

Ecology & Action

SPRING 2017



IN THIS ISSUE

Haunting the Bay of Fundy 

Wonders on the Seafloor 

There's A Whale In My Carbon Sink! 

VOL. 35 NO. 1

PM 4005 0204 | ISSN 2369-5943

A publication of  Ecology Action Centre

Contents

CONTRIBUTORS

Sadie Beaton, Emma Boardman, Katie Brennan, Robert Fairweather, Susanna Fuller, Alexa Goodman, Ian Johnston, Samantha Page, Amber Tucker, Colleen Turlo, EAC staff

CONTENT EDITORS

Shannon Arnold, Sadie Beaton, Emma Boardman, Maggy Burns, Heather Grant, Ian Johnston, Kelsey Power, Marla MacLeod, Amber Tucker

COPY EDITORS

Ian Johnston, Mairin Prentiss

ADVERTISING

Cormekia Clayton

ILLUSTRATIONS /ARTWORK

Colleen MacIsaac,
Heather Grant, Dean Gallant

PHOTOGRAPHERS

Fisheries and Oceans Canada, Fundy North Fishermen's Association, Gabriel Barathieu, Maggy Burns, Hans Hillewaert, Hans-Petter Fjeld, Mermaid Fare, NOAA Photo Library, Sylke Rohrlach, OAR/NURP.

DESIGN & PRODUCTION

Dean Gallant, Pinwheel Communication Design

DISTRIBUTION

EAC staff, members & volunteers

COVER ARTWORK

Colleen MacIsaac is a multi-disciplinary artist based in Halifax, working in illustration, theatre, and comics. Check out her daily art project at littlefoible.net.

Letters	1
Fishing for Facts on Seafood	2
Peace and Friendship on the Sipekne'katik River ..	4
Sea Level Rising	6
Voices on the Ocean	8
Haunting the Bay of Fundy	10
Wonders on the Seafloor	12
There's A Whale In My Carbon Sink!	14
Hot, Sour, and Breathless	16
Who will be 2017 Miss Deep Sea?	18
Action is our Middle Name	20
The Seasonal Gourmet	22
Action in Verse	23

To advertise in *Ecology & Action*, please contact advertising@ecologyaction.ca. We support businesses working towards social and environmental justice.

Printed at Halcraft Printers on Chorus Art Paper, 50% recycled fibre, 25% post-consumer with vegetable based inks.

Ecology & Action is published three times a year by the Ecology Action Centre (the EAC), a charitable organization (PM Registration # 40050204).



Ecology Action Centre

The EAC's vision is of a society in Nova Scotia that respects and protects nature and provides environmentally and economically sustainable solutions for its citizens. The EAC is a founding member of the Canadian and Nova Scotia Environmental Networks. Views expressed in *Ecology & Action* are those of the writers and do not necessarily represent the EAC or its supporters.

Ecology Action Centre

2705 Fern Lane

Halifax, Nova Scotia B3K 4L3

902.429.2202

www.ecologyaction.ca

 /EcologyActionCentre

 @EcologyAction

 /EcologyAction

Letters

WE LOVE HEARING FROM YOU!
EMAIL YOUR THOUGHTS TO
MAGAZINE@ECOLOGYACTION.CA

To the Centre

You published an article, "A Legacy of Broken Promises" (*E&A* Spring 2016, pp.12-13), on the 50+ years of continuous pollution of Boat Harbour, and recently Pictou Harbour, by effluent from the Scott Paper Mill and ongoing fouling of the home of Pictou Landing First Nation under Northern Pulp Co. The author Jonathan Beadle included "A Timeline" from 1965 to 2016. Under the first entry for 1965, the final sentence read: "Pictou Landing First Nation (PLFN) received \$60,000 compensation for the loss of fishing grounds (this would be equivalent to \$450.00 in today's dollars)." This implies that \$60,000 in 1965 is only worth \$450 in "today's dollars," allowing for inflation and the reduction of purchasing power of the dollar over the past 51 years. I do not think this was the case. If \$450,000 was intended, this may imply an incorrect inflation rate? Could I please ask that you consult with the author and correct the sentence in a future issue?

We can only hope that Nova Scotia's Government and the company keep their 2020 commitment to end the flow of effluent. Please keep us informed.

Alan Ruffman

Member, Ecology Action Centre

**Thank you Alan for sending in that correction.
We crunched the numbers and, yes, in 2016 dollars
the amount would be \$454,855.77.**

First Impressions Last Forever...



