.**

PC1 also suggested that:

**I am no longer a representative to the working group on BRs at the national level, as that is now the responsibility of the parks service [National Parks and Wildlife Service, Tasmania], and we are now separate departments. This is part of the problem of continuity, there really is no one at Parks that has that carriage at all – and the great majority of them would not know what the hell you are talking about.**

The South-West BR file is one of the smallest files kept in the records archives of the State Government Nature Conservation Branch, testament to the lack of dialogue on the designation over 25 years. Amongst its contents, a minute to the Minister by Mark Bryce, the Southern Regional Manager at the time of delisting, outlines some issues surrounding the South-West as a BR. According to Bryce (2002: 1), at the request for delisting, the South-West BR 'generally only has a core area, satisfying the conservation function. It is doubtful if the reserve meets the development and logistic functions'. It was also stated that:

the community is not aware of the MAB programme. For the community to embrace the concept, Parks and Wildlife would be required to dedicate significant resources to promote the concept. Notwithstanding, there are no residential communities within the BR. The Parks and Wildlife Service are continuing to work with local government and local communities in planning for the use and development of reserves (Bryce 2002: 1).

Importantly, Bryce also states that:

since the listing of the South-West National Park as a BR the area has been dedicated as part of the Tasmanian Wilderness World Heritage Area ... The recognition of the area as a WHA has brought enormous benefits to the management of the reserve and this is likely to continue. Unlike the recognition of the area as a World Heritage Area, the significance of the area as a BR has not led to any tangible benefits. Largely the

objectives of the BR are being pursued through other mechanisms. I am not suggesting that the BR concept is not worthwhile, however its usefulness to the management of the South-West National Park is questionable. The advantages of the BR is questionable, and it is considered that the efforts devoted to preparing the status reports for the BR would be better directed to implementing conservation programs, and further promotion and management of the South-West as a World Heritage Area.

E4 suggested that BRs were well suited in specific situations, but their interview response suggested an obvious lack of understanding about the BR concept post-Seville:

**BRs are fantastic in the right location, for the right use. In a third world country – Uganda – or somewhere, where there is raping and pillaging of an elephant population by a local community that is desperate for money – they need to be able to work out a refuge program for the species but allow some sort of input from the local community to allow the community to change their habits and have an income stream attached to ripping ivory off elephants, or something like that. And that is where they work really well. That type of concept. But in the western countries and in the sophisticated technologies that we have in places like Tasmania, I am not quite sure. Unless the relationship of having a BR is just totally related to having a scientific example, well, that might be possible, such as Macquarie Island (E4).**

It is not surprising that a mainland Tasmanian BR no longer exists. In the absence of interest and knowledge from civil society, government or industry in the prospects for BRs in the state, it is unlikely that any BRs could succeed. This is an opportunity missed, considering 40 per cent of Tasmania's land mass is dedicated to protection under National Parks, World Heritage and other conservation reserves. Many of Tasmania's economic commodities are primary produce or extractive resources (timber and mining products), which are uncomfortably juxtaposed with these designations and the state's other major source of revenue, nature-based tourism and ecotourism.

The model of a BR provides a social-ecological approach to marry these land uses in a cooperative, joint venture approach, through communication between primary producers, large industry (such as Forestry Tasmania and Gunns<sup>82</sup>), conservation area managers and volunteer groups, along with education sectors (primary, secondary, tertiary), researchers and entrepreneurs. As in other BRs, the keystone to initiation and success often only requires a motivated local *champion* of the concept. Due of the declaration of a Tasmanian BR in a highly remote location, BRs have not become community initiatives in this state, a situation also perpetuated by a lack of awareness on the part of the Tasmanian Government of the evolving tenets of the BRP.

#### **9.4.4 Lessons for Resilience**

Based on the preceding data and the lessons articulated below, this designation was never able to reach Phase I of the BR resilience conceptual framework, due to an absence of *social, institutional* and *financial capital* arising from a mis-match between the purposes of the area and the functions of a BR. In the absence of a local population to form the basis for *social capital assets* and potential for

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<sup>82</sup> Gunns Pty Ltd is Australia's largest fully integrated hardwood forest products company. Within Tasmania, the company owns and operates five sawmills, two veneer factories and four woodchip export ports. It is also the proponent of the controversial, proposed Longreach Pulp Mill in the Tamar Valley, Northern Tasmania.



local *champions*, this BR could not realise the changing mandate of the BR in the 1990s and 2000s. This BR highlights the importance of *capital assets* in the transition of a BR from merely a designation on paper, to a *social-ecological* praxis. Whilst there are undoubtedly other BRs internationally that arose to fulfil only biodiversity and research components, there would be few as isolated and uninhabited as the South-West. Surrounded by the Southern Ocean on one side, this BR's only social ecological interface occurs at the present day boundary of the TWWHA, where forestry and hydro-electric industries provide the major resource regimes that support the people of local townships. Given historical clashes between environmentalists and these industries in the region, it is unlikely that many local people would be mobilised to *champion* a BR for the region. Twenty - five years of the designation resulted in no *local champions*, and only one *champion* of the concept within the entire state, the same individual attributable to the designation in 1977.

However this BR was not, and probably never will never be, a working landscape. The expansion of the park and the subsequent legal protection garnered for the TWWHA ensured that the existing South-West National Park would be protected indefinitely, buffered from the impacts that were potential threats prior to these expansions. Its internationally significant natural and cultural heritage are better protected and appreciated through a World Heritage listing and national park status. As a national park, the South-West is not indicative of the usual social and ecological tensions found in other MII BRs and does not need therefore, to be a BR.

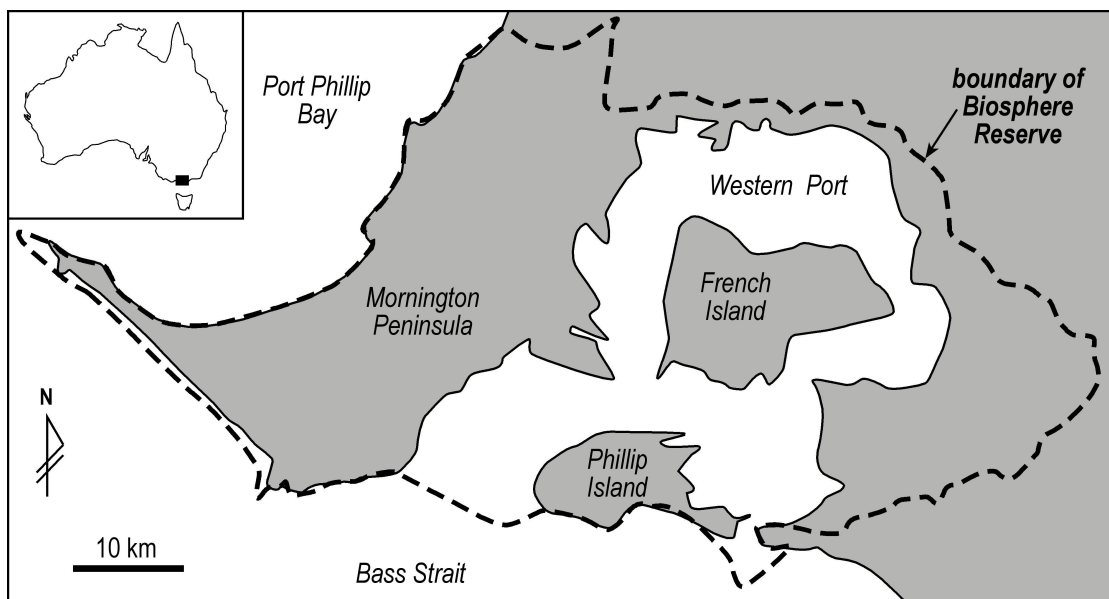
The reason for the delisting, however, was not theoretical analysis but rather ambivalence, misunderstanding, paucity of *social, institutional* and *financial capital* and lacking *experimentation* and *innovation* on the part of the Tasmanian Government. The government's short-term solution was to delist the designation. Whilst the reporting of a poor 10-year review may not have been widely noted within the state, it may have been at a national level, and certainly at an international one. Whilst delisting of BR designations is pertinent in some cases where sustainable development is not a government or community priority, it appears that in this case, it was sought due to a lack of interest in, and commitment to the designation by government. This is suprising given the State's international and national branding and marketing as 'the natural state' and an iconic desination for nature-based and ecotourism. Hence is is also surprising that more was not done to support and explore the options for this designation prior to de-listing.

## 9.5 Mornington Peninsula – Western Port Biosphere Reserve, Victoria

### 9.5.1 The Environment

One hour drive from Australia's second largest city, Melbourne, is the Mornington Peninsula and Western Port BR (MPWPBR), a designation spanning 214 200 ha (Figure 26). The MPWPBR comprises the Mornington Peninsula, the waters of Western Port, and the southern part of the Western Port water catchment, incorporating the entire Mornington Peninsula Local Government Area (LGA), part of the Bass Coast and Cardinia LGAs, and parts of the cities of Frankston and Casey (MPSC et al. 2002). It also includes French Island. When the MPWPBR was designated in late 2002, it was the first new Australian BR designation in 25 years.

**Figure 26 Mornington Peninsula, French Island, Phillip Island and Western Port Bay region**



Source: adapted from MPSC et al. (2002: 2).

The MPWPBR includes nearly 400km of coastline and significant marine and coastal environments within its large zone of cooperation. Western Port periodically supports over 20 000 waders, ducks and swans, and a rich invertebrate fauna of some 1380 species (MPSC et al. 2002). Some areas of the MPWPBR are protected by the Ramsar convention and include species protection by the China - Australia Migratory Bird Agreement (CAMBA) and the Japan - Australia Migratory Bird Agreement (JAMBA). At the Seville conference, both of these qualities (large diverse zone of cooperation and coastal / marine conservation) were specifically included<sup>83</sup> in the Seville Strategy (Hyman 2005).

Major ecosystem types within core and some buffer zones include sclerophyllous forests, woodlands or scrub including wetlands, mangroves and marine ecosystems. Forests include cool temperate rainforest, damp forest, grassy forest, herb-rich foothill forest, riparian forest, shrubby gully forest, and

<sup>83</sup> "Develop BRs that include a wide variety of environmental, biological, economic, and cultural situations, from largely undisturbed regions, to cities. There is a particular potential, and need, to apply the BR concept to the coastal and marine environment" (UNESCO 1996: 15).

wet forest with eucalypts (*Eucalyptus sp.*), wattles (*Acacia sp.*) and prickly currant bush (*Coprosma quadrifolia*), amongst others. Woodland and heathland comprise *Eucalyptus sp.*, black sheoak (*Allocasuarina littoralis*), silver banksia (*Banksia marginata*) dominants, whilst wetland and swamp areas are characterised by *Melaleuca sp.*, swamp gum (*Eucalyptus ovata*), common reed (*Phragmites australis*) and narrow leaf cumbungi (*Typha domingensis*). Dry coastal ecosystems include coast saltbush (*Atriplex cinerea*), coast banksia (*Banksia integrifolia*), coast tea-tree (*Leptospermum laevigatum*) and drooping she-oak (*Allocasuarina verticillata*) dominants. Wet coastal ecosystems support grey mangrove (*Avicennia marina*), shrubby glasswort (*Sclerostegia arbuscula*), seablite (*Suaeda australis*) and samphire (*Sarcocornia quinqueflora*). Marine ecosystems of intertidal rocky shores, sub-tidal reefs, seagrass beds, sheltered intertidal flats, mangroves, sandy beaches, sub-tidal soft substrates and pelagic environments include species such as seagrass (*Zostera muelleri*), hertog seagrass (*Heterozostera tasmanica*) and sea nymph (*Amphibolis antarctica*).

Small residential and town centres are strung along the coastline abutting Port Phillip Bay, from Frankston City to Rye, and then continuing for most of the Nepean Peninsula until Portsea. The coastal band between Point Nepean to Cape Schanck forms the Mornington Peninsula National Park (2686 ha). The total permanent population is 190 000 with a seasonal population of approximately 270 000. By 2021, an additional 330 000 people are forecast to live in metropolitan Melbourne, many of them in the MPWPBR (MPWPBRF 2007a).

The southeast coast of the Mornington Peninsula is popular with Melbournians for holidays, and hence is home to a dense array of holiday residences. Around Arthur's Seat State Park, the peninsula's highest point shares its views of Melbourne with up-market housing. The balance of the southern peninsula is occupied by rural housing and mixed agriculture (Hyman 2005). The economic circumstances represented on the Peninsula are numerous – a function of a productive and diverse landscape giving rise to a variety of land uses.

### **9.5.2 History of the Designation**

In the 1840s, major European activity on the Peninsula began. By the mid-1850s, vast tracts of Sheoak (*Allocasuarina verticillata*) were cleared, to be used to fire the city's ovens and kilns. Then, after the primarily pastoral use that followed the initial land clearing, extensive orchards were planted at Somerville, Tyabb, Moorooduc, Merricks North and Red Hill. However as population increased in these regions, the quality of orchard fruit decreased and now vineyards and berry plantings have largely compensated for this lost agriculture (Hyman 2005).

Heavy industry commenced on the Mornington Peninsula in the mid 1960s. Within a decade, British Petroleum, BP, two jetties and a pressed steel works were the main industries and infrastructure in the region. Later, terminals were added for the export of Gippsland crude oil and liquefied petroleum gas, operated by Esso-Australia. Present day naval facilities round out the Peninsula's heavy industrial infrastructure. Other infrastructure includes the Nepean Highway, carrying upwards of 34 000 vehicles per day (Morris 2002). A commuter rail link connects the Mornington Peninsula to Melbourne's central business district, with the service available several times per hour from downtown Frankston (Morris 2002).

In early 1999, Mornington Peninsula resident, Liz Keep, was concerned about the impending sale of a wooded area in the suburb of Mount Eliza. She contacted a local environmental group, the Mount Eliza Association for Environmental Care (MEAFEC), then under the leadership of local artist, Craig Forster. In turn, Forster contacted the Victorian Environmental Defenders Office (EDO), a non-profit community legal service. Legend has it that the request he made for information about creating urban bushland reserves was mistakenly understood to be an inquiry about urban BRs. The EDO suggested to Forster that he contact Ian Weir, Phillip Island Nature Park, for more information. Hence, *community champions* and *initiative* for a BR on the Mornington Peninsula were generated (Hyman 2005).

In June of 1999, in his capacity as president of MEAFEC, Forster convened a concept meeting at his home. In attendance were representatives from the Mornington Peninsula Shire Council (MPSC), several NGOs, as well as some Bookmark BR representatives and Ian Weir, who had become a notable local champion of the BR concept. The attendees stressed the precarious ecological position of the Mornington Peninsula and discussed how the BR concept might be applied there to curtail land development and to preserve and enhance whatever natural remnants remained. They recognised that a 'huge awareness program [is] needed' as well as the importance of framing the BR as a 'regional program of voluntary participants – so that people don't feel threatened' (Hyman 2005; MEAFEC 1999:2).

By mid-1999, Ian Morris, then MPSC Director of Sustainable Environment, had also taken an active interest in the concept. An ad-hoc advisory group (later known as the Biosphere Advisory Group – BAG) formed, in order to build support around, and assemble the nomination for, what would become the MPWPBR. Funding for the project was sought from an AU\$100 000 grant through the Local Government Incentive Program, administered by the then Australian Department of Transport and Regional Services. The application was not successful and a smaller sum of AU\$35,000 (over 2 years) was acquired from the then Victorian Department of Infrastructure, channelled from a project that had been unexpectedly cancelled. Over the course of the next three years, BAG was instrumental in creating the BR.<sup>84</sup>

Alongside the champions of the BR idea for the Mornington Peninsula, another impetus for the timing of the MPWPBR proposal was the re-organisation of local government under Victorian Premier Jeff Kennett's leadership. The increased size of municipalities, incorporating a regional approach, created instability and distrust within the newly created authorities. Some community members believed that their interests would now only represent small issues in a bigger picture, and that their concerns would be overlooked. The BR concept offered a new forum opportunity, with international credentials, for voicing local concerns.

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<sup>84</sup> There was significant involvement from a number of local champions from community groups in the region, which contributed to the ultimate success of the nomination to UNESCO. BAG represented one of approximately 150 conservation groups within the BR, and served as a steering committee with 54 regular participants. The multiplicity of environmental groups in the region has been a challenging aspect in the development of support for the BR.

Thus, with the impetus provided by some members of state government (Parks Victoria) and community activists, community forums were held, facilitated by the MPSC, examining the meaning of sustainability from residents' perspectives. Many hundreds of people attended, prepared to give their time to discuss these issues concerning the sustainability of the Peninsula. One of the reasons this particular local council was keen to foster the BR idea was due to its existing Sustainability Framework: an initiative to assist decision making for planning assessments, thus enabling the retention of social, environmental and economic core values identified by residents as crucial to their well-being and to the economy and ecology of the region. The MPSC considered the BR a strategy to manage these values concurrently. AE1 explained the process:

**This Shire's sustainability initiative started before the Biosphere and we used our community forums to identify community issues. We also then looked at ways of responding to those issues, and then how we monitor our progress towards resolving those issues. We go to the major townships, we have 40 townships in the peninsula and we try to go to the major townships at least once a year, either with a council meeting, or with a community workshop. If you want to get community feedback, the last thing you can do is to sit in a council chambers and expect people to come and tell you what their issues are. You have to engage people, not just on their terms, but also on their turf. Then you will start to build up a degree of trust. People will come up to us at those meetings and just be so appreciative that we have made the effort to go to them rather than them coming to us (AE1).**

A parallel program to the sustainability framework, Community Partnerships, was also developed by the MPSC. Initiated in 1999, the program was the brainchild of Ian Morris (the then sustainability officer for the MPSC), after he was visited by a member of a community environment group. The community member had been working on a project in the area for several years, monitoring the flora of the locality. He wanted to create an interpretation brochure to provide visitors and interested parties with information on local ecology. Requiring approximately AU\$2000-\$3000, Morris requested AU\$50 000 for this project from the Executive committee of the MPSC. Morris argued that such funding would illustrate implementation of the Council's promises for facilitating community projects: part of a MPSC community plan, stating that community assistance was core council business. The Executive granted AU\$100 000 for the purpose. The grant set a precedent for the MPSC, which has maintained a strong financial endorsement of community partnership projects ever since.

A major public consultation program, as a further initiative prior to official declaration of the BR, was undertaken by the MPSC to increase public awareness of UNESCO BRs. Approximately 5000 brochures were distributed explaining the BR program to state, local government, interest groups, and the general community.<sup>85</sup>

In September 2002, the Earthwatch Institute convened a one-day conference entitled 'Biospheres: Creating Sustainable Regional Communities'. The 200 attendees discussed BR concepts,

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<sup>85</sup> However, given the Mornington Peninsula Shire Council's funding of this consultation program, there was little awareness raised in any of the other Shires that later became included in the MPWPBR designation. The surrounding Shires, at this early stage, had little involvement in the proposal.

opportunities for the Mornington Peninsula and the importance of research and monitoring, communication and community involvement. The proceedings of this conference claim that the 'engagement and enthusiasm expressed at the seminar indicate that this proposal has very strong community support' (Earthwatch Institute 2002). They also emphasised the 'need for a bottom-up' process (Earthwatch Institute 2002). The conference stirred ideas and support for the BR, and established a precedent for Australian BR networking. Shortly after, the official inauguration of the MPWPBR to the WNBR occurred, at a ceremony on French Island.

The MPWPBR provides an example of a community-led, urban and peri-urban BR, the first of its kind in Australia. From the outset, the relative proximity to metropolitan Melbourne suggested great potential to balance inevitable urban growth with ecological conservation and hence provide opportunity to showcase social-ecological innovation.

The nomination as a BR was fitting for a number of reasons. For more than 30 years, it has been home to one of the earliest and consistently active networks of community conservation groups in Victoria. Numerous scientific studies of international importance had been undertaken in the area. According to AE1:

**The differentiating factors that create sense of place for the region include a clearly identifiable water catchment, the conservation-significant waters of Western Port and French Island, and the semi-rural, open green space afforded by the region's distance from the city.**

Furthermore, **Mornington Peninsula Shire Council residents generally have a strong concern and awareness of their local natural areas, which is more pronounced than that of surrounding shires (AE1).** The management of urban growth and developing a community-based culture of responsible stewardship were (and remain) two key principles for the MPSC, which became the major stewarding organisation for initiating the MPWPBR proposal.

**The MPWPBR is quite an achievement against the odds – it certainly created some interesting issues in a procedural sense when it was generated largely by the community... Parks Victoria didn't instigate the BR idea, although I think we generated some seeds of it (P1).**

The area of the BR at 2100km<sup>2</sup> is the stage one component of two potential stages.<sup>86</sup> According to the BR proponents in the region, the designation has federal, state and local government support, thereby taking on a holistic approach to conservation (MPWPBRF 2007a) where the main goal of the BR is 'to enable groups and individuals to achieve ecologically sustainable use and development of the region's natural and cultural resources' (McDonald 2004: no page). Local champions argue that the MPSC's Sustainable Peninsula Initiative complements BR objectives, as the initiative includes a variety of programs and activities to achieve sustainable outcomes. However, P1, in 2004 suggested

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<sup>86</sup> A proposed extension of the BR – Stage 2 - would potentially increase the size of the designation to 3400 km<sup>2</sup>. Such an extension however, is not considered a current priority by the MPWPBRF.

that sustainability for the BR at that time may have been too ambitious, and highlights a preferred, iterative, long term approach for assessing BR progress:

**Mornington Peninsula Western Port Biosphere Reserve is only just getting underway – that is my understanding of it. It is just starting – it is too soon to tell [in 2004]. I think at this stage they would be trying to develop the Foundation, the Foundation is going to develop a variety of partnerships to seek funding and do all those chores. In some time from now, in five or six years – that would be the time to see how well they are able to do it. MPWP's early designation may well have contributed to some of its problems now – it is always a question of when is too soon [for designation] (P1).**

### 9.5.3 Governance and Capital in the MPWPBR

At the first meeting after the inauguration ceremony, BAG changed its name to BIG – the Biosphere Interim Group – and segmented into working groups for governance, visioning and research. These groups held their initial meetings within the first month. However, **the open nature of these meetings meant that much time was lost bringing newcomers up to date with information. Slow progress and confrontation were indicative of these committees (E3).**

During 2003, a Constitution was drafted by a legal firm, proposing legal status for the newly formed MPWPBR Foundation, as a Limited Liability Company. The constructive community cooperation observed during the development of the nomination to UNESCO turned out to be conspicuously absent during the 18-months between that nomination's submission and the incorporation of the Foundation (Hyman 2005). It was noted by E3 that **an unprecedented amount of immaturity slowed the process – everyone wanted to be in charge (E3).** However, given the size and population of the MPWPBR, forging cross-sectoral organisation from stakeholders with diverse interests was always going to be riddled with complications.

For example, just after submitting the nomination form to UNESCO, BAG formulated an Action Plan for the second half of 2002. This plan outlined 18 tasks to complete before the official announcement of the MPWPBRs designation (Table 16, pg. 248-9). Two years later, over half of these tasks remained uncompleted.

**Table 16 Tasks completed, late and impending for BAG, July 2002**

<b>Task described by Action Plan (July 2002)</b>	<b>Completed</b>	<b>Late</b>	<b>Pending</b>
Negotiate ministerial conditions	X		
Complete consultation with major stakeholders	X		
Provide any additional information to UNESCO	X		
Develop a logo and register as a trademark			X
Define media and publicity arrangements			X
Appoint a project officer	X		
Develop a 12-month budget and funding strategy			X
Obtain required funding levels	X		

Task described by Action Plan (July 2002)	Completed	Late	Pending
Conduct community workshop on Biosphere management	X		
Develop and implement administrative arrangements		X	
Establish Public Fund Committee			X
Develop performance monitoring indicators			X
Establish Technical Advisory Committee			X
Prepare explanatory brochure for distribution at opening			X
Develop a three -year Biosphere Program			X
Arrange opening celebrations	X		
Identify and negotiate an Aboriginal name for the reserve			X
Develop a communication plan (Website, info kit, etc.)			X

Source: adapted from Hyman (2005: 86).

Part of the reason for the stalemate in achieving these tasks was in the designation itself. While the nomination was still in development, all parties had an interest in *cooperating* to ensure its success. Once BAG had submitted the nomination however, this incentive to *cooperate* greatly diminished. Until early 2003, the community-driven approach had been proficiently administered by Ian Morris (MPSC), who had managed to keep the diverse group of stakeholders working constructively together throughout the nominating process. Michael Kennedy (CEO of the Mornington Peninsula Shire) succeeded Morris as the chair of BAG in 2003 due to Morris' departure from the MPSC.

What followed was a fierce contest over the administrative structure for the MPWPBR, and debilitating *power struggle*. From the outset of the MPWPBR idea, machinations over the governance structure had been foreseen. The planning for the MPWPBR's implementation had been purposefully postponed. If the state government had perceived disaccord over any part of the designation prior to submission to UNESCO, their support could have been withdrawn, thus voiding the proposal. This *power struggle*, lack of *social capital* and reluctance for *interdependence* and *collaboration* has resulted in insufficient *capacity* in the BR arising from eroded *capital assets*.

The lack of a public information campaign was one major inhibiting factor for *collaboration*. Although the Victorian Government supported the MPWPBR nomination to UNESCO as one means of encouraging ecologically sustainable development, it did not provide any *financial capital* contribution to support the kind of campaign that would be necessary to adequately canvas the large population of the region, for example through letter-box drops. The Victorian Government stated that the MPWPBR should:

- be community-driven, self funded and based on voluntary participation by individuals;



- not restrict uses that are consistent with state legislation, planning schemes or other government policies; and
- be technically sound and have sound governance and business frameworks (MPSC 2004).

However, in a move imposing top-down control over an otherwise supposedly community-driven process, the State of Victoria issued a policy on BR proposals. This policy mandated an 18-month evaluation period between approval of one BR proposal and the consideration of another, allowing the state Government to restrict prospective BRs. The policy arguably lends credibility to the Victorian BRs, insofar as all newly nominated BRs must demonstrate fulfilment of their BR agenda, hence maintaining a quality over quantity approach. However, the policy is seriously debilitating in terms of access to *capital assets*. As BRs are intended to add tangible value to regions by working to find a healthy equilibrium between resource use and conservation, the lack of state-derived *capital* for this initiative seems incongruous with state environmental rhetoric. By forcing local governments and constituent communities to carry the entire cost of the MPWPBR, the state government provides no safety net for its continuity. The same is true of the Federal Government.

Since December 2003, MPWPBR governance has been administered through an incorporated non-statutory body established as a Foundation. The organisational arrangement provides for the involvement and participation of land managers of the core and buffer areas, together with public authorities and trusts, providing funding and / or other forms of support to assist in delivery of projects agreed by the Foundation (MPWPBRF 2007b). The structure of the MPWPBRF is organised according to its Constitution which was adopted at the inauguration ceremony (December 2003). The MPWPBRF comprises:

- a representative from each LGA council within the BR (5);
- a representative nominated from each community roundtable (6);
- a representative from Parks Victoria and the Victoria Minister for the Environment (Department of Sustainability and Environment) (1); and
- a representative from industry, selected by the Board (1) and an independent Chair, selected by the Board after Ministerial consultation.

Each individual member of the MPWPBRF nominates a community roundtable to which to belong for exercising the rights accorded by the Foundation Charter and Constitution. Membership to a roundtable is open to the public and costs AU\$11.00 per annum. Apart from the shire councils and individual members, significant partners include the Royal Melbourne Institute of Technology (RMIT), Phillip Island Nature Park and Parks Victoria.

Local communities are represented and participate through democratically elected representatives. The six district roundtables provide manageable units according to shire council areas, and:

... are regionally based forums within the Foundation that enable members and stakeholders to meet and deliver the Foundation's mission at a local level. They devise and implement their own local projects and events and actively recruit members. They work with other roundtables, the Foundation's research committee and other subcommittees, host municipalities and stakeholders to deliver biosphere-wide projects. They contribute to, and initiate via the board, the development of biosphere-wide policy,

programs, events and knowledge. Each roundtable appoints a director to the board and its own office bearers (MPWPBRF 2007b: no page).

The community roundtables are the primary means for community involvement in the BR, however, in the first instance, the only activity has been agenda setting. Within each LGA, roundtables are meant to hold regular meetings, and membership is based according to the shire of residence. A MPWPBRF Charter clearly stipulates the intended relationship between the community and the BR (MPWPBRF 2003: no page):

It is, then, the intention of all stakeholders in the creation of the BR that the Foundation will, as far as possible, be community-driven and be organic rather than hierarchical in its structure and culture ... The Board will seek to guide, support and resource the activities of the roundtables, which will be the driving force of the Biosphere... It is intended that the members of each roundtable will largely determine that group's focus and priorities according to their judgment about how they can best contribute to the achievement of the Foundation's mission.

Hence, a tension is inherent within the MPWPBR, where roundtables 'are seen as the driving force of the Biosphere', yet 'the Board will seek... to guide the activities of the roundtables'. The ultimate aim of regional activity directing the scope of the BR also has problems, according to E3:

**I think that by creating these Roundtables, they are actually creating six biospheres. That is divisive. I think that the biosphere is more of a movement than a club and that it can influence and add flavor to projects and initiatives across the region without having to have localised committees. I think that that is just reinventing the wheel. I think that the value of the biosphere is to add value to what we have already got, rather than creating new networks. Part of the reason that the Cardinia Roundtable never took off was that they already have a very, very strong environmental collective in that area. The Biosphere was seen to be a poor cousin to what they already had (E3).**

Based on the results of a 2001 group survey<sup>87</sup>, 51 environmental groups within the Western Port catchment were identified, with a combined membership of 3131 members (CMA (Port Phillip and Westernport) 2003). Most of these groups were found to be located within the boundaries of the MPWPBR. Collectively, these groups form an important basis for conservation efforts for the region, however their existence, as described above, has also contributed to membership problems for the MPWPBR. Given the array of competing groups and duplicated effort in the BR region, the success of the roundtable governance arrangement was questionable at the time of the research visit in 2005.

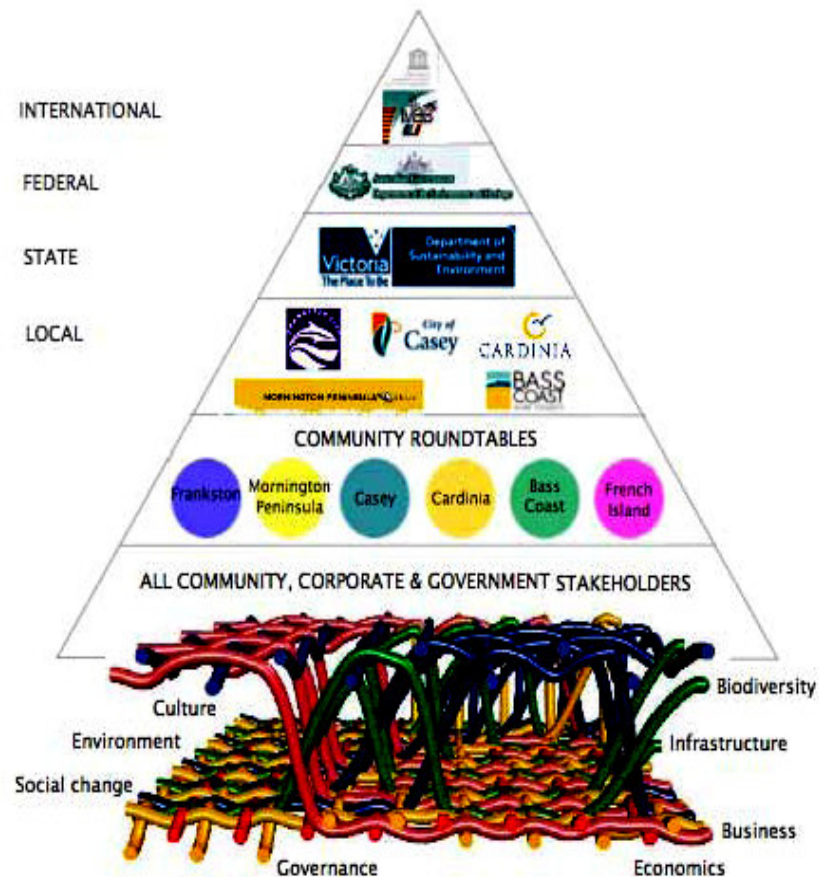
During 2006 the MPWPBRF adopted the Living Strategy - an approach to strategic planning which may help to provide a basis for *shared values* between the roundtables. Regarded by the Foundation as the most useful and *reflexive* approach given the multiplicity of organisations, agencies and individuals operating within the BR, the Strategy brought a broad but useful mandate to the BR, reflecting a *new governance* approach (Figure 27):

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<sup>87</sup> 239 groups in the Port Phillip and Westernport region responded to the survey, involving more than 18,000 people overall.

Achieving sustainability in this diverse environment is like creating a multi-layered tapestry, weaving together the spectra of partners, perceptions, scales of activities, levels of sophistication and multitude of issues (MPWPBRF 2007a: no page).

**Figure 27 MPWPBRF Living Strategic Plan**



Source: MPWPBRF (2007a).

The Strategy outlines success criteria to provide benchmarks for progress assessment. Each year, previous achievements will be built on to assist in:

- progression of social, economic and ecological sustainability in the BR;
- coordination of on-going measurement of social, economic and ecological sustainability in the BR;
- increasing business and community understanding, perception and engagement with sustainability in the BR;
- galvanising stakeholders towards greater sustainability, both within and outside the BR;
- building the financial capacity, resource capability and recognition of the Foundation as a soundly governed organisation providing sustainability leadership in the BR; and

- developing and recognising sustainability achievements of individuals, organisations and businesses in the BR community, through scholarships, awards, accreditation, leadership and volunteer opportunities.

These attributes are approached through key strategic themes including natural environment and biodiversity conservation, sustainable development on a regional scale, logistical support including research, monitoring, evaluation of progress in sustainability, and a strong, dynamic and flexible Foundation (MPWPBRF 2007a).

Presently, the MPWPBRF has an excellent website that provides information exchange on current and topical social-ecological issues in the BR, along with all the relevant information on the BR concept, the Foundation's history, charter, constitution, current projects, membership forms and contact information. Up-to-date news is provided on the homepage, with 12 news entries on pertinent MPWPBR topics for the period June 2007 to Nov 2007. This information production and availability is unusual amongst Australian BRs, and represents a *coordinated* approach to *knowledge-sharing* and information management.

The Foundation now supports a diverse range of conservation and sustainability projects, with benefits for communities across the BR (MPWPBRF 2007b). A part-time executive officer, now funded by the Foundation, facilitates coordination and information management across the roundtables and provides invaluable administrative and contact-point services.

