

CANADIAN BIOSPHERE RESERVES AND SOCIAL INNOVATIONS: AN EXPLORATION

Introduction and Background

A Social Sciences and Humanities Research Council (SSHRC) funded “Biosphere Sustainability Project” (BSP) at the University of Waterloo is currently looking into three broad interrelated concepts as they might relate to biosphere reserves: resilience analysis, sustainability assessment, and social innovation generation. The first serves as a diagnostic, the second as an approach to review policy, strategy or project proposals to enhance the resilience of a social-ecological system, and the third as a likely prerequisite for achieving successful outcomes. Participants in the BSP are also working with other people who are interested in these different approaches, including the McConnell Foundation funded “Social Innovations Group (SiG@Waterloo)” established at the university in 2007.

A “biosphere reserve” is a designation of recognition conveyed by UNESCO for places in the world that meet stringent criteria relating to the promotion of conservation and local sustainable development, and they are viewed by UNESCO as “learning platforms” for how this can be accomplished. As of May 2009, there were 553 biosphere reserves in 107 countries, including 15 in Canada. Our exploration is to determine whether, how and to what extent social innovation has been a feature of the experience in different Canadian biosphere reserves.

Social Innovations and Social Entrepreneurs

Social innovation has been defined as “an initiative, product or process or program that profoundly changes the basic *routines, resource and authority flows or beliefs* of any social system. Successful social innovations have durability and broad impact”. (Frances Westley, Chair, SiG@Waterloo – italics in the original).

The processes of innovation are generally viewed as a sequence of five phases, all of which can take time (months to decades) to realize, as follows:

- i. A visionary idea is invented, adopted by, or otherwise originates with a key “agent” (individual champion or small group) about how some apparently intractable situation (problem or opportunity) might be addressed;
- ii. This idea is discussed further and articulated into some programmatic and/or organizational form so that it can be communicated better and considered for a possible trial run;
- iii. An “exploration” phase then examines ways to adapt the program and/or organization ideas to the particular circumstances of a given place (including the overlays of governance institutions) and pilot projects are developed as prototypes to demonstrate their feasibility;
- iv. Assuming encouraging results from the prototypes, further efforts go into intensifying implementation measures through entrepreneurial initiatives to obtain funding, linking up with others in networked communities-of-practice, and strengthening managerial capacities in order to encourage a “scale-out” through replications elsewhere by people in different larger networks of practice;
- v. Entrepreneurial efforts are also directed by the original champions or others towards a “scale-up” to attract strong institutional support in a way that helps assure the durability and larger scale impacts of what by then is recognized to have been a successful innovation.

All of these processes and sequences are strongly influenced by the dynamics of larger scale social-economic and social-ecological systems. These systems collectively set the contexts and conditions that determine whether successful local innovations encounter enabling supportive environments or face major barriers for their efforts during one or more phases (and especially for the “scale-up” challenges).

From a perusal of the experiences of biosphere reserves in Canada, including the circumstances under which they arose, views from three different perspectives can give insights to the phenomena of social innovation. One is to consider the concept of a “biosphere reserve” itself to be an innovative idea and examine the extent to which it has been developed in Canada. A second is to note examples of innovations that came as “scale-out” replications from sources outside of biosphere reserves but were recognized to have important beneficial features for the purposes of a biosphere reserve. The third is to note innovations that originated within the area of a biosphere reserve and the extent to which they have reached the different phases from there.

The Biosphere Reserve Concept as an Innovative idea.

The concept originated in the UNESCO “Man and the Biosphere” (MAB) program in 1974. It was intended to highlight examples of places where a much broader approach to the conservation of ecosystems, and to what are now called “ecological goods and services”, had to be taken in order to incorporate issues of human livelihoods and community well-being into sustainable uses of landscapes. A contrast was sometimes drawn between this and the approach driven by the parks and protected areas movements that often privileged conservation of ecosystems over the needs of people who lived there. The concept of biosphere reserves has evolved over the years and will continue to do so. It now includes the full scope of “sustainable development” not only for rural areas or resource hinterlands but also for urbanizing regions as well. The parks concept has also evolved but still focuses on nature conservation in protected areas as the top priority.

Given the criteria required by UNESCO for a designation, a biosphere reserve initiative has to be well into phase 3 of a social innovation before it can be recognized. In Canada it commonly takes from 5-7 years for local champions (or social entrepreneurs) to achieve this. There have been a number of cases where such initiatives were not successful in the sense they could go forward for consideration by UNESCO.

Viewed as a group, the 15 (+ one other now pending) are at earlier stages in phase 5. Along the way to recognition, there have been elements of a phase 4 replication

whereby people from existing biosphere reserves informally help people elsewhere in Canada to explore the feasibility of implementing a biosphere reserve in their particular region, assuming that the requisite criteria could be met. Over the past two years the Canadian Biosphere Reserves Association has taken a major initiative to scale-up by seeking core funding from the federal government (that otherwise has “supported” Canadian involvement in UNESCO/MAB but not biosphere reserves because of jurisdictional issues that can be raised given the scope of their terms of reference).

