

**BENEFITS AND COSTS OF BIOSPHERE RESERVES
FOR CANADA'S NATIONAL PARKS**



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PHOTO CREDIT

Cover Photo of Waterton Biosphere Reserve by Larry Frith

EXECUTIVE SUMMARY

Increasingly, managers of national parks and other protected-area and conservation organizations are looking outward beyond park boundaries into greater park ecosystems and bioregions to address the challenge of maintaining ecological integrity and realize their conservation goals. Biosphere reserves, with their sustainability mission and emphasis on stakeholder cooperation, are exceptionally positioned to create the shared vision necessary to integrate conservation and development interests.

Biosphere reserves are areas designated by UNESCO, which serve as models for co-operative effort to conserve biodiversity, demonstrate sustainable development and increase local capacity for both. Of the thirteen biosphere reserves designated in Canada seven have national parks as their core, while two of the most advanced proposals for biosphere reserves are for areas that contain national parks.

This study reviews the benefits and costs of national park involvement with biosphere reserves, illustrates the relationships between park managers and other partners, and relates the role and potential of biosphere reserves to Parks Canada and other partners that stand to benefit from biosphere reserves.

Case Study Results

Four national parks, which form core areas of biosphere reserves, participated in this study: Waterton Lakes National Park, Riding Mountain National Park, Bruce Peninsula National Park and Fathom Five National Marine Park (joint administration), and St. Lawrence Islands National Park.

The benefits to Waterton Lakes National Park (WLNP) in the areas of protection, regional awareness and cooperation are quite significant especially considering the minimal costs. WLNP staff also described many other collaborative initiatives beyond the administrative structure of the Waterton Biosphere Reserve (WBR) that contribute to and support the aim of the biosphere reserve designation and the park (i.e. Crown of the Continent Managers Partnership, Interagency Steering Committees). There was resounding agreement that the benefits of WBR engagement are worth the costs.

Riding Mountain Biosphere Reserve's (RMBR) contribution to Riding Mountain National Park (RMNP) is seen to be very important relative to the low costs, particularly in terms of the invaluable role that it has played in facilitating and resolving regional-park issues. Regional co-operation is vital for the long-term health of RMNP, particularly because of the intensive surrounding land use. RMBR has been instrumental in getting people together in a neutral forum to talk about issues, acting as a source for accurate impartial direction, and providing a vehicle for issue resolution between the park and local communities.

Bruce Peninsula National Park has benefited greatly from its relationship with the Bruce Peninsula Biosphere Association (BPBA). Although the BPBA has only existed for five years, the establishment of regional monitoring programs and local education programs

are novel enterprises that without BPBA involvement would otherwise not exist. The BPBA has also performed a role the park is simply not capable of, that is, acting as a facilitator to engage community members and stakeholder groups on issues of local importance. Although it is not yet possible to measure the influence the biosphere reserve designation has played in catalyzing and harmonizing initiatives along the escarpment, it has no doubt fostered a landscape-level approach and encouraged wider cooperation such as is occurring with compilation of monitoring metadata and advocacy of escarpment issues. It should be noted too that the national park has participated in activities of the full biosphere reserve. But in this study, the Bruce Peninsula component of this large biosphere reserve was used, for the most part, to illustrate benefits to the national park.

At St. Lawrence Islands Park (SLI) the biosphere reserve and attendant network was developed as a result of broad-based community process, and as such, the biosphere reserve enjoys widespread support with over 70 groups coming under its umbrella. The benefit of involvement for SLI and other partners, with the Thousand Island – Frontenac Arch Biosphere Reserve Network is in broadening the community of interest in areas that can be beneficial to all. In essence, this cooperative network makes the park's job much easier and effective. The primary role of the Biosphere Network organization is facilitation. The BR is valued because it enhances relationships and provides a sphere of influence that is compatible with long term planning interests. Essentially they do what the park doesn't do well because of Parks Canada's inward focus. SLI continues to witness an exponential increase in partnering opportunities whereby skills and expertise are being applied beyond the traditional sphere of activity. Project priorities for 2004 included connecting the landscape-core areas, cultural festivals, shoreline stewardship, review of park management and official plans, land trust networking, forest inventory, among others. It is anticipated that this will have a great benefit for ecological integrity over time.

Emerging Themes

National park - biosphere reserve relationships exhibit a wide range of common elements, benefits, and challenges. In terms of benefits and challenges they are park specific, and vary depending on the orientation of the biosphere reserve, but themes do emerge.

Benefits

- By virtue of their broad mandate as models for co-operative effort, biosphere reserves, and their associated facilitating bodies, help to build regional networks, long-term community capacity, and provide a forum for dialogue around common interests.
- Biosphere reserves, with their non-legislated, permeable boundaries and emphasis on regional actors, engender a broader landscape level approach to issue management than what delimited protected areas can achieve.
- Biosphere reserves have also enabled national parks to effectively engage community champions and networks in resolving regional issues and pursuing initiatives at a fraction of what it might cost the national park to achieve the

same results.

- A recurring theme was the pride and credibility which designation of a biosphere reserve brought to an area. This is an intangible benefit with implications not only for the profile of the park but also may help to foster place-based awareness and value amongst local residents.
- Linking to larger national and international networks and initiatives is a significant benefit to both national parks and adjoining areas. For example, this network has enabled cooperating partners to rapidly expand program dissemination.

Common Challenges

- Biosphere reserves in Canada generally suffer from a chronic lack of funding. This lack of resources for coordination has prevented them from having results anywhere near commensurate with their potential, which has prevented them from being taken more seriously at local and national levels. Securing adequate and stable resources to sustain biosphere reserve activity is an ongoing issue.
- There is a common need for staff capacity across biosphere reserves. Given the geographic scale and jurisdictional complexity it is crucial to have at least one staff person who can facilitate communication across the community-of-interest and coordinate activities on behalf of the biosphere reserve.
- Alleviating concerns and building community trust around the purpose of biosphere reserve designation is particularly important in fostering acceptance and ownership of biosphere reserves.
- Based on protected areas, with boundaries that are often not ecological in design, biosphere reserves must, and have, built beyond this jurisdictional approach.

Conclusions

As surrounding landscapes continue to become more developed parks must focus externally and find allies to broaden their engagement at the regional level. Biosphere reserves have a number of strengths in this regard which can be brought to bear in both resolving complex multi-jurisdictional issues and in drawing together community interests to develop a shared regional vision which promotes collective responsibility. These unique strengths, however, will only be realized through a well-supported local biosphere reserve and associated network.

The applicability and benefits of biosphere reserve engagement for other federal government departments, levels of government, industry and non-government organizations need to be articulated in order to capitalize and develop the biosphere reserve network. As new partners are engaged by the biosphere reserve concept and

model, whether in newly designated locales or under pre-existing structures, a pooling of resources by this community-of-interest would enable partners to benefit from the unique functions and services of a biosphere reserve while cost-sharing associated expenses. Federal government departments could build capacity for their own efforts, and demonstrate leadership by officially endorsing the MAB Biosphere Reserve program and concomitantly increasing funding to sustain the biosphere reserve network. The biosphere reserve network would also benefit by establishing a working group of national park managers and biosphere reserve directors to share experiences and facilitate collaborative initiatives. A national workshop to catalyze this engagement would be valuable.

An area of great potential is the use of biosphere reserves as test areas for methods of regional coordination and sustainable development. Engaging development interests is important to integrate socioeconomic and ecological interests in a meaningful way and begins to address the underlying behaviours and structures that threaten natural areas. Biosphere reserve relationships with the private sector must move beyond corporate environmental philanthropy and towards helping local businesses integrate sustainability as a business practice and advantage. If biosphere reserves are to resonate beyond park and conservation circles, progressive industry proponents with regional land-based interests need to be sought out and engaged.

Biosphere reserves enable organizations to cooperate beyond their narrow jurisdictional mandates to collectively address pervasive regional issues. The working relationships that arise from cooperating under a biosphere reserve model enhance regional capacity to cooperate and plan for environmental as well as economic and social goals. The real strength of biosphere reserves is the forum they provide for dialogue and action towards regional sustainability. It is hoped that this study will help Parks Canada, and other partner and prospective organizations, to realize the full potential of biosphere reserves in Canada.

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PREFACE

Parks Canada staff have participated in and supported biosphere reserves ever since the first Canadian biosphere reserve containing a national park, Waterton, was designated in 1979. Today, there are seven Canadian biosphere reserves containing national parks and more are under development. Managers within Parks Canada generally agree that biosphere reserves are beneficial to national parks, but there has been no formal assessment of their net benefits since 1988. This study is meant to bring that evaluation up to date.

The appraisal, detailed in this report, reflects benefits and costs at the field level, and was based on input from national park staff. Biosphere reserves also receive assistance from the National Office of Parks Canada through the part-time loan of a staff person acting as Executive Secretary of the Canadian Biosphere Reserves Association and a small amount of money for the association's administration; however that is not addressed in this study.

Two important elements of Parks Canada's policy that have changed since 1988 are the addition of a strong emphasis on the ecological integrity (EI) of national parks and reference to the federal government's framework for sustainable development. External and internal documents suggest that biosphere reserves are important tools in both those areas (e.g. Panel report on the ecological integrity of Canada's national parks; Securing Canada's Natural Capital – 2005 report of the National Roundtable on the Environment and the Economy; Report of the Minister of the Environment to Recommendations made at the Third Minister's Round Table on Parks Canada). So a new review of biosphere reserves vis-à-vis national parks is timely.

INTRODUCTION

Parks Canada's mandate is to protect ecological integrity, so as to leave it unimpaired for future generations. National park policy outlines this priority goal as follows: "*An ecosystem has integrity when it is deemed characteristic for its natural region, including the composition and abundance of native species and biological communities, rates of change and supporting process*" (Parks Canada, 2000). This responsibility to ensure that national parks maintain integrity is made immeasurably complex because, by themselves, the areas that have been set aside for our parks are often too small and isolated to sustain the systems they are to represent (Soulé and Wilcox, 1980). Ecological integrity in national parks is largely dependent on the decisions and activities occurring in surrounding landscapes (Parks Canada, 1998). The impacts occurring from land use activities such as habitat loss and fragmentation, pollution, wildlife disturbance and species loss, are fundamental challenges that beset Canada's national park system (Parks Canada, 2000). Compounding these challenges is the extensive downsizing that has occurred within the Parks Canada Agency since the 1980s (Boyd, 2003) resulting in inadequate resources devoted to an expanding park system. Increasingly, managers of national parks and other protected-area and conservation organizations¹ are looking outward beyond park boundaries into greater park ecosystems and bioregions to address these challenges and realize their conservation goals.

The Panel on the Ecological Integrity of Canada's National Parks (2000) suggested "*Successful regional integration of land uses in and around national parks depends in large measure on a common vision for the greater ecosystem [and that] without doubt, the ecological integrity in national parks...depends on Parks Canada's ability to co-operate with park neighbours*". Unfortunately, the development of a common vision, under which a comprehensive landscape approach to management might thrive, is often lacking.

