

# MAWQATMUTI'KW



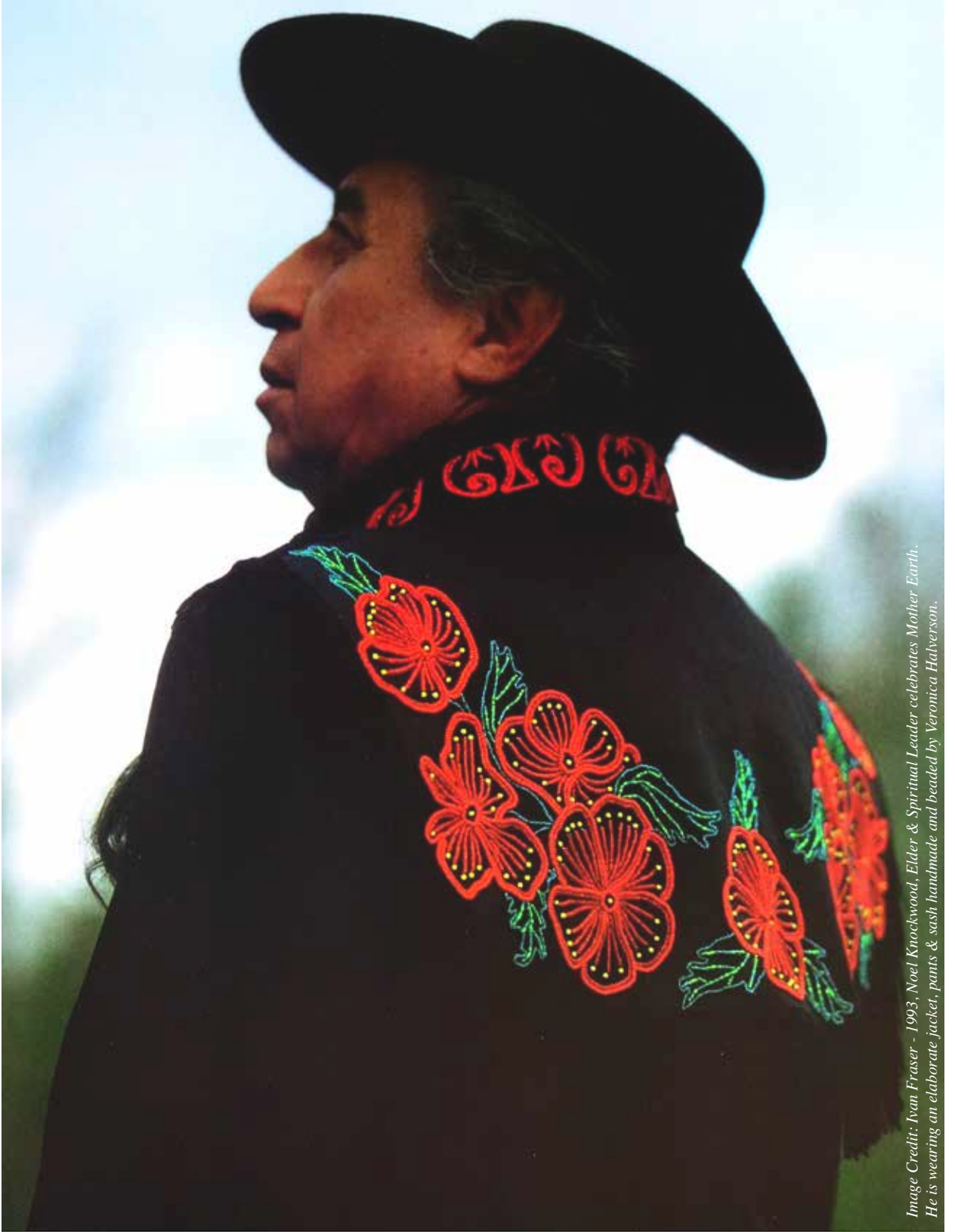
# OUR CONNECTION

**A**S THE DESCENDANTS OF our aboriginal Mi'kmaq forefathers, we speak for ourselves. We do not want others to speak for us. We will not make accommodations or deals with polluters.

We want to educate others about our aboriginal perspective, and to understand the natural law as it is given from the God of Our Understanding. As we unfold our worldview to you, we reaffirm our beliefs, and recognize sound environmental lifestyles. We also commit to influence all politics that affect our people on our land. We want Elders and youth involvement. We will protect our rights to practice our spiritual beliefs.

As Chief Seattle said in 1888, "...Earth does not belong to man, man belongs to Mother Earth, and what he does to Mother Earth, he does to himself... contaminate your bed, and you will one night suffocate in your waste... but perhaps it is because I am a savage and do not understand." This is what I know to be true.

*Noel Knockwood (the late), B.A., Elder, Veteran, Spiritual Leader & Grand Council Keptin*



*Image Credit: Ivan Fraser - 1993, Noel Knockwood, Elder & Spiritual Leader celebrates Mother Earth. He is wearing an elaborate jacket, pants & sash handmade and beaded by Veronica Halverson.*

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Mawqatmuti'kw is also produced to feature articles and information about MAARS work to promote knowledge about aquatic resources, ocean management, communal commercial fisheries, collaborative partnerships and governance.

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## **Front Cover Credit**

Gilbert van Ryckevorsel (Underwater Conservation Photographer) - (*Chelydra serpentina*) A Common Snapping Turtle, Canada's largest freshwater reptile, reaches upward for a breath in the St. Mary's River, Guysborough County, Nova Scotia.

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# INDEX

GUEST WRITER	page 6	A Gift of Tiny Moments
RESEARCH	page 10	Un-Build It And They Will Come Penobscot River
CONSERVATION	page 14	One Of The World's Most Endangered Turtles
WORLDVIEW	page 18	Discarded & Stranded Sardines
BIODIVERSITY	page 20	Nine Surprising Facts About Sea Turtles
CLIMATE CHANGE	page 24	Soil Degradation Threatens Nutrition In Latin America
OCEAN FOOD	page 28	New Food Security In South America
ECOLOGICAL COMMITMENT	page 32	UNCCD Announces WDCD Slogan
ECOLOGICAL COMMITMENT	page 36	Scientists Investigate Scale of Plastic Trash Indian Ocean
FISH FARMING	page 38	Fish Farming Now a Big Hit in Africa
CONSERVATION	page 42	Eels Freely Swim Across Strait of Gibraltar
THREATS	page 44	Leaving Indigenous Peoples Behind
WARNING SIGNS	page 48	Herring Scarcity Worries Lobster Industry

## VIEWS FROM MAARS

CELEBRATION	page 50	Celebrating Water
CONSERVATION	page 54	History of Lake Utopia
RESOURCE STUDY	page 60	Aboriginal Peoples Use of Resources
STEWARDSHIP	page 64	Successful Breeding Season for Kakapo
RIVER PROJECT	page 68	Shubenacadie River Shaping Land and Communities
TECHNOLOGY	page 72	Lobster Pound - Cripple Creek
CLIMATE CHANGE	page 76	MAPC Represented at Canada's CMP
CONSERVATION	page 80	American Lobster Settlement Update
OUR READER'S	page 82	MAARS, MAPC & Ikanawtiket's Work
A COMPELLING REASON	page 84	Sunset Abstract in a River



# GUEST WRITER

## A GIFT OF TINY MOMENTS

by ANNA NIBBY-WOODS



I have an ash basket that my grandmother made long before I was born. It was made for my mother, Veronica Nibby, when she was about ten years old. Over the years it has held many things from the mundane to the precious.

At times the basket kept mom's letters and personal notes almost like a diary. At other times the little basket has been a sort of safe where mom deposited money she was saving for something special. And at other times it's kept mom's sewing goods all in one place; thread, needles, buttons, and scraps of cloth.

This little basket is silky smooth and a patina has developed from the many handlings over the years that is a reddish-brown...almost the colour of my grandmother's hands. It is solid, sturdy and strong and doesn't show its age, unlike my grandmother. When I pick it up it's light as a feather, as if I'm holding air.

*I'm sitting at my grandmother's feet watching; watching granny's hands move over the strips of material is like watching a pianist composing music. Artistry and technical skill converge and she guides*

*her needle and thread securing the fabric into place...the fabric that she has cut out of our old clothes. This is something that she has done her entire life. Something she learned from her mother and taught to my mother. She's making a crazy quilt but the strips of cloth sewn onto and into blocks are creating a pattern and at granny's hand it looks like the material has its own will or memory and before you know it, where once just a pile of old clothes sat there are piles of quilt blocks ready for assembly.*

Eventually mom's sewing goods outgrew the little ash basket and she needed a large sewing box. As the years past she practiced, honing her techniques and skills until an entire room became necessary to house all the tools of her trade. Now it's late in the 80s and mom finds herself sewing at all hours of night and day filling orders for all manner of sewn goods and garments from wedding gowns and three-piece suits to quilts and linens. And there was always an embellishment such as embroidery, lace, ribbing, applique and fringe.



*Anna Nibby-Woods is a Mi'kmaq, an artist, an entrepreneur. Nibby-Woods, a hyphenated combo, is a pre-contact name meaning leaf and pronounced Nip-peech. Interestingly Anna married a woods. For the past thirty-five years Anna has worked in print, advertising and communication industries in one capacity or another as a graphic artist, production manager, art director, estimator, illustrator, copy writer, etcetera. Over the years Anna has diversified into several other fields including diversity management, cultural sensitivity and cultural eco-tourism. Images, stories and concepts gleaned from her Mi'kmaq culture become inspiration for her painting, sculpting, drawing, and writing*

It was around this time that mom remembered a beaded outfit that her grandmother made long before mom was a little girl and wore often until her passing in 1954. Mom pulled out a sealed bag from her trunk, carefully untying the ribbons and removing the tissue paper package inside. Now with the package in her hands she places it on her lap and closes the lid of the trunk and lays the package on top. Tiny moments from her childhood, like an elastic band, snap into her present time and suddenly she's about 5 years old and sitting next to her grandmother's feet watching her needle slide into one side of the smallest, red-glass bead

*Grandmother Morris - Annie Louise Morris (Brooks) in her handmade beaded and applique outfit.*





Veronica Halverson (Nibby) and Noel Knockwood at the first fitting of his handmade ceremonial regalia in 1992. He wore this regalia to every important ceremony and was waked in it in 2014.

and out the other side then down into the heavy fabric...

*"Loop the thread under the fabric and back up, next to the secured bead. The next step T'us," says grandmother Morris "is to place another bead next to that bead, but be careful that the bead is lined up with the first one. Through the bead and down through the material and loop under back up to pick up the next bead." It was starting to get dark and mom felt a tug on her braid from grandmother Morris, "That's enough for tonight, we'll do some more tomorrow in the day light."*

Gingerly she unfolds the layers of tissue paper to reveal the package contents. The dress itself

is worn thin, old and faded as is the applique. Some of the stitches have broken but the beads are all in place and vibrant. Mom examines the construction of the dress, especially the beadwork. How the beads are laid down, one at a time, following invisible lines that form ancient motifs. Now in this quiet moment, looking at her grandmother's 'Indian' dress she's remembering those silent lessons from all those years ago. Veronica watched her mother and grandmother sewing and beading, all the while learning the fine art of beading without knowing it.... she can almost feel the tug on her braid...

*"It's time to put this away for now T'us," she hears her grandmother say.*

That day began her research into traditional Mi'kmaq techniques and designs. From that research she began designing her own patterns and motifs which she practiced and perfected; only then expertly applying bead by bead her Mi'kmaq inspired designs to her handmade garments. In the early 90s mom's work was being bought and displayed in galleries and museums. If you wanted something made you would have to get on a waiting list.

In 1992 Veronica handcrafted a tailored suit for Noel Knockwood that included a jacket, sash, and pants all of which carried beads, silk applique and fringe. The cape that showcased the beaded motif on the back was lined with red silk, as was the jacket and the sash. Veronica and Noel both loved this suit and wanted it to be put on display some day. I have the suit now and will make sure the suit finds a home where everyone can see it.

I've started to collect beads and thread for my little ash basket and someday when I least expect it, my tiny moments will converge and I will feel that tug on my braid.

*all my relations*





*Photo credit: Ivan Fraser - Noel Knockwood getting ready for a ceremony in 1993. This image shows the back of his jacket with the fully beaded attached cape.*

# RESEARCH

## UN-BUILD IT AND THEY WILL COME PENOBSCOT RIVER

PART 3 OF 5 IN THE ATLANTIC SALMON SERIES

National Oceanic & Atmospheric Administration  
- Fisheries 'Greater Atlantic Region' (NOAA)  
April 29 2015.

On a rare mild day in early April, engineer Don Dow and fisheries biologist Dave Bean from NOAA Fisheries Protected Resource Division in Orono, Maine, inspected the construction of an estimated \$3.2 million nature-like bypass by SumCo Eco Contracting at the Howland Dam on the Piscataquis River. This bypass is the next step in improving access to a significant amount of riverine habitat for diadromous fish, including endangered Atlantic salmon, as well as American shad, alewife, sea lamprey, striped bass, rainbow smelt, blueback herring, and brook trout.

“Excavation and other work to prepare the site for channel construction is nearly complete,” reported Dow, “including maximizing use of on-site and local rock in building the

bypass and working with appropriate agencies on materials sorting and management. SumCo, the design engineer Bjorn Lake of Kleinschmidt, and George Aponte Clarke and Laura Rose Day of the Penobscot Trust are doing a great job of managing this complex project on a fast-track schedule.”

The Penobscot, New England’s second largest river, drains nearly one third of the state of Maine, with a watershed area of 8,570 square miles. The Penobscot Watershed is one of NOAA’s Habitat Focus Areas, which is particularly important habitat for 11 migratory fish species, as well as rich in cultural history that included tribal sustenance fishing and historic recreational fishing for Atlantic salmon. The focus area designation brings additional resources and attention within NOAA to the Penobscot where we are working with partners to develop and implement a comprehensive diadromous fish restoration plan.



## **RESTORATION IS A GROUP EFFORT**

The Penobscot River Restoration Trust is helping to lead federal and state government agencies, hydropower dam owners, Penobscot Indian Nation, and seven conservation groups in an ambitious plan to undo two centuries of damage to habitat for sea-run fish. In 2010, the Penobscot Trust bought three dams—Veazie, Great Works, and Howland—from PPL Corporation for \$24 million. The Great Works Dam was removed in 2012 and the Veazie Dam was removed in 2013. NOAA Fisheries provided approximately \$21 million for the purchase of the three dams and subsequent removal of

the Great Works and Veazie dams. In addition, NOAA Fisheries provided substantial technical support in the design and removal of these dams and in the design of the Howland bypass project. The hydropower companies applied for and received federal and state approvals to increase power generation at four other dams higher up in the river to maintain or increase energy generation.

## **SEA-RUN FISH GET A LIFT**

Fish now swim freely from the sea up to Old Town, Maine, where a new state-of-the-art



*This is the second Atlantic salmon spotted in 2014 at the viewing window of the new Milford lift and trap.  
Photo Credit: Don Dow, PE for NOAA Fisheries.*

fish lift and trap was installed at the Milford hydroelectric facility in 2014. The new fish lift brings upstream-migrating fish over the dam, allowing them access to the river up to the Howland Dam. The lift is designed to pass 12,500 Atlantic salmon, 633,000 American shad, and 3.8 million alewife.

“The fish lift seems to be operating well, but only more field testing will tell for sure how successful it will be,” says Dow, who helped design the lift. “We have designed the lift with a high degree of variability in flow rates, water velocities, and headlosses in order to maximize our options to find the best settings at attracting and capturing upstream migrants.”

When the Howland fish passage is complete, sea-run fish will have access to historic spawning, nursery and rearing grounds they

haven't used since the 1800s.

### **ICE JAMS AND DAMS**

Despite cold temperatures and two-foot-deep ice on the rivers this winter, construction on the fishway carried on. As spring comes to Maine, the National Weather Service in Caribou has been monitoring the risk of floods due to melting ice and ice jams. The stretch of river upstream of the Howland Dam has been known to flood because of ice jams in the past. Before removing the Great Works and Veazie dams, the Army Corps of Engineers studied the possible effects of dam removal on ice dynamics on the Penobscot River. Their report concluded that frazil ice (long loose crystals) could form a longer single ice jam in the lower river instead of above the Veazie Dam, but otherwise would not affect the likelihood of ice-jam related flooding. At this





*Let the race begin! In August 2014, the Penobscot Nation held the First Annual Bashabez Run, a 15-mile canoe race between Indian Island and Brewer in the Penobscot River. Named for Chief Bashabez, who Samuel de Champlain witnessed leading a fleet of canoes along the Penobscot River, the race takes advantage of the new dam-free stretch of river. Building on this success, from July 16-22, 2015, the tribe will host, supported by local businesses, communities, and organizations, the Penobscot River Whitewater Nationals*

point in the season, ice-out has occurred on the Penobscot, but rivers are still running high from snow-melt.

## **MONITORING THE RETURNS**

Implementation of the lower river dam removals has been accompanied by a monitoring program that evaluates ecosystem response. Ten coordinated, long-term studies of physical, chemical, and biological measures began in 2009 to document baseline conditions

and most have now collected a season of post-removal data. Although restoration doesn't happen overnight, there are early signs of recovery. In 2014, scientists counted more than 800 American shad, more than 180,000 river herring, and 255 Atlantic salmon at the Milford fish lift, the only dam between Howland and the sea. Prior to 2014, there were no known American shad above Milford and very few river herring. While there is still a long way to go, early data suggest that if we un-build it, the fish will come.

Story Credit: National Oceanic & Atmospheric Administration - Fisheries 'Greater Atlantic Region' (NOAA)  
April 29 2015. [www.greateratlantic.fisheries.noaa.gov](http://www.greateratlantic.fisheries.noaa.gov)

# CONSERVATION

## ONE OF THE WORLD'S MOST ENDANGERED TURTLES

by KHAN SOPHIROM

AKP Phnom Penh, April 25, 2016 - Cambodia's Royal Turtle (*Bataguraffinis*), also known as the Southern River Terrapin, one of the world's most endangered turtles is now facing threats to its very survival due to habitat loss caused by increased sand dredging and illegal clearance of flooded forest, according to a press release of Wildlife Conservation Society (WCS) AKP received this morning.

For several years the small remaining population of Royal Turtles – perhaps numbering fewer than 10 – have been successfully protected from extinction by the Fisheries Administration (FiA) in partnership with WCS and local communities. A recent increase in disturbance along the SreAmbel River System in Koh Kong province, the only place the species is still found in Cambodia, is putting this species at great risk.

The Royal Turtle has been listed on IUCN Red List of Threatened Species as Critically Endangered – the highest threat level. It is one of the world's 25 most endangered tortoises and freshwater turtles. Until now, the species has been designated as Cambodia's National Reptile by Royal Decree issue on Mar. 21, 2005.