Looked at individually, there was variation as may be expected in the circumstances under which each biosphere reserve was launched. One shared characteristic is that each location included landscapes (and/or waterscapes) with topographic variety along with distinctive patterns of human uses of land and resources. This variety supported both amenity values, interesting local biodiversity, and a local cultural and historical heritage that engendered a strong sense of place among many residents and regular (seasonal) visitors. The local champions who took a lead in seeking a UNESCO designation generally expressed some mix of concerns about actual or potential threats to these values as well as possibilities for addressing them that could be enhanced by an international recognition of their place. Examples include:

- Waterton, where constant pressures were being placed on adjacent municipalities to “develop” extensive tourism attractions and palatial homes. This would otherwise disrupt a prosperous ranching community adjacent to the national park, obstruct the much publicized “viewscape” (where the prairies meet the mountains), and destroy critical wildlife habitat along a particularly narrow portion of the Rocky Mountain corridor;
- Redberry Lake, a rural community in slow decline (“depleted community”) that nevertheless had a distinctive Ukrainian heritage as can be seen in the local village architecture and place names (in Ukrainian) along with an ecologically significant alkaline lake complex that includes the most northern known colony of white pelicans; both might be marketed for local tourism enhancement;

- Georgian Bay, where there was a felt need to find ways to build trust among four distinct constituencies in the population of the region through adoption of a larger vision of place and what would be possible to do together to enhance widely shared values in it;
- Frontenac Arch, where the challenge was seen as “connecting the dots” to network many isolated initiatives for conservation and development into a more effective collaborative endeavour with a widely shared vision of what should be done;
- Lac Saint-Pierre, that has a strong sense of place and local history that could form the basis for a sustainable eco-tourism industry to help re-invigorate the local economy.

The five phase interpretation of successful social innovation indicates the importance of a final “scaling-up” to institutionalize the innovation, and the importance of some disruption of the institutional context to enable this to occur. In the case of biosphere reserves, there are several cases where institutional disruptions had occurred first, and gave rise to rule changes for local governance that were meant to resolve long-standing disputes, bitter political conflicts, or contested rights. These in turn created conditions for introducing the biosphere reserve concept as an innovative idea and then to pursue some opportunities opened up by the disruption. Examples include:

- Formal legal protection by the Ontario government for the 725 km long Niagara escarpment was given under the Niagara Escarpment Planning and Development Act (1973). In due course, the first Niagara Escarpment Plan was adopted in 1985 (and has been up-dated, most recently in 2008). This Plan laid out the basic framework for introducing the biosphere reserve, designated in 1990;
- The Riding Mountain Liaison Committee was formed in 1980 by the Riding Mountain National Park (Manitoba) with 15 surrounding rural municipal districts. This structure was created to resolve recurring issues arising from a National Park set in the middle of an agricultural region, usually questions

about wildlife and cattle. It soon became viewed, by 1982, as an organizational framework for a biosphere reserve to be organized as a collaborative sub-set of the larger committee. The biosphere reserve was designated in 1986;

- British Columbia's Clayoquot Sound Land Use Decision, 1993, along with the creation of the Clayoquot Sound Central Region (Co-management) Board, 1994, encouraged exploration of a possible biosphere reserve beginning in 1993. In 1996 the Regional Board formally requested the Prime Minister to arrange it, and the designation was subsequently received in 2000;

Similarly, for two situations where a biosphere reserve is being seriously considered:

- The Supreme Court of Canada's (Marshall) Decision in 1999 confirmed aboriginal rights to commercial fishing. The requirements of this decision were acted upon quickly by Mi'kmaq communities and the Department of Fisheries and Oceans on Cape Breton Island. The restructuring of relations and responsibilities led indirectly to exploring the biosphere reserve idea for the Bras d'Or Lake (actually an estuary) and watershed in 2003, and a designation is pending in 2009;
- Ontario enacted the Oak Ridges Moraine Conservation Act, 2001, and ORM plan in 2002. It then passed a more extensive Greenbelt Act, 2005, in conjunction with a "Places to Grow" policy for a large region centred on the Greater Toronto Area. These legal arrangements became the basis for the current exploration of a possible Oak Ridges Moraine Biosphere Reserve. The NEBR and possible ORMBR form legislated axes for the much larger protected countryside within the Greater Golden Horseshoe urbanizing region;

As noted, by the time a designation is received from UNESCO, biosphere reserves are usually well into the 3rd phase of an innovation sequence. Not all have been able to move forward to becoming a viable organization of their own. While many of the functions of the biosphere reserves continue to be performed by different actor systems

(networks of “agents”) in them, the original champions of the idea or their successors have not always been successful in building up the collaborative management capacities to take it much further. It is usually a question of access to skill sets and resources combined with a heavy reliance on volunteers who are often already busy in their communities. There are, however, some promising examples including:

- The Clayoquot Biosphere Trust was established with a \$12 million endowment fund, and is organized as a co-management operation under the Regional Board. As part of the provincial government’s land use decision in 1993, the Scientific Panel on Sustainable Forest Practices in Clayoquot Sound required major changes in practices to promote sustainable forestry on a more selective basis; that has in turn led to the abandonment of industrial forest operations and the creation of an aboriginal-owned alternative (Iisaak Forest Resources). The Trust provides seed money and matching funds for projects selected by several advisory committees, and the entire effort is paced by the current status of on-going Treaty negotiations with the Nuu-chah-nulth First Nations.
- Frontenac Arch adopted a “Networks R Us” approach to capacity building supported by website services it also provides for other community organizations. It has multiple collaborative projects underway at any given time that involve up to about 80 other organizations and agencies in the biosphere reserve region, with multiple sources of project funding and some services partly on a cost recovery basis.
- Mont Ste-Hilaire has been able to evolve from its origins as an excellent research and education site (conforming very well with the original concept of a biosphere reserve from the 1970s) to an organization that successfully scaled-out (and into) the surrounding communities. It offers a range of services including a well-developed set of program activities to learn about and celebrate the natural, cultural, and historical heritage of the region surrounding the area of the biosphere reserve. It has also been successful in earning sufficient income to cover costs, much of it from parking lot charges

for visitors. It also has state-of-the-art website materials to help support these programs.