Halcraft
Printers Inc.®

We are FSC® Certified
60 Years of Quality, Full Colour Printing & Binding

902 453 4511
2688 Robie Street - Halifax - N.S. B3K 4N8 - sales@halprint.com
www.halcraftprinters.com

FSC
www.fsc.org
FSC® C016290
The mark of responsible forestry

On March 31, 2017, our long-time Managing Director, Maggy Burns, finished up at Ecology Action Centre to move on to new adventures. Reprinted here, with her permission, is the heart-felt letter she sent to all of us on staff. Thank you for your many years of stewarding the EAC ecosystem, Maggy!

My dear friends and colleagues,

Thank you for being the heart of EAC. Thanks for being both brave and beautiful.

There's the fiery, take no guff exterior of EAC: protest signs, multi-generational projects, court cases and sharply worded press releases. Everyone knows that you're that kind of brave. But I think you're also a less obvious kind of brave. The kind that has the courage it takes to do the unconventional and even to challenge your own closely held beliefs, on occasion. You have the kind of bravery it takes to create an organization that welcomes hundreds of volunteers into leadership roles and even gives some of them free reign with our Facebook password! Together we have the courage it takes to build the kind of organization that tries every day to be a microcosm of the better society that we are all working towards.

The EAC is also a beautiful place, thanks to you.

As a student I was obsessed with evolutionary biology. I love how it examines pathways and interconnections, logic and randomness, the big and the small. Like nature, I think EAC is a messy and beautiful creature. And, thanks to people like you, I've been deeply rewarded for my long study of EAC.

I believe that part of EAC's beauty is that it's complicated and messy but it works. Also that a bigger, more profound part of that beauty is EAC's DNA, which is the amazing integrity and compassion of people like you. It's the fact that you cultivate the ability to pay attention to the 'who' and the 'how' of things, not just the 'what' and 'how fast can we get it done.'

For many years I found it hard to see my role at EAC as one of leadership. We're all told that leadership is a white man in a suit making a visionary speech to the masses. And my work has been to glue things together; wandering the EAC web and trying to understand how the pieces fit together and how to amplify the power of our collective efforts. But thanks to my time in the brave and beautiful world of EAC I've come to understand that this is a profound and sometimes radical kind of leadership.

I believe that you bring a version of this kind of leadership to the world too. You have my heartfelt thanks for that, for your brilliance and commitment and for making my time at EAC truly extraordinary!

Lots of love,

Maggy

Fishing for Facts on Seafood

by COLLEEN TURLO /// EAC Staff

On the Atlantic Canadian coast we are fortunate to have access to a wide variety of seafood options that are of exceptional quality. Many of these seafood choices are harvested sustainably and locally, supporting the livelihoods of Atlantic Canadian fishers and their communities. Unfortunately, there are also some fisheries that have harmful effects on populations of fish and on our fragile ocean ecosystem.

So how do you know if your seafood is sustainable or not?

TAKE ACTION

- Look up seafood options on-the-go with the **Seafood Watch app**.
- Through SeaChoice, the Ecology Action Centre is petitioning the government to have better seafood labelling in Canada. Better labelling can not only help consumers make more **sustainable** choices, it can also help businesses that buy and sell seafood ensure the **traceability** of their purchases, so that there is no fraud in the supply chain. Better labelling will **incentivise fishers** to use more sustainable practices (as they can make more money) and it will also **align our labelling policies** with those of our major trade partners like the EU and the US. To learn more about sustainable seafood and the benefits of better labelling and to lend your voice to our petition visit **SeaChoice.org**




SeaChoice.org
for healthy oceans

EUROPEAN UNION



*United Kingdom commercial designation

UNITED STATES



CANADA



Compared to the US and the EU, Canada's seafood labels don't require much information. This is an example of how Pacific yellowtail rockfish (*Sebastes flavidus*) would be labelled in a store from each jurisdiction based on mandatory requirements.

ILLUSTRATION: Heather Grant

What is “Sustainable” Seafood?

Not every fish is alike, so there is no simple answer when someone asks, “What is sustainable seafood?” Let’s take salmon as an example. You cannot tell if “salmon” is sustainable or not because you need to know more about it first.

What else do you need to know to determine if something is sustainable?