In the absence of a shared community vision for the greater park ecosystem, successes are often achieved through regional co-operation with partners that share complementary goals. National park managers diligently pursue ecological integrity and other park objectives (e.g. public education, visitor experiences, conflict resolution) with a variety of partners. Within the national parks system there are many examples of promising efforts of regional co-operation and integration. These efforts include: integrated resource management occurring on land abutting national parks; involvement with Model Forests; participation in municipal planning processes; co-management boards where land claim agreements form the basis of park management; and informal working relationships with provinces, territories, First Nations, municipalities, and private landowners on projects of common interest.

Local biosphere reserve committees represent one such set of partners that work with national park managers on a variety of goals. Their encompassing view of conservation

¹ Although this study is primarily interested in national park – biosphere reserve relationships, other protected area and conservation organizations would benefit from analysis and introspection on the role biosphere reserves can play.

and sustainable development make them different, however. The sustainability mission of a biosphere reserve and its emphasis on cooperation among stakeholders give it unrivaled potential to create the shared vision for the greater park ecosystem that is currently lacking.

Key activities include research, monitoring, education, training and demonstration (see Appendix 1). Typically, a biosphere reserve contains a core of one or more protected areas, a buffer zone, and a surrounding zone of co-operation.

The potential of a biosphere reserve to enhance the greater park ecosystem has prompted the interest of many national park managers. Of the thirteen biosphere reserves designated in Canada seven have national parks as their core, while two of the most advanced proposals for biosphere reserves are for areas that contain national parks. This increasing designation of biosphere reserves centered on national parks presents interesting potential for Parks Canada.

STUDY OBJECTIVES

This study represents a review of national park involvement with biosphere reserves. Its goals were to:

- Clarify the inputs and results of national park involvement in biosphere reserves;
- Illustrate the relationships between park managers and other partners in a biosphere reserve;
- Relate the role and potential of biosphere reserves to Parks Canada's corporate objectives, particularly its mandate to protect ecological integrity.

METHOD OF REVIEW: ANALYSIS OF BENEFITS AND COSTS

The study gathered information for analysis by means of a standard questionnaire and phone interviews. The questionnaire was prepared and sent, in March 2004, to managers of national parks serving as core areas of Canadian biosphere reserves. By the end of 2004 responses had been received from four of the national parks (Georgian Bay Littoral Biosphere Reserve, containing Georgian Bay Islands National Park, had not yet been designated by UNESCO). Correspondence and discussion took place throughout this period and through the analysis phase that followed.

The questionnaire developed for this project built upon previous analyses carried out by Jim Birtch for Waterton Lakes (1988) and Riding Mountain National Parks (1988), and the checklist from *Guidelines for Canadian Parks Service Involvement in the Biosphere Reserve Program* (1990). It was developed in conjunction with the Canadian Biosphere Reserves Association (CBRA) and Parks Canada staff at the National Parks Directorate. Interview information was received from four of the six parks and complemented with a review of pertinent literature.

The questionnaire was divided into two main sections, *National Park Benefits of Involvement with the Biosphere Reserve* and *National Park Costs of Involvement with the Biosphere Reserve* with a concluding set of *Summary Questions*. The benefits and costs are further divided into non-financial and financial. See Appendix 2 for a template questionnaire. Table 1 denoted the categories used to assess benefits and costs via the questionnaire.

Table 1: Categories for Assessing Benefits and Costs

Benefits of Involvement	Costs of Involvement
Administration: ◦ <i>Staff Development</i> ◦ <i>Inter-Agency Cooperation</i> ◦ <i>Regional Cooperation</i> ◦ <i>Regional Awareness</i> ◦ <i>Operations</i> Resource Conservation: ◦ <i>Protection</i> ◦ <i>Planning</i> ◦ <i>Management</i> ◦ <i>Research</i> Visitor Activities: ◦ <i>Interpretation</i> ◦ <i>Education</i> ◦ <i>Visitor Use and Experience</i>	Administration: ◦ <i>Park Operations Resources (i.e. Use of staff time and associated travel, and meeting facilities)</i> ◦ <i>Challenges to Inter-Agency Cooperation</i> ◦ <i>Regional Coordination (i.e. lengthen resolution of issues)²</i>

Where appropriate, the non-financial benefits and costs were estimated qualitatively by park staff using a sliding scale of 1-5, with 1 equal to a little and 5 equal to a lot. The categorical descriptions below provided a frame of reference for selecting the appropriate category when answering each question.

Scale ↑	5 = daily involvement 4 = weekly involvement 3 = monthly involvement 2 = bi-annual involvement 1 = annual involvement	Increasing level of involvement ↑
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The financial benefits and costs of involvement were estimated for the time period for which park staff were familiar. Estimated contributions of staff time were converted to

² Although benefits are broken over a number of categories all of the non-financial costs associated with park involvement in biosphere reserves were captured under a single administration category.

monetary figures at a rate of 35\$/hour for a superintendent’s time, while other staff and volunteer contributions were calculated using 25\$/hour.

Findings for each national park are described individually and comparatively to illustrate the varying contexts, benefits, costs, strengths, and challenges of working co-operatively with biosphere reserves. A draft report was reviewed by all interviewees and revised accordingly to ensure views were represented fully and accurately.

NATIONAL PARK - BIOSPHERE RESERVE CASE STUDIES

Figure 1 provides an overview map of biosphere reserves containing national parks. Four national parks, which form core areas of biosphere reserves, participated in this study (see Table 2). Kejimikujik and Pacific Rim National Park we’re contacted but did not participate due to time and resource constraints.

Figure 1: Overview map of National Park Case Study sites.

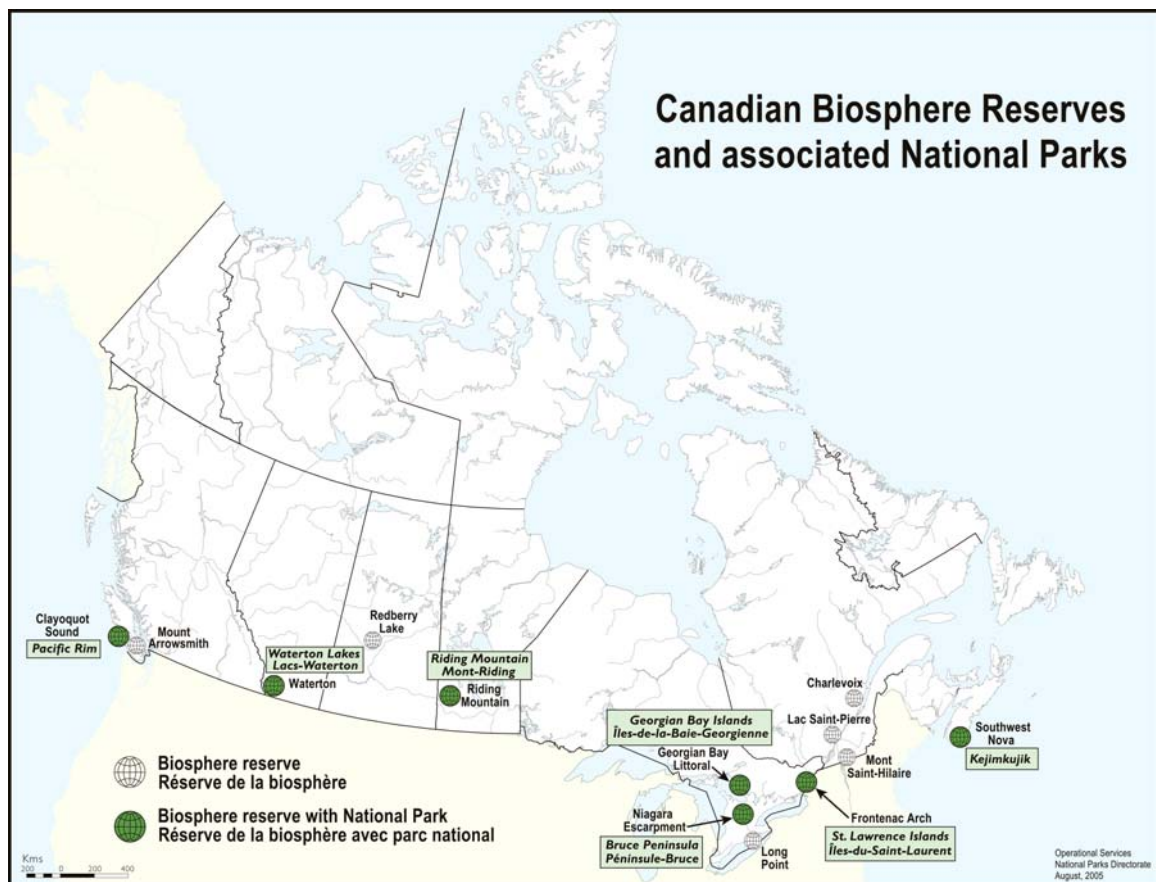


Table 2: Participating National Parks with associated Biosphere Reserves

National Parks serving as BR Core Areas	Biosphere Reserve	Year of BR Designation
Waterton Lakes	Waterton	1979
Riding Mountain	Riding Mountain	1986
Bruce Peninsula and Fathom Five	Niagara Escarpment	1990
St. Lawrence Islands	Frontenac Arch	2002

Waterton Lakes National Park - Waterton Biosphere Reserve

Description of Waterton Lakes National Park

Designated in 1885, as Canada's 4th national park, Waterton Lakes represent the Southern Rocky Mountains Natural Region. Its 525 sq kilometers include both mountains and prairie. It was a local rancher who lobbied the federal government to create this park, and the park remains a source of local pride and recreation. In 1932, it joined Glacier National Park (Montana, USA) as the world's first international Peace Park.

The natural region which the park represents is recognized for exceptional biodiversity, particularly vegetation and large mammals such as grizzly bear and elk. The park also possesses a scenic landscape stemming from the dynamic convergence of the Great Plains and Rocky Mountains. The small size of WLNP relative to important ecological processes like wildfire and wildlife dispersal underscore the acute need for an ecosystem-based management approach focused on the greater park ecosystem. The profusion of competing interests and jurisdictions responsible for land use in the region also accentuate the need for cooperation (Dolan and Frith, 2003).

Description of Waterton Biosphere Reserve

Waterton Biosphere Reserve was designated by UNESCO in 1978, one year after Mont Saint-Hilaire became Canada's first biosphere reserve. Local citizens were consulted, but the biosphere reserve was not their initiative (Canadian biosphere reserves are now created through community action). The initial recommendation came from the national committee for Man and the Biosphere (Canada MAB) of which Parks Canada was a member. There was little follow up to the designation until the early 1980s when local ranchers and national park staff formed the Waterton Biosphere Association (WBA) and began to actively promote the biosphere reserve concept. The WBA has typically comprised 6-8 volunteers, mainly livestock ranchers from locations near the national park boundary, and from 1 to 3 senior park staff (Francis, 1997). It was originally co-chaired by a rancher and the park superintendent, but for over two decades has been officially led only by members of the ranch community. National park staff do however continue to support the WBA. During its first decade, the WBA had a technical committee with membership from industry, municipalities, and other federal and provincial departments. The technical committee survived until about the time of the Crown of the Continent initiative (see below).

