Kataq

Mi'kmaq Ecological Knowledge:

Bras d'Or Lakes Eels

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by Shelley Denny, Angela Denny, Tyson Paul

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We dedicate this publication to the many eel fishers of Unama'ki, past and present, who inspired us with their thoughtful insights, humour and passion for eels.

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Introduction

Aboriginal Traditional Knowledge (ATK) is a broad description of an integrated package of knowledge that includes the local knowledge of species, environmental practices and management systems, social institutions that provide the rules for management systems, and world views that form the basis for our beliefs. ATK comes from watching and listening, through direct experience of song and ceremonies, through the activities of hunting and daily life from trees and animals, and in dreams and visions. Knowledge, values, and identity are passed down to the next generation through practice, ceremonies, legends, dance, or song. ATK, and more specifically Mi'kmaq Ecological Knowledge (MEK), the Mi'kmaq way of life, is derived from centuries of interaction, observation, and adaptation to the natural environment. It is the Mi'kmaq science of survival intertwined with spirituality and culture unique to the people.

The collection and preservation of ATK is becoming more important. Initially used in land negotiations, ATK is increasingly recognized for use in scientific assessments, management plans, and recovery strategies for several species protected through Canadian legislation, known as the Species at Risk Act. Because of the potential use for MEK for culturally important species such as the American eel (katew) and Atlantic salmon (plamu), demand for specific ecological knowledge held by the Mi'kmaq is increasing. While there are protocols in place for the collection of MEK, little documentation has been produced for sharing this knowledge beyond the community's use and culture.

The Unama'ki Institute of Natural Resources (UINR) is an organization that represents the five Mi'kmaq communities of Unama'ki (Cape Breton, Nova Scotia) on natural resources issues. UINR contributes to an understanding and protection of the Bras d'Or Lakes' ecosystem through research, monitoring, education, management, and by integrating Mi'kmaq and conventional ways of understanding, known as Two-Eyed Seeing. UINR was identified as the lead organization to collect, interpret, and store MEK for this region.

Mi'kmaq World View

The Mi'kmaq are part of Wabanaki, the Algonquin-speaking confederacy that includes four other Nations; Maliseet, Passamaquoddy, Penobscot, and Abenaki. Mi'kma'ki (land of the Mi'kmaq) includes the five Atlantic provinces and northern Maine.

Mi'kma'ki was held in communal ownership. Land and its resources were not commodities that could be bought and sold but were considered gifts from the Creator. This view is very different from the Western view of land. As Mi'kmaq, we were the caretakers of the seven districts of Mi'kma'ki and strived to live in harmony. This belief remains strong in our culture today.

We view the world and all that is in it as having spirit. We consider all life equal to our own and treat it with respect. We developed an intimate understanding of the relationships between the living and non-living so that each plant, animal, constellation, full moon, or red sky tells a story that guides our people so they can survive. These beliefs affect the manner in which we treat the natural world for sustenance and survival. Animals and plants are not taken if they are not needed. All spirits are acknowledged and respected as relatives and are offered tobacco, prayer, or ceremony (or combination) when taken. No part of an animal is wasted. All parts that cannot be used are returned to the Creator.

The Mi'kmaq right to fish for food, social, and ceremonial needs, and for a moderate livelihood, are recognized by the Supreme Court of Canada and protected by the Constitution of Canada.

Bras d'Or Lakes

The Bras d'Or Lakes, situated in the center of Cape Breton Island, Nova Scotia, are a large estuarine body of interconnecting bays, barachois ponds, channels, and islands. The Bras d'Or Lakes formed approximately 10,000 years ago when the existing basin that was carved out of soft sandstone from the last glacial period became flooded by adjacent ocean water.

The term "Lakes" refers to two main components. The North Basin and the Bras d'Or Lake, connected by a 500 m wide opening (Barra Strait), are known collectively as the Bras d'Or Lakes. The smaller component, the North Basin, branches into two channels that lead to separate small openings to the Atlantic Ocean. The Great Bras d'Or Channel is 30 km long with an average depth of 19.5 m, average width of 1.3 km and is the source of the majority of saltwater exchange between the Lakes and Sydney Bight (Atlantic Ocean). St. Andrew's Channel connects to Sydney Bight through a much more restrictive opening known as the Little Bras d'Or Channel. This channel, 8 km in length, less than 100 m wide and approximately 5 m deep, does not contribute significantly to temperature and salinity distributions. At their southern-most point, the Bras d'Or Lakes connect to the Atlantic Ocean through a small man-made canal that allows only an occasional exchange of water during vessel movements.