In 2007, a number of projects demonstrate accrual of *capital assets* and practice of *new governance* within the BR:

- An event in June 2007, 'Western Port in 2025: Feeling the Heat', was held in partnership with the Department of Sustainability and Environment. In a hypothetical format, participants looked forward to 2025 to grapple with climate change, population growth and other challenges for Western Port and its catchment. Almost 150 people attended the event, held in Cardinia. During the event, the MABF introduced its newly appointed Executive Officer, Graham McLennan, and launched the new Foundation website.
- The Foundation established an integrated catchment management project to clean up Watson Creek, which drains into Western Port's Yaringa Marine National Park. Watson Creek is one of Victoria's most polluted creeks. This collaborative project involves three local governments (Frankston, Casey and Mornington Peninsula), Melbourne Water, EPA Victoria, Parks Victoria, industry and private landowners. The Foundation received funding to hire a part-time project officer to bring stakeholders together and to gain a commitment to improve the water quality of the creek (MPWPBRF 2007b).
- In what was an exceptionally hot, dry year (2007), the Foundation's Mornington Peninsula Roundtable secured a Community Water Grant to install water-saving equipment in 22 schools across the Mornington Peninsula. The project will save 1 million litres of water a year.
- The Frankston Roundtable collaborated with Frankston City Council and the Western Port Greenhouse Alliance to hold a climate change forum attended by over 300 people. Held in August 2006, this was reportedly the largest climate change event in Victoria prior to Al Gore's visit. Keynote speakers were Victoria's Commissioner for Sustainability, a former Director of CSIRO, a citizen of the Pacific island of Tuvalu, the MPWPBRF Chair and President of Greening Australia Victoria.
- The Foundation's Research Committee, supported by the Frankston Roundtable, won a NHT grant to undertake habitat improvements at The Pines Flora and Fauna Reserve to protect a colony of the endangered Southern Brown Bandicoot (*Isodon*

*obesulus*). An outcome of this grant was the first forum in Victoria on the species, which attracted over 50 scientists, government department representatives and land managers. Several more Southern Brown Bandicoot colonies have been discovered in the BR and awareness of this species is growing. The Foundation has recently applied for a Threatened Species Network grant to protect remaining colonies in Cardinia and Casey.

- The Frankston Roundtable hosted a Green Corp Training Program for 10 unemployed young people, in partnership with the Frankston North Community Group. The program commenced in June 2007 and involves Frankston City Council, Parks Victoria and Chisholm Institute of TAFE. Participants gain work experience at Frankston City Council's indigenous plant nursery and complete a Certificate II in Bushland Management.
- The Foundation's Bass Coast Roundtable has piloted a business sustainability recognition program, which aims to encourage small businesses to adopt sustainable practices. This program is now being evaluated for rollout to other municipalities across the BR.

Since early 2005, these initiatives have been instigated by the present Chair of the Foundation, Rob Gell<sup>88</sup> who appears to be acting as a highly effective *champion*, *coordinator* and facilitator for the BR. The initiatives described above reflect a renewed *capital assets* base, present in 2005 during the last research visit, but thwarted by *power sharing* struggles and governance arrangements related to the Foundation's formative stage. Under Gell's leadership, the MPWPBRF is evidently resolving these issues.

#### 9.5.4 Lessons for Resilience

Based on the preceding data and the lessons articulated below, the MPWPBR has overcome an internally contentious and disparate association of roundtables and is now more representative of a Phase II BR, due to the presence of a diversity of *capital assets* and consolidation of *new governance* arrangements. From the outset, the MPWPBR has had to forge an entirely new path, as it was not only the first MII BR, but was unprecedented in Australian BRs due to the urban and complex jurisdictional arrangement of the region. Outside of a preliminary designation organising group, governance arrangements were not in place when the BR was designated in 2002. This allowed for an emergent governance arrangement to form, appropriate to the requirement for widespread civil society and government involvement over a period of several years and across jurisdictions. However significant contentions arose during that period.

*Power sharing* problems were indicative of the early governance stages, where strong personalities attempted to steer the BR in a narrow direction, in order to fulfil individual visions for the BR. During these stages, *openness* was compromised, at the expense of *social capital* (*trust* and *reciprocity*). But *local champions*, familiar with the true intentions of a BR, worked to maintain basic *capital assets*, *partnerships*, *openness*, *multiple knowledges* and *ecologically rational institutions*. In particular, the MPSC was integral during these early stages, providing vital *financial* and *institutional capital* to mobilise a BR committee. In light of a respected environmental *champion* recruited to lead the

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<sup>88</sup> Rob Gell is a high profile and well respected environmentalist within Victoria. A coastal geomorphologist by training, in his professional life he works as an environmental and communications consultant. He is chair of two companies. Previously Rob taught environmental science and physical geography and is a published author. He has been a local government councillor and was a councillor of the Australian Conservation Foundation and numerous philanthropic, environmental and not-for-profit groups.

Foundation and the resultant *partnerships* and *innovation* that are occurring now, compared with early 2005, the BR appears to have proceeded through a process of *social learning*. A multiplicity of groups are collaborating effectively in 2008, as the idea of the BR matures and local governments, civil society and others recognise its potential. *Financial capital* input from Foundation membership fees is helping to provide subsistence funds for the BR, and demonstrate buy-in to the idea on behalf of civil society.

The roundtables, under a Chair familiar with the complexities and challenges of environmental *coordination* and *knowledge-sharing*, are now an effective means of *coordinating* BR activity for *capacity-building* across a geographically and social-ecologically disparate region of six LGAs. This *coordination* is facilitated by a new website for *information sharing*, a part-time *coordinator* and regular meetings. *Social capital* is supported through *financial* and *institutional capital* of local governments of the roundtable regions. Local government *capital* helps to maintain interest and enthusiasm of committees by providing *capital assets* to make incremental achievements, in *partnership* with other areas of civil society and some institutions. Sole responsibility has shifted away from the MPSC, to incrementally increase *collaboration* and *multi-level, polycentric* arrangements.

## 9.6 Lessons from Australian BRs and the BRP

The four preceding case studies provide a number of lessons to inform the future operation of BRs and the BRP in Australia. They also illustrate a collection of problems with individual BRs and the national BRP. MII BRs are exemplified by the developments during the early part of this decade, in Fitzgerald River BR and MPWP BR. New governance literature, specifically as it relates to NRM, has developed during the same period. Prior to MII BRs, Australian society lacked pervasive, *coordinated*, practical, sustained and community-driven social-ecological dialogues and forums.<sup>89</sup> MII BRs engage with, and sustain their *capital assets*, employ *innovation* and *experimentation* and achieve *new governance* outcomes to address their social-ecological contexts with, for example, *openness*, *social learning*, *partnerships* and *capacity-building*. Yet Australian BRs remain hindered by the lack of government, civil society and industry dialogue on these very issues, despite emerging *new governance* theory related to Australian NRM, generated by academic and research institutions (Davidson et al. 2006; Moore and Rockloff 2006; Brunckhorst et al. 2002; Stratford and Davidson 2002). Concurrently, the nation has multiple and competing social-ecological crises, managed by either project-specific NHT funding, NGOs, or under-resourced state and federal protected area and resource management authorities (Copson 2004; Muldoon 2003).

All of the BRs presented in the case studies protect values of core areas, usually by a national park designation. All of the MI BRs were established due to their national park status, indicative of a historical and prevalent attitude situating conservation as the responsibility and directive of government. Whilst legislated protection provides security to core areas and *partnership*

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<sup>89</sup> Landcare, Coastcare, Rivercare and Bushcare have been examples in this area, but driven and directed by government.

opportunities, state and federal governments historically have been and remain, unacquainted with BRs as a modality for working landscape management.<sup>90</sup>

The case studies highlight the opportunity provided by BR forums that establish without authoritarian pretexts, legal powers, or secure funding allocation. Current thinking in protected area management suggests that planning and managing in a working landscape context reflects best practice. Due to focus of conservation effort on national parks and the historic closed boundary style of management in Australian protected areas, a valuable opportunity has been and continues to be missed, in implementing best practice protected area management and in engendering *community-driven resilient working landscapes*. As all Australian BRs are associated with protected areas, this opportunity is surely heightened.

Despite MII BRs highlighting the inadequacies of their MI counterparts, they are not without their challenges. As illustrated by the case studies, building *resilience* is not simply a matter of creating *partnerships* and employing *innovation*. For instance, the deleterious effect of *power struggles* on *capital assets* erodes *social capital*, thereby reducing the other forms of *capital assets* it so often mobilises. *Partnerships* and their associated *social capital*, strengthen *capital assets*; conversely, *power struggles* erode them.

As seen from the example of the South-West BR in Tasmania, *capital assets* are crucial for a BR to reach Phase I of the BR resilience conceptual framework. Therefore in the first instance, efforts to create and sustain *capital assets* would assist Australian BRs to build *resilience*. Also, examples of community BRs (Fitzgerald and Riverland) illustrate that *social capital* may be more readily mobilised in small communities where networks are close to negative feedback loops, *collaboration* develops from shared *place-based* connection and where, as a result, expedited *social learning* occurs. Small communities, like these, provide opportunity for establishing successful BRs, until the idea is better understood and the BRP supported. Moreover, in such communities NRM and NHT-derived projects can have mutually dependent relations with BRs, as highlighted in the Fitzgerald BR, where *capital assets* were greatly enhanced by the *cooperation* and *interdependency* between NHT, NRM and BR initiatives.

The importance of BR *champions*, illustrated by the Canadian cases, has been asserted again in the Australian case studies, as they mobilise both BR concepts and practices through accessing *capital assets* within their *networks* of influence. Evidence from the Fitzgerald BR, Riverland BR and the MPWPBR indicates that the mobilisation of *local champions* is connected to *place-attachment*, where *place-attachment* engendered stewardship of place in particular individuals. Small communities were often those most closely connected to environmental realities of their landscape due to, for instance, economic reliance on agriculture. Combined with close *social networks*, *place-based social learning* occurred, as illustrated in the Fitzgerald BR. These circumstances built *social capital* and hence

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<sup>90</sup> Whilst the Federal Government made some headway during the 1990s by establishing Bookmark, now Riverland BR and recognising it as a working landscape, overt top-down interference with the emerging new governance arrangements thwarted the intended outcome.

assisted in mobilising other forms of *capital*. The next chapter integrates these lessons and insights with theoretical understandings to support the conceptual framework for BR resilience.



## 10 Resilience for Biosphere Reserves

*This chapter identifies and discusses the phases, assets and processes related to BRs as resilient social-ecological systems. The objective of this chapter is to integrate lessons and insights from the case analyses with theoretical understandings to support the BR resilience conceptual framework. BRs can be viewed as ongoing experiments in sustainability, where the increasing role of civil society in BR administration and logistics is noteworthy, as 'BRs do not happen by accident. They take a determined, concerted effort in the face of myriad challenges' (Ravindra 2004: 58).*

*BRs are designed to demonstrate linked social-ecological systems, recently suggested by a suite of scholars as the necessary, current focus of sustainability science (Resilience Alliance 2007b; Lobel et al. 2006; Olsson et al. 2006; Walker et al. 2006a; Walker et al. 2006b; Folke et al. 2005). The social-ecological systems approach includes social aspects of ecosystem management (Olsson 2003), an approach still in its infancy in Australia, but comparatively well recognised in Canada.*

*A BR is more resilient than most institutions from a socio-ecological perspective, in that there is explicit recognition of it as a coupled system of humans and nature. Furthermore, there is recognition of the importance of local institutional structures for guidance and management. As a means of adaptive governance of social-ecological systems, BRs rely on social factors to enhance the fit between governance systems and ecosystems. The challenge lies in matching a multi-level governance system, often characterised by fragmented organisational and institutional structures and siloed decision making processes, with ecosystems characterised by complex interactions in time and space (Olsson et al. 2007).*

*The contribution of the BR resilience conceptual framework offered in this thesis lies in making explicit the theory underpinning resilient BRs. 'Biosphere reserves explicitly attend to social and ecological aspects of the areas they exist within and rely on the involvement of local communities' (Taylor 2004: 79). At present, BRs are divorced from concurrent understanding of the phases, assets and process that, when present or absent, valued or ignored, cumulatively work to either support or erode a BR. These phases, assets and process are often implicit in the local communities upon which they rely, but to date, have not been made explicit or integrated into a meaningful framework, to propel understanding of the interrelationship between them. This chapter aims to demonstrate and support the variables of resilience in BRs by interpreting each phase of the BR resilience conceptual framework:*

- *Phase I is an innovation and experimentation phase with capital assets. Examples of this phase are Mount Arrowsmith, Riverland and Niagara Escarpment BRs;*
- *Phase II is a consolidation phase in the process of new governance. Examples of this phase are Fitzgerald River and Mornington Peninsula – Western Port BRs; and*
- *Phase III is an adaptive capacity phase and resilient working landscape outcome. Examples of this phase are the Long Point and Clayoquot Sound BRs.*
- *An overlapping, matrix-like formation of the phases of the framework means that segregation between them is not complete. Rather, they are embedded, one within another and can arise and change in response to other social-ecological influences, such as those described later as slow and fast variables, but which are not listed in the framework. For convenience, the framework diagram from Chapter 1 is represented*

*here (Figure 28, pg. 262). I begin with a consideration of the phase dynamics of the BR resilience conceptual framework.*

### **10.1 Phase Changes in the BR Resilience Framework**

The BR resilience conceptual framework developed in this thesis describes and maps three phases, together with the associated assets and process, that constitutes a developmental trajectory toward a resilient working landscape characterised by adaptive capacity. The assets or process depicted in each phase are not necessarily achieved sequentially as might be suggested in Figure 28 (pg. 262), but rather, may arise in another order and / or be achieved concurrently.<sup>91</sup> Phase I is concerned with innovation, experimentation and capital assets. Social, institutional, natural and financial capital are the assets needed to build a sound basis for governance of a BR. The BR idea inherently requires an innovative and experimental mind-set as it provides a concept, forum, process and designation to implement locally driven and directed social-ecological change. The innovation and experimentation required in Phase I provides capacity to persist with the changes required by a BR to shift away from the status quo, a reason to employ a systems thinking approach, and a means to harness and mobilise capital assets.

Phase II is the consolidation phase, employing new governance. Multi-level partnerships and collaboration, coordination, openness and low institutional rigidity, place-based focus and capacity-building, social learning and multiple knowledges characterise the requirements for, and goals of, this phase. Consolidation of new governance arrangements is critical to Phase II, and is achieved through feedback mechanisms inherent in ecologically rational institutions.

Phase III is the adaptive capacity phase to achieve a resilient working landscape. The requirements and goals include a polycentric approach; connectivity conservation; adaptation, innovation and experimentation; interdependence; equity and power sharing; collaboration and networking; reflection and vision; recognition of complexity and uncertainty; and mobilised resources and expertise. Adaptive capacity is characteristic of, and essential to Phase III.

All three phases rely on the strength of the constituent assets and processes of that phase and where applicable, the previous phase (i.e. Phase II relies on the strength and consolidation of Phase I). Shifts in phases, which can occur alongside influences of slow and fast variables, will affect and alter the social-ecological dynamic of the BR, as discussed below. Therefore, shifts up or down in the framework can occur as a result of assets or process described, or by separate, slow and fast, social and ecological influences that characterise the complex system within which a BR is situated.

In this context, panarchy theory provides a useful means of explaining shifts within and between Phases I to III. Panarchy theory is concerned with describing social-ecological system structures and functions as they relate to wide spatial and temporal scales (Walker et al. 2006b). Social-ecological systems have structures and functions that cover ranges of spatial and temporal scales and exhibit thresholds that, when exceeded, result in changed system feedbacks and changed function and

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<sup>91</sup> For instance, multi-level partnerships may arise after or before openness in Phase II, rather than in the order shown in the conceptual framework.

structure. The system is said to have undergone a regime shift, where the resultant change may be reversible, irreversible or effectively irreversible (not applicable to the timeframes of human life spans). The more resilient a system, the larger the disturbance it can absorb without shifting into an alternate regime (Walker et al. 2006b). As social-ecological systems are dominated by human actions, the adaptability of such systems is mainly a function of the individuals and groups managing them (Resilience Alliance 2007b). Their actions influence resilience, either intentionally or unintentionally.

Panarchical relations suggest that both top-down and bottom-up interactions occur in these systems, where the dynamics of a system cannot be understood without taking into account the cross-scale influences of the processes from the scales above and below it (Walker et al. 2006b). In panarchy, thresholds and adaptive cycles influence resilience. Over time, the structures and functions of systems change as a result of internal dynamics and external influences, resulting in four characteristic phases described by Holling (1987).

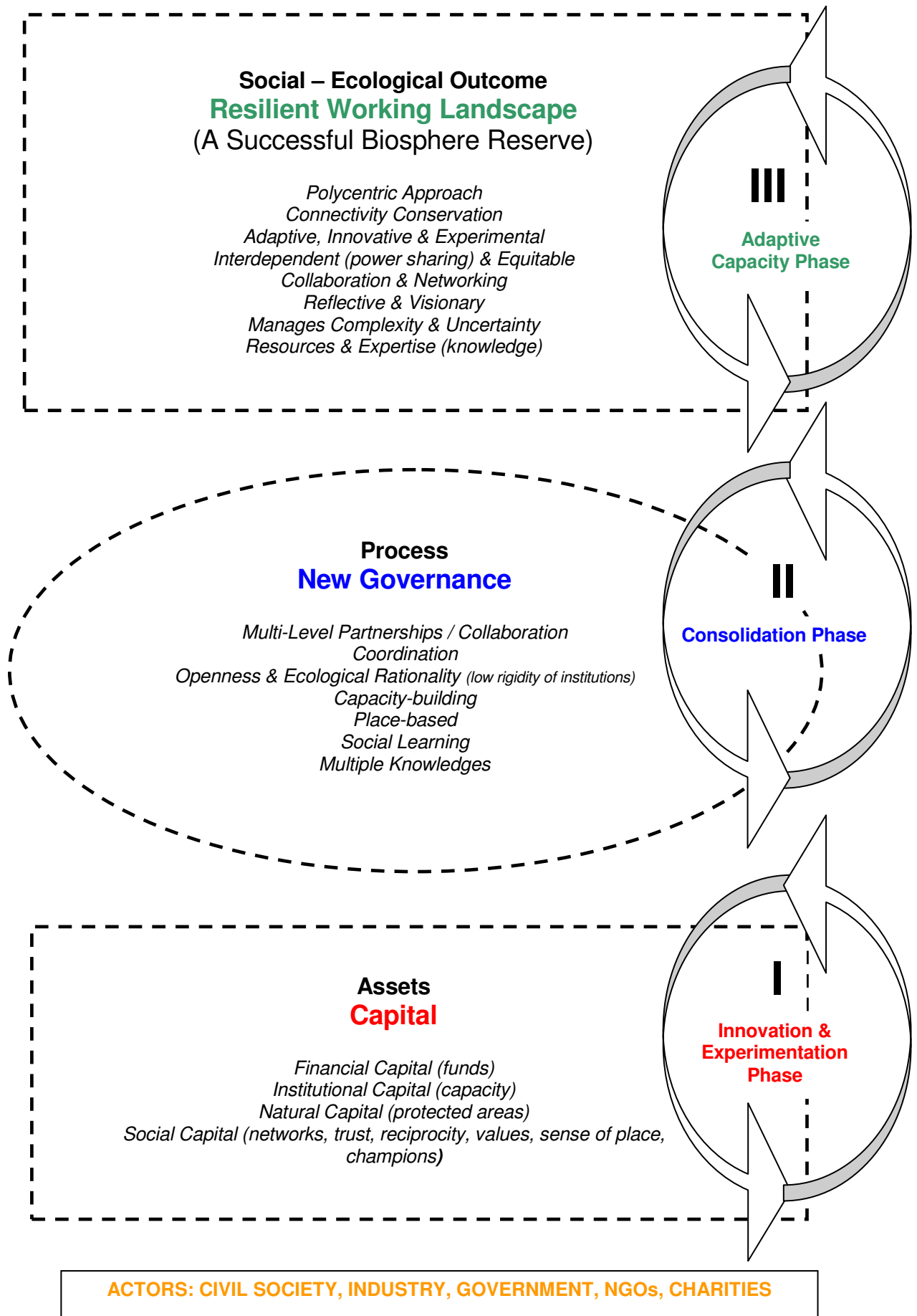
The first is a phase of growth ( $r$ ) characterised by readily available resources, the accumulation of structure, and high resilience. As structure and connections among system components increase, more resource and energy are required to maintain them (Walker et al. 2006b). The second phase is thus one in which net growth slows and the system becomes increasingly interconnected, less flexible, and more vulnerable to external disturbances. This is described as the conservation phase ( $K$ ). These two phases,  $r$  to  $K$ , called the fore loop, correspond to ecological succession in ecosystems and constitute a development mode in organisations and societies (Walker et al. 2006b). Disturbances lead to the next phase, a period of release of bound up resources ( $\Omega$ ) in which the accumulated structure collapses, followed by a reorganisation phase ( $a$ ), in which novelty can take hold, and lead eventually to another growth phase in a new cycle (Walker et al. 2006b). These two phases are referred to as the back loop. The new  $r$  phase may be quite similar to the previous  $r$  phase, or it may be quite different. Many systems appear to move through these four panarchical phases, described as the adaptive cycle, including ecosystems (Holling 1986), social systems (Westley 2002), institutional systems (Janssen 2002), and social-ecological systems (Holling 2001; Gunderson et al. 1995).

Walker and Salt (2006) argue that these are the descriptors to the behaviour of social-ecological systems over time, going through cycles of growth and conservation (the fore loop) followed by release and renewal (the back loop). The fore loop is characterised by the slow accumulation of capital and potential, by stability and conservation. The back loop is characterised by uncertainty, novelty, and experimentation. Different cycles operate at different scales and the linkages across scales are critical to the functionality of the system (Walker and Salt 2006).

These panarchical phases are described to provide a context for the BR resilience conceptual framework and the complexity and uncertainty of its operational social-ecological context. In Figure 28, dashed lines are shown around each phase, representing the open nature of the framework. The panarchical phases ( $r$ ,  $K$ ,  $\Omega$ ,  $a$ ), constitute a dynamic overlay that can be used to describe and

understand the evolution or devolution of a BR between any one of the three phases of the framework.

Figure 28 The BR Resilience Conceptual Framework



## **10.2 Supporting and Demonstrating Phase I of the BR Resilience Conceptual Framework: Assets**

The first phase of developing and sustaining resilience is concerned with capital asset accrual. Davidson and Stratford (2000) suggest that capital asset accrual is also a process of capital asset renewal, which relies on sustaining the life support functions of natural capital, whilst also attending to the availability of useable knowledge and capacities for learning, in the presence of trust. These are central components in the design and selection of institutions for NRM, of which BRs are one.

Empirical and theoretical evidence suggests that natural capital provides a catalyst for the organisation of other forms of capital, where 'an abundance of valuable ecosystem services ... is reflected in the range of stakeholders representing different interests, from local farmers to international nature conservation organisations' (Olsson et al. 2007: 4). Case studies presented in this thesis illustrate that the presence of natural capital arising from legal protection of core areas, secures valuable ecosystem services and often represents the key attribute for engendering community place-attachment. The same empirical evidence suggests that natural capital is strongly affiliated with the economic regime of a BR region, where a close feedback loop between a community's reliance on that regime and the quality of the natural capital asset correlate. For instance, an agricultural regime in the Fitzgerald BR and a close feedback loop to the land helped to create local champions who recognise their economic reliance on the quality of ecosystem services arising from natural capital. This feedback is described by Olsson et al. (2007: 5) as a stimulant for 'a dormant or latent set of connections in a social network of actors involved in the management [of that regime]'.

Olsson et al. (2007) propose, through an unprecedented international study of resilience, social-ecological systems and BRs, that recognition and utilisation of local and regional social capital is vital to connect institutions and networks across levels and scales. These networks facilitate information flows, identify knowledge gaps and create nodes of expertise of significance for ecosystem management. Brunckhorst et al. (2002: 109) support the importance of social capital in reconciling the fit between social systems and ecosystem management, also concurring with empirical evidence regarding the role of place-attachment in mobilising this capital asset:

The foundation for socially resilient civic engagement lies in the community networks of trust and reciprocity, termed social capital, which greatly enhances the mobilising of resources within a community. It also relates to the degree of investment a community (or residents are prepared to make) in a particular area. This 'sense of place' or 'place capital' includes the attachment by a community to the particular characteristics of a regional cultural and natural landscape. The creation of a resource governance institution that draws on these social resources and matches them to the local community territory provides both, a logical and a theoretically grounded, spatial arrangement – a nested (multi-scale) resource governance framework (Brunckhorst et al. 2002: 2)

Natural capital may nurture place-attachment in individuals with basic environmental awareness. Empirical and theoretical understanding provides evidence that place-attachment fosters social capital through shared value within networks of influence or regimes (Malpas 1999; Lipschutz and Mayer 1996). This connection between natural and social capital is important in this context as local champions for several of the case study BRs cited a strong sense of place-attachment as a reason

for their involvement with BRs. Therefore, natural capital and social capital are positively related to place-attachment, as seen in Fitzgerald, Bookmark, and MPWP BRs.

Social capital provides a source of leadership, which can come in different forms (Olsson et al. 2007) and as indicated throughout this research, manifests as local champions. A local champion or champions, provide the impetus for a BR, from which other capital assets are created. Effective citizen engagement at both a local level (face to face) and an institutional level (networked organisations) requires strong facilitation and committed champions to ensure adequate support. Champions are required at both the community and regional scales for awareness and interest to grow. BRs foster citizen engagement by encouraging people to use cooperative strategies to sustain local economies and resource use while conserving biodiversity (Pollock et al. 2008).

Leadership for BRs is critical to establish other forms of social capital such as trust and reciprocity, which in turn, provide a basis for network linkages, multi-level partnerships and polycentric governance. Key individuals can provide visions of ecosystem management and sustainable development that frame self-organising processes (Olsson et al. 2007), evidenced by empirical data from NEBR, Riverland, Fitzgerald and MPWP BRs. In these BRs, local champions were essential to establishing functional links between organisational levels and therefore, facilitating the flow of information and knowledge from multiple sources, applied in the local context of ecosystem management. In the South-West BR, absence of this leadership meant that these linkages did not occur and the BR relied on a simple, large-scale centralised governance structure, or unicentric governance typical of MIs, devoid of the kind of variety of response capabilities that complex, polycentric, multi-level governance systems can provide (Ostrom 1998).

Bardach (1998) describes how leaders play different roles in systems of strategic interaction, which include eliciting common goals, creating an atmosphere of trust, brokering organisational and individual contributions and developing energies in accordance with some strategic plan. Moreover, as illustrated in the case study BRs, Olsson et al. (2007: 14) suggest the pivotal role of these leaders where 'organisations that do not appear to have much in common may develop crucial links thanks to these key people, who form the nodes of different, loosely connected, networks'. Those BRs with a diversity of leaders, such as Long Point and Fitzgerald, have created multiple networks of loosely associated groups to collaborate in the BR. This diversity is shown to be positively reinforcing, where diversity promotes high levels of generalised trust and community reciprocity in associations whose memberships are socially diverse (Rydin and Holman 2004; Fien and Skoien 2002). Therefore, those BRs with diverse memberships are more effective in generating social trust and cooperation.

With a diversity of such partners, new ideas can be shared, but more importantly, they provide networks of contacts. This allows for a BR to accrue dispersed sources of information and institutional arrangements that enable integration and mobilisation of knowledge between relatively autonomous but interdependent actors and groups of actors at multiple scales. For instance, accumulation of social-ecological understanding and experience in a social memory seems critical for dealing with change (Olsson 2007). These social networks can serve to store social memories for ecosystem management that can be revitalised over time. In the NEBR for instance, by acting as a central node

of the BR and hosting the Leading Edge conference series, the NEC managed networks of local stewardship groups to mobilise knowledge and social memory, in turn helping to deal with uncertainty and shape change. With strong natural and social capital, a basis for mobilising other capital assets exists.

CSOs are a source of capital assets, instrumental in the identification of conservation priorities, appropriate development goals and capacity needs (for instance, Coalition on the Niagara Escarpment). They help a BR integrate local knowledge with scientific knowledge and where possible, combine projects of appropriate scope with available skills and resources. In this regard, BRs benefit from a wide range of participants including volunteers, champions and outside experts (CBRA and WNBR). CSOs are under-represented in Australia yet well understood and utilised in Canada due to a stronger historical partnership approach to social-ecological issues.<sup>92</sup> In the NEBR and the Riverland BR, loose networks of groups with shared value of local natural capital provide diverse capital assets for BR activity. In the NEBR specifically, the NEC and manifold CSOs, along with community members and government bodies provide a range of capital assets that have resulted in interacting individuals and organisations at different levels. At Riverland BR, community members representing various networks (education, conservation, industry) have partnered with a related natural resource group (Birds Australia). In the MABR, a lack of CSO input has meant that capital asset accrual is difficult. Despite some strong Phase I assets, these BRs do not have sufficient capital, innovation and experimentation to transition to Phase II at this time. BR champions or committees working in conjunction with the BR resilience conceptual framework could be better equipped to progress their resilience.

The notion of valuing capital assets in an explicit sense between organisations and networks is innovative and experimental and with the enunciation of new governance, the value of these should be increasingly recognised (discussed in Phase II). Without innovation and experimentation, capital assets remain dormant. Yet, with leadership from social capital, in concert with other capital assets and innovation / experimentation, Phase II can be realised. Most successful collaborative efforts exhibit a different mind-set among those involved; one that includes their willingness to try new behaviours and different ways of interacting (Wondolleck and Yaffee 2000). Innovation and experimentation are critical to Phase I, as one of the most common barriers to creative, multiparty problem solving is the unwillingness of groups to set aside past modes of interaction and traditional management practices and consider new approaches (Berkes and Folke 1998). In the MABR, NEBR and Riverland BRs, a willingness of a handful of individuals (often land owners or local champions) to try a different approach to problem solving has provided sufficient momentum to drive Phase I.

Power struggles are the antithesis of experimentation and innovation. Whilst common in pursuit of effective governance, enduring and pervasive power struggles will result in stagnancy at Phase I, as illustrated by the Riverland BR. In that situation, overriding institutional rigidity and inability to

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<sup>92</sup> BRs, as a type of CSO, may encounter some of the challenges of public participation, such as citizen bias for certain projects or a lack of resources to contribute to projects. But the challenge then, is to balance local and immediate concerns with broader regional and long-term views of socio-economic and environmental change.



collaborate in an open and networked manner has resulted in massive division, dissolution and ineffectiveness of capital assets and innovation. Community champions are working to the best of their ability to restore Phase I of the BR.

Davidson et al. (2006), on the topic of power and authority in governance, reiterate that collaborative planning, as articulated by leading proponents such as Healey (1997), draws on the theory of communicative rationality (Habermas 1983). With communicative rationality, decisions and actions are valid only if they arise from circumstances where all actors have been able to express themselves without inhibition or constraint, and where outcomes are unconditionally and freely accepted by all parties (Habermas 1983). In practice, these conditions are almost impossible to achieve in full and collaborative participation sometimes remains an ideal rather than a reality. Some commentators have also argued that even in apparently well-functioning collaborative processes, it is inevitable that some people will exert undue power and influence (Flyvberg and Richardson 2002). The degree to which social capital outcomes such as honesty, clarity, sincerity, as well as lack of distortion, manipulation and deception can influence the adverse influences of power struggle will determine the flow of other assets such as institutional and financial capital.

Aspects of the NEBR, MABR and Riverland BRs are indicative of Phase I as they have substantial natural capital that has created a sense of place-attachment and stewardship in individuals who have become champions. Through their leadership and implicit systems thinking approach in their networks of influence, shared value has been established within and between other local networks, often in the context of ecological services. Social capital attributes of, for instance, trust, solidarity and cooperation, establish networks over time (often years) and space (often hundreds of kilometres but most effective at local to regional scales). These networks form the basis for BR community committees and vary in the number of participants (over 100 in the NEBR, less than 10 in the MABR), often due to the geographic scale of the BR and the number of related pre-existing networks, such as, for example, conservation trusts and government sponsored natural resource initiatives. These BRs have mobilised capital assets to various extents based on natural capital and leadership from local champions.

The mobilisation and accrual of capital assets occurs readily where feedback loops between social and ecological systems are close as often represented in agricultural regimes. Furthermore, capital assets of BRs can only be mobilised and useful in the generation of resilience if the social-ecological fit is appropriate to the actors and regimes concerned. For instance, the NEBR is a sprawling BR, with manifold social and ecological issues. The Bruce Peninsula Community Committee represents an appropriate fit between its social and ecological systems, as capital assets have been mobilised. However, at present the rest of the BR is without local community leaders to mobilise place-specific networks and capital assets to establish a better social-ecological fit in the seven other constituent counties.<sup>93</sup> Instead, these other sections of the NEBR are reliant on a larger governance arrangement

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<sup>93</sup> This may be due to disconnection between social and natural capital in these other counties, resulting in a lack of place-attachment and hence local champions. Similarly, it may be the result of a lack of civil society awareness related to the BR, but this circumstance is comparatively less likely in this BR than others due to the continued and active role of multiple CSOs and the NEC.

between multiple overlapping CSOs and the NEC, still able to attain and mobilise capital assets. This represents a less responsive feedback loop unlikely to enable achievement of Phase II, unless a significant change occurs in the value of, and attention to, BR capital assets in these other counties.

#### **10.2.1 Summary: Phase I**

Social capital is key to mobilising other capital assets but will only manifest through use. The BR forum provides a means to build social capital and hence mobilise other forms of capital. As BRs are complex systems, de-limiting the spatial scale to a 'place' provides a sense of purpose and hence drives trust and social learning. At such a scale, actors may be motivated to contribute to networks where they perceive an input can have a direct effect. The feedback loop at this scale is appropriate as BR initiatives, monitoring and management responses can occur at the local level. With social capital mobilised, usually around a core group or champion, the basis for a BR network exists, where other capital assets can be attracted and mobilised.

In the MABR, NEBR and RBR, capital assets exist but the social capital and champions required to mobilise them are fragmented, insufficient and / or engaged in power-struggle. Shifts in phase can occur when social capital is mobilised by local champions who use their networks of influence to spread shared value and understanding of the idea. Each of these BRs face unique social-ecological problems and threats, where there are certain to be multiple individuals prepared to find collaborative and innovative solutions. However, a narrow capital asset base limits their resilience to Phase I for a variety of reasons in each case, including a lack of innovation and experimentation (no reinforcing cycle, hence inadequate renewal of capital assets), too few financial and institutional capital assets, uniform networks (lack of diversity) and a problem of fit between BR size and capital asset mobilisation.

### **10.3 Supporting and Demonstrating Phase II of the BR Resilience Conceptual Framework: Process**

Pollock (2004: 35) suggests 'regional governance arrangements are influenced by various capital assets including natural, human, physical, financial and social'. The process of new governance in a BR can progress toward a state of increased resilience in the absence of power struggle and by drawing on the capital assets mobilised by champions in Phase I (capital assets plus innovation / experimentation). This is because Phase II attributes facilitate, cumulatively, BR organisation that bridges local actors and communities with other organisational levels, hence a BR committee becomes what Olsson (2007) describes as a bridging organisation, linking civil society, government and industry.

Capacity to deal with the interactive dynamics of social and ecological systems is central to a bridging organisation, whilst also stimulating a learning environment amongst networks of interacting individuals and organisations at different levels to create the right links, at the right time, around the right issues (Westley 2002). These bridging organisations are similar in some respects to boundary

organisations,<sup>94</sup> but have a broader scope and address resilience in social-ecological systems. The FRNPBR and the MPWPBR are indicative of this phase.