Scaled-Out Innovations Adopted Within Biosphere Reserves

The examples identified below apply to the conservation of ecosystems, resource stewardship practices, sustainable livelihoods, and research and learning for sustainability.

Conservation of Ecosystems

“EcoGifts”, Land trusts and Conservancies:

Until the 1990s, conservation groups in Canada mobilized to lobby governments to acquire natural landscapes as additions for their different park and protected areas programs. With budget reductions by both the federal and provincial governments in the early 1990s, park agencies had difficulty in maintaining the park systems they already had and began to refuse additions to them. At the same time the Nature Conservancy of Canada (NCC), an organization that had grown steadily from its beginnings in 1962, encountered tax policy difficulties when trying to arrange acquisitions of ecologically significance lands from private owners who were interested in either selling or donating them to the NCC in order to arrange for their long-term stewardship. NCC in turn had often turned such lands over to governments for stewardship under some park category.

The technical innovation worked out by NCC in consultation with senior tax officials in the federal government (and subsequently some provinces too) was to reduce, and then eliminate capital gains taxes on lands donated for conservation, and to issue tax credits for some portion, subsequently almost all of the value of the lands. This led to the federal “EcoGifts” program organized by Environment Canada in 1995 (and refined in subsequent years) to adjust these tax policies, define ecologically significant lands whose protection would qualify for the tax changes, identify non-governmental organizations that were capable of administering these changes, and authorize them to secure and hold such lands from willing sellers or donors. This technical innovation has

stimulated social innovation in the form of the rapid growth of land trusts and conservancies in most provinces (there are now over 40 of them in Ontario).

Land trusts have been acquiring conservation lands in at least 10 biosphere reserves as well as the two new candidate ones (in Cape Breton and in the Greater Toronto Area). The Long Point BR and Niagara Escarpment BR in Ontario each have at least 5 trusts engaged in habitat protection within their areas.

Greater Ecosystems, mapping and priority setting:

Landscape ecology and conservation biology underlie most thinking about conservation strategies for landscape protection. This goes beyond the “islands of green” approach of existing parks and protected areas to emphasize the importance of connectivity and habitat configuration patterns for protected green space on a landscape. While securing properties to restore lost corridors is recognized to be a very long-term proposition, a first step has been to map some optimal pattern of possibilities. GIS technologies have made this quite possible.

National Parks in Canada have a legislated requirement to protect the “ecological integrity” of their lands as a first priority (the same requirement was legislated for Ontario parks and conservation reserves in 2006). Because ecosystems do not conform to jurisdictional or proprietary boundaries, a “greater ecosystem” concept has been adopted in some areas to assess issues of integrity and monitoring for it at some larger scale. Examples of this as they relate to biosphere reserves include:

- the Canadian Parks and Wilderness Society (CPAWS) mapped GIS data for conservation purposes around the Riding Mountain National Park (and biosphere reserve) in Manitoba; the northern Bruce Peninsula in Ontario for the Fathom Five and the Bruce Peninsula National Parks (Niagara Escarpment Biosphere Reserve); and for the Thousand Islands National Park on the Saint Lawrence River (Frontenac Arch Biosphere Reserve);

- the Miistakis Institute for the Rockies at the University of Calgary has mapped the Crown of the Continent Ecosystem that includes the Waterton Lakes National Park and biosphere reserve;
- consultants did the same for Georgian Bay Islands National Park for an area that included part of the Georgian Bay Biosphere Reserve;
- the NCC has done the same for Carolinian Canada, an eco-region in southwestern Ontario that includes the Long Point Biosphere Reserve and the southern half of the Niagara Escarpment Biosphere Reserve;
- Mont Saint Hilaire Biosphere Reserve has mapped forest corridors extending beyond the biosphere reserve especially ones along the Richelieu River that connect with the eastern end of the Lac Saint-Pierre Biosphere Reserve;
- The Geomatics Research Group at Nova Scotia Community College has prepared GIS maps for the Southwest Nova Biosphere Reserve.

These kinds of data have been of interest to conservation groups that are dedicated to corridor conservation initiatives such as:

- the Crown of the Continent along the Rocky Mountains (including Waterton Biosphere Reserve) which in turn has been extended by the Yellowstone to the Yukon (Y2Y) concept;
- the 25 km Wildlife Corridor between Riding Mountain and the Duck Mountains to the north along the same escarpment formation that occurs in the eastern and northern section of the Riding Mountain Biosphere Reserve. The NCC, as part of a parkland habitat partnership, is leading acquisitions of aspen parkland landscapes along this corridor;
- the Carolinian Canada Coalition is promoting the corridor configuration mapped by the NCC that includes the Long Point Biosphere Reserve and especially the best remnant Carolinian forests that occur in Norfolk County;

- the corridor of interest to the Algonquin to Adirondacks (A2A) Conservation Association includes the Frontenac Arch Biosphere Reserve as a key segment of the corridor as well as a supporter of the concept. The FABR is developing a extensive and detailed community atlas that (among other things) identifies key habitats for species-at-risk in the area.

Mention could also be made of conservation measures for long distance migratory species that need particular summering and wintering grounds as well as migratory stopover locations. For example, the Commission for Environmental Cooperation (CEC) is helping to coordinate a North American Marine Protected Areas Network that, along the Pacific Coast, would protect essential sites for migratory gray whales (seen regularly at Clayoquot Sound Biosphere Reserve where some spend the summer). The CEC has also launched a North American Monarch (butterfly) Conservation Plan that recognizes important stopover sites for the fall migration such as the Long Point Biosphere Reserve.

