

PART I: SUMMARY

PROPOSED UNESCO FUNDY BIOSPHERE RESERVE

NEW BRUNSWICK, CANADA

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1. PROPOSED NAME OF THE BIOSPHERE RESERVE

In local publications, the proposed area will be referred to as the “Fundy Biosphere Reserve”; the stakeholder group will be referred to as the “Fundy Biosphere Regional Network”.

2. COUNTRY: Province of New Brunswick, Canada

3. FULFILLMENT OF THE THREE FUNCTIONS OF BIOSPHERE RESERVES

The Bay of Fundy and its adjacent watershed is one of the most dramatic and ecologically diverse landscapes not only in eastern Canada, but also on the east coast of North America. It is one of the less developed and least ecologically disturbed areas on the east coast of North America, and as such, it contains most of its original, natural and cultural features. As in the past, today many residents look to the area for a source of livelihood, while the area attracts an increasing number of visitors. They also view the area as a primary source of recreational opportunities and natural inspiration. The Bay of Fundy is one of the world’s richest marine environments and depends on the adjacent terrestrial watersheds to provide nutrient and a vast array of plant life and micro-invertebrates to support its rich biodiversity. The bay is also renowned for having one of the highest tidal ranges in the world.

The Bay of Fundy is an extension of the Atlantic Ocean’s Gulf of Maine and separates the provinces of New Brunswick and Nova Scotia. The proposed Fundy Biosphere Reserve (FBR) is located on the New Brunswick side of the upper most part of the bay. Some of the earliest colonial settlements in North America occurred in this region. As a result, this area had a significant influence on the settlement of the rest of Canada, as well as in shaping our Canadian identity. The total area of the proposed FBR is in excess of 432,000 hectares; included in this area is 9,940 hectares of estuarine coastal habitat. The area’s maritime climate coupled with the bay’s extreme tidal range and the area’s diverse topography, which ranges from towering cliffs to broad sweeping salt marshes at the head of the bay, characterize the region. The area’s unique landscape has had a significant influence on the evolution of the area’s cultural heritage, which started with the original inhabitants, the Mi’kmaq, and continued to influence the Europeans that began settling here more than 400 years ago.

The steep forested river valleys that are deeply incised into coastal areas are regularly punctuated by waterfalls, rapids and steep rock walls. Elevations in the area range from 40 m below sea level in the marine areas to 400 m in the interior highland areas. The area has offered security, shelter and resources to many generations of people of diverse cultural backgrounds. Today, residents and visitors alike have increasingly looked on the area as a primary source of recreational opportunities.

The original Mi’kmaq residents and the diverse European settlers that followed French explorer Samuel Champlain 400 years ago all recognized the area as a special place with abundant marine and land based resources. Artefacts from previous aboriginal generations that inhabited this Bay of Fundy region date back more than 6,000 years. Over the many centuries since, this fog shrouded coast, these mist-filled valleys, steep cliffs and broad reaching marshes have had a profound spiritual impact on all those who have resided here. The diversity of both landscape and culture, which defines this area, has had a profound effect on both our regional and national identity. What has resulted from this multicultural background is a current day multicultural population that cooperates and speaks with one voice when it comes to matters related to the environment and socioeconomic issues. New Brunswick is the only officially bilingual province in Canada and the City of Moncton is the only officially bilingual city in the country. This has not

meant that the individual cultures in the province have been totally integrated, in fact, Mi'kmaq, Acadian, European and other cultures are very much in evidence, but they do have an inherent commitment to cooperate on the larger sustainability issues and concerns facing the province

Overview of Project Purpose, Goals and Objectives

The Fundy Biosphere Regional Network's (FBRN) rationale for developing this UNESCO - MAB Fundy Biosphere Reserve (FBR) proposal is based on three components; a) the area's integration of the unique terrestrial and marine ecosystems; b) the rich multicultural heritage of the area and c) the commitment of New Brunswick citizens to sustainability (across multiple human generations) which has been supported by a long history of scientific research and discovery. The above rationale has led the FBRN to develop the following vision, goals and objectives:

Vision: To be a place where communities, policy makers, resource managers and scientists work cooperatively to achieve a greater degree of sustainability between human development and ecosystem integrity.

Goals: To be a FBR regional network that provides initiative, leadership and logistical support that will enable its stakeholders to achieve their sustainability goals more effectively and efficiently.

The FBRN is already a broad and inclusive organization (see Appendix 1). Furthermore, the programs, activities and educational programs of each individual organization will provide much of the logistical support that will be required by the FBRN as a whole. The categories of organizations that participated in the development of the UNESCO - MAB nomination process include:

- Academic institutions
- Conservation organizations
- Economic development agencies
- Education institutions
- Local municipalities
- Provincial and federal government departments
- Resource sector managers
- Tourism organizations

The basic premise on which the FBRN bases its vision, goals and objectives is an ecosystem management model that includes the human element in its strategies for achieving sustainability. Succinctly stated, it is: "A coherent system of biophysical and social factors capable of adaptation and sustainability over time" (Machlis, Force, Burch, 1997).

The roles that the FBRN envisions for itself in its effort to progress toward fulfilling its goals and objectives include:

- Promoting greater public awareness of the uniqueness of the local ecology, culture and history through awareness, education and interpretation initiatives;
- Initiating and maintaining cooperation and collaboration between communities, policy makers, scientists, educators and resource managers;

- Assisting local communities choose a more sustainable future by promoting and supporting an informed stewardship ethic in the region;
- Working with communities and stakeholders to maintain, restore and enhance the integrity of terrestrial and marine ecosystems;
- Providing a southern New Brunswick region wide forum that facilitates the exchange and sharing of existing and new information across sectors;
- Initiating new projects and initiatives to address information gaps relative to sustainable economic development and regional environmental conservation;
- Working with community economic development agencies and rural planning commissions to initiate and promote sustainable economic development in the region;
- Initiating and participating in joint projects with regional, national and international UNESCO Biosphere Reserves.

The FBRN will establish a democratic governance model that is not intended to be another level of bureaucracy but to be a forum that promotes collaboration between stakeholder organizations. It will be:

- Administered by a FBR Regional Network Board of Directors that represents a cross section of stakeholder organizations;
- It will work with stakeholder organizations to achieve their conservation goals more quickly and effectively;
- The board will not seek to change or challenge any laws or legal rights at the jurisdictional level;
- It will be an organization that co-exists with all protected and special management areas in the region;
- The FBRN will be a non-profit, non-government organization.

3.1 Conservation

There has been a recent transformation in how people think about their regional and global environments; this is as true in the Bay of Fundy region as in the rest of the world. Generally, people wish to become more involved in resource management decisions that affect their well-being and socioeconomic security; they also realize that they have a role to play in maintaining the natural resources of the region. In Canada, an increasing segment of society is insisting on greater environmental sustainability, a better quality of life and more sustainable rural communities. This reflects the economic and social advances in the country as a whole. The establishment of the proposed FBR is one means to address these and other concerns of local communities.

Increased awareness of rapid environmental change, resulting from increasing human interaction with the environment, has made people and communities realize that there is a need to maintain the region's protection and conservation areas, and prevent these special areas from becoming scattered remnants of a fully functioning ecosystem. The establishment of a biosphere reserve in this area will significantly assist in maintaining key habitats, species and genetic materials as well as help develop a regional stewardship and conservation ethic. The proposed FBRN intends to work with senior government departments, resource management agencies, conservation groups, communities and academic institutions to further environmental and community sustainability and to foster ecological integrity within the proposed bounds of the FBR and within the whole bioregion.

Residents of New Brunswick appreciate the ecological diversity of the Bay of Fundy and its surrounding environments. The ecological and scenic significance of the area is made evident by the presence of a national park, several provincially protected natural areas and conservation areas dedicated explicitly to biological conservation. The proposed FBR area, the upper Bay of Fundy watersheds, has by far, the largest number of officially protected areas in any of the 15 provincial ecoregions (Sections 8 and 12). The IV World Congress on National Parks and Protected Area in 1992 established six classes of protected area and set conservation objectives for each. Table 3.1 indicates that most of these categories are present within the proposed FBR. A complete listing of protected and conservation areas in and within the vicinity of the proposed FBR is appended.

Table 3.1 Categories of protected areas in the proposed FBR.

Protected Area ¹ Category	Name of Protected Area	Primary Objective	IUCN ² Class	Area (ha)
1. Strict Nature Reserve/ Wilderness	- Little Salmon River	Full Protection, Monitoring, Research	Class I	706 ha
	- McManus Hill		Class I	158 ha
	- Point Wolf Gorge		Class I	704 ha
	- Wilson Brook		Class I	76 ha
2. National Park	- Fundy National Park	Ecological Integrity	Class II	20,600 ha
3. National Monument	- Hopewell Rocks Ocean Tidal Exploration Site NB Park	Protection & Interpretation	Class II	
4. Protected Landscape/ Seascape	- Fundy Linear Park	Protection & Interpretation	Class II	2,640 ha
	- Caledonia Gorge PNA ³		Class II	3,000 ha
5. Habitat/Species Management	- Shepody Wildlife PA	Protection by Management	Class II	989 ha
	- Tantramar Wildlife PA		Class II	
	- Deer Wintering Areas	RAMSAR site ⁴	N/A	1,200 ha
	- Water Body Buffers - Mary's Point PA		Class II	
6. Managed Resource Protected Area	- NB Crown Land	Sustainable Use, Research, Monitoring	N/A	1,700 ha
	- Turtle Creek Municipal Watershed		N/A	
	- Fundy Model Forest		N/A	420,000 ha
	- Greater Fundy Ecosystem Study Area		N/A	104,900 ha

¹ World Congress Protected Area Categories.

² IUCN, World Conservation Union.

³ PNA Protected Natural Area; PA Protected Area.

⁴ RAMSAR international convention on wetlands (location of first conference).