The attributes of new governance including multi-level partnerships, openness, capacity-building, place-based social learning and multiple knowledges are outcomes of a bridging organisation. A BR committee, as a bridging organisation, can create the space for institutional innovations, redirect external forces into opportunities, serve as a catalyst and facilitator between different levels of governance, and bring in resources, knowledge and other incentives for ecosystem management (Olsson et al. 2007; Kinzig 2001).

Tracking the evolution of the MPWPBR and the FRNPBR from Phase I to Phase II illustrates the incremental achievement of resilience. Evidence from the MPWPBR shows that capital assets accrued and mobilised slowly after the establishment of the BR Foundation. The MPWPBR in Phase I was characterised by some contention and power sharing issues, closed institutions from decades of siloed operation, slow rates of change, little innovation and experimentation and limited social learning, due to a lack of precedent for this type of new governance arrangement in Australia. In the FRNPBR, a strong place-attachment amongst community members arising from an agricultural resource regime, coupled with a sense of stewardship to reconcile existing environmental debt, provided capital assets (mostly social) from local community champions. Shared institutional capacity coupled with co-occurring innovation / experimentation within government approaches to social-ecological management (Regional NRM bodies and NHT funded projects) provided social, institutional and financial capital, overseen by national parks and community leadership.

Along with this basis of capital mobilisation and accrual, adaptive capacity requires consolidation of new governance style organisational arrangements (Folke et al. 2003; Folke et al. 2002). Organisational arrangements that value and sustain capital assets in conjunction with the use of innovation / experimentation and that place a BR committee as the central node amongst a social network of actors are commensurate with the achievement of this goal, and hence underpin the success of Phase II in the BR resilience conceptual framework.

The mobilisation and accrual of capital assets from multi-level sources to create networks is a key aspect of creating a BR committee in Phase II. Local champions are often the instigators of such a committee and, once formed, a domain for social-ecological management exists where there previously was none. Based on shared values, the BR becomes the 'social space' as perceived and defined by the actors who share it. The BR domain arises because actors within the social-ecological system become aware of their interdependence with similarly situated actors. The domain is an innovative and experimental place and forum to combine capacity to explore this interdependence for addressing shared and complex issues. Such multi-level governance arrangements illustrate how regional systems are open to external influences (from both local and global pressures) and how the

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<sup>94</sup> Boundary organisations are the result of bonding capital as distinct from bridging capital, usually considered as strong and weak forms respectively. In the case of BRs however, bridging capital and organisational arrangements arising from it are stronger due to their diversity of actors and are representative of the complexity inherent in social-ecological systems (Olsson et al. 2007).

institutional layers for managing them might be fragmented among separate, and sometimes competing, organisations. As Draper (2004: 229) explains, addressing the challenge of open systems and institutional fragmentation:

... requires learning how to strengthen existing relationships, forge new partnerships, incorporate different kinds of knowledge, and institute new co-management (governance) processes. [It] also entails understanding and managing complex relationships among ecosystems and people ...

According to organisational ecosystems, domains and regimes are phases in institutional development that continually evolve and thus may be newly created, adapted or devolved (Pollock 2004). This feature has been indicative of the case studies where the process of consolidating new governance arrangements is iterative and dynamic, reflecting social-ecological changes in short and long timeframes, where reversion to less resilient states is also possible. For instance, in the FRNPBR, long-term monitoring projects have established a data set on speciation and habitat structures, whilst the yabby and tourism market feasibility studies provide examples of shorter term social-ecological opportunity. Both of these examples are means to support the BR's new governance arrangements based on capital asset accrual and consolidation, coupled with innovation and experimentation. However, both have the potential to become moribund if the capital assets to support them are withdrawn or eroded, and / or experimentation and innovation cease, resulting in lowered resilience to Phase I rather than increased consolidation of Phase II.

### **10.3.1 Multi-level Partnerships and Collaboration**

BRs in Phase II foster citizen engagement by encouraging people to use cooperative strategies to sustain local economies and resource use while conserving biodiversity. A key challenge for BRs is to balance local and immediate concerns with a broader regional and long-term view of social-economic and environmental change. Various scholars have pointed out that linking different levels and knowledge systems requires an active role of individuals or organisations (champions), as coordinators and facilitators in co-management processes (Olsson et al. 2007; Raco and Flint 2001; Taylor 2000; Solecki 1994; Nozick 1992; Roseland 1992). Effective citizen engagement at both the local level (face to face) and the institutional level (networked organisations) requires strong facilitation and committed champions to ensure adequate support (Francis 2004c; Pollock 2004).

As seen in the FRNPBR and the MPWPBR, champions have been central to engage networks with differing capital assets. In the FRNPBR, John Watson has championed the concept at a state government level, and coupled with local agricultural initiative networks and NHT derived funding, along with local farmers, a multi-level partnership arrangement is now consolidated. In the MPWPBR, Craig Forster and Ian Weir, amongst others, motivated the MPSC to the extent that the shire funded the entirety of BR related costs until the concept could become established in the other shires of the designation. Part of the role of these champions is to motivate and empower others to be creative and take ownership for problem-solving (Rydin and Pennington 2000; Brown and Ashman 1996; Bryson and Crosby 1992). Such champions are well situated to recognise and work within sensitive local contexts that might affect the delineation of BR boundaries. As individuals with networks of

influence pertinent to the BR, they may, for example have connections to farmers, land management groups, local entrepreneurs, teachers and academics, amongst others.

Collaboration has a role to play in responding to a variety of social-ecological challenges. According to Wondolleck and Yaffee (2000) it can help create the networks of relationships that relate administrative or political boundaries to those defined by problem or ecosystem. Collaboration can assist in the development of rich pools of knowledge that draw from diverse sources and provide a framework for interdisciplinary learning and problem solving. Building bridges between public and private parties can generate a diversity of ideas and approaches, so that decision makers have a menu of responses available to deal with changing conditions, problems, and values. It can also help administrative agencies stay in touch with changing public values and knowledge. Collaborative processes can help agencies and interests understand each other, whilst providing a decision making framework that involves groups in a way that builds support and ownership (Wondolleck and Yaffee 2000). These processes can also help to provide structures through which post-decision monitoring and evaluation can take place. Images of successful collaboration can help motivate agency staff and citizens alike. Ultimately, it can also help create a dialogue about shared values and problems and assist in rebuilding a sense of individual responsibility for collective problems (Wondolleck and Yaffee 2000).

All of these attributes contribute to effective new governance, and help to consolidate capital assets by investing in mutually beneficial arrangements between actors and ultimately building Phase II. This has been demonstrated in the FRNPBR where the domain of the BR transcends the national park and incorporates social-ecological issues relevant to managing the significant conservation values of the core with the requirements of a surrounding, environmentally impacted, working landscape. Both the national park and working landscape are economically significant for the Fitzgerald region, with little other sources of income outside of primary production and tourism. Through collaboration employing a multi-level approach, rich knowledge of the social-ecological system is shared, to contribute to learning and problem-solving. Barriers between state, regional and local; private, public and individual; farmers and planning authorities have been tackled, culminating in diverse input for decision making and policy development. In this regard the role of SCRIPT in the FRNPBR is particularly pertinent. The FRNPBR exhibits particular strength in maintaining understanding across agency and civil society boundaries, where a shared value and sense of ownership of the BR helps to overcome previously limiting silos. The collaborative dynamic of the BR is driven by momentum on the part of those in the committee who mobilise the maximum capital assets from their respective networks of influence, whilst employing innovation and experimentation.

The long time scales of the social-ecological problems (such as biophysical change processes and human impacts) and the constraints of institutional inertia on policy and social change suggest that there has to be perseverance amongst collaborating parties in a BR at Phase II if there is to be sufficient longevity to consolidate new governance arrangements. According to Davidson et al. (2006), robust collaborative processes supported by appropriate funding, broad political commitment, realistic reporting and achievement expectations promote 'durability' in new governance. The multi-level partners in the collaborative processes present at the MPWPBR and FRNPBR have exhibited

this perseverance, which has assisted consolidation of Phase II. However, appropriate funding and multi-level political commitment are two factors of durability yet to be achieved.

### **10.3.2 Coordination**

Coordination is a central facet of successful new governance, and an ongoing and evolving process rather than a particular outcome. An advantage of a BR as a social-ecological domain is that it has the capacity to cross pre-existing institutional silos to conduct innovative dialogue based on shared values and to build capacity to address social-ecological changes and challenges into the future. This kind of a dynamic and flexible domain, like any successful multi-level, multi-disciplinary endeavour, requires a hub, or centre of coordination, from which to control, distribute, arrange, plan and organise information and matters arising from it. Central to coordination is a sense of meaning and legitimacy; two aspects sorely missing in most traditional 'public participation' approaches (Wondolleck and Yaffee 2000) and that provide challenge in the process of consolidating BR new governance.

Meaning and legitimacy are facilitated by an 'early, often and ongoing involvement' approach where early and often multi-stakeholder involvement through the decision making process is likely to result in more effective decisions and produce satisfied stakeholders (Mendis-Millard 2007). Moreover, information is collectively produced, and outcomes are shared. In this way, knowledge is built within a coordinated, networked context.

Rather than seeing civil society as an entity to be consulted because of statutory requirement or because it is politically correct, BR efforts during Phase II view the ideas and buy-in of partners as integral to finding an effective solution. Such efforts build processes of information sharing and decision making that allows for real, substantive involvement on the part of many interests. FRNPBR and MPWPBR have achieved this by basing all coordination at the committee level, where input is achieved by all involved and decisions are formed based upon shared information. Coordination over an expansive area is achieved in the MPWPBR through roundtables, which have developed into an effective means of providing opportunity for BR activity at socially meaningful scales. The ecological issues arising at the same scale are bounded by local government jurisdictions, however through MPWPBRF, opportunity presents to coordinate management of cross-boundary issues throughout the BR.

The role of the BR coordinator is crucial. BRs with a coordinator devoted to projects are more successful than in BRs where individuals combine this role with other responsibilities (such as in Phase I BRs). Coordinators help to increase the number of projects and their visibility, benefiting both the BR and the partners involved. Prior to recruitment of a coordinator, many BR initiatives in these two case studies succeeded because they relied on the efforts of a small set of dedicated, energetic individuals who catalysed an activity and drove it forward. A strong leader or interested party has energy and vision that mobilises others to participate (Gregg 1998). This has been evident in both the FRNPBR and the MPWPBR where local champions provided the precursor to community committees and designated coordinators. Many of these individuals have gone well beyond the call of duty, often persisting in spite of considerable challenges. However sole reliance on such individuals

can lead to burn out. Coordination is more certain if funding can be derived for that purpose and used to support a full or part-time staff member.

### **10.3.3 Openness and Ecological Rationality (institutional rigidity)**

The complexity of institutional arrangements for a given landscape will affect the ability of community to create formal and informal regimes (Francis 2003). Some community groups struggle to make sense of the fragmentation of institutional organisations, instruments and regimes within their particular landscape (Pollock et al. 2008). To participate effectively in shaping BR governance regimes, communities must first navigate the existing governance system and then form or maintain a regime that will help to steer the governance system toward their desired goal (Pollock et al. 2008). Institutional resistance (rigidity) may occur, as BRs may be perceived as creating more work. This resistance to change can also occur in unlikely domains. For example, the BR tendency to focus on sustainable working landscapes runs counter to the goals of some people in the conservation community. 'A BR initiative can therefore be at once perceived as too 'conservation focused' by local resource groups, and too 'development focused' by local conservation groups' (Ravindra 2004: 56).

However, by engaging in collaborative effort to build a domain for social-ecological management, agency representatives and civil society members involved in this phase of a BR have gone (and can go) beyond traditional views of how they should interact together or interact with other agencies (Wondolleck and Yaffee 2000). Rather than being authoritarian, they act in an open and increasingly networked manner (Healey 1998). In the case of the MPWPBR and the FRNPBR, rather than simply consulting with the public to get its consent for a desired agency direction, BR members have committed to a open approach in which decision making has proceeded in partnership, even though some agencies (such as MPSC for instance) have retained ultimate authority to make some decisions. As BRs such as these move from designation to implementation, they have needed to critically assess the potential for strategic combinations of private / public / civic governance arrangements with organisations and agencies within and outside their locality (Pollock et al. 2008).

In Phase II, traditionally closed government sectors and private interests have been able to make an often difficult transition to a broader set of roles, including those of expert, stakeholder, partner, facilitator, and leader. In the case of the MPWPBR, agencies such as Parks Victoria and the shire councils of the BR, have been successful in collaborative initiatives by providing expertise and retaining ultimate decision making power. During Phase II, the expertise of agency representatives is welcomed because it provides information necessary for effective decision making. Also, agency representatives become more partners and leaders, and less dictatorial decision-makers in the process. This type of relationship indicates the institutional openness and ecological rationality required to consolidate new governance (Howlett and Raynor 2006; Bingham et al. 2005).

This transition toward ecologically rational institutions, as described in Chapter 7, is characterised by necessary negative feedback mechanisms; coordination across different actors and different collective actions; and particular performance capacities of robustness and flexibility which enable them to respond adequately to changing internal or external conditions (Dryzek 1987). Negative rather than positive feedback is a necessary capacity since this kind of feedback provides alert

signals that indicate impact on the least advantaged sector of the social-ecological system. Coordinated feedback is required for negative feedback to work effectively and to make the necessary conclusions (Davidson and Stratford 2000). In Phase II, this negative feedback is received through open, multi-level committees, where negative feedback can be received and acted upon in a coordinated way, to further build robustness.

Organisational, political, or social arrangements that provide opportunities for open interaction among members of different groups or organisations can help set the stage for collaborative problem solving. These arrangements can include very formalised mechanisms such as advisory committees or simple, informal arrangements, such as regular personal interaction between domains (Wondolleck and Yaffee 2000). As successful examples of collaboration, the FRNPBR and the MPWPBR arrangements incorporate informal relationships, project coordinators, memoranda of understanding between organisations, advisory committees, NGOs, and jointly managed facilities. Critical to the effectiveness of these structures is the core mission to foster outreach interchange, and decision making among diverse interests. These BR committees have established points of contact that are visible and accountable to outside groups and created structures through which relationships have developed among diverse partners.

MPWPBR and FRNPBR share a similar institutional context in terms of complex overlays of organisations, agencies and EMO coalitions working at local to bioregional scales. Each is governed by a combination of regimes, such as legislation, regulation, and planning guidelines. Yet the presence of open institutions, such as EMOs (and their education campaigns, lobbying, media attention, and political leverage) ensures that the governance regimes of these BRs continue to evolve in order to keep pace with external threats that flow into the system (e.g resource extraction and urban growth pressure) (Pollock et al. 2008).

#### **10.3.4 Place-based and Capacity-building**

BRs are well positioned to foster place-based governance in several ways. First, BRs are designed to promote regionalism and are themselves models of regional, multi-jurisdictional management (Foster 1984). They draw upon principles from landscape ecology to designate core protected areas and simultaneously strive to respect diverse cultural understandings of those same landscapes (Pollock 2004; Goldstein 1999). BRs, as bridging organisations, thrive under open, ecologically rational institutions, that provide flexibility and space for dealing with the ambiguity of multiple objectives. These are important factors in building capacity of local actors. By reducing the (non-monetary) transaction costs of collaboration, bridging organisations can be described as providing social incentives to stakeholders to invest in building trust, identification of common interests, and resolving conflict, all of which are inherently connected to a 'place' or region of common identity (Olsson et al. 2007; Folke et al. 2005). The facilitation, leadership, and social incentives for collaboration provided by bridging organisations or key persons in the community appear to be essential for building the capacity to adapt to change (Olsson et al. 2007; Folke et al. 2005).

The cases of FRNPBR and MPWPBR suggest that community capacity to address institutional fragmentation began through multi-stakeholder collaboration underpinned by place-based relations.



According to Pollock et al. (2008) one major role for communities is in creating and maintaining appropriate regimes for landscape governance. Collaboration between civic organisations and public agencies contributes to both private and public property regimes, builds institutional capacity, and helps to steer governance. To generate improved trust and collaboration at the landscape scale, Pollock et al. (2008) suggests that BRs should consider becoming repositories of scientific research. This has been achieved in the FRNPBR and the MPWPBR. Such action has required local committees to become more actively involved in identifying and advertising research needs, linking scientists undertaking research locally, and ensuring data collected is retained publicly. This has greatly increased place-based capacity-building. According to Pollock et al. (2008) such capacity-building is a difficult challenge that requires sustained funding, committed staff and volunteers, as well as efforts to find common ground and to create incentives to work together on initiatives. However this role has given local communities greater capacity to make links between individual EMOs and ultimately to take part in steering regional governance activities themselves.

In the MPWPBR and the FRNPBR, communities have thought about the types of institutional arrangements that give them greater opportunities for participation in governance. This has occurred in response to the fragmented and open nature of these landscape systems, as a means to secure fundamentally important livelihoods as part of a broader vision for landscape protection. These BR communities are realising the benefits of tracking sustainability at the landscape scale. For the agricultural communities represented in these BRs, the viability of traditional farming is a key component of governance for sustainability and a major driver behind community involvement (particularly in the Fitzgerald BR).

Both community capacity and institutional capacity of other actors, such as governments, are crucial. These capacities, often derived from capital asset accrual, as seen in Phase I, are intimately connected to 'place'. Yet, concerns are evident in this discourse that promoting capacity at one level reduces capacity at others (Pollock 2004). For example, that promoting active citizenship at the community level inadvertently encourages governments to abrogate their responsibility for economic, social and environmental well-being (Pollock 2004; Scheffran and Stoll-Kleeman 2003). A rhetoric of shared governance may act to disempower communities if resources are reduced while expectations mount (Pollock et al. 2008). This situation has been averted in the cases of the MPWPBR and the FRNPBR as there has been no pre-existing expectation at a governmental level on the governance outcomes of BRs. This lack of expectation has allowed successful championship of the BR concept, as communities were able to drive the focus, direction and pace of action, rather than being a party to, or subject to the expectation of government-derived ideas and directives. Hence, 'ownership' of the BR at a community level developed, and capital assets were accessed and accrued to build capacity.

#### **10.3.5 Social Learning and Multiple Knowledges**

Well-informed decisions are required in both instrumental and communicative rationality (Habermas 1983). NRM problems, which are inherently social-ecological problems and thus pertinent to BRs, are characterised by complexity, uncertainty, long time scales, multi-dimensionality, and diverse values.

Their solution has to be informed by a diverse range of knowledge sources including scientific research, on-ground experience, and traditional ecological knowledge (Davidson et al. 2006; Olsson and Folke 2001). According to Davidson et al. (2006) information is a key component of transparency, and hence social learning. Accessibility and equity of information flows, effective communication, and education (the public transfer of knowledge, skills, ideas and facts) form a component of achieving greater diversity of knowledge and expertise input into decision making and thus more effective problem solving. The right kind of freely flowing information, together with effective communication, can stimulate creativity and flexibility necessary to respond to new situations as they arise (Davidson et al. 2006; Anderson and Hoskins 2004).

BRs must serve as facilitator and partner, providing both a forum and a helping hand for groups to join together to discuss and understand conservation and sustainability issues of mutual concern and then deal with them as best they can. The other role is to keep abreast of all that is happening in a BR and report on this from time to time to all who live there, and to anyone else that may be interested. As Francis (2004a: 25) notes, 'No one else does this. It is a special niche for a BR group and a demanding one. Guidance for what to track can be found in the UNESCO nomination and periodic review forms'.

Brunckhorst (2002: 17), in discussing the facets of new governance, suggests that:

These approaches also have the potential to create uniquely robust governance institutions that possess the essential dynamic qualities to enable improved adaptive capacities to the emergent processes that constantly challenge (non-metropolitan) communities. Transformation to a more effective resource governance framework will also draw on the notions of a bioregional framework (Brunckhorst 2000) and an effective nested arrangement that better represent a community's actual interests in a particular regional landscape, while retaining the capacity to address resource governance issues at appropriate ecological scales. The result is an institutional interface that bridges social and ecological processes while providing workable administrative arrangements (e.g. for NRM agencies, LGAs and other government services).

In developing and consolidating Phase II of the BR resilience conceptual framework, MPWPBR and FRNPBR have utilised the community committee space as a means for information flow, transparency and expert decision making, based on input from locally pertinent actors (for example from regionally significant regimes, such as state government, local farmers and NRM projects). These actors transfer and interact with knowledge and information within and between their respective networks and the BR committee, providing expertise and openness, overcoming fragmentation of institutional arrangements, building capacity through collaboration and realising the potential for communities in these open social-ecological systems to address working landscape sustainability. Interaction across these multiple jurisdictional, spatial and temporal scales along with inherent commitment to collaborative processes and multiple knowledges, has resulted in a process of social learning in these BRs that continues to drive the consolidation of Phase II.

Social learning amongst these actors and regimes is associated with shorter feedback loops than those of traditionally fragmented institutional structures. As such, various uncertainties and feedback effects associated with social-ecological problems of the BRs means that institutions and

organisations involved must be capable of adapting to changing circumstances and knowledge. Change in BR social-ecological systems and the shortened feedback loops to report it results in self-reflexivity at the BR level. If the organisational and policy learning of the various institutional bodies represented in these BRs at Phase II could be directed back from the BR to influence change at the institutional level, resulting in institutional learning, this would complete the feedback loop of the BR. However, to date, such reflexivity is only occurring from social learning within the BR, as at the institutional level (for instance in industry and government) BRs continue to be undervalued.

#### **10.3.6 Summary: Phase II**

Phase II combines the assets, experimentation and innovation of Phase I to manifest multi-level partnerships, collaboration, coordination, openness, capacity-building, place-attachment, social learning and multiple knowledges. With iterative attention to these facets of new governance, and through conscious sustenance of capital assets, Phase II is consolidated. Domains and regimes can be interpreted as phases in institutional development processes that continually evolve (Francis 2003). Therefore, influenced by fast and slow social-ecological variables, and in the context of applying a new governance framework, Phase II may take the longest of the three phases to put into operation and consolidate. The expedience with which this occurs will be determined by the ease with which civil society, government and industry learn to integrate and coordinate their regimes to protect the capital assets that collectively sustain them. This phase necessitates iterative work between these constantly evolving and changing domains and regimes, to understand and work within the context of interdependencies and feedbacks between ecosystem development, social dynamics and cross-scale interactions.

Ultimately, just as power struggles invoke shift from Phase II to Phase I, a social-ecological event (catalyst) can invoke an evolution from Phase II to Phase III. Consolidation of new governance attributes at Phase II to the point of persistent positive feedback cycles, extended stability or necessity to raise the status quo to meet an urgent, new and dynamic social-ecological challenge may be types of catalysts for this shift. In the cases of the FRNPBR and MPWPBR, further consolidation of Phase II is required for a shift to Phase III, as several capital assets and new governance attributes are unstable or unrealised. For example, direct financial and institutional capital input from federal and state governments is absent, national BR information sharing through a dedicated BR forum / committee is non-existent, and multi-level partnership networks can be further extended. Whilst direct financial and institutional input from federal and state governments appears to negate the intention of Mark II BRs, Australian BRs would benefit from a similar contribution in this regard as occurs in Canada (from Parks Canada). This subsistence financial and institutional capital provides a catalyst for supporting innovation and experimentation and accessing pre-existing and potential capital assets that may otherwise not occur.

As Olsson et al. (2007: 10) suggest:

... it is not enough to create arenas for dialogue and collaboration, nor is it enough to develop networks to deal with issues at a landscape level. There is a need to understand and actively manage the underlying social structures and processes for ecosystem management. A challenge in such governance systems is to support social

mechanisms and enable institutional arrangements for accessing and combining knowledge to respond to ecosystem feedbacks at critical times ... Bridging different actor groups in networks and creating opportunities for new interactions are important when dealing with uncertainty and change, and are critical factors for learning and nurturing integrated adaptive responses to change.

This research concurs with Olsson et al. (2007) who suggest that i) social mechanisms for combining multiple sources of knowledge; ii) building moral and political support in social networks; and iii) having legal and financial support as part of the adaptive governance structure, reduces vulnerability and increases resilience. These attributes support the content of the BR resilience conceptual framework. Indeed, these attributes are the likely catalysts in evolution of the MPWPBR and FRNPBR into Phase III. Additionally, attending to adaptive capacity and evolution from Phase II to III requires understanding of the complex institutional arrangements of the governance systems of pertinence to a BR (including those of the agencies and institutions collaborating in the BR); democratic practice of these governance systems; and engagement by communities through collaborative institutional arrangements.

#### **10.4 Supporting and Demonstrating Phase III of the BR Resilience Conceptual Framework: Outcome**

Phase III denotes the physical management and theoretical understanding of a working landscape, recognising the social factors implicit in supporting adaptive capacity, and the governance of resilient social-ecological systems. Phase III engages the previous two phases, where the assets and processes built in Phase I and II promote further application and building of new governance, with the aim of achieving adaptive capacity and resilience.

Folke et al. (2003: 353) argue that 'facing complex co-evolving systems for sustainability requires the ability to cope with, adapt to, and shape change without losing options for future adaptability'. As such, adaptive capacity is a crucial component of resilience for sustainability that reflects the processes of social learning, experimentation and innovation (Mendis-Millard 2007). This research concurs with Mendis-Millard (2007: 354), where:

These processes [which assist adaptive capacity] require key social aspects, which include social capital (networks, trust, reciprocity, and social norms), values, equitable governance processes and outcomes, and the creation, use and validation of multiple knowledges. The ability to act collectively is also thought to be crucial to creating and sustaining adaptive capacity.

In Phase III, the characteristics of successful BRs described by Francis (2004a: 10) are apparent (and manifest in Clayoquot and Long Point BRs), including:

- integration of social and ecological systems;
- flexible interpretation of three tiered zonation concept;
- recognition of inter-relationships;
- fostering of place-based governance;
- actors, domains, action and interaction and regimes are considered in novel ways outside of existing precedents within their relevant spatial and temporal scales;
- champions for the BR;

- established local organisational arrangements;
- support (or buy-in) from community groups and governments;
- a governance arrangement that helps develop BR functions; and
- Perseverance / durability of the BR, especially through setbacks or periods of discouragement.

He also notes that ‘the collective result [delivered by the cumulative outcome (Phase III) of assets, process and phases] is a lot to ask of volunteers’ (Francis 2004a: 10). The two Canadian BR examples representing Phase III, Clayoquot and Long Point BRs, do not rely completely on volunteers, as institutional and financial capital are provided to them, in varying amounts by government. They are recognised as a mode of governance practicable to achieve institutional aims desired by government, effected through the BR approach.

Whilst the area of adaptive capacity and new governance attributes in BRs is a relatively new and emerging area of theory, the most recent literature on the subject supports the findings of this research; that successful attributes of a BR are derived from a combination of the assets, phases and processes described in the BR resilience conceptual framework (Pollock et al. 2008; Kusova et al. 2007; Olsson et al. 2007). The preceding sections have explained the two prior phases. This section is the third and final in the BR resilience conceptual framework and discusses the attributes of Phase III.

#### **10.4.1 Polycentric Approach**

A polycentric approach builds adaptive capacity and reflects the complex nature of a working landscape. As polycentric governance is a way to match organisational and institutional structures with ecological dynamics at different spatial and temporal scales and address linkages between those scales (Berkes et al. 2003; Olsson 2003; Folke et al. 2002; Holling and Meffe 1996), polycentric governance is a type of panarchy. Therefore, the degree to which a BR develops a polycentric approach will be affected by fast and slow variables. Fast and slow variables could include, for example, prevalence and openness of CSOs and ENGOs, government funding, a region’s demographic profile, drought or some other environmental crisis.<sup>95</sup>

The polycentric nature of a BR means that the choice of response available and the information informing any response or change to the BR is representative of the BR community and provides more options than is the case with disparate institutions. As elucidated in Chapter 7, adaptive governance of ecosystems generally involves polycentric institutional arrangements, involves local as well as higher organisational levels, and aims to find a balance between decentralised and centralised control. Institutional interaction across organisational levels can increase the diversity of response options and can deal more appropriately with uncertainty and change. Furthermore, such polycentric arrangements may be of significance in responding to ecosystem dynamics at different scales, and is where the pertinence of institutional fit (scale matching) is most apparent.

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<sup>95</sup> Phase II is also concerned with matching organisational and institutional structures with ecological dynamics at different spatial and temporal scales therefore, also is influenced by slow and fast variables.

Understanding the loss, creation, and maintenance of resilience through the process of co-discovery (by way of polycentric sources such as scientists, policy makers, practitioners, stakeholders and citizens) is at the heart of sustainability (Gunderson and Holling 2002). The social part of this capacity for ecosystem management can include the diversity of expertise and knowledge within organisations such as networks, which gather and store ecosystem knowledge and experience, create flexibility in institutions and problem solving, and balance power among interest groups (Berkes et al. 2003). However the social structures and processes that sustain the adaptive capacity of social-ecological systems in a world that is constantly changing need to be further investigated and understood (Walker et al. 2006b; Walker et al. 2002).

In the case of Long Point and Clayoquot Sound BRs, flexible institutional arrangements and multi-level governance have supported adaptive governance frameworks, operationalised through adaptive co-management where the dynamic learning characteristic of adaptive management is combined with the multi-level linkage characteristic of co-management. The sharing of management 'power' and responsibility involves multiple and polycentric institutional and organisational linkages amongst the BR community, government agencies and non-governmental organisations. This adaptive co-management relies on the collaboration of a diverse set of stakeholders (polycentric), producing multi-level social networks to generate and transfer knowledge and develop social capital and other capital assets, in support of BR management initiatives.

#### **10.4.2 Connectivity Conservation**

The key to resilience in any complex adaptive system is in the maintenance of heterogeneity, the essential variation that enables adaptation (Lobel et al. 2006). For resilience, an ecosystem must maintain integrity in the face of changing environmental conditions and human impacts (Levin 1998). Connectivity conservation increases the likelihood of maintaining integrity and hence variety of response to change. Indeed, this is one of the basic premises of BRs: the three-tiered zonation system allows for buffering of adverse affects to the core area, and hence aims to maintain ecological integrity.

Connectivity conservation is an adaptive capacity response available to a BR in Phase III, where core areas of biodiversity value are linked across the spatial, jurisdictional and social regimes of the BR, reducing effects of 'island biogeography', both in a biological and institutional sense (i.e. disconnect from flow of genes and information, respectively). Protected areas, as natural, complex adaptive systems, change primarily through the reinforcement of chance events, such as mutation, and environmental variation, operating at local levels (Laurance and Gascon 1997). The potential for alternative developmental pathways is enormous (Levin 1998). As a system changes and develops, the existence of multiple stable states is possible, and the potential for qualitative shifts in system dynamics occurs under changing environmental influences (Levin 1998). Connectivity conservation provides a biological and ecological buffer within which these shifts can occur with ecological integrity.

Heavily managed systems, such as in agriculture or forestry, are not purely complex adaptive systems, as their simplified structures are imposed exogenously, rather than arising endogenously

(Levin 1998). As such they are fragile, vulnerable to single stresses such as pest outbreaks, that can cause system crashes in the absence of adaptive responses. Linkages in the landscape, that a BR can create, may help to maintain heterogeneity and hence reduce vulnerability and increase resilience. At Clayoquot and Long Point BRs, concern for connectivity conservation is evident through explicit implementation of a buffer zone and through attention to conservation activities in the zone of cooperation. Recognition of the protected area stressors and means to link vulnerable natural systems is a way that connectivity conservation is improving resilience in these BRs. Another aspect and strength of connectivity conservation is that it creates a collective, and through combined capacity, can institute a perceptual regime shift. Such a shift is often needed to give political momentum to instigate new management approaches (Olsson et al. 2007).

#### **10.4.3 Adaptive, Innovative and Experimental**

Support of flexible institutions and multi-level governance is essential to Phase III, requiring further capacity (than Phase I) to innovate and experiment. Multi-level governance of complex ecosystems needs constant adjustment, which requires innovation and experimentation (Folke et al. 2002). Olsson and Folke (2001) describe the development of watershed management by a local fishing association in a multi-level governance system faced with internal and external ecological and social change. The social change included devolution of management rights which provided an arena for local users to self-organise and develop, refine, and implement rules for ecosystem management. Not only did this allow response to change, it also built adaptive capacity to deal with future change in the multi-level governance system (Folke et al. 2002). The same situation is apparent in the cases of Long Point and Clayoquot BRs, where social and ecological changes threaten the stability of both systems. The capacity to adapt, innovate and experiment through the multi-level, multi-institutional framework of a BR has provided a means to meet changing facets of these social-ecological systems that have been previously disconnected.

As discussed, a polycentric approach to BR governance is critical, and once established, Imperial (1999: 453) argues that such an approach creates an institutionally rich environment that can 'encourage innovation and experimentation by allowing individuals and organisations to explore different ideas about solving [complex] problems', thereby reinforcing the capacity to innovate and experiment. Again, the interdependence of the described assets and processes toward building resilience is strong and apparent.

In Long Point BR, innovation and experimentation have characterised the work of the LPWBRF, in part due to the diverse representation of the committee from a range of disciplines, and their willingness to try almost anything as an experiment for forwarding the BR. For instance, an awareness raising marathon swim by one of the members provided a highly unusual and effective means of promoting the mandate of the BR. Media coverage ensured that the effort was broadcast to a wide audience. Similarly, the willingness of the LPWBRF to engage with a large-scale carbon offset project with OPG catapulted this BR, and indeed all Canadian BRs, into an unprecedented position, as that of service providers for industry. In Clayoquot BR, the CBT is continuously adapting to its social-ecological context, through supporting innovative research and community projects. Ongoing

First Nations treaty negotiations coupled with an active forest industry necessitates a reflexive and adaptable BR, sensitive to its cultural and economic contexts and willing to explore innovative and experimental means to reconcile a multiplicity of otherwise competing agendas.

#### **10.4.4 Interdependent (power sharing) and Equitable**

According to Plant and Plant (1992), understanding of power has been shaped by the mechanistic worldview which sees power as an attribute of limited quantity, distributed unevenly to isolated individuals. For instance, in this view:

Power is something which someone or some group has. It is something which can be seized, taken, given, or 'put in its place'. This static view of power emphasises the separation between those who 'have' power (the power-full) and those who don't (the power-less). Because there is only so much power to go around, one can only have more power by taking it away from someone else (a win-lose situation where their gain is another's loss), or by persuading those with power to give some of it up (in which case they continue to depend on the goodwill of the powerful who can always 'take it back') (Plant and Plant 1992: 47).

A more dynamic understanding of power, as stipulated by new governance, focuses on the connections between the individuals involved. Power, as a relation, flows from sender to receiver (Taylor 2000). The effectiveness of the exercise of power by the sender depends on the degree to which the receiver consents to the relation. In this view, power is neither positive nor negative. The form it takes depends on the nature of the relationships through which it flows (Taylor 2000). In a BR, the relationships that sustain a 'neutral' power relation for adaptive capacity are those that are collaborative, interdependent and equitable.