Resource Stewardship Practices

Model Forests and sustainable forestry:

In preparation for the 1992 UN Conference on Environment and Development, the Canadian Council of Forest Ministers sponsored the first Canadian Forest Accord, a 5-year agreement among governments, industries, and non-governmental organizations to cooperate in promoting sustainable forest management in Canada, and to develop a Canadian National Forest Strategy as a guide. These commitments have been renewed about every 5 years.

The model forest concept was also developed in 1992 to select demonstration areas in different forest regions of Canada. This gave rise to the Canadian Model Forest Network that has been funded by the Canadian Forest Service for a succession of three 5-year periods with diminishing federal contributions each time. These reductions were to be off-set by funds raised from other sources by the forest managers. In 2007, with 11

recognized sites, the official model forest program ended although the model forest network continues.

The Canadian Forest Service then initiated a very similar Forest Communities Program by funding 11 sites of which 8 were among the original model forests and another 3 were for special project areas. There are currently 14 community forests/model forests in Canada. Each one is to demonstrate through local stakeholder consultations improved ways (mostly technical) for managing forests, taking into account non-fibre products and forest values as well as commercial products (lumber, pulp, biomass fuels). Since 1995, the International Development Research Centre has funded a secretariat for an International Model Forest Network that has 30 members from other countries, some “twinned” with Canadian sites.

There are some collaborative activities with biosphere reserves. Examples include:

- projects on forest ecology and wildlife carried out by the Nova Forest Alliance (a forest community project) and the Mersey-Tobeatic Research Institute established by the Southwest Nova Biosphere Reserve;
- Fundy Biosphere Reserve includes part of the original Fundy model forest. The administrative organization for the biosphere reserve was modeled on the model forest and the former Executive Director of the model forest became an interim Executive Director for the biosphere reserve;
- The Frontenac Arch Biosphere Reserve is located completely within the 1.5m ha Eastern Ontario Model Forest and they mutually support each other’s activities. The model forest holds a certification from the International Forest Stewardship Council on behalf of many owners of small woodlots, including people living within the biosphere reserve. Both organizations contribute to public education programs sponsored by the Landon Bay Centre. They are currently planning with other partners to assess the economic value of natural landscape ecological services, including carbon sequestration;

- the Westwind Forest Stewardship Inc., in Parry Sound Ontario, although not a model forest, holds a Sustainable Forest License for the French-Severn Forest that includes all of the Georgian Bay Biosphere Reserve. It also has certification from the International Forest Stewardship Council for its planning and management practices. There is informal cooperation between Westwind and the biosphere reserve on public education and outreach activities;
- Ecotrust Canada has been working closely with the Nuu-chah-nulth First Nations in Clayoquot Sound on management issues relating to their lisaak forest operations and more recently on a shared Forest Communities Program, funded by the Canadian Forest Service. Their approach is to build a “conservation economy” on First Nations’ guiding principles that would maximize value-added manufacturing using relatively small volumes of raw wood. lisaak also has certification from the International Forest Stewardship Council. Ecotrust’s work is endorsed and supported by the Clayoquot Biosphere Trust (the local biosphere reserve organization).

In addition, the Manitoba Model Forest is currently planning to establish a “Western Region” component that would embrace the Riding Mountain Biosphere Reserve. Riding Mountain originated as a Forest Reserve in 1895 before becoming a National Park in 1930 (and a biosphere reserve in 1986).

Watershed Management

There are watershed management issues in each of the 15 biosphere reserves (and the two possible new ones). The different watershed management or water resource management agencies operating in each biosphere reserve address these issues. In most cases, people associated with each biosphere reserve also participate in water-related issues such as fisheries management, aquatic habitat improvements, wetland conservation, water quality monitoring, source water protection, and public education. In some cases, biosphere reserves have taken on a more extensive role, for example:

- the Georgian Bay Biosphere Reserve has taken a lead role within the Canadian Framework for Community Action for the Lake Huron-Georgian Bay Watershed. This is part of a federal-provincial/state Lake Huron Bi-national Partnership (2002) that is to develop and help carry out a Lake-wide Management Plan for Lake Huron under the terms and conditions similar to those called for in the Great Lakes Water Quality Agreement;
- the Lac Saint-Pierre Biosphere Reserve is located around a widened (with flood plains) section of the St. Lawrence River that is managed under the provisions of the Canada-Quebec St. Lawrence Action Plan (1988; 2000; 2008). The “lake” is one of 14 “ZIPs” (zone d’intervention prioritaire) designated in 1996 for which a “PARE” (plan d’action et de réhabilitation écologique du lac Saint-Pierre) was developed. A number of projects have been undertaken to control or remediate pollution and toxic contaminants in the aquatic ecosystems, rehabilitate fish and wildlife habitats, and to develop eco-tourism. Eco-tourism in the broadest sense is the main focus for the biosphere reserve;
- Fundy Biosphere Reserve includes two sites in the Petitcodiac River Basin (Pollett River and Hayword Brook) in which long-term studies are underway to assess the impacts of forest management practices on water resources;
- the inland lakes and rivers of the Southwest Nova Biosphere Reserve are important for their distinctive Atlantic Coastal Plains Flora, some disjunct occurrences of species-at-risk, sports fishing, and canoe-based outdoor recreation. Nova Scotia is in the process of developing a water resource management strategy that will likely lead to major policy decisions within the next few years. The Mersey-Tobeatic Research Institute (established by the biosphere reserve) conducts ecological field studies of these areas (some quite impacted by acid rain) and is seeking partnerships to enhance this work. There is interest in strengthening community-based involvement in resolving these issues that could also become linked to whatever provincial legal framework for watershed management might be developed.