“This year our team has observed a decline in nesting of the Royal Turtle. We believe this is caused by increased sand dredging, wood transportation along the nesting habitat, and illegal clearance of flooded forest disturbing the females during the breeding season,” said Mr. InHul, FiA Official and Project Coordinator.

“Only one nest has been located this year, compared to four nests last year. This is very worrying and if it continues it will be potentially putting the species at high risk of extinction,” added Mr. InHul.



*Photo credit: WCS Cambodia*

The Royal Turtle was believed extinct in Cambodia until 2000 when a small population was rediscovered by FiA and WCS in the SreAmbel River.

“Many people thought the Royal Turtle was extinct from Cambodia until our team re-discovered it again in 2000. We are very proud of knowing that the Royal Turtle is still present in Cambodia and committing to protect it for young generations,” said Mr. Heng Sovannara, a senior official from FiA.

“This is good news for Cambodia and its people, and it is not too late to save our national

reptile of Cambodia,” he added.

Urgent action is needed or the Royal Turtle will disappear forever. FiA in partnership with WCS and local communities are working closely together to save the remaining population.

In 2001, WCS in partnership with the FiA began a community-based protection program in SreAmbel, hiring former nest collectors to search for and protect nests, instead of harvesting the eggs. Since then, 39 nests with a total of 564 eggs have been protected and have resulted in 382 hatchlings.

Hatchlings from protected nests are then



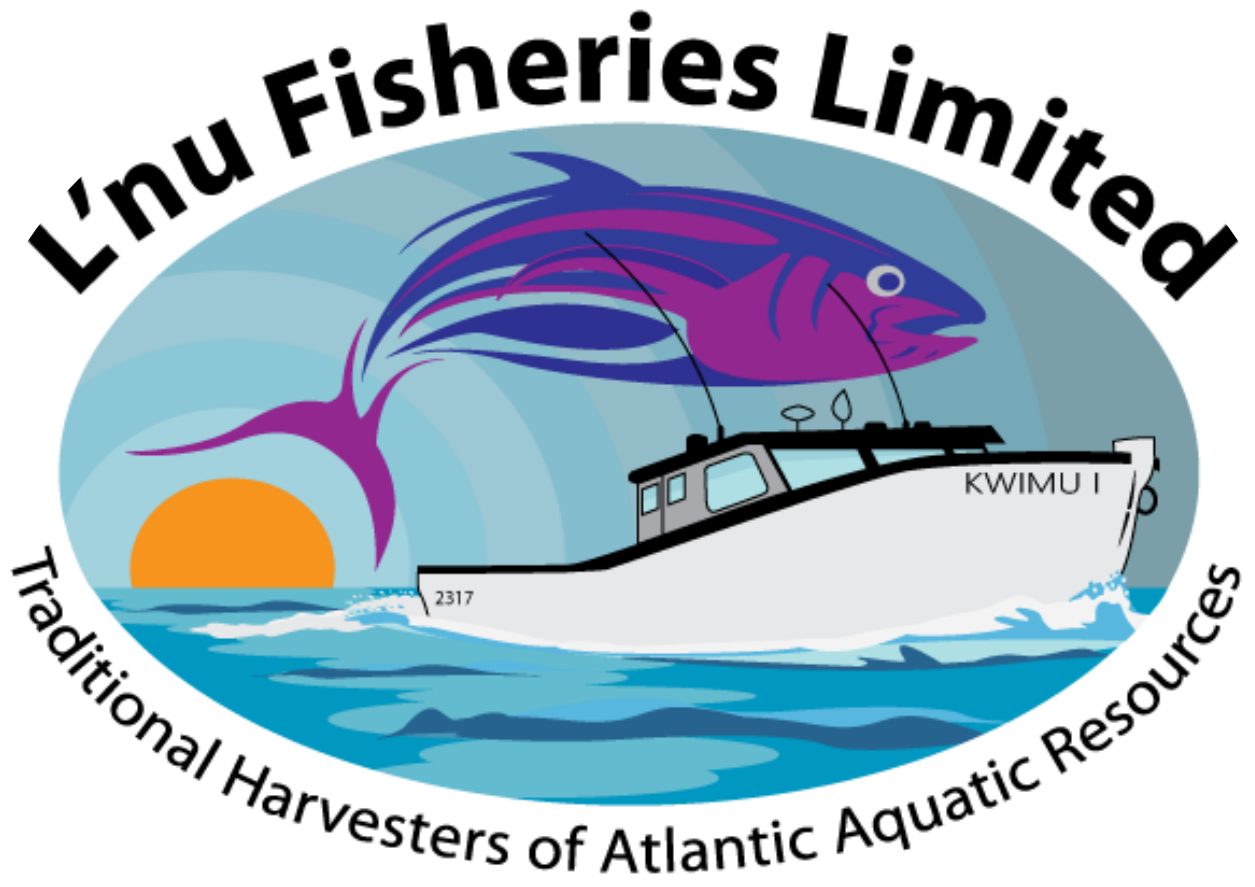


taken into captivity where they are raised until several years old and therefore better able to survive. Once released, the animals are fitted with acoustic transmitters so their movement and survival can be monitored. In 2015, WCS and FiA released 21 individuals fitted with transmitters and they are being monitored. Three such animals recently travelled down the SreAmbel River, along the coast and up another river system ending up over 97 kilometers from where they were released.

Photo credit: Som Sitha / WCS







L'NU FISHERIES PRESIDENT JORDAN CRANE IS PLEASED TO ANNOUNCE AND DISPLAY THE NEW LOGO FOR THE NATIVE COUNCIL OF PRINCE EDWARD ISLAND'S (NCPEI) ABORIGINAL COMMUNITY COMMERCIAL FISHERIES ENTITY (ACCFE).

*Over time, the logo will begin to appear on all vessels and other promotional materials that promote NCPEI'S ACCFE. Jordan believes that the new image is more representative of traditional harvesters and the local community fishery.*

## FISHING BOATS RESPONSIBILITY DISCARDED IN STRANDED SARDINES

by FIS

Chili - Fish Info & Services (FIS), 11 April 2016 - The National Fisheries and Aquaculture (SERNAPESCA) ruled out the participation of artisanal or industrial fishing boats in the recent sardine stranded around creek Queule, in the region of Araucania, after verifying the operation of vessels in the area (by satellite control system).

This was announced by the regional director of the agency, Bernardo Pardo, after participating with the mayor of Araucania in a first flyby over the affected area.

During an aerial survey conducted last Thursday the concentration of stranded

sardines was confirmed in at least seven spots of the bay of Queule, especially on beach Los Pinos and in the estuary of the river Queule until about 4.5 kilometres upstream.

"Sardine accumulations have different sizes and thicknesses depending on the morphology of the seabed, currents and characteristics of the banks, so it is not easy to offer an estimate of the total volume of the affected sardines," explained Pardo, who, nevertheless, ventured that it would be several hundred tonnes.

For this reason, the mayor Andres Jouannet requested a second flyby on Friday

to assess the behavior and movement of the stranded species with the tide. The measure is part of the actions planned after the declaration of the Imminent Health Hazard Zone, decreed yesterday the Health Secretariat, for the sectors of Queule Creek, the mouth of the river and surrounding beaches, given the health risk posed by the eventual decomposition of the fish. The mayor also requested that the technical agencies directly related to the contingency (SERNAPESCA, Health Secretary), together with the Fisheries Zonal Director of the Undersecretariat of the



*Stranded sardine Queule Creek. (Photo: Sernapesca)*

Department, would meet both with the mayor of Queule and with artisanal fishermen to explain the scope of the measures to be implemented. On Thursday evening, the mayor of Araucania convened a second meeting which was attended by ONEMI, Police, Army, Maritime Authority, Air Force, Economy Secretariat,

Health Secretariat, Social Development Secretariat, Government of Cautin, Municipality and SERNAPESCA, who formed an interagency working table in order to coordinate operational actions of immediate reaction, and start with the removal and disposal of fish beached on certain spots for disposal.

Story Credit: Fish Info & Services (FIS) April 2016. [fis.net](http://fis.net)

# BIODIVERSITY

## NINE SURPRISING FACTS ABOUT SEA TURTLES

by NATALIA LIMA



*A sea turtle in clear blue maui waters. ThinkstockPhotos-3180683*





**Care2: Causes** - June 16 is World Sea Turtle Day, and while we all know they're pretty, that the younglings rush to the water after they hatch, and that they often become victims of plastic waste, there's so much more to these guys! Their age, anatomy and physical abilities are astonishing and undeniably justify giving these guys their own special day.

## 1. They think jellyfish are delicious.

Leatherbacks and hawksbill turtles feed on jellyfish and keep their populations in check. Plastic looks like jellyfish when it's floating in the water and that's why so many turtles die from ingesting plastic — they were going for a tasty snack.

## 2. They're the oceans' lawnmowers.

Green sea turtles have a more plant-based diet and eat seagrass. By keeping seagrass short, they prevent it from getting tall and harming other marine creatures.

## 3. They cannot retract into their shell like other turtles.

Since they don't have to protect themselves from predators for most of their life on water, sea turtles cannot retract their flippers and head into their shells. Their anatomy makes them more agile when under the sea but highly vulnerable when nesting and hatching.



ThinkstockPhotos-515159060

#### **4. Temperature dictates the sex of baby turtles.**

Warmer nests lead to more females and cooler ones lead to more males — which is why climate change could drastically affect their populations by creating too many females and too few males to match them for reproduction.

#### **5. They've been around for a very, very long time.**

An estimated 110 million years is how long sea turtles have existed on Earth, which means they once shared the planet with T-Rex and other dinosaurs.

#### **6. They can hold their breath for five hours underwater.**

To accomplish this mighty feat they slow their heart rate to up to nine minutes in between heart beats in order to conserve oxygen.

#### **7. They live to about 100 years.**

And that's also roughly the amount of eggs they lay every time they nest.

#### **8. Dogs are not a sea turtle's best friend.**



Even though they're marine animals, some of their natural predators include dogs who dig up their eggs buried in the sand.

## **9.** They have an excellent sense of direction.

Sea turtles can detect the Earth's magnetic field and they use it as a compass.

*All Photos: ThinkStock*

Read more: <http://www.care2.com/causes/9-surprising-facts-about-sea-turtles.html#ixzz4BptlPzC4>

Story Credit: Care2: causes. June 2016 - Care2.com

# CLIMATE CHANGE

## SOIL DEGRADATION THREATENS NUTRITION IN LATIN AMERICA

by Milesi & Jarroud

SANTIAGO, Jun 15 2016 (IPS) - This article was published ahead of the World Day to Combat Desertification, celebrated Jun 17.

Curbing soil degradation is essential for ecological sustainability and food security in Latin America and the Caribbean. “Everyone knows how important water is, but not everyone understands that soil is not just what we walk on, it’s what provides us with food, fiber and building materials, and it is where water is retained and atmospheric carbon is stored,” said Pilar Román at the regional office of the United Nation Food and Agriculture Organisation (FAO).

More than 68 percent of the soil in South America is currently affected by erosion: 100 million hectares of land have been degraded as a result of deforestation and 70 million have been over-grazed.

For example, desertification plagues 55

percent of Brazil’s Northeast region – whose nearly 1.6 million sq km represent 18 percent of the national territory – affecting a large part of the staple food crops, such as maize and beans.

In Argentina, Mexico and Paraguay, over half of the territory suffers problems linked to degradation and desertification. And in Bolivia, Chile, Ecuador and Peru, between 27 and 43 percent of the territory faces desertification.

An especially serious case is Bolivia, where six million people, or 77 percent of the population, live in degraded areas.

The situation is not much different in Central America. According to the 2014 Soil Atlas of Latin America and the Caribbean produced by the EUROCLIMA program, erosion affects 75 percent of the land in El Salvador, while in Guatemala 12 percent is threatened by desertification.





*Las Canoas Lake in the town of Tipitapa, near Managua, dries up every time the El Niño weather phenomenon affects Nicaragua, leaving local residents without fish and without water for their crops. Credit: Guillermo Flores/IPS*

FAO stresses that as much as 95 percent of the food consumed worldwide comes from the soil, and 33 percent of global soils are degraded.

In Africa, 80 percent of land is moderately to severely eroded, and another 10 percent suffers from slight erosion.

To alert the global population about the dangers posed by desertification and soil degradation, the world celebrates the World Day to Combat Desertification on Jun. 17, under the theme this year of

**Protect Earth.  
Restore Land.  
Engage People.**

“Without a long-term solution, desertification and land degradation will not only affect food supply but lead to increased migration and threaten the stability of many nations and regions,” U.N. Secretary General Ban Ki-moon said on the occasion of the international day this year.

Román, with the FAO regional office’s technical support for South American



*Terraces built by Atacameño indigenous people in the village of Caspana, in the northern Chilean region of Antofagasta. This age-old farming technique represents local adaptation to the climate and arid soil to guarantee the food supply for Andean highlands people. Credit: Marianela Jarroud/IPS*

subregional coordination, told IPS that there are close links between poverty, desertification and land degradation.

“Numerous studies show that the poorest and most vulnerable communities have the worst access to inputs. A poor community has access to less fertile land, and more limited access to seeds, water, productive resources, agricultural machinery and incentives,” she said.

“In these poor communities,

the most vulnerable are women, who have fewer land titles and more restricted access to economic incentives, and indigenous people.

“There is a direct correlation in that direction and vice versa: degraded soil will push a community to migrate and will generate conflicts over a limited resource,” she said in an interview in the FAO regional office in Santiago.

One example is Chile, where 49 percent of the land suffers from moderate to severe

erosion and 62 percent faces desertification.

To address this severe problem, the authorities updated a land degradation map, with the aim of designing and implementing strategic climate change mitigation and adaptation measures.

The map was updated using meteorological and bioclimatic data from the last 60 years, as well as physiographical, socioeconomic and environmental indicators, and statistics on natural resources.

Efraín Duarte, an expert with Sud-Austral, a private consultancy, who is the author of the updated map, told IPS that “the main direct causes of desertification, land degradation and drought at a national level are deforestation, degradation of forests, forest fires and processes arising from land-use changes.”

“The impact of climate change” should also be factored in, he said.

According to several studies, at least 25 percent of the rainfall shortage during the current drought in Chile, which has dragged on for nearly five years, is attributable to human-induced climate change, said Duarte.

He also cited indirect causes: “Inadequate public policies for oversight, regularisation and fomenting of ‘vegetational’ resources (forests, bushes and undergrowth), combined with rural poverty, low levels of knowledge, and a lack of societal appreciation of plant resources.”

Using the updated map, the government designed a national strategy focused on supporting the recovery and protection of native forests and plants adapted to desert conditions, and on fomenting reforestation and revegetation.

According to Duarte, “Chile could carry out early mitigation actions focused on fighting deforestation, forest degradation, excessive extraction of forest products, forest fires, over-grazing, over-use of land and unsustainable land use, and lastly, the employment of technologies inappropriate for fragile ecosystems.”

The expert said the fight against desertification is a shared responsibility at the national and international levels.

Román concurred and proposed that the prevention of soil degradation should be carried out “in a holistic manner, based on adequate information and training and awareness-raising among communities and decision-making agents on protection of the soil.”

Also important in this effort are agricultural production, avoiding the use of bad practices that prioritise short-term results, and pressure on land, he added.

For FAO, sustainable agricultural production practices would make it possible to produce 58 percent more food, besides protecting the soil for future generations.

Prevention not only consists

of applying techniques in the countryside, but also making efforts at the level of government and legal instruments, and working with the communities, said Román.

While the ideal is to prevent degradation and desertification, there have been successful initiatives in the recovery of desertified areas.

In Costa Rica, for example, the two main causes of degradation were reduced between 1990 and 2000, when the area affected by deforestation shrank from 22,000 to 8,000 hectares, while the area affected by forest fires shrank from 7,103 to 1,322 hectares.

Román underlined that, as a form of mitigation, it is important to diversify and expand the range of foods consumed, as potatoes, rice, wheat and maize – just four of the 30,000 edible plants that have been identified – currently represent 60 percent of all food that is eaten.

“On one hand, monoculture plantations of these plants are one of the factors of soil degradation, and on the other hand, a diet based on carbohydrates from these plants generates malnutrition,” she said.

*Edited by Estrella Gutierrez/  
Translated by Stephanie Wildes*



# OCEAN FOOD

## NEW FOOD SECURITY IN SOUTH AMERICA

by ORLANDO MILESI

Inter Press Service (IPS) June 2016 - Seaweed gains ground as a pillar of food security in South America. It is native to eastern Asia (Japan, China, Korea) - Seaweed, a nutrient-rich foodstuff that was a regular part of the diet of several South American indigenous peoples, is emerging as a new pillar of food security in Latin America and is providing a livelihood for thousands of people in the region's coastal areas.

"I have been harvesting seaweed since I was five years old, and now I am 50. The person who always buys all my produce says it is used to make creams and plastics," Zulema Muñoz, a seaweed collector in the small coastal town of Matanzas on the Pacific ocean 160 km south of Santiago, told IPS.

Seaweeds have been used as human food ever since ancient times, especially in China, the Korean peninsula and Japan.

When people from these countries migrated to other regions of the world they took their food habits with them. This is why dishes based on fresh, dried and salted algae can be found in nearly every corner of the earth.

According to the Food and Agriculture Organization of the United Nations (FAO), some 25 million tonnes a year of seaweeds and other algae are gathered worldwide for use as food, cosmetic and fertiliser ingredients; they are also processed to make thickeners and additives for animal feeds.

FAO says that marine aquaculture products, particularly algae and molluscs, contribute to food security and the alleviation of poverty, since most producers work in small- or medium-sized fishing businesses.

In Latin America, hunger affects 34 million people out of the total regional population





*Zulema Muñoz wades out of the Pacific ocean near the small town of Matanzas, carrying two large seaweed plants she uprooted from the rocks where they hold fast and grow. Seaweeds are an increasingly important part of the Chilean fisheries sector and provide a livelihood for thousands of people. Credit: Orlando Milesi/IPS*

of 625 million, according to FAO's statistics. Countries like Argentina, Brazil, Colombia, Cuba, Ecuador, Mexico, Peru and Venezuela have explored seaweed production for food.

In Chile, "studies carried out in Monte Verde (in the Los Lagos region, 800 km south of Santiago) showed that in one of the earliest human settlements in the Americas, people ate seaweed as part of their

diet," said Erasmo Macaya, principal researcher at the Algal Research Laboratory at Chile's prestigious University of Concepción.

Marine algae "were a food source for the Lafkenche indigenous people, who used them (and still do) as part of their diet, particularly kelp (*Durvillaea antarctica*), known as 'kollof,' and 'luche' (*Pryopia* and *Porphyra* species)," he told IPS, speaking from the

southern city of Concepción.

Axel Manríquez, head chef at the Plaza San Francisco hotel in Santiago, told IPS that there is currently a "re-enchantment with algae, primarily because vegans eat so much of them."