Plant and Plant (1992) suggests that as individuals, 'power-from-within' occurs when a choice is made to act from an inner sense of integrity and truth. The strength of 'power-from-within' does not come from external authority nor from possession of the means of coercion. 'It comes from a willingness to act from, and to protect the deep bonds that connect us with each other and with the Earth' (Plant and Plant 1992: 48). It is in the willingness and readiness to exercise this power that the authority of 'power-over' is weakened, and movement toward 'power-with' can be achieved. The source of 'power-with' is the willingness of others to listen, which is preceded by social capital attributes such as respect. This form of power is exercised within the limits of community – the net relations which sanction the ordered use of our individual and collective powers (Aberley 1993; Lipshutz and Conca 1993; Plant and Plant 1992). It is a fluid, constructive, and creative form of leadership which 'retains its strength only through restraint. It affirms, shapes and guides a collective decision but it cannot enforce its will on the group or push it in a direction contrary to community desires' (Plant and Plant 1992: 49). The linking of 'power-from-within' and 'power-with' offers a clear alternative to 'power-over'. It is through the exercise of these powers that capacity to act, to resist, to create, is enhanced, as represented by Phase III BRs such as Clayoquot and Long Point. A true power sharing arrangement in these BRs ensures that the basis of resilience (capital assets) is sustained and supported, and coupled with effective new governance mechanisms, rather than eroded through assertion of siloed mandates and mis-trust.



According to Davidson et al. (2006), those charged with advancing regional NRM arrangements are expected to be fair and equitable in the exercise of authority conferred to them, particularly in relation to the distribution of power, the creation of opportunities for engagement, the treatment of participants, recognition of diverse values, consideration of current and future generations, and the development of mechanisms to share costs, benefits and responsibilities of decision making and action. This situation is similar to that of BRs in all three phases of the BR resilience conceptual framework. However 'power-with' and 'power-from-within' are more explicit components for building adaptive capacity due to the voluntary nature of a BR, as opposed to regional NRM initiatives (e.g. SCRIPT in the FBR) that are either directly or indirectly funded in full by government, and therefore subject to 'power-over' relations. Therefore, Phase III BRs are distinguished by real co-management, with shared management authority, rather than multi-stakeholder bodies that are often used by government agencies to increase legitimacy and manage conflicts without devolution of power (Berkes et al. 2003).

Given the multi-scale, multi-jurisdictional nature of BR problems, it is especially important to ensure that responsibilities and roles are clearly defined and that responsibility is distributed across actors. Long Point and Clayoquot BRs have combined capital assets from a range of agencies and actors to create an interdependent, equitable BR committee. In the case of Clayoquot BR, the CBT holds a degree of 'power-over' due to their responsibility to the trust endowment. However, a basis of shared value, interdependency, equity and collaboration allow for power sharing rather than power-struggle, most notably since the increased involvement of community actors in Clayoquot's BR governance.

#### **10.4.5 Collaboration and Networking**

A network perspective focuses on the structure of such systems and the importance of structure for their resilience (Janssen et al. 2006). So far, theoretical studies on the robustness of networks have focused on static networks in rather homogenous systems, and applying this perspective to more heterogeneous and dynamic systems is more difficult. Nonetheless, networks consist of nodes and links that can be used to represent a given system in terms of its localised components, i.e., nodes or vertices, and the relations between those components, i.e., links or edges (Janssen et al. 2006). In BR committees, these nodes and links can be represented by the actors and institutions (nodes) and the collaborative effort arising from mobilised social capital within and between them (links). Through involvement in the BR, these nodes and links play an important role in their networks of influence by building and strengthening the social aspects of adaptive capacity, or the social capacity to respond to change. They tend to do this directly through initiatives, processes and structures that facilitate collective action and social learning. The BR committees of Clayoquot and Long Point are well placed to assist the social processes of responding to change and the arising issues from it, as they are flexible, non-threatening civil society actor groups with a mandate to promote a balance between conservation and sustainable development through research, education and training (Mendis-Millard 2007).

Collaboration ultimately takes the form of interpersonal relationships (Adger 2003; CSIRO Sustainable Ecosystems Regional Development Futures 2001; Taylor 2000). Effective collaborative

partnerships recognise the need to build and sustain productive relationships between those involved and take steps to establish and maintain those linkages. Relationships established in the past can have a major impact in allowing collaborations to move forward. Pre-existing networks and the relationships that sustain them often provide seeds for collaborative efforts. This has been the case in creating network linkages between EMAN and the LPWBRF, which has proven to be a particularly important collaboration for the BR. The influence of the CBT endowment has allowed networks of attraction – where the efforts and values of the BR are commensurate with many other organisations that require funding. A symbiotic network sustains many aspects of the Clayoquot BR.

#### **10.4.6 Reflective and Visionary**

The various uncertainties and feedback associated with a BR means that the institutions and organisations associated with them must be capable of reflecting and adapting to changing circumstances and knowledge. Accelerated change in natural systems and shortened feedback loops imply a need for systematic approaches to organisational and policy learning through ongoing assessment of performance and processes – that is, self-reflexivity, reflection, and vision (Davidson et al. 2006). In light of the uncertainties and complexities generated under such conditions, these processes help to inform adaptive governance, policy, planning and management (Davidson et al. 2006).

Without explicit reflection and vision on BR governance, opportunity for reversion to lower states of the BR resilience conceptual framework is likely. Through reflection and vision over the long timeframes that develop effective, adaptive governance of BRs, a deeper understanding of the key mechanisms that determine resilience in a BR are ascertained. Explicit attention to facets that build adaptive capacity and resilience are likely to create and sustain enduring BRs.

Transforming institutions and practices requires learning and adaptation. Scheffran and Stoll-Kleeman (2003) suggest that major successes in the implementation of sustainable development have often failed due to their inability to overcome established modes of behaviour and lifestyles, in particular, if they run in conjunction with existing interest and power constellations which prevent major changes. Such a circumstance arises from an absence of vision and reflection, ignorance of opportunities and problems, and reluctance to embrace innovation and change. ‘Breaking the deadlock does not only require an improvement in the human capital of the social actors, but also an evolution of the links and interactions between them, and their social capital’ (Scheffran and Stoll-Kleeman 2003: 319).

At Clayoquot and Long Point BRs, regular initiatives in response to reflection on changing governance requirements, capital inputs and threats and opportunities has meant that the evolution toward Phase III resilience has been iterative. The reflection and vision on the part of the BR committees at these two locations has spurred innovation, adaptation and change as required. Through the networks operating at each BR, multiple knowledges have been pooled over years, networks broadened and polycentric management valued. With a diversity of representation, the ideas, knowledges and memories of these committees has enabled much reflection, revision,

adaptation, forecasting and planning to occur based on shared values and innovative, experimental ideas.

#### **10.4.7 Complexity and Uncertainty**

For a BR to consolidate Phase II processes, it must be capable of expecting complexity and uncertainty and be open to these influences. Proponents of the ecosystem approach argue that since knowledge about the complexity and interconnectedness of ecosystems is incomplete, management should be adaptive and include a means of learning about ecosystem dynamics from policy experiments (Holling and Meffe 1996). This learning approach to ecosystem management is also the idea behind adaptive co-management, which simultaneously allows for tests of different management policies and emphasises learning in the use and management of resources (Olsson 2003). This includes monitoring and accumulating ecosystem knowledge along the way and constantly adjusting the rules that shape behaviour to match the change and uncertainty inherent in the social-ecological system. The adaptive co-management approach treats policies as hypotheses and management as experiments from which managers can learn, accepting uncertainty and expecting surprises (Gunderson et al. 1995). By engaging the process of new governance in Phase II, adaptive capacity is built in Phase III. Hence, environmental feedback is created, and from that feedback, learning is integrated (Berkes et al. 2003; Olsson 2003; Berkes and Folke 1998). The polycentric approach employed in Phase III is designed to enable effective management, monitoring, and reflexivity in the presence of acknowledged and continuous complexity and uncertainty.

At the Long Point and Clayoquot BRs, monitoring and research are important measures to understand such social-ecological uncertainty and complexity, where information from multiple short and long term projects is generated by BR partners (such as University of Victoria in Clayoquot BR, and EMAN in Long Point BR). Through this process of monitoring and response, social learning and adaptive capacity are built (Olsson 2003). By responding to and managing feedback from ecosystems, instead of blocking them out, adaptive co-management has the potential to avoid the command-and-control pathology of conventional resource management (Olsson et al. 2007). Hence complexity and uncertainty are recognised, and adaptive capacity sought in order to shape appropriate responses.

#### **10.4.8 Resources and Expertise (knowledge)**

Crisis, perceived or real, seems to trigger learning and knowledge generation and opens up space for new management trajectories of resources and ecosystems. For example, Olsson and Folke (2001) described how threats of acidification, over-fishing, and disease successively initiated learning and generated ecological knowledge among local groups in the Lake Racken catchment in western Sweden. This scenario mirrors crises experienced in both Long Point and Clayoquot Sound BRs, where critical and urgent action was required on the part of multiple agencies to resolve intractable social-ecological problems (pollution and other human impact in Long Point and forest industry threatening local cultural and environmental values in Clayoquot Sound). Resources and expertise were mobilised around these crises.

Knowledge acquisition of social-ecological systems is an ongoing, dynamic learning process, and such knowledge often emerges over decades with peoples' institutions and organisations (Folke et al. 2005). The Phase III process emerging in Clayoquot Sound and Long Point BRs is characterised by ecological knowledge, where people interact through social networks across local to national organisational and institutional levels. For instance, both BRs are strongly aligned with federal government institutions, national corporate businesses, NGOs and civil society. In these BRs, the following has been realised:

Some communities seem to recognise the interconnections between protected areas and sustainable livelihoods, between environmental and human health, and between local pressures and global change. These emergent forms of regime creation rely on community engagement and, indeed, leadership, in order to steer governance in new ways (Pollock et al. 2008: 129).

In Clayoquot BR, this understanding by community has been expedited by significant financial capital. However in Long Point, Phase III process is occurring through institutional and civil society commitment to effective social-ecological governance. Understanding the process of regime formation at the landscape scale will help communities, researchers and practitioners to identify how best to steer governance arrangements. Phase III BRs, as a means to develop more effective networks to facilitate the shared use of knowledge, or 'knowledge pools' (Wondolleck and Yaffee 2000), are an important strategy that benefits improved human interaction (Yaffee 1996).

The importance of social networks during times of stress is well established for both communication and facilitating collective action (Wall and Marzall 2006; Adger 2003; Oliver-Smith 1996). Two variables are used to represent the level of social resources existing in a community. *Community attachment* describes the implicit understanding that the stronger the attachment, the greater the social resource. *Social cohesion* reflects the trends in mobility rates for assessing cohesiveness of a community. In the latter, it is argued that communities with high turnover rates create environments where strong social networks are comparatively less common, against those with those where the population is stable (Wall and Marzall, 2006). Also considered important for developing social cohesion and hence accessing resources, knowledge and expertise, is the number of community events held. Such events provide opportunities for residents to meet, socialise and strengthen their relationships (Wall and Marzall 2006). Therefore, place-attachment is a central component of the variables of community attachment and social cohesion. Long Point and Clayoquot BRs have been particularly active in this regard, where the BR has provided a reason for these communities to gather, celebrate successes, take field trips, and undertake rehabilitation projects and awareness raising initiatives. In the process, social networks have strengthened, values have been shared, and the basis for increasing the capital input from which knowledge, resources and expertise are derived, has widened.

One of the most important features of this dynamic network is that it provides a conduit for trusted information. 'Official' expertise is often treated with suspicion for various reasons: people may suspect a hidden government or corporate agenda; the providers of the knowledge are not known personally to the recipients, so that there are no bonds of trust, inter-dependence and respect; and external knowledge lacks local insight, as is not borne out of long-term personal experience of local

conditions (Selman 2001). Consequently, the type of community-based science and monitoring facilitated by, for instance, EMAN at Long Point, and the CBT and Clayoquot Sound, helps to provide a complement, if not an alternative to, expert knowledge and advice. Social capital and derived networks can therefore form the basis for synergies between official and unofficial knowledge and expertise, and extending opportunities to include community members in research and strategy formation (Selman 2001).

Significantly, professional expertise is greatly appreciated by active environmental citizens, such as those found on the BR committees of Clayoquot and Long Point BRs; it is not a substitute for enthusiasm and commitment, but can provide reassurance, indemnity and practical assistance. The key issue, as Blake (1999) has attested, is that of trust: when communities work with government and non-government organisations, their perceptions of incompetence and indifference are generally dispelled, and a mutual sense of purpose is allowed to develop. This is the case in both Clayoquot and Long Point BRs, where the shared importance of these parties within the conceptual and practical notion of a BR has reduced previous contentions to a point of mutual respect and inter-dependence. These considerations are central to the consolidation and acquisition of adequate and representative resources and expertise in a BR region.

#### **10.4.9 Summary: Phase III**

As indicated in Chapter 1, resilience is recognised by three key characteristics according to the Resilience Alliance (2007b). The BR resilience conceptual framework accounts for these three characteristics, as illustrated by Clayoquot and Long Point, where resilience is demonstrated by:

- undergoing change whilst still retaining the same controls on function and structure. For example, fast and slow social-ecological variables affect the BR and its governance, yet the BR retains its capital assets and new governance processes;
- maintaining social-ecological system self-organisation. For example, core areas are sufficient to provide ecological integrity and the governance processes controlling them maintain this capability in the presence of social-ecological change and uncertainty; and
- by building and increasing the capacity for learning and adaptation. For example, each BR utilises multiple knowledges and institutional memory drawn from polycentric sources, recognises institutional interdependency for adaptive capacity and is reflective and visionary. These attributes promote social learning, which builds further capacity when feedback cycles indicate that these attributes promote positively reinforcing outcomes (Resilience Alliance 2007b).

Phase III, as illustrated by Clayoquot and Long Point BRs, characterises a BR whose spatial and temporal influence is tangible and enduring, built from robust capital assets and new governance processes. Whilst each of these BRs have arisen out of vastly disparate socio-political circumstances, each has achieved adaptive capacity through iteratively building Phase I and II assets and processes. Polycentric networks, employing the characteristics of new governance from Phase II, form a basis for the work of Phase III. Connectivity conservation is a useful and unifying concept around which polycentric networks can collaborate, and provides both an ecological goal and a tangible social one (social by necessity through deployment of multiple collaborating parties).

The role of adaptation, innovation and experimentation continues in Phase III, as a means of responding to complex social-ecological situations and as a means to mobilise organisational change and innovation. Creativity and risk-taking enables continuous improvement, often conflicting with entrenched norms and traditions, particularly within institutions. Thus, a BR in Phase III continues to act as an experiment in sustainability, providing a forum and social-ecological space to test new ideas and give support to collaborative effort otherwise unfulfilled by individual attempts of civil society, government or industry.

From Phase II's consolidated new governance arrangements, openness is established in Phase III, where interdependence is essential to realise shared objectives and sustain capital assets. Hierarchy is not important in a Phase III BR, as power sharing and equity characterise BR relations and networks. The social-ecological system of a BR is sustained through multiple knowledges of equal importance: cultural, political, economic, agricultural, entrepreneurial, governmental, industrial and academic inputs are of equal weight. Respect for all of these viewpoints is critical to maintenance of equity, and hence, trust. Through recognised interdependence, equity and trust comes collaboration and networks, built in Phase II, and sustained and progressed in Phase III. Through collaboration and networking, the unique achievements of BRs can be built.

The capacity to deal with the interactive dynamics of social-ecological systems requires the type of network of interacting individuals and organisations at different levels found in Phase III BRs, creating timely links around relevant issues. Openness of institutions and low rigidity allows flow of information, resources, effort, funds and capacity. Networking enables BR ideas and results to reach new audiences and sustain relationships and rapport with existing ones. Sharing information, problems, successes and capacity through networks of a BR provides adaptive response to feedback. Reflection and vision are critical for negative feedback response, social learning, management of change, charting courses of future action and determining shared objectives for mobilising assets and action.

Complexity and uncertainty in Phase III are recognised as inherent to the social-ecological dynamic of a BR, for which it has built adaptive capacity to respond. Systems thinking amidst polycentric networks coupled with research, monitoring and a learning approach enable the BR to work amidst changing spatial and temporal social-ecological influences. Explicit consideration of panarchy and associated fast and slow variables can assist in understanding, identifying and managing the complexities and uncertainties of a BR. Resources and expertise required to build adaptive capacity in a Phase III BR are characterised by long time frames (i.e. institutional, scientific, individual knowledge built up over decades), multi-level sources and scarcity. In consolidating available knowledge and resources, social cohesion and community attachment influence existence of, and access to knowledge pools. These social capital resources (inherently connected to place-attachment) are critical to mobilising resources and expertise. Multi-level knowledge sharing through active participation and collaboration at a BR level provides both scientific, cultural, anecdotal and other forms of knowledge, and learning opportunities.

## **10.5 Applying the BR Resilience Framework: Guidelines for BR Resilience**

This section provides specific guidelines for implementing the three phases of the BR resilience conceptual framework. These guidelines are intended to inform civil society, particularly community groups and those seeking a practical synopsis of the major steps to build BR resilience.

### **10.5.1 Phase I**

- 1. Local champion(s) and natural capital

Phase I of the BR resilience conceptual framework starts with a single local champion and / or multiple local champions with shared value. Such champions have an important role in identifying natural capital of social and ecological value in the area of interest. The role of the local champion is so important, it may as well be viewed as a 'condition of success' (Ravindra 2004). In the face of chronic lack of funding, developing a successful BR requires a local champion or champions endowed with dynamism, optimism, and the constant generation of good ideas that can buoy up a flagging volunteer spirit, and attract resources (including volunteers, funding, and in-kind support) (Ravindra 2004). Volunteers are also critical, as they support the local champion(s), gather information for nomination materials, form the board of the local committee, initiate and shepherd BR projects, and fill other roles and responsibilities.

- 2. Disseminate idea

The local champion(s) should act to disseminate the idea of the BR and an articulated ideal to their networks of influence. The local council and / or other influential institutions within the area of interest should be approached for discussion of the BR idea and how it relates to their own sustainability initiatives and visions. Getting the BR messages clear and consistent is crucial. This can be challenging for local organisers because it can take a long time to understand the BR concept. At heart, it is a kind of philosophical notion – not a 'thing' so much as world view – and as such is very much about changing the way that people live. This in itself can be an obstacle, and the challenge of clearly presenting the BR concept is aggravated by its frequent confusion with protected areas. When managing and delivering information, it is important to identify any potential controversies in advance, taking appropriate measures to minimise or negate them (Ravindra 2004).

- 3. Scale matching

Many of the problems encountered by societies in managing natural resources arise because of a mismatch between the scale of management and the scale(s) of the ecological processes being managed. Therefore, in developing a BR that has meaning to its local constituency, an appropriate scale needs to be considered. Recognising and resolving scale mismatches is an important aspect of building resilience in social-ecological systems. BRs can explicitly attend to this problem by linking multiple spatial and temporal scales, wherein the achievement of Phase I is a process of defining the scale of relevance to a BR and its community. This serves, as described by Cumming et al. (2005: 14) as 'a window of opportunity to resolve scale mismatches ...[that can have] profound and long-term benefits for both societies and ecosystems'. Long term solutions to scale mismatch problems will depend on social learning and the development of flexible institutions that can adjust and reorganise in response to change in ecosystems (Cumming et al. 2005).

- 4. Forum

Ideally with the support of the local council or other institution (to provide resources such as a regular meeting place), a community forum should be held to present ideas, coalesce intent, gather capital, and initiate capacity-building. Harnessing the support of elected representatives or known community leaders helps to create a critical mass of supporters should there be confusion or misinformation about the concept. The institutional capital and social capital of a local council or institution, coupled with local championship should be sufficient to initiate community discussion on the social-ecological values of the area of interest. Prior to the forum, issues such as 'setting a date', location, dissemination of meeting announcement, agenda, public input, minute-taking, speakers and refreshments need to be planned. Initial forums should proceed with emphasis on 'BR ideas and intents'. Emphasis on the benefits of a BR process – such as economic benefits through an enhanced regional profile, improved cooperation between different sectors, or the potential attractiveness of a BR community to health care or education professionals – may be more constructive than a chronicle of environmental woes (Mendis-Millard 2007). Interested individuals should be apparent at this stage and their capacity acted upon to build BR capital.

- 5. Social capital recognition, mobilisation, renewal

A community event to support and celebrate local natural capital around a particular land or sea characteristic or other feature assists in bringing people together, based around a common idea and / or festivity. For example, a gathering in response to a threatening development in the area of interest (such as anti-pulp mill); an 'xyz watershed' summer solstice party; a community 'clean up' barbeque; or a 'celebrating our local biosphere' fundraiser involving local schools, are various ideas for gathering the community. The scale of such an initiative is important, as reliance on volunteers or champions at this stage is tenuous, therefore, the event should be modest, realistic and achievable. Institutional and financial capital are important and may arise as sponsorship and endorsement by local businesses, council and industry for the event. The celebration of natural capital in this way potentially involves a variety of individuals who may not otherwise interact and gathers them together around a shared value. Such events stimulate place connectedness and sense of place and belonging. When people feel connected to their home area, they are inclined to support and defend it. Ideas on the BR can be raised at such an event and social capital further mobilised. A key to renewal and sustenance of capital assets at a local level is the availability of usable knowledge and capacities for learning, while for society as a whole the renewal process is dependent upon the presence of trust.

- 6. Shared value, trust, reciprocity, visions built

Relevant / interested local institutions (e.g. council), in concert with the mobilised local champions and interested parties, should meet to share ideas, brainstorm, build shared value, trust reciprocity and vision. If local councils and other large institutions of the BR region are not yet involved in the BR concept, their involvement should be strategically targeted at this stage. If this is unsuccessful, some other form of institutional capital must be acquired in support of the BR. Potential participants in a BR won't agree on everything, or even on many things. But there is always some value or need (such as love of the landscape or need to save a local school) that is commonly shared (Ravindra 2004).



Identifying these and using them as a starting place for information on the local BR organisation could be helpful.

- 7. Innovation and experimentation

With some form of institutional capacity secured, innovation and experimentation should be addressed. Partnerships and collaborations, events, meetings and forums that previously did not occur could all be organised at this stage around BR ideas and goals. Through innovative and experimental initiatives, social capital can be built, as individuals and organisations work together toward shared objectives. Success in these initiatives will build social capital further, through bridging and bonding capital. Tangible projects and successes need to be highlighted so that people can rally around them and take pride in their area's achievements. BR champions sometimes put a lot of energy in the early stages into building widespread community awareness of the idea. However, people tend to get involved with projects that are working. It might be more effective to start with small, effective actions and projects, which in turn, can lead to greater community and partner buy-in and awareness.

### 10.5.2 Phase II

- 8. Multi-level partnerships and collaboration

There is a wealth of literature on principles of, and guidelines to achieve, effective collaboration and participation (Bingham et al. 2005; Sarkissian 2004; Ploger 2001; Webler et al. 2001; Pretty and Frank 2000; Wondolleck and Yaffee 2000; Healey 1998; Webler and Renn 1995). It is not the intention of this sub-section to relate all of this information, but rather provide some key points to achieve the basis for partnership and collaboration in Phase II. For people to effectively engage in sustainable development, they must establish a shared sense of purpose and participate in a process that is meaningful to them. To sustain their engagement, they must perceive that their involvement is effective and relevant (Healey 1998), measured by how efficient, instrumental and meaningful the outcomes are of their deliberation. Therefore, in creating multi-level partnerships and collaboration, effective citizen engagement is required, which involves specific process, engagement and outcomes. The criteria that characterise effective process, engagement and outcomes, outlined below, draw on the principles of effective participation and collaboration cited above and include:

#### Criteria for Process

- *Strategic*: a well-structured process involves planning, not only of the type of participation but also the desired outcomes. It involves identifying timelines, resources, stakeholders, and objectives for the process. Task definition and decision making facilitation are very important for participants to experience a productive outcome.
- *Inclusive*: processes should reflect the principle of inclusiveness and fairness. There must be opportunities for meaningful involvement of participants; selected stakeholders should adequately represent the affected population not only in terms of representation

of community members (age, gender, ethnicity), but also in terms of competing values and interest groups.<sup>96</sup>

- *Transparent*: the process should make clear how decisions are being made, including differences in power or privileged information among stakeholders. A transparent process is open to outside evaluation and should clearly demonstrate to what extent stakeholder involvement influenced the outcomes.

#### Criteria for Engagement

- *Enabling*: the process should be equally accessible to all stakeholders; stakeholders must have the capacity to participate in terms of articulacy, technical literacy and resources. They must also feel that their contributions have value and relevance.
- *Respectful*: good relationships among participants and the sponsoring agency are important for constructive dialogue. Mutual learning may build trust between participants.
- *Constructive*: exchange of perspectives and 'knowledges' is essential for informed decisions to be made, while feedback is crucial for maintaining respect and transparency in terms of how decisions are ultimately made.

#### Criteria for Outcomes

- *Efficient*: participatory processes should be cost-effective and timely wherever possible. A strategic plan may improve efficiency, increasing the legitimacy of the process overall.
- *Instrumental*: deliberations should meet strategic goals and objectives and make a difference to the broader policy or community. Substantive results should emerge from the process.
- *Meaningful*: participatory processes should be relevant to participants; the deliberations should influence the decisions at stake and when possible contribute to a positive change (Pollock 2004: 41).

In creating multi-level partnerships and collaborations, diversity of representation should be sought including from, for instance, universities, schools, industry, government, business, NGO, agriculture, arts and tourism areas. Creating linkages with these parties requires identifying shared capacities, and means to strengthen these whilst attending to shared values and goals. When this capacity-building is occurring, a diverse BR community committee can be expected to form.

- 9. Coordination

Establishing effective coordination requires regular meetings and preferably a dedicated part- or full-time BR coordinator. Alternatively, a volunteer from the community may be nominated as the chief coordinator for a one year term, with a new coordinator voted on each year by the BR committee. Meetings should be a means to share information, learning and coordinate ideas and projects. Instigating means to share and disseminate information is critical to effective coordination, for example, a regular newsletter, a website and community forum provide tangible sources of information and dialogue, which can sustain and galvanise existing interest, and inform potential participants. Coordination is assisted through these mechanisms as information can easily be relayed to a wide audience, for example, to advertise upcoming events and meetings.

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<sup>96</sup> Inclusiveness, as stipulated here, may be difficult for a BR to achieve. For example, the idea will attract those who wish to participate and deter those who do not align with the idea. Furthermore, previously mentioned demographic characteristics affect ability and desire to participate in a BR. For example, retired individuals are well represented in BR committees, whilst young people are not.

- 10. Openness and ecological rationality (low rigidity) of institutions

For coordination and multi-level partnerships to achieve their fullest potential, openness and low rigidity should be an explicit aim of BR meetings. All parties collaborating should be made aware by local champions that openness is a central issue for BRs to achieve their desired goals. Openness is also an outcome of high social capital mobilisation and renewal, as trust is present. However, institutional resistance may occur as BRs can create various stresses for government departments at all levels. The BR concept further sets institutions, governments, other organisations and local groups on the same playing field, a role that may be uncomfortable for some institutional partners. When this discomfort is overcome, institutional partners may see a BR as a way to extend their own capacity, especially at a community development level. The degree of openness is a major factor that determines the length of time a BR takes to mobilise its assets and instigate a new governance process.

- 11. Place-based and capacity-building

Place-based motivations are important for creating and sustaining Phase II processes, as they help to address the problem of fit in sustainable social-ecological systems. Different community and political levels of participation in decision making and broadly inter-connected ecological systems and resource uses, need a mutual geography that brings together shared natural resource issues and their stakeholders at appropriate scales of engagement (Brunckhorst et al. 2006). This problem of fit is reconciled through close attention to place-based concern and appropriate scales of governance. The result is an appropriate social-ecological scale, known as an eco-civic region, that (Brunckhorst et al. 2006: 269):

- maximises the spatial capture of 'sense of place', i.e. the landscape area of interest to residents, in which they are willing to engage in decisions for the future. Therefore, the governance region should encapsulate the largest proportion possible of the areas that residents regard as their community;
- maximises the spatial capture of similarities of the ecological resource base (homogeneity of the biophysical landscape); and
- can be scaled up from a local level to broader regional contexts (nesting) while not compromising the first two principles.

One means to achieve this is through social-ecological hotspots; locales that exhibit spatial coincidence of both high-perceived landscape values and high consideration for biophysical conditions (e.g. national parks or productive agricultural landscapes). A social-ecological hotspot might occur in an area perceived by community members to have high biological value along with high biological productivity as determined using quantitative measurement. Alessa et al. (2008) argue that the social-ecological hotspot mapping method identifies areas of significant convergence between social and ecological space. The identification of such areas is a first step toward developing sustainable land management plans that protect landscapes while providing for human needs. This is a useful tool in identifying 'landscape values', including aesthetic, cultural, economic, historic, recreation and wilderness values that provide an operational bridge between the 'geography of place' and the 'psychology of place' (Alessa et al. 2008: 3). At this stage in the BR resilience conceptual

framework, it is useful to identify such place-based values and thus build capacity around the protection and enhancement of those values.

- 12. Social learning and multiple knowledges

The capacity of BRs to tap indigenous, lay, expert, industry and scientific knowledges results in an entirely new version of landscape knowledge, where the combination of these knowledges provides for an explicit type of ground-truthing, often missing from current land planning and management processes. Goals, objectives, and policies of a land or resource plan developed in relative isolation by experts may not survive close scrutiny on the subjective elements of the plan. If these same plan elements are logically derived from publicly held landscape values, in combination with the views of resource planners and managers, the plan will be more defensible, if not acceptable, to local communities. This represents social learning, where new forms of decision making can occur in relation to meaningful social-ecological parameters. A BR that enables learning from local communities with long-term experience of environmental variability and uncertainty, yields insights for managing complex ecosystems for resilience (Olsson 2003). Therefore, multiple knowledges and diversity of representation in a BR committee must be targeted, and the slow and fast variables of resilience determined through that knowledge group, to enable shared social learning of the social-ecological system of interest.

### **10.5.3 Phase III**

- 13. Polycentric approach

At this stage of the BR resilience conceptual framework, much of the organising for establishing networks and linkages has occurred. However developing a polycentric BR requires continual adaptation to changing social-ecological circumstances and part of this process is identifying and connecting with individuals and organisations that can further diversify the governance network of the BR as these variables shift. The fast and slow variables that may affect the participation and collaboration of potential and current BR partners should be identified so that exposure to uncertainty and therefore chance of shift into alternate, undesirable regimes can be reduced.

- 14. Connectivity conservation

Efforts to increase connectivity conservation should be made as this enables further social and ecological heterogeneity. Often a flexible, collaborative approach to management occurs in response to a perceived decline of natural systems and their health or as a response to an anticipated crisis (Olsson et al. 2007). However, connectivity conservation works on a somewhat precautionary approach, requiring links to develop amongst individuals, networks and organisations, preferably prior to undesirable regime shifts. Realisation of interconnected and interrelated social-ecological problems in a defined area (defined by for instance, political, hydrological and / or land use borders) can assist in broadening the focus of otherwise hard-working, dedicated and related organisations and individuals. Connectivity conservation generally occurs at Phase III because it is not just a process of connecting people, but also involves building trust, compiling and generating ecosystem knowledge, defining an area for management, developing a common vision and goals for ecosystem management, and mobilising broad support for change (Olsson et al. 2004). If these factors are given

attention, connectivity conservation is achievable and can aid the BR social-ecological system by increasing natural integrity and hence adaptive capacity.

- 15. Adaptive, innovative and experimental

Innovation and experimentation are fostered by polycentric governance through an institutionally rich environment, where exploration of different ideas toward problem solving occurs and can adapt according to shifts in social and ecological factors. Therefore polycentric governance should be an explicit target, however one does beget the other. Building and maintaining adaptive capacity, innovation and experimentation necessitates treating the BR as a continual experiment, monitoring success and failure of past and present initiatives, searching for unfulfilled service niches for the BR to provide and continuously looking for new partners, means of exposure, sources of capital and opportunities for awareness raising. Such active engagement with adaptation, innovation and experimentation requires, amongst other Phase III attributes, a regularly convening, dedicated, intelligent community committee and a coordinator.<sup>97</sup>

- 16. Interdependent and equitable

By Phase III, the basis for interdependence and equity has been established through new governance processes in Phase II. In particular, the generic principles of good governance are implemented, including attention to fairness and equity. However, these aspects cannot be forgotten or ignored in working toward adaptive capacity and a resilient working landscape. Interdependence and equity must be iteratively revisited and attended. In Phase III, the panarchy within which a BR is situated may be further recognised and explored. Therefore, the difficulty, if not impossibility for one or a few people to possess the range of knowledge needed for BR governance and ecosystem management is clearly understood, and interdependence explicitly recognised. In Phase III, it is not enough that groups are interdependent; rather, they must perceive this interdependence and recognise that it creates a need for cooperative action (Wondolleck and Yaffee 2000). Moreover, uncertainty and change are seen as inevitable, the undesirable effects of which are significantly reduced in the presence of multiple knowledges and capacities. When the value of these various knowledges is equally valued and acknowledged, equity can exist.

Successful partnerships go beyond recognition of shared goals to the perception that individual interests are interconnected. Geographic isolation helps to promote a sense of interdependence. For example, extremely isolated communities, linked by one remote road, work together, even when there are competing interests, as illustrated by a number of the case studies (Bruce Peninsula, Long Point, Fitzgerald).

In successful collaborative efforts, considerable time is allocated to craft decision making processes that are perceived as fair, and outcomes that are judged as equitable. Building trust and respect is centred on 'treating people fairly' (Wondolleck and Yaffee 2000: 153). Using objective criteria for decision making is important to promote fairness in a BR. Also, in creating an equitable environment,

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<sup>97</sup> The requirements described by Dovers and Mobbs (1997) provide further insight on the challenges of achieving adaptive management.

costs must be shared. The opposite situation, in which some groups come to be seen as ‘free riders’, can damage an effort over time.

- 17. Collaborative and networked

The concept of building an interactive network of ideas, information, and capabilities must be integrated into the way that other tasks are approached and structured. It is part of a way of thinking about ecosystem-scale management that cannot be held in isolation from other resource management tasks. At Phase III, a good understanding of the benefits of collaboration exists but the benefits may not yet be fully achieved. Several points can assist in maintaining and building networks and collaboration at this stage:

- 1. Initiating contact with other groups, managers and agencies is an important first step and is a way of networking rather than only responding to concerns.
- 2. An adaptive management approach is necessary to build bridges where experimentation, evaluation and revision represent means to consistently reach new goals. Personal commitment and perseverance are continuously required.
- 3. Open-mindedness and creative means objectives that are necessary to work with diverse interest and conflict.
- 4. Useful skills for those involved in successful BR collaborative and networking efforts include humility, honesty, sincerity, groundedness, creativity, understanding of the BR group’s objectives, listening and understanding others points of view, persistence and tenacity.
- 5. Building capacity to initiate, guide or participate in a collaborative process is useful for a BR committee, and training sessions or workshops in collaboration, communication and group problem solving can assist in this goal.