The environmental significance of the area is indicated by more than one hundred years of documented ecosystem research and monitoring conducted by scientists from various senior government agencies and educational institutions (Wells, Daborn, Percy, Harvey and Rolston – Health of the Bay of Fundy). The Fundy Biosphere Region Network (FBRN), the coordinating organization for the proposed FBR, as described in section 4.6, intends to work with key multi-stakeholder organizations functioning in the region, such as the Bay of Fundy Ecosystem Partnership (BoFEP), Greater Fundy Ecosystem Research Group (GFERG), Petitcodiac Watershed Alliance (PWA), Enterprise Fundy (Community Economic Development Agency), Regional Planning Commissions and the Fundy Model Forest (FMF). Despite some overlap, each organization represents different resource sectors. The FBRN will provide the necessary forum to ensure the sharing of information and knowledge across resource sectors, resulting in

a potential for greater sustainability of the whole landscape.

The FBRN understands that the route to greater sustainability must address the way people manage and interact with nature in the protected areas within the region, as well as where they live and work, whether that be in forestry, agriculture, fisheries, tourism or in service industries. These regional resource sectors have significant consequences for wildlife management and other major uses of land and water resources. Increased sustainability can only be accomplished by expanding the geographic scales of conservation and development programs, by shifting their traditional scope to embrace whole ecosystems (J. Lash – World Resource Institute). The FBRN does not intend to duplicate ongoing efforts in conservation, research and monitoring, but will draw on the knowledge and resources previously developed by the broad spectrum of organizations working toward greater sustainability and conservation in the region. The residents and their communities have been an influential part of the Bay of Fundy ecosystem for many generations. The "bioregional" approach will encourage maintenance of the area's natural resources while enabling local communities to derive sustainable livelihoods from those resources.

The FBRN will design and carry out new initiatives, but more importantly, it will strive to bring about a synergy in the conservation movement and be a catalyst to other conservation groups, policy makers, resource managers and communities in bringing about reasonable guidelines to enhance ecosystem health and integrity. It will especially focus on engaging local practitioners in efforts to advance the concept of a more inclusive approach to bioregional management.

The Bay of Fundy Ecosystem Partnership and the Greater Fundy Ecosystem Research Group (GFERG), both stakeholders in the FBRN, have made significant strides in building the concept of bioregional management. The latter has produced "*Forest Management Guidelines to Protect Native Biodiversity in the Greater Fundy Ecosystem*". Figure 18.1 indicates the intensive study area of the GFERG. This and other similar efforts by multi-stakeholder organizations create awareness and encourage higher conservation goals for the entire region. The FBRN will ensure a continued sense of "a special place" in New Brunswick through environmental and cultural awareness initiatives and activities. Using the best available science and information to protect, restore and carefully manage biodiversity and natural resources in the region will promote a stewardship ethic. The FBRN will cooperate with biosphere sites within the Atlantic Canada, nationally and internationally, through the appropriate exchange of information between students and scientists. The FBRN envisions a close working relationship with Southwest Nova Biosphere Reserve and the Canadian Biosphere Reserve Association.

The three primary reasons for seeking UNESCO - MAB designation of the Fundy Biosphere Reserve are:

- Recognition of a unique Atlantic Canadian coastal landscape and its diverse ecosystems;
- Recognition of the area's history and its cultural identity in the region and within Canada;
- Recognition of the continued commitment of communities, policy makers, resource sectors and scientists to future goals for regional sustainability.

The approach to bioregional management the FBRN will pursue is based on ecosystem management in accordance with the provincial ecological land classification method. These internationally accepted protocols were used to select and establish a series of protected natural areas in the province.

The basic question pertaining to environmental and community sustainability is: how can the elements of nature, including its species, genetic traits, populations, habitats and ecosystems, be maintained on a landscape that also needs to produce material goods, environmental services and the many cultural, aesthetic and spiritual benefits that people everywhere want? The FBRN will create greater awareness of issues and concerns by bringing together resources to address this fundamental question. It will also work with communities, senior government agencies and resource management organizations to secure answers to this basic question. The first order of business will be to address issues and concerns related to species, habitats and communities that are threatened or endangered. This also means the sustainability of towns and villages in the area that have witnessed a decline in their populations and quality of life due to a continuous decline in the area's traditional resource sector industries; fisheries, forestry, agriculture and mining (see Appendix 15). The proposed FBRN does not intend to attempt to bring about further regulation or restrict products and services that are developed and produced sustainably. The FBRN will promote the concept of striking a rational balance between utilization and conservation.

Ecosystem management is an innovative framework designed to achieve harmonious and mutually dependent sustainability of society and the environment, focused on human and natural systems at regional scales across multiple generations of the human population that live and recreate in the area. In essence, it integrates the human needs into the ecosystem concept of nature. The human ecosystem model, as indicated above, has been described as "a coherent system of biophysical and social factors capable of adaptation and sustainability over time" (Machlis, Force, Burch, 1997). Another related term used in the context of ecosystem management is bioregional management, which denotes a landscape area that contains one or more nested ecosystems, that is one or more ecosystems with smaller ones nested within the large ones. This is the case for the proposed FBR, which contains a number of ecodistricts and numerous ecosites, contained or nested, within a larger ecoregion.

Some potential benefits to using an ecosystem management approach to conservation management are:

1. Communities and management agencies gain greater awareness of linkages and interdependencies between the resources that provide environmental services and the functioning of healthy regional ecosystems that help maintain these resources. This knowledge helps to clarify the relationship between a healthy environment, food, ecological services and employment.
2. This approach enables managers and communities to address the key components of ecosystems (e.g. forest cover, salt marsh, freshwater habitat, estuarine areas or other ecological structures) that are in need of restoration in order to maintain ecosystem integrity.
3. By monitoring change and rate of change in ecosystem components, communities and resource managers will be better prepared to address the issues related to climate change. This, in particular, will show how such changes in resource features, such as sea level and air temperature causes stresses on habitats and wildlife populations.
4. The diverse stakeholder associated with the FBR will provide the means to systematically examine the issues and concerns within each of the major resource sectors and find resolution to arising conflicts.

The FBRN ecoregion approach to ecosystem management may be applied at the grassroots/bottom up approach with the support of local communities. This will allow local

values and ideas to be integrated into projects, activities, plans and studies. The FBRN envisions that it will incorporate conservation objectives into its strategies, similar to the following principles developed by the Everglades Biosphere Reserve:

- Aim to recover and maintain the biological diversity, ecological function and defining characteristics of natural ecosystems;
- Recognize that people are part of ecosystems that they shape and are shaped by the natural systems, and that ecological and societal systems are mutually dependent;
- In planning and management, remember that all ecosystems and institutions have unique and varying conditions;
- Integrate sustained economic and community values into ecosystem management;
- Develop a shared vision of the social, economic and environmental conditions desired;
- Ensure ecosystem governance takes place at the appropriate ecological and institutional scales;
- Use adaptive management to achieve desired outcome and deepen understanding of ecosystems;
- Integrate the best available science into decision-making while continuing research to reduce uncertainties;
- Implement ecosystem management principles through coordinated government and non-government plans and activities (Source: U.S. Department of State, 1994).

The FBRN has three significant challenges in order to address conservation management in the region, all of which are influenced by traditional land uses, public perceptions and policies.

They are:

1. **Capacity Building:** requires bringing together policy makers, resource managers and communities, as well as various technical, social and policy tools. This is an important challenge with potential for great local benefits.
2. **Stakeholder Involvement:** each interested group/organization has various motives and expectations for continuous involvement in a bioregional conservation effort. In providing a forum for issues resolution, the FBRN will focus on common grounds among stakeholders and encourage all to participate in the process.
3. **Institutional Cooperation:** the proposed area is administered by various senior government agencies, resource sector managers, conservation groups, research agencies and municipalities responsible for various tracts of land. Each administrator has evolved policies for land management. As with stakeholders' involvement, the challenge for coordination among organizations is to look at the big picture, which will be aided by the facilitating role of the FBRN.

The first tasks that the proposed FBRN will undertake to establish the basis for conservation management will be to complete a series of environmental monitoring plots for watersheds within the area. The second task will be to complete a watershed status report for each of the major watersheds using an established methodology, such as the Ecological Monitoring and Assessment Network procedure. There will be an effort to involve local residents, schools and conservation groups in the monitoring and reporting processes. Biosphere sites in Canada have proven to be effective in doing this type of coordination and facilitation.

3.2 Development Function

The primary development message that the FBRN will convey is that the health of the local economy is related to the MAB mission that promotes the concept of rational use and conservation of the resources of the FBR. If sustained, these natural assets will continue to make the area a desirable location for both residents and various businesses to locate and build stable local economies. Conversely, a fragmented landscape, that negatively influences the area's scenic beauty, minimizes economic opportunities. Such losses would decrease community sustainability in the longer term. The FBRN will promote the premise that the preservation of natural landscapes and their inherent ecosystems will enhance the local economic base and provide an array of management options for future generations. Such an approach does not restrict economic opportunities for the traditional natural resource industries, but rather it points to new approaches by which to sustain a balance between environmental stewardship and the utilization of resources. It is essential to maintain the natural attractiveness of the bioregion so people and business continue to experience that sense of place, and perceive it as a desirable place in which to live and do business. New businesses have greatest success in attracting qualified people to attractive and stable communities.

Traditional natural resource industries and environmental protection agencies have a major role in contributing to the well-being of local communities and their economic base. One of the requirements of bringing more stability to local environments and economies is that communities need to be consulted more during the resource management decision-making processes that affect their local area. All parties will be encouraged to participate in FBRN's sustainability initiatives to be open to change as well as be willing to seek compromise when it will result in a greater benefit for all.

The World Commission on Environment and Development defined "sustainable development" as "... meeting the needs of the present generation without compromising the ability of future generations to meet their own needs". This means using resources at rates that are within their capacity for renewal. Sustainable communities are not merely about "sustaining the quality of our lives – they are about improving it" (Toward Sustainable Communities – M. Roseland, 2005).