"Because of intermarriage with Chinese people and the influence of Chinese culture, Peruvians have incorporated seaweed into their "Chifa" cuisine (based on Cantonese

culinary traditions). In Chile, Chinese influence is limited to the north of the country, and so all our seaweed is exported to Asia, where it is in great demand as a foodstuff,” he said.

Algae “are extremely potent: they are rich in nutrients and are also a very healthy product because their salinity is regulated by the ocean. They do not contain excess salt, and they can be eaten either raw or cooked. They help our metabolism and facilitate iodine incorporation. Asian people do not get thyroid diseases because they eat large amounts of seaweed,” the chef said.

Over 700 species of marine macroalgae have been described in Chile, yet only 20 of these species are utilised commercially.

“Unfortunately there have been very few studies on biodiversity and taxonomy, which are also very poorly funded since they do not generate immediately visible products, and many observers consider they do not have a ‘direct’ application,” said Macaya, who believes the real number of species is probably “two- or three-fold higher” than those already classified.

Macaya said that in Chile, only kelp and “luche” (*Pyropia* and *Porphyria* species) are used as human food at present, but that red algae like “carola” (*Callophyllis*) and sea chicory (*Chondracanthus chamissoi*) are being exported to other countries for human consumption.

Ongoing research is being done on ways of adding value to algae by converting them into biofuels, bioplastics and biomedical products, among others, a move that is recently gaining ground at global level.

However, over the past few decades demand has grown faster than the capacity to supply needs from natural (wild) seaweed stocks.

“Seaweeds must definitely be cultivated because we cannot simply collect the wild algae populations. Experience shows that over-exploitation is a widespread problem – not only for seaweed – for which we must find sustainable solutions,” said Macaya.

Fifty-one percent of the 430,000 tonnes of algae extracted in Chile in 2014 was “huido negro” (*Lessonia spicata*) or “chascón” (*Lessonia berteroa*). Together with two other brown seaweed species, “huido palo” (*Lessonia trabeculata*) and “huido” (*Macrocystis pyrifera*), they make up a combined 71 percent of the extracted biomass.

“This is very worrying, considering that all these species fulfil tremendously important ecological roles: they create undersea forests that host a wide, rich biodiversity,” Macaya said.

To address this problem, the Chilean government enacted a law to promote cultivation and repopulation of natural seaweed beds (“Ley de bonificación para el repoblamiento y cultivo de algas”). This will provide compensation to small seaweed collectors (artisanal fishers and micro-businesses) in order to increase algal cultivation and harvesting and, in the process, to redeploy large numbers of workers.

Although many people do not realise it, algae are in daily use: everyday products like toothpaste, shampoos, creams, gels and natural remedies contain compounds known as phycocolloids that are derived from seaweed, such as carrageenan, agar and alginates.

And they are also used in food dishes. For instance, “nori” is a Japanese seaweed used in the preparation of sushi.

Muñoz, the seaweed collector in Matanzas, only eats “luche, but not the other seaweeds.



*“Luche” (Pyropia and Porphyra species of algae) on sale in a market in Chile, where it is finding a niche among traditional produce. Seaweed was part of the diet of several indigenous peoples in the country and its consumption is beginning to take off due to its high nutritive value. Credit: Courtesy of Erasmo Macaya*

They say they are delicious when properly prepared, especially “luga”, but I have never cooked it,” she said.

Day after day, she wades in and out of the sea, armed only with a knife in a bag attached to her belt, fetching armfuls of “luga”, “chasca”, kelp and “luche.”

In a good week she may collect up to 500 kilos to sell. “Luga” commands 450 pesos a kilo (65 cents of a dollar), kelp 720 pesos (1.02 dollars) and “chasca” 1,000 pesos (1.50 dollars) a kilo.

“Four women used to work here, then one died and three of us were left. Now there’s another

seaweed collector, a girl who has joined the fisheries union, but she only works for a few hours,” said Muñoz while she waited for the feeble winter sun to dry the seaweed spread out on the sand. It will soon be ready for sale.

The country’s seaweed sector directly employs 6,456 artisanal fishers and coastal shellfish gatherers, as well as 13,105 artisanal divers. Including indirect jobs, the number of artisanal fishers and small businesses involved is over 30,000.

*Edited by Estrella Gutiérrez. Translated by Valerie Dee.*

Story Credit: Orlando Milesi, Inter Press Service News Agency, June 2016. ipsnews.net



# ECOLOGICAL COMMITMENT

## UNCCD ANNOUNCES WDCD SLOGAN HIGHLIGHTS LINKS TO CLIMATE ACTION

23 February 2016: The UN Convention to Combat Desertification (UNCCD) has announced that the slogan for the 2016 World Day to Combat Desertification (WDCD), which is celebrated on 17 June, will be 'Protect Earth. Restore Land. Engage People.'

UNCCD Executive Secretary Monique Barbut thanked China for offering to host the global observance event at the Great Hall of the People in Beijing, highlighting the country's experience in "nursing degraded lands and man-made deserts back to health."

Barbut noted that the current El Niño could destroy

the livelihoods of up to 60 million people around the world in the first half of 2016. Emphasizing that "we have seen this before," she urged the international community to show solidarity by finding long-term solutions, not just quick fixes, "to disasters that are destroying communities." Among such actions, Barbut highlighted "simple and affordable acts," such as restoring degraded lands and helping countries to set up better drought early warning systems.

Barbut expressed hope that WDCD commemorations in 2016 would mark a

turning point by showcasing examples of practical action and cooperation to address these challenges "at the front-end" and "not only after disasters happen." She noted that this knowledge "can and should" benefit initiatives such as the Great Green Wall of the Sahel, Regreening Africa, and Initiative 20x20 in Latin America.

The 2016 WDCD campaign will also seek to advance the implementation of the Sustainable Development Goals (SDGs), particularly the target to achieve a land degradation-neutral world by 2030.



# 17 JUNE WORLD DAY TO COMBAT DESERTIFICATION



A related meeting between the UNCCD Executive Secretary and Ségolène Royal, France's Minister of Environment, Energy and the Sea, and newly-appointed President of the 21st session of the Conference of the Parties (COP 21) to the UN Framework Convention on Climate Change (UNFCCC), explored urgent adaptation actions in African countries that are on the frontline of climate change. The

two leaders discussed the further implementation of the UNCCD in the framework of the recently adopted Paris Agreement on climate change, including the contribution of the UNCCD's Land Degradation Neutrality (LDN) Fund in advancing land restoration and rehabilitation, and creating employment opportunities for young people in the worst hit regions.

In 1994, the UN General

Assembly designated 17 June as World Day to Combat Desertification, marking the anniversary of the adoption of the UNCCD and with a view to raising public awareness about international efforts to stop desertification and the effects of drought.

Read more: <http://sd.iisd.org/news/unccd-announces-wdcd-slogan-highlights-links-to-climate-action/>

Story Credit: <http://sd.iisd.org/news/unccd-announces-wdcd-slogan-highlights-links-to-climate-action/>

HINTERLAND  
WHO'S WHO

# CELEBRATE the CENTENNIAL



BILL MCWILLIEN



Barrels packed with pigeons, ducks and shorebirds, destined for the dinner table, were transported by train to the city. Millions of birds were killed annually to adorn the hats of rich socialites and small-town women alike. When the skies were filled for days with migrating birds, the supply seemed endless. It was in the late 19<sup>th</sup> century, and North Americans were slowly beginning to realize that the growing demand for birds had created pressure that populations simply could not withstand. The most abundant bird species in North America, the Passenger Pigeon, went extinct with the death of Martha, the last lonely bird of her kind, in 1914. Around the same time, public awareness of the profound effects humans were having on wildlife and their habitats marked the dawn of a new crusade: the conservation movement.

Concerned individuals came together to form naturalist clubs and conservation organizations to protect habitat and call for a halt to the uncontrolled harvests. Many of these groups are still active today.

In Canada, conservationists pioneered the practice of placing bands on the birds' legs to identify individuals. The recovery of bands and the coordination required to manage birds that routinely crossed borders brought forth the need for an international agreement.

One hundred years ago one of the first international treaties on wildlife conservation was born, beginning a new era of international collaboration for wildlife and habitat conservation. Signed on August 16, 1916 the Convention for the Protection of Migratory Birds (more commonly known as the Migratory Birds Convention) between Canada and the United States was intended to regulate the bird's harvest and assure the preservation of species either harmless or beneficial to man.

And birds *are* beneficial. Their roles in pollination, seed dispersal, pest control and nutrient cycling keep our natural systems functioning. They also inspire art, and compel us to glimpse their beauty.



# of the MIGRATORY BIRDS Convention!

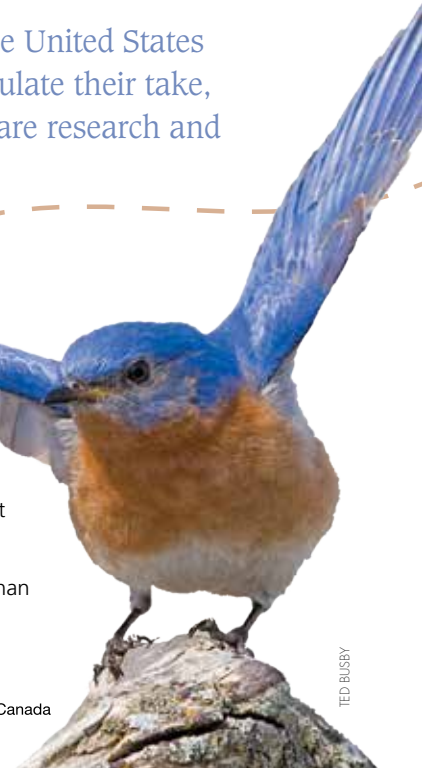
## What a Difference a Century Makes!

In order to implement the Convention, in 1917 the *Migratory Birds Convention Act* was passed into law in Canada; the following year, the United States government passed the *Migratory Bird Treaty Act*. The Migratory Birds Convention and the Act have shifted the harvest of birds from uncontrolled to sustainable. Waterfowl in particular have largely recovered to healthy levels thanks to decades of improved science, harvest management and coordinated habitat conservation under the North American Waterfowl Management Plan. When researchers began banding waterfowl, they realised that the birds follow established migration corridors as they fly north to breeding areas in the spring,

and return south in the fall. In 1952, the four Flyway Councils (Atlantic, Mississippi, Central and Pacific) were created to coordinate research and management of game birds along these migration routes. For 60 years, the Canadian Wildlife Service and the U.S. Fish and Wildlife Service, in cooperation with other government agencies and organizations, have been conducting annual surveys to report on population status and provide information required for harvest management. The introduction of the Migratory Game Bird Hunting Permit in 1966 allowed a better assessment of the harvest itself and how it can be expected to influence the health of bird populations.

“The Migratory Birds Convention commits Canada and the United States to “work together to cooperatively manage populations, regulate their take, protect the lands and waters on which they depend, and share research and survey information.”

Other groups of birds are not doing as well and new threats have emerged. Chief among these is the loss, degradation and fragmentation of habitat. Fortunately, the *Migratory Birds Convention Act* includes regulations allowing the creation and management of Migratory Bird Sanctuaries in areas that provide important habitat. In 1919, Bonaventure Island and Percé Rock in Québec became the first Sanctuary, designated to protect an important breeding area for seabirds such as Northern Gannets, Common Murres and Black-legged Kittiwakes. There are currently over 90 Migratory Bird Sanctuaries across Canada that protect more than 11 million hectares of terrestrial and marine migratory bird habitat.



# ECOLOGICAL COMMITMENT

## SCIENTISTS INVESTIGATE SCALE OF PLASTIC TRASH IN INDIAN OCEAN

[International Institute for Sustainable Development \(IISD\) Reporting Services](#) -

11 August 2015: Scientists from eight countries aboard the Dr. Fridtjof Nansen, a research vessel operated by the Norwegian Institute of Marine Research (IMR) in collaboration with the Food and Agriculture Organization of the UN (FAO), are assessing the scale and nature of industrial trash, including plastics and micro-plastics, in remote parts of the southern Indian Ocean. FAO notes that the Atlantic and Pacific Oceans both have floating islands of trash twice the size of Texas, but the extent and impact of trash and plastic in the southern Indian Ocean is not yet known. The research mission aims to fill this information gap.

Five trillion pieces of plastic are currently floating in the world's oceans, according to FAO, and have potential impacts on the

food chain and marine ecosystem health. Scientists aboard the research vessel are releasing and hauling special nets into the ocean several times a day to document the location and quantity of microplastics and how they move. Plastic particles have been found in almost all stations sampled, according to IMR and FAO.

The scientists are also measuring ocean temperatures, oxygen and chlorophyll levels, and biological process like plankton production and fish distribution, including in the Gyre, a cyclical vortex of currents. Chlorophyll is an indicator of the ocean's food supply and its carbon storage capacity. The crew is using robotic sensors to sample ocean temperatures and salinity at depths of up to 2,000 meters.

Research vessels named the Dr. Fridtjof Nansen have conducted scientific operations





on marine resources and trained scientists from around the world since 1974. The boat flies the UN flag, allowing it to operate across jurisdictional boundaries. The fourth phase of the programme is called the EAF-Nansen Project, and works with 32 African countries to assess their marine resources, develop fisheries management plans and maintain ecosystem health and productivity. FAO is the executive agency and Norad the principal

funder of the EAF-Nansen project.

A new Dr. Fridtjof Nansen will be launched in 2016, with modern sonar sensors to quickly map fish distribution and a remote-control submersible vehicle for taking photos of the ocean floor.

Read more: <http://nr.iisd.org/news/scientists-investigate-scale-of-plastic-trash-in-southern-indian-ocean/>

Story Credit: <http://nr.iisd.org/news/scientists-investigate-scale-of-plastic-trash-in-southern-indian-ocean/>

# FISH FARMING

## FISH FARMING NOW A BIG HIT IN AFRICA

by JEFFREY MOYO

HARARE, Aug 5 2015, Inter Press Service (IPS) - Hillary Thompson, aged 62, throws some grains of left-over rice from his last meal, mixed with some beer dregs from his sorghum brew, into a swimming pool that he has converted into a fish pond.

“For over a decade, fish farming has become a hobby that has earned me a fortune,” Thompson, who lives in Milton Park, a low density area in the Zimbabwean capital, Harare, told IPS. In fact, he has been able to acquire a number of properties which he now rents out.

Thompson is just one of many here who have struck gold through fish farming.

African strides in fish farming are gaining momentum at a time the United Nations is urging nations the world over to ensure sustainable consumption and production patterns as part of its proposed

new Sustainable Development Goals (SDGs) which will replace the Millennium Development Goals (MDGs) when they expire this year.

The SDGs are a universal set of 17 goals, targets and indicators that U.N. member states are expected to use as development benchmarks in framing their agendas and political policies over the next 15 years.

Faced with nutritional deficits, a number of Africans have turned to fish farming even in towns and cities to complement their diets.

In Zimbabwe, an estimated 22,000 people are involved in fish farming, according to statistics from the country’s Ministry of Agriculture.

Behind the success of many of these fish farmers stands the Aquaculture Zimbabwe Trust, which was established in 2008 to



*Fish farming has fast turned into a way for many Africans to beat poverty and hunger. Credit: Jeffrey Moyo / IPS*

mobilise resources for the sustainable development of environmentally-friendly fisheries in Zimbabwe as a strategy to counter chronic poverty and improve people's livelihoods.

Over the years, it has been on the ground offering training aimed at building capacity to support the development of fish farming.

The figure for fish farmers is even higher in Malawi, where some 30,000 people are active in fish farming-related activities, according to the U.N. Food and Agriculture Organisation (FAO). Fisheries are reported to contribute about 70 percent to the protein intake of the developing country's estimated 14 million people, most of whom are too poor to afford meat.

For many Malawians like Lewis Banda from Blantyre, the country's second largest city, fish farming has become the way to go. "Fish breeding is a less demanding economic venture, which anyone willing can undertake to do, and fish sell faster because they are

cheaper," he told IPS.

In many African towns and cities, thriving fish farmers have converted their swimming pools and backyards into small-scale fish farming ponds, and many like Banda have seen fish farming trigger their proverbial rise from rags to riches.

"I was destitute when I came to Blantyre eight years ago, but now thanks to fish farming, I have become a proud owner of home rights in the city," Banda said.

Globally, FAO estimates the value of fish trade to be 51 billion dollars per annum, with over 36 million people employed directly through fishing and aquaculture, while as many as 200 million people derive direct and indirect income from fish.

FAO also reports that, across Africa, fishing provides direct incomes for about 10 million people – half of whom are women – and contributes to the food supply of 200 million more people.

In Uganda, for example, lake fishing yield



catches are worth more than 200 million dollars a year, contributing 2.2 percent to the country's gross domestic product (GDP), while fish farming employs approximately 135,000 fishers and 700,000 more in fish processing and trading.

The rising fish farming trend comes at a time when the New Partnership for Africa's Development (NEPAD) has been on record as calling for initiatives such as fish farming to be replicated in order for Africa to harness the full potential of its fisheries in order to strengthen national economies, combat poverty and improve people's food security and nutrition.

Last year in South Africa, Alan Fleming, the director of The Business Place, an entrepreneur development and assistance organisation based in Cape Town, came up with the idea of using shipping containers as fish ponds, an idea that was well received by the country's poor communities.

"My children are now all in school thanks to the noble idea hatched by Fleming of having a fish farm designed within the confines of a shipping container, which is indeed an affordable idea for many low-income earners like me," Mpho Ntabiseni from Philippi, a low-income township in Cape Town, told IPS.

Citing a growing shortage of traditionally harvested fish, the South African government invested 100 million rands (7.8 million dollars) last year in aquaculture projects in all four of the country's coastal provinces.

In 2014, some 71,000 South Africans were involved in fish farming, according to figures from South Africa's Department of Environmental Affairs.

Nutrition experts say that fish farming

has added nutritional value to many poor people's diets. "Fish farming helps poor African communities to add high-value protein to their diet since Africa often suffer challenges of malnutrition," Agness Mwansa, an independent nutritionist based in Lusaka, the Zambian capital, told IPS.

Adding an environmental concern to the benefits of fish farming, Julius Sadi of the Aquaculture Zimbabwe Trust, told IPS that "fish from aquaculture ponds are preferred by consumers because they are bred in water that is exposed to very little or no pollution, which means that there is high demand and therefore high income for fish farmers."

As a result, donor agencies such as the U.K. Department for International Development (DfID) have helped to give Africa's aquaculture industry a kick-start over the last decade.

According to FAO studies, about 9.2 million square kilometres (31 percent of the land area) of sub-Saharan Africa is suitable for smallholder fish farming, while 24 countries in the region are battling with food crises, twice as many as in 1990.

The State of Food Insecurity in the World 2015 report released jointly by FAO and the World Food Programme (WFP) says that the East and Central Africa regions are most affected, with more than 30 percent of the people in the two regions classified as undernourished.

With fish farming gaining popularity, it could be the only means for many African to beat poverty and hunger. "Fish breeding has emancipated many of us from poverty," said Banda.