- 18. Reflective and visionary

Iterative reflection on past actions and reactions, successes and opportunities, failures and pitfalls builds social learning and a vision for a future successful working landscape. One key role of the BR committee, and in particular, local champions, is to spur this knowledge generation, and assist in its dissemination. SMART (specific, measurable, achievable, realistic, timely) plans for the future, on short, medium and long term timeframes, should be determined by collaborative reflection on multi-scale, multi-jurisdictional lessons from the past.

- 19. Manages complexity and uncertainty

In a BR, change and uncertainty are recognised as intrinsic and unavoidable. Finding a fit between the spatial, temporal, utility, social and ecological parameters represents a panarchy in constant flux. Therefore, no single, enduring ‘fix’ is likely. Instead, adaptation to continually shifting problems and successes is required. Land claims, proposed park expansion, forest fire, research station closure, funding cuts, local crisis, death of a community leader – these may crop up at any time and threaten to derail a BR process. Similarly, unforeseen events may also occur that could enhance or speed the development of a local BR. The challenge for local BR organising groups is to recognise opportunity when it comes up and to have the flexibility and adaptability to be able to profit from it.

Achieving an open, flexible, creative, positive, risk-taking, and holistic mind-set that is problem-focused and that rises above traditional concepts of agency roles, is a constant struggle. Therefore, the factors that can be controlled, such as capital assets, in particular social capital, should be of primary concern. Through management of Phase I and Phase II assets and process, the effects of complexity and uncertainty in Phase III can be reduced. Strong capital assets, innovation and experimentation, and consolidated new governance processes will reduce both the scale and likely impact of complexity and uncertainty in Phase III.

- 20. Resources and expertise

The occurrence of two Phase III BRs in Canada in this research is no coincidence. CBRA, through its national BR coordination role, has prompted adaptive capacity in these two BRs by provision of institutional capital, expert knowledge, champions, volunteers, information dissemination, in-kind assistance, social memory, networks and collaboration. Clayoquot and Long Point BRs had the necessary consolidated Phase II attributes to effectively utilise these resources. Therefore, for a BR to reach Phase III, the support and capital available by a national BR coordination body is recommended.

At a local level, the capital assets, expertise and processes of Phase I and II continue to influence Phase III. Indeed, the requirement for resources and expertise during Phase III may be greater than in other phases, as more initiatives are envisaged and possible, as networks diversify and complexity is acknowledged. The spatial and temporal scales of the BR in Phase III may be greater and therefore resources and expertise input can expect to alter accordingly. For example, a BR may harness Phase III capacity to an extent that it becomes a benefactor for small CSOs or individual researchers, perhaps through provision of in-kind or financial assistance. However, without successful engagement in Phase II and a significant pool of resources and expertise, the BR does not reach Phase III. Therefore, in Phase III, a BR community committee will contain the necessary means (skills, networks, collaboration, trust, resources) to acquire funding and further expertise to achieve its planned objectives.

This chapter has described and analysed the major tenets of the BR resilience conceptual framework supported by both theoretical and empirical data. It has argued for the BR resilience conceptual framework as a means to create sustainable social-ecological systems through the BR model, linking capital assets, new governance, adaptive capacity and resilience. Specific recommendations pertaining to the application of the BR resilience conceptual framework have been provided. The following chapter concludes by addressing the fulfilment of the research aim and objectives, discussing the academic contribution of the work and providing recommendations for future research.

# 11 Conclusion

*This chapter offers conclusions with respect to lessons and insights from the case analyses, integrated with theoretical understandings in support of the BR resilience conceptual framework, with specific reference to the aim and objectives of the research. The significance of the contribution is discussed, and avenues for future research suggested, along with ways in which the findings can be utilised in pursuit of locally-derived social-ecological initiatives.*

## 11.1 Fulfilment of Aim and Objectives

The aim and objectives of the thesis were given on page 18. The aim of this thesis has been achieved by identifying the key features (assets, process and outcome) required to enhance the fit between governance systems and ecosystems using the UNESCO BR model, and through the BR resilience conceptual framework, has developed of a framework for establishing BRs as resilient working landscapes. The research has focussed on identifying features that are critical for linking civil society, institutions and government dynamically across multiple levels, and addressed the governance dimension of ecosystem management and the social factors that enable such management.

Chapter 3 fulfilled the first objective of the thesis by analysing the BR concept including functions, zones, variations, steps in the designation process and benefits of successful BRs. These aspects of the BR concept informed the latter components of the thesis by establishing the framework under which BRs operate, their explicit benefits and the increased relevance of new governance through Mark II BRs.

Chapters 4 and 5 charted the discourses and key drivers of BRs through the 1960s to present. These chapters fulfilled the second objective by examining development of these discourses and drivers to illustrate the increasing complexity and diversity of environmental thinking, since the early preservationist and scientific approaches of the 1960s. These chapters developed the idea that the role for BRs has become more pertinent through time, as a heightened focus on sustainability has become the norm, and the BR program has adapted at an international level to accommodate these changes. The lack of practical application of broad sustainability principles, despite international conventions and few programs available to approach the issue of sustainability at local to national levels, reinforces the importance of BRs as a means to practice and develop sustainability.

Chapter 6 analysed the operation of Australian and Canadian BRPs with respect to their historical development and present contexts. Australian BRs, characterised as MI and MII face challenges particular to monocentric or polycentric governance arrangements, respectively. The role of federal government in supporting and disseminating the BR idea, alongside a national BR committee or working group is critical to achieve objectives of the BRP. In Canada, a history of multi-tenure reserve networks has created a climate of collaboration and coordination. The realisation of Phase III in two Canadian BRs is indicative of the assistance provided by CBRA; a historical approach to partnerships



and collaboration; and local BR factors such as capital assets that are valued and maintained. This chapter fulfilled objective three.

Chapter 7 illustrated the current thinking on good governance and its relation to BR governance. Connections between capital and new governance, which to date have received limited attention, reveal a basis for building adaptive capacity. Capital assets provide a basis for integrating across disciplines, cognitive capacities, policy arenas and fields of practice for more effective, efficient and equitable governance. Capital assets are supported by new governance including a multi-stakeholder integrative sustainability planning approach. When capital assets are accrued rather than eroded, and mobilised in a context of experimentation and innovation, the process of Phase II is achievable. This chapter addressed objectives four, five and six.

Chapters 8 and 9, also addressing objectives four, five and six, identified the environmental and historical situations, capital assets and governance processes of the eight BRs. Through the cases, manifold problems and prospects that characterise BRs were illustrated, along with the differences and similarities between BRs of Canada and Australia. An overlap and interrelatedness emerged between BR capital assets, new governance process and the realisation of an adaptive capacity outcome. The cases provided the empirical basis for developing the BR resilience conceptual framework.

Chapter 10 proposed the relevance of panarchy theory and phase changes to BR resilience. The three phases of the BR resilience conceptual framework were supported and demonstrated, by linking current literature in capital assets, new governance, adaptive capacity and resilience to the empirical evidence of the case studies. In analysing BR empirical data and literature on resilience, a close relationship emerged between practice (indicated by the case studies) and previously published theory. The guidelines for applying the BR resilience conceptual framework articulated specific means for any interested party to actively pursue a resilient BR. This chapter fulfilled objective seven of the thesis.

The BR resilience conceptual framework developed in this thesis, fulfils the last objective, to integrate lessons and insights from the case analyses (Objective 7) with theoretical understandings (Objectives 4 to 6) to construct a framework for BR resilience (Objective 8). This framework has been well supported through empirical and theoretical sources, as demonstrated throughout the thesis.

## **11.2 Significance of the Contribution**

This thesis has developed a conceptual and practical framework based on empirical and theoretical evidence to provide for sustainable social-ecological resilience in BRs. The broad mandate of BRs, their adaptability to varying situations and difficulty in achieving all that their program intends has been illustrated through the eight case studies. The multiple benefits of BRs have been demonstrated. It is these benefits that make BRs worthwhile in the pursuit of sustainable social-ecological systems. Moreover, in the absence of many other comprehensive, international, practical tools to achieve the same ends, the role for, and importance of, BRs is further magnified. The scope of reconciling social-ecological issues is vast and as such, has rarely been addressed under a single

program. Due to the irrevocably intertwined nature of social and ecological processes and assets, reconciling any question or problem within these realms necessitates a holistic, adaptable, innovative and largely experimental approach.

With little knowledge of BRs in society at large, reliance on volunteers, and scarce guidance for implementation, it is not surprising that many BRs are characterised by uncertainty and flux, despite nearly 40 years of operation. Yet, the urgent need to find effective and replicable tools for sustainability continues to underlie the importance of BRs from global to local scales. Many of the benefits offered by a BR are unrealised to date due to insufficient information relating to the requisite assets and process for their success. The advent of a conceptual framework reduces this uncertainty and illustrates the pathway to BR resilience.

Addressing the mismatch between ecological and social dynamics has provided a central focus of this research. The problem of fit, which presents a major challenge in addressing the governance dimension of environmental management and the social factors that enable such management, is reconciled herein in the context of BRs. This is done by enunciating i) the social factors for mobilising and maintaining stocks of capital assets; ii) means to generate and consolidate new governance attributes; and iii) a procedure to build adaptive capacity for creating resilience in BR institutions.

Governance for sustainability is shifting toward devolution, a bioregional focus, new governance attributes and address of change and complexity. BR communities, as intended examples of sustainability in action, require governance direction and shared information networks to propagate polycentric support and impart greater certainty regarding both their individual futures, and their collective program objectives.

Prior to this thesis, little research had been conducted relating BRs, social-ecological systems and resilience, and in Australia, there was no such research. The significance of this work derives from its original international contribution for the development of resilient, working examples of sustainability in local contexts. The BR program, applied with reference to the BR resilience conceptual framework provides the basis for understanding the assets and process required to fulfil the potential of BRs; to realise adaptive capacity; and ultimately achieve local, community-derived working landscape resilience.

The outcomes of this research are applicable at local, state / provincial, national and international levels. First, at a local level, communities with a bioregional awareness of their local region can employ the framework to understand and harness their collective capacity to achieve chosen social-ecological goals. Through the framework, the role of community champions, capital assets, experimentation and innovation, new governance processes and adaptive capacity are made clear through a three phase process.

At state and provincial levels in Australia and Canada, the role of BRs is unrealised, and the BR resilience conceptual framework illustrates why this situation should change. What other civil society programs achieve what BRs achieve? There is no precedent that overshadows BRs for the

achievement of resilient social-ecological systems. In an era of sustainable development, state and provincial government environmental mandates espouse community capacity-building, environmental, social and economic productivity, and collaborative governance. BRs provide a framework for achieving such mandates with a bioregional focus harnessing multiple knowledges, capital and capacities. To achieve this goal, states must fulfil a role in BRs through provision of institutional or financial capital. Yet, in the state of Victoria (Australia), for example, government measures regarding BRs impede rather than support BR development. This research provides states and provinces with a framework for understanding how BRs can and should develop and prosper.

BRPs at a national level require a working group, with representatives from each BR, along with relevant academics and government representatives. Successful achievement of resilience requires such a working group, as networking, collaboration and multiple knowledges must be shared and achievements celebrated within the context of other BRs. At this national level, annual meetings provide an opportunity and means to harness collective capacity, share experience and build adaptive capacity. The critical mass of knowledge provided through regular national BR networking is central to sustain the relevance, context and meaning of BRs in the face of competing issues and programs, and shifting priorities. This research has highlighted the importance of the role of this group in Canada, and its necessity if BR resilience is to be realised in Australia.

The generic assets, process, outcome and phases developed in the BR resilience conceptual framework could also be applied to BRs in countries other than Australia and Canada. At an international level, the BR resilience conceptual framework can be applied to any BR organised around a community committee (within developed countries) to stabilise performance (Phase I – II) and / or promote resilience (Phase III). One proviso is that the framework will apply most readily in those BRs with community-based governance or those BR communities and / or champions seeking to develop it.

This thesis contends that connectivity conservation may be supported by resilient social-ecological systems found in successful BRs. If applied to connectivity conservation, the three phases of the BR resilience conceptual framework could inform proponents of a proposed or existing connectivity initiative in mobilising and accruing capital assets and building capacity at nodes. Whilst connectivity conservation initiatives generally exist at a larger scale than a BR (for example Y2Y), the principles of connectivity conservation are intrinsic to BRs - their mandate provides for ecological integrity and adaptive capacity through multiple core areas linked by buffer zones. By extending to multiple nodes the social-ecological governance principles established here, a polycentric connectivity conservation initiative may be formed. This principle of multiple nodes in a connected landscape is one also relevant to large scale BRs. For example, as highlighted in the case study, the NEBR would benefit from the formation of multiple BR community committees along the length of the escarpment, in order to overcome the 'problem of fit', and match appropriate social scales of place-attachment with corresponding ecological function and management.

### **11.3 Avenues for Future Research**

The importance of addressing the complexity of social–ecological systems for sustainability is recognised. However literature and expertise in this area are presently limited and require increased attention across a breadth of locations if BRs are to be furthered according to resilience attributes, as expounded in the BR resilience conceptual framework. Beneficial avenues for future research relate to understanding resilience of social-ecological systems, including phase changes, panarchy theory and how these aspects manifest in BR contexts. For example, in Australia, research examining eco-civic regions (Brunckhorst et al. 2006) and Catchment Management Authorities would provide critical knowledge on the problem of fit between top-down NRM governance and civic-led, place-based governance. Coupled with analyses of slow and fast variables in selected locations, important insights could be gained to inform resource governance and biodiversity policy.

In Australia, an academic research focus on BR related matters would assist in development of a national BR discourse; focus attention more directly on BRs and their purpose; and provide critical knowledge necessary for innovation, experimentation and the provision of expertise related to sustainability. A research focus directed at multi-tenure reserve networks alongside new governance would improve a presently limited knowledge-base in this area.

The outcomes of sustainability research needs, most urgently, to be conveyed in the public domain, at a practical level – in the communities and homes of working landscapes. In this sense, BRs provide the ideal mode to propel their own mandate, by arising from community level sense of place, commitment and through the vehicle of a local champion encouraging proactive social-ecological engagement. However, BRs need to be included in the lexicons of protected area managers, governments (local to national), NGOs, community groups, media bodies, schools, industry and the resource and agricultural sector, if a greater number of such local champions are to be mobilised.

Due to the broad social-ecological tenets of the BR resilience conceptual framework, it also has potential application to a number of other community-level sustainability initiatives concerned with building adaptive capacity and realising resilient sustainability outcomes. Many community groups concerned with such work require models for good governance, and the BR resilience conceptual framework may serve this purpose. Research investigating the application of the three phases to other sustainability initiatives would contribute to providing a critical mass of knowledge in this area, particularly in Australia, where social-ecological sustainability and successful governance thereof, require much greater attention.

### **11.4 Endnote**

This work arose out of a concern for improvement and balance within and between social and ecological systems. Protected areas provide the backbone of biodiversity preservation, but represent a rapidly diminishing spatial and temporal window of global naturalness. While there have been some improvements in protection and restoration, ecological systems are exposed to an unprecedented suite of anthropogenic risks and challenges including climate change, population pressure, pollution, globalisation, and over-consumption. Cumulatively, these forces are changing the face of the planet.

In an era of these manifold risks, the BR model and BR resilience conceptual framework developed herein offer a practical means to achieve locally-driven sustainability initiatives. Attendance to working landscapes through a BR model, if popularised, offers a promising tool for place-based, social-ecological governance and environmental stewardship. With only adaptive capacity to gain, and ineffectual outdated modalities to lose, UNESCO Biosphere Reserves, with their requisite assets, process and outcome, can provide a keystone for practical realisation of sustainable development.

# **References and Appendices**

## 12 References

- ABV (Australian Biosphere Volunteers) (2007). Incorporation. Retrieved 26/07/07, from <http://australianbiospherevolunteers.info/index.html>.
- Aberley, D. (1993). Boundaries of Home: Mapping for Local Empowerment. New Society Publishers, Gabriola Island.
- Aberley, D. (1999). Interpreting Bioregionalism: A story of many voices. Bioregionalism. McGinnis, M. V. (Ed.), Routledge, New York.
- Adger, W. N. (2003). Social aspects of adaptive capacity. Climate Change, Adaptive Capacity and Development. Smith, J. B., Klein, J. T. and Huq, S. (Ed.), Imperial College Press, London.
- Alessa, L., Kilskey, A. and Brown, G. (2008). Social-ecological hotspots mapping: A spatial approach for identifying coupled social-ecological space. Landscape and Urban Planning 85 (1): 27-39.
- Alfsen - Norodom, C., Boehme, S. E., Clemants, S., et al. (2004). Managing the Megacity for Global Sustainability: The New York Metropolitan Region as an Urban Biosphere Reserve. Annals of the New York Academy of Sciences 1023: 125-41.
- Allen, T. F. and Hoekstra, T. W. (1992). Toward a unified ecology. Columbia University Press, New York.
- Allen, W. J. (1997). Towards improving the role of evaluation within natural resource management R&D programmes: The case for 'learning by doing'. Canadian Journal of Development Studies, 18 (Special): 625-38.
- Allmendinger, P. and Tewdwr-Jones, M. (2002). The Communicative Turn in Urban Planning: Unravelling Paradigmatic, Imperialistic and Moralistic Dimensions. Space and Policy 6 (1): 5-24.
- Anderson, K. P. and Hoskins, M. W. (2004). Information use and abuse in the local governance of common-pool resources. Forests Trees and Livelihoods 14 (2-4): 295-312.
- Antrop, M. (2006). Sustainable landscapes: contradiction, fiction or utopia? Landscape and Urban Planning 75: 187-97.
- Atkins, P. (2004). Interdisciplinarity and positionality. Interdisciplinary Science Reviews 29 (1): 2-5.
- Australian Biosphere Volunteers Incorporated. (2007). Incorporation. Retrieved 26/07/07, from <http://australianbiospherevolunteers.info/index.html>.
- Australian Bureau of Statistics. (2007). 2006 Census Statistics - Jerramungup, Hopetoun, Bremer Bay, Fitzgerald, Ravensthorpe. Retrieved 22/10/07, from <http://www.censusdata.abs.gov.au>.
- Australian Inland Botanic Gardens. (2007). Barkindji Biosphere - Australian Inland Botanic Gardens. Retrieved 10/10/07, from <http://www.austinlandbotgardens.org/introduction/introduction.html>.
- Australian Landscape Trust. (2007). ALT - Calperum and Taylorville Stations. Retrieved 8/10/07, from [http://www.austlandscapetrust.org.au/index.php?option=com\\_content&task=view&id=16&Itemid=64](http://www.austlandscapetrust.org.au/index.php?option=com_content&task=view&id=16&Itemid=64).
- Australian Landscape Trust and Renmark Paringa Council (2003). Pamphlet of McCormick Centre for Environment. Australian Landscape Trust, Renmark.
- Bardach, E. (1998). Managerial craftsmanship: getting agencies to work together. Brookings, Washington D.C.

- Barkindji Biosphere Reserve. (2007). Barkindji Biosphere - Indigenous Culture - Name + History. Retrieved 04/09/07, from [http://www.barkindjibiosphere.org/indigenous/name\\_and\\_history.html](http://www.barkindjibiosphere.org/indigenous/name_and_history.html).
- Barnett, G. (2001). Ecosystem Services for Regional Sustainability. BDP Environment Design Guide. The Royal Australian Institute of Architects.
- Barnett, M. (2000). It is in their hands - Landcaring at Bookmark Biosphere Reserve. The University of Melbourne, Melbourne.
- Barrett, H. B. (2000). Lore and Legends of Long Point. Patterson's Creek Press, Haldimand-Norfolk.
- Batisse, M. (1982). The Biosphere Reserve: A Tool for Environmental Conservation and Management. Environmental Conservation 9 (2): 101-11.
- Batisse, M. (1984). Biosphere Reserves throughout the world: Current situations and perspectives. Conservation, Science and Society. McNeely, J. A. and Navid, D. (Ed.), UNESCO, Paris.
- Batisse, M. (1993). The Silver Jubilee of MAB and its Revival. Environmental Conservation 20 (2): 107.
- Batisse, M. (1996). Biosphere Reserves and Regional Planning: a prospective vision. Nature and Resources 32 (3): 20-30.
- Batisse, M. (1997). Biosphere Reserves: A Challenge for Biodiversity Conservation and Regional Development. Environment June: 7-33.
- Batisse, M. (2000). Biosphere Reserves: A personal appraisal. Seville +5: International Meeting of Experts, MAB/ UNESCO, Pamplona.
- Beatley, T. and Manning, K. (1997). The Ecology of Place - Planning for Environment, Economy and Community. Island Press, Washington D.C.
- Beausang, F. (2002). Democratising Global Governance: The Challenges of the World Social Forum. Retrieved 29/07/07, from [http://www.unesco.org/most/dsp59\\_en.htm#chap11](http://www.unesco.org/most/dsp59_en.htm#chap11).
- Beazley, K. (1993). Forested Areas of Long Point / Landscape History and Strategic Planning. University of Waterloo, Waterloo.
- Berg, P. (1991). What is Bioregionalism? Trumpeter 8.1: 6-8.
- Berg, P. (1996). Discovering your life-place: A first bioregional workbook. Planet Drum Foundation, San Francisco.
- Berkes, F., Colding, J. and Folke, C., Eds. (2003). Navigating Social-Ecological Systems: Building Resilience for Complexity and Change. Cambridge University Press, Cambridge.
- Berkes, F. and Folke, C., Eds. (1998). Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience. Cambridge University Press, Cambridge.
- Bingham, L. B., Nabatchi, T. and O'Leary, R. (2005). The New Governance: Practices and processes for stakeholder and citizen participation in the work of government. Public Administration Review 65 (5): 547-58.
- Binning, C. (2000). Creating private markets for nature conservation Bushcare Grassy Landscapes Conference, Environment Australia, Clare, South Australia.
- Binning, C. E. and Young, M. D. (1997). Paper 1/97: Motivating people: Using management agreements to conserve remnant vegetation. National Research and Development Program on Rehabilitation. Environment Australia, Canberra.
- Bird Studies Canada. (2004). Bird Studies Canada - About the program. Retrieved 24/08/04, from <http://www.bsc-eoc.org/bscmmain.html>.



Birds Australia (2004). Birds Australia Gluepot Reserve - pamphlet. Birds Australia, East Hawthorne.

Birds Australia. (2005). Annual Report. Retrieved 21/10/07, from [http://www.birdsaustralia.com.au/downloads/BA\\_Annual\\_Report2005.pdf](http://www.birdsaustralia.com.au/downloads/BA_Annual_Report2005.pdf).

Birds Australia. (2006). Annual Report Retrieved 21/10/07, from [http://www.birdsaustralia.com.au/downloads/BA\\_Annual\\_Report2006.pdf](http://www.birdsaustralia.com.au/downloads/BA_Annual_Report2006.pdf).

Birtch, J. (2004a). Personal communication: Questions regarding the establishment of MAB and Biosphere Reserves in Canada. Matysek, K.: By email.

Birtch, J. (2004b). Development of an Urban Program Component in MAB: A proposal to UNESCO including MAB Urban Demonstration Areas as a model for discussion. Retrieved 20/05/04, from <http://www.unesco.org/mab/urban/MUDA2754.pdf>.

Birtch, J. (2004c). Urban Demonstration Areas Quebec, Canada.

Birtch, J. (2004d). Personal communication: Canada's Biosphere Reserve history. Matysek, K.: St. Catharines.

Birtch, J. (2004e). Personal communication: The establishment of MAB and Biosphere Reserves in Canada. Matysek, K.: By email.

Birtch, J. (2005). Niagara Escarpment - Provincial Envirothon a Resounding Success. Biosphere Reserves in Canada - Newsletter,

Blake, J. (1999). Overcoming the 'value-action gap' in environmental policy: tensions between national policy and local experience. Local Environment, 4 (3): 257-78.

Blongrem Bingham, L., Nabatchi, T. and O'Leary, R. (2005). The New Governance: Practices and Processes for Stakeholder and Citizen Participation in the Work of Government. Public Administration Review 65 (5): 547-58.

Bondrup-Nielson, S., Munro, N. W. P., Nelson, G., et al., Eds. (2002). Managing Protected Areas in a Changing World - Proceedings of the Fourth International Conference on Science and Management of Protected Areas. Science and Management of Protected Areas Association, Nova Scotia.

Bonnes, M. (2000). The "Ecosystem Approach" to urban settlements: 20 years of the MAB - Rome Project. The 16th MAB International Coordinating Council - First meeting of the MAB ad hoc Working Group to Explore the Application of the Biosphere Reserve Concept to Urban Areas and their Hinterlands, UNESCO, Paris.

Bookchin, M. (1981). The Ecology of Freedom: The Emergence and Dissolution of Hierarchy. Cheshire Books, Palo Alto.

Borodczak, N. (1995). Ontario's Niagara Escarpment (Ontario, Canada): Implementing the Biosphere Reserve Ideal in a Highly Developed Region. Paper presented by the Niagara Escarpment Commission at the International Conference on Biosphere Reserves, Sevilla.

Botequilha Leitao, A. and Ahern, J. (2002). Applying landscape ecological concepts and metrics in sustainable landscape planning. Landscape and Urban Planning 59: 65-93.

Boychuk, S. (2004). Personal communication: The Clayoquot Biosphere Reserve and the CBT. Matysek, K.: Tofino.

Bradshaw, M. and Stratford, E. (2000). Qualitative Research Design and Rigour. Qualitative Research Methods in Human Geography. Hay, I. (Ed.), Oxford University Press, Melbourne.

Brandon, K., Redford, K. H. and Sanderson, S. E., Eds. (1998). Parks in Peril: People, Politics and Protected Areas. The Nature Conservancy and Island Press, Washington D.C.

Bridgewater, P. (1999). World Heritage and Biosphere Reserves - Two sides of the same coin. Environment Australia, Canberra.

Bridgewater, P. B. (2002). Biosphere Reserves - a network for conservation and sustainability. Parks 12 (3): 15-20.

Bridgewater, P. B. and Muldoon, J. (2000). Sixteenth Session of the International Coordinating Council of the Man and the Biosphere Program - Agenda Item 6 National Reports - Australia. UNESCO, Paris.

Bridgewater, P. B., Phillips, A., Green, M., et al. (1996). Biosphere Reserves and the IUCN System of Protected Area Management Categories. Australian Nature Conservation Agency, World Conservation Union and UNESCO MAB Program, Canberra.

Brown, L. D. and Ashman, D. (1996). Participation, social capital and intersectoral problem solving: African and Asian case studies. World Development 24: 1467-79.

Brown, V. A. (1997). Managing for Local Sustainability: Policy, Problem-solving, Practice and Place. University of Western Sydney, Sydney, Australia.

Brunckhorst, D. (2000). Bioregional Planning: Resource Management Beyond the New Millennium. Harwood Academic Publishers, Sydney.

Brunckhorst, D. (2001). Building capital through bioregional planning and biosphere reserves. Ethics in Science and Environmental Politics February 1: 19-32.

Brunckhorst, D. (2002). Institutions to sustain ecological and social systems. Ecological Management and Restoration 3 (2): 108-16.

Brunckhorst, D. (2005). Integration Research for Shaping Sustainable Regional Landscapes. Journal of Research Practice 1 (2): Article M7.

Brunckhorst, D., Bridgewater, P. B. and Parker, P. (1997). The UNESCO Biosphere Reserve Program Comes of Age: Learning by doing, landscape models for sustainable conservation and resource use. Conservation Outside Reserves Conference, University of Queensland Press, Brisbane.

Brunckhorst, D., Coop, P. and Reeve, I. (2002). Designing 'Eco-Civic' Regions for NRM: Final report on Land and Water Australia UNE 35: Ecological and Social Functions Influencing Governance of Natural Resources. Institute for Rural Futures, University of New England, Armidale, New South Wales, Australia: 19.

Brunckhorst, D., Coop, P. and Reeve, I. (2006). 'Eco-civic' optimisation: A nested framework for planning and managing landscapes. Landscape and Urban Planning 75 (2006): 265-81.

Brunckhorst, D. and Reeve, I. (2006). A Geography of Place: Principles and application for defining 'eco-civic' resource governance regions. Australian Geographer 37 (2): 147-66.

Bryce, M. (2002). Delisting of Southwest MAB Reserve. Minute to the Minister. Department of Primary Industries, Water and Environment, Hobart.

Bryson, J. M. and Crosby, B. C. (1992). Leadership for the Common Good: Tackling Public Problems in a Shared Power World. Jossey-Bass Publishers, San Francisco.

Buckingham-Hatfield, S. and Percy, S. (1999). Keys to a sustainable environment. Constructing Local Environmental Agendas: People, Places and Party. Buckingham-Hatfield, S. and Percy, S. (Ed.), Routledge, London.

Bush Heritage Australia. (2007). Gondwana Link. Retrieved 30/11/07, from <http://www.bushheritage.org.au/browse.asp?ContainerID=gondwana> link.

- Cairns, J. (2003). Integrating top-down/ bottom-up sustainability strategies: an ethical challenge. Ethics in Science and Environmental Politics February 6: 1-6.
- Cameron, J. (2000). Focussing on the Focus Group. Qualitative Research Methods in Human Geography. Hay, I. (Ed.), Oxford University Press, Melbourne.
- Cameron, J., Mulligan, M. and Wheatley, V. (2004). Building a Place-Responsive Society through Inclusive Local Projects and Networks. Local Environment 9 (2): 147-61.
- Campbell, S. and Fainstein, S. (2003). Introduction: The structure and debates of planning theory. Readings in Planning Theory. Campbell, S. and Fainstein, S. (Ed.), Blackwell, Oxford.
- Canada MAB (1987). National Action Plan on Biosphere Reserves in Canada. Report 19. Canadian Commission for UNESCO, Ottawa.
- Canada MAB (2000). Landscape Changes at Canada's Biosphere Reserves. Environment Canada, Toronto.
- Canadian Biosphere Research Network. (2006). The Canadian Biosphere Research Network. Retrieved 22/05/06, from <http://www.biosphere-research.ca/index.htm>.
- Canadian Biosphere Reserves Association. (2003). About CBRA. Retrieved 16/08/04, from <http://www.biosphere-canada.ca/about.htm>.
- Canadian Biosphere Reserves Association. (2004). Projects and programs. Retrieved 16/08/04, from [http://www.biosphere-canada.ca/projects\\_and\\_programs.htm](http://www.biosphere-canada.ca/projects_and_programs.htm).
- Canadian Biosphere Reserves Association (2005). Your Biosphere Reserve - Creating a Sustainable Future: A community guide to Canada's Biosphere Reserves. Parks Canada, Quebec.
- Canadian Biosphere Reserves Association. (2007a). Canadian Biosphere Reserves Newsletter. Retrieved 09/08/07, from <http://www.biosphere-canada.ca/publications/newsletters-bulletins/2007march-english.pdf>.
- Canadian Biosphere Reserves Association. (2007b). CBRA - Fully Functioning Biosphere Reserves. Retrieved 05/09/07, from [http://www.biosphere-canada.ca/functional\\_br.htm](http://www.biosphere-canada.ca/functional_br.htm).
- Canadian Biosphere Reserves Association. (2008). Biosphere Reserves in Canada. Retrieved 23/04/08, from [www.biosphere-canada.ca](http://www.biosphere-canada.ca).
- Canadian Community Monitoring Network/ Citizen Science Network. (2007). Canadian Community Monitoring Network/ Citizen Science Network. Retrieved 1/11/07, from <http://www.ccmn.ca/english/>.
- Carr, A. J. (2004). Why do we all need community science? Society & Natural Resources 17: 841-49.
- Carter, O. (1998). Physical Background to Bookmark: Lake Merreti Study. University of Melbourne, Melbourne.
- Celecia, J. (1994). Consultation on Cities, Protected Areas and the Concept and Practice of Biosphere Reserves. UK-MAB Forum/ UNESCO-MAB Consultation on Cities, Protected Areas and the Concept and Practice of Biosphere Reserves, UK-MAB/ UNESCO-MAB, University of Manchester.
- Celecia, J. (2000). UNESCO's Man and the Biosphere (MAB) Program and Urban Ecosystem Research: A brief overview of the evolution and challenges of a three-decade international experience. UNESCO, Paris.
- Chambers, J. (2004). Personal communication: Interview regarding the Fitzgerald Biosphere Reserve Matysek, K.: Ravensthorpe.
- Checkland, P. B. (1981). Systems thinking, systems practice. John Wiley, New York.

- Cheng, A. S., Kruger, L. E. and Daniels, S. E. (2003). Place as an integrating concept in natural resource politics: Propositions for a social science agenda. Society and Natural Resources 16: 87-104.
- Chowilla Station. (2007). Chowilla History. Retrieved 08/10/07, from <http://www.riverland.net.au/~chowilla/history.html>.
- Clark, J. (1990). Democratizing Development: The Role of Voluntary Organizations. Kumarian Press, West Hartford.
- Clark, W. (1995). Environmental intelligence. Environment 37 (7): 1.
- Clayoquot Alliance for Research, E. a. T. (2004). About CLARET. CLARET, Tofino, British Columbia.
- Clayoquot Biosphere Trust. (2004). Clayoquot Biosphere Trust - Vision - Timeline - The Making of the Clayoquot Sound UNESCO Biosphere Reserve. Retrieved 02/09/04, from <http://www.clayoquotbiosphere.org/index.htm>.
- Clayoquot Sound UNESCO Biosphere. (2007a). Clayoquot Sound UNESCO Biosphere Reserve. Retrieved 30/10/07, from <http://www.clayoquotbiosphere.org/index.php>.
- Clayoquot Sound UNESCO Biosphere. (2007b). Clayoquot Biosphere Trust Retrieved 27/10/07, from <http://www.clayoquotbiosphere.org>.
- CMA (Port Phillip and Westernport) (2003). Strategy for the Support and Coordination of Landcare and Community Groups in the Port Phillip and Westernport Region, Frankston.
- Coalition on the Niagara Escarpment (1998). Protecting the Niagara Escarpment: A citizen's guide. Pim, L., Lindgren, R. and Attridge, I. Coalition on the Niagara Escarpment, Scarborough.
- Coalition on the Niagara Escarpment (2003). Welcome to the Niagara Escarpment: A World Biosphere Reserve - Pamphlet. Coalition on the Niagara Escarpment, Acton.
- Coleman, J. S. (1988). Social Capital and the Creation of Human Capital. The American Journal of Sociology 94 (Special): 95-120.
- Colloff, M., Fokstuen, G. and Boland, T. (2003). Toward the Triple Bottom Line in Sustainable Horticulture: Biodiversity, Ecosystems Services and an Environmental Management System for Citrus Orchards in the Riverland of South Australia - Final Report. CSIRO Entomology, Canberra.
- Commission on National Parks and Protected Areas (1979). The Biosphere Reserve and its relationship to other protected areas. IUCN, Gland.
- Commonwealth of Australia (2001). National objectives and targets for biodiversity conservation 2001–2005. Environment Australia, Canberra.
- Copson, G. (2004). Personal communication: Southwest Biosphere Reserve and other Australian Biosphere Reserve Issues. Matysek, K.: Hobart.
- Corangamite CMA (2005). Corangamite Native Vegetation Plan. Corangamite Catchment Management Authority, Colac.
- Craig, B. (2004). Personal communication: The history, context and current situation of the Long Point area, including the Long Point Biosphere Reserve. Matysek, K.: Simcoe.
- Creswell, J. W. (1998). Qualitative inquiry and research design : choosing among five traditions. Sage Publications, California.
- Croft, R., Phillips, A. and Jones, T. (2004). The Durban Action Plan - Revised Version, March 2004. Retrieved 04/10/07, from <http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/wpc/durbanactionplan.pdf>.