In addition, for two prospective new biosphere reserves:

- the Bras d'Or Lake Biosphere Reserve Association is expected to have direct involvement with implementation of a multiple-agency Collaborative Environmental Planning Initiative that has specified desirable objectives for each of the 13 sub-watersheds draining into the "lake" (actually a marine & estuarine complex) and with reference to several "ecologically and biologically significant areas" within the complex (as defined under the federal Oceans Act, 1997).
- the Oak Ridges Moraine region (north of Toronto) has a deep and complicated configuration of groundwater aquifers that provide the water supply for over 100,000 people. The aquifers also serve as headwaters for about 60 rivers and creeks including many of the larger rivers that flow through the Greater Toronto Area to Lake Ontario, and several of the main rivers that flow north into Lake Simcoe. A possible biosphere reserve would emphasize this function and its importance as well as the more observable protection of farmland near cities and day use recreation opportunities on the moraine.

Agricultural lands

Example: Alternative Land Use Services:

This alternative land use services reflects the concept of a "multi-functional landscape" that is well accepted in Europe, whereby farmers receive payment for producing valued ecological services as well as for crops & livestock products they sell. The ALUS concept was introduced in Canada by the Delta Waterfowl Foundation and the Manitoba Keystone Agricultural Producers organization in 1999. Pilot projects are underway in Manitoba, Saskatchewan, PEI and Ontario (Norfolk County since 2004).

The Norfolk ALUS sponsored the formation of an "Ontario ALUS Alliance" in March 2009 in preparation for "scale-up" initiatives. The Long Point, Niagara Escarpment and Frontenac Arch biosphere reserves have endorsed the Alliance. There is also an

ALUS pilot project underway in the Rural Municipality of Blanshard in Manitoba, immediately south of Strathclair RM that has a representative on the Riding Mountain Biosphere Reserve.

Redberry Lake Biosphere Reserve in Saskatchewan has also expressed interest in developing an ALUS. The biosphere reserve is heading up a partnership with 6 rural municipalities, the Saskatchewan Watershed Authority, Ducks Unlimited (Canada) and the Prairie Farm Rehabilitation Administration to promote interest and adoption of the Canada-Saskatchewan Farm Stewardship Plan. (In Ontario, an environmental farm plan is a pre-requisite for participation in ALUS).

Example: Land Trusts for Ranchlands in Southwestern Alberta.

Persistent threats to the rangelands on the east side of Waterton Lakes National Park led members of the Waterton Biosphere Reserve to look into the applicability of conservation easements on land titles to protect their continued use as ranchlands. Some placed easements on their own lands and subsequently, with some informal help and advice from the Alberta Office of the Nature Conservancy of Canada (NCC), created the Southern Alberta Land Trust Society (SALTS) in 1997. This was the “first locally based, rancher-driven land conservation organization in Canada” that preserves agricultural lands and agricultural livelihoods.

With additional support from the NCC and other organizations, some 12,140 ha of ranchlands have been secured to form a Waterton Front Range Project that also protects wildlife habitats and the magnificent viewscape of the Rockies in that location. A number of range habitat restoration and monitoring activities are also being carried out among about 40 ranchers in the area.

The SALTS has attracted interest from ranchers in other areas of the southwestern Alberta front range ranchlands and watersheds. It is now working with landowner groups such as the Chinook Land Owners' Association near Pincher Creek, the Livingstone Landowners Group in the Oldman River watershed, the South Porcupine Hills Stewardship Association west of Claresholm, and the Pekisko Group of landowners near High River. The SALTS has also sponsored the Southern Foothills Study of alternative

development scenarios for the front range lands and has helped form a new Canadian Land Trust Alliance in 2004.

Example: Local Food Plus and community food security:

A number of initiatives are underway in Canada to address concerns about the quality and continued availability of food products through large corporate-controlled commodity chains that extend into the global economy. At the same time they drive local farm enterprises out of business. Enhanced local sustainability and sense of security are being sought through shorter supply chains and closer connections between producers and consumers. Initiatives are taken under themes such as local food plus, local flavours and product branding, community-supported agriculture, 100 mile diets, organic production for specialty markets in nearby urban areas, community gardens (including rooftops) and culinary tourism. Municipal governments play an increasing role in some of these initiatives. So do some biosphere reserves:

- the Frontenac Arch Biosphere Reserve promotes a “local flavours” network that publicizes opportunities on a website that has about 70 entries from farmers, farmers’ market, restaurants, retailers and bed & breakfast operators, including maps of their location. It has also sponsored an annual 100 mile dinner fundraising event;
- a “biosphere action group” in Georgian Bay Biosphere Reserve is organizing a network directory for local producers who sell produce from the farm gates; the Iroquois Cranberry Growers (Wahta Mohawks) are a major local producer;
- the Mont Saint-Hilaire Biosphere Reserve helps advertise and sell local apple products from the remaining orchards on its hillsides. Some neighbouring farms are part of the ASC (Agriculture Soutenue par la Communauté) and are advertised informally at the biosphere reserve;

- the Charlevoix Biosphere Reserve has a local association, the Table Agro-Touristique de Charlevoix, and a Route de Saveurs that are promoting agro-culinary tourism with a number of locally branded food products;
- the Southwest Nova Biosphere Reserve offers publicity to support regional farmers' markets;
- in the Mount Arrowsmith Biosphere Reserve, the Oceanside Community Food Initiative began exploring options for local food production in 2009;
- the Clayoquot Biosphere Trust is supporting a West Coast Community Food Survey by the Ucluelet Community Food Initiative, and the first "Ukee Spring Food Fair" (2009) showcased local foods to some 150 people;

And as a prospective biosphere reserve:

- the Oak Ridges Moraine has a large number of local urban and rural groups linking up in various ways to make use of the opportunities provided by greenbelt protection.

