The Bras d’Or Lake Biosphere Reserve: A Celebration of Natural and Cultural Ecology

Credit: Highland Village Museum (Iona, N.S.)

A Reflection Paper for the Canadian Commission for UNESCO
By Dr. Annamarie Hatcher
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Cover photo: The Barra Strait, linking the Bras d’Or estuary to the Atlantic Ocean. Photo courtesy of the Highland Village Museum, Iona, Nova Scotia.

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About the Author

Annamarie Hatcher

I (Dr. Annamarie Hatcher) am a mother of three and grandmother of two. I am also a consulting ecologist and a member of the board of directors of the Bras d’Or Lake Biosphere Reserve Association. My academic research involved a Masters degree in Biology and three postdoctoral scholarships in Oceanography at Dalhousie University in Halifax, Nova Scotia interspersed with a Ph.D. degree in Zoology from the University of Western Australia. Scattered through these research positions were teaching positions ranging from postgraduate Oceanography courses to primary science in St. Vincent and the Grenadines to cross-cultural science pedagogy for teachers. A pivotal point in my career came when working with community groups during one of my postdoctoral positions. This climb down from the ivory tower led me to design and deliver field courses at Dalhousie University in collaboration with community-based environmental stewardship groups to address the problems that they faced. A move to Unama’ki (Cape Breton) helped me translate this passion into developing and teaching courses in Integrative Science (the common ground between Western and Native science) and I am happy to be on the steep side of this learning curve supported by my many Mi’kmaw friends, mentors and students.
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The Land
The Bras d’Or Lake is in the centre of Cape Breton Island cradled in the Atlantic Ocean on the northern end of Nova Scotia, east coast of Canada. Cape Breton is an island with a small population embedded in the rich cultural traditions of the Indigenous Peoples and the settlers. Unama’ki (Cape Breton) is one of the seven traditional districts of the Indigenous Mi’kmaq who were joined by Scottish immigrants in the late 18th and early 19th centuries. Vibrant Celtic culture is also evident in communities spread between the Mi’kmaw reserves, nurtured through the generations from the original waves of immigrants from the Hebrides.

This Story
This narrative is filtered through my lens so you should know me. In Indigenous cultures, knowledge is an active ‘coming to know’ process. In this case, I will be your guide supported by the knowledge and biases that I have accumulated over my many years of rich experiences. My chosen field of study was Oceanography and I spent many of my younger years totally immersed in the intense academic work related to that field. I did undergraduate and Masters Research in Canada, Ph.D. research in Australia and then returned to Canada for three successive postdoctoral fellowships. Several years of teaching science to children (my three sons and many others) and working with environmental stewardship community groups led me to the field of Integrative Science, bringing together Indigenous and Western scientific knowledge and ways of knowing. I have since been generously guided by Mi’kmaw Elders, knowledge holders, and students. I have regained the humility that I lost while immersed in the culture of academia.
Working as a member of the board of directors of the Bras d’Or Lake Biosphere Reserve Association (BLBRA) has been transformative for me. I have allowed myself the freedom to explore other ways of knowing which has led me into fields such as medicinal plants and natural dyeing with plants and lichens, quite remote from Oceanography. These explorations are based in the common ground between Mi’kmaw and Western science. My experience as an educator has prepared me to co-develop learning resources based in this common ground, directly supporting the United Nations Educational Scientific and Cultural Organization’s (UNESCO’s) ‘Man and the Biosphere’ (MAB) Programme goal (intercultural dialogue through education, scientific activities, culture, communication and information).²

**Reconciliation with the Land**

This part of our story involves Tom and Stan Johnson, Elder Ernest Johnson and Elder Albert Marshall from Eskasoni First Nation, which is located near the middle of the Bras d’Or Lake Biosphere Reserve (BLBR). This story also involves many Mi’kmaw postsecondary students whom I first met in the MSIT (Mi’kmaw word meaning ‘everything together’) courses that I taught at Cape Breton University. They are now working in their communities. The Integrative Science program at Cape Breton University was the umbrella for the MSIT courses and a valuable catalyst between Mi’kmaw Elders and youth in the learning laboratory of the traditional territory of the BLBR.

*Tom and Stan Johnson with Elder Ernest Johnson. Photo submitted by Tom Johnston.*
Tom Johnson, Executive Director of the Eskasoni Fish and Wildlife Commission\(^3\), member of the board of directors of the BLBRA, and member of the Canadian Commission for UNESCO’s Executive Committee views ‘Reconciliation’ with the land as a priority for all of us and something that strengthens the cultural bridges in our biosphere reserve as we all work with a common purpose. In the words of Mi’kmaw Elder Dr. Albert Marshall\(^4\):

“If we work together we can accomplish almost anything”.