1. You need to know what **species** it is.
2. You need to know if it is **farmed or wild**.
3. You need to know where it is **from**.
4. You need to know what **gear type** or **aquaculture method** was used.

Once you have the answers to these questions, you can tell whether or not that salmon is sustainable. Now, if you want to know about another species you will have to ask all these questions again. Seems like a lot of work to find out whether or not something is sustainable doesn't it? So let's take a closer look to find out why exactly these four pieces of information are important.

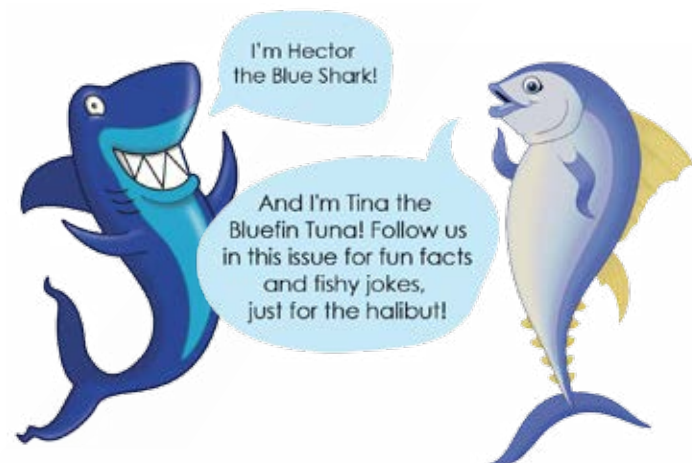
Species name – Sometimes seafood is labelled generically, like “tuna.” But some types of tuna might be abundant and others endangered, so it’s important to find out which specific species it is.

Farmed or wild – Some species are abundant in the wild, some are not. Knowing if they are wild or farmed can help us understand the impact on wild populations.

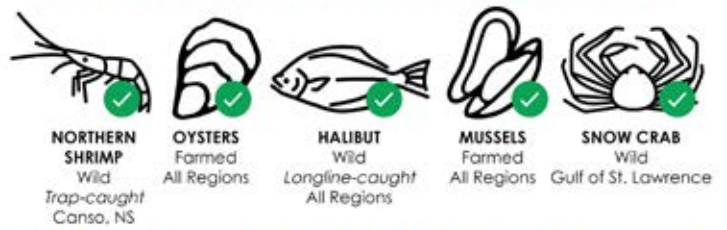
Where it’s from – Different regions have different populations of the species and different management methods for fisheries and aquaculture that can impact the species’ sustainability.

Gear type or aquaculture method – Some gear types have negative impacts on other species (often accidentally caught as bycatch) or harm the ocean floor, while others are more selective and less destructive. Similarly, some aquaculture operations can impact the local environment negatively, while others may have no effect.

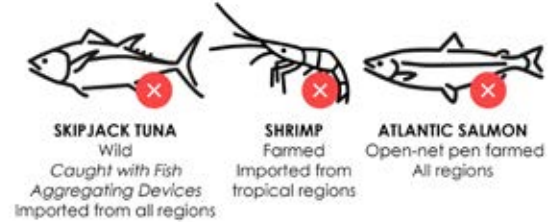
Once you have these four answers, you can determine the sustainability of that seafood item and learn more about it by visiting a sustainable seafood resource. We recommend the SeaChoice website or the Seafood Watch app.



BEST ATLANTIC CANADIAN SEAFOOD CHOICES



TOP UNSUSTAINABLE SEAFOOD TO AVOID BUYING



Here's a quick guide highlighting some sustainable, local seafood options, and also some unsustainable seafood options that are common in Canadian stores. ILLUSTRATION: Heather Grant

Where Can I Find Sustainable Seafood?

You can probably find sustainable seafood at your local grocery store, at the farmers’ market, or already in your freezer! However, as you now know, determining whether or not something is sustainable requires a lot of information. One issue in identifying sustainable seafood is that it isn’t always labelled with enough detail to answer the four sustainability questions.

If you are at the farmers’ market, your fishmonger should be able to answer the questions, as they often know a lot about their product and how it was caught or farmed. At a grocery store, however, a lot of the information needed to find out if the seafood is sustainable isn’t there. So when you are at the fish counter ready to make a purchase, be sure to ask, “What is it? Where was it caught (or farmed)? How was it caught (or farmed)?” Then reference the Seafood Watch app to see if it is a good choice.