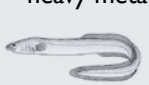
The perimeter of the Bras d'Or Lakes measure approximately 1,000 km and have a total area of 1,080 km^2. Their average depth is 30 m but varies throughout. St. Andrew's Channel, for example, has a maximum depth of 280 m while small bays and coves have average depths of 10 m or less. Tidal range diminishes rapidly

from the Great Bras d'Or Channel inward, with tidal ranges between 16 cm near the entrance to 4 cm at Iona. Currents also follow the same pattern but are stronger in the channels and choke points. Salinity and temperature varies by area. Salinity ranges from 30 ppt in the Great Bras d'Or Channel to salinities lower than 18 ppt in semi-enclosed basins, but averages tend to fall around 22 ppt in most of the open regions. Winter temperatures fall to just below 0°C and the coves and ponds freeze over. However, in the past few years, some of these areas did not freeze. Summer temperatures exceed 16°C in July and surface and sub-surface temperatures are even higher (>20°C) in shallow coves, especially in River Denys Basin. Substrata are primarily silt with smaller proportions of sand, gravel, and boulders.

The environmental quality of the Lakes is still considered to be very good. Sewage inputs from farming operations, inadequate treatment plants, and residential on-site disposal systems are the primary sources of pollution. Sediments from land are becoming increasingly difficult to control and have the potential to alter important habitats. Organic contamination and heavy metals in sediments, water, and biota are well below the federal sediment and water quality guidelines. The productivity of the Bras d'Or Lakes has been described as low and can only support a relatively low level of natural productivity.

The Bras d'Or Lakes are home to a variety of biota. Warm and cold water fish and invertebrates are present with several fish species, such as mackerel, herring, and salmon migrating to the Lakes annually to spawn. The primary commercial fisheries are for lobster, eel, and gaspereau. Invasive species such as the green crab, the MSX oyster disease parasite, eel swimbladder parasite, and the golden star tunicate have found their way into the Bras d'Or Lakes. With their rare physical and chemical oceanography, range of temperate, arctic biota occurring in less than 10 km of water, and diversity of habitats, the Bras d'Or Lakes are truly a unique ecosystem.

The Bras d'Or Lakes are of great significance to the Mi'kmaq heritage in this region. The Mi'kmaq word for the Bras d'Or Lakes is Pitu'paq, meaning "to which all things flow." The Bras d'Or Lakes have provided a food source for the Mi'kmaq. Numerous fish species, such as mackerel, trout, salmon, smelt, gaspereau, cod, hake, flounder, herring, eel, and others provide protein to our diet, as do resident invertebrates such as lobster, mussels, oysters, clam, scallops, whelks, and quahogs. Numerous bird species, such as geese and duck, have thrived here and were hunted. These gifts are important to communal health and are intertwined in our culture. The Lakes are also a means of transportation between hunting and fishing areas and those used for spiritual solidarity, like Malikewe'j (Malagawatch) or Mniku (Chapel Island).



Knowledge Gathering

For knowledge collection and sharing, UINR follows Mi'kmaq Ecological Knowledge protocols established by the Assembly of Nova Scotia Mi'kmaq Chiefs, Mi'kmaq Ethics Watch (Unama'ki College), Unama'ki Parks Canada sites (prepared for Parks Canada by the UINR 2007), and advice of Elders and fishers.

In January 2010, application for the collection of Mi'kmaq ecological knowledge was submitted to the Mi'kmaq Ethics Watch for consideration. Once the project objectives, approach, and questions were developed and submitted, final approval was obtained on June 4, 2010. A workshop was subsequently coordinated for July 16, 2010 in Membertou, Nova Scotia. Selection of participants included a balance of Elders, current resource users, and knowledge holders. Knowledge holders were not randomly selected. Selection of Elders was based on a referral method from UINR's Elder Advisor. Current resource users were selected from a pool of individuals who were believed to be representative of the active fishers for all areas within the Bras d'Or Lakes. Knowledge from two other workshops, individual interviews, and time spent with traditional eel fishers is also included in this report. A workshop was held on November 3, 2010 to review and interpret the knowledge gathered prior to release of this report.