At the time the biosphere reserve was being proposed to UNESCO, no administrative unit was available to act as a buffer for the core area (the national park) and ranchers did not want their lands to be considered as buffers to a park. Therefore, the zones of the park with the highest public use (zones 4 and 5) were put forward on the nomination as the buffer area (a UNESCO requirement). Local residents also objected to the UNESCO term “Zone of Transition” and so to allay their concerns and to facilitate voluntary participation in biosphere reserve activities this outer zone was renamed “zone of cooperation”. This latter term is now used in all Canadian biosphere reserves and is becoming popular in other countries as well.

In the early 1990s the WBA was instrumental in stimulating an international, multi-stakeholder initiative for cooperation on the protection of a large region centered on Waterton Lakes and Glacier National Parks. The Crown of the Continent Ecosystem (CCE) took its name from the fact that the waters from its heights flowed east, west, north and south to the Atlantic, Pacific and Arctic Oceans and the Gulf of Mexico. As well as Waterton Lakes, the Canadian component of CCE included ranch and First Nations land in Alberta, and forestry land and the Flathead River Basin in British Columbia. In a sense, the CCE represented an evolution of the biosphere reserve, but when a coordinating structure for the CCE was formed, it took half of the members of the WBA with it. This weakened the WBA and about this time, the technical committee of the WBA stopped functioning.

Biosphere reserves in Canada do not receive ongoing core support from the federal government, with the exception of small annual contributions from Parks Canada for most of the biosphere reserves that contain national parks (one, Clayoquot Sound Biosphere Reserve operates on a trust fund derived from a large federal grant received upon its designation). This lack of support is a particular problem for WBR because dryland ranching supports a low population density and thus a smaller available pool of volunteers than in most other areas in southern Canada. During the early years of the biosphere reserve, this was less of a problem because interagency cooperation, through the WBA technical committee, led to an ongoing generation of projects. But as cutbacks shaved the field budgets of federal and provincial agencies, including Parks Canada, and the technical committee disappeared, responsibility for functioning of the biosphere reserve fell mostly on the shoulders of a few ranchers and a couple of national park staff.

Despite this, the WBA has had some notable achievements over the past two decades. It continues to promote sustainable land use to address a wide range of local priorities. This includes: controlling alien species, minimizing wildlife-human conflicts, and maintaining a viable economy based on ranching and agriculture to support the livelihood of area residents (Dolan and Frith, 2003; WBA, 1991).

Relationship between the National Park and Waterton Biosphere Reserve

When WBR was designated by UNESCO in 1979, this was likely seen by Parks Canada

as a status symbol for the national park and an opportunity to enhance research, particularly in conservation of natural features. When Dr. Bernie Lieff became Superintendent of WLNP, he saw the biosphere reserve's strong potential for developing cooperation between the park and its surrounding region, for natural and social/cultural objectives. Bernie and his staff worked closely with regional partners towards jointly identified goals. They were able to use these relationships to address a variety of issues that were important to both park managers and residents, including: hunting regulation, development pressures, cattle-wildlife interaction etc.

Initially, the National Office of Parks Canada provided annual funding of \$5000 for the WBA. At the same time, national park managers provided logistical support (typing, telephone calls, meeting space) for biosphere reserve activities. The WBA thus had resources for public education and workshops, while a variety of partners carried out research and monitoring projects.

By the 1990s, however, greater responsibilities and tighter budgets for park managers reduced their capacity to assist the WBA. The cooperation between the two organizations began to weaken. The annual support from the National Office of Parks Canada also decreased, because more biosphere reserves containing national parks had been designated, and the same small budget was split among more biosphere reserve associations. By 2005, the annual amount was \$1667.

Nevertheless, by 2000 the thinking of national park managers had come to be much in line with that of other WBA members. They shared a common understanding of the importance of ecological integrity and sustainable development. With fewer resources, they acted more strategically, using scarce resources to catalyze and motivate others to address the goals of the biosphere reserve.

Benefits of the Biosphere Reserve for Waterton Lakes National Park

This review of benefits and costs is based on the last 14 years of WLNP involvement with the WBR. The highest ranking benefits are highlighted below.

Protection

Protection was the highest ranked benefit of involvement with the biosphere reserve. The WBA is involved in reducing development pressure and conserving key habitats and species outside of the park through their support of the acquisition of conservation lands. For example, in 1997 the WBA produced a video illustrating the long-term social, economic, and ecological relationships between WLNP and the ranching community. The video was used to support fundraising efforts of the Nature Conservancy of Canada.

Regional Awareness and Cooperation

Regional awareness and cooperation are both important functions of the WBR. Initially, during the 1980s, the Biosphere was seen by the ranching community as a mechanism to influence park management and cooperate on regional management issues although some

regional residents perceived the designation as an attempt to expand the national park (Dolan, 2004). Since the late 1980s, the WBA has been less active but has been strategic in its focus. There is now less public perception of the WBA and the WBR, however, the WBA has, through its strategic approach, identified research opportunities, land use pressures and species restoration issues thereby increasing the knowledge of park management issues and values in the region.

The WBR has also been a mechanism through which to address regional issues with the potential for negative effects on the park. It has provided a strategic window into the ranching community to focus on important research, education and land use issues as needed.

Planning and Management

Planning and management support were rated as important benefits for the national park. Although the interaction between the WBA and the park on this is episodic, it focuses strongly on results. The WBA provided key planning support by articulating a vision for the region, identifying key ecological issues in the region, and facilitating multi-stakeholder planning processes. It also influenced management practices in the greater-park ecosystem. These included the promotion of best land use practices, and cooperative land, water and species management. For example, in 1994 the WBA facilitated an expert workshop with local ranching communities to discuss the management implications of a recently re-colonized wolf population.

The lack of appreciable core funding or staff for the WBA limits its potential. In 1998, it worked with regional management agencies to develop a community-based education and management program related to non-native vegetation, but it was only partially implemented, because of lack of money. Similarly, a proposed regional eco-tourism initiative to promote best practices and enhance economic benefits in the reserve remains unrealized due to a lack of fiscal and human resources.

More recently in 2002 monitoring has been initiated within the WBR. The WBA has partnered with Environment Canada's Ecological Monitoring and Assessment Network under their Canadian Community Monitoring Network to establish a community-based monitoring network in Pincher Creek and Piikani First Nation (Timko, 2003). The biosphere reserve has been active in linking ecological monitoring data to local policy change. Work was also done through local First Nations organizations to establish a cultural mapping project of Oldman River.

Education and Interpretation

The largest contribution of the WBA to national park visitor activities has been in holding environmental workshops and assisting with interpretation programs. The WBA also provides ongoing support and guidance to students conducting research in the park and biosphere reserve. At the international level the WBA has also facilitated discussion, dialogue and demonstration site visits for international delegations from China, Inner Mongolia, Thailand and Indonesia, and provided agricultural advice in visits to Tibet and Mongolia.

Financial Benefits – Income or In-kind Support

The WBA contributes financial or in-kind support to achieve park objectives through the procurement of funds from other agencies and the use of volunteer time. As shown in the Waterton column of Table 3, inputs for items such as research projects, conservation land securement, and cost sharing agreements or interpretive displays are estimated at \$9300 p.a. Although Table 3 shows a small net financial benefit of the biosphere reserve, the non-financial benefits are most important. Many of these relate to results that would not likely have been achieved without the biosphere reserve.

Table 3: Comparison of the Financial Benefits and Costs associated with National Park involvement with Biosphere Reserves

Categories / Parks	Bruce Penn/ FathomFive	St.Lawrenc e Islands ³	Riding Mtn	Waterton Lakes	Park Average
Financial Benefits		No data			
Research Projects	25000		750	1400	\$9050
Facilities and Works	monitoring			100	\$33
Cost sharing agreement			40000	1400	\$13800
Conservation land securement				1000	\$333
Technical support				400	\$133
Monitoring and patrols				700	\$233
Interpretive material / displays			250	1400	\$550
Volunteer contributions			3750	2500	\$2083
Savings on administration			750	400	\$383
Total Annualized Benefits	25000		45500	9300	\$26600
Financial Costs		No data			
Time of superintendent*	280			210	\$163
Time of other staff**	5000		2500	1250	\$2917
Administrative support	200			100	\$100
Travel				300	\$100
Annual operating grant	1667		1667	1667	\$1,667
Contributions to specific projects	5000		40000	400	\$15133
In kind Costs	10000				\$3333
Total Annualized Costs	20480		42500	7260	\$23413
Net Financial Benefits	\$2,853	No data	\$1333	\$5373	\$1520

* Superintendent FTEs calculated at 35\$/hour ** Staff FTEs calculated at 25\$/hour

Costs of the Biosphere Reserve for Waterton Lakes National Park

Although the non-financial benefits of the biosphere reserve, particularly support for ecological integrity, are of most interest, it is useful to know the financial outlay and return for the park, resulting from its relationship with the biosphere reserve.

³ No financial data was obtained for St Lawrence Islands.

Non-Financial Costs

All of the non-financial administrative costs associated with the WBR were ranked as very low.

Financial Costs

The costs to WLNP of involvement with the WBR are small. WLNP initially contributed a \$5000 annual operating grant to the WBA, though this is now \$1667, while another \$400 towards specific projects rounds out the financial support. The major associated in-kind cost is the time park staff spend engaging with the WBA on projects and issues of concern. Although minimal, travel costs are also incurred by park officials involved with WBR committee meetings and initiatives. In the absence of core funding the WBA relies on the park for administrative support.

Comparison of Benefits and Costs

As shown in Table 3, the net financial benefit for the biosphere reserve for the park is \$373/year. This dollar figure is substantially lower than the \$16740 calculated in the 1988 study (Birtch, 1988a), for a number of reasons.

The 1988 study included research projects in the park and region coordinated by the WBA technical committee. Many of these projects could have been carried out without the involvement of the WBA, although the WBA did enhance these projects by improving inter-agency participation, increasing financial contributions, and widening the dissemination of findings. The technical committee has since been dissolved although inter-agency cooperation continues. As was mentioned the WBA has become much more strategic in its activities. Over the last 14 years there have been less capital intensive projects which also contributes to the lower financial figure. The avenues through which the park itself works in the region have also expanded. WLNP now works with many new organizations and initiatives that did not exist in 1988. Although these collaborative efforts contribute to the intent of the biosphere reserve designation their financial benefits could not be quantified and thus were not included here.

Although not quantifiable, the benefits to WLNP in the areas of Protection, Regional Awareness and Cooperation are quite significant particularly relative to the low costs. WLNP staff also described many other collaborative initiatives beyond the administrative structure of the WBR that contribute to and support the aim of the biosphere reserve designation and the park (i.e. Crown of the Continent Managers Partnership, Interagency Steering Committees). In conclusion, there was resounding agreement among park managers that the benefits of WBR engagement are worth the costs.

Riding Mountain National Park – Riding Mountain Biosphere Reserve

Description of Riding Mountain National Park

Riding Mountain National Park (RMNP), which encompasses 2973 km² of southwestern Manitoba, serves as the core of the Riding Mountain Biosphere Reserve (Parks Canada,

2005). The park is unique in that it contains the juncture of three natural regions including expanses of northern boreal forest, prairie meadows, and mixed deciduous woods along the Manitoba escarpment. Home to wolves, black bear, moose, elk, a profusion of bird species, and a captive bison herd, RMNP is also well known for its clearly demarcated border, a result of the intensively managed agricultural lands that surround it. The park is vulnerable to both internal and external threats including: poaching/hunting pressure along park boundaries, habitat fragmentation, fertilizer/pesticide contamination of water, and a human-altered fire cycle (Parks Canada, 2005).