*Edited by Phil Harris*



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# CONSERVATION

## EELS FREELY SWIM ACROSS STRAIT OF GIBRALTAR

FIS EDITORIAL

DENMARK: Apr 12 2016, Fish Info & Services (FIS)  
- Researchers conducting tagging experiments with eels from the Mediterranean in French waters concluded that the species can find their way through the Strait of Gibraltar to the Atlantic and potentially reach the Sargasso Sea to spawn along with eels from the rest of Europe.

Senior Researcher Kim Aarestrup, from DTU Aqua, who is part of the research team behind the article published in the scientific journal Nature's Scientific Reports, pointed out: "Our results provide evidence that Mediterranean countries also have an important role to play in helping to save the European eel."

"There has previously been speculation about whether eels in the Mediterranean could even find their way out into the Atlantic; thus the question was whether the Mediterranean eel was important for maintaining the eel population, or whether we might as well just eat them all. Well, obviously, we shouldn't!" the researcher stressed.

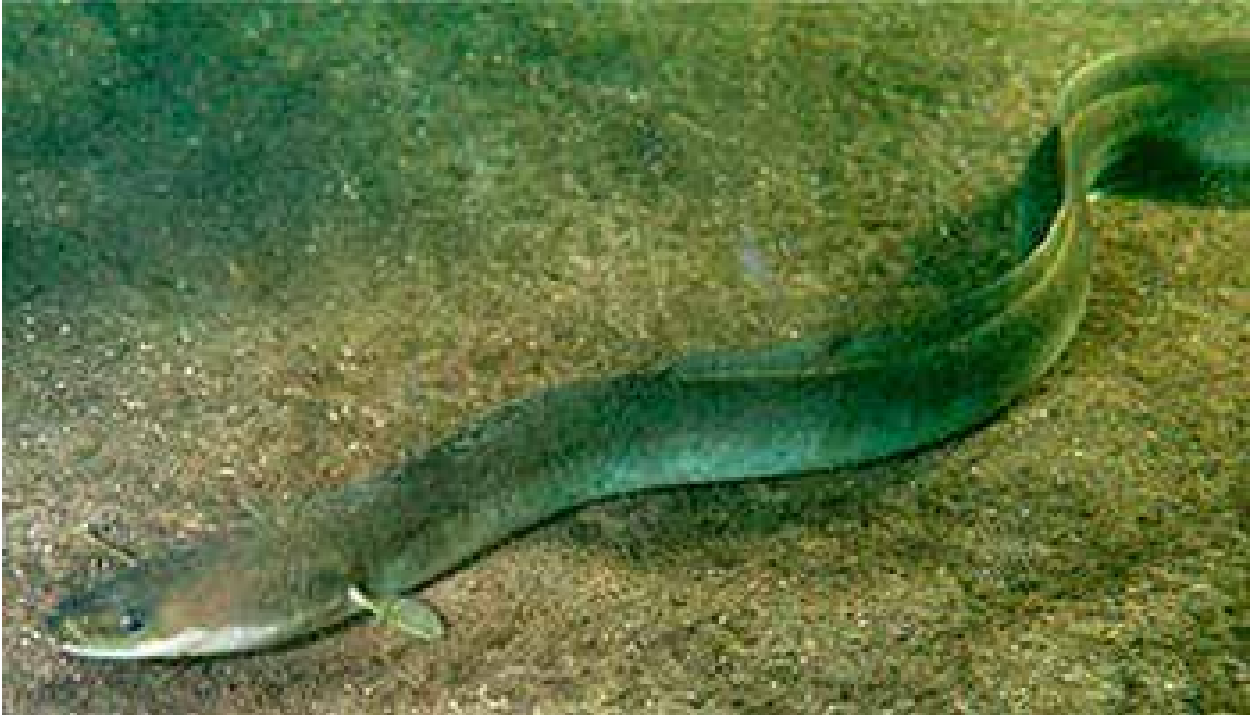
As part of the experiment, the research team tagged eight silver eels in southern France with small advanced measuring instruments, pop-up

satellite transmitters, which detect light, depth and temperature along the eels' route. The data were sent to scientists via satellite when, six months later, the tags were released and rose to the surface to be collected.

Five of the eels, however, were apparently eaten by predators in the Mediterranean. From the data, researchers can see when an eel is eaten along the way as the data pattern suddenly changes, for example if an eel is monitored near the surface during the day without the tag registering any light data. Then, the eel is probably in the belly of a predator such as other fish or a marine mammal.

From the temperature and depth measurements, Aarestrup estimates that four eels were eaten by marine mammals, i.e. whales or seals, whilst the last one potentially ended up in the stomach of a blue-fin tuna:

"It's not something we can say with certainty, but it is an educated guess, since no mammals have ever been recorded to dive down for as long as we saw for that tag, and no other kinds of fish in the area will have such a high internal temperature. So here we



*European eel. (Photo: Ron Offermans/CC BY-SA 3.0)*

might be seeing an example of one endangered species eating another endangered species," explained Aarestrup.

At the end of the six months that the study lasted, there were three eels left. One of them was still in the Mediterranean Sea, 719 km from where it had been labelled. But the remaining two eels were in the Atlantic Ocean, 2,000 km from the location where they were tagged. And they must have swum through the Strait of Gibraltar to get there.

"It is both satisfying and interesting that for the first time we have been able to show that eels can migrate from the Mediterranean through the Strait of Gibraltar. One of the arguments against this being the case has

been the strong ingoing current. Our data show that the eels do manage to get through. They probably don't like the strong current, so they change strategy, as we can see, and break their normal swimming pattern by swimming towards the bottom to avoid it, and staying there while passing through the Strait. Out in the Atlantic they then change back to their normal pattern again," highlighted the researcher.

The eel's ability to switch swimming strategies is not the only thing that has surprised the scientists. Data from the satellite tags have also challenged the hypothesis that it is the temperature differences in the water that normally makes eels swim at a depth of 200-400

metres at night and then dive down to a depth of 600-1000 metres during the day.

"We see the same swimming pattern in the Mediterranean as we have seen previously in the Atlantic Ocean. But in the Mediterranean, there is no discernible difference in water temperature, so it means that it is cannot only be temperature differences down through the water that cause the eels to switch between deeper and shallower water during the day," Aarestrup concluded.

The tagging experiment was a collaboration between researchers from The University of Perpignan (France), Cefas (UK), DTU Aqua (Denmark), and the University of Agricultural Sciences (Sweden).

# THREATS

## FAST-TRACK DEVELOPMENT LEAVES BEHIND INDIGENOUS PEOPLES

by ARUNA DUTT

UNITED NATIONS, Jul 18 2016 Inter Press Service (IPS) - Fast-tracked development often means that indigenous people and their territories get run over and their rights are not taken into consideration, Roberto Borrero, from the International Indian Treaty Council and Indigenous Peoples Major Group, said here Friday.

The High Level Political Forum currently taking place at the UN includes many discussions on “private partnerships” and “fast-tracking” development in order to “leave no one behind,” worrying indigenous leaders that development will continue to ignore the rights of indigenous peoples, pushing them behind further.

“If priorities have been given to these relationships with businesses, and there are not special measurements to gauge their impacts on indigenous peoples and their

violations of human rights, then we will be left behind,” says Roberto Borrero, from the International Indian Treaty Council and Indigenous Peoples Major Group.

Up to 50 percent of global land is customary land of indigenous people, but only 10 percent is legally recognized. Joan Carling, Expert Member of the Permanent Forum on Indigenous Issues and Secretary-General of the Asia Indigenous Peoples Pact (AIPP), says these actions against indigenous land is a key factor why indigenous people are marginalized and remain vulnerable.

“Aside from many large dams and pipelines such as in Asia, Latin America and Africa which are considered to be ‘clean energy’, we also have massive plantations for biofuels such as palm oil and corn, extractive industries and agri-business,”





*Peruvian peasant women working in the potato fields. Credit: Milagros Salazar/IPS*

says Carling, “These are being undertaken without meaningful consultations and the free prior and informed consent of indigenous peoples. Thus, these development projects are clear cases of land grabbing.”

“We should not just reach out to those left behind, but we need to reach out to the 1 percent who are actually in control of the global wealth, and make sure that the structures that perpetrate inequality are also addressed by clear actions, especially by states and development actors,” said Carling.

Dams are one example of how different

groups define development differently. While some UN member states may define mega hydro projects as development, or even sustainable development, Indigenous groups say that when the harm caused by these dams is taken into account it is difficult to define them as development.

The case of award-winning indigenous activist, Berta Caceres, who was murdered for opposing the construction of a hydroelectric dam in Honduras, shows that indigenous people have a different interpretation of what sustainable development is, says Carling.

The dam, which can consume as much

water in a few hours as a rural Honduran family would consume in a year, was part of a larger economic development plan for Honduras that promoted foreign investment and large-scale resource extraction at the expense of hundreds of indigenous and peasant rural communities.

These interests included the Honduran government and its powerful supporters, as well as U.S., Canadian, Chinese and other foreign interests. The four men charged for Caceres' murder were active or retired military officers, the hydro company's personnel, and one was an engineer for the dam.

“When indigenous peoples try to defend their lands and resources like Bertha, they are being intimidated, arrested, criminalised or killed,” said Carling.

“Further, there are many unreported cases of such killings and other forms of human rights violations.”

“We can be sure that there will be thousands of Berta Caceres in the world if indigenous people's voices are not taken into consideration for the Sustainable Development Goals,” said Carling.

“We need to address the root causes of why certain groups are left behind, which are clearly the violation of

our human rights. It is clearly our invisibility, that we are seen as a burden, not as an asset,” said Carling.

Borrero said that although the SDGs are considered an improvement to the Millennium Development Goals, in which indigenous peoples were completely invisible, the new goals still fail to address many issues of main concern to indigenous communities. These include references to collective rights, self-determination, holistic development approaches, and the right to free, prior informed consent, cultural sensitivity, and a human rights based focus.

Story Credit: by Aruna Dutt, July 2016, Inter Press Service News Agency. [ipsnews.net](http://ipsnews.net)

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# WARNING SIGNS

## HERRING SCARCITY WORRIES LOBSTER INDUSTRY

FIS EDITORIAL

UNITED STATES: Thursday, July 07, 2016. Maine's lobster fishermen have expressed concerns about the likelihood of running out of bait, a situation which could affect their sector a great deal.

Their fears stem from the fact that herring quota could be used up too quickly and this species is the primary bait used for capturing lobsters, WCSH6 reported.

Meanwhile, herring fishermen say the problem is that there is scarcity of herring, used for bait and for some animal feed, on Georges Bank off Massachusetts and the large out-of-state boats have started going to Maine to capture it.

Besides, owners and operators of the smaller Maine boats that fish closer to shore are worried the summer herring quota will be caught too quickly and they will not have bait to sell to lobstermen, at a time when the lobster fishing is heating up.

To deal with the issue, the Maine Department of Marine Resources met with herring fishermen to outline a new plan to limit the number of days they can fish and how many fish they can catch.

The state authorities hope that will stretch the fishery

out until late August or September, and make sure there is a consistent supply of lobster bait.

Fishermen and the DMR said the problem on Georges Bank does not reflect a population decline for herring. They believe herring stocks are in generally good shape.

Instead, they said that herring move from one area to another during the year, further out to sea in winter and close to shore to spawn in summer.

Referring to the issue, Sheila Dassatt, executive director of the Downeast Lobstermen's Association, said bait supply is coming down to New England from Canada, but prices for herring have still been higher than usual, Boston.com reported.

On the other hand, Bert Jongerden, general manager at Portland Fish Exchange auction house, said bait dealers are scrambling to find herring and taking their reserve supplies out of cold storage.

Story Credit: FIS Editorial, July 2016.  
editorial@fis.com. www.fis.com



# VIEWS FROM MAARS

MARITIME ABORIGINAL AQUATIC RESOURCES SECRETARIATE

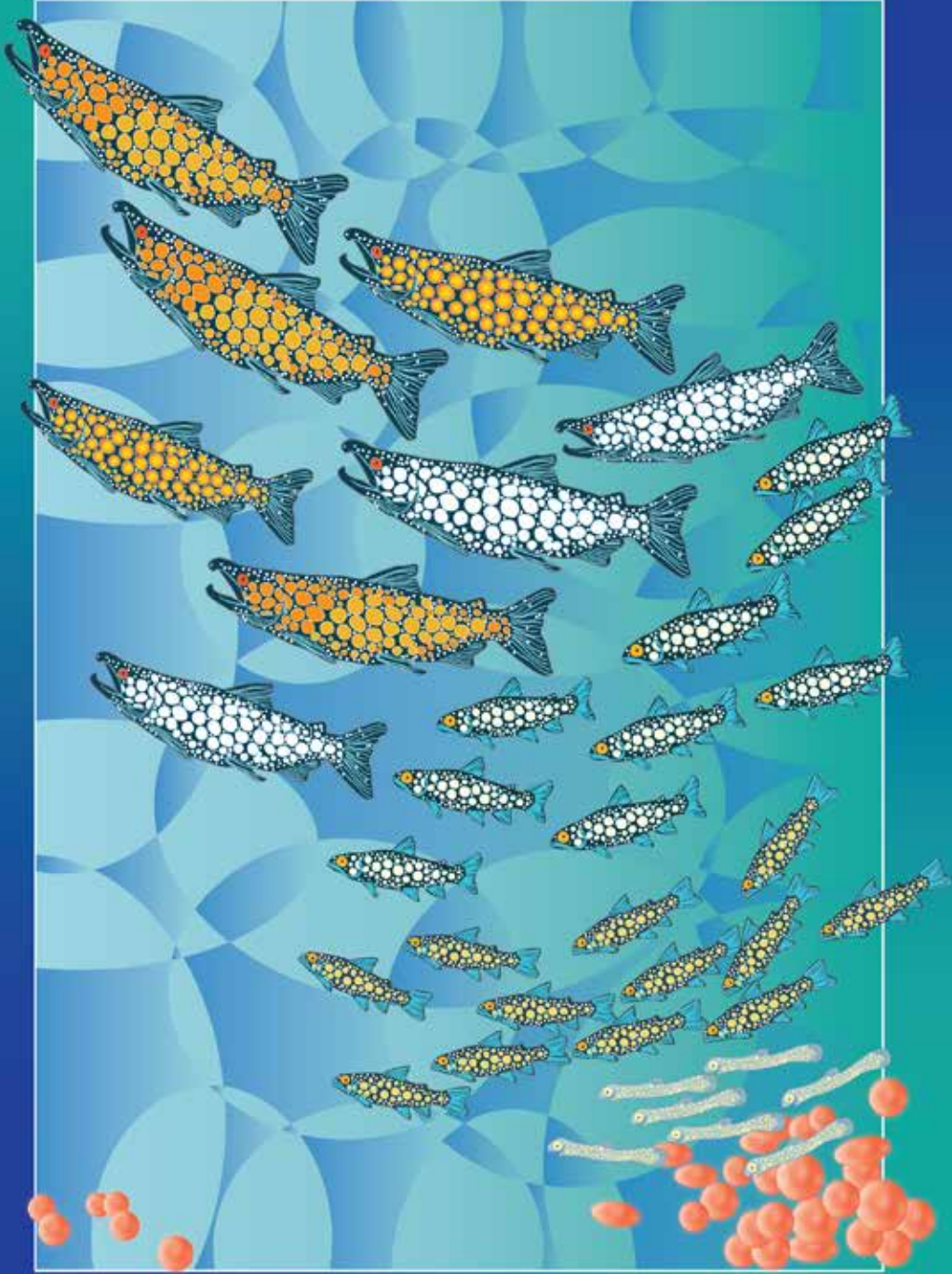
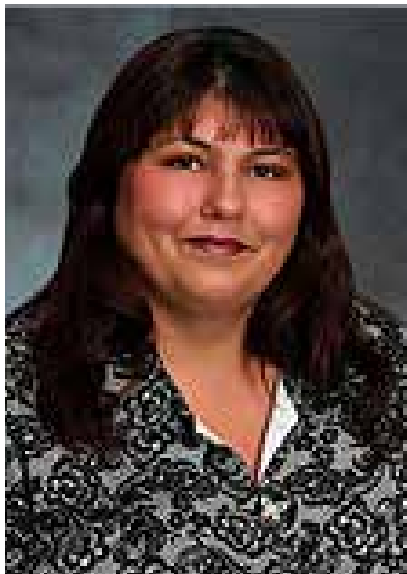


Illustration by Anna Nibby-Woods

# CELEBRATION

## CELEBRATING WATER

by JEANNIE HOPKINS



This year for World Wetlands Day, February 2nd, 2016, the IKANAWTIKET team set up a large information booth and

interactive wetlands display at the Shubenacadie Wildlife Park. The purpose was to educate the youth and the public about wetlands, the ecosystem services they provide, and how to minimize the impact people have on them. The booth included a booklet about the RAMSAR Convention on Wetlands and wetland ecosystem services, as well as several publications and brochures from the Maritime Aboriginal Aquatic Resources Secretariate office. Youth also received a Wetlands Day bag, a water bottle, and a toque. At the interactive wetlands display, youth learned about different

types of wetlands, and what the different soil and rock layers do for the environment, such as flood control, filtration, and organic debris decomposition. Youth then built their own wetlands and tested their filtering power. Approximately 215 youth visited our wetlands day booth, and approximately 75 grade 7 students participated in the wetlands learning display activity. Thank you to NovaTree and Searle's Greenhouse for supplies.

To celebrate World Water Day, Jessica Seward kicked off the UNEP-DHI Aqua Republica EcoChallenge on March 24,



*Grade 7 youth from Colchester County participate in the Wetlands Day Interactive Display where they created their own “pollution” with relish, salt, pepper, dish soap and woody debris – each representing a pollutant commonly found in wetlands. The youth poured their mixture into their wetlands and witnessed the important ecosystem services that wetlands provide when the pollution was absorbed and filtered by the different layers in their wetlands.*

2016 with a group of Aboriginal youth from the Truro area. The kick-off began with pizza and the screening of ‘Fractured Land’, a documentary that provides a powerful Indigenous point of view about the true complexities of hydrocarbon development, the significance of trust, and the power of vulnerability. After the documentary, the youth played Aqua Republica, an online serious role-playing game created by DHI in partnership with the United Nations Environment Program. The youth role-played as national

water resource managers with the mission to balance their nation’s water use with their nation’s need for food, energy, and ecosystems. During the gaming session the youth encountered unforeseen obstacles and sub-goals that they were presented by the game. These helped youth to understand and reason through complex and intertwined needs for industry, agriculture, and cities, while implementing policies and establishing structures on each of their developments to avoid

water scarcity, and maintain a healthy environment. If the balance wasn’t maintained, they encountered issues such as upstream industries polluting their cities’ water sources, dying fish populations, air quality problems, or population declines. IKANAWTIKET thanks Computers for Schools Nova Scotia for their generous donation of 6 used laptops which enabled our youth to compete against more than 3,500 14-17 year olds from around the world in the EcoChallenge.