Knowledge

The views in this report do not represent those of the entire Mi'kmaq nation. Participation by UINR and the Mi'kmaq in this workshop group is not, and should not, be construed as consultation. Any new areas being proposed by the Crown(s) to have expanded legal protection would require separate consultation under the Mi'kmaq-Nova Scotia-Canada Consultation process.

The knowledge contained in this report is strongly connected to Mi'kmaq tradition, the practice of eel spearing in the Bras d'Or Lakes, and the transfer of knowledge between generations through stories and practice.

Bras d'Or Lakes Eels

Mi'kmaq eel fishing spans many generations and is a reflection of local and intimate understanding of eels in the Bras d'Or Lakes. Spearing methods, best times to fish, and eel preparation are examples of knowledge that is learned, refined, and applied to capture eels with minimum effort, while respecting and maintaining the spiritual relationship between man and nature. Eel spearing and the practice and transfer of this knowledge are important and active components of Mi'kmaq culture in Unama'ki today.

Eel Fishing

Various methods are used for fishing eels but the spear is the most widely used method. The type of spear used depends on eel habitat. For example, the winter spear, netawemkewe'l, is used when the eels are buried within the mud. There are more prongs to capture the eel as one cannot see the eel they are trying to catch. The summer spears, nikoql, have fewer prongs but, depending on eel habitat where the fishing takes place, they look somewhat different. The metal spear is used in habitats that have hard bottoms, while the wooden spear is used for softer bottoms. Other methods of eel fishing include snorkelling with a spear, fyke nets, and eel pots.

Mi'kmaq eel fishing reflects the daily and seasonal movements of eels. Spearing may take place in barachois ponds or along the shoreline in shallow water up to 4 m. During the spring, summer, and fall this area often includes eel grass until eelgrass growth makes it difficult to see the eels. Fishing during this time is in the dark and is referred to as saqsikwemk (torching). Spearing eels during the day is referred to as alkumit. This usually occurs during the early morning before the wind picks up. As the season progresses from early fall to mid fall, fishing strategies change to capture eels moving into the barachois ponds to overwinter or those migrating out. Fishing does not resume until winter when ice cover is thick enough to hold the fishers' weight. Holes cut through the ice to fish are called qwi'kn.

Certain environmental conditions must be met in order to spear eels effectively in the open water.

Eel spearing takes place during calm evenings when there is little to no wind. Water clarity is important so that eels can be seen, so fishers will wait a few days after a rainfall or strong winds. Run-off from land makes eel fishing nearly impossible and even more days must pass before fishing can resume in certain areas of the Bras d'Or Lakes. It is believed that lightning causes eels to go into hiding and several days must pass before fishers will return to the water. The phase of the moon is identified as very important. For successful fishing, the night cannot be lit by the full moon. Other fishers embrace storm events and find the eels closer to the land and easier to capture.

During the spring to fall months, the fisher skillfully selects eels visually. Eel spearing targets eels that are 45 cm or greater. Smaller eels (<45 cm) are not commonly fished. The most common size of eels caught in the Bras d'Or Lakes are around 56 cm.

Eels are distinguished using the characteristics of size and body condition. These qualities determine how the eel will be prepared. There are eels that are used to make eel stew or soup and those that are used for baking or drying (preservation). These, for the most part, coincide with the scientific categorization of yellow and silver eels, although baking and drying eels can be large yellow eels. Both these categories of eels can be found in the same habitats throughout the year, although the larger eels may be found at greater depths and leaving the barachois ponds in the fall. One area in particular was identified as having more of the larger eels but they are not fished because of the belief that they are there for a reason. This reinforces the spiritual relationship and belief that a greater purpose exists and must be respected.