Description of Riding Mountain Biosphere Reserve

Riding Mountain Biosphere Reserve (RMBR) comprises 1.5 million ha including RMNP and the adjoining 18 rural municipalities. Formed in 1980, the Riding Mountain Regional Liaison Committee (RMRLC) addresses issues related to the existence of RMNP within this major agricultural region. When the RMBR was designated in 1986, the existence of this liaison committee provided the necessary framework for its governance. A Biosphere Reserve Management Committee (BRMC) was formed with members designated from 9 municipalities, and three *ex officio* members, two from the provincial government and one from RMNP. The RMBR patterned itself after the WLBR designating a zone of cooperation rather than delineating buffer and transition zones. The management committee has pursued an information and education role focused on ecosystems and sustainability within the regional agricultural economy (Francis and Stewart, 2001). Close links to elected officials and local decision-makers has enabled the BRMC to influence regional decision-making processes. With the increasing emphasis on consultative approaches to engage and resolve community concerns, the BRMC has, since the late 1990's, emerged as an important mechanism to catalyze the requisite collaboration.

Relationship between the National Park and Riding Mountain Biosphere Reserve

In the 1970s, relations were strained between the national park organization and the surrounding municipalities, mostly because of different interpretations of proper land and resource use (Birtch, pers.comm). These surrounding municipalities formed the Riding Mountain Regional Liaison Committee (RMRLC) to have a collective voice when dealing with the national park. When the application went to UNESCO for a biosphere reserve it was the RMRLC that was the proponent. Part of the local appeal for the international designation was that it was neither a federal nor a provincial initiative. Upon designation, municipal governments (through the RMRLC) delegated people to form the biosphere reserve management committee. At that time there was also a technical advisory committee to the management committee that contained federal and provincial representatives.

While the biosphere reserve management committee has remained independent of the national park in its structure and decisions, it has nevertheless advanced a number of positions on conservation and development issues that have been close to those of the

national park. For example, it has opposed baiting of elk (for hunters) around the park boundary. For this reason, the biosphere reserve committee was thought by some residents to be an extension of the national park organizations. More recently though, the biosphere reserve committee has taken public positions that in some cases are seen by residents to be more in line with area farmer's positions rather than with park views. At all times, it has endeavored to act as a neutral forum for discussion of regional issues, while maintaining a philosophy that is pro-sustainability.

Over the years, the national park has continued to offer some technical (e.g. Geographic Information System) and administrative support (e.g. meeting space, project support) to the biosphere reserve committee, because park managers recognized the long-term benefit that the biosphere reserve provided. Activities of the committee were seen as a catalyst for regional integration of the park and more recently as a very important tool for ecological integrity in the greater-park ecosystem.

Today, the relationship between the national park and the biosphere reserve committee is positive, respectful and mutually supportive.

Benefits of the Biosphere Reserve for Riding Mountain National Park

This review of benefits and costs is based on the last decade of RMBR involvement with the RMNP. A wide range of benefits were identified as being particularly important. These include: protection, planning, education, staff development, inter-agency cooperation, and regional consultation. One key issue, bovine tuberculosis (TB), continues to dominate local concerns in and around RMNP. Addressing the potential ecological and economic consequences of any increase in TB in wildlife and/or cattle is currently paramount in the RMBR's role in the region.

Protection, Planning and Inter-Agency Cooperation

Protection was one of the highest ranked benefits of involvement because of the role of the RMBR in multi-stakeholder efforts to control TB and to a lesser degree to acquire conservation lands. An essential function of RMBR involvement in protection issues is facilitating planning processes and mediating between stakeholders to identify key ecological issues in the region. Improved networking and cooperation are substantive benefits of park involvement with the RMBR. The RMBR continues to facilitate a multi-stakeholder advisory group on behalf of Parks Canada, Agriculture Canada and the Manitoba Cattle Producers Association that is searching for local solutions to the bovine TB issue in the Riding Mountain region (Whitaker, 2002). The RMBR, because of its neutrality, is seen as the ideal agency to address TB. Facilitation is highly valued by the park and the community because the RMBR has provided an unbiased forum for the TB program particularly in the area of information sharing, and in providing local residents with the opportunity to provide advice to the government agencies administering the program.

Management

Management skills have also benefited from park involvement with the biosphere

reserve. The RMBR hired a person to map landscape changes in the biosphere reserve over the past 60 years. As part of the program, the RMBR supplied information and training on GIS technology to local Rural Municipal councils. RMBR involvement with the TB program has had spill over effects in terms of improving the consultation skills of staff and providing advice on related science projects.

Research

The RMNP has been able to increase research spending through liaison with the biosphere reserve (Parks Canada, 2005). RMBR contributes to park research in terms of long-term monitoring. The RMBR in cooperation with the Ecological Monitoring and Assessment Network of Environment Canada (EMAN) operates a set of forest monitoring plots within the greater park ecosystem that measure ecological change. Biosphere reserve designation has also attracted graduate research projects from the University of Manitoba. RMBR has an information role in this work.

Education

RMBR has been involved in communicating the message of ecological integrity to new and expanded audiences including youth, educators, regional residents, urbanites, industry associations, and government authorities through sponsored seminars. The biosphere reserve committee has contributed primarily by hosting community meetings and demonstration events that promote sustainable land use and farming practices within the greater park ecosystem (Francis, 2001). It has also actively engaged in projects to lessen drainage damage to agricultural lands and rural roads.

Another key area of benefit in terms of education is the incorporation of park-related themes into local school curricula through the UNESCO Associated Schools Project. Some park interpretation has also occurred with the chair of the biosphere reserve giving talks at university and college on the role of parks and biosphere reserves. Disseminating information through the RMBR, and their website, has allowed the park to be more flexible and cost-effective in communicating with the public.

Visitor use and park operations are areas where the RMBR has had decidedly limited involvement. RMNP is a large park with a large staff complement. It also has a cooperating association (Friends of Riding Mountain NP) providing information and services to visitors and so has not needed the help of RMBR for visitor use and park operations.

Regional Cooperation

The RMBR has been a key mechanism to consult residents and address regional issues on issues such as beaver damage, stream siltation/erosion and TB. The biosphere reserve has actively developed networks, partnerships and collaborative research projects in the region. These efforts have led to the RMBR playing a key role in maintaining open communications between local communities and RMNP. In 2001, the biosphere reserve began providing support to the Prairie Farm Rehabilitation Administration (PFRA) to select the best locations for intensive livestock operations with a view to a more sustainable regional economy (Birtch, 2005). The RMBR also participates as a member

of the Riding Mountain Advisory Board, which represents an array of interest groups within the regional ecosystem and provides key advice on current management planning issues (Parks Canada, 2005).

Financial Benefits – Income or In-kind Support

The Biosphere Reserve Management Committee contributes financial or in-kind support to achieve park objectives through the procurement of funds from other agencies and the use of volunteer time. Inputs for items such as research projects, cost sharing agreements, or interpretive displays are estimated at \$45500 p.a. (see Table 3). \$40000 is in-kind support for a cost-sharing agreement to facilitate regional actions around TB.

Costs of the Biosphere Reserve for Riding Mountain National Park

To round out the discussion of benefits of the biosphere reserve, the non-financial and financial costs of engaging RMBR are summarized below. The financial benefits and costs calculations are based on data from 2003/2004.

Non-financial Costs

The volunteer contributions from the biosphere reserve have far outweighed the contributions that they have asked for from the park. The non-financial administrative costs associated with the WBR were ranked as very low.

Financial Costs

The costs to RMNP for involvement with the RMBR have been minimal. Over the past year, 2004, RMNP has provided the biosphere reserve with approximately \$40000 to support a part-time executive director and the RMBR's role as facilitator in the TB program. In terms of associated in-kind costs the RMBR has required minimal time commitments in the range of 10 person days/annum. Park-specific volunteer contributions have gone primarily to research, interpretation and public consultation related to the TB program.

Comparison of Benefits and Costs

Although the total annualized benefits from involvement with the RMBR exceed the costs by \$1333, it is the impartiality of the RMBR as a facilitator that is most valued. This financial cost-benefit ratio is substantially lower than the 1988 study (Birtch, 1988b) for similar reasons to those noted for the WBA study. In the 1980's the BR facilitated many university research projects (e.g. Canid/Ungulates Monitoring & Research - \$193,000) and received outside contributions which were included in the study analysis. Although the RMBR technical committee played a facilitation role back then, it no longer exists. Perhaps these research projects could have taken place without biosphere reserve involvement. Therefore, omitting similar research spending in 2003/04 the current cost-benefit analysis is a very conservative estimate.

RMBR's contribution is seen to be very important relative to the low costs, particularly in terms of the invaluable role that it has played in facilitating and resolving regional-

park issues. Regional co-operation is vital for the long term health of RMNP, particularly because of the intensive surrounding land use. The RMBR has been instrumental in getting people together in a neutral forum to talk about issues, acting as a source for accurate impartial direction, and providing a vehicle for issue resolution between the park and local communities.

Bruce Peninsula National Park and Fathom Five National Marine Park – Niagara Escarpment Biosphere Reserve

Description of Bruce Peninsula National Park and Fathom Five National Marine Park

Designated in 1987, Bruce Peninsula National Park (BPNP) and the co-managed Fathom Five National Marine Park (FFNMP) constitute Parks Canada's main linkage to the Niagara Escarpment Biosphere Reserve (NEBR). This core area of 154 km² is located on the tip of the peninsula and contains mainland, 21 islands, and surrounding waters. Fathom Five, Canada's first national marine park, preserves deep, cold waters in Georgian Bay, warmer shoreline waters, and shoreline habitat known for its cliffs, caves, beaches, and "flowerpot" islands. BPNP is characterized by its rich diversity of habitats including unique stands of mixed forests, wetlands, alvars and ancient cliff-edge ecosystems. The park boasts a profusion of plant species including a wide variety of orchids, ferns, and ancient dwarf eastern white cedars. The park also plays an important role in southern Ontario in preserving wildlife such as black bears and the Eastern Massasauga rattlesnake. The main management challenges stem from the parks proximity to a large population base that is steadily expanding northward. There is mounting pressure around the park for recreational and vacation property development precipitating habitat loss and fragmentation as well as invasion of non-native species.

