

Amalamaq

Mi'kmaq Ecological Knowledge: Atlantic Mackerel in Unama'ki



Amalamaq Mi'kmaq Ecological Knowledge: Atlantic Mackerel in Unama'ki by Shelley Denny, Angela Denny, Tyson Paul, Jennifer Sylliboy

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Dedication

We would like to dedicate this publication to our fellow fishers who have passed on.

Norman Basque (Potlotek) Piel la'lo Paul (Eskasoni) John Googoo (We'koqma'q) Melvin Pierro (Wagmatcook) John Joe (Malagawatch) Walter Poulette (Eskasoni) Walter Young (Eskasoni) Lawrence Paul (Eskasoni) Ekkian Googoo (We'koqma'q)

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Indigenous Knowledge System (IKS) 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. IKS is a way of knowing that 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. IKS, and more specifically Mi'kmaq Knowledge System, which we call "Mi'kmak 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 way of knowing and survival intertwined with beliefs, spirituality and culture unique to the people.

The collection and preservation of IKS is becoming more important. Initially used in land negotiations, IKS is increasingly recognized for use in scientific assessments, management plans, and recovery strategies for several species protected through 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 MKS, 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 Island, Nova Scotia) on natural resources issues. UINR contributes to an understanding and protection of the Bras d'Or Lake ecosystem through research, monitoring, education, management, and by integrating Mi'kmaq and conventional ways of understanding, known as Two-Eyed Seeing. UINR is identified as the lead organization to collect, interpret, and store MEK for this region.



Mi'kmaq Worldview

The Mi'kmaq are part of Wabanaki, the Algonquinspeaking confederacy that includes four other Nations: Maliseet, Passamaquoddy, Penobscot, and Abenaki. Mi'kma'ki (land of the Mi'kmaq) consists of provinces in Eastern Canada, the Gaspe Peninsula, 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 we 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 way 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 consciousness is described by the Mi'kmaq word, Netukulimk.

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

Mi'kma'ki

Kespek

Siknikt

Epekwitk aq Piktuk

Mi'kma'ki

Unama'kik

Eskikewa'kik Sipekne'katik Kespukwitk Wagmatcook

We'kogma'g

Eskasoni

Potlotek

Bras d'Or Lake

Membertou

The Bras d'Or Lake, situated in the center of Cape Breton Island, Nova Scotia, is a large estuarine body of interconnecting bays, barachois ponds, channels, and islands. The lake 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 Bras d'Or Lake has been designated a Biosphere Reserves by the United Nations Man and Biosphere Programme.

The perimeter of the Bras d'Or Lake measures approximately 1,000 km and has a total area of 1,080 km2. Its 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 subsurface 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 Lake is still considered to be very good. Sewage is the primary source of pollution. Sediments from land are becoming increasingly difficult to control and have the potential to alter important aquatic habitats. Organic contamination and heavy metals in sediments, water, and biota are well below the federal sediment and water quality guidelines. The Bras d'Or Lake has been described as having a relatively low level of natural productivity.

With two open connections to the Atlantic Ocean in the Great Bras d'Or Channel, the Bras d'Or Lake is 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 Lake 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 Lake. With its 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 Lake is truly a unique ecosystem.

The Bras d'Or Lake is of great significance to the Mi'kmaq heritage in

this region. The Mi'kmaq word for the Bras d'Or Lake is Pitu'paq, meaning "to which all things flow." The Bras d'Or Lake has 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 Lake is also a means of transportation between hunting and fishing areas and those used for spiritual solidarity, such as Malikewe'j (Malagawatch) or Mniku (Chapel Island).

Knowledge Gathering

MEK gathered for this report was collected from Mi'kmaw Elders and harvesters through a series of interviews and workshops. For knowledge collection and sharing, UINR follows MEK 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 UINR in 2007), and advice of elders and harvesters.

An application was submitted to the Mi'kmaw Ethics Watch on January 25, 2019. Approval for the workshop was received prior to conducting the workshops.

A workshop was held March 7, 2019 in Eskasoni, Cape Breton, Nova Scotia. Knowledge holders were not randomly selected. Selection of participants was based on a referral system by UINR's aquatic and stewardship department and invited participants from each Mi'kmaq community in Unama'ki.