Eel spearing is a skill that one learns, practices and perfects, however, the eel must also offer itself to the individual fishing. If the fisher is successful, then he offers the eel his/her gratitude. The fisher will wait until the eel wraps its body around the spear before pulling it out of the water. The art of eel spearing was traditionally practiced by men although women who are skilled in fishing and hunting also enjoy spearing for food.

Eels are food for many other species. They are an important food source for larger fish, birds, and other mammals.

Timing of Eel Fishing

The timing of fishing coincides with cues from Mother Nature. As spring emerges, many changes are occurring simultaneously. Frogs are peeping, the leaves of the trees are budding and opening, and spring rains create channels in the sandbars that separate the barachois ponds from the main waters of the Bras d'Or Lakes.

In the spring, many people use the song of the frogs as a signal that the eels are ready. Lightning bugs were also used as natural cues, however, given the change in timing of spring, lightning bugs now emerge after the eels. Another cue that is used is the timing of the gaspereau run. Eels are often seen and captured during the gaspereau fishery that occurs in the channels of the barachois ponds. Gaspereau spawning and frog emergence follow the budding of alders. This typically occurs in late May and early June.

Some fishers carry on the practice of not fishing during certain times of the year. This is common for many species fished as it is believed that their spawning time must be respected. For eels, many fishers maintain the tradition of not fishing during blueberry season.

In the winter, cooling water temperatures are a signal to eels that it is time to overwinter. The formation of the first thin layer of ice indicates that eels are no longer available to spear until the time when the ice is completely formed in the barachois ponds. Often, the heavy rains of October were an indication that eels were preparing to overwinter. Now fishers find that they are burrowing later.

Eel Habitats

Eels can be found in most aquatic habitats in the Bras d'Or Lakes. Eels are primarily fished in the coves, inlets, open bays, and the numerous barachois ponds that dot the shoreline. Barachois provide essential habitats for eels where they spend approximately half of their lives (six to seven months each year) and are considered important areas to preserve. These are also the primary areas that the Mi'kmaq of Unama'ki conduct their winter eel fishery, but are often threatened by land development, pollution, and alteration.

Eels are found in other habitats as well. Spring, summer, and fall eel spearing occur in the shallow areas (<4 m) following the perimeter of the shoreline and around the islands in the Bras d'Or Lakes consisting of algae, eel grass, and areas where there is an assortment of cobble and larger rocks. Eel fishing does not take place in sandy areas or areas that are exposed and subjected to high wind and wave action. It is observed that eels are not found in these types of habitats.

Eels have been observed in freshwater lakes and rivers but little eel fishing takes place in these habitats. There is no desire or need to fish in these areas since five out of six Mi'kmaq reserves are located on the shores of the Bras d'Or Lakes.

Eel grass is important to eels. While fishing does occur in areas of eel grass, the eel grass itself is a refuge for eel prey and small eels (<20 cm). Eel grass has the effect of slowing down water currents and making the area suitable for eels. Eels feed on the assortment of fish such as cunner and Atlantic silversides, and invertebrates like sand and grass shrimp and green crab, commonly found in this type of habitat in the Lakes. Interestingly, fur has also been found in stomachs of eels.

Different areas produce different sizes of eels. Some pond eels are slim compared to eels caught in the main body of the Lakes or other ponds. Other eels caught in freshwater lakes appear to be larger and heavier.

From 30 years ago to as recently as the summer of 2007, elvers (eels <10 cm) have been observed in brooks, coves, and barachois ponds of the Bras d'Or Lakes. Elvers have been observed in the spring, summer, and fall. They have been seen in the mud of the entrances of creeks entering barachois ponds, especially in the spring. These creek bottoms are similar to other areas in which glass eels were observed and fished outside the Lakes, although much smaller in size. Areas of low water flow, with muddy bottoms and undercut grassy banks, seem to be favoured by elvers. Currently there is no food, social, or ceremonial fishing in this stage of the eel life cycle.