Cronon, W. (1995). Uncommon Ground: Toward Reinventing Nature. W.W. Norton & Co, New York.

CSIRO Sustainable Ecosystems Regional Development Futures (2001). Building Regional Capacity For Envisaging A Sustainable Future in the Atherton Tablelands. CSIRO, Canberra: 57.

CUBES. (2004). CUBES Columbia University / UNESCO Joint Program on Biosphere and Society: The Earth Institute at Columbia University - Working Groups: Urban Biosphere Groups. Retrieved 07/01/04, from <http://www.earthinstitute.columbia.edu/cubes/groups/urbanbio.html>.

Cumming, G., Barnes, G., Perz, S., et al. (2005). An Exploratory Framework for the Empirical Measurement of Resilience. Ecosystems 8: 975-87.

Daly, H. (2005). Economics in a Full World. Scientific American 293 (3): 10.

Dant Ewart, S. (Unknown). Bioregional Politics: The Case for Place. Oregon Historical Quarterly 103 (4): 439-51.

Davidson, J., Lockwood, M., Curtis, A., et al. (2006). Governance Principles for Regional Natural Resource Management. Land and Water Australia, Hobart, Tasmania.

Davidson, J. and Stratford, E. (2000). Building the Knowledge Base of the Social and Institutional Dimensions Natural Resource Management: Report for the Land and Water Resources Research and Development Corporation. University of Tasmania, Hobart.

Davis, B. W. and Drake, G. A. (1983). Australia's Biosphere Reserves: Conserving Ecological Diversity. Australian National Commission for UNESCO, Canberra.

Davison, A. (2001). Technology and the Contested Meanings of Sustainability. State University of New York Press, Albany, New York.

de Souza Briggs, X. (1997). Social Capital and the Cities: Advice to Change Agents. National Civic Review 86 (2): 111-17.

Dearden, P., Bennett, M. and Johnstone, J. (2005). Trends in global protected area governance, 1992-2002. Governance stream of the Vth World Parks Congress, Parks Canada and IUCN / WCPA, Ottawa.

Deb, K. and Srivastava, L., Eds. (2003). Transition Towards Sustainable Development in South Asia. The Energy and Resources Institute, New Delhi.

Deegan, P. (2004). Personal communication: Fitzgerald River National Park Biosphere Reserve. Matysek, K.: Jerramungup.

DEH. (1999). Environment Protection and Biodiversity Conservation Act. Retrieved 01/04/2005, from [www.deh.gov.au/epbc/](http://www.deh.gov.au/epbc/).

Dempster, B. (2004). Canadian Biosphere Reserves: Idealizations and realizations. Environments 32 (3): 95-101.

Denzin, N. (1978). The Research Act: A Theoretical Introduction to Sociological Methods. McGraw-Hill, New York.

Denzin, N. and Lincoln, Y., Eds. (1994). Handbook of Qualitative Research. Sage Thousand Oaks, California.

Denzin, N. K. and Lincoln, Y. S., Eds. (2000). Handbook of Qualitative Research - Second Edition. Sage Publications, California.

Department of Environment and Heritage. (2004). UNESCO Working Group on Biosphere Reserves. Retrieved 05/08/04, from <http://www.deh.gov.au/parks/biosphere/working/index.html>.

- Dick, B. (2002). Resource papers in action research - Grounded theory: a thumbnail sketch. Retrieved 23/03/05, from <http://www.scu.edu.au/schools/gcm/ar/arp/grounded.html>.
- Dietz, T., Ostrom, E. and Stern, P. (2003). The struggle to govern the commons. *Science* 302: 1907-12.
- Dobbie, S. (2004). Grassy White BoxWoodland Recovery Plan: Draft for public comment. NSW National Parks and Wildlife Service, Hurstville.
- Dodge, J. (1998). Living by Life: Some Bioregional Theory and Practice. *Debating the Earth - The Environmental Politics Reader*. Dryzek, J. S. and Schlosberg, D. (Ed.), Oxford University Press, New York.
- Dovers, S. R. and Mobbs, C. D. (1997). An alluring prospect? Ecology, and the requirements of adaptive management. *Frontiers in Ecology: Building the links*. Klump, N. and Lunt, I. (Ed.), Elsevier Science Ltd, Albury.
- Dramstad, W. E., Olson, J. D. and Forman, R. T. T. (1995). Landscape Ecology Principles in Landscape Architecture and Land-Use Planning. Graduate School of Design Harvard University. American Society of Landscape Architects and Island Press, Boston.
- Draper, D. (2004). Marine and freshwater fisheries. *Resource and Environmental Management in Canada: addressing conflict and uncertainty*. Mitchell, B. (Ed.), Oxford University Press, Don Mills, Ontario.
- Dryzek, J. S. (1987). *Rational Ecology: Environment and Political Economy*. Basil Blackwell, Oxford.
- Dryzek, J. S. (1997). *The Politics of the Earth: Environmental Discourses*. Oxford University Press, New York.
- Dryzek, J. S. and Schlosberg, D., Eds. (1998). *Debating the Earth: The Environmental Politics Reader*. Oxford University Press, New York.
- Dunn, K. (2000). Interviewing. *Qualitative Research Methods in Human Geography*. Hay, I. (Ed.), Oxford University Press, Melbourne.
- Earthwatch Institute (2002). *Biospheres: Creating Sustainable Regional Communities - Summary of Proceedings*. Biospheres: Creating Sustainable Regional Communities, Earthwatch Institute, Cape Schank, Victoria.
- ECC (2001). Box-Ironbark Forests and Woodlands Investigation final report. Environment Conservation Council, Melbourne.
- Eckersley, R. (1992). *Environmentalism and Political Theory: Toward an Ecocentric Approach*. State University of New York Press, New York.
- Ecological Monitoring and Assessment Network. (1998). Canada / MAB Program. Retrieved 06/05/04, from <http://www.eman-rese.ca/partners/mab/history.html>.
- Eisenhardt, K. M. (2002). Building Theories From Case Study Research. *The Qualitative Researcher's Companion*. Huberman, A. M. and Miles, M. B. (Ed.), Sage Publications, Thousand Oaks.
- Engel, J. R. (1987). *The Symbolic and Ethical Dimensions of the Biosphere Reserve Concept*. Fourth World Wilderness Congress Worldwide Conservation - Symposium on Biosphere Reserves, U.S. Department of the Interior, National Park Service, Estes Park, Colorado.
- Environment ACT (2003). National recovery plan for natural temperate grasslands of the Southern Tablelands (NSW and ACT): An endangered ecological community. Environment ACT, Canberra.



- Environment Australia. (2001). Biosphere Reserve Working Group - Meeting on Kangaroo Island. Retrieved 05/08/04, from <http://www.deh.gov.au/parks/biosphere/working/pubs/minutes-august2001.pdf>.
- Environment Australia. (2002a). Environment Protection and Biodiversity Conservation Act - Biodiversity Conservation- Biosphere Reserves. Retrieved 29/08/02, from <http://www.ea.gov.au/epbc>.
- Environment Australia. (2002b). Working Group on Biosphere Reserves Retrieved 19/08/02, from [www.ea.gov.au/parks/biosphere/working/members.html](http://www.ea.gov.au/parks/biosphere/working/members.html).
- Environment Canada. (2007). The Species At Risk In Ontario. Retrieved 14/10/07, from [http://www.on.ec.gc.ca/wildlife/factsheets/fs\\_sar\\_act-e.html](http://www.on.ec.gc.ca/wildlife/factsheets/fs_sar_act-e.html).
- Esakin, T. (2001). Community Involvement in Planning for Clayoquot Sound. Biosphere Reserves in Canada News,
- Escarpment Biosphere Conservancy. (2007). Escarpment Biosphere Conservancy Funding. Retrieved 31/10/07, from <http://www.escarpment.ca/funding.php>.
- eTree. (2007). eTree. Retrieved 19/10/07, from <http://www.etree.com.au/?bhjs=1&fla=0&bn=ie&bv=6.0&bo=winxp>.
- Falk, K. (2001). Myths, Policies and Institutions Impacting Sustainable Working Landscapes. Working Landscapes in the Midwest: Creating Sustainable Futures for Agriculture, Forestry and Communities, Institute for Agriculture and Trade Policy and the Meridian Institute, Delavan, Wisconsin.
- Farina, A. (2000). The cultural landscape as a model for the integration of ecology and economics. Bioscience 50: 313-20.
- Federation of Mountain Clubs of British Columbia/ The Alpine Club of Canada. (2007). Mount Arrowsmith - Natural History. Retrieved 2/10/07, from [http://www3.telus.net/Mount\\_Arrowsmith/natural\\_history.html](http://www3.telus.net/Mount_Arrowsmith/natural_history.html).
- Fien, J. and Skoien, P. (2002). "I'm Learning ... How You Go about Stirring Things Up - in a Consultative Manner": social capital and action competence in two community catchment groups. Local Environment, 7 (3): 269-82.
- Figgis, P. (1999). Australia's National Parks and Protected Areas - Future Directions. Australian Committee for IUCN, Sydney.
- Fitzgerald Biosphere Marketing Association (2004). Where to from here: Fitzgerald Biosphere - Quality without compromise, produced in cooperation with nature. Fitzgerald Biosphere Group Inc, Ravensthorpe Agriculture Initiative Network Inc, Jerramungup.
- Fitzsimons, J. A. and Westcott, G. (2005). History and Attributes of Selected Australian Multi-Tenure Reserve Networks. Australian Geographer 36 (1): 75-93.
- Flyvberg, B. and Richardson, T. (2002). Planning and Foucault: In search of the dark side of planning theory. Planning Futures: directions for planning theory. Tewdwr-Jones, A. P. and Tewdwr-Jones, M. (Ed.), Routledge, London.
- Folke, C., Carpenter, S., Elmqvist, T., et al. (2002). Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations. Scientific Background Paper on Resilience for the process of The World Summit on Sustainable Development. The Environmental Advisory Council to the Swedish Government, Stockholm.
- Folke, C., Colding, J. and Berkes, F. (2003). Synthesis: building resilience and adaptive capacity in social-ecological systems. Navigating social-ecological systems: building resilience for complexity and change. Berkes, F., Colding, J. and Folke, C. (Ed.), Cambridge University Press, Cambridge.

- Folke, C., Hahn, T., Olsson, P., et al. (2005). Adaptive Governance of Social-Ecological Systems. Annual Review of Environment and Resources 30: 441-73.
- Forman, R. T. (1995). Land Mosaics: The Ecology of Landscapes and Regions. Cambridge University Press, Cambridge.
- Foster, C. H. W. (1984). Experiments in Bioregionalism: The New England River Basins Story. University Press of New England, London.
- Francis, G. (1981). Report of the Working Group on Biosphere Reserves - 28 April. The George Francis Collection. University of Waterloo, Waterloo.
- Francis, G. (1988). Institutions and ecosystem redevelopment in Great Lakes North America with reference to Baltic Europe. Ambio 17 (2): 106-11.
- Francis, G. (1991). Development of UNESCO/MAB's Global Network of Biosphere Reserves: Canada's Contribution to this Goal. Strengthening Biosphere Reserves in Canada. Heritage Resources Centre, Canada / MAB, Canadian Wildlife Federation, Wildlife Habitat Canada and University of Waterloo, Waterloo.
- Francis, G. (1992). Applying Landscape Ecology to Biosphere Reserves in Landscape Approaches to Wildlife and Ecosystem Management. Second Symposium of the Canadian Society for Landscape Ecology and Management, Polyscience Publications, University of British Columbia.
- Francis, G. (2003). Chapter 12: Governance for Conservation. Experiments in Consilience: Integrating Social and Scientific Responses to Save Endangered Species. Westley, F. R. and Miller, P. S. (Ed.), Island Press, Washington.
- Francis, G. (2004a). Biosphere Reserves in Canada: Ideals and some experience. Environments Winter edition: 27.
- Francis, G. (2004b). George Francis Fonds: A Chronology of Involvement in UNESCO Biosphere Reserves. Retrieved 09/11/06, from <http://www.clayoquotbiosphere.org/documents/csubr/Francis.pdf>.
- Francis, G. (2004c). Personal communication: Canadian Biosphere Reserve Program and complex adaptive systems, . Matysek, K.: Waterloo.
- Francis, G. (2004d). Personal communication: The Canadian Biosphere Reserve Program. Matysek, K.: Waterloo.
- Francis, G. and Whitelaw, G. (2001). Long Point Biosphere Reserve Periodic Review Report 2000. Canadian Biosphere Reserve Association, Waterloo.
- Francis, G. and Whitelaw, G. (2002). Niagara Escarpment Biosphere Reserve Periodic Review. CBRA Biosphere Reserve Reviews. Canada MAB and the Canadian Commission for UNESCO, Waterloo, Ontario: 113.
- Francis, G. and Whitelaw, G. (2004). Biosphere Reserves in Canada: An introduction. Environments 32 (3): 1-2.
- Fraser, R. (2002). Mount Arrowsmith Biosphere Reserve - A cooperation plan. Canadian Biosphere Reserves Association, Parksville, Canada: 46.
- Fraser, R. and Jamieson, G. (2003). Community environmental education: Challenges within the biosphere reserve concept. Prospects 33 (3): 293-302.
- Fredrickson, H. G. (1999). The Repositioning of American Public Administration. PS: Political Science and Politics 32 (4): 701-11.
- Friedmann, J. (1987). Chapter 5: Planning as Social Learning. Planning in the public domain: From knowledge to action(Ed.), Princeton University Press, Princeton.



- Frost, P. (2001). Urban Biosphere Reserves: Re-integrating people with the natural environment. Town and Country Planning 70 (7/8): 4.
- German MAB National Committee (2005). Full of Life - UNESCO Biosphere Reserves: Models Regions for Sustainable Development. Springer, Bonn.
- Gibbs, D. and Jonas, A. E. (2000). Governance and regulation in local environmental policy: The utility of a regime approach. Geoforum 31 (3): 299-313.
- Gibson, R. B. (2004). Exploration of the role of citizen engagement in governance for socio-ecological sustainability: conceptual framework and case studies. Canadian Social Sciences and Humanities Research Council (SSHRC) funding application,
- Gillham, B. (2000). Case Study Research Methods. Continuum Publishers, London.
- Glaser, B. G. (1978). Theoretical sensitivity: advances in the methodology of grounded theory. Sociology Press, Mill Valley, California.
- GLCU. (2007). Gondwana Link. Retrieved 26/09/07, from <http://www.gondwanalink.org/>.
- Goldsmith, E., Allen, R., Allaby, M., et al. (1972). A Blueprint for Survival. Penguin Books, London.
- Goldstein, B. E. (1999). Combining science and place-based knowledge: Pragmatic and visionary approaches to bioregional understanding. Bioregionalism. McGinnis, M. V. (Ed.), Routledge, London, England.
- Gondwana Link Coordination Unit. (2007). Gondwana Link. Retrieved 26/09/07, from <http://www.gondwanalink.org/>.
- Graham, J., Amos, B. and Plumptre, T. (2003). Governance Principles for Protected Areas in the 21st Century. The Fifth World Parks Congress. Institute on Governance, Parks Canada and the Canadian International Development Agency, Durban.
- Granovetter, M. (1973). The strength of weak ties. American Journal of Sociology 78: 1360-80.
- Gray, B. G. (1989). Collaborating: Finding Common Ground for Multiparty Problems. Jossey-Bass, San Francisco.
- Gregg Jr., W. P., Krugman, S. and Wood Jr., J. D. (1989). Worldwide Conservation Congress. Proceedings of the Symposium on Biosphere Reserves, Fourth World Wilderness Congress, September 14-17, Department of the Interior, National Park Service, Estes Park, Colorado.
- Gregg, W. (1984). Multiple Site Biosphere Reserves for Better Management of Regional Ecosystems. Proceedings of the Workshop on Biosphere Reserves and Other Protected Areas for Sustainable Development of Small Caribbean Islands, Virgin Island U.S Department of Interior, National Park Service, Virgin Islands National Park, Canteel Bay.
- Gregg, W. (1998). Environmental Policy, Sustainable Societies and Biosphere Reserves. Ecosystem Management for Sustainability: Principles and Practices Illustrated by a Regional Biosphere Reserve Cooperative. Peine, J. D. (Ed.), Lewis Publishers, Boca Raton, Florida.
- Gregg, W. and McGean, B. A. (1985). Biosphere Reserves: Their history and promise. Orion 4 (3): 41-51.
- Gunderson, L. and Holling, C. S. (2002). Panarchy: Understanding transformations in human and natural systems. Island Press, Washington.
- Gunderson, L. H., Holling, C. S. and Light, S. S., Eds. (1995). Barriers and Bridges to the Renewal of Ecosystems and Institutions. Columbia University Press, New York.
- GWWCE. (2007). Murray-Darling Basin (MDB) Water Budget Project. Retrieved 30/11/07, from <http://www.gewex.org/mdb.html>.

- Habermas, J. (1983). The Theory of Communicative Action. Beacon Press, London.
- Haines-Young, R. (2000). Sustainable development and sustainable landscapes: Defining a new paradigm for landscape ecology. Fenna 178 (2000): 7–14.
- Hajer, M. A. (1995). The Politics of Environmental Discourse: Ecological Modernisation and the Policy Process. Oxford University Press, Oxford.
- Halffter, G. (1981). The Mapimi Biosphere Reserve: Local participation in conservation and development. Ambio (2-3): 93-96.
- Hammer, D. and Wildavsky, A. (1989). The Open-Ended, Semistructured Interview, An (Almost) Operational Guide Wildavsky's Craftways: On the Organization of Scholarly Work. Wildavsky, A. (Ed.), Transaction, New Brunswick, NJ.
- Hardin, G. (1968). The Tragedy of the Commons. Science 162 (1968): 1243-48.
- Hawken, P., Lovins, A. and Lovins, H. (1999). Natural Capitalism: Creating the next industrial revolution. Little, Brown and Co., Boston.
- Hawkins, V. and Selman, P. (2002). Landscape scale planning: exploring alternative land use scenarios. Landscape and Urban Planning 60: 211-24.
- Hay, P. (2002). Main Currents in Western Environmental Thought. University of New South Wales Press, Sydney.
- Healey, P. (1997). Collaborative Planning: shaping places in fragmented societies. Macmillan Press, London.
- Healey, P. (1998). Collaborative planning in a stakeholder society. Town Planning Review 69 (1): 1-22.
- Hinote, H. (1999). Framework for Integrated Ecosystem Management: The Southern Appalachian Man and the Biosphere Cooperative. Ecosystem Management for Sustainability: Principles and practices illustrated by a regional Biosphere Reserve cooperative. Peine, J. D. (Ed.), Lewis Publishers, Boston.
- Holland, K. M. and Morton, F. L. (1996). Federalism and the Environment: Environmental Policymaking in Australia, Canada and the United States. Greenwood Press, Westport, Connecticut.
- Holling, C. S. (1973). Resilience and stability of ecological systems. Ecology and Society 11 (1): 12.
- Holling, C. S. (1978). Adaptive environmental assessment and management. John Wiley, New York.
- Holling, C. S. (1986). The resilience of terrestrial ecosystems: local surprise and global change. Sustainable development of the Biosphere. Clarkland, W. C. and Munn, R. E. (Ed.), Cambridge University Press, Cambridge.
- Holling, C. S. (1987). Simplifying the Complex: the paradigms of ecological function and structure. European Journal of Operational Research 30: 139-46.
- Holling, C. S. (1995). What barriers? What bridges? Barriers and bridges to the renewal of ecosystems and institutions. Gunderson, L., Holling, C. S. and Light, S. (Ed.), Columbia University Press, New York.
- Holling, C. S. (2001). Understanding the complexity of economic, ecological and social systems. Ecosystems 4: 390-405.
- Holling, C. S. and Meffe, G. K. (1996). Command and Control and the pathology of natural resource management. Conservation Biology 10: 328-37.

- Hounsell, S. (2001). Ontario Power Generation's Carbon Sequestration and Biodiversity Monitoring Program – Working With Nature to Mitigate Greenhouse Gas Emissions, . Leading Edge Biosphere Conference. Niagara Escarpment Commission, Burlington.
- Howlett, M. and Raynor, J. (2006). Convergence and Divergence in 'New Governance' Arrangements: Evidence from European Integrated Natural Resource Strategies. Journal of Public Policy 26 (2): 167-89.
- Huberman, A. M. and Miles, M. B. (2002). The Qualitative Researcher's Companion. Sage Publications, Thousand Oaks, California.
- Hugo, G. P. Smailes, P. Macgregor, C. Fenton, M. and Brunckhorst, D. (2001). Defining social catchments in non metropolitan Australia. Bureau of Rural Sciences, Australia.
- Hyman, G. (2005). The Mornington Peninsula Western Port Biosphere Reserve: Community cooperation for sustainable futures. Masters thesis. University of Sorbonne, Paris.
- Imperial, M. T. (1999). Institutional analysis and ecosystem-based management: the institutional analysis and development framework. . Environmental Management 24: 449-65.
- International Council for Local Environmental Initiatives, The International Development Research Centre and The United Nations Environment Programme (1996). The Local Agenda 21 Planning Guide: An introduction to sustainable development planning. The United Nations Environment Programme, Toronto, Canada.
- IUCN (1995). Evaluation of the Implementation of the 1984 Action Plan for Biosphere Reserves. UNESCO, Paris.
- IUCN (2000). Application of IUCN Protected Area Management Categories - Draft Australian Handbook. WCPA Australia and New Zealand Region.
- IUCN (2003). Vth IUCN World Parks Congress - Benefits Beyond Boundaries. World Conservation 2 (2003): 32.
- IUCN. (2004). The IUCN Protected Area Management Categories. Retrieved 10/08/04, from [http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/pascat/pascatrev\\_info3.pdf](http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/pascat/pascatrev_info3.pdf).
- IUCN. (2007a). Protected Area Categories Summit, Alm ria Spain, 7-11 May 2007 - The Summit. Retrieved 04/10/07, from <http://iucn.org/themes/wcpa/theme/categories/summit/summit.html>.
- IUCN. (2007b). News Release: 3rd IUCN World Conservation Congress shows know-why and know-how for conservation and development. Retrieved 04/10/07, from <http://www.iucn.org/congress/2004/documents/press/2004-11-25-closing.htm>.
- IUCN WCPA, Ed. (2005). The Protected Landscape Approach: Linking nature, culture and community. IUCN, Gland.
- Jamieson, G. (2003). Efforts to fund and empower local communities in conservation of existing protected areas: the Mount Arrowsmith Biosphere Reserve, British Columbia, example. Retrieved 29/10/07, from [http://www.unesco.org/mab/BRs/q\\_e/Oceansidedollars.pdf](http://www.unesco.org/mab/BRs/q_e/Oceansidedollars.pdf).
- Jamieson, G. (2004). Personal communication: Mt. Arrowsmith Biosphere Reserve. Matysek, K.: Parksville.
- Jamieson, G., Francis, G., Whitelaw, G., et al. (2008). Canadian Biosphere Reserve Approaches to the Achievement of Sustainable Development. International Journal of Environment and Sustainable Development Special Issue on Biosphere Reserves (In Press).
- Janssen, M. A. (2002). A future of surprises. Panarchy: Understanding transformations in human and natural systems. Gunderson, L. and Holling, C. S. (Ed.), Island Press, Washington, D.C.

- Janssen, M. A., Bodin, O., Anderies, J. M., et al. (2006). Toward a Network Perspective of the Study of Resilience in Social-Ecological Systems. Ecology and Society 11 (1): 15.
- Kay, J. H., Regier, H., Boyle, M., et al. (1999). An ecosystem approach for sustainability: addressing the challenge of complexity. Futures 31 (7): 721-42.
- Kearns, A., Barnett, G., Matysek, K., et al. (2006). CSIRO Submission to the Legislative Assembly of the Australian Capital Territory Standing Committee on Planning and Environment - Inquiry into the proposed nomination of the ACT as a UNESCO Biosphere Reserve. Issues Paper. Commonwealth Scientific, Industrial and Research Organisation, Canberra.
- Kellert, S. R. (1986). Public Understanding and Appreciation of the Biosphere Reserve Concept. Environmental Conservation 13 (2): 101-05.
- Kinzig, A. (2001). Bridging disciplinary divides to address environmental and intellectual challenges. Ecosystems 4: 709-15.
- Knudtson, P. and Suzuki, D. (1993). Wisdom of the Elders: Sacred Native Stories of Nature. Bantam, New York.
- Kooiman, J., Ed. (1993). Modern Governance: New Government-Society Interactions. Sage Publications, Thousand Oaks, California.
- Kriwoken, L. K. (1989). Australian Marine Protected Area Policy: Towards a National System of Marine Biosphere Reserves. PhD. University of Tasmania, Hobart.
- Krugman, S. and Gregg, W. (1988). Proceedings of the Symposium on Biosphere Reserves. Symposium on Biosphere Reserves, Department of the Interior Science Publications Office, Atlanta.
- Kusova, D., Tesitel, J., Matejka, K., et al. (2007). Biosphere reserves - An attempt to form sustainable landscapes: A case study of three biosphere reserves in the Czech Republic. Landscape and Urban Planning 84 (1): 38-51.
- Kvale, S. (1996). Interviews: An introduction to qualitative research interviewing. Sage Publications, Thousand Oaks, California.
- Lafferty, W. M. (1998). The Politics of Sustainable Development: Global Norms for National Implementation. Debating the Earth: The Environmental Politics Reader. Dryzek, J. S. and Schlosberg, D. (Ed.), Oxford University Press, New York.
- Lane, M. B. (2001). Affirming New Directions in Planning Theory: Co-management of Protected Areas. Society and Natural Resources 14: 657-71.
- Lau, L. and Pasquini, M. W. (2004). Meeting grounds: perceiving and defining interdisciplinarity across the arts, social sciences and sciences. Interdisciplinary Science Reviews 29 (1): 49-64.
- Laurance, W. F. and Gascon, C. (1997). How to Creatively Fragment a Landscape. Conservation Biology 11 (2): 577-79.
- Lee, K. N. (1993). Greed, scale mismatch and learning. Ecological Applications 3: 560-64.
- Legendre, L. (2004). Science, culture and (eco-)ethics. Ethics in Science and Environmental Policy 2004 (1): 13-23.
- Lerner, S. (2004). Networking Possibilities: Learning together for sustainable development. Environments 32 (3): 91 - 93.
- Levin, S. (1998). Ecosystems and the Biosphere as Complex Adaptive Systems. Ecosystems 1: 431-36.
- Lincoln, Y. S. and Guba, E. G., Eds. (1985). Naturalistic Inquiry. Sage Publications, Newbury Park, California.

- Linschoten, R. (2003). Cascades and waterfalls of Hamilton. Hamilton Conservation Authority, Hamilton.
- Lipschutz, R. D. (1999). Bioregionalism, civil society and global environmental governance. Bioregionalism. McGinnis, M. V. (Ed.), Routledge, New York.
- Lipschutz, R. D. and Mayer, J. (1996). Global Civil Society and Global Environmental Governance: The Politics of Nature from Place to Planet. State University of New York Press, Albany.
- Lipschutz, R. D. and Conca, K., Eds. (1993). The State and Social Power in Global Environmental Politics. Columbia University Press, New York.
- Lobel, L., Anderies, J. M., Campbell, B., et al. (2006). Governance and the Capacity to Manage Resilience in Regional and Social-Ecological Systems. Ecology and Society 11 (1): 19.
- Locke, H. and Dearden, P. (2005). Rethinking protected area categories and the new paradigm. . Environmental Conservation 32: 1-10.
- Lockwood, M. (2007). Personal communication: Protected Areas. Matysek, K.: Hobart.
- Lockwood, M., Worboys, G. and Kothari, A., Eds. (2006). Managing Protected Areas: A Global Guide. Earthscan, London.
- Long Point World Biosphere Reserve Foundation (1996). Monitoring at Long Point, Ontario. Long Point World Biosphere Reserve Foundation,, Port Rowan, Ontario.
- Long Point World Biosphere Reserve Foundation (2002). Long Point Cooperation Plan to Establish Comprehensive Community Environmental Monitoring and Reporting Mechanisms. EMAN, Burlington.
- Long Point World Biosphere Reserve Foundation (2004). LPWBRF Director's Retreat. Long Point World Biosphere Reserve Foundation Director's Retreat, Simcoe, Ontario.
- Looker, M. (2004). Proposed Barkindji Biosphere Reserve - Australian Biosphere Reserve News June 2004. Retrieved 03/07/04, from <http://www.deh.gov.au/parks/biosphere/working/pubs/bionews-june2004.pdf>.
- Ludwig, D., Mangel, M. and Haddad, B. (2001). Ecology, conservation and public policy. Annual Review of Ecology and Systematics 32 (481-517).
- Lukiv, D. (2004). AE-Extra July-August 2004 - Article 1. Retrieved 30/10/06, from [http://72.14.253.104/search?q=cache:3Uf-lr\\_GexoJ:asstudents.unco.edu/students/AE-Extra/2004/7/Art-1.html+%E2%80%98Qualitative+interview+data+speaks,+in+the+same+sense+that+a+poem+speaks,+about+meaning,+about+thematic+statements%E2%80%99.&hl=en&gl=au&ct=clnk&cd=1](http://72.14.253.104/search?q=cache:3Uf-lr_GexoJ:asstudents.unco.edu/students/AE-Extra/2004/7/Art-1.html+%E2%80%98Qualitative+interview+data+speaks,+in+the+same+sense+that+a+poem+speaks,+about+meaning,+about+thematic+statements%E2%80%99.&hl=en&gl=au&ct=clnk&cd=1) >.
- Malpas, J. (1999). Place and Experience: a philosophical topography. Cambridge University Press, Cambridge.
- Martin, V., Ed. (1988). For the Conservation of the Earth. International Wilderness Leadership Foundation, Colorado.
- Martinez, T. A. and McMullin, S. L. (2004). Factors Affecting Decisions to Volunteer in Nongovernmental Organisations Environment and Behavior 36 (1): 112-26.
- Martino, D. (2005). Unleashing the wild: response to Locke and Dearden's 'rethinking protected area categories' Environmental Conservation 32 (3): 195-96.
- Mason, J. (1996). Planning and designing qualitative research. Qualitative Research(Ed.), Sage Publications, London.

- Matysek, K. (2005). A UNESCO Program for Local Sustainability, Good Governance and Community Partnerships. Planning Institute of Australia National Congress 2005, PIA, Melbourne, Australia.
- Matysek, K., Stratford, E. and Kriwoken, L. K. (2006). The UNESCO Biosphere Reserve Program in Australia: Constraints and opportunities for localised sustainable development. Canadian Geographer 50 (1): 85-100.
- Matysek, K. A. (2001). Nature-based and Ecotourism Accreditation: The Tasmanian Experience. Honours thesis. University of Tasmania, Hobart.
- McCarthy, D., Whitelaw, G., Jongerden, P., et al. (2006). Sustainability, social learning and the Long Point World Biosphere Reserve. Environments 34 (2).
- McCloskey, D. D. (1999). A Bioregion is a Life-Place. Retrieved 29/7/03, from <http://www.olywa.net/speech/may99/mccloskey.html>.
- McCormick, J. (1989). Reclaiming Paradise: The Global Environmental Movement. Indiana University Press, Indianapolis, U.S.
- McDonald, A. (2004). Personal communication: Mornington Peninsula Western Port Biosphere Reserve. Matysek, K.: Melbourne.
- McGinnis, M. V., Ed. (1999). Bioregionalism. Routledge, London.
- McKinney, M., Fitch, C. and Harmon, W. (2002). Regionalism in the West: An inventory and assessment. Public Land and Resources Law Review: 20.
- McLaughlin, L. and Hilts, S. (1999). Monitoring Accuracy and the Decomposition of Error Committed by Volunteers in a Wetland Wildlife Monitoring Program,. Leading Edge Conference Niagara Escarpment Commission, Burlington.
- MEAFEC (1999). Minutes of the Mornington Peninsula Biosphere Concept Meeting. 11 June 1999.
- Mendis-Millard, S. (2007). How can Biosphere Reserves help rural communities adapt to change. PhD Thesis. University of Waterloo, Waterloo.
- Miller, K., Allegretti, N., Johnson, N., et al. (1991). Measures for conservation and sustainable use of biodiversity. Global Biodiversity Assessment. Heywood, V. H. (Ed.), Cambridge University Press, Cambridge.
- Mol, A. P. J. and Van Den Burg, S. (2004). Local Governance of Environmental Flows in Global Modernity. Local Environment 9 (4): 317-24.
- Moon, J. (unknown). Business Social Responsibility and Multi-level Governance: An institutional approach. School of Law, Governance and Information Management, University of North London, London, England.
- Moore, S. A. and Rockloff, S. F. (2006). Organising Regionally for Natural Resource Management in Australia: Reflections on Agency and Government. Journal of Environmental Policy and Planning 8 (3): 259-77.
- Morris, I. (2002). Personal communication: Australian Biosphere Reserves and the MPWPBR. Matysek, K.: Frankston.
- Moss, M. R. and Milne, R. J. (1998). Biophysical processes and bioregional planning: The Niagara Escarpment of southern Ontario, Canada. Landscape and Urban Planning 40: 251-68.
- Mount Arrowsmith Biosphere Reserve Foundation (2002). Mount Arrowsmith Biosphere Reserve - Pamphlet. Mount Arrowsmith Biosphere Foundation, Parksville, British Columbia, Canada.
- Mount Arrowsmith Biosphere Reserve Foundation. (2004). The Mount Arrowsmith Biosphere Reserve. Retrieved 02/12/04, from <http://www.mountarrowsmithbiosphere.ca/>.