Unama’ki (Cape Breton) is the centre of Mi’kmaw culture and the BLBR is the centre of Unama’ki. Mi’kmaq have been the custodians of this territory for many thousands of years and are guiding us in the exploration of this place in the context of designation under UNESCO’s MAB Programme. Our UNESCO designation was due in large part to the tireless efforts of Elder Albert Marshall, the environmental spokesperson for all five Mi’kmaw chiefs in Unama’ki. He met with chiefs and band councils and explained the merits of the UNESCO MAB Programme for the Bras d’Or region. In his words:

“No one being is greater than the next, that we are part and parcel of the whole, we are equal, and that each one of us has a responsibility to the balance of the system”.

Elder Albert is the creator of the Two Eyed Seeing Concept (Balancing Traditional Indigenous Knowledge and Contemporary Science). He suggests that Two Eyed Seeing emerged in Atlantic Canada - the traditional territory of the Mi’kmaw Nation - because Mi’kmaq are the Indigenous Peoples of North America who have had the longest experience of living side-by-side with the newcomers from Europe. As a residential school survivor Albert shaped ‘Two Eyed Seeing’ with one eye representing the culture that he was removed from and the other eye as the one that he was forced into. He values both worldviews and suggests that we walk in the common ground, taking the best from both.

Ernest Johnson is a Mi’kmaw Elder who specializes in primitive work with modern tools\(^5\). According to Tom Johnson, he is part of the land that we now call the BLBR. Ernest knows the habits of the non-human residents because he has trapped and hunted in the traditional way. He knows how to cook their meat, tan their hides and make tools from their bones. Most importantly, he knows when to harvest without a negative impact on the population and he patiently teaches anyone who is interested. The principles of UNESCO’s MAB Programme\(^6\) are already ingrained in the way that Elder Ernest walks on Mother Earth.

The demise of Cape Breton’s coal and steel industries has put us in a good position to develop a model of sustainability and community-based economic development in the naturally beautiful Bras d’Or Lake environment. So, what is unique about this environment that we want to take care of? It is the home of 33,466 humans, which is about 26% of the population of Unama’ki and 13% of the population of the whole province of Nova Scotia. However, these residents tend to spread out. Around 8.8 % of these humans occupy one km\(^2\) which is one half of the average population density in the rest of Nova Scotia.

There are five Mi’kmaw communities which occupy land in the BLBR. Residents of these communities are living in much closer quarters (110.5 per km\(^2\)) and are younger (average of 27 years old compared to overall average of 50.4). So, the 5,919 Mi’kmaq in the BLBR account for 17.7% of the total human population and the post-2011 growth rate of 8.31% per year is driving an impressive average population growth rate BLBR-
Past and Present Ecology of a Charismatic Ecosystem

The Bras d’Or Lake and its watershed is an ecosystem that still reflects its long past in the communities of plants and animals and the intimate relationship between the land and its traditional caretakers. We are all connected (MSHT No’kmaq) to our past and our future through this land. The natural beauty is obvious whenever we drive along the shore. The Bras d’Or Lake and watershed covers over 3,500 km$^2$ of forest and watery ecosystems in the centre of Cape Breton Island.

The Lake is not really a lake or an inland sea. It is actually an estuary where fresh and salt waters mix. It has two distinct sections which are sometimes called the big lake and the small lake. Thus, it is often called the 'Bras d’Or Lakes'. However, the policy of the BLBRA is to call it the 'Bras d’Or Lake' because it is a single water body. The estuary occupies 31% of the biosphere reserve and the rest is watershed land. There is over 1,000 km of coastline with plenty of fine beaches for swimming and sheltered coves to moor a boat. The animals that call the estuary home are descendants of ancestors from times past when the sea levels and water temperatures were different. Up until about 5,000 to 6,000 years ago, the Bras d’Or Lake was a series of tiny fresh water lakes or ponds connected to the Atlantic Ocean by long river systems.$^8$

Image of Unama’ki from NASA’s Terra satellite taken on May 30, 2018 and downloaded by Fred Baechler. Bras d’Or estuary is in the centre of the island.
Cultural memory of this time is reflected in the Mi’kmaw name for the Bras d’Or (Pitu’paq) which means ‘waters flowing together’. As sea levels rose with the retreat of the glaciers it reached the level of a bedrock ridge in the Great Bras d’Or channel and salt water started to flood into the lowlands of the Bras d’Or Lake as we know it today. Over long periods of time, the sea level has risen and fallen and the surrounding ocean has been warmer and then colder than it is today. Because of the many protected pockets of water both deep and shallow, the present-day Bras d’Or Lake still provides a home for unique species that arrived from the arctic and other species from the sub-tropics during those earlier times. Some tiny shrimp-like animals and segmented worms abundant in the deep, cold waters of the Bras d’Or Lake are not found anywhere else outside of the high arctic.