Eel Preparation and Uses

The size of the eel caught determines how it is prepared. Eels used for stews and soups (katewapu'l) are approximately 45 to 60 cm in length. These eels tend to weigh less and are noticeably "skinnier" than those eels that are used for baking. They are cleaned and skinned before they are used in traditional meals, especially during wakes, salite'* and mid-winter feasts. Baking eels (pqwasaw) generally weigh more and have more meat on their bodies (thick bodies). This type of eel is not categorized by length but by weight and muscle content. They tend to be reserved for baking and will likely be gutted, the tail cut to drain the blood, and hung to dry, sometimes with the addition of a salt rub. The head is not removed as it would be for stews and soups and is used to hang the eel. The skin remains on during cooking (baking, barbeque, or hanging over an open fire) and forms a crispy layer when baked, but some may be skinned so the skins can be used for other means. Eels are also cooked on cedar planks, smoked, salted and dried, and used in boiled dinners.

Katewapu'l is prepared more than pqwasaw. This is because of the greater number of smaller eels in the population. An offering of eel stew when visiting means that you are held in high regard. To capture an eel for pqwasaw is a very special gift. There is a sense of pride when a larger eel is caught. When one is caught, the fisher does not take it for himself. It is shared with the respected elders in the community. One large eel can feed many people.

The flavour of eels is also related to their size. Smaller to medium-sized eels are considered to have a milder flavour while the larger eels will have a stronger flavour. This is believed to be a result of the greater quantity of oil present in larger eels.

It is very important to clean and prepare the eel properly. The renal gland (kidney and arteries) must be removed or it will taint the taste of the meat. When skinning an eel, the eel should be rolled on sand or a table prior to skinning. It is important to take your time when separating the skin from the meat by getting a good hold of the skin. The skin is pulled off the body, starting from the head, in one continuous motion. Newspaper, paper towel, and dried eelgrass provide good grips, as does one's teeth.

* Salite' is a form of tribal consciousness where the Mi'kmaq engage in the births and deaths of its members. Salite' occurs after the burial where the community gathers to feast and hold an auction. Funds from the salite' are used to cover funeral expenses.

All parts of the eel can be used. Eel skins have been used as boot/moccasin soles, ties, bindings, and to stabilize limbs that are sprained or broken. The tail of the eel is used as bait for other fisheries and may be preserved until needed. The skins were also used as fat to cook other foods and as medicine. Npisun, or Indian medicine as it is commonly referred to, was taken as part of regular maintenance of the body (preventative rather than as a treatment or cure). Oils from larger eels were used to treat ear infections and loosen ear wax. The fresh skins of larger eels were used to set bones and relieve joint pain.

Observations on Eels and Eel Behaviour

Eel fishing is an excellent opportunity to observe natural eel behaviour and to note differences between eels. Many have observed that storm events can be predicted by eels. For example, eels feeding in a vertical position were observed before lightning storms. Another behaviour–eel balling–has been seen in the spring or fall. It is believed that one can tell the gender of an eel by looking at the shape of its head. Eels with pointy heads are believed to be males while round heads are thought to be female. Generally, in scientific literature, larger eels are considered to be female. It was observed that the head tends to become more rounded as it grows in length. The use of rounded head shape as an indication of female gender by Mi'kmaq fishers is likely correct.

Eels are a hardy fish that can survive out of water and recover from injuries. They have been seen crossing land from the main body of the Bras d'Or Lakes to reach ponds and the reverse in the fall. They have been known to stay alive for several days in a refrigerator. They can survive numerous spearing attempts. One eel was observed to have the scars of six previous spearing attempts when it was finally caught.

Eels are not as commonly observed during the day as they are in the evenings. This is likely due to the reflection of the sun on the water's surface. However, eels have been speared during the day in the same depth of water as those speared in the evening. Eagles are able to quickly and efficiently capture eels during the day. It is not uncommon to see an eagle flying overhead with a squirming eel in its talons.

Eels have been observed to have sores or whitish spots when they are beginning to come out of the mud. By June, the spots are gone. Fishers believe they are from the mud.

One can tell whether an eel burrow is used by an eel based on the colour of the hole. If the hole is green or light blue, then it is an active hole. Burrows that appear black are not used or occupied by eels. During the winter fishery, larger eels have been observed to be buried deeper than smaller eels.

Interesting eel behaviours have been observed. Eels can be found on land (sandbars) when there is a lightning storm. Eels are capable of jumping out of the water. There was one report of an eel jumping into the boat of a fisher. Eels are also observed foraging during the day in a vertical position.