Description of Niagara Escarpment Biosphere Reserve

The NEBR is unique in that its designation (1990) extends linearly along all 725 kms of the Niagara escarpment. The escarpment, which runs north south from the Bruce Peninsula in Lake Huron down to the Niagara River, is an exposed ridge of fossil-rich sedimentary rock exhibiting high cliffs, deep valleys, and glacial landforms. The core of NEBR is composed of lands designated as "escarpment natural area" in the Niagara Escarpment Plan (NEP). In addition 131 provincial parks (existing and proposed), private lands, and portions of BPNP and FFNMP, which are located at the northerly end of the escarpment, provide additional protection within the NEBR. 93000 ha of natural area, designated as "protection" or "rural" in the NEP constitute the buffer area. The NEP is unique in that it is Canada's first large scale land use plan and is administered by a provincial cabinet-appointed body, the Niagara Escarpment Commission (Osch and Nelson, 2000). The NEP provides a framework within which to coordinate management efforts across many political and administrative jurisdictions. The cooperation zone, primarily where people live and work, is comprised of the NEP designations "urban," "minor urban," "recreation", and "mineral resource".

The Niagara Escarpment Commission coordinates BR activities and provides a member for the Canadian Biosphere Reserves Association (see Benefits section under Comparative Summary of Case Studies). It was also a strong supporter for development of the Bruce Peninsula Biosphere Association (BPBA), which complements its biosphere reserve coordination activities, and would like to see similar community-based biosphere reserve organizations in central and southern parts of the Niagara Escarpment. Most of the analysis in this study is based on the relationship between the BPNP-FFNMP and the BPBA. It should be recognized, however, that there is an ongoing relationship between Parks Canada and the NEC on biosphere reserve activities.

In the BPBA's own words "*the association addresses local environmental concerns by taking an approach that allows for informed decision-making in support of a sustainable community with a balance between local development and ecological conservation*" (BPBA, 2005). Despite its short history the BPBA has had success in involving local communities in research and monitoring activities and facilitating landowner and other stakeholder issues in the greater park ecosystem.

Relationship between the National Park and Niagara Escarpment Biosphere Reserve

In the late 1990's Parks Canada recognized the need to increase cooperation with surrounding communities and began to designate annual funding towards establishing a community committee. The National Office of Parks Canada provided \$10,000 in 1999 and then provided \$5000 per year. This annual amount has been steadily reduced since 2002, however, because a small budget is being shared with newly designated biosphere reserves that contain national parks.

In 2000, a local champion initiated community meetings that quickly led to the establishment of a local biosphere reserve committee (the Bruce Peninsula Biosphere Association-BPBA). Local activities quickly followed. Although the BPBA enjoys a cooperative relationship with BPNP, to alleviate any potential concerns that the association might be another park committee it distinguished itself as independent and designated a local community member as Chair of the BPBA (Burrows, pers. comm). There is an informal Parks Canada policy to not take a leadership role in a BR and Parks Canada's National Coordinator for BRs advises this in all consultations with park managers.

Park staff have been involved in biosphere reserve activities from the beginning, including research and monitoring projects and the NEC's bi-annual Leading Edge Conference. At the level of the whole biosphere reserve, coordinated by the Niagara Escarpment Commission (NEC), the park has always had good communications. There is a high level of professionalism in both programs. Parks staff also recognize that the biosphere reserve brings benefits to the national park in terms of regional integration and ecological integrity. In addition, mandates of the two organizations are quite compatible because of common objectives in the Niagara Escarpment Plan and the National Parks

Act.

With the formation of the BPBA, however, national park involvement has increased. Staff have worked closely with volunteers and member organizations of the BPBA on projects that jointly benefit the park and the surrounding area. The BPBA benefits from the technical and organizational skills of the park (e.g. supervision of summer project staff) and the park benefits from the non-profit status (for fundraising) and community contacts of the association.

The BPBA is strongly community based and independent, but has a mutually supporting relationship with the national park.

Benefits of the Biosphere Reserve for Bruce Peninsula and Fathom Five National Park

This review of benefits and costs of park involvement with the NEBR encompasses 2000 to 2004. The most notable benefits include improved: inter-agency cooperation, regional awareness, planning processes, educational programming, and research. The BPBA has focused on the greater park ecosystem with much focus on non-positional mediation and soft activities such as education and student research and employment opportunities.

Inter-Agency Cooperation and Planning

The BPBA has improved networking and facilitated agreements with provincial and federal agencies, municipal governments, schools, and universities particularly in the areas of research and monitoring. Positioning themselves as a facilitating body they have avoided being simplistically labeled as “pro-park” but rather have engaged landowners and stakeholders on issues of local importance. A successful example of this type of collaboration was their partnership in 2001 with the NEC, conservation authorities, landowners, and community groups to restore rare, oak savannah habitat in the Dundas Valley and increasing forest connectivity along the Nottawasawa Bluffs.

Regional Awareness

The BPBA has increased regional awareness of park values as well as showcased ecologically sustainable initiatives to new and expanded regional audiences. Though not specifically tied to park initiatives, much of the work that the BPBA has initiated indirectly supports protection of park resources. For example, in response to the proposed Bruce County logging by-law the association sponsored an evening of information and discussion for woodlot managers. It also sponsors the Grey-Bruce Cleanwater Festival promoting water stewardship and environmental education.

The pre-eminent awareness building initiative of the NEBR is the biannual Leading Edge Conference, which brings together researchers, planners, municipal representatives, students and citizens to showcase the conservation and sustainable development activities taking place along the Niagara Escarpment and surrounding areas.

Education

The majority of work that the BPBA conducts is in the area of education. The BPBA has engaged two local schools in the UNESCO Associated Schools Program. Projects are aimed at promoting biodiversity through outdoor classroom activities and school site naturalization. Experiential learning is also underway through a comparative water quality monitoring study and an annual ecology field camp course for local students. The BPBA in cooperation with the Ontario Forestry Association was also instrumental in bringing the Ontario Envirothon (an annual high school environmental championship) to the area where students took part in environmental research field trips, workshops, and regional competitions.

Research and Monitoring

The BPBA has made a major contribution to the national park and greater park ecosystem in terms of research and biomonitoring capacity. The BPBA is dedicated to providing opportunities for youth and has seasonally employed a summer student to conduct forest and benthic monitoring. BPBA has partnered with Environment Canada's Science Horizons Internship Program and Parks Canada to implement EMAN's Terrestrial Monitoring Protocols and assess the overall condition of forest ecosystems on the Northern Bruce Peninsula. The association also established a partnership in 2003 with the Ontario Benthos Biomonitoring Network (OBBN) to evaluate aquatic ecosystem condition. The biosphere reserve designation also attracts much university research, which typically explores the stewardship of human-environment interactions in the greater park ecosystem. University led research to integrate the biosphere reserve concept into the Grey-Bruce regional tourism strategy and has led the local tourist industry to increasingly reflect a stewardship role within their operations.

Financial Benefits – Income or In-kind Support

The BPBA contributes primarily in terms of in-kind support for monitoring forest and aquatic health and attracts complementary research from regional universities. In 2004, the contribution to monitoring was estimated at \$25000 (see Table 3).

Costs of the Biosphere Reserve for Bruce Peninsula and Fathom Five National Park

The benefits gained by working with the Biosphere Reserve do impose some modest financial and in kind costs on Parks Canada. The following review of costs is also based on engagement from 2000 to 2004.

Non-Financial Costs

All of the non-financial contributions to the NEBR were ranked as low.

Financial Costs

The financial costs are in the form of an annual \$5000 operating grant (initially \$5000, now \$1667), staff time and in kind costs associated with the regional forest and benthic monitoring programs. In 1998 the Parks Canada Agency began designating the annual operating grant. However, it was not used at the site until the local association was formed to actualize the biosphere reserve.

Comparison of Benefits and Costs

Without doubt, BPNP staff view the benefits of involvement with the NEBR worth any associated costs. The biosphere reserve designation is viewed as having added a lot of credibility to the area. The financial cost-benefit comparison also indicates an annual park benefit of \$4520.

The BPNP has benefited greatly from its relationship with the BPBA. Although the BPBA has only existed for five years it has developed some tangible programs. The establishment of regional monitoring programs and local education programs are novel enterprises that without BPBA involvement would otherwise not exist. The BPBA has also performed a role the park is simply not capable of, that is, acting as a facilitator to engage community members and stakeholder groups on issues of local importance. The park continues to not only assess what the NEBR can provide the park but also what the park can provide to the biosphere reserve and greater park ecosystem. Cooperation on monitoring work among the NEC, NEBR, University of Waterloo, and others has provided a model on which similar community-based biosphere reserve associations could develop. It's hoped that this local effort will precipitate interest in developing a network of biosphere reserve committees along the escarpment to increase community engagement and enhance partnership activities (Ramsay, 1998).

The BPBA includes the municipality around BPNP, which is only a part of the entire Niagara Escarpment (the Bruce Peninsula is a fairly large area). There are also innumerable activities that indirectly support the BPNP that have arisen as a result of coordination of environmental interests along the Niagara Escarpment. Although it is not yet possible to measure the influence the biosphere reserve designation has played in catalyzing and harmonizing initiatives along the escarpment, it has no doubt fostered a landscape-level approach and encouraged wider cooperation such as is occurring with compilation of monitoring metadata and advocacy of escarpment issues.

St. Lawrence Islands National Park – Thousand Islands–Frontenac Arch Biosphere Reserve

Description of St. Lawrence Islands National Park

St. Lawrence Islands National Park (SLI) is located in the 1000 Islands – Frontenac Arch area, an 80-km wide strip of hilly land, shallow soils and rock outcroppings joining the highlands of Algonquin Park in Ontario with the Adirondack Mountains in New York State. The park was established in 1904 following the donation of a private waterfront property and has since then expanded to include 20 islands, 90 islets, and over 1000 ha in several parcels along the mainland, some of which, acquired in 2006, are ecologically-sensitive (Parks Canada, 2005; Gardner, 2005). The islands of SLI form stepping stones shortening the distance across the St. Lawrence channel and facilitating ecological connectivity and wildlife dispersal into the largely settled mainland. As part of an

ecological transition zone, the park has a rich biodiversity which includes atypical species, many of which are at risk, such as the black rat snake (*Elaphe obsoleta*), five-lined skink (*Eumeces fasciatus*), and deerberry (*Vaccinium stamineum*).

The 1997 State of the Parks Report ranked SLI as exhibiting the highest levels of ecological impairment of any of Canada's national parks. Significant threats are mainly from external sources including direct visitor disturbance, habitat fragmentation and loss due to road corridor development, exotic introductions, toxin and pollutants, sport fishing stress, and anticipated climate change impacts. SLI, in its ecological vision of the park, acknowledges its reliance on cooperative land stewardship to fulfill its purpose: "*Since the park is small and fragmented, the maintenance of its ecological integrity can only be pursued on a regional scale. Staff must work with partners to link the park with other core protected areas, to promote sustainable development in the region, and to building a constituency of support through a program of education and interpretation*" (Parks Canada, 2005).

Description of Thousand Islands–Frontenac Arch Biosphere Reserve

Although Thousand Islands – Frontenac Arch Biosphere Reserve (TIFA) was designated recently in November 2002, there was work ongoing 10-15 years before (including the development of a common regional database and land acquisition) that laid a solid foundation for establishment (Stephenson, pers.comm.). The biosphere reserve encompasses a triangular area of 150 000 hectares comprised of federal and provincial protected areas, natural and recreation areas and historic sites, land trust holdings, regional conservation lands, as well as urban and rural zones of cooperation. The zone of cooperation covers a diverse transition of interests including lifestyles along the St. Lawrence, the rural interests surrounding Ontario's major hwy 401, and tourism to the north.