Sustainable Livelihoods

"Green" alternatives:

The word "green" has become code for a number of ways in which economic and social needs can be met other than through mass consumerism from increasingly global markets. In addition to fostering a sense of food security through community-supported local agriculture, green alternatives also address multiple goals at small-scale and local levels for efficient and reduced uses of energy, water and materials; promotion of renewable energy, water conservation, recycling and waste reduction; elimination of toxic contaminants from air, water, food and environmental surroundings; and promotion of healthy lifestyles including less use of automobiles. Examples from biosphere reserves include:

- Fundy Biosphere Reserve is committed to helping with green alternatives in both urban and rural areas as has been called for by some municipalities and local groups;
- Lac Saint-Pierre Biosphere Reserve’s comprehensive approach to eco-tourism and sustainable development incorporates components from green alternatives;
- Frontenac Arch Biosphere Reserve maintains a free website for people to use to promote “exchanges” (recycling) of re-usable building materials and industrial wastes, residential furnishings and other items, and for car-pooling;
- The Georgian Bay Biosphere Reserve has explored possibilities for cooperating with the Rocky Mountain Institute in Colorado to identify energy efficiency options that could be promoted locally as a basis for new small businesses;
- The Erie Shores Wind Farm in Long Point Biosphere Reserve and adjacent Elgin County has installed 66 turbines with 99MW capacity along a 25 km coastal stretch of Lake Erie; there are also two fields of solar panels in the biosphere reserve. These are commercial ventures connected to Ontario Power Generation and the provincial grid;
- In Riding Mountain Biosphere Reserve, the Friends of Riding Mountain National Park maintains a Friends Recycling Depot and public education program as a public service for businesses, cottage owners, and visitors;
- The Clayoquot Biosphere Trust funded the “Green Economic Opportunities Studies” (2003) conducted by Ecotrust Canada and the Community Economic Development Centre at Simon Fraser University to review 13 different sectors (all except forestry and finfish aquaculture) and with special emphasis on small business opportunities for First Nations communities in the region. Strategies to realize opportunities were identified and follow-up

had to be on a case-by-case basis with specific business and marketing plans. The CBT has also initiated a “Measuring Community Health Initiative” that uses 12-15 indicators to give a holistic interpretation of wellbeing.

Sustainable tourism:

Most biosphere reserves (like other regions) have groups looking towards enhanced tourism to support their local economies. There are many players in the tourism industry largely dominated by the private sector services and facilities along with government agencies that offer the marketing and publicity service for tourism generally. Issues vary greatly depending upon the kinds of tourism sought, the success in attracting it, and the kinds of impacts it has on local environments and livelihoods. There are examples where the biosphere reserve group has taken lead roles:

- the Lac Saint-Pierre Biosphere Reserve has made eco-tourism its dominant orientation. It had an Ecotourism Development Master Plan prepared in 2003 that proposed a number of projects to enhance eco-tourism along both sides of the “lake” (St. Lawrence River); the biosphere reserve is now developing criteria and standards for recognizing enterprises, sites and events in different sectors and is also developing a variety of tourism packages. Projects are implemented on an opportunistic basis with different sources of funding;
- the Frontenac Arch Biosphere Reserve is currently building a “National Model for Sustainable Tourism” in partnership with a number of organizations including the UN World Tourism Organization, the Tourism Industry Association of Canada (TIAC), the National Geographic Society, Transat A.T. Inc., Parks Canada, the Ontario Ministry of Tourism and Recreation, and the Eastern Ontario Development Program. Comprehensive inventories of attractions and businesses have been compiled, a series of sustainable tourism workshops have been sponsored, and a Canadian Charter for Sustainable Tourism has been prepared with TIAC as a code of ethics (based on international standards) for adoption by tourism service providers;

- a \$230m Charlevoix Massif project is being constructed (from 2002-2013) by private interests along a 20 km section of the north shore of the St. Lawrence River, including about 120 km² of steep hills extending down to the coast. This is to be a year-round resort complex having a variety of hotel and other accommodations and services including over 100 different organized activities, all designed to be compatible with the natural environment and deep cultural heritage of the area. The Charlevoix biosphere reserve group has publicized this development and is satisfied that it is consistent with sustainable tourism. In addition the biosphere reserve is promoting local food production and culinary tourism opportunities.

Generally, biosphere reserve groups have ventured more into promoting niche markets for eco-tourism, for example:

- Riding Mountain Biosphere Reserve has organized “Caching Riding Mountain” with communities around the national park in order to attract attention to local cultural and natural features;
- the Georgian Bay Biosphere Reserve has a development committee consulting with stakeholder groups to see if they can agree upon ecotourism standards and local accreditation of services for this;
- the Long Point Biosphere Reserve is proposing to other groups that they work together to create an ecotourism component that builds on local natural and cultural heritage features. It will also work informally with a number of local businesses that have advertised themselves as being located in a biosphere reserve. An initial Sustainable Eco-Tourism Stakeholder Workshop to organize this was held in May 2009;
- Mont Saint-Hilaire Biosphere Reserve’s education and outreach programs will be an important component for a new bi-national Champlain-Richelieu Heritage Corridor (2006) that is to highlight distinctive natural, cultural, historical and recreational resources in the Lake Champlain and Richelieu

River valley. Special events during the summer of 2009 will celebrate the quadricentennial (400th) anniversary of Champlain's voyage through the area;

- Fundy Biosphere Reserve hosted a 2-day Sustainable Tourism Conference in February 2009 and plans to initiate collaborative approaches for developing local tourism including up-grading standards at particular locations along the Fundy Coast Drive and Fundy Trail Parkway (and Footpath).