*CLIPPIE supporters and Reduce Ocean Plastic Garbage pledgers celebrating World Ocean Day and showing-off their World Oceans Day T-shirts.*

For the 10th year in a row, IKANAWTIKET participated at the World Oceans Day event on the Halifax Waterfront at the Maritime Museum of the Atlantic, on June 3rd, 2016. Building on last year's theme to reduce plastic waste in the ocean, IKANAWTIKET gave out canvas bags and T-shirts and asked 700 visitors to sign up and promote "The



Better Bag Challenge". "The Better Bag Challenge" is a personal promise not to use plastic bags for shopping for one year. IKANAWTIKET also set up an information table to educate visitors about the types of plastics found in the oceanic gyres. We had a lot of personal discussion with visitors about microbeads that can be found in everyday body care products.

Many people were surprised to learn that microbead plastics were in many of the products they purchased on a regular basis and did not realize that those microbeads cannot be

filtered out of waste water by municipal treatment plants. Although Canada has recently passed regulations to phase out the use of microbeads in exfoliating products, it is anticipated that those products will remain on store shelves for some time. In the meantime, consumers need to look out for ingredients such as polyethylene (PE) and polypropylene (PP) in their face scrubs, body wash, soaps, toothpaste, and other exfoliating products, or switch to more natural ingredients such as nut shells, sands, or even sugar based exfoliants.





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# CONSERVATION

## HISTORY OF LAKE UTOPIA

by JESSICA SEWARD

This history report is meant to provide some historical perspectives on human occupation in the Maritimes and the Lake Utopia region, as well as the use of Lake Utopia so as to understand the community impacts which the Lake Utopia rainbow smelt has faced over the last 200+ years.

### CREATION AND ORIGINAL INHABITATION

Although sites, such as the Debert Site, clearly show that Aboriginal Peoples had permanent settlements in the Maritimes Region well over 10,000 years ago, there has been little evidence found to indicate human occupation in the Maritimes between 10,000 and 5,000 years ago. This raised the question “where did the people go?” and led to the theory of the “Great Hiatus”, a theory that the Maritimes Region was depopulated, either through migration or death. However, recent archaeological research at Lake Utopia and the

connecting Mill Lake and tributaries, has unearthed several artifact assemblages, possibly one of the earliest recorded sites in North America, yielding irrefutable evidence of Aboriginal camps during this period.

The settlement patterns of the Mi’kmaq People, Passamaquoddy People, and later the Maliseet People, were determined by the availability of food. Due to their reliance on fish and other coastal species, the Mi’kmaq occupy a huge territory of 20,645 km of coastline and in-land territory throughout present-day Prince Edward Island, Nova Scotia, New Brunswick, the Gaspé Peninsula, as well as parts of Newfoundland and the State of Maine – what the Mi’kmaq call Mi’kma’ki.

The Bay of Fundy, 400 kms in length with an average depth of 75 m, is of particular interest to the Mi’kmaq, Maliseet, and Passamaquoddy People. The Fundy tides cause the shores of the



*A Lake Utopia sunset.*

Bay of Fundy to experience a longer growing season than that of other regions of the Maritimes. The Bay of Fundy also provides shelter from storms unlike the Atlantic side, and its high salinity prevents the Bay from freezing over during the winter months.

Inland from the Bay of Fundy along the New Brunswick shore, near St. George lies a lake in the lower Magaguadavic River basin (meaning river of eels). Historically, the lake was formed when passing glaciers dammed the L'Etang River. The lake's proximity to the Bay of Fundy coast and its

connection to the Magaguadavic River made it an ideal resource.

Through a clean-cut thoroughfare, locally known as 'the Canal', Lake Utopia occupies and transverses a 2 mile long break in the granite hills before emptying into the Magaguadavic River. Though the Canal is a natural formation, its uniform width throughout its length often leads inquisitors to believe that it is an artificially cut canal, thus the term 'the Canal'. Another notable feature of the Canal occurs where the Canal meets Lake Utopia. At that point 'the Canal' breaks out into two long

grassy parallel points which extend nearly one half of a mile directly into the lake.

These features can be generally described as a delta. Though the water flows through the Canal from Lake Utopia into the Magaguadavic River most of the year, at certain times of the year the water levels in Lake Utopia and the Magaguadavic River are the same preventing flow of water through the Canal. During these times, if there is a large rain or quick snowmelt, the Magaguadavic River will rise far more rapidly than Lake Utopia and the flow of water and sediment reverses through the Canal and the sediment will deposit along the delta. The presence of Lake Utopia's prominent grassy points explains the significance of the name given to it by the Passamaquoddy People - Meskequagum. Mes-ke-qua-gum means "with grass (or bulrushes) around it".

## ENGLISH SETTLEMENT OF LAKE UTOPIA

In 1784 the lake had taken on a different name when the lands along the Magaguadavic River, just above St. George, were granted to the Royal Fencible American Regiment by Governor Carleton. Using the Magaguadavic River as a transect, lots were laid out on either side of the river, but the surveyor did not know the existence of Meskequagum. Shortly afterward, complaints from the grantees were being made that some of the river lots were covered by the waters of the Lake. When Governor Carleton visited, he was taken to the top of what is now locally known as Troak's Mountain. Governor Carleton, in a humorous reference to the cause of their complaints, gave the Lake the name "Utopia", meaning "no place" due to their lands being rendered no place by the presence of the Lake. This is not to be confused with the historically common misused term "Eutopia" meaning "excellent place." The name Lake Utopia was affixed in 1786 when the name Utopia appeared on an official map of the Province. The

name Lake Utopia has displaced the original name Meskequagum among the Aboriginal community.

## FORESTRY AND SHIP BUILDING

Over the decades of the 18th and 19th century, as English settlement and industry expanded in Southern New Brunswick, the Crown asserted more authority over forested lands, displacing Aboriginal Peoples. Of particular interest to the Crown was the harvest of large white pines for the Province's thriving shipbuilding industry.

Timber would be thrown into the water and, if possible, assembled into timber rafts 121 to 153 metres long to be taken to St. George. Lake Utopia was an asset to the log drive due to its large size and adjacency to the Magaguadavic River, and its proximity to lumber camps upstream and saw mills in St. George.

With the early adoption of hydropower sawmills (60 mills by 1831) and the wealth of lumber coming from the Lake Utopia staging area, Charlotte County became the leader in lumber production in British North America, and one of England's main suppliers of timber.

By the mid-19th century the region had reached its high point for timber and shipyard development. However, the high and sustained demand for large pine and spruce dramatically and irreversibly changed New Brunswick's large mature pine dominated Acadian forests to one that was younger and more mixed. By the early 20th century, the rise of steam power, the expanded use of smaller dimensional lumber, and the lack of large diameter trees, shifted the Province's economy away from supplying lumber for shipbuilding and many mills closed shop, replaced by a new type of mill – the pulp and paper mill, such as the St. George Pulp and Paper Company, established in 1902.



## THE GRANITE INDUSTRY

The red granites of Southwestern New Brunswick extend for 60 miles from the Saint John to the Saint Croix River and were highly prized for their colour and pattern.

The granite industry was sparked in Lake Utopia and St. George in 1872, when Mr. Ward formed the Bay of Fundy Red Granite Company. Mr. Ward purchased 1,320 acres of land around Lake Utopia and erected a \$75,000 hydropowered plant on the west side of the Magaguadavic Falls in a narrow gorge known as the "Gully". The hydropowered plant, located near the Bay of Fundy which was convenient for transportation, was vital to the granite operation as it provided the majority of the power for grinding and polishing. Though granite has been quarried at sum 50 quarries over the years throughout Southern New Brunswick, St. George was known by everyone as "granite town".

Steel shot was used to smooth the rough granite, sand and carborundum was used for polishing, and scouring blocks cut from willow trees trunks saturated with whitening or felt with whitening were used to create a glossy finish. These methods produced a considerable amount of waste material, otherwise known as "grout". When the granite industry came to an end in 1953 much of this grout, which had been piled up around the shores of Lake Utopia, was used to face up river banks and piers around Lake Utopia.

## PULP AND PAPER MILLS

In 1902, St. George Pulp and Paper Ltd. purchased the Charlotte County timberlands, as well as the waterpower rights of several granite manufacturers. The waterpower rights allowed the Company to dramatically modify the original Gully dam, built circa 1860s. When St. George Pulp & Paper modified the dam they also became a power company, supplying power to the granite sheds.

The St. George Pulp and Paper Company cut timber from its own limits around Lake Utopia for "pulpwood" needed for the new and growing market for paper products which required fibre, not whole trees. Pulpwood was driven down the Magaguadavic River each spring to the mill in St. George where the pulpwood would be mechanically processed and pressed into thick fibre board and exported to the company's paper mill in Norwalk, Connecticut. The St. George Pulp and Paper Company maintained an average production of 18 tons of pulpwood per day, 6,500 tons per year, during the 1910s, but by the 1960s the mill was producing up to 60 tons of pulpwood per day. The energy intensive process of mechanically pulping wood couldn't compete with newer chemical processes causing the St. George Pulp and Paper Company to close its doors in 1967.

In 1971, a semi-chemical sulfite digesting pulp mill was commissioned and began operations just southeast of Lake Utopia. Two years later the mill was purchased and became what is now known as Lake Utopia Paper Ltd. The company began producing approximately 507 tonnes of per day of finished corrugating medium, discharging its effluent with excessive amounts of pulp fibers, sulphur compounds, and BOD (biological oxygen demand) into the upper section of the L'Etang Estuary.

According to a long-time local and knowledgeable Elder of the St. George and Lake Utopia area, the L'Etang Inlet was at one time a highly biologically diverse area that was very important to local fishermen. When a causeway was built across the upper section of the L'Etang Inlet in 1967 for the construction of a new highway, a 2km section of the upper L'Etang was isolated from the rest, preventing exchange of seawater. The discharge, coupled with the large amount of off-gassing of sulphur compounds, caused the area to fester with

toxicity. This region of the L'Etang became locally known as L'Stink.

Finally, 17 years after the establishment of the pulp mill, an anaerobic digester for effluent treatment at the mill was installed to bring the effluent within national pulp effluent guidelines. Locals continue to be concerned about whether any of the chemicals used or effluent produced by the pulp mill have found their way into Lake Utopia.

## HYDROELECTRICITY

The St. George dam was modified for a third time when its height was increased in 1950, and for a fourth time when St. George Power undertook a major construction project to extensively redevelop a new hydroelectric dam between 2002 and 2004. The St. George dam created a head pond which extends to the Canal and is a factor, along with heavy rainfall, contributing to the reverse flow of the Canal into Lake Utopia, affecting the retention time of water in Lake Utopia. In the last 37 years of record for the St. Stephen weather station there is an increasing trend in the number of large precipitation events.

In preparation for the anticipated seasonal flooding, St. George Power draws water from the Lake by opening the flood gates early. The spring "draw-down" usually lowers Lake Utopia water levels several feet. This practice has had a detrimental effect on Lake Utopia rainbow smelt eggs, due to timing.

Lake Utopia rainbow smelts are known for spawning along the edge of streams where the eggs will mat together and cling to rocks, submersed in flowing water, but out of any heavy current. This is also usually the time when St. George Power conducts their water draw-down operations. The result is that if the Lake Utopia rainbow smelts spawn when

water levels are high and then St. George Power draws down water, those eggs are left exposed to the air along the edges of the stream bank. If the fish spawn when water levels are unnaturally low due to a water draw-down by St. George Power and a large snowmelt or rain event occurs the streams water level will rise to near flood stage very quickly flushing the eggs out of the stream and into Lake Utopia where they cannot survive.

## MOUNT PLEASANT MINES

Mining for tungsten and molybdenum also occurs within the Lake Utopia's watershed.

In 1983, Mount Pleasant Mines Ltd. began mining for tungsten at a rate of 650,000 tonnes/year. By 1985 the tungsten price had crashed causing the Mount Pleasant operation to cease; nevertheless, hydro, mine, and mill buildings, as well as, tailings facilities still exist on the mine-site. The mine remained largely unproductive until 2006 when production increased to 2,900 tonnes per day for another ten years until mid-2015. The area surrounding the Mount Pleasant mine also contains toxic heavy metals such as tin, copper, silver, zinc, lead, and arsenic that can easily contaminate surface and ground water.

The landscape surrounding the Mount Pleasant Mine, once lush forests, has been largely transformed to agricultural land. The lack of forest cover promotes erosion and the polluted surface and ground water flow downstream toward the Bay of Fundy, contaminating the Lake Utopia watershed. According to a long-time resident, and Elder of the area, the watershed's groundwater supply is highly interconnected through a series of groundwater channels that run beneath the mine, through McDougall Lake and Lake Utopia, and flushes into the L'Etang Estuary.

In 1985 a study was conducted by the Department of Fisheries and Oceans on the effects of tungsten effluent from the Mount Pleasant mine on biota. The tungsten effluent had negative impacts on the macroinvertebrates such as midges and mayflies, which fish feed upon, but did not appear to significantly impact the fish species directly. However, sedimentation due to forest clearing and construction of the effluent pond and diversion channel appeared to be the major cause of degradation to brook trout habitat immediately downstream from where the effluent pond converges with Hatch Brook.

## **THE HATCHERY**

The Lake Utopia Fish Hatchery, an on-shore salmon hatchery, began production in 1989. The hatchery draws clear, cold water from Lake Utopia, and discharges warmer effluent containing salmon feed and excrement back into Lake Utopia. In 2000, the facility's total annual production increased from 1,000,000 to 2,000,000 smolts per annum. Although the facility's wastewater is treated using rotary filter technology and the existing settling ponds, the hatchery's effluent still remains a concern in regards to toxic algal blooms caused by phosphorous loading of Lake Utopia.

## **RESIDENTIAL AND RECREATIONAL USE**

The majority of the residential and recreational property owners of Lake Utopia surround the mid to southern portion where residents fish, hunt, hike, ATV, swim, and boat. The activities practiced by the residents and industries in this area have caused unacceptable siltation. The effects of the excess nutrients are compounded due to the dramatically reduced flushing rates of

Lake Utopia when the Canal reverses flow, and their accumulated effects can cause significant negative impacts on water quality.

The results of a lake survey conducted by the New Brunswick Department of Natural Resources in 1979 indicate several fish species present in Lake Utopia apart from the unique sympatric pair of rainbow smelt. The fish species include: Atlantic salmon, alewife, brook trout, American eel, smallmouth bass, burbot, yellow perch, white sucker, brown bullhead, and lake chub. Additional studies have also shown that Lake Utopia rainbow smelts are not only at risk from poor water quality and land-use activities, but they are also at risk to recently introduced predatory sport fish species.

The Magaguadavic River is the sixth largest river in New Brunswick, and is heavily used by sport fishers who accidentally or deliberately make illegal introductions of exotic sport fish species. Four exotic fish species have been recorded in the Magaguadavic watershed: smallmouth bass, rainbow trout, and largemouth bass. The most recent, and most alarming introduction yet, is that of a noted self-sustaining chain pickerel population, which was first recorded in the Magaguadavic River in 2003. Though all of these species are voracious predators of other fishes, chain pickerel is a particular threat to the Lake Utopia rainbow smelt.

This is our 3rd report about Lake Utopia, New Brunswick and our conservation work for the rare Lake Utopia rainbow smelt. If you would like to learn more about this unique lake and its biota please see the first report is in the Mawqatmuti'kw Issue 3, Summer-Fall, 2014, and the second report is in Issue 4, Winter-Spring 2014.

# RESOURCE STUDY

## ABORIGINAL PEOPLES USE OF MARINE & COASTAL RESOURCES

by JESSICA SEWARD

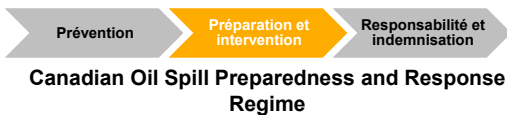
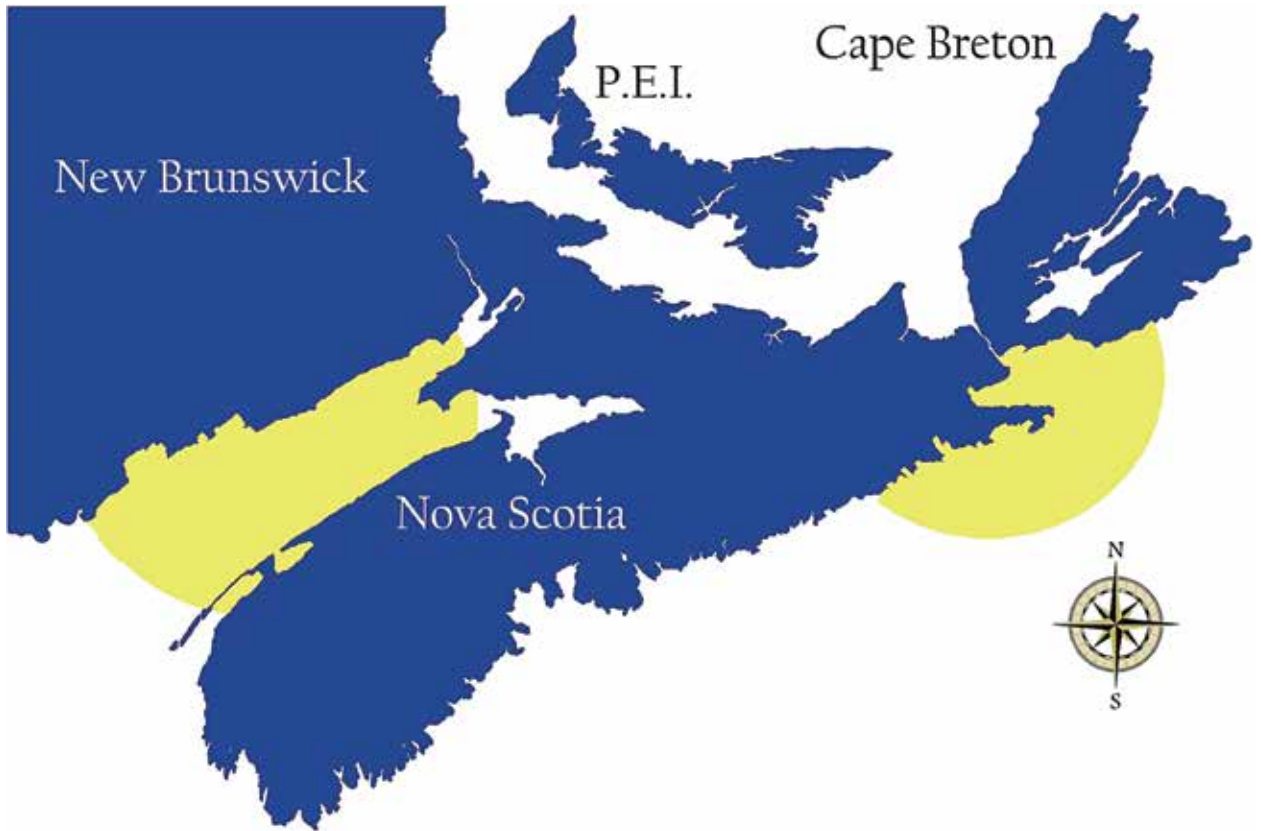


In November 2013, the Canada's Tanker Safety Panel published a report, "A Review of Canada's Ship-source Oil Spill Preparedness and Response Regime – Setting the Course for the Future" conducted by the Independent Tanker Safety Expert Panel, reviewing the current Ship-source Oil Spill Preparedness and Response Regime south of the 60th parallel.