The oyster, a flatfish species, and many other species of segmented worms, which shelter in the warm and shallow waters of the Bras d’Or Lake, are not common elsewhere north of Virginia. A single body of water providing a habitat for arctic as well as sub-tropical species of many types makes the Bras d’Or Lake truly unique. Over 30° of latitude are represented over distances of less than 10 km.

**Collaborative Stewardship**

Groups within UNESCO biosphere reserves generally work together toward a common vision of environmental stewardship. Cape Bretoners have strong Mi’kmaw, Scottish and Acadian cultural identities and there has been a history of mutual respect and a desire to work together. Mi’kmaq have been caretakers of this land for many centuries. The Mi’kmaw philosophy encapsulated by the word ‘Netukulimk’ can be viewed as a guide to respectfully living in nature, the foundation of UNESCO’s MAB Programme. To follow the principle of Netukulimk we must harvest resources without jeopardizing the integrity, diversity, or the productivity of the environment. This philosophy has spawned several organizations dedicated to the stewardship of the Bras d’Or Lake.

The Eskasoni Fish & Wildlife Commission (EFWC) was established in 1991 to deal with environmental issues of concern to Indigenous Peoples in the entire Bras d’Or Lake watershed. The watchdog for sewage-related issues in the Bras d’Or estuary is the Pitu’paq Partnership Society which was created in 2001 by leaders of Cape Breton’s five First Nations and five Cape Breton municipalities (four counties and The Town of Port Hawkesbury).

Unama’ki Institute of Natural Resources (UINR), established in 1998 by the EFWC, represents the five First Nations communities on issues pertaining to management and stewardship of resources in the traditional territory of Unama’ki (Cape Breton). The Bras d’Or Preservation Nature Trust is a private environmental non-profit organization formed in 1991 to protect environmentally significant private land in the Bras d’Or Lake watershed and educate Cape Breton communities and visitors about the unique ecological and cultural heritage of the Bras d’Or Lake.

The Bras d’Or Stewardship Society is a non-profit organization, established in 1998, comprised of individuals committed to promoting accountable and responsible stewardship of the Bras d’Or Lake and watershed. In 2018 the elderly board members of the society decided to join forces with the BLBRA. A significant decision was made to purchase life-time memberships in the BLBRA for all 96 of the Society’s members! That donation of human resources almost doubled the Association’s membership (previously 118...
members), bringing a rich pool of experience and talent to the organization, as well as a substantial cash infusion.

CEPI (Bras d’Or Lakes Collaborative Environmental Planning Initiative)\textsuperscript{14} arose from a request from First Nations Chiefs in 2003 to develop an overall environmental management plan for the Bras d’Or Lake and watershed lands. This collaborative partnership is among five First Nations, four counties, three provincial government departments, three federal government departments, and several non-governmental organizations. So, before the BLBR came to the attention of UNESCO we were already working together to sustain the integrity of our natural home.

\textbf{CEPI charter (https://brasdorcepi.ca/)}

\textbf{Our Journey Together}

As the BLBRA matures we are developing stronger liaisons with CEPI. Stan Johnson is the conduit between the organizations. He is the co-ordinator of CEPI and is on the board of directors of the BLBRA. Several other board members, including myself, serve on the CEPI steering committee. Two current examples of our collaboration include an estuary-wide citizen science initiative called Bras d’Or Watch and a proposed Colloquium and Forum concentrating on climate change adaptation.
As a Mi’kmaw-led organization, the CEPI has produced a vision for the protection and sustainability of the Bras d’Or Lake and a process plan for individuals and governments who live and work in the Bras d’Or Lake watershed. It introduces the Lake as a living entity that generates feelings in people, and supports them in many ways. The Indigenous philosophy informs the planning process in ‘The Spirit of the Lakes Speaks’.

“It provides a way forward for municipal, provincial and federal governments and the Mi’kmaq of Unama’ki to maintain the trust, transparency, harmony and cooperation established among themselves while discharging their various mandates in the protection, maintenance, and enhancement of the Bras d’Or Lakes watershed. The plan proposes a set of “Guiding Principles” for decision-making and action. It incorporates Circular Planning guided by the Medicine Wheel and the ‘Two-eyed Seeing’ concept where one view is based on contemporary scientific knowledge and the other on Traditional Ecological Knowledge about the plants, fish, and wildlife inhabiting the Lakes and the watershed lands.”