Eel Parasite Observations

The first observation of the swimbladder parasite, *Anguillicola crassus*, differs. This is not surprising as different areas within the Bras d'Or Lakes have different levels of parasitic infections. No parasites were observed by fishers prior to 2010 in Potlotek, the southern portion of the Bras d'Or Lakes. In Wagmatcook, swimbladder parasites were observed three years ago. Eels with this parasite are now common to the area of Whycocomagh Bay and Nyanza Bay, and less common in Eskasoni, Malagawatch, and Potlotek. Round worms have been observed in eels for at least 25 years.

An incident that occurred over a decade ago convinced a fisher that eels carried their babies. When the fisher opened the eel, he noticed small, brown, eel-like organisms. These small worms may have been mistaken for young eels as typical eel parasites are white and thin, not brown and thick like *Anguillicola crassus*.

Seasonal and environmental influences determine when and where the swimbladder parasite is found. The swimbladder parasite is not observed in eels during the winter months when eels are speared through the ice. It was noticed in 2009 that water with higher salinity in Whycocomagh Bay had fewer eels with parasites and infected eels had fewer parasites per eel. Areas of low salinities appeared to have more infected eels.

The introduction of the swimbladder parasite is believed to be related to shipping traffic in this region of the Bras d'Or Lakes. Cargo vessels used to transport gypsum to the United States regularly visit this area. Recent changes initiated by Transport Canada's best management practices (2007) ask ships to exchange ballast water outside the Bras d'Or Lakes if the sea conditions allow them to do it safely. Prior to 2007, ships likely exchanged ballast on site. This, combined with an ideal environment, may have led to the establishment of the swimbladder parasite in the Bras d'Or Lakes.

Above: Healthy eel swimbladder Below: Infected eel swimbladder

The Value of Eels and Eel Fishing

The value of eels to Mi'kmaq culture is difficult to quantify. The value is not driven by dollars, landings, or economic potential. The value is in the life, culture, health, and spirituality they sustain. Traditional meals with eel are enjoyed today, as they have been for thousands of years.

Predominantly, the eel is a source of food for the Mi'kmaq people and is valued as life-sustaining. For large families, eels and the practice of eel fishing, meant they would eat, therefore survive. In some instances, eels were the only source of food and were consumed three times a day for many days and weeks. Oil from eels was added to baby bottles for extra nutrition and, in doing so, children would develop a taste for eels and ensured their survival.

Eels hold a special place in Mi'kmaq spirituality. They are often requested as a last meal to ease transition to the spirit world. Consumption of eels is relaxing and calms the spirit so that transition between the two worlds is without fear or resistance. Eel heads are often left to the Creator in gratitude, as an offering for a successful hunt, or to survive a harsh winter.

Less obvious but equally important are the cultural and spiritual traditions the eel represents. The practice of eel fishing is a time to rekindle relationships to water, eels, and nature in general. To others, the experience is deeply spiritual and it becomes a time to remember the deceased who have have passed the tradition to their children. Eel fishing represents a sense of pride, carrying on a Mi'kmaq family tradition that is as old as the culture. Others find eel fishing therapeutic and humbling, and others enjoy sharing eels and gathering for traditional meals with their community. In doing so, all are practicing and carrying on the traditional way of the Mi'kmaq people.

Traditional Resource Management of Eels

Traditional management of eels is directed by Mother Nature and guided by the Mi'kmaq world view that encompasses the belief and practice of "take only what you need." Environmental conditions (including weather), seasons, rotation of fishing areas, eel size (length and body condition), and fishing method were identified as the ways Mi'kmaq manage local eel populations. Fishing strategies changed from year to year based on need and availability of resources.

Weather was identified as being the greatest force in managing Mi'kmaq traditional eel fishing. Certain environmental conditions must be met in order to spear eels. Spearing takes place during calm evenings when the moonlight is not bright. Water must be clear in order to see eels. These conditions do not occur daily. Eel fishing is seen as an opportunity controlled by Mother Nature.