Research and Learning for Sustainability

With biosphere reserves being promoted by UNESCO as models for learning how to enhance local or regional sustainability, the main challenge for each biosphere reserve is how to adapt general principles for sustainability into viable actions for the particular circumstances of place. This requires some research, monitoring, education and training ("logistic support function") capabilities. Some biosphere reserves have research institutions in or near to them but the latter are often pre-occupied with their own academic or applied specialties, driven by particular sub-disciplinary questions and/or techniques. If they conduct field studies in biosphere reserves it is more as a matter of convenience than an attempt to deal with broader systems issues inherent in biosphere reserve ideals. Each biosphere reserve has had to develop their own relations with research groups from other institutions or strive to develop their "logistic" capabilities in other ways. The range of approaches being taken are exemplified as follows:

- the Clayoquot Sound Biosphere Reserve has no difficulty in attracting interest from people wanting to undertake studies there because of its attractive location. With help from the University of Victoria, it has developed a "Standard of Conduct for Research" (2003). It also maintains two research cabins acquired from the former Clayoquot Biosphere Project, and contributes to the support of research and other studies by the Central Westcoast Forest Society (Ucluelet), the Clayoquot Field Station at the Tofino Botanical Gardens, the Strawberry Island Research Society, Tofino, the Temperate Rainforest Field Study Centre and the Hooksum Outdoor leadership training program, both in Hesquiaht. The Bamfield Marine

Sciences Centre, established in 1972 just to the south (of Barkley Sound) conducts year-round research and teaching related to marine and coastal studies. One of three “core priorities” for the CBT is to establish a Biosphere Centre (2008);

- the Mount Arrowsmith Biosphere Reserve has promoted the idea of a “world-class” Vancouver Island Biosphere Centre and has been able to carry it forward to complete a pre-feasibility study. The next steps require a location decision (within the Parksville area) and strategy for raising capital funds before architectural design work begins. MABR with the University of Victoria are also part of two (related) international monitoring networks, the “Global Observation Research Initiative in Alpine Environments” (GLORIA, established in 2001 with 43 research sites world-wide), and the “Global Change in Mountain Regions” (GLOCHAMORE, established in 2005 by the European Union and UNESCO/MAB with 28 mountain biosphere reserves around the world that are part of the global Earth Systems Science Partnership);
- in Waterton, Parks Canada personnel have cooperated with others to create a Crown of the Continent Managers’ Forum with the Miistakis Institute of the Rockies at the University of Calgary providing information sources and Secretariat back-up. The annual forum often identifies research and monitoring needs and exchanges information about what’s being done by whom;
- Redberry Lake Biosphere Reserve maintains a newly up-dated Research and Education Centre on the shore of the lake that hosts public meetings, has displays of the local history and ecology of the area, and maintains both archives and some facilities for field research. It was originally constructed to support field studies of white pelicans and other waterfowl that nest in the lake area. The biosphere reserve also calls upon people from the University of Saskatchewan for advice on topics such as aquatic eco-toxicology, carbon credit possibilities, and approaches to public participation;

- facilities maintained by Parks Canada in Riding Mountain National Park are used by personnel from the University of Manitoba (especially the Natural Resources Institute) and Brandon University especially for studies relating to cattle and wildlife interactions as well as other topics of interest to the biosphere reserve;
- the Niagara Escarpment Biosphere Reserve assists other groups to conduct surveys and studies that contribute to the cumulative effects monitoring program designed for the biosphere reserve (but not consistently funded). The University of Waterloo has conducted an annual ecological monitoring course that also contributes to this. Various academic groups have done research in the area, most notably the Cliff Ecology Research Group at the University of Guelph. The Bruce Peninsula Biosphere Association (2000) became the first community-based organization there to implement the concept of a biosphere reserve through work on forest monitoring, benthic studies and a project to rehabilitate agricultural streams;
- the Georgian Bay Biosphere Reserve is developing connections with Canadore College (scheduled to open a teaching facility in Parry Sound in 2011), Nipissing University, and the University of Waterloo for work related to the biosphere reserve;
- Long Point Biosphere Reserve is home to Bird Studies Canada (BSC), an NGO that has for almost 50 years conducted field programs for bird-banding and bird population monitoring, both directed towards basic questions in ornithology and to conservation issues. BSC now operates throughout Canada, and also works closely with BirdLife (*sic*) International, and other organizations addressing North American and Western Hemisphere issues of bird conservation. BSC also works with the biosphere reserve on bird-related issues in the Norfolk County-Long Point complex and the biosphere reserve also cooperates with people from various Ontario universities for field studies of mutual interest;

- The Frontenac Arch Biosphere Reserve is home for the Queen's University Biological Station at Lake Opinicon that was founded about 50 years ago and has an elaborate set of facilities on some 2,000 ha of land. It hosts faculty and students from a number of universities for field courses and field studies in biology. The biosphere reserve can draw upon some of this work for its Environmental Education Network (FABREEN). It is also planning to create a biosphere institute and sustainability centre to help support work of its various networks on the general theme of sustainable community development;
- The Mont Ste-Hilaire Biosphere Reserve is located on a site owned and operated by McGill University. The eastern 4.5 km² half of it is "strictly designated as a preservation sector" used for observational research. Given the interests of academics most associated with it, much of the work by both McGill and visiting faculty and students from other universities is devoted to topics under the broad theme of evolution and ecology of forests and vegetation associations. The substantial field facilities also host work on population dynamics of mammals, birds, and amphibians, and (at times) mineralogy, given that the site is a mineral rich pluton;
- the Lac Saint Pierre Biosphere Reserve had expressed interest in creating a rural research laboratory for sustainable development in the context of a master plan for eco-tourism development (2003) and is now exploring how best to provide training for eco-tourism as a means for promoting more local involvement in sustainability issues. The Université du Québec à Montreal conducts eco-toxicology research in the biosphere reserve especially as it relates to the sports fishery;
- the new Manicouagan-Uapishka Biosphere Reserve has links with several research institutions including the Institut des Science de la Mer for work on eco-toxicology and on aquaculture; Université Laval for work on forestry and wildlife; Université du Québec à Chicoutimi for research in sustainable development, and Université du Québec à Rimouski for work on conservation of northern ecosystems and on coastal management;