- MPSC. (2004). Mornington Peninsula Shire - Sustainable Peninsula - Biosphere. Retrieved 02/10/04, from <http://www.mornpen.vic.gov.au/content/content.asp?cid=685&tid=685&tpid=620&sid=&spid=&cnid=1924>.
- MPSC, Phillip Island Nature Park, RMIT, et al. (2002). The Mornington Peninsula Western Port Biosphere Reserve - Stage 1 Nomination. Mornington Peninsula Shire Council, Melbourne.
- MPWPBRF (2003). Mornington Peninsula Western Port Biosphere Reserve Charter, Melbourne.
- MPWPBRF. (2007a). A Living Strategic Plan 2007-2011. Retrieved 11/09/07, from <http://www.biosphere.org.au/documents/livingstrategy250107.pdf>.
- MPWPBRF. (2007b). Mornington Peninsula-Western Port Biosphere. Retrieved 12/10/07, from <http://www.biosphere.org.au/index.html>.
- Muldoon, J. (2003). Personal communication: In-person discussion of Australian Biosphere Reserves. Matysek, K.: Canberra.
- Murtough, G., Aretino, B. and Matysek, A. (2002). Creating Markets for Ecosystem Services. Productivity Commission Staff Research Paper, Canberra.
- Murzin, R. (2004). Personal communication: The Niagara Escarpment and its Biosphere Reserve, in the context of the Niagara Escarpment Commission. Matysek, K.: Georgetown.
- Nauber, J. (2005). World Network of Biosphere Reserves. Full of Life - UNESCO Biosphere Reserves: Model Regions for Sustainable Development. German MAB National Committee (Ed.), Springer, Bonn.
- Naveh, Z. (2000). What is holistic landscape ecology? A conceptual introduction. Landscape and Urban Planning 50: 7-26.
- NEC and CBRA (2002). A Cooperation Plan for the Niagara Escarpment Biosphere Reserve, Georgetown.
- Nelson, G. (2004). Editorial. Environments 32 (3): v.
- Nelson, J. G. and Wilcox, K. (1996). Long Point Folio. Retrieved 10/02/05, from <http://www.kwic.com/~longpointbio/folio/content/content.htm>
- Newman, L. and Dale, A. (2005). Network structure, diversity, and proactive resilience building: a response to Tompkins and Adger. Ecology and Society 10 (1): 24.
- Niagara Escarpment Commission. (2008). About the Niagara Escarpment Biosphere Reserve. Retrieved 11/05/08, from [www.escarpment.org/biosphere/about\\_nebr.htm](http://www.escarpment.org/biosphere/about_nebr.htm).
- Niagara Escarpment Commission and Canadian Biosphere Reserves Association (2002). A Cooperation Plan for the Niagara Escarpment Biosphere Reserve, Georgetown, Canada.
- Norfolk County Planning Authority (2003). Norfolk County 2020 Plan. Norfolk County Planning Authority, Simcoe.
- Nozick, M. (1992). No Place Like Home: Building Sustainable Communities. Canadian Council on Social Development, Ottawa.
- OCF (1987). Our Common Future: World Commission on Environment and Development. Oxford University Press, Oxford.
- Oliver-Smith, A. (1996). Anthropological research on hazards and disasters. Annual Review of Anthropology 25: 303-28.



- Olsson, P. (2003). Building capacity for resilience in social-ecological systems. Stockholm University, Stockholm.
- Olsson, P. and Folke, C. (2001). Local ecological knowledge and institutional dynamics for ecosystem management: A study of Lake Racken watershed, Sweden. Ecosystems 4 (2): 85-104.
- Olsson, P., Folke, C., Galaz, V., et al. (2007). Enhancing the Fit through Adaptive Co-management: Creating and Maintaining Bridging Functions for Matching Scales in the Kristianstads Vattenrike Biosphere Reserve, Sweden Ecology and Society 12 (1): 28.
- Olsson, P., Gunderson, L., Carpenter, S., et al. (2006). Shooting the Rapids: Navigating Transitions to Adaptive Governance of Social-Ecological Systems. Ecology and Society 11 (1): 18.
- Olsson, P., Hahn, T. and Folke, C. (2004). Social-ecological transformation for ecosystem management: The development of adaptive co-management of a wetland landscape in southern Sweden. Ecology and Society 9 (4): 2.
- Ostrom, E. (1990). Governing the Commons: The evolution of institutions for collective action. Cambridge University Press, Cambridge.
- Ostrom, E. (1996). Crossing the great divide: coproduction, synergy, and development. . World Development 24: 1073-87.
- Ostrom, E. (1998). Scales, polycentricity and incentives: Designing complexity to govern complexity. Protection of global biodiversity: converging strategies. Guruswamy, L. D. and McNeely, J. A. (Ed.), Duke University Press, Durham.
- Pakulski, J. and Tranter, B. (2004). Environmentalism and social differentiation: A paper in memory of Steve Crook. Journal of Sociology 40 (3): 221-35.
- Parisi, D., Taquino, M., Grice, S. M., et al. (2004). Civic responsibility and the environment: Linking local conditions to community environmental activeness. Society & Natural Resources 17: 97-112.
- Parker, P. (1993). Biosphere Reserves in Australia: A Strategy for the Future. Australian Nature Conservation Agency, Canberra: 44.
- Parker, P. (1994). Australia's Biosphere Reserves: A Report. Australian Nature Conservation Agency, Canberra.
- Parker, P. (2004). Personal communication: Interview regarding the Bookmark Biosphere Reserve. Matysek, K.: Renmark.
- Parks Canada. (2004). National Roundtable on the Environment and Economy, Conservation Documents, Clayoquot Sound Biosphere Reserve. Retrieved 03/10/04, from [http://www.nrtee-trnee.ca/eng/programs/Current\\_Programs/Nature/Case-Studies/Clayoquot-Case-Study-Complete\\_e.htm](http://www.nrtee-trnee.ca/eng/programs/Current_Programs/Nature/Case-Studies/Clayoquot-Case-Study-Complete_e.htm).
- Patton, M. (2002). Qualitative research & evaluation methods. Sage Publications, Thousand Oaks, California.
- Peine, J. D., Ed. (1999). Ecosystem Management for Sustainability: Principles and Practices Illustrated by a Regional Biosphere Reserve Cooperative. Lewis Publishers, Boston.
- Pfueller, S. (2008). Role of Bioregionalism in Bookmark Biosphere Reserve, South Australia. Environmental Conservation 35: 173-86
- Phillips, A. (1997). Working Landscapes and Protected Areas: The Agenda for the 21st Century. Linking Protected Areas with Working Landscapes Conserving Biodiversity - Proceedings of the Third International Conference on Science and Management of Protected Areas, Science and Management of Protected Areas Association, Nova Scotia.
- Phillips, A. (2003). Turning Ideas on their Heads: The New Paradigm for Protection Areas. The George Wright Forum 20 (2).



- Phillips, A. (2007). A Short History of the International System of Protected Areas Management Categories. IUCN World Commission on Protected Areas Task Force: IUCN Protected Area Categories. IUCN/ WCPA, Andalusia.
- Plant, C. and Plant, J., Eds. (1992). Putting Power In Its Place: Create Community Control. New Society Publishers, Gabriola Island.
- Ploger, J. (2001). Public participation and the art of governance. Environment and Planning B: Planning and Design 28: 219-41.
- Pollock, R. (2004). Identifying Principles for Place-Based Governance in Biosphere Reserves. Environments 32 (3): 27-41.
- Pollock, R. M., Reed, M. G. and Whitelaw, G. S. (2008). Steering governance through regime formation at the landscape scale: evaluating experiences in Canadian biosphere reserves. Transforming Parks and Protected Areas: Policy and Governance in a Changing World. Hanna, K. S., Clark, D. A. and Slocombe, D. S. (Ed.), Routledge, New York.
- Potschin, M. B. and Haines-Young, R. H. (2006). Editorial - Landscapes and Sustainability. Landscape and Urban Planning 75: 155-61.
- Pretty, J. and Frank, B. R. (2000). Participation and social capital formation in natural resource management: achievements and lessons. Changing Landscapes, Changing Futures. International Landcare Conference, Melbourne.
- Price, M. F. (1996). People in Biosphere Reserves: An evolving concept. Society and Natural Resources 9 (6): 645-54.
- Price, M. F. (2000). The Impact of the Periodic Review of Biosphere Reserves: Towards ensuring a strong World Network. Seville +5 International Meeting of Experts, UNESCO / MAB, Pamplona.
- Pulsford, I., Worboys, G. and Knight, A. (2007). From the Australian Alps to Atherton (A2A) and beyond – progress in establishing Australia's first continental scale mountain connectivity conservation initiative. Proceedings of the Biodiversity Extinction Crisis Conference - A Pacific Response, Society for Conservation Biology, Sydney.
- Raberg, P., Ed. (1997). The Life Region: The Social and Cultural Ecology of Sustainable Development. Routledge, London.
- Raco, M. and Flint, J. (2001). Communities, places and institutional relations: Assessing the role of area-based community representation in local governance. Political Geography 20: 585-612.
- Ramsar. (1999). People and Wetlands: The Vital Link - 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands. Retrieved 31/08/04, from [http://www.ramsar.org/key\\_guide\\_list\\_e.htm#i](http://www.ramsar.org/key_guide_list_e.htm#i).
- Ramsar. (2007). Ramsar - Status of the Convention. Retrieved 11/10/07, from [www.ramsar.org](http://www.ramsar.org).
- Ramsay, D. and Whitelaw, G. (1997). Biosphere Reserves and Ecological Monitoring as Part of Working Landscapes: The Niagara Escarpment Biosphere Reserve Experience. Linking Protected Areas with Working Landscapes Conserving Biodiversity, Science and Management of Protected Areas Association, Nova Scotia.
- Ravindra, M. M. (2004). A Road to Tomorrow: Local organizing for a biosphere reserve. Environments 32 (3): 43-59.
- Reaney, C. (2001). Advisory Committee of Niagara Escarpment Biosphere Reserve. Retrieved 13/03/04, from <http://www.biosphere-canada.ca/publications/newsletters-bulletins/13/art9.htm>.
- Reid, J. B., Hill, R. S., Brown, M. J., et al. (1999). Vegetation of Tasmania. Environment Australia, Hobart.

- Resilience Alliance. (2007a). Resilience. Retrieved 24/07/07, from <http://resalliance.org/576.php>.
- Resilience Alliance (2007b). Assessing and Managing Resilience in Social-Ecological Systems: A Practitioners Workbook. The Resilience Alliance,
- Ritchey-Vance, M. (1996). Social Capital, sustainability and working democracy: New yardsticks for grassroots development. Grassroots Development 20: 3-9.
- Robbins, W. G., Spence, M. and Dant Ewart, S. (2002). Beyond Place: A Forum. Oregon Historical Quarterly 103 (4): 414 - 19.
- Robertson-Vernhes, J. (1987). Biosphere Reserves: the Beginnings, the Present, and the Future Challenges. Fourth World Wilderness Congress Worldwide Conservation - The Symposium on Biosphere Reserves, U.S Department of the Interior, National Park Service, Estes Park, Colorado.
- Roots, F. (2004). Personal communication: Canadian Commission to UNESCO and Canadian Biosphere Reserve Program. Matysek, K.: Victoria.
- Roots, J. M. (1989). Biosphere Reserves in Canada: Current Status and Future Prospects. Masters. Dalhousie University, Nova Scotia.
- Roseland, M. (1992). Toward Sustainable Communities: A Resource Book for Municipal and Local Governments. National Round Table on the Environment and the Economy, Ottawa.
- Roseland, M. (1997a). Dimensions of the Eco-City. Cities 14 (4): 197-202.
- Roseland, M., Ed. (1997b). Eco-City Dimensions: Healthy Communities, Healthy Planet. New Society Publishers, Gabriola Island.
- Rosendal, G. K. (1991). International Conservation of Biodiversity: A quest for effective international solutions. The Fridtjof Nansen Institute, Lysaker.
- Ross, J., Lowe, K. W., Boyle, C., et al. (2003). Landscape plans for the eastern zones in the Victorian Volcanic Plain bioregion. Parks, Flora and Fauna Division. Department of Sustainability & Environment, Melbourne.
- Ruttan, N. (2004). Are Biosphere Reserves the missing link in Canada's move towards a more sustainable society? Environments 32 (3): 107-10.
- Rydin, Y. and Holman, N. (2004). Re-evaluating the Contribution of Social Capital in Achieving Sustainable Development. Local Environment 9 (2): 117-33.
- Rydin, Y. and Pennington, M. (2000). Public Participation and Local Environmental Planning: the collective action problem and the potential of social capital. Local Environment 5 (2): 153-69.
- San Blas Alvarez, A. (2002). Innovation and Information Society in Island Biosphere Reserves. La Palma International Conference on Island Biosphere Reserves, Cabildo Insular de La Palma, Ministerio de Medio Ambiente, Gobierno de Canarias, Santa Cruz de la Palma, Canary Islands.
- Sarkissian, W. (2004). An inclusionary model for community consultation. Retrieved 05/04/08, from [www.sarkissian.com.au/downloads.html](http://www.sarkissian.com.au/downloads.html).
- Scheffran, J. and Stoll-Kleeman, S. (2003). Participatory Governance in environmental Conflict resolution: Developing a framework of sustainable action and interaction. Transition towards sustainable development in South Asia. Deb, K. and Srivastava, L. (Ed.), The Energy and Resources Institute, New Delhi.
- Schusler, T. M., Decker, D. J. and Pfeffer, M. J. (2003). Social learning for collaborative natural resource management. Society & Natural Resources 16: 309-26.
- Scott, J. and Trubek, D. (2002). Mind the Gap: Law and New Approaches to Governance in the European Union. European Law Journal 8 (1): 1-18.

- Selman, P. (2001). Social Capital, Sustainability and Environmental Planning. Planning Theory and Practice 2 (1): 13-30.
- Selman, P. (2002). Multi-function Landscape Plans: a missing link in sustainability planning? Local Environment 7 (3): 283-94.
- Senge, P. M. (1992). The Fifth Discipline: The Art and Practice of the Learning Organisation. Random House Australia, Sydney.
- Shannon, M. A. (1998). Understanding social organizations and institutions. River ecology and management: Lessons from the Pacific coastal ecoregion Naiman, R. J. and Bilby, R. E. (Ed.), Springer, New York.
- Sherif, M. (1958). Superordinate goals in the reduction of intergroup conflict. American Journal of Sociology 63: 349–56.
- Silverman, D. (2000). Doing qualitative research: A practical handbook. Thousand Oaks and Sage Publications, London and New Delhi.
- Slocombe, D. S. (1993). Implementing ecosystem-based management. BioScience 43 (9): 612 -.
- Slocombe, D. S. (2004). Personal communication: Biosphere Reserves and Protected Areas in Canada. Matysek, K.: Waterloo.
- Slocum, R. L., Wichart, L., Rocheleau, D., et al., Eds. (1995). Power, process and participation: tools for change. Intermediate Technology Publications, Exeter.
- Smart Growth Network and International City / County Management Association (2002). Getting to Smart Growth: 100 policies for Implementation. ICMA, California.
- Smismans, S. (2006). European Governance Papers: New Modes of Governance and the Participatory Myth. Eurogov.
- Smith, K. (2004). Personal communication: Bookmark Biosphere Reserve. Matysek, K.: Berri.
- Smith, R. S., Herman, T. and Bondrup-Nielson, S. (2002). Globalisation and Protected Areas: A Stakeholders' Roundtable Discussion. Managing Protected Areas in a Changing World, Parks Research Forum of Ontario, Wolfville, Nova Scotia.
- Solecki, W. D. (1994). Putting the Biosphere Reserve Concept into Practice: Some evidence of the impacts in rural communities in the United States. Environmental Conservation 21 (3): 242-47.
- Solecki, W. D. and Rosenzweig, C. (2001). Biodiversity and the City: A Case Study of the New York Metropolitan Region. Retrieved 12/02/03, from [http://prfamerica.org/biodiversity\\_and\\_the\\_city.html](http://prfamerica.org/biodiversity_and_the_city.html).
- Sparling, E. (2001). Implementing the Biosphere Reserve ideal in a linear, multi-agency, urban fringe landscape: Opportunities and challenges on the Niagara Escarpment. Master of Arts. University of Toronto, Toronto.
- Stake, R. E. (2000). Case Studies. Handbook of Qualitative Research - Second Edition. Denzin, N. K. and Lincoln, Y. S. (Ed.), Sage Publications, Thousand Oaks.
- Starik, M. (2004). Toward a Multi-Level, Multi-Systems Approach to Sustainability Governance and Outcomes. Retrieved 01/02/05, from <http://www.innovation-enterprise.com/6.2/6.2.5.php>.
- Stedman, R. C. (2003). Is it really just a social construction?: The contribution of the physical environment to sense of place. Society & Natural Resources 16: 67-86.
- Stockholm Resilience Centre (2009). Philosophy of Science for Interdisciplinary Environmental Research,

- Stokes, P., Havas, M. and Bridges, T. (1990). Public Participation and Volunteer Help in Monitoring Programs: An Assessment. Environmental Monitoring and Assessment 15: 225-29.
- Stoll-Kleeman, S. (2005). Ways towards a more sustainable natural resources management and governance – An integrative and transdisciplinary analysis. Habilitationsschrift an der Humboldt-Universität zu Berlin, Berlin.
- Stratford, E. and Davidson, J. (2002). Capital Assets and intercultural borderlands: Socio-cultural challenges for natural resource management. Journal of Environmental Management 66: 429-40.
- Tansey, O. (no date). Process Tracing and Elite Interviewing: A Case for Non-probability Sampling. Retrieved 08/10/07, from <http://www.nuffield.ox.ac.uk/Politics/papers/2006/tansey.pdf>.
- Taschereau, P. M. (1985). The Status of Ecological Reserves in Canada. The Canadian Council on Ecological Areas and the Institute for Resource and Environmental Studies, Dalhousie University, Halifax: 120.
- Taylor, M. (2000). Communities in the Lead: Power, Organisational Capacity and Social Capital. Urban Studies 37 (5-6): 1019-35.
- Taylor, P. (2004). Resilience and Biosphere Reserves. Environments 32 (3): 79-90.
- Thackway, R., Szabo, S. and Smyth, D. (1996). Indigenous Protected Areas: a new concept in biodiversity conservation. Biodiversity: Broadening the Debate Longmore, R. (Ed.), Australian Nature Conservation Agency, Canberra.
- Thayer, R. L. (2003). LifePlace: Bioregional Thought and Practice. University of California Press, Los Angeles, California.
- The Encyclopedia of Earth. (2007). Southwest Wilderness, Tasmania. Retrieved 18/10/07, from [http://www.eoearth.org/article/Tasmanian\\_Wilderness\\_Australia](http://www.eoearth.org/article/Tasmanian_Wilderness_Australia).
- The Fitzgerald Biosphere Marketing Association (2004). Fitzgerald Biosphere Lamb and Yabbie Feasibility Study and Marketing Assessment Trial. The Fitzgerald Biosphere Marketing Association, Jerramungup: 3.
- The Nature Conservancy. (2007). The Nature Conservancy. Retrieved 25/07/07, from [www.nature.org](http://www.nature.org).
- Thiele, K. R. and Prober, S. M. (1999). Reserve concepts and conceptual reserves: Options for the protection of fragmented ecosystems. Temperate Eucalypt woodlands in Australia: Biology, conservation, restoration and management. Hobbs, R. J. and Yates, C. J. (Ed.), Surrey Beatty, Chipping Norton.
- Thiele, K. R., Prober, S. M., Higginson, E., et al. (2002). Conservation management networks: A working national framework for their establishment and operation. Discussion paper prepared in conjunction with the National Workshop on Conservation Management Networks. Environment Australia,
- Thomas, A. (1989). Trembling Horizon: The story of an important place - the Fitzgerald Biosphere Project Area. EPA WA, The Australian National Commission for UNESCO, Alcoa of Australia, Jerramungup.
- Tress, B., Tress, G. and Fry, G. (2005). Key steps for reaching integration. From Landscape Research to Landscape Planning: Aspects of Integration, Education and Application. Tress, B., Tress, G., Fry, G. and Opdam, P. (Ed.), Springer, Wageningen.
- Trist, E. (1983). Referrent Organisations and the Development of Inter-Organisational Domain. Human Relations 36: 269-84.
- UNDP. (2007). United Nations Development Program. Retrieved 24/08/07, from <http://www.undp.org/about/>.

UNEP - CBD. (2007a). Convention on Biological Diversity - Conference of the Parties. Retrieved 04/10/07, from <http://www.cbd.int/convention/cops.shtml>.

UNEP - CBD. (2007b). COP Decisions. Retrieved 04/10/07, from <http://www.cbd.int/convention/cops.shtml>.

UNEP. (2007). United Nations Environment Program. Retrieved 24/08/07, from <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=43>.

UNESCO (1969). Final Report of the International Conference of Experts on the Scientific Basis for Rational Use and Conservation of the Resources of the Biosphere (The Biosphere Conference). UNESCO, Paris.

UNESCO (1974). Final Report, task force on: Criteria and guidelines for the choice and establishment of biosphere reserves. MAB report series No.22. UNESCO. UNESCO, Paris.

UNESCO (1996). Biosphere reserves: The Seville Strategy and the Statutory Framework of the World Network. UNESCO, Paris.

UNESCO. (2000a). Appendix 4: The Unesco Man and the Biosphere (MAB) Programme's Seville +5 Recommendations for the establishment and functioning of Transboundary Biosphere Reserves Retrieved 30/08/07, from [http://www.iucn.org/bookstore/HTML-books/BP7-transboundary\\_protected\\_areas/Appendix4.html](http://www.iucn.org/bookstore/HTML-books/BP7-transboundary_protected_areas/Appendix4.html).

UNESCO (2000b). Solving the Puzzle: The Ecosystem Approach and Biosphere Reserves. UNESCO, Paris.

UNESCO. (2001a). Biosphere Reserves in a Nutshell. Retrieved 01/03/05, from <http://www.unesco.org/mab/nutshell.htm>.

UNESCO. (2001b). A forum managed by the Secretariat of the UNESCO Man and the Biosphere (MAB) Program. Retrieved 27/09/02, from [www.unesco.org/mab/urban/urbanhome.html](http://www.unesco.org/mab/urban/urbanhome.html).

UNESCO. (2002a). The Role of Wetlands in Biosphere Reserves. Retrieved 18/07/04, from <http://www.unesco.org/mab/cooperation/Ramsar/Czmeet2002.doc>.

UNESCO. (2002b). UNESCO - MAB Biosphere Reserves Directory - Biosphere Reserve Information - Australia, Southwest. Retrieved 19/08/02, from [www.unesco.org/mab/br/brdir/directory.html](http://www.unesco.org/mab/br/brdir/directory.html).

UNESCO. (2003). Urban Biosphere Reserves in the context of the Statutory Framework and the Seville Strategy for the World Network of Biosphere Reserves. Retrieved 16/12/03, from <http://www.unesco.org/mab/urban/UrbanGrpPolicyPaper.pdf>.

UNESCO. (2004a). The MAB Program - About MAB: Managing our Biosphere. Retrieved 08/08/04, from <http://www.unesco.org/mab/about.htm>.

UNESCO. (2004b). The MAB Program - Regional Networks - Australia. Retrieved 10/11/04, from <http://www2.unesco.org/mab/br/brdir/asia/Australiamap.htm>.

UNESCO. (2004c). The Seville Strategy for Biosphere Reserves. Retrieved 04/03/05, from <http://www.unesco.org/mab/docs/stry-4.htm>.

UNESCO. (2004d). World Heritage Convention. Retrieved 31/08/04, from <http://whc.unesco.org/pg.cfm?cid=160>.

UNESCO. (2004e). The MAB Program - Regional Networks - Europe and North America. Retrieved 10/11/04, from <http://www2.unesco.org/mab/br/brdir/europe-n/Canadapmap.htm>.

UNESCO. (2006a). The Seville Strategy for Biosphere Reserves. Retrieved 10/09/06, from <http://www.mabnet.org/publications/framework.html#ELE3>.

- UNESCO. (2006b). The Statutory Framework for Biosphere Reserves. Retrieved 10/09/06, from <http://www.mabnet.org/publications/framewk.html#ELE3>.
- UNESCO. (2006c). News and Events Archive. Retrieved 07/01/06, from [www.unesco.org/mab/news](http://www.unesco.org/mab/news).
- UNESCO. (2007a). Biosphere reserve integrated monitoring (BRIM): Observing global biodiversity changes. Retrieved 10/10/07, from <http://www.unesco.org/mab/BRs/BRIM.shtml>.
- UNESCO. (2007b). Biosphere Reserve Information - Australia - Fitzgerald River. Retrieved 06/10/07, from <http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=AUL+08&mode=all>.
- UNESCO. (2007c). Biosphere Reserve Information -Australia- Riverland. Retrieved 06/10/07, from <http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=AUL+11&mode=all>.
- UNESCO. (2007d). UNESCO Background. Retrieved 12/05/07, from [www.unesco.org](http://www.unesco.org).
- UNESCO. (2007e). The Statutory Framework of the World Network of Biosphere Reserves. Retrieved 05/09/07, from <http://www.unesco.org/mab/doc/statframe.pdf>.
- UNESCO / MAB (1984). Action Plan for Biosphere Reserves. *Nature and Resources* 20 (4): 1-12.
- UNESCO / MAB (1987). A Practical Guide to MAB. UNESCO, Paris.
- UNESCO Australia (1992). Community involvement makes Fitzgerald River Biosphere Reserve a success. *UNESCO Australia - Australian National Commission for UNESCO magazine*,
- UNESCO/SACAM. (2002). South and Central Asia MAB Network Newsletter. Retrieved 09/10/04, from <http://www.unesco.org/mab/regions/Sacam/SACAM1.pdf>.
- van de Kerkhof, M. (2001). A survey of the methodology of participatory integrated assessment. *IIASA Working Paper IR-01-014*, Laxenburg.
- Vaughan, H. (2000). CBRA: What do we do and how do we do it? *Ecological Monitoring and Assessment Network*, Burlington.
- Wadland, J. H. and Gibson, A. (1997). Bioregionalism: Interdisciplinary in Theory and Practice. *Arachne* 4 (2): 43-65.
- Walker, B., Anderies, J. M., Kinzig, A., et al. (2006a). Exploring Resilience in Social-Ecological Systems Through Comparative Studies and Theory Development: Introduction to the Special Issue. *Environment and Society* 11 (1): 12.
- Walker, B., Carpenter, S., Anderies, J. M., et al. (2002). Resilience Management in Social-Ecological Systems: a Working Hypothesis for a Participatory Approach. *Conservation Ecology* 6 (1): 17.
- Walker, B., Gunderson, L. H., Kinzig, A., et al. (2006b). A Handful of Heuristics and Some Propositions for Understanding Resilience in Social-Ecological Systems. *Environment and Society* 11 (1): 13.
- Walker, B. and Salt, D. (2006). *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*. Island Press, Washington.
- Wall, E. and Marzall, K. (2006). Adaptive capacity for climate change in Canadian rural communities. *Local Environment*, 11 (4): 373-97.
- Walter, A. (2005). MAB - a Programme over the Course of Time. *Full of Life - UNESCO Biosphere Reserves: Model Regions for Sustainable Development*. German MAB National Committee (Ed.), Springer, Bonn.



- Watson, J. (2001). Case Study 16.1 Stepping outside - a bioregional and landscape approach to nature conservation. Protected Area Management: Principles and practice. Worboys, G., Lockwood, M. and De Lacy, T. (Ed.), Oxford University Press, Melbourne.
- Watson, J. (2004). Personal communication: Fitzgerald River Biosphere Reserve. Matysek, K.: Esperance.
- Watson, J., Lullfittz, W., Sanders, A., et al. (1995). Networks and the Fitzgerald River National Park Biosphere Reserve, Western Australia. Nature Conservation 4: The Role of Networks. Saunders, D. A., Craig, J. L. and Mattiske, E. M. (Ed.), Surrey Beatty and Sons, Perth, Western Australia.
- Watson, J. and Sanders, A. (1997). Fitzgerald River National Park Biosphere Reserve 1978 - 1997: the evolution of integrated protected area management. Parks 7 (1): 9-19.
- Webler, T. and Renn, O. (1995). A brief primer on participation: philosophy and practice. Fairness and Competence in Citizen Participation: Evaluating models for environmental discourse. Renn, O., Webler, T. and Wiedemann, P. (Ed.), Kluwer, Dordrecht.
- Webler, T., Tuler, S. and Kruger, L. E. (2001). What is good public participation process? Five perspectives from the public. Environmental Management 27 (3): 435 - 50.
- Weinstein, D. and Weinstein, M. A. (1991). George Simmel: Sociological flaneur bicolore. Theory, culture & society 8: 151-68.
- Westley, F. R. (2002). The devil of the dynamics: adaptive management on the front lines. Barriers and bridges to the renewal of ecosystems and institutions. Gunderson, L., Holling, C. S. and Light, S. (Ed.), Columbia University Press, New York.
- Whitelaw, G. (2004). Personal communication: Niagara Escarpment Biosphere Reserve. Matysek, K.: Guelph.
- Whitelaw, G., Craig, B., Jamieson, G., et al. (2004). Research, Monitoring and Education: Exploring the "logistics function" of four Canadian Biosphere Reserves. Environments 32 (3): 61-78.
- Whitney, D. (1994). From the global to the local: Issues of policy implementation in sustainable development. Perspectives Towards Sustainable Environmental Development. Williams, C. C. and Haughton, G. (Ed.), Avebury Studies in Green Research, Hants, England.
- Wilkenson, K. P. (2000). The rural community in America. Social Ecology Press, Middleton, Wisconsin.
- Williams, R. (2004). Personal communication: The Fitzgerald Biosphere Reserve. Matysek, K.: Jerramungup.
- Wilson, E. and Peter, F., Eds. (1986). Biodiversity. National Academy Press, Washington D.C.
- Wilson, G. (2002). The Lisaak Sustainable Forestry Project: A Partnership Between Lisaak Forest Resources Ltd. and The Clayoquot Biosphere Trust. Clayoquot Alliance for Research, Education and Training, Victoria.
- Wondolleck, J. M. and Yaffee, S. (2000). Making Collaboration Work: Lessons from Innovation in Natural Resource Management. Island Press, Washington.
- Wood, L. (2005). MPA Global – an online database of the world's marine protected areas. Retrieved 20/05/06, from <http://www.seaaroundus.org/newsletter/Issue27.pdf>.
- Woods, M. (1997). Researching rural conflicts: hunting, local politics and actor-networks. Journal of Rural Sociology 14 (3): 321-40.
- Worboys, G., Pulsford, I., Figgis, P., et al. (2007). Connectivity Conservation - Draft. IUCN and WCPA, Canberra.

World Commission on Protected Areas. (2007). Protected Areas and World Heritage Programme. Retrieved 14/09/07, from [http://72.14.253.104/search?q=cache:4xSU7S7RnuIJ:www.unep-wcmc.org/protected\\_areas/data/un\\_eintro.htm+United+Nations+Economic+and+Social+Council+in+1959+recognised+that+%E2%80%98national+parks+and+equivalent+reserves+are+important+factors+in+the+wise+use+of+natural+resources%E2%80%99&hl=en&ct=clnk&cd=1&gl=au](http://72.14.253.104/search?q=cache:4xSU7S7RnuIJ:www.unep-wcmc.org/protected_areas/data/un_eintro.htm+United+Nations+Economic+and+Social+Council+in+1959+recognised+that+%E2%80%98national+parks+and+equivalent+reserves+are+important+factors+in+the+wise+use+of+natural+resources%E2%80%99&hl=en&ct=clnk&cd=1&gl=au).

Worster, D. (1979). Nature's Economy: The Roots of Ecology. Doubleday, Garden City, New York.

Yaffee, S. (1996). Ecosystem Management in Practice: The Importance of Human Institutions. Ecological Applications 6 (3): 724-27.

Yin, R. (1991a). Case study reserach: Design and methods. Applied Social Science Research Methods Series(Ed.), Sage Publications, London.

Yin, R. (1991b). Case study reserach: design and methods. Applied Social Science Research Methods Series(Ed.), Sage Publications, London.

Young, O. R. (1997). Arctic Governance: Bringing the High Latitudes In from the Cold. International Environmental Affairs 9 (1): 54-68.

YYCI. (2007). Yellowstone to Yukon Conservation Initiative. Retrieved 26/09/07, from <http://www.y2y.net/>.

Zubrow, E. B. W., Schumm, J. R., Finn, S., et al. (1995). The Biological Reserve: The Future's Last Stand. Futures 27 (4): 437-46.



# Appendix A

## Information Sheet

Implementing an International Sustainable Development Program at the Local Level:  
Praxis meets Theory in Australian and Canadian UNESCO Biosphere Reserves

Chief Investigator: Dr Lorne Kriwoken, Senior Lecturer, Centre for Environmental Studies

Student Investigator: Kate Matysek, PhD Candidate, Centre for Environmental Studies

### Purpose of the Study

The purpose of this doctoral study is to examine the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Man and the Biosphere (MAB) Biosphere Reserve Program in relation to case examples of Biosphere Reserves in Australia and Canada, illustrating the constraining and successful elements in each country and in local contexts. The project is concerned with the theoretical framework of regionalism meeting localism for community-driven social change processes and capacity-building.

Questions raised in the thesis include:

- Is the Biosphere Reserve a useful tool for the replication of regionalism at local scales?
- Can Biosphere Reserves foster community capacity and social capital in a bottom-up approach that is replicable and self-generating?
- Can communities achieve their agreed goals in social, environmental and economic priorities without resources and legislation of standard government –level patronage?
- What are the roles for i) place ii) actors iii) networks iv) community v) governance vi) regionalism vii) scale, in the Biosphere Reserve Programs of Australia and Canada?

### Procedure

This study is being undertaken as part of the requirements for the degree of Doctor of Philosophy (Environmental Studies). We would like to invite your participation in the following research.

Participation involves contribution through an interview over the phone or in-person. The discussion will involve myself asking you a few questions about your perception and experiences of the UNESCO Biosphere Reserve Program, and its related planning and management for working landscape conservation. The insights gained through your professional and / or voluntary involvement in the Biosphere Reserve Program are of great importance and interest to this research.

The interview will take approximately 30 minutes to 1 hour. Transcripts of discussion information will be available for review by you, to verify information or to make any additions or withdrawals of information. Transcript verification is not compulsory, but is optional to you, the participant. No remuneration is involved with participation in this research project.

### Freedom to refuse or withdraw and confidentiality

Participation in this study is entirely voluntary. If you should decide not to participate in the study, information that you may have submitted can be withdrawn from the research. If you agree to take part in the focus group or study you can withdraw at any time without prejudice. Any information obtained will be treated as highly confidential, no names will be disclosed in published material without consent and any files and associated information containing individuals names will be

stored securely for a required period of five years. After the five year period, data collected will be destroyed or kept if required for further research, in the same manner of security as stated above.

## Results

The results of this study will be available through a variety of means. Your responses of verbatim discussion will be forwarded to you for verification or amendment. Final results of the study will be published in international peer-reviewed journal articles; a doctoral thesis; and presentations within the School of Geography and Environmental Studies at the University of Tasmania. A synopsis of the research will be updated regularly and may be accessed via the following web page: <http://www.geol.utas.edu.au/geography/index.htm>. Alternatively, participants who wish to stay informed about the process of the research may choose to call either of the investigators directly (details below).

## Questions

This project has approval from the Southern Tasmania Social Sciences Human Research Ethics Committee. If you have any complaints or concerns of an ethical nature please contact the Chair or Executive Officer of the University Ethics Committee:

Chair of Committee: Associate Prof. Gino Dal Pont Ph: (03) 6226 2078

or Executive Officer: Ms Amanda McAully Ph: (03) 6226 2763

If at any time you would like more information about this project, you may contact either:

Dr Lorne Kriwoken: (03) 6226 2458

or Kate Matysek: (03) 6226 7454

Both at the Centre for Environmental Studies

School of Geography and Environmental Studies

University of Tasmania

Thank you.