Though the foundational principles of the Regime have stood the test of time, the Panel made 45 recommendations recognizing that the Regime must be improved to not only enhance Canada's preparedness and response to ship-source oil spills, but also its liability and compensation component. The report acknowledged that Canadian taxpayers should not bear any liability for spills in Canadian waters and that the potential polluters should be prepared, through their contracted Response Organizations and cascading mutual assistance agreements that supplement a response organization's risk-based response capacity.

Spill planning, response strategies, and response resources allocated to prepare for spills should be based on risks specific to a geographic area in order to quickly and effectively limit the environmental and socio-economic impacts of a spill.





On May 13, 2014 the Government of Canada announced a risk-based Area Response Planning approach to guide its plan for responsible resource development. As a first phase initiative, risk-based Area Response Planning was proposed in response to the Independent Tanker Safety Expert Panel's main recommendations.

The Area Response Planning Initiative is a pilot project that aims to identify aspects of the Ship-source Oil Spill Preparedness and Response Regime that can be improved and ensures that it remains responsive by identifying the critical elements of ship-source oil spill prevention, preparedness and response. Transport Canada is already developing an Area Risk Assessment Methodology to aid in the development of tailored Area Response Plans (ARP).



Two of the four pilot areas are located in DFO Maritimes Region: Saint John Harbour/Bay of Fundy, and the Port Hawkesbury/Strait of Canso area. The pilot areas were selected, based on levels of

vessel traffic and areas of response for Canada's four certified Response Organizations (RO), three of which are on the East Coast: Atlantic Emergency Response Team (ALERT), Eastern Canada Response Corporation (ECRC), and Point Tupper Marine Services (PTMS).

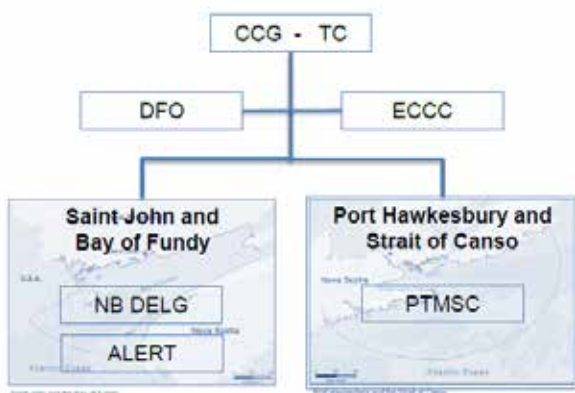
In 1993, amendments were made to the Canada Shipping Act (CSA) to strengthen Canada's marine oil spill response capability. The amendments required that certified Response Organizations be established, and that ships, as defined in the CSA, operating in Canadian waters south of 60° N Latitude and designated oil-handling facilities located in Canada south of 60° N Latitude have an arrangement with a certified response organization. Response Organizations provide marine oil spill response services to its members, when requested to do so. Canada's private sector established four response organizations within Canada to meet the requirements of the CSA and to provide marine oil spill response services to their members.

The Government, led by Transport Canada, has committed to working collaboratively with key marine stakeholders, including the Canadian Coast Guard, Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC), as well as Provincial governments and ROs to develop and implement tailored Area Response Plans for the identified pilot areas. This initiative will draw on

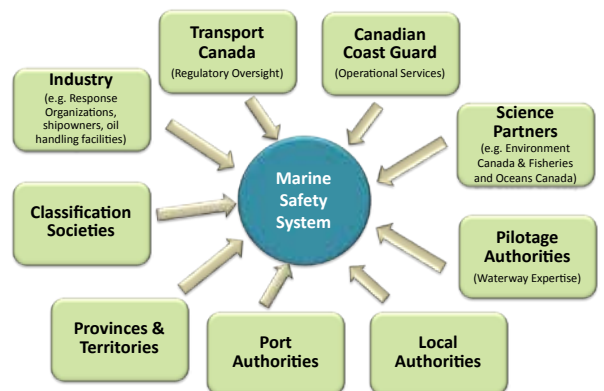
public input, as well as Aboriginal Rights Holders and marine stakeholders participation to provide coastal data and information which will support Environment Canada's national environmental emergency system and response organizations involved in spill response.

The Maritime Aboriginal Aquatic Resources Secretariate (MAARS) was approached by DFO in February 2016 to aid in the collection of Aboriginal knowledge for Saint John Harbour and the Bay of Fundy, as well as the Port Hawkesbury and the Strait of Canso area.

MAARS, in partnership with IKANAWTIKET Environmental Incorporated, Mime'j Seafoods Ltd., the Native Council of Nova Scotia, Netukulimkew'e'l Commission, New Brunswick Aboriginal Peoples Council, Aboriginal Seafood Network Inc., and Najiwsgetaq is conducting an "Aboriginal Peoples Use of Marine and Coastal Resources Study." The study will collect information about Aboriginal Peoples use of marine and coastal resources for different geographic areas, scales, time periods throughout the year (seasons), as well as information about current or historical resource use in the project pilot areas. Small and large scale base maps will be used to begin discussions about the study areas including the shorelines, estuaries and freshwater systems, as well as the nearshore and offshore. Where appropriate, species lists with pictures/



### Built on Partnerships



common names will be used to facilitate the discussions. Also, nearby shoreline uses and socio-economically important areas, environmentally sensitive areas, as well as ecologically, culturally, and archaeologically significant areas and specific priority items or places will be included in the study.

The study will rely on community information about Aboriginal Peoples uses of finfish (marine, freshwater), shellfish and invertebrates, plants (marine, wetland, coastal), marine mammals, as well as amphibians and reptiles (turtles). Information about Food, Social and Ceremonial Activities (fishing, harvesting, gathering, and cultural ceremonies and gatherings), Aboriginal Communal Commercial Activities (fishing and aquaculture), and other significant areas and activities in specific areas for this study.

Participants in the Aboriginal Peoples Use of Aquatic & Coastal Resources Study will provide vital information to the Area Response Planning Initiative which will increase awareness and understanding for the prevention, preparedness and response planning for ship-source oil spills, including related roles and responsibilities, to build a more inclusive and transparent process for area response planning, which will result in more effective response plans which reflect a



range of diverse views, interests, concerns, and uses of marine and coastal resources.

All individually provided data to the MAARS study will be depersonalized, anonymized, and used for the production of composite maps of the Saint John Harbour/Bay of Fundy and Port Hawkesbury/Strait of Canso areas that aggregate collected information. The composite maps from the MAARS study will be shared with DFO, on a confidential basis, to aid in the prioritization of

issues and areas of significance to ensure a timely response in the case of a ship-source oil spill in the pilot areas.

Increasing the confidence of stakeholders, Aboriginal Rights Holders, and the broader public in the Marine Safety System's ability to prevent and respond to oil spills in Canadian waters, will reinforce regional and local relationships and partnerships over the medium and long term, strengthening Canada's Ship-source Oil Spill Preparedness and Response Regime.

**NCNS and NBAPC Community Members, if you want to share information about your use of resources in one of the project areas please contact Jessica Seward, Study Facilitator.**

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172 Truro Heights Road, Truro Heights, NS B6L 1X1**

# STEWARDSHIP

## SUCCESSFUL BREEDING SEASON FOR KAKAPO

by REBECCA HUNKA

### **Population of Flightless Parrot Soaring After Recent Successful Breeding Season**

Back in 2014 we did a short article on the kakapo, a critically endangered species of parrot native to New Zealand. The largest species of parrot- adults can weigh up to 8lbs- is also flightless. This is one of the factors that led to the serious decline in population after ground predators such as rats, stoats, and dogs were introduced to New Zealand when the first Polynesian settlers arrived on its shores in the early 13th century (these are the Maori). The settlers themselves also hunted the birds in excess

because of their desirable plumage and the amount of meat one could obtain from a single bird. Kakapo were very easy to find and catch. Prior to settlement, New Zealand was a very unique place which had no land mammals at all except for a few species of bats, so the introduction of such species was devastating to the population of large, round, ground dwelling, and brightly coloured parrot.

Within 500 years, when the Europeans arrived, the kakapo population had vanished on many parts of the islands, with the remaining kakapos living in the forests of the South Island and the central area of the

North Island. The Europeans further contributed to the destruction of the kakapos by introducing more predators, as well as being predators themselves.

The first attempts at saving the kakapos happened in the late 19th century, however those attempts failed and the population continued to decline at a rapid rate. Expeditions to retrieve birds from the wild and move them to an island free of predators proved temporarily successful with the transfer of hundreds of kakapos to Resolute Island. Unfortunately, stoats (aka ermine or short tailed weasel) also made their way to the island and the





*Kakapo. Adult male (Sirocco). Maud Island. Image © Dylan van Winkel by Dylan van Winkel*

population of kakapos was killed off after only six years.

Further attempts at reviving the kakapo population also failed, and by 1974 none were known to exist. However, three years later an expedition in Fiordland led to the discovery of 18 male kakapos, and later a small population of 200 birds was discovered in southern Stewart Island which fortunately included some females. From there, things started to look up for these seemingly doomed parrots. Feral cats did prove a problem though and in 1984 the decision was made to collect the remaining population and transfer them to an offshore island sanctuary.

By 1995 the population of kakapo had dropped to only 51 living birds. This led to the creation of the Kakapo Recovery Programme, which included a National Kakapo Team, and a ten year recovery plan. The New Zealand government also increased funding and dedicated a specialist advisory group called the Kākāpō Scientific and Technical Advisory

Committee to assist in recovery efforts. The recovery plan included everything from dietary changes to breeding programs, which often coincide.

Kakapos have a lifespan of up to 95 years. Given their long lifespan, these parrots do not breed every year, and only do so if there is enough of their favorite fruit from the rimu tree for them to eat. This had been a problem for scientists working to encourage breeding in this small population because the Rimu does not produce fruit every year. By 2000, the programme had managed to increase the kakapo population by 68%, bringing the total number to 62, with five new females, a big deal for a population consisting mostly of males.

At the time our last article went to print, the Kakapo Recovery Team had successfully raised the number of live kakapo to 126 (60 females and 66 males). That meant the population had risen 150% in the 19 years since the National Kakapo Team was created back in 1995.



*The Rimu tree is one of New Zealand's most common native conifers, and the Kakapo depends on the berries of the tall conifer tree for its high in calcium and certain forms of vitamin D content which is essential for the production eggs but the Rimu tree can go for years without producing any fruit at all.*

Two years after our previous article things are still looking up for our favorite fat, flightless parrot with the 2016 breeding season being the most successful year ever in the history of kakapo recovery. The last breeding season previous to this year was 2014 which yielded only six kakapo chicks. This year the recovery program announced that 47 chicks had hatched. Losses inevitably occurred leaving the current number of surviving chicks at 34, with the most recent chick passing after having a hard time while being treated for a broken

femur which was announced by the Kakapo Recovery Team on their Facebook page on July 5th. On July 10th the Team posted that all but 5 of the 34 chicks that remain have fledged, while those five are still being weaned after being hand-reared. The number of adult birds is currently 123 after losing Lionel in June 2014, Ellie in July 2015, and most recently Smoko in February 2016.

This year's success is in large part due to technological advancements in recent years which have made tracking and monitoring the live birds much

easier, with less of a hands-on approach which is necessary as the population continues to grow. This includes remote nest monitoring through live webcam streams, as well as smart transmitters which alert rangers responsible for keeping track of the kakapos movements and breeding practices to any activity or changes in behaviour, some of which may require intervention for the safety of the bird.

Another major development for the Kakapo Recovery Team came in autumn of 2015. Since the kakapos breeding seasons are heavily determined by the



fruit produced by the rimu tree, scientists have been using dietary supplements for years to attempt to encourage mating during fruitless years. Until now, results have varied, though nothing has proved a success. Research done by Professor David Raubenheimer and a team from the University of Sydney showed that the rimu fruit were naturally very high in both calcium and vitamin D, specifically D2 and D3. Previous to this research it was thought that D3 was only produced by animals. According to Raubenheimer's study "the avian vitamin D receptor (VDR) is thought to have a much greater affinity for the D3 form". It concluded that rimu fruit is the perfect source of both calcium and vitamin D, when previously the rimu was known only as a great source of calcium.

Scientists working for the recovery efforts now have a major new piece of information to use when developing new dietary supplements during fruitless years which could just be the spark that ignites that flame. This year's 47 hatchlings was a new record for the Kakapo Recovery Team, but with this new knowledge coming years could produce many more chicks, at more frequent intervals, as up until now breeding could occur only when the rimu tree has bared enough fruit (having only had 6 breeding seasons in the past 15 years). 47 hatched eggs is a great achievement in the recovery effort, but there were 123 eggs laid. The potential for healthy hatchlings grows immensely if a proper dietary supplement is introduced that provides the calcium necessary for strong eggshells and bone growth of this hearty bird and the proper form of vitamin D that encourages breeding.

Another exciting announcement regarding kakapo came early this year with a kakapo genome sequencing project, Kakapo 125 Genomes Project. Originally seeking to sequence 40 older birds, they are now seeking funding sources from nonprofits, corporations, and even crowdsourcing to be able to complete the project by sequencing the entire population. This project is being lead by Andrew Digby, a conservation biologist and a member of the Science Advisory Team for Kakapo.

*The Kakapo 125 project website states the objective as: To sequence the genomes of all remaining 125 kākāpō. This will allow us to better understand the genetic variation between individuals which in turn allows us to breed pairs even more selectively. It also serves as a foundation for potential future genetic intervention in order to more quickly and successfully breed kākāpō. [www.geneticrescue.science/projects/genome-sequencing/kakapo](http://www.geneticrescue.science/projects/genome-sequencing/kakapo)*

Never before in history has an entire species population been sequenced. This project is truly one of a kind, and very important for the future of the species. With so few remaining, and so many of those birds being so closely related, genome sequencing will help scientists to better design a breeding program that will produce healthy offspring to aid in achieving stronger future generations and avoid frequent inbreeding which can lead to genetic defects.

So far, 2016 has been a great year for kakapo recovery. Please visit the following websites to find out more and follow the efforts and advancements for the kakapo recovery effort:

Official Kakapo Recovery site: [www.kakaporecovery.org.nz](http://www.kakaporecovery.org.nz)  
Facebook: [www.facebook.com/KakapoRecovery/Kakapo125](http://www.facebook.com/KakapoRecovery/Kakapo125)  
Also: [www.geneticrescue.science/projects/genome-sequencing/kakapo](http://www.geneticrescue.science/projects/genome-sequencing/kakapo)  
Or: [www.genestogenomes.org/kakapo-125-genomes-project-sequencing-an-entire-species](http://www.genestogenomes.org/kakapo-125-genomes-project-sequencing-an-entire-species)

Did you know every adult Kakapo is given a name? For information on each individual kakapo including their name, date of birth, parentage and progeny go to [en.wikipedia.org/wiki/List\\_of\\_kakapo](http://en.wikipedia.org/wiki/List_of_kakapo)

# RIVER PROJECT

## SHUBENACADIE SHAPING LAND & COMMUNITIES by BRENDAN DOBLE & VANESSA MITCHELL THROUGH TIME

The Shubenacadie River is an immense estuarine area that is the end point of one of the largest drainage basins in Nova Scotia. It includes the entire drainage area of the Shubenacadie and Stewiacke Rivers. IKANAWTIKET Environmental Incorporated with sponsorship support from Alton Natural Gas Storage L.P. launched the river project: *Shubenacadie Shaping Land and Communities Through Time*. The project encompasses the area from the mouth of the Shubenacadie River at Cobequid Bay to its confluence with the Stewiacke River about 30 kilometres upstream.

The Shubenacadie River has drawn people to its banks for thousands of years. Shubenacadie, from the Mi'kmaq word "Sipekne'kati", meaning the area where the wild turnips or wild potatoes grow, is a historic and diverse region that encompasses the great river. The region's fertile soils supported

the growth of many plant and tree species, including medicinal, softwood, and hardwood species. These natural resources, along this abundant waterway and trade route, empowered the prosperity of communities. Accordingly, people have come to make their mark on this rich landscape. This began with the first Aboriginal Peoples, the Mi'kmaq. The Mi'kmaq continue to live, aware of a sustainable way, where they should not take more than what is required to sustain their livelihoods. The French constructed dykes and channels, altering the natural tidal hydrology of the river and bay shore. The English settled and developed ship building and the lumber industry by using the abundance of softwood and hardwood trees. The current communities continue to establish themselves with farming activities, tourism and recreational pursuits, such as thrill-seeking tidal bore rafting. Given





*The Gosse Bridge, that stretches over the Shubenacadie River and the remnants of the old railroad bridge.*

the past and current activities along the Shubenacadie River, it is clear that the region's richness is endlessly exploited.

As a result, the Shubenacadie River system has changed significantly since communities established themselves. Understanding this change, IKANAWTIKET has commenced research to bridge the region's rich history and different uses up to present day. Academic research has revealed a better understanding of how communities formed and how the river was used in the past, and how it is currently being used. The project involves an in-depth study into the Shubenacadie River's geological, and geographic formation with historical information, increasing our knowledge about communities and the river from a variety



*The powerful tide coming in, where Pitch Brook meets the Shubenacadie River*



*Low tide of a characteristic Shubenacadie River tributary*

of museums, libraries, databases, community groups, professionals, and interested people.

Additionally, field work commencing in July 2016 will gather baseline data about water quality and mud biodiversity of the significant tributaries along the Shubenacadie River. The field research is two-fold; on one hand, it will consist of on-site surveys and collecting water samples from the tributaries emptying into the Shubenacadie River. The collected samples will be evaluated to assess the

concentrations of metals and contaminants in these tributaries. The samples will be collected several metres above the head of tide to eliminate the influence of bay waters. At sites where significant tributaries meet the Shubenacadie, mud core samples will be taken. The mud samples will be evaluated to determine the biodiversity of macroscopic benthic communities. These water and mud core samples will be taken following strict protocols, and will be analyzed by an independent laboratory in Dartmouth.

What this 30 km study along the Shubenacadie River will reveal is unknown, as focused studies of this kind have not been performed in the past. If the results demonstrate concern, areas will be selected for potential future projects involving either restoration or mitigation measures. In the short-term, a book with research data and historic information will be produced. IKANAWTIKET is proud to finally start work on this project which will better document the influence of the Shubenacadie Shaping Land and Communities Through Time.