- Charlevoix Biosphere Reserve has links with Université Laval, Faculté de Foresterie et de Géomatique which includes a Centre for Northern Studies and a proposed UNESCO Chair for studies at Charlevoix. The Faculty maintains the 6,600 ha Forêt Montmorency just to the west of Charlevoix, and conducts boreal forest management studies elsewhere in the Quebec as well, including studies of woodland caribou and predation in the Charlevoix area. The idea of a “green college” in/for the biosphere reserve is being explored (at La Malbaie);
- Southwest Nova Biosphere Reserve established the Mersey Tobeatic Research Institute as a cooperative of landowners and research personnel to advance collaborative research, monitoring and management that will promote sustainable use of resources and biodiversity conservation in the biosphere reserve. It currently has 120 members and 25 partner groups
- Fundy Biosphere Reserve has close ties with faculty in the University of New Brunswick, the Université de Moncton, Mount Allison University, and the Fundy Model Forest. It plans to develop a research network that draws upon these and other institutions.

For the two prospective new biosphere reserves:

- the Bras d’Or Lake Biosphere Reserve Association has close ties with the Bras d’Or Institute for Ecosystem Studies at the University of Cape Breton, the Unama’ki Institute for Natural Resources at Eskasoni, and the Aras na Mara Marine Sciences Centre being developed at Iona;
- the Oak Ridges Moraine group has incorporated an Oak Ridges Institute for Applied Sustainability (ORIAS) that is intended to become a node for a network of people from a number of universities, colleges, and other organizations engaged in research, monitoring, and educational activities in the region. As of 2008, The King Township campus of Seneca College became the global Secretariat for a “Revitalization Institute” that maintains a network of renewal activities in communities and regions.

Links among biosphere reserves:

The Canadian Biosphere Reserves Association has promoted exchange of information and experience among Canadian biosphere reserves by maintaining a website (now being completely re-designed), producing a newsletter usually about twice a year, and convening annual meetings hosted by a different biosphere reserve each time. The Canadian Biosphere Research Network, that was originated by, and is maintained by graduate students interested in biosphere reserves, maintains a website database of information and reports relating to biosphere reserves.

As opportunities arise, often through meetings organized by UNESCO, informal links have been made with people in other biosphere reserves. These sometimes lead to opportunistic informal visits back and forth and occasionally to some semi-official exchange or “twinning” agreements. Current examples include:

- the Rhön Biosphere Reserve, Germany, has established partnerships with Charlevoix, Frontenac Arch, Georgian Bay and Redberry Lake biosphere reserves;
- the Carmargue Biosphere Reserve, France, has a partnership with Charlevoix Biosphere Reserve;
- China MAB has approved agreements between Baotienman BR with Frontenac Arch, Dalai Lake BR with Lac Saint-Pierre, and Jiuzhaigou BR with Riding Mountain.

There have been episodic attempts to develop informal links with Mexican biosphere reserves and with US biosphere reserves should the latter get re-established. Informal exchanges are also developing with a new Global Centre for Biosphere Reserve Advancement at the University of Greifswald, Germany (2009), and with the Stockholm Resilience Centre for research on governance of social-ecological systems (2008). Several research themes being developed by the SRC would include biosphere reserves, including “URBIS” an Urban Biosphere Network (in which the Biosphere

Sustainability Project (U Waterloo) and Oak Ridges Moraine group are an informal member).

Examples of Other Innovative Initiatives Underway Within Particular Biosphere Reserves

Associated with local community (economic) development:

- forest community program being implemented by Ecotrust Canada and Lisaak in Clayoquot Sound, as well as the conservation economy program being carried out at a number of locations along the BC west coast, including Clayoquot Sound
- measuring community health with 12-15 balanced, manageable and relevant indicators, Clayoquot Biosphere Trust
- creation of a local currency “Oceanside Dollars” (now discontinued), Mount Arrowsmith Biosphere Reserve
- organizing a multi-agency Task Force for Bovine Tuberculosis to track incidence of TB in wildlife and cattle, Riding Mountain Biosphere Reserve
- organizing a multi-stakeholder advisory group for consultants to redesign a 3.5 km causeway to reduce wildlife kills and improve traffic safety, Long Point Biosphere reserve
- protection of “heritage breeds” of farm crops, McMullen farm, Long Point BR
- air-transporting winter-killed elk carcasses into grizzly habitat in winter to discourage bears from coming feed on ranchlands adjacent to Waterton in early spring

Engaging youth as a key to the future:

- aboriginal language retention and cultural awareness programs for youth, Clayoquot Biosphere Trust
- Kids for Turtles – environmental education program, Long Point and Georgian Bay biosphere reserves
- Lake Huron ambassadors program, Georgian Bay Biosphere Reserve

- members of the UNESCO Associated Schools Network (“learning to know, to do, to be and to live together” – with suggested broad themes to organize local activities), Redberry Lake Biosphere Reserve, Riding Mountain Biosphere Reserve, Bruce Peninsula Biosphere Association
- maintain networks for environment education, Frontenac Arch Biosphere Reserve, Mont Saint-Hilaire Biosphere Reserve