The biosphere reserve is governed by a community-based board of directors (a.k.a. the Biosphere Network) drawn from the local network of nature and history organizations. Together they "*work together to promote and support shared efforts and to implement programs for conservation, development, research and education in the Thousand Islands-Frontenac Arch region*" (Biosphere Network, 2005). TIFA focuses its efforts on developing what they refer to as a "Chamber of Conservation" which is a community-of-interest that facilitates networking, coordination, and advocacy to organize around issues of regional importance.

Relationship between the National Park and Thousand Islands – Frontenac Arch Biosphere Reserve

The relationship between St. Lawrence Islands National Park and biosphere reserves initially began through the Chair of the St Lawrence Parks Commission, Gary Clark, who was interested in the idea of developing a biosphere reserve to enhance interagency cooperation and regional benefits. In 1993, following a presentation by Jim Birtch, of Parks Canada's national office, staff of the St Lawrence Parks Commission and St

Lawrence Islands NP, decided to begin applying ideas from the biosphere reserve program without actually attempting to designate the area as a biosphere reserve. To this end, they formed the Thousand Islands Area of Cooperation (Ontario and New York) and established a steering committee, however, after a few years the initiative died.

The feasibility of pursuing a biosphere reserve in the Thousand Islands area was revived in 1999 following work by a masters student (Lief Helmer), who, with the support of Parks Canada, looked at key issues and methodologies, and chaired a number of public stakeholder meetings which engendered local interest in the idea. A plan to proceed was spurred in late 2000 by a stakeholder meeting sponsored by the Thousand Islands Heritage Conservancy.

Although national park management was careful not to be the public proponent of the biosphere reserve, both paid and volunteer support by Parks Canada staff was instrumental in coordinating development of the initiative, including nomination for the biosphere reserve. After designation in November 2002, the national park has continued to provide behind the scenes support for the biosphere reserve. Technical support (e.g. mapping) has continued but administration of biosphere reserve coordination is ably carried out by staff of the biosphere reserve network. The national park is one of the key members in the 70 member network and a member of the board.

Many of the projects in which the biosphere reserve network has played a part have had quite positive benefits for the national park, including the expansion of the national park, stewardship and other ecological integrity initiatives.

Park managers value the skills and initiative of the biosphere reserve network board and its experienced staff. Respect for park managers is equally as strong. Within this positive relationship, the biosphere reserve network has found resources and identified a mission that allows it to operate independently from the national park, but with many overlapping objectives.

Benefits of the Biosphere Reserve for St. Lawrence Islands National Park

This review of benefits and costs is based on SLI involvement with TIFA since its inception and draws from the preceding foundational experiences. The biosphere reserve and attendant network was developed as a result of broad-based community process, and as such, the biosphere reserve enjoys widespread support with over 70 groups coming under its umbrella. Significant consultation of municipal and stakeholder support for the concept has promoted a sense of ownership and value and embedded the BR vision into the wider community (Giffin, pers. comm.). The BR relationship makes the park more effective as a neighbour in a community. Park staff highlighted that the benefit is not from having the biosphere reserve do work that park staff undertake as part of their mandated role but rather the network broadens the sphere of interest and engagement in areas that can be beneficial to all. The BR is viewed as a means of leveraging an investment with longer-term dividends and as such should not be seen as a means of reducing investments in selected park activities. Effectiveness should be measured not by

cost reductions but by results-based indices within the broader landscape such as land under protection, shared programming and projects, partnerships, new business opportunities, inter-government co-operation, etc. Intangible benefits are viewed as being most important. With this orientation staff discussed the park-biosphere reserve relationship in terms of regional benefits and challenges of cooperation without reference to financial implications.

Regional Awareness

Regional awareness was ranked as one of the largest benefits of biosphere reserve involvement because of its role in disseminating park values and showcasing ecologically sustainable activities. The BR acts as a window for transmission of information and awareness among a broad community of regional actors. Education and awareness events have included community conferences, workshops/training, public education displays, and media coverage reaching thousands of local residents (Biosphere Network, 2005). A recent feasibility study was completed to use low power radio transmitters to communicate with residents and travelers along 401 Highway.

Interagency Cooperation

The primary role of the Biosphere Network organization is facilitation. The BR is valued because it enhances relationships and provides a sphere of influence that is compatible with long term planning interests. Essentially they do what Parks Canada doesn't do well because of Parks Canada's inward focus (Giffin, pers. comm.). The Biosphere Network provides a forum for common ground to be established. Organizations under its umbrella have, for example, cooperated to assess municipal plans from the perspective of a network. This community of interest has much greater clout than individual interest groups because initiatives are perceived not as emerging from an advocacy group but as being community led and inspired which lends credence to the organization when dealing with authorities and increased political access.

The Biosphere Reserve is one of the few non-government organizations to receive funding under Parks Canada's Innovation Funding envelope. The BR is working to help the park better move beyond a fragmented jurisdictional approach and integrate its programs and services with the surrounding community (TIFA, 2004).

The Biosphere Network has facilitated a cooperative agreement among a coalition of regional partners (i.e. TIFA, Nature Conservancy of Canada, Thousand Islands Nature Conservancy, Parks Canada, and St. Lawrence Parks Commission) with the objective of increasing the land under "Core protected Status".

The BN has also taken a project sponsorship role outside of the park when an individual member organization does not have the capacity to develop and deliver a project. They have, for example, sponsored trail development projects.

Planning

The Biosphere Network (BN) has a 10-20 member multi-disciplinary working group to review draft official plans for municipalities. In this way the partners discuss collective

concerns and respond as a consortium of interests. Where individual groups may not necessarily be heard, the collective voice of the BN is listened to. Townships have requested help in acquiring data on significant natural areas as required by the municipal planning process.

Management

The BN is assisting a sub-network to identify, collect, analyze and report on significant woodlands, wetlands, wildlife habitat and core/connecting areas in the Biosphere Reserve and Eastern Ontario (Biosphere Network, 2005). Data continues to be compiled for a Community Atlas of Conservation Information. The BN plans to continue to develop this Geographic Information System database for use by local government, economic development, conservation and cultural use.

Regional Cooperation and Protection

The access provided by the BN umbrella allows the park to touch the membership of all affiliated organizations. The park benefits by using these network relationships for communications, planning, awareness and issue resolution.

A major initiative underway is *Algonquin to Adirondacks* (A2A) which works to connect the natural landscapes between these two parks. The BN has been instrumental in supporting this natural corridor initiative by conducting research on permeability of the 401 highway for wildlife crossing, documenting collisions, and identifying land with potential for long-term conservation and re-connecting the landscape.

The BN has undertaken an ambitious program of shoreline assessments along the St. Lawrence and in Charleston Lake. Private property owners receive an assessment with recommendations on shoreline rehabilitation to help water quality and wildlife habitat. The BN has also spawned a materials exchange using an industrial ecology model that helps communities and organizations reduce waste and recycle surplus goods and materials to those that can use them (QBC Management, 2005).

Costs of the Biosphere Reserve for St. Lawrence Islands National Park

To round out the discussion of benefits of the biosphere reserve, non-financial and financial costs were collected from each national park. However, because of SLI's orientation on using the biosphere reserve to develop a network for conservation which the park could not do alone, staff discussed the park-biosphere reserve relationship in terms of regional benefits and challenges of cooperation without reference to associated costs.

Comparison of Benefits and Costs

In summary, the benefit of park, and other partner, involvement with the BR Network is in broadening the community of interest in areas that can be beneficial to all. In essence, this cooperative network makes the park's job much easier and effective. SLI continues to witness an exponential increase in partnering opportunities whereby skills and

expertise are being applied beyond the traditional sphere of activity. Project priorities for 2004 included connecting the landscape-core areas, cultural festivals, shoreline stewardship, review of park management and official plans, land trust networking, forest inventory, among others. It is anticipated that this will have a good deal of impact on ecological integrity over time.

COMPARATIVE SUMMARY OF CASE STUDIES: EMERGING THEMES

National park - biosphere reserve relationships exhibit a wide range of common elements, benefits, and challenges. In terms of benefits and challenges they are park specific, and vary depending on the orientation of the biosphere reserve, but themes do emerge. Benefits for both the parks and adjoining regions are first identified.

Benefits

National park managers and staff that are involved with biosphere reserves exhibit strong support for them. In large part this backing centers on the unique role that the biosphere reserve concept can play in facilitating communication and building regional networks around common interests. As Dolan and Firth (2003) suggest (in relation to Waterton Biosphere Reserve) biosphere reserves are actualized through the *collective effort of many individuals and organizations, which may work independently or collaboratively towards the overarching goals of MAB*. By virtue of their broad mandate as models for co-operative effort, biosphere reserves, and their associated facilitating bodies, often simply provide a forum for dialogue among existing networks. As simple a role as this may sound, national parks benefit immensely from this type of grassroots dialogue. The increased diversity of perspectives brought to bear on an issue engendered by biosphere reserve-mediated discussions can greatly improve the outcomes possible for issue resolution. The network that develops is also often used as a standing instrument for consultation and collaboration on issues as they arise. Information can be more broadly disseminated, controversial issues in the region can be raised for consultation and addressed, constituencies can be broadened, shared interests can be pursued, and ideally regional visions can emerge.

No matter the size of a park it relies on cooperative land stewardship in the surrounding landscape. As conservationists have noted, increased protected areas, buffer zones, and improved connectivity between parks are critical to stem biodiversity loss and maintain ecological integrity (Noss and Cooperrider, 1994). Biosphere reserves, with their non-legislated, permeable boundaries and emphasis on regional actors, engender a broader landscape level approach to issue management than what delimited protected areas can achieve. Oriented in this way, biosphere reserves have shown success in enhancing inter-agency cooperation to address complex multi-jurisdictional issues (e.g. bovine tuberculosis in the Riding Mountain National Park area). Although time intensive, including a wider group of stakeholders in issue resolution, not only improves solutions but also embeds implementation of initiatives within the broader community.

Biosphere reserves have also enabled national parks to effectively engage community champions and networks in resolving regional issues and pursuing initiatives at very low costs. The focus of specific projects may vary across biosphere reserves, but parks are able to leverage their financial resources by collaborating on GPE-based projects that support their goals. For example, the education efforts in the NEBR and monitoring work in RMBR both supported park interests and were garnered at a fraction of what it might cost the national park to achieve the same results.

A recurring theme was the pride and credibility which designation of a biosphere reserve brought to an area. This is an intangible benefit with implications not only for the profile of the park but also the mindset of local residents who may begin to acknowledge the uniqueness of their particular geography. Biosphere reserve activities such as the Bruce Peninsula Biosphere Association regional showcase of sustainable initiatives also help to foster this place-based awareness and value. Increased volunteer capacity may be a plausible result with long-term dividends in local communities.