The FBRN recognizes the need for social equity. Locally, this means that we must integrate the needs of the biosphere with the needs of economically challenged communities and individuals into development plans which fit with three elements of sustainability cited by Jacobs, 1993:

- Environmental considerations must be entrenched in economic policy-making. Environmental and economic objectives must be included in a common framework in which various parallel objectives are recognized;
- Sustainable development incorporates an inescapable commitment to social equity. This requires not simply the creation of wealth and the conservation of resources but their fair distribution both between and within communities. Sustainability also requires the fair distribution of environmental benefits and costs between generations;
- "Development" does not simply mean "growth," as represented by faulty measures of economic performance, such as, increases in gross national product (GNP). Development implies qualitative as well as quantitative improvement.

Sustainable development requires a commitment to a pro-active strategy that promotes sustainability. The FBRN will work with its stakeholders, such as the Provincial Economic

Development Agencies, New Brunswick Enterprise Network, the Rural District Planning Commissions and the Atlantic Canada Opportunities Agency (ACOA) to attain these objectives.

Despite impressive economic growth in some urban areas in Atlantic Canada, such as Moncton and Dieppe, most rural areas face underemployment, social exclusion and regional disparities. This is a result of a decline in traditional industries due to declining resources and advances in production technologies. This same trend is evident elsewhere in Canada. The situation appears to be more acute in this region because of a longer history of resource utilization and the smaller geographical size of the area. This is most evident in Albert County, which is a significant portion of the land base of the proposed FBR, where the human population has been in decline for four decades (see Appendix 16 for current population distribution).

Greening the Tourism Sector

The regional Community Economic Development Agencies (CEDA), Enterprise Fundy, Enterprise Greater Moncton and Enterprise Southeast, along with local tourism organizations involved in the FBRN, have identified tourism as one opportunity with potential for sustainable economic development. As a priority, the FBRN will work with these organizations to develop a more comprehensive tourism strategy. This represents one way to stabilize communities' populations, local economies and social structures while conserving the ecosystem values of the local landscape. In addition, a sustainable tourism strategy can significantly promote the cultural heritage. The FBRN will encourage development of collaborative endeavours communities, economic development agencies and various resource sectors. It will foster the development of sustainable tourism plans that consider a balanced approach and the limits of acceptable change to communities.

The Canadian tourism industry has enjoyed many years of prosperity and growth. The tourism industry accounts for 2.5 per cent of Canada's Gross Domestic Product contributing \$54 billion to the Canadian economy (Murray 2000, TIAC 2001). Alternatives, based on a greening of the industry, are required as Canadians realize that tourism has an impact on ecosystems and communities (Sustainable Tourism Association of Canada, 2002). Cooperation among partners within the FBRN will aid in the development of the appropriate environmentally sensitive alternatives suitable for the region.

The FBRN seeks a balanced approach within the existing tourism sector, and in future developments that reflect the following definition by the Sustainable Tourism Association of Canada: "Ecotourism reflects a process of conscious change in how tourism products are designed and delivered based on an ethic of sustainability that reflects a higher order evaluation of quality vis-à-vis ecological and social sustainability..." (Sustainable Tourism Association of Canada, 2002).

There has been a recent trend toward increasing ecotourism in the Bay of Fundy region. This coincides with a larger proportion of the world's population living in cities and towns. But the tourism sector is changing; there is evidence that there is a growing emphasis on catering to travelers interested in the conservation of nature and cultures. Because of this trend, the Fundy region expects continued increases in tourism visitation. At present, there are no local and/or regional standards that encourage consistent implementation of environmentally friendly or "green practices" throughout this sector. Environment Canada indicates, in its State of the Environment Report (1996), that the ecotourism sector depends on a healthy natural environment and the industry has some responsibility to ensure quality is maintained. Failure to meet government and public expectations in this regard will result in increased laws, regulations

and standards to define acceptable practices. A more efficient approach would be to have the local industry develop a voluntary sustainable management plan with local standards and guidelines.

Experience shows that the best management of ecotourism development is through interaction between government policies, industry advocacy and public response. The proposed FBRN will promote and assist in facilitating the transition of the region's tourism sector to a more environmentally and socially responsible economic sector. The FBRN will engage tourism operators, policy makers, enthusiasts, environmental managers and host communities in establishing tourism goals rooted in sustainable land use, local cultural and heritage values and viewscape management. To accomplish this, the proposed FBR will require collaborative development of a sustainable strategy plan with voluntary operational practices. Furthermore, the FBRN can facilitate the sector's voluntary applications for program accreditation under one or more nationally and/or internationally recognized programs.

Participants at a special EuroMAB Ecotourism workshop held in Quebec City in 2001, along with the 2001 Leading Edge Forum coordinated by the Niagara Escarpment Biosphere, agreed that the main requirements for ecotourism involve:

- Travel to natural sites;
- Minimal environmental impact (positive or negative);
- Environmental awareness and appreciation of its intrinsic and other values;
- Financial benefits for the conservation of species and ecosystems;
- Financial benefits and empowerment for local communities;
- Respect for local culture (indigenous and historic agriculture and fisheries);
- Sensitivity to the political environment and social climate; Support for human rights (traditional land use and harvesting), Leading Edge Conference, Burlington, Ontario, October 2001, initiated by the Canadian Biosphere Reserves Association (CBRA).

3.3 Logistic Support

The FBRN has already established a strong base for logistic support, as indicated by the diversity of organizations listed in Appendix 1. The environmental, social and economic interests of the organizations represented within the FBRN represent a significant knowledge base which is considered as one of the most significant assets of the FBRN. It is the foundation on which the FBRN will base its ability to plan and implement a sustainability strategy for the proposed FBR. Individuals on the FBRN also represent a broad cross section of society which includes such interests as education, management planning, research and sustainable economic development. When the FBR attains UNESCO - MAB designation, the Board of Directors and the various committees will work with these organizations to design projects and activities, and deliver results so communities and resource sectors which may use relevant information to improve awareness programs and/or operational practices.

At the regional scale, there has been more than a century of scientific research conducted in the Gulf of Maine and the Bay of Fundy. This has produced a great wealth and diversity of knowledge in such areas as marine and terrestrial ecosystems, culture, heritage and economic development. The roles and contributions of logistic support stakeholders are presented in Part II of this document. See Table 15.1 for sources of logistical support for the proposed FBR.

An important aspect of this proposed FBRN is that the Board of Directors and the various committees will be a forum for information sharing between cooperating agencies across resource sectors. The FBRN does not intend to develop extensive research and development programs. Cooperating stakeholders will continue to provide and develop information and carry out ecosystem and socioeconomic research. The FBRN will coordinate information sharing with communities and between logistic support groups. This will include suggesting and facilitating new projects that will enhance current knowledge to support greater environmental and community sustainability. The FBRN will encourage research and development in socioeconomics and environmental research.

4. CRITERIA FOR DESIGNATION AS BIOSPHERE RESERVE

4.1. Integration of Bio-geographical Regions and Human Intervention

The FBRN will promote regional ecosystem management based on ecological land classification methodology (ELC) developed and applied by federal and provincial government agencies in Canada. The process integrates an array of factors related to climate, terrain, soil, water, and wildlife habitat into a multilevel framework. Classification units are used for scientific research, resource sector reporting, land-use planning, resource management and environmental education. It encompasses many ecological scales ranging from the very broad ecozones, which could span several provinces to the very detailed eco-element which might be the size of a forest stand. The Canadian approach to ELC provides a uniform scientific and ecological based approach to land classification. It was adopted as the model for New Brunswick's Ecological Land Classification system in the 1990s.

Ecosystem management based on Ecological Land Classification units will enable the FBR to develop a logical framework for monitoring and reporting the impacts of natural and man made disturbances on the environment. ELC is a tool used to set priorities for restoration of impaired ecosystem functions and identify gaps in knowledge and process that exist between the natural environment and socioeconomic sustainability.

The land base of the proposed FBR exhibits a variety of human intervention that range from the pristine to urban environments, and everything in between.

This area has a rich cultural heritage with the Mi'kmaq being the earliest known inhabitants. Early settlement by French and English speaking Europeans has given New Brunswick, a unique bicultural identity within Canada. It is the only officially bilingual province in Canada. This diverse linguistic background makes the province a preferred location for visitors, investors and businesses in need of bilingual services and employees. Today, the Greater Moncton Area, (Moncton, Dieppe and Riverview), is the major urban centre while there remain many scenic towns and villages throughout the area where population is relatively sparse (see Appendix 16 for current population distribution).

Processes and initiatives leading to greater community sustainability are discussed in the following sections.

4.2 Significance for Biological Diversity Conservation

Coastal Marine Environment: The Bay of Fundy is renowned for having the highest tidal ranges in the world, and is one of the least developed areas on the east coast of North America. The FBRN has an estuarine component that extends 500 m into the bay from the shoreline. However, there is potential for expansion of this aspect of the proposed FBR.

The Bay of Fundy encompasses offshore oceanic features with shallow banks and deep channels and diverse coastal marine habitats. The combination of the benthic community and geology constitutes the biotope of the bay. The seabed is characterized by grain size, shape, porosity, thickness, sorting or roughness; geological terms that help define the physical aspects of habitat types. Seven distinct inter-tidal habitat types are identified by Yeo and Risk (1981): salt marsh, beach, upper and lower mudflat, sand flat, channel lag and sand bar. Salt marshes and mudflats up to five kilometres in width are common at the head of the bay. The upper Bay of Fundy area is critically important as a migratory staging area for millions of birds and is a

significant summer and winter bird habitat. The distribution of euphausiids and copepods throughout the bay has a major effect on distribution of whales and seabirds.