The partnership that has been built in the BLBR is based on mutual respect and the settlers are earning that respect by learning about Mi’kmaw culture and philosophy and strengthening cultural bridges. There are several current initiatives that strengthen those cultural bridges. Firstly, place-based, cross-cultural school science curricula are being collaboratively developed. It is an exciting time in the Nova Scotian school system as educators struggle to ‘indigenize’ their curriculum. In the BLBR we are in a good position to contribute to these efforts because of our place-based learning about Mother Earth using the guiding principle of Two-Eyed Seeing. Experiential, cross-cultural curriculum resources based on the Acadian forest and the salmon (Plamu) have been developed by the education committee of the BLBR, adopted by the Mi’kmaw school board (Mi’kmaw Kina’matnewey), and are currently being reviewed by the provincial school board.

There are other units also being developed. The third unit concentrates on the microhabitats of the Bras d’Or estuary and the students learn about the adaptations that allow the unusual plankton to control their density and stay in the water masses that they are physiologically adapted for. So, relict arctic species that invaded the estuary thousands of years ago when Mi’kmaw ancestors lived in a much colder climate, can now maintain their positions in isolated, cold pockets in the depths of the Bras d’Or Lake. The present reflects the distant past.

Another unit is aimed at an examination of habitat requirements of a resident and an invasive crab species using a medicine wheel. When a habitat is in balance, as demonstrated using a medicine wheel, all of the animal’s requirements are met. Students can appreciate the imbalance imposed on the resident crab’s habitat by the invading species. These place-based multidisciplinary science-based units tie students to Mi’kmaw philosophy, help them understand large natural cycles, and encourage inter-generational dialogue based on stories rooted in a cultural memory of place. Elder Albert Marshall has advised that it is time that Mi’kmaw science is reflected in school curricula. The BLBR is an ideal place to develop those curriculum pieces in that common ground.

**Nourishing a Stewardship Ethic**

There are several BLBRA initiatives evolving that address the common goal of introducing residents and visitors to the biosphere reserve ecosystems to nourish a stewardship ethic. These include monthly columns in the four local newspapers and in social media on the current natural events based on the Mi’kmaw
calendar. For example, the April moon is Pnatmuiku’s (Birds laying eggs time) and columns for that time have been based on the breeding biology of local, culturally-significant birds such as the American Black Duck (Apji’kmuj), the Gray Jay (Nikaqoqwej) and the Bald Eagle (Kitpu). These articles encourage people to get out and observe what is happening in the ecosystem based on long-term timekeeping of the Mi’kmaw calendar. People engage more enthusiastically in stewardship efforts for ecosystems that they understand and become emotionally attached to.

A Celebration of the Ecosystem

Another initiative of the BLBRA is the development of a citizen science project (Bras d’Or Watch) with sites on the shore and in the forest of Mi’kmaw reserves, and at other green spaces outside the reserves, in collaboration with the Unama’ki Institute of Natural Resources. This citizen science project concentrates on developing the tools to allow us to see and hear what Mother Earth is showing and telling us.

The evolving Bras d’Or Watch program which is at the nexus of citizen science and public education seeks to strengthen the human-habitat bond among participants by:

1. providing a forum for citizens to interact with their place
2. networking citizens who want to strengthen their bond with place
3. matching residents with scientists and historians who can share their knowledge of place
Global climate change is affecting the BLBR at an uncomfortably rapid pace and a more frequent re-acquaintance with ‘place’ is a strategy to engage observers to recognize and adapt to change. Thus, we repeat the Bras d’Or Watch field day at the same time each year (mid-summer) at the same sites.
The richest site for all of the Bras d’Or Watch program is on the shores of the largest Mi’kmaw reserve in the world (Eskasoni) and many Cape Bretoners travel to visit that site to count invasive crabs, the charismatic northern pipefish, and exuberant seabirds. This brings them into a Mi’kmaw reserve that they wouldn’t normally visit and in touch with Mi’kmaw researchers based in that community. So, the citizen science project is accomplishing much more than simple ecosystem observation.

Another initiative of the BLBRA is the trails project, co-ordinating trails so that one can ‘walk around’ the Bras d’Or Lake and so that all communities (including four Mi’kmaw reserves) are connected. We are all related (MSIT No’kmaq) and the BLBRA is making sure that we can be connected.

Our Journey Forward
The BLBRA acknowledges that we are privileged to be welcomed into unceded Mi’kmaw territory. We were all at the table together from the beginning, united by a common goal of caring for the Bras d’Or Lake. We work in the common ground between Mi’kmaw and Western worldviews, taking the best from each and acknowledging the source. We act as a catalyst between several distinct cultures and between the ecosystem and the people who reside in or visit it. Together we are taking the first step and reconciling with the land. In Stan Johnson’s words:

“We are not just from the land but are part of the land. Our ancestors are all around us: the soil, the trees, the rivers, the wildlife that lives on this land”18
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