Linking to larger national and international networks and initiatives is a significant benefit to both national parks and adjoining areas. The biosphere reserve network is international and provides for the exchange of ideas and lessons learned (e.g. UNESCO associated schools project). At the national level Environment Canada's EMAN program has been embraced by biosphere reserves enabling both the Parks Canada Agency to benefit from the monitoring results and the Department of Environment to rapidly expand its partner-network for monitoring. An important development which strengthened network linkages for all biosphere reserves and their associated protected areas and partners, was the incorporation of the Canadian Biosphere Reserves Association (CBRA) in 1998. CBRA has greatly strengthened national coordination of biosphere reserves and facilitated information exchange and cooperation on projects. CBRA has benefited biosphere reserves as well as the associated national parks by coordinating national projects in the areas of land-use change, effects of climate change, habitat restoration, ecotourism accreditation studies, biomonitoring, and student research (CBRA, 2005). A particularly important initiative was the development of Cooperation Plans for biosphere reserves (Birtch, 2005). The consultation process among regional partners stimulated local interest and involvement around shared priorities. The organization continues to actively employ and pursue new approaches and resources to support biosphere reserves and their associated park partners in achieving their goals.

Opportunity

As might be expected, biosphere reserves play very little role in terms of operational support for parks (e.g. park facilities, environmental management systems, environmental assessment) and facilitating visitor experiences within the park. However, cooperating to promote regional (eco) tourism is an issue and role that is germane to biosphere reserves. This study found there were only two that were somewhat active in this regard. This may be due, in part, to the divergent foci of biosphere reserves and traditional tourism which respectively focus on regional sustainability and increasing tourism spending, though

sustained BR capacity is also an issue. Although Parks Canada and the Tourism Industry Association of Canada (TIAC) released *Canada's Code of Ethics and Guidelines for Sustainable Tourism* in the late 1990's it is only more recently that substantive work has taken place (Parks Canada, 2005b). While Parks Canada and the TIAC acknowledge the inextricable links between sustainable tourism and conservation in their 2001 *Accord for Sustainable Tourism*, biosphere reserves may wish to explore how they can support the implementation of this joint initiative.

Common Challenges

There are a number of common challenges among the national park - biosphere reserve relationships reviewed.

Securing long-term funding

Biosphere reserves in Canada generally suffer from a chronic lack of funding. Securing adequate and stable resources to sustain biosphere reserve activity is an ongoing issue. For example, in WBR the main challenge to date as identified in the 1997 periodic review of the biosphere reserve was “*the lack of resources to evolve from a dedicated volunteer group to a small, but effective 'catalytic organization' with a broader membership base, a corporate identity, and a small staff to organize and coordinate projects and programs*” (Francis, 1997).

Funds are administered by the National Office of Parks Canada to support national parks which then fund biosphere reserve activities, however, as the biosphere reserve network in Canada has expanded their associated funding has not, and so existing funds are now spread thinner across individual biosphere reserves. In 2005 this money equated to \$1176/biosphere reserve. Parks Canada supports the biosphere reserves containing national parks because of the acknowledged benefit for the parks. But the federal government has not yet determined how it will support biosphere reserves. Because of this, Parks Canada cannot easily allocate more money to a program for which it is not officially responsible.

Since 1986 or earlier, Parks Canada has supported committees of biosphere reserves containing national parks and contributed to the costs of annual national meetings. From 1993 to 1997, an officer from the National Office of Parks Canada worked part time as the Secretary Biosphere Reserves Working Group of the Canada MAB Committee (Canadian Commission for UNESCO). Since CBRA was formed in 1997 to replace the working group, this officer has been on loan half time as Executive Secretary of CBRA. Parks Canada has initiated a number of attempts to get official federal support for biosphere reserves, however, to date these efforts have not resulted in the envisioned partnerships.

The goals and activities of the biosphere reserve program are well aligned with a wide variety of government and non-government activities and in some cases have helped government departments in pursuing their mandated goals and in delivering programs. Environment Canada's engagement of the biosphere network to develop its Ecological

Monitoring and Assessment Network is a case in point.

It would be prudent for other partners such as, federal government departments, provincial and municipal levels of government, non-government organizations and private sector organizations, which might benefit from the biosphere reserve model to consider pooling supporting for individual biosphere reserves and/or the network as a whole (i.e. CBRA). This process could be best catalyzed by the CBRA, which is well positioned to articulate the benefits and role of biosphere reserves to each of these groups. For instance biosphere reserves could play a supportive role enabling federal, provincial, and territorial ministers to meet their commitments to protect species at risk (and their habitat) under the *Accord for the Protection of Species at Risk* (RENEW, 2005). As more species are listed under the *Species at Risk Act (2000)* biosphere reserves could support Environment Canada's efforts around local species recovery by facilitating cooperative stewardship agreements and public education and engagement. More broadly, however, there are a number of federal government departments and agencies with sustainable development mandates or policies that stand to benefit from a strong BR network in Canada including: Environment Canada, Parks Canada, Agriculture Canada, Fisheries and Oceans, Natural Resources Canada, Indian and Northern Affairs, and the Regional Development Agencies. These federal government departments could build capacity for their own efforts, and demonstrate leadership by officially endorsing the MAB Biosphere Reserve program and concomitantly increasing funding to sustain the biosphere reserve network.

Building staff capacity

There is a common need for staff capacity across biosphere reserves. A lack of sufficient dedicated funding has resulted in biosphere reserve staffing and contracting on a temporary basis which in turn has limited volunteer capacity. Given the geographic scale and jurisdictional complexity it is crucial to have at least one staff person who can facilitate communication across the community-of-interest and coordinate activities on behalf of the biosphere reserve. Here again this might be cost-shared amongst benefiting or prospective partners. If biosphere reserves are to be sustained there is a need to explore options for resolving this issue over the long-term (Francis, 2001).

Fostering community trust and ownership

The history of biosphere reserve designation can also pose a challenge. In the cases where a national park was involved as one of the proponents public proponents of a biosphere reserve (Waterton Lakes), designation concerns arose within the surrounding community. Some people thought that the biosphere reserve was simply another park committee and therefore narrowly focused on park issues or even an attempt to expand the park. For the most part this concerns was allayed quickly as national park managers realized the sensitivity of ensuring community leadership. In another case, Riding Mountain BR, was proposed by an association of all the municipalities around the park who had organized to have a common front against the park on several important issues. From this genesis the BR was perceived as independent and very credible in terms of engaging community interests. It is thought that the limited resources and community

involvement in WBR may be tied to the biosphere reserve designation initially being perceived as owned by Parks Canada. Alleviating concerns and building community trust around the purpose of designation is particularly important in fostering acceptance and ownership of biosphere reserves.

Enabling a regional focus

Some suggest that the current Biosphere Reserve model, with protected core, buffer zone and transition zone, does not promote an ecosystem-based approach (Dolan and Firth, 2003). Based on protected areas, with boundaries that are often not ecological but political in design, biosphere reserves must, and have, built beyond this jurisdictional approach. Designating separate buffer and transition zones is often problematic because of the pragmatic challenge of delineating their boundaries. More importantly, these zonal designations tend to concentrate attention on differentiating land-based activity in each zone. These zones are required to get UNESCO designation, fortunately in Canada however, they are not a main focus for BRs. As most biosphere reserves have already done, a more enabling approach may be to describe an area of cooperation to re-focus on regional relationships. A salient reason for delineating boundaries for BRs is to allay suspicion that a BR will restrict community activity. However, the focus should remain on the strength of the BR as a body to foster non-regulatory, cooperative action across jurisdictional boundaries.

Proposing boundaries has shown some benefits for new BR creation. In the development of the Thousand Islands Frontenac Arch BR for example, a local city planner on the outskirts of the BR, convinced municipal councilors that their city should become part of the BR after realizing the benefits of being a member. The de-facto permeable boundary of BRs has also enabled many entities outside the BR boundaries to become engaged and collaborate under the auspices of the BR. Although, biosphere reserves have enabled a wider regionally-based focus for parks their lack of resources for coordination has prevented them from having results anywhere near commensurate with their potential, which has prevented them from being taken more seriously at local and national levels.

Although not widespread, the specific regional geography of some biosphere reserves presents some challenges. The shape and size of the NEBR, along a linear landform extending north-south 725 kms, increases the challenges of coordinating interconnected projects and information sharing. This sizeable region increases stakeholder diversity and numbers (>450 parties consulted for the NEPlan), and while such a broad constituency increases buy-in it must be balanced against the increase in communications and transactional costs. Fortunately, in the case of the NEBR the NEC has the capacity to engage such a widespread group and is currently looking for opportunities to foster development of more community-based BR associations in the central and southern parts of the BR. Incidentally, UNESCO's recent periodic review recommended that the boundaries of the NEBR be expanded outward from the Niagara Escarpment Plan Area, which will better encompass ecological systems and also increase the need for broader community consultation.

ENHANCING CO-OPERATIVE PARTNERSHIP BETWEEN NATIONAL PARKS AND BIOSPHERE RESERVES

National parks and biosphere reserves mutually benefit when both are functioning well. This review highlights a number of lessons learned that may be helpful in successfully establishing biosphere reserves and enhancing partnerships with national parks, and/or other partners:

- Focus on the biosphere reserve concept as a unifying vehicle through which collective regional efforts of many independent individuals and organizations can be aligned.
- Rather than focus on jurisdictional mandates and boundaries, promote the biosphere reserve as a cooperative model with a primary emphasis on relationships among regional actors. This emphasis allows a blurring of boundaries that engenders a broader landscape level approach to issue management.
- Pursue biosphere reserve designation within a broad-based community process of consultation to promote a sense of ownership and embed a vision within the region.
- Biosphere reserves can, and have been, stimulated by the individual efforts of a local champion and then built and sustained by a small cadre of volunteers.
- Build a community of interest, focusing effort on common goals while agreeing to disagree on others.
- Maintain an open membership policy to involve a range of interests and diversity of values.
- Clearly articulate and link goals and objectives to common interests and concerns.
- Address the interests/needs of others first before expecting the same courtesy.
- Develop a thorough understanding of the region, its communities, and interests.
- Maintain an external focus with other partners and stakeholders beyond protected area boundaries.
- The governance structure and orientation of biosphere reserves should, and do, vary according to regional differences and considerations.
- The pride instilled following designation of a biosphere reserve should be nurtured into action by regional partners.

- Biosphere reserves should promote their unique regional role as facilitator and catalyst for action among regional actors and interests. Their proven strengths should also provide foci for action: enhancing inter-agency cooperation, supporting protected area-community efforts to disseminate information, raising education and awareness, implementing new projects, and promoting best practises.
- Biosphere reserves can serve to enable partners to leverage their financial resources by collaborating on regional projects that support their goals.
- Draw on the benefit of joining a widespread network of biosphere reserves. As part of the biosphere reserve network, protected areas and regions gain national and international opportunities to showcase initiatives and benefit from peer-learning.
- To maintain a successful administrative biosphere structure, a substantive and consistent level of fiscal resources is essential. Consider cost-sharing amongst benefiting or prospective partners.

The above list is based on principles outlined by Dolan and Firth (2003) and the themes developed in this research.

CONCLUSION AND FUTURE DIRECTIONS

As many others have argued, parks should function as core protected areas providing representative ecological baselines within a landscape of sustainable activities (Boyd, 2003; Parks Canada, 1998). As surrounding landscapes are developed parks must focus externally and find allies to broaden their engagement at the regional level. Biosphere reserves have a number of strengths in this regard which can be brought to bear in both resolving complex multi-jurisdictional issues and in drawing together community interests and developing a shared regional vision which promotes collective responsibility. These strengths are unique and will only be realized through a well-supported local biosphere reserve and associated network.