The inner bay, towards the northeast terrestrial component of the proposed FBR, is the primary nutrient and food source, such as micro-invertebrates and zooplankton, for the species further up the food chain in the deeper water areas of the outer bay where it meets the Gulf of Maine and eventually the open waters of the Atlantic Ocean. Within this large marine area, the FBR includes an expansive estuarine coastal environment that extends to the region's largest salt marshes. These areas are the primary production sources for marine micro-invertebrates; they also provide staging areas for large flocks of migratory birds. The salt marsh is a major contributor of nutrients and food reserves that support the high diversity of marine life that inhabit the coastal and marine areas, making the Bay of Fundy one of the richest marine environments in the world. Five major rivers transect the area: Petitcodiac, Memramcook, Big Salmon, Tantramar and Point Wolf plus many smaller rivers and streams.

Terrestrial Environment: The proposed Biosphere Reserve consists of the watersheds that drain into the bay and the associated estuarine coastal areas. Based on the New Brunswick Ecological Land Classification, three ecoregions represented within the proposed Fundy Biosphere Reserve: Fundy Coastal Ecoregion, Central Uplands Ecoregion and Eastern Lowlands Ecoregion. An indication of the area's ecological and scenic significance is the fact that the area has one of the country's oldest national parks, as well as a number of other protected areas.

Land management units are provincial and federal crown lands, large forest industry freehold lands, small private woodlots, agricultural lands, municipalities and those areas occupied by permanent infrastructure such as highways, roads and energy corridors.

In spite of being one of the least developed and ecological disturbed areas on the eastern seaboard of North America, there are a number of species that are threatened, at risk or endangered. The most significant endangered species case is that of the inner Bay of Fundy Atlantic salmon, a subspecies of the main run Atlantic salmon that remains in the Bay of Fundy, as opposed to making annual transatlantic crossings to northern Europe. Its historic freshwater habitat is the area that has been selected by the FBRN to be the proposed FBR. Members of the FBRN are involved with reintroduction and habitat restoration programs for the species. In addition, the proposed area has lost three other species of anadromous fish that no longer spawn in the upper Bay of Fundy Rivers and the freshwater dwarf wedge mussel. The native northern leopard frog has not been recorded in the area for almost two decades, and is now considered extirpated. The northern flying squirrel is considered to be threatened as well, due to fragmentation of its forest habitat.

Species extinction and creation is part of the natural process but evidence indicates that it is happening in the area of the proposed FBR at a faster rate than can be attributable to natural means. This is a common story in all parts of the world, but the rate in the upper Bay of Fundy region is not as great as most, due to the fact that it has not gone under any intensive development. However, in total, the upper Bay of Fundy terrestrial ecosystem has lost 14 species of vertebrates, one invertebrate and 20 species of plants over the last century. In terms of animals, the most notable species is the eastern panther (cougar) that is considered extinct, although unconfirmed sightings are common place. American pine martin, wolverine, lynx, caribou, sea mink and wolf are considered to be extirpated from the area.

There is as much concern on the part of ecologist about the number of introduced species that have been recorded in the proposed FBR area, 132 in all. Most are innocuous, but there are some pathogens that have affected canopy forming tree species, the elimination of which can alter forest structure and species habitats. Because exotic species exist in high numbers our wide range of taxa have the potential to make dramatic changes in habitats and plant communities.

However, there have been some successes as well; the peregrine falcon and the American Bald Eagle, once considered being at risk, have made an impressive recovery mainly due to species reintroduction programs and protection of habitats.

The FBRN will work with stakeholders, scientists, resource managers and policy makers to conserve restore and maintain the native species of the area. A stakeholder organization, the Atlantic Canada Conservation Data Centre maintains the information data for the Maritime Provinces relative to species at risk that the FBRN can access to determine the status of individual species.

Ecosystem Types in the Proposed FBR



Fundy Coastal Ecoregion: The high variation in that region's geology has yielded a highly varied landscape, ranging from low lying salt marshes to high cliffs, and from gently rolling hills to the rugged highly dissected shoreline where fault lines interrupt bedrock. Relief generally fluctuates between 30 and 80 m. Persistent summer fog results when warm moist air from the interior meets the cold waters of the bay. There can also be a steep temperature gradient in progressing from the coast to just a few

kilometres inland, primarily due to the reduced influence of the marine environment. Vegetation shows a sharp transition from coniferous coastal forests at lower elevations to mixed or deciduous forests over warmer inland terrain. The coniferous forest community is dominated by red spruce with balsam fir, black spruce, white spruce and tamarack, with eastern white cedar occurring on limestone-derived soils.



Central Uplands Ecodistrict: This is a broad upland plateau situated along the upper Bay of Fundy. The landscape has a central plateau characterized by rolling igneous hills and scoured by precipitous river-lined gorges. The plateau itself averages about 300 m in elevation, peaking at 400 m in the Kent Hills. The flatter upland areas and gentle mid-slopes are associated with mixed forests of red spruce, yellow birch and red maple with some balsam fir. Valley bottoms and flatlands with impeded drainage often produce pure

stands of spruce and balsam fir. It has small but productive zones of calcite-rich bedrock and soil where rare species of plants may occur.

Eastern Lowlands Ecoregion: Is a broad wedge of flat to gently rolling terrain at the northeast end of the proposed FBR. The coastal area supports sand dunes, salt marshes and lagoons that sustain a distinctive fauna and flora. Inland, wetlands contain a myriad of both common and rare species. The Petitcodiac River Ecodistrict is the portion of the ecoregion that occurs in the proposed FBR area. This river flows southward through the Greater Moncton urban areas into an expansive river estuary and the Shepody Bay. To the east, the Memramcook and Tantrammar rivers also flow into the coastal wetlands before flowing south through estuaries into

Shepody Bay. Red spruce dominates the forests of the Petitcodiac Ecodistrict with white spruce, black spruce, balsam fir, red maple, white birch and trembling aspen also occurring in the area. The high frequency of disturbed sites dominated by aspen reveals the degree of historical and recent human disturbance within the Petitcodiac River watershed.



Freshwater and saltwater marshes provide valuable habitat for many avian species. Three particularly significant conservation areas are the Tantramar Marshes and the two Shepody Bay RAMSAR sites. The two RAMSAR sites located in this ecodistrict are: Mary's Point and Tantramar National Wildlife Area. Together, these sites constitute the internationally recognized Shepody Bay Western Hemispheric Shorebird Reserve (WHSRN), a program sponsored by the US based Manomet Conservation Organization.

The dynamic New Brunswick landscape is unlike any other in Canada. For centuries, this landscape has shaped local communities and influenced the lives of the residents. Archaeological evidence indicates that aboriginals lived in the area at least 6,000 years ago. Europeans came to the area 400 years ago, they chose to settle in the sheltered coastal areas, especially along the fertile marshlands and river valleys of the proposed FBR (see Appendix 17, Champlain Map of the Northeast Coast of North America, 1607). Hamlets evolved in zones of arable soil and dyked marshlands, while forestry and mining towns emerged in districts rich with timber and minerals. Petitcodiac, Memramcook and Tantramar rivers served as highways for canoes, schooners and steamboats. Engineers designed roads and railways around landforms that shaped the geology and topography of the area. This area, in conjunction with the entire Maritime Provinces, helped form the Canadian identity which spread westward from this region. The proposed FBR area played a significant role in shaping the culture and economy of the province of New Brunswick.

New Brunswick has a unique bicultural identity among Canadian Provinces, with a rich anglophone and francophone heritage and culture that predate most other regions of North America. This diverse linguistic background makes the province a preferred location for visitors, investors and businesses. Approximately one third of the population is francophone and a significant portion of that population is either within the Greater Moncton Area, the largest urban area in the proposed FBR, or in smaller communities nearby. Approximately half of Moncton's population is bilingual. This linguistic asset will continue to be a major cultural attraction for potential visitors and new residents, and be a competitive advantage for the area in attracting new businesses that requiring bilingual services. Government policies, cultural events and the prolific arts and crafts of the region reflect this cultural diversity. Approximately 60 percent of the province's population resides in urban and semi-urban areas and Greater Moncton is, by far, the fastest growing urban area in the province and the region (see Appendix 16 for current population distribution).



In order to seriously address the rate of change and impact on our environment, there is a need for monitoring and reporting to further define our ecosystems and their integrity in comparison to their perceived natural state. Many government agencies and multi-stakeholder groups that promote environmental sustainability have advanced this approach to sustainability in the past decade. In summary, the proposed FBRN will work in collaboration with all stakeholders to enhance scientific knowledge and cultural appreciation and to assist communities in using that knowledge to

improve the level of resource management stewardship in the region.

Increasingly more of our province's citizens are embracing a strongly grounded, local ecosystem-based image of their home territory. As effective environmental stewards, they realize there is a need to know more about their landscape heritage (Ecological Land Classification - Zelazny, Ng, Hayter, Bowling, Bewick, 1989). Establishment of the proposed FBR will help address that need for awareness, knowledge and technology as well as facilitate putting it into the hands of communities and practitioners. Primary stakeholders will provide the logistical support, scientific and resource management information are the Bay of Fundy Ecosystem Partnership, Greater Fundy Ecosystem Research Group, Fundy Model Forest, Minas Basin Working Group, Atlantic Salmon Recovery Team, Petitcodiac Watershed Alliance and the Fundy Model Forest, as well as senior government departments and academic institutions.

4.3 Opportunities to Explore and Demonstrate Approaches to Sustainable Development

As indicated in the foregoing descriptions of the land base and its culture and history, the proposed FBR is largely a rural area that is interspersed with villages and towns. It is these areas that support the majority of the biodiversity in the area. Therefore, it is those rural areas that the FBRN considers that it can have the most effect in helping to bring about greater ecosystem integrity. It is also those areas that are most in need of a sustainable economic development if these small communities are to survive. And the FBRN will work with its community economic development stakeholders to bring about new revenue generating opportunities that will help stabilize the populations in these rural communities, some of which are described below. This is not to indicate that the environmental and socioeconomic concerns of the Greater Moncton will not be addressed. However, the concerns and challenges that are faced in this urban environment are more due to the stresses that a high density population can put on its local environment. In the rural areas, the issues and concerns arise primarily from natural resource utilization and the effect of outside influences, such as climate change, and what their affects are on species and habitat supply. This, in turn, can have a greater overall affect on the natural biodiversity richness of the area. Each of the three municipalities has or is in the process of developing green plans that effectively reduces their imprint on their local environment.