# DURING THIS SUMMER IKANAWTIKET HAS TAKEN ON TWO INTERNS AS RIVER TECHNICIANS



*Brendan Doble, BSc; is a student from McGill University, Montreal, Quebec. He has a background in biology and ecology, and is completing his Master's degree in Integrated Water Resources Management. He is currently working as one of the Shubenacadie Rivers technicians, while he is residing in Truro. He has a keen interest and passion for the sustainable use of coastal resources, and the overall environmental integrity of the coastal zone. The Shubenacadie River Project is a great fit for his passion, and he is pleased to be a part of the MAPC – IKANAWTIKET team!*



*Vanessa Mitchell, BES; is a Master of Resource and Environmental Management candidate at Dalhousie University in Halifax, Nova Scotia. She focused her undergraduate degree in Environmental Studies at Saint Mary's University largely on watershed and fisheries management, more specifically the human dimensions of fisheries with a concentration in recreational fisheries. In fact, her thesis work concentrated on effective communication to address conflict in recreational fisheries in British Columbia and Nova Scotia. The Shubenacadie River project ignites her passion to understand how people connect to and use waterways.*

IKANAWTIKET started field work during the second week of July. If readers have any questions about the *Shubenacadie Shaping Land and Communities Through Time* project, or stories to share for the historical and current use study, please feel free to contact us at 902 895-2982.

# TECHNOLOGY

## LOBSTER POUND - CRIPPLE CREEK

by RODDY MILTON



Sustaining fresh lobster efficiently and economically is the dream of all lobster brokers and with the progression of aquaculture systems has made this dream possible for many lobster holding facilities.

For many, the arrival of summer means an impending lobster feast. This means that lobster holding facilities are a necessity for the successful lobster broker to ensure that live lobster is available to consumers year-round in Nova Scotia. In 2008, Mime'j Seafoods Ltd. (Mime'j) acquired a three-tank lobster holding facility on the Cripple Creek Road in Clam Point, Nova Scotia. This facility will enable Mime'j to hold live lobster year round and gain market share advantage. Mime'j had the Clam Point facility and its existing equipment fully evaluated and has begun the lengthy process of re-commissioning and expanding the facility into a modern energy-efficient sustainable operation with the goal of maximizing economic viability. This will allow for a more

energy efficient operation and decreased labour intensity, while also maximizing the carrying capacity and minimizing waste and discards. Modern aquaculture systems have advanced





*Mime'j Seafoods Ltd. Cripple Creek lobster holding facility in Clam Point, Nova Scotia.*

significantly and the new methods, such as recirculating aquaculture systems, are able to support superior holding densities, as well as increase the rate of survivability for lobsters while in the holding facility.

The enhanced facility will be able to accommodate in excess of 100,000 pounds of live lobster at any given time. To achieve its goals Mime'j is presently performing significant upgrades to the existing systems and a complete overhaul of other systems. This re-commissioning and expansion project is following a phase-by-phase approach. Currently Mime'j is in the first phase of a potential three or four phase expansion. The first phase includes expanding the facility's utility area, modernizing and installing back-up systems for the existing equipment where possible and replacing those unsuitable for upgrading. This will allow lobsters to be held sustainably for an extended period of time while minimizing waste. The following phases will include completing the business plan to

determine whether the facility should remain solely a holding facility for shipping live lobster or be further expanded into a lobster processing facility. This is a critical question when considering the future development of the project because Mime'j has put a lot of effort into choosing the right companies to design, supply, and install the modern components that are imperative to reducing energy consumption and energy waste, but not at the expense of functionality.

Today's recirculating aquaculture systems constantly recycle the water being used. This reduces the amount of ocean water drawn into the facility and reducing the impacts on the ocean environment, but it also requires additional features. These features include improved aeration, filtration, and refrigeration systems to ensure that lobsters remain healthy and fresh on their way to the consumers' plates. The Clam Point facility now has advanced water and aeration systems built and installed which improved



*The recirculating pumps decrease water demands.*

the levels of oxygen required to increase the rate of lobster survivability. These systems are enhanced with the installation

of YSI water quality probes to measure the various parameters of the tank waters and monitoring systems with programmable

*A brand new expansion houses both the recirculating water pumps and the electrical equipment.*



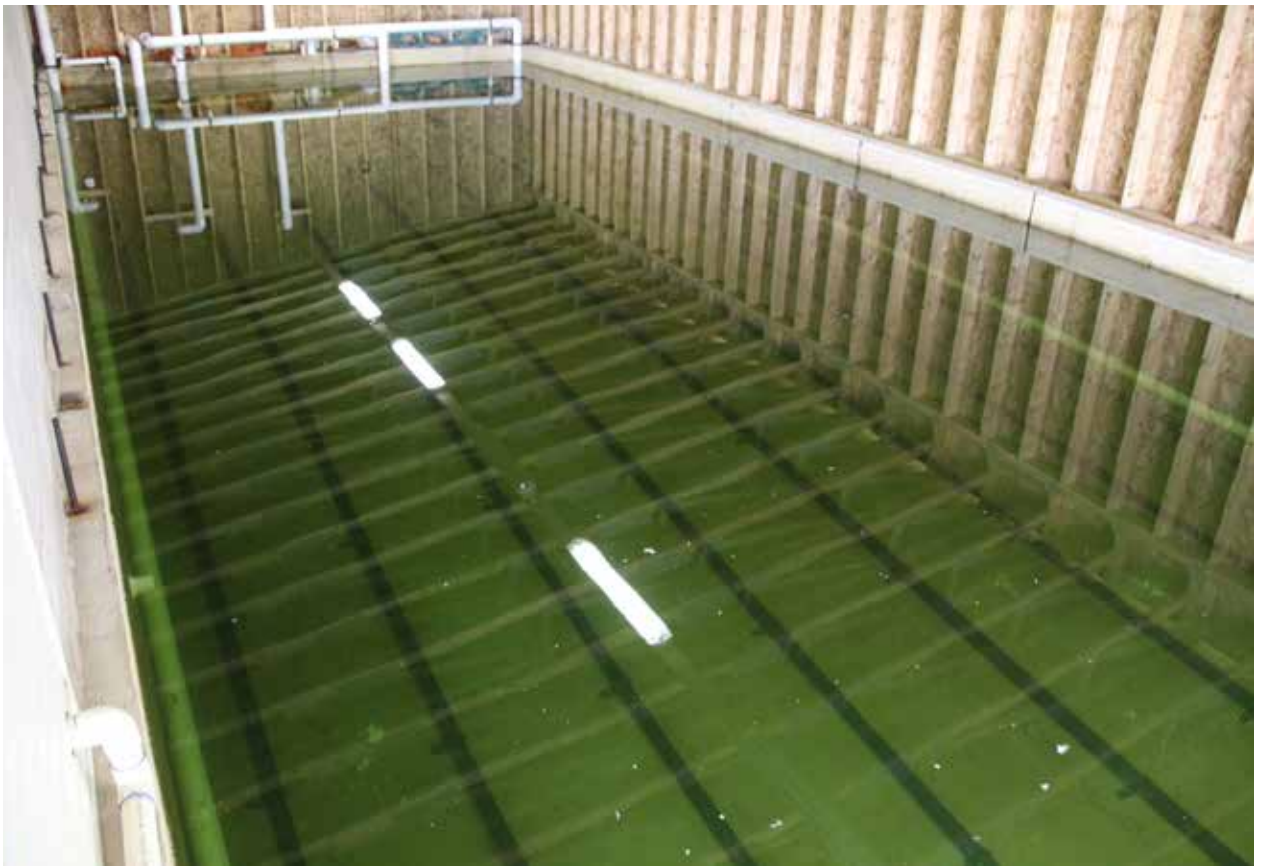
parameter capabilities to add functionality of being remotely accessible and monitored 24/7. This also forms the main component of the alarm system that will inform staff and management if a specific part of the system is operating outside the set parameters or has malfunctioned. These alarm systems will limit the risk of loss of live product that could occur if parameters are not met and maintained. Additionally, back-up electric generators have been installed that will reduce the risk of system interruptions/failures in the event of a power outage.

Just as recirculating systems are less wasteful, so too are three-phase power systems – a type of polyphase system commonly used by electrical grids to transfer power. Three-phase power systems allow the

facility to use variable frequency drives which further increase energy savings by allowing pumps and other equipment to operate at variable speed levels rather than continuously outputting at maximum energy load and cost.

The facility is equipped and nearing operational requirements to get ready for the fall lobster harvest season, but is not currently holding lobster. There is still on-going work and planning to be evaluated and completed. In the meantime, valuable information is constantly being gathered by visiting other live lobster holding plants and this has, and will continue to aid Mime’j in the decision-making process around the future implementation of systems, equipment and expansion.

*The rear holding tank awaiting the arrival of the first lobsters.*



# CLIMATE CHANGE

## MAPC REPRESENTED AT CANADA'S CHEMICAL MANAGEMENT PLAN

by JOSHUA MCNEELY



As the representative for the Maritime Aboriginal Peoples Council (MAPC), I have been appointed to a 5 year term to the Stakeholder Advisory Council for the Phase III development of Canada's Chemical Management Plan (CMP), being led by Environment and Climate Change Canada and Health Canada. As a SAC member my role on the committee is: 1) to bring the regional off-reserve Aboriginal Peoples perspective and interests to the table and 2) to inform our Maritimes off-reserve Aboriginal community about the process and outcomes of the CMP and be a point of contact for sharing information.

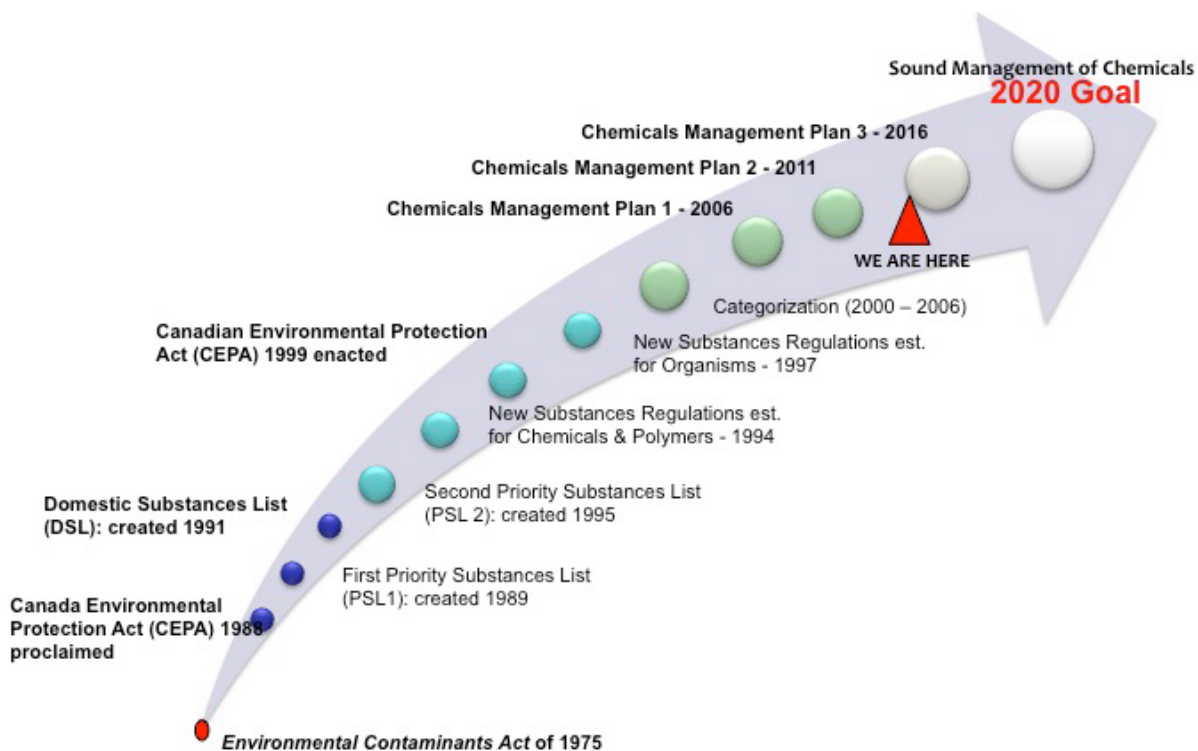
### **A brief synopsis of the Chemical Management Plan**

In Canada there is a patchwork of many federal and provincial laws and programs which regulate some aspect of certain types of chemicals, such as provincial laws regulating the application of agricultural pesticides, federal laws regulating the importation and transportation of dangerous goods, provincial waste reduction programs, and federal laws to regulate and inform consumers about chemical ingredients in consumer products. In 1988,

Canada passed the Canadian Environmental Protection Act, 1988 (CEPA) which, among other things, gave the federal government the ability to regulate a multitude of chemical pollution sources not covered by other laws.



# Evolution of Chemicals Management under CEPA



CEPA, 1988 required the Minister to make a list of the 23,000 known chemical substances manufactured in or imported into Canada between 1984-1988, known as the Domestic Substances List (published in 1991). The DSL is used as the benchmark reference to determine if a chemical is “new” to Canada and thus the manufacturer/importer is required meet new notification and testing requirements. CEPA, 1988 also required the Minister to categorize those chemicals according to toxicity, i.e., level of harm, persistence, bioaccumulation, and level of exposure, known as the Priority Substances List (published in 1989 and 1995). CEPA, 1988 also established the Schedule 1 List of Toxic Substances which require diligent regulation.

In 1999, CEPA was reviewed and a new CEPA was passed to replace CEPA, 1988, which put chemicals management and pollution prevention as the cornerstone of the Act. Specifically, CEPA, 1999

calls for the “virtual elimination” of the most persistent and bioaccumulative toxic substances (i.e., those on the Schedule 1 List of Toxic Substances). CEPA, 1999 also gave new powers for chemical pollution prevention regulations, enforcement, and national and international cooperation. One important aspect of CEPA, 1999 was the requirement for all new (post-1988) chemicals manufactured in Canada or imported into Canada to be assessed under newly developed and much more rigorous criteria for impacts to human health and the environment and to manage those chemicals accordingly. However, the 23,000 known chemicals already in Canada before CEPA 1999 came into effect were not subject to the new assessment process.

Not only is it important to assess and manage new chemicals under the new CEPA, 1999 criteria, it is also important to do the same for existing chemicals – therefore the Chemical Management Plan was born in

2006. Also vital is the need to inform Canadians about chemicals they may be exposed to and the hundreds of new chemical substances entering Canada each year (roughly 4,500 since 2006), so as to provide Canadians information that they can use to reduce their level of exposure or that to the environment. This is a monumental task employing 75 chemical assessors and hundreds of others feeding into the assessments or working on management plans or instruments in response to the finished assessments.

Although the time line is short, with the goal to have all assessments done by 2020, Environment and Climate Change Canada and Health Canada assured me that they are on-target. To date, Canada has gone through a prioritization process of the Domestic Substances List which identified about 4,300 chemical substances that could potentially be harmful to human health or the environment and which would require a more detailed assessment. Of those 4,300 requiring assessments, over 2,700 have been completed to date, of which 363 have been found to be toxic. Also to date, 78 risk management instruments have been finalized, which cover all or some aspect of 325 chemical substances or groups of chemical substances.

While this may not seem like a lot, many more risk management instruments are in the pipes. While the assessment process for the backlog of existing chemicals is expected to finish in 2020, new assessments for new chemicals is on-going, as well as the development of new risk management instruments for old or new chemicals as more is learned about how they are manufactured, imported, moved, stored, used, and disposed of in Canada. In addition, it is very likely that many chemicals will need to be reassessed from time to time as more is learned about their toxic effects, particularly their persistence and bioaccumulation in the body or the environment – two areas of science which are growing rapidly. Certainly Canada has advanced since the early CEPA, 1988 days only having the Schedule 1 List of Toxic Substances to regulate, which to date only totals 133 substances.

The Schedule 1 List of Toxic Substances number includes the new addition this year of plastic microbeads found in common health care products, because of their toxic effects on the environment and the fact that waste treatment systems cannot screen out microbeads. Unfortunately, those products will likely stay on store shelves for some time yet until the supply is consumed and replaced under a voluntary phase-out by the 14 members of the Canadian Cosmetic, Toiletry, and Fragrance Association, which extends to 2019.

As consumers, we are still only just beginning to learn about the toxic effects of many chemicals we use every day. The old consumer habits of using chemicals is still prevalent, “if an ounce is enough, a pound is better”. Consumers still desire to have a completely “weed free lawn” or “bug free garden” not knowing the toxic effect or damage caused by these chemicals. Canada still struggles with food labelling laws for ingredients and nutrition facts, let alone being able to embark on the much more expansive problem of accurate labeling of all chemical constituents in all chemical products. Despite efforts such as the CMP, our regulatory system is still geared toward marketing and selling chemicals before all the health and environmental effects are known; as well as accepting chemical products from other countries without complete testing. A multitude of misleading or “greenwashed” labels and packaging statements abound which claim to be safe for the environment, humans, pets, wildlife, etc., but which are challenged or outright debunked or which have little or no information available to the public to back up their claims.

Clearly after nearly three decades of chemicals management in Canada, we are still at the beginning of a long and arduous journey. For these reasons, as a member of the CMP Stakeholder Advisory Council, I am advocating that our Aboriginal community and Canadians in general need more access to easy-

to-read information so that we can make informed decisions to reduce our exposure to toxic chemicals and be informed about appropriate uses, amounts, risks, and alternatives to the many chemicals we use each day. Now that the bulk of the assessment work is complete or scheduled to be completed in the next couple of years, officials and stakeholders are looking toward the next phase (“post-CMP assessments”). Public information and education was identified as a top priority by the Stakeholder Advisory Council, and a Communications Sub-Group was struck (to which I am also a member) to discuss ways to engage the public. I don’t believe a static website or web portal are enough, nor is the typical accompaniment of a “diarrhea of statistics and scientific analysis”. Canadians want to know in-hand, point-of-sale, grabbing off the kitchen shelf, kids running around, phone’s ringing, truck won’t start, the dog’s sick,

moose flies are stripping away my carcass, need to know now kind of information: what is in it, what are the risks, how is it use appropriately, how do I disposed of it – and I want to know those few details for my exact circumstance at this point in time. Information is only good if you have timely access.

For our part, MAPC is attempting to engage Environment and Climate Change Canada and Health Canada to look at ways of informing our Aboriginal community about chemicals and Canada’s Chemical Management Plan.

If you have any project ideas or want to know more, you can call me at the office at 902 895-2982 or e-mail [jmcneely@mapcorg.ca](mailto:jmcneely@mapcorg.ca). You can also visit the Government of Canada’s Chemical Management Plan website at [chemicalsubstanceschimiques.gc.ca](http://chemicalsubstanceschimiques.gc.ca).