Seasons also offer protection for eels. Many feel that the quality and quantity of eels are best in the spring and summer. Spearing takes place between April and October. Fishing typically does not resume until the water freezes which may be in January or February. There are usually three to four months in which the eels are not speared–November to January, and in March–depending on the water temperature and ice cover. If there is no ice, or if it is unsafe, fishing may not take place in the winter.

Mi'kmaq fishers practice rotational fishing. They do not fish the same area over and over again, but move from place to place. It is believed that continually fishing the same area will result in depletion of the species. It is customary to wait five to seven days before returning to the same place to fish. Freshwater habitats, such as rivers and lakes, are not targets for eel spearing even though eels are present. These habitats offer a refuge for eels from the majority of Mi'kmaq eel fishing in the Bras d'Or Lakes.

The Mi'kmaq practice stringent conservation. They do not target smaller eels when fishing. A size of 30 cm is considered too small. They prefer pqwasaw (the larger eel) but do not specifically set out to spear them. When one is caught, it is considered a gift and a sense of pride and communal sharing accompanies the catch. The Mi'kmaq do not believe that it is necessary to remove many eels, and thus many spirits, to get the same quantity of eels. This is a demonstration of the integration of ecological conservation and spirituality in the same practice.

The fishing method is a traditional resource management tool. Spearing becomes increasingly difficult as the water gets deeper. Visibility is reduced at depths of 4 m and greater. The spear also becomes difficult to thrust and effectively pierce the eel. It is believed that more harm will be done by not capturing the eel efficiently and more energy will be expended to catch it. If eels move to deeper waters, then it is likely that they will not be caught using a spear.

Fishers exhibit selective fishing for size to obtain a balance between larger and average-sized eels even during the winter fishery. Fishers adjust their spearing thrust to select larger eels that bury deeper.

The Mi'kmaq fish with balance and spirituality. Eels are not the only species fished. Other species are fished if they are available. Wastefulness is not practiced. If a smaller eel is taken by accident, it will be kept. If it is released and dies later, then an eel and its spirit have been wasted.

Photo: Kerry Prosper

Current Status of the Bras d'Or Lakes Eel Population

Overall, the population of eels have declined in the Bras d'Or Lakes over the past 20 to 30 years. Some regions within the Bras d'Or Lakes appear to have a better population while some areas have seen drastic changes in abundance and eel health. While many feel the population is still good and has seen its ups and downs, its future is uncertain.

The time it takes to catch eels (a measure of effort) depends on which area of the Bras d'Or Lakes is fished. Overall, it takes more time to catch the same amount of eels. In River Denys Basin, it takes 20 minutes to spear about 12 eels, which is considered very good. In Potlotek (the southern portion of the Bras d'Or Lakes), it takes four to five hours to get six to eight eels. In Wagmatcook (Nyanza Bay in St. Patrick's Channel), it used to take 30 minutes to get 12 eels. In 2010, it took five hours for the same skilled fisher to catch 12 eels. The population around Eskasoni has also seen an increase in effort for fewer eels.

Mi'kmaq Concerns

Fishers and Elders are concerned about the condition of the current eel population in the Bras d'Or Lakes. With declining abundance, changing distribution, and presence of a parasite, eels needs our help. Concerns such as land run-off and sedimentation, climate change, pollution, invasive species and commercial fisheries were identified as contributors to the decline.

There is concern regarding the impact of increased rainfall events as a result of climate change on traditional summer fishing. Rainfall affects the turbidity of the water in certain areas that are affected by land run-off and sedimentation. Several days have to pass before visibility returns. This increases the time it takes to practice the traditional method of spearing to get food on the table and therefore affects our way of life.

The Bras d'Or Lakes are considered a relatively pristine system of interconnecting bays and basins. However, there are several sewage treatment plants that do not treat for chemical products that potentially disrupt fish reproduction. Historically, there have been instances of logging and habitat destruction in the freshwater streams that feed into the Lakes, and dumping of munitions that are not recorded in current literature. Land development practices are changing the shoreline forever. Many feel that nature has been destroyed without really understanding the relationship between the land and the Lakes and the species that rely on them. Local threats to eel habitats include increases in sedimentation (land run-off), and alteration and pollution of barachois ponds.