The FBRN will work with both rural and urban communities to reach more sustainable solutions to their environmental concerns by helping to facilitate the initiation and development of low environmental impact economic opportunities. The following describes how local people will benefit from a UNESCO - MAB designation in the area.

Sustainable development, what it means and how it can be achieved, is an area of intense debate. And there is a growing consensus that if sustainable development is to be achieved, it has to be done at the local level if it is to be realized on a global basis (International Council for Local Environmental Initiatives, 1996). This proposal to establish a UNESCO - MAB Reserve on the upper Bay of Fundy is responding to a local need for greater community, economic and environmental sustainability in society. It is based on the principle that maintenance of attractive natural landscapes coupled with community participation in resource decision-making will lead to a more diversified and healthy economy. Intact ecosystems create more options for future generations to determine their own standards of environmental health and community well-being. Ecosystem integrity will create economic opportunity by attracting and holding people and businesses. Evidence of this fact has occurred repeatedly in other parts of Canada, such as in parts of Alberta and British Columbia, where governments and communities have

opted for “green development” over dependence traditional single resource industry alternatives. The FBRN will help developed community and ecosystem sustainability strategies by employing the following processes and methods:

a) Capacity Building

The proposed FBRN will promote the multi-stakeholder approach to sustainability by involving federal, provincial and municipal governments, in partnership with local conservation groups to sustainably manage the area’s resources. Both senior levels of government and existing multi-stakeholder groups have already made significant advancements in the development of environmental protection guidelines. New Brunswick has recently designated four protected natural areas within the proposed FBR area and has an ongoing effort, based on policy and regulations, to protect water quantity and quality. There are many academic and research organizations conducting environmental research, monitoring, as well as conducting educational and awareness programs. They are also involved in financing research and stewardship initiatives carried out by local groups. Municipal governments collaborate in water management through land use planning, and through ownership and operation of public water and wastewater systems. However, there is still a need for communication of this information in order to build local capacity so that communities are better prepared to participate in natural resource decisions that affect the stability and quality of their lives. Appendix 1 provides a list of the organizations, agencies and municipalities that have participated in the development and review of the UNESCO - MAB Fundy Biosphere Reserve proposal. There has been an encouraging level of support from all the 15 municipalities in or nearby the proposed FBR area, including the urban municipalities of Greater Moncton (Moncton, Dieppe and Riverview). This is demonstrated by the letters of support shown in Appendix 19.

As indicated, the FBRN does not intend to challenge existing federal and provincial government programs, policies or initiatives, nor will it attempt to duplicate any conservation efforts that are already active in the proposed area. The plan is to work with these senior government agencies and initiatives to help facilitate their objectives in a more effective and timely fashion. This will be done through FBRN outreach, education and awareness initiatives that will facilitate the communication linkages between government agencies and local communities and the public at large. These outreach activities will also aid in the sharing of information between all FBRN stakeholders in a more efficient manner so that dialogue between government agencies and resources managers, landowners, economic development groups, conservation groups and academic institutions can take place more effectively, that will facilitate the application of government policies and conservation initiatives. This outreach process will aid in creating more awareness and therefore greater public acceptance of government initiatives.

To use an example, the New Brunswick Department of Environment has a “Coastal Zone Management Policy”. To some, this is interpreted as being a very much needed initiative intended to manage and to protect coast lines and estuarine habitats in a more effective manner, notably in light of the added stresses being experienced by these environments due to various causes, from global warming to point source pollution. Others, particularly those with direct economic or development interests in these areas, interpret the policies as being an infringement on their rights and are thus less than receptive. In cases such as this, the FBRN would be available to initiate and facilitate dialogue between the policy makers and the various interest groups that are affected.

There are a number of instances where some FBRN multi-stakeholders organizations are already carrying out similar conciliation and conflict resolution processes which include: Fundy

Model Forest, Bay of Fundy Ecosystem Partnership, Petitcodiac Watershed Alliance, Minas Basin Watershed Working Group and NB Protected Natural Areas Advisory Committee. The FBRN would also collaborate with government sponsored community economic development agencies, district planning commissions, urban municipal governments to enhance the line of communications and to effectively increase the level of awareness of such organizations, policies and initiatives and to assist, where possible, in bringing about greater conservation and community sustainability.

The FBRN has already laid the framework to carry out such outreach and education initiatives. In that, it has the support in principle of all the municipalities, 15 in total, in close proximity to the proposed FBR for the UNESCO - MAB site proposal, as the letters of support, accompanying these nomination documents, indicate.

The FBRN will facilitate activities such as:

- Assist communities to employ and develop strategies to protect or enhance the environment, preserve biodiversity and ecosystem integrity;
- Assist communities and businesses to develop strategies to avoid waste, reduce pollution and minimize the use of environmentally harmful materials and processes;
- Assist in development of strategies to conserve water, increase energy efficiency and encourage use of renewable energy sources such as wind, solar and tidal power;
- Assist in seeing their “place” within the cultural diversity and deep human history of the region;
- Assist to prioritize environmental and socioeconomic issues and concerns that threaten the stability and quality of life in local urban and rural communities, and develop strategies to address those priorities.

It is anticipated that stakeholder participation in the various collective initiatives will take varied forms and involve all levels of government, academic institutions, business interests and community members. The first level of multi-stakeholder involvement will include existing organizations such as:

- Bay of Fundy Ecosystem Partnership in matters related to the marine environment;
- Greater Fundy Ecosystem Research Group, provincial Protected Natural Areas Committees, Fundy Model Forest, Watershed Working Groups in terrestrial ecosystem related matters;
- Provincial community economic development agencies (New Brunswick Enterprise Network), Rural Planning Commissions and the Atlantic Canada Opportunities Agency (ACOA);
- Forestry, fisheries, agricultural or tourism focused associations based on partnerships between resource management stakeholders and government organizations;
- Volunteer based initiatives driven, initiated and/or maintained by local community volunteers, such as Albert County Historical Society, Westmorland Historical Society and Tantramar Heritage Trust;
- Atlantic Coastal Action Program (ACAP) groups.

b) Knowledge Sharing

This region has a long history of multi-stakeholder collaboration. One of the oldest multi-stakeholder groups is the Gulf of Maine Council on the Environment (GOMC). The Bay of Fundy Ecosystem Partnership (BoFEP), a primary stakeholder in the FBRN, represents Canada's interests in the GOMC. These organizations are examples of broad based multi-stakeholder initiatives operating a geographic scale that includes the entire Gulf of Maine, with the BoFEP more specially concerned with the Bay of Fundy. The Bay of Fundy Ecosystem Partnership and the Gulf of Maine Council on the Marine Environment each have a common interest in conservation and protection of the Bay of Fundy. Their collaborative research, monitoring agenda and support network reflect this fact. Other key multi-stakeholder organizations that are expected to contribute to the FBRN in a significant way are: Greater Fundy Ecosystem Research Group (GFERG) and the Fundy Model Forest (FMF), both of which are concerned with terrestrial ecosystem health and forest sustainability, Figure 18.1. As well, there are three Community Economic Development Agencies: Enterprise Fundy, Enterprise Greater Moncton and Enterprise Southeast that operate in the area that are primarily concerned with socioeconomic issues. The FBRN will continue to develop its working relationship with these organizations to promote conservation in the region and delivery of information and knowledge to local communities.

c) Sustainable Strategy Plans

The forest industry is the most influential enterprise on the economy and on the terrestrial environment in the proposed FBR, followed by mining, fisheries, agriculture and tourism. Each of these economic sectors is closely regulated by provincial policies and management planning process. In fact, the integrated forest management planning developed by the provincial government in New Brunswick, in collaboration with the forest industry, is recognized as being one of the most environmentally progressive approaches in Canada. Most forest resource management companies undergo third party certification for their management plans and operational practices, while their harvesting allocations depend on the judicial application of operational techniques. One of the largest forest companies in New Brunswick is J. D. Irving Limited; they are known as the "Tree Growing Company" in the province. Their management plan objectives and operational practices often exceed the requirements of provincial government regulation. This company, along with the private woodlot owners' organizations in the area, is a partner in the Fundy Model Forest program, a national program supported by Natural Resources Canada. The primary goal is to advance sustainable integrated forest management not only in the upper Bay of Fundy region but in the province. These goals are in line with that being sought by the FBRN. All resource sectors are concerned about potential loss of rights or resource allocation due to environmental oriented initiatives; however, the forest industry sector in southern New Brunswick supports the FBR through its activities and initiatives carried out, on their behalf, by the Fundy Model Forest multi-stakeholder organization. Enclosed with this documentation is a letter from the forest company, J. D. Irving Limited that describes this relationship with the FBRN. The degree of support and reaction to the proposed FBR from other resource sector agencies has been similar, that is mining, fisheries and agriculture. The most expressive support comes from the tourism sector, which stands to gain substantially from the designation of a UNESCO - MAB site in the province.

The region's tourism sector has been steadily growing. The FBRN will work with the New Brunswick Enterprise Network and the Rural Planning Commissions to assist tourism associations and related businesses to develop a sustainable tourism plan for the region that will include voluntary operational practices. The goal will be to preserve the scenic

attractiveness of this region and prioritize awareness of cultural diversity across four centuries of settlement for residents and visitors while fostering a stewardship ethic. Eventually, the objective is to have a sustainable tourism plan that can be certified by a recognized national sustainable tourism organization.

d) Greening of Urban and Rural Communities

The three major urban areas within the proposed FBR - Moncton, Riverview and Dieppe - have a combined population of approximately 110,000 residents. Diverse hamlets, villages and towns are distributed across the landscape, many with historical ties to agriculture, shipbuilding, mining, forestry and fishing. The basic question is what constitutes a sustainable community: the initiatives and activities that a community can sustain, what it can afford and what its residents want, can differ significantly. Priorities differ significantly between communities depending on how issues are perceived. Rather than being a fixed thing, a sustainable community is continually adjusting to meet the social and economic needs of its residents, while preserving the environments ability to support it (Bridger and Luloff, 2001). Following are basic principles that the proposed FBRN will promote within urban and rural communities to encourage communities to “think globally and act locally”:

- A sustainable community is a community that uses its resources to meet current needs while ensuring that adequate resources are available for future generations;
- A sustainable community seeks a better quality of life for all its residents while maintaining nature's ability to function dynamically over multiple human generations by minimizing waste, preventing pollution, promoting efficiency and developing local resources to revitalize the local economy;
- Decision-making in a sustainable community stems from a rich civic life and shared information among community members;
- A sustainable community resembles a living system in which human, natural and economic elements are interdependent and draw strength from each other (Minnesota SEDEPTF, 1995).