## AMBIENT AIR QUALITY

Joshua McNeely (representing MAPC) is also a member of the Canadian Ambient Air Quality Standards (CAAQS) Development and Review Working Group (CDRWG) under the Canadian Council of Ministers of the Environment (CCME). The purpose of the CDRWG is to review scientific evidence about the effects of wide-spread air pollutants on human health and the environment and to provide advice to the CCME for the formulation of new national ambient air standards, replacing those developed in the 70s and 80s. The CDRWG is a unique technical committee of subject matter experts who also have been able to openly express among themselves the interests, concerns, and challenges faced by their respective government agency, industry, or stakeholder/rightsholder organization. Thus, the CDRWG has been able to provide to the CCME some of the strongest ambient air quality targets in the world, as well as good advice, based on the practical experience of the CDRWG members, about how governments, industry, and other organizations working together under Canada’s new Air Quality Management System can achieve the targets in a timely and realistic way. Thus far, the CCME has adopted the CDRWG proposed ambient air quality standards for fine (2.5µm) particulate matter and ground-level ozone. This summer, the CCME is expected to make a decision about the CDRWG’s proposal for sulfur dioxide. The CDRWG is currently working on new standards for nitrogen dioxide, to be proposed in 2017. For more information about CAAQS and the Air Quality Management System, please visit: [www.ccme.ca/en/resources/air/aqms.html](http://www.ccme.ca/en/resources/air/aqms.html) or contact Joshua at (902) 895-2982.



# American Lobster Settlement Index | Update 2015

Compiled by: R. Wahle and N. Oppenheim

Participants: ME DMR (C. Wilson), MA DMF (T. Pugh), RI DFW (S. Olszewski), NH F&G (J. Carloni), DFO Canada (M. Comeau, P. Lawton, S. Armsworthy, A. Cook), UNB, St. John (R. Rochette), Guysborough Co. Inshore Fishermen's Assoc., NS (E. O'Leary), Fishermen & Scientists Research Society (S. Scott Tibbets)

<http://umaine.edu/wahlelab/current-projects/american-lobster-settlement-index/>

The question on everyone's mind in the lobster industry is: *How long will this boom last?* As 2015's lobster landings are still being tallied, it's shaping up to be another all-time record for the US and Canada. That is, in dollar value. But for Maine, the state dominating US landings, volume has fallen off the 2013 peak for the second year running. Indeed, while Maine's landings shot up by 23% in value in 2014, volume was down 3%. In 2015 value surged again by another 8%, masking a 2.4% decline in volume from 2014. This **ALSI Update** adds the 2015 settlement numbers to our accumulating time series from diver-based and collector-based sampling in New England and Atlantic Canada. We also include updates on our regional ALSI-based forecasts, which suggest that if settlement is of any use as a predictive tool, some areas may be in for a longer term slide from their astronomical highs.

**Settlement 2015:** Young-of-year lobster densities in 2015 were down from 2014 in most areas (Fig. 1). In the Gulf of Maine, most monitoring sites from Jonesport, Maine to Cape Cod Bay reported some of the lowest settlement on record. Declines were less steep in southwest Nova Scotia, and settlement was even slightly up in Beaver Harbour, New Brunswick. But northeast Nova Scotia – Cape Breton and Canso – have had a weak couple of years. Even the southern Gulf of St. Lawrence, where juvenile lobster numbers and subsequent landings have surged upward in recent years, reported a downturn in settlement in 2015. In southern New England, south of Cape Cod, settlement remains at historic lows under a siege of still prevalent shell disease.

**Forecast validation:** Over the past year we have made strides in developing ALSI as an early warning system for future trends in lobster landings. These forecasting models start with the premise that settlement strength is an accurate indicator of year-class strength, and in turn, a key determinant of subsequent recruitment to the fishery. Because the lion's share of the catch consists of lobsters that have just crossed the threshold to legal size, we also consider landings to be a solid indicator of recruitment to the fishery. It would be easy to say how old a legal-size lobster is if it had growth rings we could count, such as those in fish bones and scales, but there is currently no fool-proof way to age a lobster. So, we

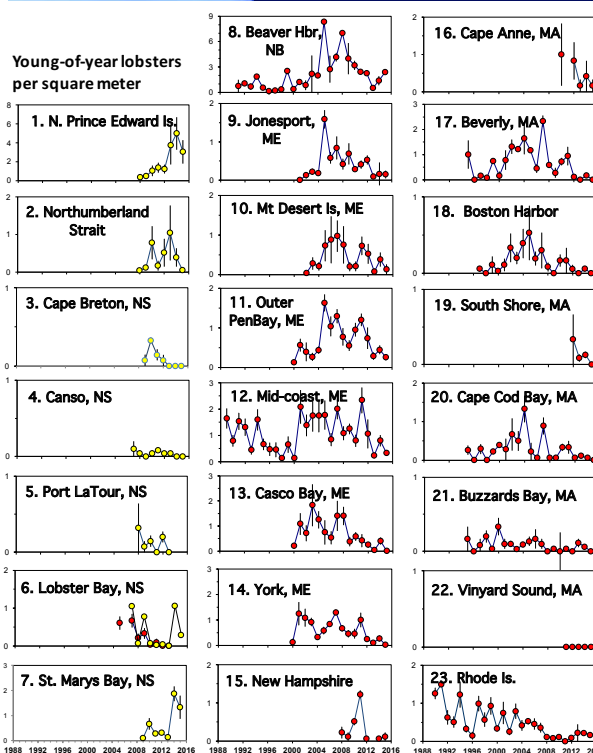
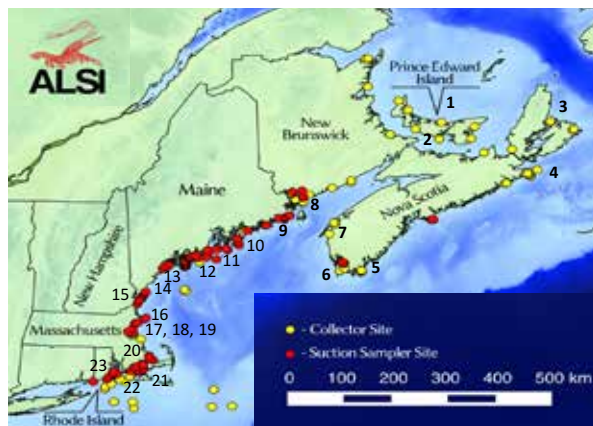


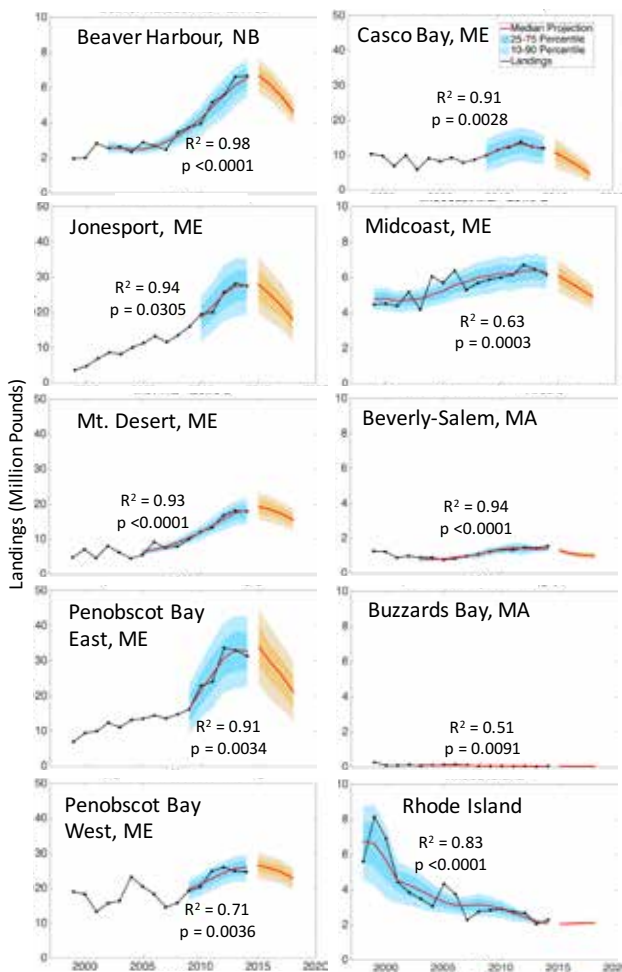
Figure 1. ALSI sampling in New England and Atlantic Canada. Diver-based suction sampling (red) and vessel-deployed collector (yellow). Corresponding time series for groups of sites in study areas numbered on the map.



must go by our best estimate of how fast a lobster grows. We know a year class does not arrive at the fishery all at once, and we account for the fact that some lobsters grow faster than others based on previous growth and tagging studies up and down the coast. It can take anywhere from 5 to 10 years after settlement for a lobster to reach legal size, depending on both individual differences and regional temperature regimes. We also know that mortality rates are not the same for juveniles in time or space, and our forecasting model accommodates changes in natural mortality over time. For example, in southern New England, incorporating changes in shell disease prevalence into our model has significantly improved its forecasting power. We end up with a series of regionally customized models that incorporate our best estimates of local differences in growth and mortality to produce a relative index of recruitment to the fishery. The next step is to test how well the time trend in the recruitment index correlates with the time series of landings for the same area. This validation step is called “hindcasting” because it looks back in time as we compare the observed landings to the model-generated index. If there is a statistically significant correlation, we can proceed with some confidence that the model we’ve developed for the area will be useful in forecasting future landings. Some models simply do not pass this validation step.

Figure 2 gives forecasts for 10 study areas that have passed our hindcasting validation step. These are study areas with long enough settlement time series to generate at least five years of hindcasts (in blue) against which we have compared observed landings (black line) with favorable correlations. Forecasts beyond the observed landings are shown in orange. In short, if ALSI - adjusted for variable growth and mortality - is a good predictor of landings, we may expect to see more precipitous declines in the coming years, especially for eastern Maine and the Bay of Fundy. ALSI time series are not yet long enough to be evaluated as a predictive tool for most Canadian waters, but the upward trend in the southern Gulf of St. Lawrence bodes well for future landings in that region.

To be sure, forecasting is an inherently uncertain business. For starters, it’s fair to ask how confident we can be that young-of-year densities are representative of year class strength. Are we missing an important settlement signal, such as in deep water, outside the range of our monitoring? An increase in lobster settlement outside our sampling domain could offset the declines we currently predict. Did we get the variability in growth rates right, particularly the effect of changing temperature? As for mortality rates, we think we have captured the effect of shell disease, but what about predators? The abundance and composition of predatory groundfish is always changing, but we have not yet accounted for it as a factor in our models. And finally, how sure can we be that landings data, our reality check on model-predicted trends in recruitment, represent an accurate indicator of fishery recruitment? Some questions are easier to address than others. Research is under way on both sides of the border to address these uncertainties - to better understand deep water settlement, the impacts of a warming ocean, movements among sub-population, and even to test new ways to age lobsters. Hopes are these forecasting tools help fishermen, dealers, managers, and policy makers realize the benefits of having a several year lead on the ups and downs in the region’s most valuable and iconic fishery. **θ**



**Figure 2. ALSI-based landings hindcasts and forecasts to 2018.** Model hindcasts, shown in blue, were correlated against observed landings (black line) to test model performance through 2014. Note landings scale varies. The model did a good job of explaining time trends in landings for 10 of the 12 areas we analyzed. For example, the  $R^2$  value of 0.98 at Beaver Harbour, NB, means that the model explained 98% of the variability in lobster landings there. Based on the strength of that relationship and settlement in more recent years, forecasts are made for future years (in orange). Time will tell whether the forecasts

# OUR READERS

## MAARS, MAPC & IKANAWTIKET'S WORK IS HELPING STUDENTS GET IT

The Maritime Aboriginal Aquatic Resources Secretariate (MAARS), the Maritime Aboriginal Peoples Council (MAPC) and IKANAWTIKET Environmental Incorporated participate yearly in a big way for Oceans Day on June 8th.

Advancing last year's theme of the need to reduce plastic waste in the ocean, this year we gave away over 900 reusable cotton shopping bags and passed out T-shirts to the youth

who visited our kiosk at the Maritime Museum of the Atlantic. The charitable work of IKANAWTIKET Environmental Incorporated benefits the community by preserving and protecting the environment through the preservation, protection, and restoration of habitats, and increasing the public's understanding about the environment and its importance to all life.

*Calley Conrad, Alivia Greer and Robbie Greer created this wonderful poster for IKANAWTIKET. They attend Dr. John C. Wickwire Academy in Liverpool, Nova Scotia and sent in this lovely poster that they drew about the day they wore their Oceans Day T-shirts to school.*

Robbie

Alivia

Calley

Me, my sister, and Calley  
wore our Ocean's Day shirts  
to school on Ocean's Day.  
We told the school how  
important it is not to poleut,  
And how important it is not  
to use plastic bags, and  
help the Ocean stay clean  
and healthy.

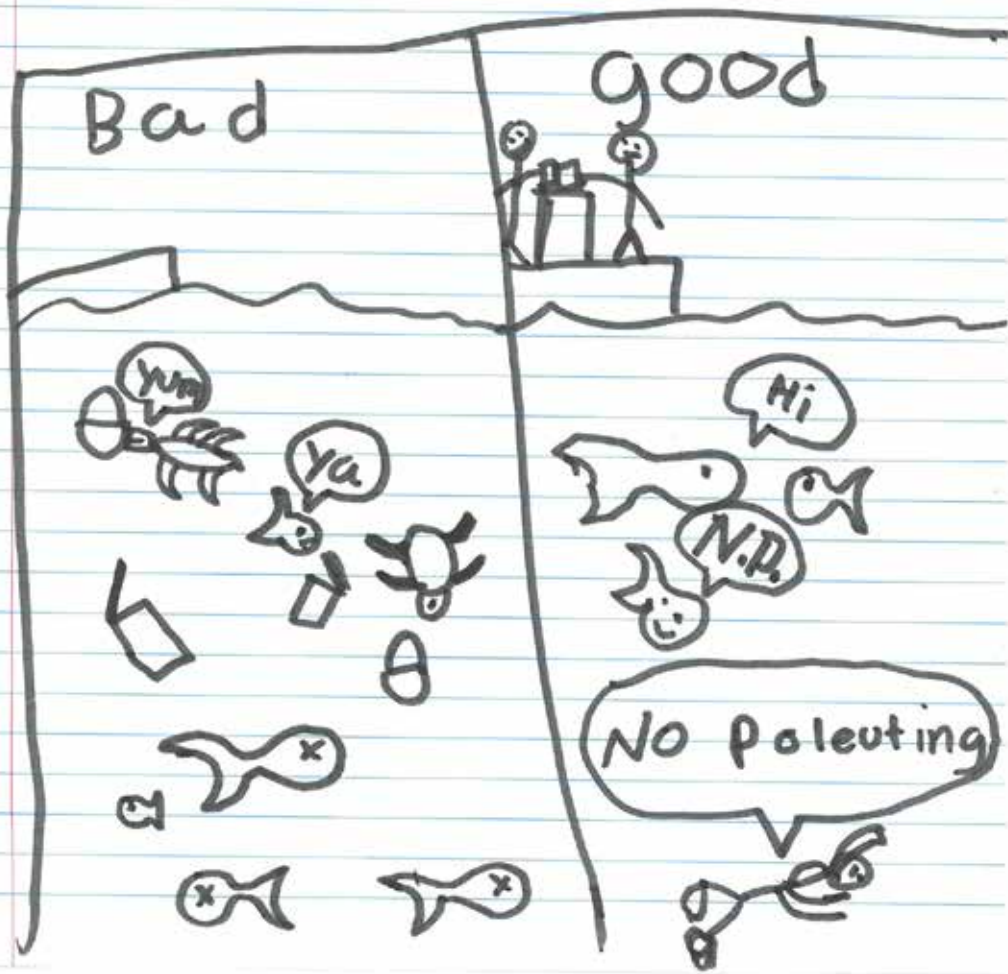


Illustration by: Calley Conrad, Alivia Greer and Robbie Greer

# A COMPELLING REASON

## SUNSET ABSTRACT IN A RIVER

"*Sunset Abstract in a River*" is one of many breathtaking photographs of our underwater world as seen through the eyes of artist Gilbert van Ryckevorsel.

Gilbert's love for the splendid creatures living in hidden aquatic environments has lured him to spend a lifetime communicating the mysteries of underwater environments. His initial and overriding goal is to create awareness about the need for preservation of life supporting water. With these motivations, he has created underwater photography, driftwood monster phantasy sculptures, beach rock engravings, ocean-mirror glass art, and marine abstract art.





*Sunset Abstract in a River by Gilbert van Ryckevorsel.*



The objective of IKANAWTIKET Environmental Incorporated is: to promote the preservation of the natural environment by educating and informing the public about environmental issues, biodiversity in the Maritime Provinces, Aboriginal culture, Aboriginal worldview, and traditional knowledge in relation to the environment.

IKANAWTIKET advances education by undertaking research which is made available to the public, providing training and instruction, offering courses, seminars, convening conferences, meetings and developing educational tools related to understanding and respecting the environment.

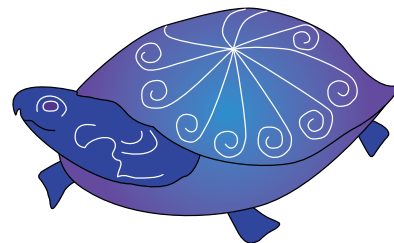
The charitable work of IKANAWTIKET Environmental Incorporated benefits the community by preserving and protecting the environment through the preservation, protection, and restoration of habitats, and increasing the public's understanding about the environment and its importance to all life.

*"Is controlling nature worth destroying our environment and our biodiversity, killing our young, and poisoning our food, water, and air?"*

IKANAWTIKET  
Environmental  
Incorporated

\*Canadian Charitable Registration  
Number 85219 3465 RR0001

[www.ikanawtiket.ca](http://www.ikanawtiket.ca)





## Science that matters.

Acadia's environmental programs for undergraduate and graduate students offer varied and exciting opportunities for student involvement in field studies with our faculty and research partners. We are focused on doing science that matters to us all!

In our aquatic program, our students have been developing valued expertise in habitat stewardship, biodiversity and water quality assessments, and conservation of species at risk. Beyond science, effective communication is essential! We demonstrate its importance by our commitment to student involvement in citizen science and community engagement.

Learn more at [acadiau.ca](http://acadiau.ca)



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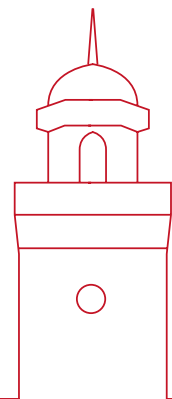
**You  
want to find  
your path.**

**We believe  
the best ones  
are never straight  
or narrow.**

At Acadia, we believe in the art and science of discovery. With the Bay of Fundy on our front doorstep and Nova Scotia's rich interior in our backyard, we have offered generations of students the opportunity to learn about our environment and why it's worth protecting.

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