It is unfortunate that invasive species in the Bras d'Or Lakes are now viewed as common. From the European green crab to parasites that cause MSX oyster disease and a Malpeque-like oyster disease, and now the invasive swimbladder parasite, the Lakes have seen their share of ecological changes. Some fishers believe a relationship exists between oysters and eels. Both species occupy similar habitats,

salinities and temperatures, growing seasons, and harvesting strategies. Both are available in the winter if you know where to look. And now both are infected with parasites. Better controls or on-site ballast water treatment are needed for ballast water exchange to reduce introduction of invasive species.

There is currently little record of commercial and recreational eel fishery landings for this region. There are approximately 100 commercial eel licenses for the Bras d'Or Lakes but likely many more recreational licenses. Recreational fishing and elver fisheries occuring on the Nova Scotia coast are seen as damaging to overwintering eels, as this is the time when they are most vulnerable to overfishing.

Other concerns expressed include the potential for inexperienced eel fishers to cause irreversible damage because of their lack of knowledge. Their efforts are viewed as wasteful and disrespectful to Mi'kmaq culture and eels. There is concern about the effects of infrastructure–such as the bridge in the Barra Strait–that may affect currents and change distribution of eel migration.

A Call for Action

The Mi'kmaq have managed resources since time immemorial and embrace an holistic approach to traditional resource management. This approach takes into consideration that the whole is not merely a sum of its parts. Interconnectedness exists between all parts, including the living and non-living. Favourable habitat must exist for eels to survive. Without adequate nutrients, shelter, temperature, and shade, eels may not thrive regardless of fishing reduction, moratoriums, or stocking programs. The complicated relationships between life and the non-living are not yet fully understood but are recognized as influencing all aspects of life. There is much to be learned from traditional Mi'kmaq resource management.

Balance is needed in provincial, federal, and international resource management of eels. Eels are still commercially fished while their population is declining. Eels taken for aquaculture, killed by dams and turbines, and prevented from reaching their spawning destination are not balanced by a reduction in commercial effort. There appears to be a "prove it first" mentality even though common sense would paint a different scenario. By proving it first, it may be too late. Experience should be our best teacher. Commercial fisheries have failed because of lack of balance. Too many fish were removed too quickly. These fisheries have yet to return even after more than a decade of moratoriums. Why would eels be an exception?

Effective controls are needed for commercial and recreational eel fishing. Recreational fishing is damaging to overwintering eels when they are their most vulnerable. The bag limits are abused and exceeded. Commercial landings for the Bras d'Or Lakes eel fishery are not known. The current legal minimum size is considered too small for harvest. Fishing elvers is seen as removing food for other species that feed on them.

Mi'kmaq fear that the economic worth of eels, their export value, the level of income they sustain, and the number of people employed will be given more importance than their intrinsic value to the cultures that depend on them for sustenance, maintenance of health, culture, tradition, and necessity to the ecosystems. There must be a shift in evaluation and emphasis from the economic value and approach to an ecological and cultural perspective and value. An innovative approach to fisheries management is needed.

Eels occupy a diversity of habitats, all of which are equally important to all stages of their life cycle. Each habitat must be adequately preserved, so that eels have adequate water, food, shelter, and the opportunity to reproduce.

There are people who would argue that the Mi'kmaq wouldn't care if they couldn't fish eels, that protein can be derived from other sources, and there are other ways to satisfy their spiritual needs. This isn't so. There is no substitute for the American eel, katew. No other fish can provide the nutrition, fishing experience, spiritual relationship, and traditional medicine that eels provide the Mi'kmaq people. Preservation efforts for this species and its habitat are paramount. We must work together as First Nations, provinces, and countries to find solutions to ensure that eels will be there for the benefit of future generations.

A painting of migrating eels is presented to commemorate the awarding of honourary docterates to Murdena and Albert Marshall. Left to right: Basma Kavanaugh-artist, Dr. Murdena Marshall, Dr. Cheryl Bartlett-CBU, Clifford Paul-UINR and Dr. Albert Marshall

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UINR–Unama'ki Institute of Natural Resources
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UINR represents the five Mi'kmaq communities of Unama'ki in forestry, marine science research, species management, traditional Mi'kmaq knowledge, water quality monitoring, and environmental partnerships.

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