Residents will be encouraged to think of communities as part of the ecosystem. This concept will help people understand the complex relationships between human activities and the environment, and how communities can organize their activities to meet both their human needs and benefit the environment.

When working with communities, the FBRN will always encourage environmental responsibility. It will assist communities in the “greening” of local businesses and attracting new environmentally-friendly business into the community. To create greater sustainability in their economies, citizens will be encouraged to protect their natural resource base and preserve their dynamic environment from deterioration. The urban area and larger towns in the area are moving toward a small business, service type economy and there is opportunity for communities to develop and market their “sustainability advantage” through environmental stewardship, pollution control and resource use efficiency. This may generate significant economic opportunities for these areas, help hold residents in the area and attract new businesses.

The City of Moncton is presently setting the pace toward greening their community. The city recently revised its municipal management plan. “Social, Environmental and Protection Services” is first on their list of priorities (City of Moncton Municipal Development Plan: 2006-2011). This plan is undergoing public review. The population of the city has increased by almost 6 percent between 2001 and 2004. Moncton’s urban planning principle used in new

development states:

“Urban municipalities in the proposed FBR intend to design a community for the future that protects and conserves the natural environment, promotes the wise use of energy and resources, encourages walking and cycling as primary forms of transportation, and includes a mix of housing, work place and daily shopping services to meet the needs of all segments of society” (Section 7.1, Municipal Development Plan).”

The city is incorporating into their development plans a strategy that will encourage more of its citizens to become more active by providing greater opportunities for citizens to walk or bike to work, a strategy designed to also encourage greater energy efficiency and reduce atmospheric pollutants. In association with the provincial government, the plan has policies and regulations to manage land use within the city’s protected watershed areas, as well as areas that support tourism. The revised plan also emphasizes the importance of the artistic and cultural community in the city and encourages the use of public and private spaces to display art and recall their heritage and cultural diversity.

Furthermore, the smaller City of Dieppe has also recently initiated a process to develop a Green Plan. Designed to complement the traditional Municipal Plan, the Green Plan will promote sustainable development through sustainable economic activities, social justice and inclusion and environmental stewardship. It also participates in the international SESEME program that promotes sustainable communities.

With the recent announcement of the establishment of the Fundy Gateway, the City of Riverview is also building on the natural capital of the Fundy region. Designated as a welcome center for tourists visiting the Fundy region and situated along the Petitcodiac River, the Fundy Gateway will include an environmental interpretive area, artisan and market stalls for local products, along with food and restaurant services.

Potential Community Greening Initiatives

Historically, communities pursuing community economic development, particularly in rural areas, focused more on social and economic goals, rather than environmental goals. Moncton and Dieppe examples indicate this is changing so that all aspects of sustainability are included in new municipal plans. The economic development message, which the FBRN will convey to local communities, will be one that encourages individual and community self-reliance through collaborative initiatives, capacity building and increased participation in making resource decisions. Communities within the proposed FBR area have resources - physical, human, social and cultural - that are unique to each location, and which can be developed in a sustainable manner to enhance local wealth.

Development of local small businesses initiatives along with job training have been common activities of the Atlantic Canada Opportunities Agency and the New Brunswick Enterprise Network since their inception. The FBRN will collaborate with these agencies to encourage sustainable development initiatives, some possibilities are as follows:

- Senior government agencies throughout Canada entice businesses and industry to energy efficiency by assistance with start up costs and through tax incentive programs. There are two relatively untapped energy sources in the Bay of Fundy Region: wind and tidal power. Community involvement to help bring environmentally friendly energy sources to this area will assist in attracting

environmentally conscious business to this area, and help existing businesses reduce operating costs and become more competitive. In this regard, the Government of New Brunswick and the provincial electricity utility, NB Power, have recently announced (January 2007) the establishment of the first wind farm in the province, to be built in the Kent Hills region of the proposed FBR. This 75 MW wind farm will be built and operated by a Canadian private company;

- Community supported forestry, fisheries and agriculture initiatives are common throughout North America. Farmers markets are obvious examples of a community-supported effort that benefits local farmers while increasing local wealth. Some rural producers contract with urban dwellers and/or businesses to supply specialty products on an ongoing basis. There are examples of successful value-added forestry initiatives that lend themselves to sustainable forestry practices while preserving the forest base and the natural assets of the area. Communities have developed manufacturing capacity to provide niche markets with specialty forest products such as furniture and finished paper products.

4.4 Size of the Proposed Biosphere Reserve Relative to the Functions

The total area of the proposed FBR is **432,310 hectares**, which is appropriate to serve the three functions of this Biosphere Reserve. The approximate areas of the FBR zones are as follows:

- | | |
|--|---------------------------|
| ▪ Core Area: | 20,600 hectares |
| ▪ Terrestrial Buffer Zone: | 26,100 hectares |
| ▪ Terrestrial Transition Area: | 385,610 hectares |
| Inclusive of the estuarine marine area | |
|
Total area: |
432,310 hectares |
|
▪ <i>Estuarine marine area:</i> |
<i>9,940 hectares</i> |

4.5 Zonation

It should be noted that the FBRN, as well as natural resource managers in New Brunswick, use several independent categories of land classification that meet specific purposes depending on the features being monitored or observed. The highest level of classification referred to, in this document, is the provincial ecological land classification scheme that has many ecodistricts and ecosites nested within the system. This methodology combines climate, biological and physical information, is well-suited to assess the status and integrity of the various ecosystem functions, processes and native species that they are expected to support. The next level of classification often referred to are the watersheds that are based on the physical features of elevation and topography.

The proposed FBR is one large watershed, meaning that the water resources in the area all drain towards the upper Bay of Fundy. This classification is particularly useful when monitoring water quantity, quality, freshwater and estuarine aquatic habitats and their associated species. Watersheds rarely coincide with ecoregion or ecodistricts boundaries, but can be entirely included or overlap their boundaries. The third type of classification referred to is species habitat. This classification is usually associated with a species or narrow group of species that depend on the attributes of a particular habitat type (e.g. forest type, plant community, wetlands, salt marshes and mudflats). This classification is used when assessing the health and status of

the various species that exists in these readily identifiable landscape features. A species will become threatened or endangered when its habitat come under stress. There is a degree of overlap in all these various land classification systems but they are particularly useful for their own specific purposes when assessing sustainability and ecosystem integrity.

a) Core Area

Fundy National Park is selected as the Core Area of the proposed FBR for three primary reasons:

- 1) It is a large contiguous area with a low level of natural or man made disturbance in the last 60 years.
- 2) It has long-term legal protected status under federal legislation.
- 3) Parks Canada is dedicated to preserving the ecological integrity of lands they manage.

As with any protected area, there are ecological integrity issues that arise between its adjacent landowners and managers. In the case of Fundy National Park, there is an open dialogue with adjacent land managers intended to reach reasonable decisions related to mitigating the potential effects of operational practices. Fundy National Park has an active habitat restoration program that is promoted outside the park area, as well as inside the park.

FNP has consistently been ranked as one of the ten most visited national parks in Canada; in many respects, it is considered the tourism gateway to the Maritimes Provinces. In addition, the park interpretation programs presented to local and international visitors have received national recognition. Parks Canada has been instrumental in reintroducing the peregrine falcon and is working diligently with the Atlantic Salmon Recovery Team to stock rivers and to improve the fresh water habitat. Park scientists have recently verified the presence of a large feline predator or cougar in the area. It remains to be proven if this species is a remnant of the eastern panther population which has been considered extinct for almost a century, or an introduced species.

b) Buffer Zone

The main purpose of the Buffer Zone in a Biosphere Reserve is to support the integrity of the protected Core Area. The Buffer Zones in the proposed FBR do this in two ways: a) by carrying out their individual conservation awareness and education programs, they and Fundy National Park (proposed Core Area) extend the conservation stewardship ethic that promotes ecosystem integrity throughout the region, and b) by networking with other stakeholder agencies, a much broader base of logistical support will be achieved, that will support the conservation function of the proposed FBR.

It should also be noted that Fundy National Park, as with all national parks in Canada, uses a zoning system that buffers and protects its more ecological sensitive areas. It also has a partner-based process intended to enhance and maintain the ecological integrity of the more expansive ecoregions that extend outside the park. The proposed FBRN will greatly aid in extending this partner based approach to the greater region and beyond. Furthermore, the province of New Brunswick has land management regulations and policies that controls all land based activities that could possibly have negative consequences for the landscape and associated ecosystems. As well, Fundy National Park is bordered by the Fundy Model Forest, the primary objectives of which are sustainable forest management that is in keeping with those of Fundy National Park and UNESCO Biosphere Reserves.