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Dr Lorne Kriwoken

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Kate Matysek

## EXAMPLE

### Interview Schedule

Date:

Name:

Position:

Employed by:

Biosphere Reserve Represented (if applicable):

Years in current position:

Years involved with the Biosphere Reserve Program:

#### Contact Details

Phone:

Email:

Mailing Address:

Fax:

1. How did you become interested in biosphere reserves?
2. What role did you play in the program (70s, 80s, 90s, present)?
3. What is your understanding of a biosphere reserve? What component is most important to you?
4. How do you view the current state of the program at a national level?
5. I have an analogy of the Biosphere Reserve program as a table with four legs. One leg is the local government, one leg is the state government, and one leg is the Commonwealth government and one leg is the international coordinating council, or the MAB ICC. If any of these legs is not fulfilling its proper support function, then the table is unbalanced and if two legs are not working then the table is essentially useless. What is your view of the way in which each of these 'legs' if you like is fulfilling its role currently for Australian Biosphere Reserves?
6. In the Tasmanian context, why have there, to date been no successful biosphere reserves? Lack of knowledge? Superfluous?
7. How important is the role of local communities in successful biosphere reserves?
8. What are the core criteria for a successful biosphere reserve?
9. As practical examples for many of the UNCED (Rio and Johannesburg) goals, why is there not more effort directed as Biosphere reserves?
10. Does it come down to profit? Can a program of this nature ever succeed – as it is voluntary and with an obvious absence of 'profit'?

## Appendix B

# The Seville Strategy

Source: UNESCO (1996).

### GOAL I: USE BIOSPHERE RESERVES TO CONSERVE NATURAL AND CULTURAL DIVERSITY

OBJECTIVE I.1: Improve the coverage of natural and cultural biodiversity by means of the World Network of Biosphere Reserves.

Recommended at the international level:

1. Promote biosphere reserves as a means of implementing the goals of the Convention on Biological Diversity.
2. Promote a comprehensive approach to biogeographical classification that takes into account such ideas as vulnerability analysis, in order to develop a system encompassing socio-ecological factors.

Recommended at the national level:

3. Prepare a biogeographical analysis of the country as a basis, inter alia, for assessing coverage of the World Biosphere Reserve Network.
4. In light of the analysis, and taking into account existing protected areas, establish, strengthen or extend biosphere reserves as necessary, giving special attention to fragmented habitats, threatened ecosystems, and fragile and vulnerable environments, both natural and cultural.

### OBJECTIVE I.2: Integrate biosphere reserves into conservation planning

Recommended at the international level:

1. Encourage the establishment of transboundary biosphere reserves as a means of dealing with the conservation of organisms, ecosystems, and genetic resources that cross national boundaries.

Recommended at the national level:

2. Integrate biosphere reserves in strategies for biodiversity conservation and sustainable use, in plans for protected areas, and in the national biodiversity strategies and action plans provided for in Article 6 of the Convention on Biological Diversity.

3. When applicable, include projects to strengthen and develop biosphere reserves in programmes, to be initiated and funded under the Convention on Biological Diversity, and other multilateral conventions.
4. Link biosphere reserves with each other, and with other protected areas, through green corridors and in other ways that enhance biodiversity conservation, and ensure that these links are maintained.
5. Use biosphere reserves for *in situ* conservation of genetic resources, including wild relatives of cultivated and domesticated species, and consider using the reserves as rehabilitation/re-introduction sites, and link them as appropriate with ex situ conservation and use programmes.

## GOAL II: UTILISE BIOSPHERE RESERVES AS MODELS OF LAND MANAGEMENT AND OF APPROACHES TO SUSTAINABLE DEVELOPMENT

### OBJECTIVE II.1: Secure the support and involvement of local people

Recommended at the international level:

1. Prepare guidelines for key aspects of biosphere reserve management, including the resolution of conflicts, provision of local benefits, and involvement of stakeholders in decision making and in responsibility for management.

Recommended at the national level:

2. Incorporate biosphere reserves into plans for implementing the sustainable-use goals of Agenda 21 and the Convention on Biological Diversity.
3. Establish, strengthen or extend biosphere reserves to include areas where traditional lifestyles and indigenous uses of biodiversity are practiced (including sacred sites), and / or where there are critical interactions between people and their environment (e.g. peri-urban areas, degraded rural areas, coastal areas, freshwater environments and wetlands).
4. Identify and promote the establishment of activities compatible with the goals of conservation, through the transfer of appropriate technologies which include traditional knowledge, and which promote sustainable development in the buffer and transition zones.

Recommended at the individual reserve level:

5. Survey the interests of the various stakeholders and fully involve them in planning and decision making regarding the management and use of the reserve.
6. Identify and address factors that lead to environmental degradation and unsustainable use of biological resources.

7. Evaluate the natural products and services of the reserve, and use these evaluations to promote environmentally sound and economically sustainable income opportunities for local people.

8. Develop incentives for the conservation and sustainable use of natural resources, and develop alternative means of livelihood for local populations, when existing activities are limited or prohibited within the biosphere reserve.

9. Ensure that the benefits derived from the use of natural resources are equitably shared with the stakeholders, by such means as sharing the entrance fees, sale of natural products or handicrafts, use of local construction techniques and labour, and development of sustainable activities (e.g. agriculture, forestry, etc.).

OBJECTIVE II.2: Ensure better harmonisation and interaction among the different biosphere reserve zones

Recommended at the national level:

1. Ensure that each biosphere reserve has an effective management policy or plan and an appropriate authority or mechanism to implement it.

2. Develop means of identifying incompatibilities between the conservation and sustainable-use functions of biosphere reserves, and take measures to ensure that an appropriate balance between the functions is maintained.

Recommended at the individual reserve level:

3. Develop and establish institutional mechanisms to manage, coordinate and integrate the biosphere reserve's programmes and activities.

4. Establish a local consultative framework in which the reserve's economic and social stakeholders are represented, including the full range of interests (e.g. agriculture, forestry, hunting and extracting, water and energy supply, fisheries, tourism, recreation, research).

OBJECTIVE II.3: Integrate biosphere reserves into regional planning

Recommended at the national level:

1. Include biosphere reserves in regional development policies and in regional land-use planning projects.

2. Encourage the major land-use sectors near each biosphere reserve to adopt practices favouring sustainable land-use.

Recommended at the individual reserve level:

3. Organise forums and set up demonstration sites for the examination of socio-economic and environmental problems of the region, and for the sustainable utilisation of biological resources important to the region.

### GOAL III: USE BIOSPHERE RESERVES FOR RESEARCH, MONITORING, EDUCATION, AND TRAINING

OBJECTIVE III.1: Improve knowledge of the interactions between humans and the biosphere

Recommended at the international level:

1. Use the World Biosphere Reserve Network to conduct comparative environmental and socio-economic research, including long-term research that will require decades to complete.
2. Use the World Biosphere Reserve Network for international research programmes that deal with topics such as biological diversity, desertification, water cycles, ethnobiology and global change.
3. Use the World Biosphere Reserve Network for cooperative research programmes at the regional and inter-regional levels, such as those existing for the Southern Hemisphere, East Asia and Latin America.
4. Encourage the development of innovative, interdisciplinary research tools for biosphere reserves, including flexible modelling systems for integrating social, economic and ecological data.
5. Develop a clearing-house for research tools and methodologies in biosphere reserves.
6. Encourage interactions between the World Biosphere Reserve Network and other research and education networks. Facilitate the use of biosphere reserves for collaborative research projects of consortia of universities and other institutions of higher learning and research, in the private as well as public sector, and at non-governmental, as well as governmental levels.

Recommended at the national level:

7. Integrate biosphere reserves with national and regional scientific research programmes, and link these research activities to national and regional policies on conservation and sustainable development.

Recommended at the individual reserve level:

8. Use biosphere reserves for basic and applied research, particularly projects with a focus on local issues, interdisciplinary projects incorporating both the natural and the social sciences, and projects involving the rehabilitation of degraded ecosystems, the conservation of soils and water and the sustainable use of natural resources.

9. Develop a functional system of data management for the rational use of research and monitoring results in the management of the biosphere reserve.

#### OBJECTIVE III.2: Improve monitoring activities

Recommended at the international level:

1. Use the World Biosphere Reserve Network, at the international, regional, national and local levels, as priority long-term monitoring sites for international programmes, focused on topics such as terrestrial and marine observing systems, global change, biodiversity and forest health.

2. Encourage the adoption of standardised protocols for meta-data concerning the description of flora and fauna, to facilitate the interchange, accessibility and utilisation of scientific information generated in biosphere reserves.

Recommended at the national level:

3. Encourage the participation of biosphere reserves in national programmes of ecological and environmental monitoring, and development of linkages between biosphere reserves and other monitoring sites and networks.

Recommended at the individual reserve level:

4. Use the reserve for making inventories of fauna and flora, collecting ecological and socio-economic data, making meteorological and hydrological observations, studying the effects of pollution, etc., for scientific purposes and as the basis for sound site management.

5. Use the reserve as an experimental area for the development and testing of methods and approaches for the evaluation and monitoring of biodiversity, sustainability and quality of life of its inhabitants.

6. Use the reserve for developing indicators of sustainability (in ecological, economic, social and institutional terms) for the different productive activities carried out within the buffer zones and transition areas.

7. Develop a functional system of data management for rational use of research and monitoring results in the management of the biosphere reserve.

#### OBJECTIVE III.3: Improve education, public awareness and involvement

Recommended at the international level:

1. Facilitate the exchange of experience and information between biosphere reserves, with a view to strengthening the involvement of volunteers and local people in biosphere reserve activities.



2. Promote the development of communication systems for diffusing information on biosphere reserves and on experiences at the field level.

Recommended at the national level:

3. Include information on conservation and sustainable use, as practised in biosphere reserves, in school programmes and teaching manuals, and in media efforts.

4. Encourage participation of biosphere reserves in international networks and programmes, to promote cross-cutting linkages in education and public awareness.

Recommended at the individual reserve level:

5. Encourage involvement of local communities, school children and other stakeholders in education and training programmes and in research and monitoring activities within biosphere reserves.

6. Produce visitors' information about the reserve, its importance for conservation and the sustainable use of biodiversity, its socio-cultural aspects, and its recreational and educational programmes and resources.

7. Promote the development of ecology field educational centres, within individual reserves, as facilities for contributing to the education of school children and other groups.

#### OBJECTIVE III.4: Improve training for specialists and managers

Recommended at the international level:

1. Utilise the World Biosphere Reserve Network to support and encourage international training opportunities and programmes.

2. Identify representative biosphere reserves to serve as regional training centres.

Recommended at the national level:

3. Define the training needed by biosphere reserve managers in the 21<sup>st</sup> century and develop model training programmes on such topics as how to design and implement inventory and monitoring programmes in biosphere reserves, how to analyse and study socio-cultural conditions, how to solve conflicts, and how to manage resources cooperatively in an ecosystem or landscape context.

Recommended at the individual reserve level:

4. Use the reserve for on-site training and for national, regional and local seminars.

5. Encourage appropriate training and employment of local people and other stakeholders to enable their full participation in inventory, monitoring and research in programmes in biosphere reserves.

6. Encourage training programmes for local communities and other local agents (such as decision-makers, local leaders and agents working in production, technology transfer and community development programmes) in order to enable their full participation in the planning, management and monitoring processes of biosphere reserves.

#### GOAL IV: IMPLEMENT THE BIOSPHERE RESERVE CONCEPT

##### OBJECTIVE IV.1: Integrate the functions of biosphere reserves

Recommended at the international level:

1. Identify and publicise demonstration (model or illustrative examples of) biosphere reserves, whose experiences will be beneficial to others at the national, regional and international levels.
2. Give guidance/advice on the elaboration and periodic review of strategies and national action plans for biosphere reserves.
3. Organise forums and other information exchange mechanisms for biosphere reserve managers.
4. Prepare and disseminate information on how to develop management plans or policies for biosphere reserves.
5. Prepare guidance on management issues at biosphere reserve sites, including, inter alia, methods to ensure local participation, case studies of various management options and techniques of conflict resolution.

Recommended at the national level:

6. Ensure that each biosphere reserve has an effective management policy or plan and an appropriate authority or mechanism to implement it.
7. Encourage private sector initiatives to establish and maintain environmentally and socially sustainable activities in appropriate zones of biosphere reserves and in surrounding areas, in order to stimulate community development.
8. Develop and periodically review strategies and national action plans for biosphere reserves. These strategies should strive for complementarity and added value of biosphere reserves, with respect to other national instruments for conservation.
9. Organise forums and other information exchange mechanisms for biosphere reserve managers.

Recommended at the individual reserve level:

10. Identify and map the different zones of biosphere reserves and define their respective status.

11. Prepare, implement and monitor an overall management plan, or policy, that includes all of the zones of biosphere reserves.
12. Where necessary, in order to preserve the core area, re-plan the buffer and transition zones, according to sustainable development criteria.
13. Define and establish institutional mechanisms to manage, coordinate and integrate the reserve's programmes and activities.
14. Ensure that the local community participate in the planning and management of biosphere reserves.
15. Encourage private sector initiatives to establish and maintain environmentally and socially sustainable activities in the reserve and surrounding areas.

#### OBJECTIVE IV.2: Strengthen the World Biosphere Reserve Network

Recommended at the international level:

1. Facilitate provision of adequate resources for implementation of the Statutory Framework of the World Network of Biosphere Reserves.
2. Facilitate the periodic review, by each country, of its biosphere reserves, as required in the Statutory Framework of the World Network of Biosphere Reserves and assist countries in taking measures to make their biosphere reserves functional.
3. Support the functioning of the Advisory Committee for Biosphere Reserves, and fully consider and utilise its recommendations and guidance.
4. Lead the development of communication among biosphere reserves, taking into account their communication and technical capabilities, and strengthen existing and planned regional or thematic networks.
5. Develop creative connections and partnerships with other networks of similar managed areas, and with international governmental and non-governmental organisations, with goals congruent with those of biosphere reserves.
6. Promote and facilitate twinning between biosphere reserve sites and foster transboundary reserves.
7. Give biosphere reserves more visibility by disseminating information materials, developing communication policies and highlighting their roles as members of the World Biosphere Reserve Network.

8. Wherever possible, advocate the inclusion of biosphere reserves in projects financed by bilateral and multilateral aid organisations.

9. Mobilise private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.

10. Develop standards and methodologies for collecting and exchanging various types of data and assist their application across the network of biosphere reserves.

11. Monitor, assess and follow up on the implementation of the Seville Strategy, utilising the Implementation Indicators and analyse the factors that aid in attainment of the indicators, as well as those that hinder such attainment.

Recommended at the national level:

12. Facilitate provision of adequate resources for implementation of the Statutory Framework of the World Network of Biosphere Reserves.

13. Develop a national-level mechanism to advise and coordinate the biosphere reserves; and fully consider and utilise its recommendations and guidance.

14. Prepare an evaluation of the status and operations of each of the country's biosphere reserves, as required in the Statutory Framework and provide appropriate resources to address any deficiencies.

15. Develop creative connections and partnerships with other networks of similar managed areas, and with international governmental and non-governmental organisations, with goals congruent with those of the biosphere reserves.

16. Seek opportunities for twinning between biosphere reserves and establish transboundary biosphere reserves, where appropriate.

17. Give biosphere reserves more visibility by disseminating information materials, developing communication policies and highlighting their roles as members of the Network.

18. Include biosphere reserves in proposals for financing from international and bilateral funding mechanisms, including the Global Environment Facility.

19. Mobilize private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.

20. Monitor, assess and follow up on the implementation of the Seville Strategy, utilising the Implementation Indicators and analyse the factors that aid in attainment of the indicators, as well as those that hinder such attainment.

Recommended at the individual reserve level:

21. Give biosphere reserves more visibility by disseminating information materials, developing communication policies and highlighting their roles as members of the Network.

22. Mobilize private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.

23. Monitor, assess and follow up on the implementation of the Seville Strategy, utilising the Implementation Indicators and analyse the factors that aid in attainment of the indicators, as well as those that hinder such attainment.

Implementation Indicators Cross Reference

## INTERNATIONAL LEVEL

Biosphere reserves included in implementation of the Convention on Biological Diversity I.1.1

Improved biogeographical system developed I.1.2

New transboundary reserves developed I.2.1; IV.2.6

Guidelines developed and published II.1.1; IV.1.4; IV.1.5

Network-wide research programmes implemented III.1.1

Biosphere reserves incorporated into international research programmes III.1.2

Regional and inter-regional research programmes developed III.1.3

Interdisciplinary research tools developed III.1.4

Clearing-house for research tools and methodologies developed III.1.5

Interactions developed with other research and education networks III.1.6

Biosphere reserves incorporated into international monitoring programmes III.2.1

Standardised protocols and methodologies adopted for data and for data exchange III.2.2; IV.2.10

Mechanism developed for exchanging experiences and info. between biosphere reserves III.3.1

Biosphere reserve communication system implemented III.3.2; IV.2.4; IV.2.7

International training opportunities and programmes developed III.4.1

Regional training centres identified and developed III.4.2

Demonstration biosphere reserves identified and publicised IV.1.1

Guidance provided on elaboration and review of strategies and national action plans for biosphere reserves IV.1.2

Mechanisms developed for information exchange among reserve managers IV.1.3

Statutory Framework of the World Network of Biosphere Reserves are implemented at the international and national levels IV.2.1; IV.2.2

Advisory Committee for Biosphere Reserves is functional and effective IV.2.3

Regional or thematic networks developed or strengthened IV.2.4

Interactions developed between biosphere reserves, and similar managed areas and organisations IV.2.5

Mechanisms developed to foster twinning between biosphere reserves IV.2.6

Information and promotional materials developed for the Biosphere Reserve Network IV.2.7

Strategies developed for including biosphere reserves in bilateral and multilateral aid projects IV.2.8

Strategies developed for mobilizing funds from businesses, NGOs and foundations IV.2.9

Data standards and methodologies applied across the World Network IV.2.10

Mechanisms developed for monitoring and assessing the implementation of the Seville Strategy IV.2.11

## NATIONAL LEVEL

Biogeographical analysis prepared I.1.3

Analysis of need for new or extended biosphere reserves is completed I.1.4; II.1.3

Biosphere reserves included in national strategies and other responses to the Convention on Biological Diversity and other conventions I.2.2; I.1.3

Links developed between biosphere reserves I.2.4

In situ conservation plans for genetic resources in biosphere reserves I.2.5

Biosphere reserves incorporated into sustainable development plans II.1.2

Biosphere reserves developed or strengthened to include traditional life-styles and in areas of critical people-environment interactions II.1.3

Conservation and sustainable use activities identified and promoted II.1.4

Effective management plans or policies in place at all reserves II.2.1; IV.1.6

Mechanisms developed for identifying incompatibilities between conservation and sustainable use functions, and to ensure an appropriate balance between these functions II.2.2

Biosphere reserves included in regional development and land-use planning projects II.3.1

Land-use sectors, near biosphere reserves, are encouraged to adopt sustainable practices II.3.2; IV.1.7

Biosphere reserves are integrated into national and regional research programmes, which are linked to conservation and development policies III.1.7

Biosphere reserves are integrated into national monitoring programmes, and are linked to similar monitoring sites and networks III.2.3

Principles of conservation and sustainable use, as practised in biosphere reserves, integrated into school programmes III.3.3

Biosphere reserves participate in international education networks and programmes III.3.4

Model training programmes for biosphere reserve managers are developed. III.4.3

Mechanisms developed to review national strategies and action plans for biosphere reserves IV.1.8

Mechanisms developed for information exchange among reserve managers IV.1.9

Statutory Framework of the World Network of Biosphere Reserves are implemented at the national level IV.2.12; IV.2.14

National level mechanism developed to advise and coordinate biosphere reserves IV.2.13

Interactions developed between biosphere reserves and similar managed areas, and organisations with congruent goals IV.2.15

Mechanisms developed to foster twinning between biosphere reserves IV.2.16

Information and promotional materials developed for the Biosphere Reserve Network IV.2.17

Strategies developed for including biosphere reserves in bilateral and multilateral aid projects IV.2.18

Strategies developed for mobilizing funds from businesses, NGOs and foundations IV.2.19

Mechanisms developed for monitoring and assessing the implementation of the Seville Strategy IV.2.20

#### INDIVIDUAL RESERVE LEVEL

Survey made of stakeholders' interests II.1.5

Factors leading to environmental degradation and unsustainable use are identified II.1.6

Survey made of the natural products and services of the biosphere reserve II.1.7

Incentives identified for sustainable use by local populations II.1.8

Plan prepared for equitable sharing of benefits II.1.9

Mechanisms developed to manage, coordinate and integrate the reserve's programmes and activities II.2.3; IV.1.10; IV.1.12

Local consultative framework implemented II.2.4

Regional demonstration sites developed II.3.3

Co-ordinated research and monitoring plan implemented III.1.8; III.2.4

Functional data management system implemented III.1.9; III.2.7

Reserve is used for developing and testing of monitoring methods III.2.5

Reserve is used for developing indicators of sustainability relevant to local populations III.2.5; II.2.6

Local stakeholders are included in education, training, research and monitoring programmes III.3.5; III.4.5

Information for visitors to the reserve developed III.3.6

Ecology field centre developed at the reserve III.3.7

Reserve is used for on-site training activities III.4.4

A local educational and training programme is in place III.4.6

Different zones of biosphere reserves identified and mapped IV.1.10.



Buffer and transitions reformulated to promote sustainable development and preserve the core area  
IV.1.12

Local community involved in planning and managing reserve IV.1.14

Private sector initiatives to establish and maintain environmentally and socially sustainable activities  
are encouraged IV.1.15

Information and promotional materials developed for the Biosphere Reserve Network IV.2.21

Strategies developed for mobilising funds from businesses, NGOs and foundations IV.2.22

Mechanisms developed for monitoring and assessing the implementation of the Seville Strategy  
IV.2.23

## Appendix C

# Interpreting Article 3 of the Statutory Framework of the WNBR in the Canadian Context

Source: Canadian Biosphere Reserve Association (2007b: no page).

The conservation function is usually fulfilled by the protected core area within the biosphere reserve. In most cases these are national or provincial parks or wildlife areas, or, in the case of Mont Saint-Hilaire Biosphere Reserve, privately-owned lands. Some conservation objectives, however, may be served by appropriate management practices in the zone of cooperation (or what UNESCO / MAB calls an outer transition area). One example is maintaining the ranch lands immediately adjacent to the National Park in the Waterton Biosphere Reserve. A number of them have been placed under conservation easements held by the Southern Alberta Land Trust Society or the Nature Conservancy of Canada.

The development function might be served by a commitment to some code of standards or best practice. For example, the recommendations from the 'Scientific Panel for Sustainable Forest Practices in Clayoquot Sound' are being overseen by the Clayoquot Sound Central Region Board within the biosphere reserve area. The development function can also include ecosystem restoration or rehabilitation sites, such as the maintenance of buffer vegetation and erosion control along major agricultural drains in the Long Point Biosphere Reserve, experimental watershed management in Wilson's Creek in Riding Mountain Biosphere Reserve, and gravel pit rehabilitation in the Niagara Escarpment Biosphere Reserve.

The logistic support function is often best performed by informally encouraging cooperation and a degree of coordination among a number of agencies, groups or individuals conducting their own research, monitoring or educational activities for their own purposes. A challenge is to create some larger or longer-term vision of what might be done, so that others can situate themselves within it. Examples include the long-term field research programs conducted at Mont Saint-Hilaire Biosphere Reserve, cumulative effects monitoring in the Niagara Escarpment Biosphere Reserve, and the linking of education and training with biodiversity plots which is being done in several biosphere reserves.

Interpreting Article 4 of the Statutory Framework of the WNBR in the Canadian context (Canadian Biosphere Reserves Association 2007b)

The mosaic of ecological systems refers to the diversity and patterns of natural habitats and land cover types within the biosphere reserve. UNESCO / MAB requests some reference be made to its classification of 15 major ecosystem types at the global level, seven of which occur in Canada. Reference should also be made to the Canadian Ecological Land Classification system at the

ecozone and eco-regional scales. In some cases, provincial classifications may be more appropriate, for example, the biogeoclimatic zones of British Columbia. Agreed upon classification schemes for coastal and marine ecosystems seem not to be available for either the global or Canadian coastal areas.

The significance of a biosphere reserve for biodiversity conservation should be reported with reference to the major vegetation or ecosystem types that are widely distributed in the geographic region (hence are 'representative' in the biosphere reserve) or those that are more localized (hence 'unique' to the biosphere reserve). Species of biota that have been placed in various categories of endangerment should also be noted. In Canada, the main source of information is the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Some provinces have their own lists as well. The Conservation Data Centres established in part by the Nature Conservancy of Canada for the Atlantic provinces and each of the other six provinces use a more fine-scale classification for assessing the conservation status of different habitats and plant associations, and for different species of biota.

Opportunities to explore approaches to sustainable development will depend considerably on the size of the zone of cooperation for the biosphere reserve, and on the nature of the local economy. If the local economy appears to remain viable, then the promotion of best practices or minor improvements would probably suffice. If the economy is going through a difficult transition, say from a resource-extraction to some more recreation-oriented or tourism base, then pilot projects to demonstrate new employment opportunities that are also environmentally sound would be appropriate. All of the biosphere reserves have some eco-tourism potential.

Whether or not a biosphere reserve is of appropriate size to carry out the three functions is a judgement call about the scale of operation that would be feasible. For example, Mont Saint-Hilaire is too small for large-scale manipulative research projects to explore alternative resource management practices. All of them would be too small to maintain viable populations of wide-ranging mammals or migrating birds which occur only seasonally within the biosphere reserve.

Core areas in Canadian biosphere reserves (as in most countries) are provided by some already established protected areas around which a biosphere reserve can be created. This can result in a public perception of bias in favour of conservation over local economies. Biosphere reserves may have one large core area served, for example, by a National Park in the case of Waterton and Riding Mountain biosphere reserves, or a large number of relatively smaller parks (such as the 100 or so along the Niagara Escarpment Biosphere Reserve), to other mixes of protected areas under different jurisdictions. Privately held lands can also serve the core function if they have the requisite protective management in place, for example, the Mont Saint-Hilaire Biosphere Reserve.

Although intuitively attractive, the concept of a buffer zone has posed problems in interpretation on the ground, especially if buffers are perceived locally as the early stage for placing restrictions on private landowners in a zone of cooperation. Most Canadian biosphere reserves have referred to zoning provisions within large National Parks, to specific land use designations at the municipal level,

or to areas within a biosphere reserve that are little used or not easily accessible, as ones that provide some buffer function.

Canada has generally preferred the phrase zone of cooperation (rather than outer transition area) to refer to the third kind of zonation. In some cases, this can be identified by natural boundaries such as watersheds (e.g. Charlevoix Biosphere Reserve), or by official land use plans (e.g. Niagara Escarpment Biosphere Reserve), or by some pre-existing inter-jurisdictional agreements such as the Riding Mountain Regional Liaison Committee involving some 18 rural municipalities adjacent to the National Park which is the core of the Riding Mountain Biosphere Reserve. Some biosphere reserves in Canada, for example Waterton Biosphere Reserve, have purposely not defined an outer boundary for a zone of cooperation, in part because it would vary with the problem being addressed, but mainly because of the misinterpretations of intent it could generate among the private landowners whose cooperation is being sought. This does not preclude an informal development of a zone of cooperation, such as has occurred in watersheds draining into the Long Point Biosphere Reserve.

Developing the local organisational arrangements is the single greatest challenge in designing and maintaining a biosphere reserve. In Canada, it has to be done locally and voluntarily. These arrangements must foster 'common ground' agendas for biosphere reserve activities among the different landowners, managers of programs, research and education personnel, and residents within biosphere reserves.

The section on management policies and plans is sometimes interpreted to mean that the biosphere reserves themselves should have authority to plan and manage the properties and programs within biosphere reserves. This gives rise to perceptions of 'another layer of bureaucracy' which can become a focus for local opposition to the concept and its realization. Because of divided jurisdictions and the extent of private land ownership in Canadian biosphere reserves, it is generally not feasible to develop some overall management policy or plan (a point to be made in the nomination submission); hence, the biosphere reserve functions have to be carried out on a voluntary basis.

## Appendix D

### A Recent Australian BR: The Barkindji Biosphere

The UNESCO declaration of the Barkindji BR, 550 km northwest of Melbourne, Victoria, represents a significant addition to the BRP. It has re-established BRs as a topic of dialogue amongst conservation agencies, government, philanthropic agencies, industry, education and other areas of civil society. Its declaration further strengthens the MII style BR in Australia, indicating that whilst the MIs may be lagging in logistics and development capacities, the MIs are coming to represent the new age of Australian BRs through their social-ecological praxis.

Barkindji Biosphere covers riverine wetland areas along the Murray River and contains red gum and box forests, mallee and chenopod plains. The interaction of the Murray River channel and floodplain and the semi-arid terrestrial environments create a range of unique habitats for flora and fauna species within this area of the Murray – Darling Basin. The area is an important ecological interface zone between more arid zones to the north and cooler, moister climates to the south. Barkindji is juxtapositioned between the Murray, the Darling and the Murrumbidgee Rivers (Appendix Figure 1, pg. 353), and is the food bowl of Australia with rich irrigation, farming and grazing land. The region accounts for 40 per cent of Australia's agricultural production, utilising about 70 per cent of all water used for agriculture across the nation.

The 1 500 000 ha under irrigation for crops and pastures represents 70 per cent of the total area under irrigation in Australia. More than 80 per cent of the divertible surface water resource is consumed in the Basin. The Basin has a population of 2 million, or about 10 per cent of the nation (GWWCE 2007) and has a naturally saline environment due to its soils and geology. However, agriculture, industry and domestic impacts have exacerbated these conditions such that high salinity levels are now an issue of national concern, prompting Commonwealth Government intervention.

The Barkindji peoples, from which the BRs name is taken, lived along the Murray near the junction with the Darling River, north along the Darling and West towards the South Australian border (Barkindji Biosphere Reserve 2007). The conservation knowledge applied by the Barkindji people sustained a very sensitive and often inhospitable region as a food source for generations. The harshness of the environment in times of drought required special skills and knowledge (Barkindji Biosphere Reserve 2007). The Barkindji had complex laws governing use of the land and rivers, relations between men and women, initiation, and their interaction with other tribes, some of whom moved into their areas when central Australia became inhospitable. Each group within the Barkindji had specialised techniques that suited the environment in which they lived (Barkindji Biosphere Reserve 2007). Archaeological records identify the cultural significance of the site. In addition to scarred trees, evidence of a large number of middens, burial sites and open campsites is present in the BR.

The Barkindji Biosphere was the brainchild of John Irwin, a long-time volunteer and Finance Chair of the Australian Inland Botanic Gardens (AIBG) and Chair of the Sunraysia Mallee Economic Development Board. Through Irwin, partnerships of not-for-profit organisations specialising in conservation, research and education formed. Links between government agencies in both Victoria and New South Wales with responsibility for environmental planning and sustainable development were initiated. In an unusual show of support for a BR, the nomination gained the financial support of the Department of Environment and Heritage and the New South Wales Minister for the Environment. The strong political support for the proposal was gained through a local champion involved in state politics. Many local landholders, LaTrobe University, the Myer Foundation, Earth Watch, the Trust for Nature, Sunraysia Mallee Economic Development Board, Birds Australia, CSIRO and local and state governments are now actively or benevolently involved. The designation of the Barkindji Biosphere supports the strategic objectives of the Mallee Catchment Management Authority, the Lower Murray Catchment Management Board and the Murray Darling Basin Commission, and policy directions of the Commonwealth, New South Wales and Victorian governments in relation to protecting biodiversity and developing sustainable communities.

The Trust for Nature purchased Ned's Corner Station in late 2002 with major support from The R.E. Ross Trust and the US Nature Conservancy.<sup>98</sup> A grant of AU\$500 000 towards the purchase of Ned's Corner Station by the Trust for Nature (Victoria) and AU\$215 000 towards the development of the nomination for UNESCO of the Barkindji Biosphere Reserve by the AIBG has fueled this new MII BR. Ned's Corner Station, in combination with Crown land, has created the largest private conservation reserve in Victoria, and the area is now included in the National Reserve System. Participation in the Barkindji BR provides an important opportunity for the Trust for Nature, the Nature Conservancy and the AIBG to undertake a landscape scale integrated sustainability initiative that will manage the area's significant conservation, economic and social assets.

A variety of major conservation and sustainable development initiatives are planned for the Barkindji BR and include:

- Reducing salinity, especially with regard to complexities associated with irrigation practices and current use of local, naturally saline areas for water run-off. A changed water table in the region has resulted in movement of salt and major salinity problems in some areas. Some of the Barkindji Biosphere Strategic Partners are experts in salinity management and are working to implement a best practice salinity management example at Barkindji.
- Increasing biodiversity in agricultural areas impacted by land clearing and grazing. The NSW Department of Land and Water Conservation and National Parks and Wildlife Service are preparing threat abatement plans for key threatening processes. Major threats include predation and invasion of exotic species and fire frequency.

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<sup>98</sup> The US Nature Conservancy works to preserve the plants, animals and natural communities that represent the diversity of life by protecting the lands and waters they need to survive in all 50 United States, and in more than 30 countries around the world (The Nature Conservancy 2007). Ned's Corner is one of four Australian projects for the Conservancy. The others are Taravale, (Qld), Ethabuka (Qld) and Gondwana Link (WA). The Nature Conservancy has an Australian office in Melbourne. Currently, the Nature Conservancy is working with Australian philanthropist David Thomas, who recently made one of the largest private gifts to conservation in Australia's history (AU\$10 million) in an effort to raise AU\$20 million to save the country's most at-risk lands, waters and wildlife.

- Ensuring sustainability of regional agricultural practices. A number of Barkindji's sustainable development initiatives will relate to salinity management and sustainable irrigation practice. Irrigation has enabled parts of the transition zone of the BR and surrounding areas to become highly agriculturally productive, particularly for citrus and vines (Barkindji Biosphere Reserve 2007). Further development of models of sustainable citrus and vine growing will be encouraged, using drought-tolerant varieties and integrated disease management to place minimal impact on the land (Barkindji Biosphere Reserve 2007).
- Rehabilitation of degraded floodplains and wetlands. As a partner in the team participating in the development and operation of the Barkindji Biosphere, La Trobe University expects to draw on the BR to support an extensive range of programs. Community consultation is planned as the Barkindji Biosphere develops. Landowners will be important potential contributors, for linking with Barkindji and extending the buffer and transition zones to aid rehabilitation programs.

Promoting sustainable tourism, especially ecotourism that includes cultural heritage experiences. Each year, more than 1.5 million visitors pass through Mildura on their journey between Adelaide and Sydney or Melbourne and Broken Hill (Australian Inland Botanic Gardens 2007). Visitors will be able to participate in some of the rehabilitation and conservation programs being undertaken in the BR including an Avian Centre (Mildura Lagoon and nearby area) with walking tracks and bird hides, or replanting programs (Australian Inland Botanic Gardens 2007). The Mildura region is also popular for gourmet food products including citrus and winemaking. An Interpretive Centre, hosted by the AIBG will be developed in the BR, as a hub for visitors. The Centre will provide information about the full range of activities throughout the BR.

According to Looker (2004: 8), 'this partnership brings to the table a wealth of knowledge in education, conservation, philanthropy and regional economic development' which have been success factors for this BR. The various human, social, financial and physical capital these parties contribute to the Barkindji BR, provide a range of social-ecological capacities.

## Staged Implementation of Barkindji Biosphere