Parks have begun to ask: What can national parks provide to biosphere reserves, and other similar organizations in the Greater Park Ecosystem (GPE) that share common interests? The guidance outlined above in *Enhancing co-operative partnerships between national parks and biosphere reserves* provides some direction in this regard. More specifically, this overview is meant to stimulate discussion and coordination among managers of national parks. Communication could be enhanced by establishing a working group of national park managers and biosphere reserve directors to share experiences and facilitate collaborative initiatives. A national workshop to catalyze this engagement (with the intention to institute ongoing communication) would be valuable.

The diversity of biosphere reserve-national park partnerships provides opportunity to develop joint initiatives and projects among biosphere reserves that would benefit

national parks and accelerate learning. This, in fact, is already happening informally as biosphere reserves across the country engage in monitoring through the Ecological Monitoring and Assessment Network. An area of great potential is the use of biosphere reserves as test areas for methods of regional coordination and sustainable development (this has been done at Niagara Escarpment and other BRs to some degree). This is a promising area for collaboration, the results of which may be applied by other parks with or without biosphere reserves. Learning around sustainability has been pursued by Parks Canada through the Innovation Fund for Ecological Integrity (e.g. A report produced in 2005 on sustainability in the TIFA biosphere reserve has possible application to other NPs). As demonstration areas for sustainable development, biosphere reserves provide a broad umbrella under which to pursue integrated socioeconomic and ecological goals. There are latent opportunities for government-industry partnerships to emerge. Although, traditionally not a primary interest of parks, sustainability initiatives within GPEs are essential to support the goal of ecological integrity and are increasingly being pursued as multi-stakeholder partnerships emerge.

The pre-eminent need to integrate park management with surrounding GPEs is being strained by tightening financial resources and a re-orientation towards cost-recovery in the national parks system. Although, to date, biosphere reserves have returned large conservation dividends while requiring only modest funding, the potential benefits of biosphere reserves are not being realized. While the benefits of engaging regional stakeholders in supporting park interests have become self-evident, one must consider the question of financial sustainability of the biosphere reserves that are established.

Although historically biosphere reserves have often arisen with primary, but limited, financial support from the park agency managing the protected core, a much wider community-of-interest has emerged to congregate around biosphere reserves. As new partners are engaged by the biosphere reserve concept and model, whether in newly designated locales or under pre-existing structures, a pooling of resources by this community-of-interest would enable partners to benefit from the unique functions and services of a biosphere reserve while cost-sharing associated expenses. In many of the other 102 countries that have biosphere reserve programs, the MAB Committees set up by the UNESCO National Commission benefit from an annual stipend or in-kind support for staff. The leading examples come from Sweden and Austria, where biosphere reserves are well integrated into the government framework and reasonably well supported in terms of Secretariat functioning (Robertson, pers. comm.).

To date, the biosphere reserve model has been actively supported by national parks, while National Wildlife Areas (NWA) and Migratory Bird Sanctuaries (MBS), provincial parks, and ecological reserves also serve as core areas for biosphere reserves. These other protected areas would also clearly benefit from pursuing collaboration under such a model. At a local level, municipalities also stand to benefit from active engagement and support for biosphere reserves. There is also potential for industry involvement within biosphere reserves.

As suggested, industry engagement may be forthcoming as sustainable development

demonstration projects are conceived and initiated. Engaging this often overlooked group of regional stakeholders is important to integrate socioeconomic and ecological interests in a meaningful way and begin to address the underlying behaviours and structures that threaten natural areas. Shell Oil and TransAlta Utilities have been cooperative corporate citizens at Waterton (i.e. Shell has rehabilitated disturbed work sites and monitored the success of planted native grasses), while several firms have been engaged in the NEBR through their support of the annual Leading Edge Conference. Biosphere reserve relationships with the private sector must move beyond corporate environmental philanthropy and towards helping local businesses integrate sustainability as a business practice and advantage. If biosphere reserves are to resonate beyond park and conservation circles, progressive industry proponents with regional land-based interests need to be sought out and engaged. Developing voluntary industry codes of practice would be a useful avenue to explore for potential industry-government-BR collaboration. The applicability and benefits of biosphere reserve engagement for other federal government departments, levels of government, industry and non-government organizations need to be articulated in order to capitalize and develop the biosphere reserve network. Government leadership is needed, however, for these consortiums of interest to come together.

Biosphere reserves enable organizations to cooperate beyond their narrow jurisdictional mandates to collectively address pervasive regional issues. The working relationships that arise from cooperating under a biosphere reserve model enhance regional capacity to cooperate and plan for environmental goals, such as ecological integrity, as well as economic and social goals. The real strength of biosphere reserves is the forum they provide for dialogue and action towards regional sustainability. It is hoped that this study will help Parks Canada, and other partner and prospective organizations, to realize the full potential of biosphere reserves in Canada.

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APPENDIX 1: Overview of the Man and the Biosphere Programme

The International Man and the Biosphere (MAB) Program was created in 1971 to provide a scientific basis for addressing human needs in harmony with nature. A major tool of MAB is the biosphere reserve, an area which is designated by UNESCO as representative of one of the world's major ecosystems and seen to be important to the biosphere. Each biosphere reserve is intended to serve as a demonstration area for the conservation of biodiversity and for sustainable development. A reserve will contain one or more protected core areas, a buffer area (normally) and a surrounding zone of cooperation. Major activities include: research, monitoring, education, training and management coordination. Local participation is an essential element of a functioning biosphere reserve, and in Canada most reserve activities are directed on a voluntary basis by local residents. These local committees also share information and experience with a worldwide network of over 482 biosphere reserves in 102 countries.

(Provided by the Canadian Biosphere Reserves Association, 2005)

APPENDIX 2: Questionnaire Template – Benefits and Costs of Biosphere Reserves for National Parks

Context of National Park Involvement with the Biosphere Reserve

Please provide the time period of national park - biosphere reserve involvement that you are knowledgeable of and are using as the basis for answering the questionnaire.

National Park Benefits of Involvement with the Biosphere Reserve

For those parks with other kinds of arrangements for cooperation (e.g. model forest, regional liaison committees) please use the “other” column to highlight the activities that are done through these other arrangements. The "comments" section can be used to specify such arrangements.

Non-financial Benefits	Little -----A Lot						
	other	na	1	2	3	4	5
Resource Conservation							
Protection							
Assist with surveys / patrols							
Reduce unauthorized access							
Protect species migrating/dispersing out of park (e.g. adjacent landowners help to reduce poaching)							
Control disease							
Reduce development pressure							
Conserve key habitats outside park							
Conserve key species outside park							
Conserve key ecological processes (e.g. fire)							
Acquire conservation lands (e.g. conservation easements)							
Assist with restoration activities							
Reduce pollution to the park							
Comments:							
Planning (with park or municipality)							
Articulate a vision for the region							
Facilitate multi-stakeholder planning processes							
Mediate between local stakeholders							
Identify key ecological issues in the region							
Input to Park Management Plan							
Comments:							
Management							
Promote best practices in land use activities							
Cooperative land management							

Cooperative water management					
Cooperative species management (please highlight whether species-at-risk, alien species, hyper abundant species, and /or re-introductions)					
Support for data/information management					
Comments:					
Research					
Address park research needs (e.g. provide data/information)					
Carry out monitoring					
Socio-economic studies					
Contribute to State of the Park Report					
Compile Traditional Ecological Knowledge					
Access to external research facilities					
Comments:					
Visitor Activities					
These questions are meant to assess how the biosphere reserve complements the information and education activities that the park provides.					
Interpretation					
Data for interpretation					
Assistance with interpretation					
Expansion of themes for interpretation					
Comments:					
Education					
Communicate ecological integrity to new/expanded audiences (Please highlight those that apply: youth, educators, urban dwellers, regional residents, politicians, businesses, industry associations, government authorities)					
Teach cultural heritage					
Develop communication materials complementing ecological integrity mandate (e.g. pamphlets, website, exhibits, displays, publications)					
Incorporate park-related themes in school curricula					
Hold environmental workshops/training					
Comments:					
Visitor Use and Experience					

Encourage responsible visitor use (i.e. reduce visitor impacts)									
Improve social-policy marketing (i.e. benefits/stresses of the park)									
Improve park services to visitors									
Improve regional services visitors									
Comments:									
Administration									
Staff Development									
Increase professional networking opportunities									
Improve knowledge of staff									
Improve public consultation skills									
Improve resource management skills									
Increase science capacity									
Comments:									
Inter-Agency Cooperation									
Network with provincial and federal agencies									
Enable agreements / accords									
Cooperate with municipal government									
Develop research partnerships with universities / government									
Cooperate on project development									
Comments:									
Regional Cooperation									
Coordinate on tourism									
Consult with residents									
Foster sustainable regional economic opportunities									
Mechanism to address regional issues with potential negative effects on the park									
Comments:									
Regional Awareness									
Increase knowledge of park values									
Showcase ecologically sustainable choices/initiatives									
Foster regional “smart growth” initiatives									

<p>Comments: Has public perception of the value of the park changed following biosphere reserve designation? If so please describe.</p>
<p>Operations</p>
<p>Improve ecological design of park facilities</p>
<p>Improve environmental management system (EMS) or sustainable development strategy (SDS) for the park</p>
<p>Contribute to environmental assessments</p>
<p>Comments:</p>

Financial Benefits	Estimated \$ Amount or # of Hours	Time Period	Annualized \$ Amount
Resource Conservation			
Please describe each project individually			
Research Projects			
Facilities and Works			
Cost sharing agreements			
Conservation land securement			
Technical support			
Monitoring and patrols			
Comments:			
Visitor Activities			
Interpretive material / displays			
Volunteer contributions			
Comments:			
Administration			
Savings on administration (e.g. public consultation)			
Marketing for park			
Comments:			

National Park Costs of Involvement with the Biosphere Reserve

Non-financial Costs	Little ---- A Lot
----------------------------	--------------------------

	n/a	1	2	3	4	5
Administration						
Park Resources						
Low priority use of staff time						
Time and distance challenges						
Comments:						
Inter-Agency Cooperation						
Challenges of integration with existing cooperation mechanisms						
Interrupt boundary discussions						
Comments:						
Regional Coordination						
Increase challenges with resolution of regional issues						
Increase old hostilities						
Comments:						

Financial Costs	Estimated \$ Amount or # of Hours	Time Period	Annualized Amount
Administration			
Time of superintendent			
Time of other staff			
Administrative support			
Travel			
Annual grants			
Contributions to specific projects			
Comments:			

Summary Questions

Are there benefits that would not likely be attained without the biosphere reserve?

Are the benefits worth the cost?

Are there other voluntary sector organizations in the greater park ecosystem that the national park is involved with? If so how do you think the role(s) of the biosphere reserve has been influenced by these other co-operative initiatives?

Feedback on the Questionnaire

In an effort to improve any such assessments in the future feedback on how we might enhance the questionnaire would be much appreciated. Thanks.