The lands chosen to represent the Buffer Zone are all the other protected areas, conservation areas and special management areas that exist in the proposed FBR area. This is atypical of the common definition of buffers, which are usually adjacent to core protected areas. Given that the land zonation objective of Biosphere Reserve sites is to represent a transition in the intensity of land use ranging from legally protected areas to lands that are being intensively managed for resource extraction, the zonation scheme proposed for the FBR more than adequately meets this objective. Rational for inclusion of all protected areas, other than the Core Area, in the Buffer Zone is that most have been in existence for a relatively short time period compared to Fundy National Park. Management strategies for some protected Buffer Zones are evolving and there is subjectivity involved in the degree of protection and utilization permitted in the various Buffer Zones. Some have full legal protection, while others are managed under the administering organization's policies, which may be subject to change and evolve with time.

c) Transition Area

The Transition Area consists of provincial Crown lands, federal Crown lands, large industrial freehold forest lands, small private woodlots, agricultural and dyked marshlands, municipalities, roads, highways and energy corridors. As with most industrialized areas of North America, the ecosystems of the Bay of Fundy were subject to a wide variety of human-influences that have brought about significant change in the landscape, distribution of species, and supply of habitat for those species. The greatest concerns relates to the loss of ecological integrity brought about through fragmentation of the landscape. The primary objective of the FBRN, for the Transition Area, is to create a multi-sector forum to facilitate the analyses of changes and potential environmental consequences; so that the issues and concerns can be better understood in both quantitative and qualitative terms. The development and sharing of knowledge across resource sectors will provide an improved scientific and socioeconomic basis to plan for the conservation and restoration of native biodiversity.

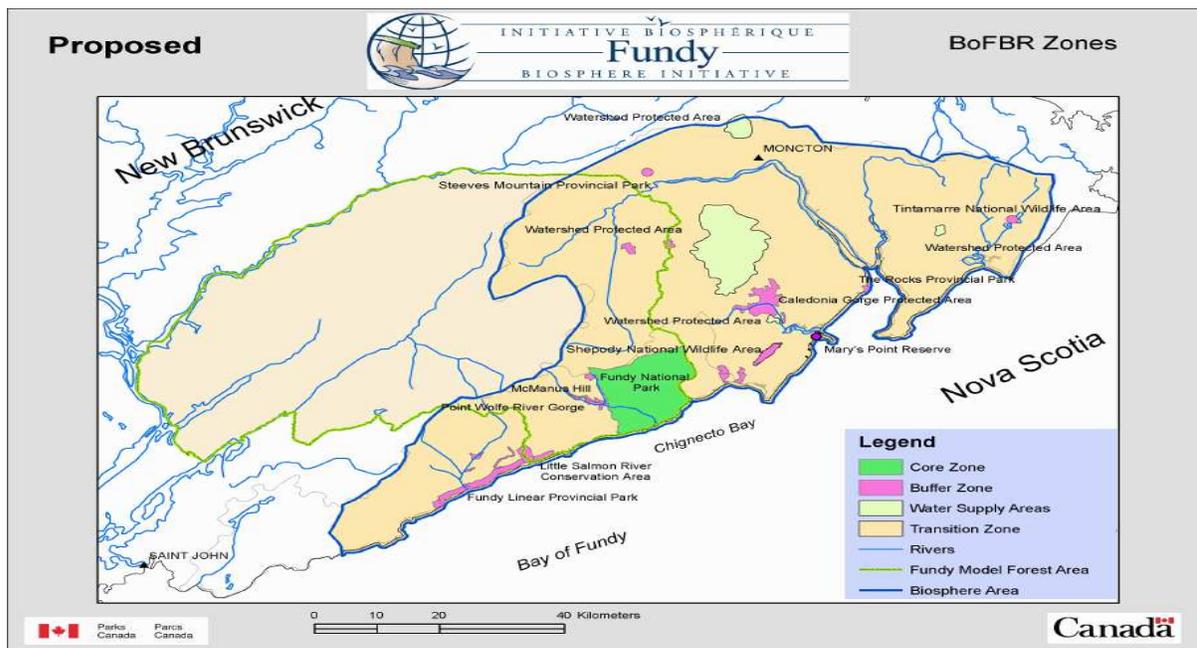


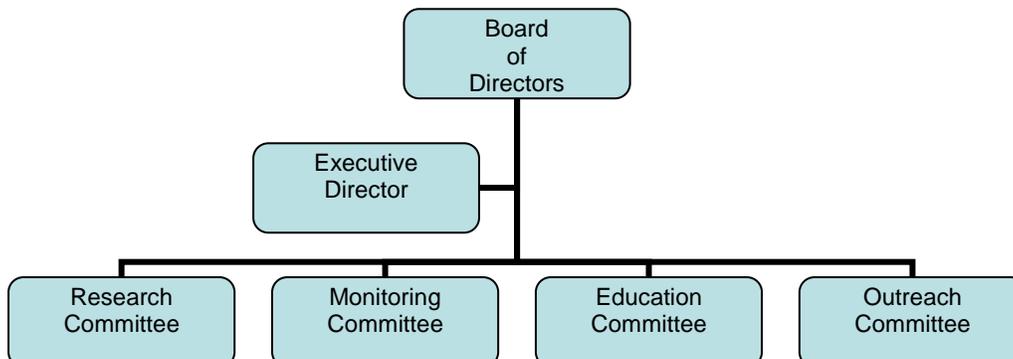
Figure: 4.1 Proposed Fundy Biosphere Reserve area (shaded area), see Appendix 3 for a larger version.

4.6 Organization and Governance

The current chairperson of the FBRN is Dr. Yves Gagnon who holds the K. C. Irving Chair in Sustainable Development at the Université de Moncton. There is also a diverse range of experience and expertise within the membership of the FBRN that ranges from local communities, resource sector managers, first nations, senior government representatives, academic institutions to conservation groups and heritage organizations. This diversity in membership is the basis for FBR area wide network that extends well beyond the boundaries of the proposed area and into the province of Nova Scotia as well as New Brunswick, which was initiated in 1999. Since that time, the FBRN has been working toward developing public support for the MAB concept and the proposed FBR through stakeholder involvement and consultation with community groups. In 2006, the show of support by stakeholders and local municipalities, including the urban area of Greater Moncton (Moncton, Dieppe and Riverview) prompted community economic development agencies, New Brunswick Enterprise Network (Enterprise Fundy) and the Atlantic Canada Opportunities Agency, along with Parks Canada and the Université de Moncton, to provide financial assistance to aid in the completion of the UNESCO - MAB nomination process.

Following UNESCO - MAB designation, the FBRN intends to expand and formalize the present structure. A new incorporated non-profit organization will be structured with an elected Chairperson and Board of Directors that will reflect the cross section of member organizations in the Fundy Biosphere Reserve Network (FBRN). A special emphasis will ensure a significant representation from communities and community based organizations. A suggested profile for the Board of Directors is shown below. The stakeholder members that will be sought to sit on the Board will be senior members of the organizations and government agencies; who have the capability to facilitate various decision-making processes that will occur within the Board of Directors deliberations. Ideally, the size of the Board of Directors, at any given time, will consist of 12 to 15 members. The FBRN will strive for, as great a cross sectional representation as possible; however, due to the size and complexity of the FBR stakeholder group, it may be necessary to have individuals represent a broad sector. For instance, there are 15 municipalities in the proposed area; it is not expected that they would all be represented individually on the proposed Board at any one time. In such instances, the FBRN will opt to have one or two senior management individuals representing all 15 communities. It would also be expected that these representatives, with the assistance of the FBRN, keep all municipalities informed and seek out their opinions on various initiatives and activities of the FBRN.

Governance model of the FBRN:



Representations on the Board of Directors of the FBRN:

- Academic Institutions
- Community Economic Development Agencies
- Conservation Organizations
- Federal Government Departments and Agencies
- First Nations Communities
- Heritage Organizations
- Municipalities
- New Brunswick Provincial Departments and Agencies
- Public at Large
- Regional Planning Commission
- Resource Sectors
- Tourism Associations

In the proposal phase of the initiative, an Interim Board of Directors, composed of the following members, has been created. This Interim Board of Directors is fully operational and is working to further define and establish the governance of the initiative.

Dr. Yves Gagnon	Université de Moncton	Chair
Dr. Paul Bogaard	Mount Allison University	Vice-Chair
Peter Etheridge	Fundy Biosphere Reserve	Secretary
Arnold Kearney	Department of Intergovernmental Affairs Province of New Brunswick	
Edouard Daigle	Fundy National Park Parks Canada	
Frank Tenhave	Enterprise Fundy	
Vince Zelazny	Department of Natural Resources Province of New Brunswick	

4.7 Mechanism for Implementation

The FBRN will use the 'Guidelines for a Biosphere Reserve Cooperation Plan' set out by the Canadian Biosphere Reserves Association (CBRA) as a means to implement the proposed FBRN vision, goals and objectives. The guidelines are shown in Appendix 11. The following indicates the progress to date along this path and what is planned for the future in terms of fulfilling the three critical functions of a UNESCO - MAB site. As indicated earlier, the FBRN will be a conservation and sustainable development network that is designed to share information and to carry out joint projects. In this sense, many of the projects initiatives and activities of stakeholder organizations will be considered FBRN activities. Essentially, the FBRN will become the forum that will be the catalyst to initiate dialogue and to see projects and activities carried out either as FBRN joint projects or by a dedicated group of stakeholders.

Activities to date

Conservation Functions

- FBRN member participation in ongoing conservation initiatives; e.g. Bay of Fundy Ecosystem Partnership as a designated working group, NB Provincial Protected Natural Areas Advisory Committee, Charring the Caledonia Gorge Protected Natural Area Local Advisory Committee management plan development process,

Petitcodiac Watershed Alliance Board of Directors, Inner Bay of Fundy Atlantic Salmon Recovery Team and the Minas Basin Watershed Working Group;

- Production of a public information tabloid to inform the public of the plight of the endangered inner Bay of Fundy Atlantic salmon;
- Production and distribution of FBR brochures outlining the conservation goals of the FBRN;
- Working on a biophysical natural resource atlas for the FBR.

Development Functions

- Carried out dialogue and discussion with local communities relative to the potential for enhanced sustainable economic development through green initiatives;
- Working with the tourism economic sector to get commitment and to plan for developing a voluntary set of environmentally friendly operational guidelines, and to eventually develop a strategy plan for sustainable tourism in the proposed FBR;
- Have applied for and received funding and in-kind support from the NB Enterprise Network (community economic development organization) in support of the premise that the FBRN will work with local communities to enhance or develop sustainable business opportunities;
- A socio-economic baseline study has been discussed and designed involving academic at the Université de Moncton and Mount Allison University.