Another workshop was held on April 17, 2019 to add to existing knowledge and to verify UINR's interpretation and review the knowledge as a report.

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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 mackerel fishing in the Bras d'Or Lake, and the transfer of knowledge between generations through stories and practice.

Amalamaq in Unama'ki

Amalamaq (*Scomber scombrus*), also known as Atlantic mackerel, is a species found in the northern Atlantic Ocean and offshore Nova Scotia.. Extremely common in the pelagic zone down to about 200 meters, it is a migratory fish that spends the warmer months close to shore, near the ocean surface. During the fall and winter, it migrates out into deeper and more southern water, seeking warmer temperatures.

The mackerel's body is elongate, steel-blue marked with wavy black lines dorsally and silvery-white ventrally. Its snout is long and pointed. Other distinguishing features included two spiny dorsal fins that are spaced far apart and small caudal and anal fins, also spaced far apart. Mackerel can have four to six finlets and five anal finlets. The fish's body tapers down its length and ends with a large tail fin. The typical size for a mature fish is 30 cm (0.98 ft), but mackerel have been caught as large as 60 cm (2.0 ft). Reproduction occurs near the shore in the spring and summer. Females can produce as many as 450,000 eggs to almost as many as 2 million and they release their eggs in batches. Juveniles reach sexual maturity at around 2 years of age and can live to be 17.

The Atlantic mackerel is an active, fast-moving fish that must keep in constant motion to bring in enough oxygen to survive. It swims using short movements of the rear of its body and the caudal fin. Unlike other mackerel, Atlantic mackerel do not leap out of the water unless attempting to escape a predator. They form large schools, consisting of individuals of the same relative size and aggregate near the ocean surface during all seasons except winter when they seek warmer temperatures below the surface.

A highly commercial species, the Atlantic mackerel is sought after for its meat. The meat is strong in flavor and high in oil content and omega-3 fatty acids among other nutrients. Nearly one million tonnes of Atlantic mackerel are caught each year globally, the bulk of which is sold fresh, frozen, smoked, or canned. Despite its commercial appeal, mackerel is currently not listed as a species at risk.



Mackerel Harvesting

Mackerel are caught using different types of methods such as rod and reel, box cages, surf casting, jigging, long-lining and gill nets. Mackerel are primarily used for bait in commercial fishing (lobster, shark and snow crab), snaring/trapping and community feasts.

Mackerel was used as bait to snare/ trap Bobcats, Lynx, bears, otter, martin and fox. Mackerel was the preferred choice for bait over gaspereau and other species because of its high oil contents and slightly longer shelf life.



Mackerel in the Bras d'Or Lake

In the Bras d'Or Lake mackerel appear in spring and departing with the arrival of colder weather in the fall and winter months. Mi'kmaq fishing expands many generations and is a reflection of local and intimate understanding of many of the fish species found in the Bras d'Or Lake. Fishing of mackerel and the practice and transfer of this knowledge are important and active components of Mi'kmaq culture in Unama'ki today.

Mackerel Habitats

Mackerel are found in deep cold areas around the ocean side of Cape Breton and also deep areas in the Bras d'Or Lake. Mackerel are also found near trout farms and oyster farms.

Mackerel has a steady population and high abundance like Iona, St. Peter's and other deep sections of the Bras d'Or.

There are few predators of mackerel. As a fast swimming fish, fishermen have reported seeing mackerel escaping whales, seals, tuna, striped bass.

Current Status of Mackerel in the Bras d'Or Lakes

Mackerel appears to have a steady abundance in the Bras d'Or Lake and along the coast of Cape Breton Island (Unama'ki). Fishers generally don't have a problem getting the amount of mackerel they need, as long as you know where and when to go.





Photo: Craig Doucette

do at

Timing of the Mackerel Fishery and Runs

Mackerel fishing has a spring run and a summer run, depending on the runs of other species. Mackerel are chasing feed such as capelin, krill and smelts. Mackerel are also being chased by tuna and striped bass and they would take shelter in bays and rivers/tributaries to avoid being eaten.