Logistic Functions

- Formation of a broad and diverse multi-discipline stakeholder group that is the foundation for the FBRN once UNESCO - MAB designation is achieved;
- Completion and coordination of the project from conceptualization to establishing goals and objectives for the project;
- FBRN completed a FBR strategy leading up to the production of a series of draft nomination documents;
- FBRN has completed:
 - a) A broad multi-stakeholder review of the nomination document;
 - b) A local level review with local municipalities, 15 in all, 3 of which are urban centres;
 - c) Completed a multi-department review with the New Brunswick provincial government, 5 departments in all;
 - d) A series of reviews with the UNESCO Canada Commission;
 - e) A re-draft of the proposal into a final document incorporating the suggestions received in each level of the review process.

Strategic directions following UNESCO - MAB designation

Conservation Functions

- Complete a Natural Resource Atlas for the FBR;
- Develop ecosystem status monitoring procedure;
- Continue the FBRN partnership and working relations with individual organizations;
- Complete a plan of cooperation and collaboration between communities, policy makers, scientists, educators and resource managers;

- Identify priorities relative to the maintenance, restoration and enhancement of terrestrial and estuarine ecosystems;
- Develop a plan to create greater awareness and promote the cultural and heritage of the FBR;
- Promotion of sustainable economic development across resource sectors;
- Develop the methods for the sharing of conservation information across resource sectors;
- Develop a strategy to assist communities in development of local solutions to socioeconomic and environmental issues.

Development Functions

- Carry out a socioeconomic impact assessment study;
- Development of an outreach, education and communication strategy for the FBR;
- Further engage local communities and businesses in sustainable economic development initiatives.

Logistic Functions

- Official formation and incorporation of the FBRN and the duly appointed Board of Directors;
- Develop by-laws acceptable to the stakeholder group;
- Develop an operational strategy plan for the medium to long term;
- Develop and implement a funding strategy;
- Plan, design and find funding to implement baseline projects indicated in section.

Table 15.1 provides a list of stakeholders that the FBRN will look for logistical support and to be involved in initiatives. It also identifies their area of greatest expertise.

a) Mechanisms to Manage Human Use and Activities in the Buffer Zones

As indicated in Section 3.1, the FBR Buffer Zone includes protected and special management areas other than Fundy National Park (Core Area). The rationale for this inclusion is that provincial policies and regulations already exist to govern the activities and land use in Class I and II protected natural areas within the proposed FBR. Other conservation areas such as provincial parks, protected watersheds, wildlife preserves and special habitat areas have appropriate regulations to govern restrictive land uses and human activities within these areas. Some FBRN representatives currently participate on provincial protected areas advisory committees, as well as on the local Caledonia Gorge protected area advisory committees. This allows input into further definition of permissible human activities in these newly established protected natural areas. Similarly, there is also a participant on the Bay of Fundy Salmon Recovery Team and other relevant efforts. Once in operation, the FBRN will collaborate with land managers and policy makers to develop guidelines for land use policies applicable to areas adjacent to the FBR Core Area and Buffer Zone protected areas.

b) Management Plans and Policies for the Proposed Biosphere Site

The FBRN Interim Board of Directors will work within current policies, regulations and guidelines as set out by the various government agencies responsible for administration of the lands in the proposed reserve. The FBRN Interim Board of Directors will also work with marine and land-based multi-stakeholder groups that have similar conservation ideals to achieve greater

environmental and community sustainability in the area. The FBRN Interim Board of Directors has a short-term strategy to move forward with bioregional objectives for conservation and sustainability; as detailed in this proposal. Upon receipt of UNESCO - MAB designation, an official Board of Directors will be selected and a long-term management plan completed collaboratively by stakeholders and local communities.

c) Designated Authorities and Mechanisms to Implement Plans and Policies

The designated authority for the Core Area is the Parks Canada Southeast New Brunswick Field Unit Superintendent (includes Fundy National Park). The protected and special management areas proposed as Buffer Zone components are administered by various senior government agencies: Environment Canada, Canadian Wildlife Service, Fisheries and Oceans and the New Brunswick Departments of Natural Resources, Environment and Local Government, Parks and Tourism.

At the outset, the FBRN will apply to various economic development programs and environmental monitoring initiatives to support one or two staff members for a period of 3-4 years, along with office facility and operational costs. During this time, the organization will aim towards self-sufficiency via various fundraising efforts. The FBRN Board of Directors will work with interested communities and stakeholders to establish a UNESCO - MAB Fundy Biosphere Reserve Interpretation Centre in one of the communities within the FBR. Such a facility will serve many purposes:

- 1) Provide a central location for the display of artefacts and interpretation of all the aspects of the marine and terrestrial ecosystems of the Bay of Fundy, including social, cultural and historical information.
- 2) A central location from which to conduct tours to outlining areas.
- 3) Serve as a library for reference materials for the Bay of Fundy and UNESCO - MAB network.
- 4) Provide facilities for scientists and students to work from, and provide lab space for field research, monitoring and analyses.
- 5) A facility to attract scientists and students from within the international biosphere network.
- 6) Promote exchanges of various types that assist Canada to meet various international commitments on sustainability, endangered species and climate change.
- 7) Aid in attracting visitors, increasing awareness on the status of various aspects of the marine and terrestrial ecosystems in the southern New Brunswick region, as well as its rich cultural diversity and heritage.
- 8) Promote the work of regional conservation organizations and government agencies.
- 9) Boost local economies by attracting national and international visitors that would purchase products and services available in communities.
- 10) Encourage development of new environmentally friendly products and services.
- 11) Present a focal point for training, courses, symposia and conferences for teachers, instructors and academics with an interest in bioregional sustainability.
- 12) Other activities deemed appropriate by the Board of Directors.

d) Programs for Research, Monitoring, Education and Training

The proposed FBR will greatly increase the likelihood of involvement of local communities on issues relative to sustainability. The FBRN will not duplicate ongoing initiatives but will collaborate with existing conservation groups drawing on their knowledge and experience to create a “grassroots” community-based bioregional conservation organization. The planned FBRN will be a consortium of stakeholder agencies working toward sustainability and committed to sharing information. Given the complexity of the environments and local economies, this strategy recognizes that it is not possible for the FBRN, as a single entity, to be the sole repository of information regarding the environmental and socioeconomic health and historical richness of the Bay of Fundy region. Hence, the knowledge base and logistical support needs to come from various sources including communities, government agencies, conservation organizations, resource managers, cultural and historical associations, land use planners, economic development initiatives and research and academic organizations. The arrangement between the FBR and its stakeholders will allow the various stakeholders to shape and set the direction for the organization. Likewise, the FBR agency will participate in the activities of the stakeholder groups.

Initially, the FBRN will complete a series of watershed based monitoring plots in the proposed areas. Some EMAN environmental monitoring plots have already been established in the area and it is proposed to complete a larger network of those plots. The FBRN will also complete a watershed classification and status reports for all watersheds in the proposed FBR area, which will be based on provincial standards. This information will also include status reports on species and habitats at risk in the coastal and terrestrial areas of the region.

A sample profile of the research activities of the various FBRN organizations is presented in Appendix 14 of this UNESCO - MAB nomination document.

The following information is meant to indicate that the FBRN is already involved in a broad range of activities that are being carried out by its many stakeholder organizations that do work in the proposed area. Many of the multi-stakeholder organizations have educational programs and materials that the proposed FBRN will use to develop educational and awareness promotion activities. Several participating organizations have trained interpreters and educators capable of assisting in educational and awareness program design and delivery. One such organization, the Tantramar Wetlands Centre in Sackville, has received several awards for its conservation education initiatives. It started as a school-oriented program, but has grown to include the public who participate in seminars, courses and field interpretation programs on a routine basis. The Tantramar organization is described in Section 15.2.1. Other stakeholder organizations that may assist in this regard are Fundy National Park, Canadian Wildlife Service, Fundy Model Forest, Bay of Fundy Ecosystem Partnership and the Atlantic Salmon Recovery Team. The FBRN has already published one document, with the assistance of Habitat Canada, which outlines the natural history of the upper Bay of Fundy Atlantic salmon and the threats to this endangered species. A local FBRN information brochure was produced, a website is ready, an Atlas of features distinctive to this biosphere, and the group has contributed to the national newsletter of the Canadian Biosphere Reserves Association (CBRA).

5.0 ENDORSEMENTS

Core Area: Parks Canada

Buffer Zone: Government of New Brunswick
Canadian Wildlife Services
City of Moncton

Transition Area: Enterprise Fundy

5.1 Signed by the authority/authorities in charge of the management of the Core Area:

Parks Canada

Signature: _____
Full name: _____
Title: _____
Date: _____

Signature: _____
Full name: _____
Title: _____
Date: _____

5.2 Signed by the authority/authorities in charge of the management of the Buffer Zone:

Government of New Brunswick

Department of Natural Resources

Signature: _____
Full name: _____
Title: _____
Date: _____

Department of Tourism and Parks

Signature: _____
Full name: _____
Title: _____
Date: _____

5.2 Signed by the authority/authorities in charge of the management of the Buffer Zone:

Canadian Wildlife Services

Signature: _____

Full name: _____

Title: _____

Date: _____

5.2 Signed by the authority/authorities in charge of the management of the Buffer Zone:

City of Moncton

Signature: _____
Full name: _____
Title: _____
Date: _____

5.3 Signed as appropriate by the National (or State or Provincial) administration responsible for the management of the Core Area and the Buffer Zone:

Not applicable.

- 5.4 Signed by the authority/authorities, elected local government recognized authority or spokesperson representative of the communities located in the Transition Area:

Enterprise Fundy

Signature: _____

Full name: _____

Title: _____

Date: _____