During the spring run, some of the mackerel are much smaller and are referred to as tinkers and would be found in the ocean side of Cape Breton. Most of the mackerel that are caught during this season are the bigger ones and the tinkers (juvenile mackerel <10 cm) are released. One of the busiest spots to find mackerel would be the Canso Causeway, St. Peter's Canal and Lennox passage on the ocean side.

During the late summer months and early fall, mackerel are much bigger and would be found in deep areas of the Bras d'Or Lake.

Mackerel are known to follow smelts in the spring after fiddleheads and dandelions have emerged after the strawberries emerge, mackerel harvested at the end of June known as "*the strawberry run*". Some indications on where mackerel can be found are areas that have a lot of seagulls, gannets, eagles, cormorants, seals, whales, sharks, dolphins, hawks, osprey, loon, merganser, since these species are in those areas because of the abundance of the fish.

Preparation and Uses

Mackerel are primarily harvested for bait and food for personal consumption because it is rich in omega-3 oils. Mackerel is important as a traditional food for community events and also to share among elders as younger generation community members are less interested in it,

In general, fishers will target large fish because they have more meat for community feasts and to share with elders. Most fishers return tinkers to the water; however, some fishers will keep them if they think they will die if released so they don't go to waste

Mackerel can also be used as a fertilizer and mackerel skin was used to make wallets.

One of the ways to prepare mackerel for cooking was poached in tomato sauce. Other common ways to prepare mackerel include:

shutterst

Smoked mackerel

Poached in tomato sauce

Stew

Baked and fried mackerel

Boiled

Chowder

Open fire

Sushi



Netukulimk [traditional management]

As Mackerel are used as food for the Mi'kmaq, they are only fished during certain times of the year. The Mi'kmaq concentrate their effort on catching the bigger ones and smaller ones are usually released back as a their practice of conservation.

Fishing locations are rotated depending on the season of the run and availability. The smaller ones are put back during the spring so they can grow bigger for the run-in late summer and early fall. Barbless hooks are the preferred method to ensure the health of the mackerel in case if releasing it back into the water.

Mi'kmaq only keep what they need so that mackerel is always available whenever they need it.

The Value of Mackerel

Mackerel is an important food for the Mi'kmaq because it's cheap and abundant. It also feeds lots of other fish. Many harvesters enjoy the sense of accomplishment of harvesting large amounts of fish with minimal effort, depending on the abundance.



Vetukulimk

Mi'kma**q Concern**s

One of the main concerns regarding the mackerel in the Bras d'Or Lake was that Mi'kmaw fishers were not being able to access their traditional areas. This lack of access was due to human relations and private property issues. Participants recounted not being welcome, threats made by locals, and private property issues. There are limitations on accessing areas that are used for aquaculture purposes.

Development from human impacts have made some traditional mackerel fishing areas to decrease the mackerel population.



Some examples would be:

Deforestation (clear cutting without having a buffer zone)

Pesticides and farm chemicals

Off-shore seismic testing

Mining activities

Climate change (changing water temperature) - changing habitat conditions causing shifting of species

Gulf stream with the sea runs

Impacts to marine and coastal habitats and species from development (oil and gas, mining, marine overfishing, residential etc.) may have direct and indirect impacts to mackerel and the food web . Any changes in one species food chain may affect other species such as mackerel.

Pollution from effluent and discharge from some areas into the Bras d'Or Lakes has caused harvesting to decline in those areas. People fear that poor water quality will have impacted the quality of mackerel.

Recommendations

Several recommendations were provided to help guide UINR. Specifically to UINR, mackerel fishers and elders would like to be better informed regarding the status of Atlantic mackerel and hope that UINR can provide such information in a concise format. Many complained that finding the information is difficult and compounded by differences in status and management practices between regions.

While the Mi'kmaq have their own understanding of mackerel status, many felt that it would be worthwhile to have federal fisheries incorporate it, and use in decision making. Science assessment for mackerel is limited and incorporating Mi'kmaw knowledge could enhance decision-making.

Water quality is important for all life. Perceptions of poor water quality is a deterrent to fishing activities in general and is linked to land development. Preserving water quality must be a priority and done better land development practices near key fishing areas.

Recommendations

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UINR-Unama'ki Institute of Natural Resources

is Cape Breton's Mi'kmaw voice on natural resources and the environment.

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

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