By making thoughtful and carefully considered seafood purchasing decisions, you can help protect the biodiversity of our oceans and ensure that sustainable fisheries and aquaculture operations are rewarded. Bon appétit!

Colleen Turlo is the Sustainable Seafood Coordinator at the Ecology Action Centre.

Peace and Friendship on the Sipekne'katik River

by **SADIE BEATON** /// EAC Staff

Under a growing slab of Fundy mud on the banks of the Sipekne'katik (Shubenacadie) River, carefully placed eel traps are fossilizing, becoming artefacts. Mi'kmaw Water Protectors set the traps into the river with love and prayer last summer, as others worked to build a "Truckhouse" in accordance with the Peace and Friendship Treaties.

The eel traps were set into a diverted section of the river created as a crude "mixing channel" by Alberta-based natural gas company AltaGas last summer. AltaGas proposes to drill a series of salt caverns underground on unceded Mi'kmaw territory to store natural gas and dump the briny mine waste through a pipeline into the Sipekne'katik River.

The Alton Gas project poses serious risks to the river ecosystem and threatens the health, livelihoods and rights of Mi'kmaw communities as well as the safety of living near the cavern site. Neither Mi'kmaw nor non-indigenous communities were meaningfully included in the decision to approve this project, and many have voiced serious concerns about potential impacts.

Resistance to Alton Gas has anchored itself in the Peace and Friendship Treaties. These treaties (one of which was signed along the Sipekne'katik River) never ceded title of the land and waters to colonial forces and guaranteed Mi'kmaq people the liberty to hunt and fish as usual. The treaties also made provisions for a Truckhouse to meet and trade fish and other goods on the Sipekne'katik River or any place of their usual resort.

Last summer, Mi'kmaw people and allies worked together to build a Truckhouse on the banks of the river adjacent to the Alton Gas site. It was the first to be built in many decades and serves the clever purpose of ensuring treaty-protected access to the river for everyone. Along with the eel traps, the Truckhouse demonstrates tangible resistance to Alton Gas and provides space for Mi'kmaw people and allies to explore how we can work together in peace and friendship.

As part of my role with the Community Conservation Research Network, I have been lucky to participate as an ally in the ceremony and resistance that is working to build treaty relationships on the bank of the Sipekne'katik River. The following excerpts come from interviews and conversations with Nova Scotia Museum Curator of Ethnography and Sipekne'katik First Nation band member Roger Lewis, Unamaki Treaty Scholar Kevin Christmas, and Sipekne'katik District War Chief Jim Maloney.

ROGER LEWIS: *Pre-contact, most Mi'kmaq [communities] were situated on our primary rivers. We have forty-something primary rivers in the province of Nova Scotia and Mi'kmaw people were basically on them all. They were autonomous, individual kind of governments or institutions based along the river systems.*

KEVIN CHRISTMAS: *Now you have to remember that the river system from Dartmouth right down to Minas is one whole river system and all of the estuaries and everything else that flow from that system are all connected. It was to us a superhighway back before settlement occurred. It was the principal means by which our people provided for themselves. It was the centre of our livelihood. It was the centre of our identity and our way of life.*

ROGER LEWIS: *So [Mi'kmaw communities] are living on rivers and all of a sudden the Europeans show up here. Mi'kmaq were well aware of trade before the French came here to settle, because they were trading with the Basque and other people who were fishing off the coast. [Even] when the French and English politics shifted, the Mi'kmaq were still enjoying access to traditional lands. But after the expulsion of the Acadians, when they were bringing in the Planters and the Loyalists, there became an increased demand for land. A lot of those lands were critical to Mi'kmaw people, so that's when you started to see conflict.*

JIM MALONEY: *[In Sipekne'katik district] we were the expressway people. It was the interstate. When the British were fighting the Mi'kmaq here in Chebucto Head, here in the Dartmouth-Halifax area, they couldn't understand how they could be fighting the same guys the very next day in the Bay of Fundy, because they would travel the Sipekne'katik River on the tide and they'd be there before the ships came around. They couldn't understand the speed. The [Peace and Friendship] Treaties were actually signed with the Sipekne'katik district. We're the treaty holders. And the government is actually in Sipekne'katik district, in Halifax.*



We are all treaty people. Read the Peace and Friendship treaties online and build your own personal relationships based on peace and friendship to help us all move towards reconciliation on these lands we share. Allies can join (or start!) a Truth and Reconciliation Summary Report Reading Group, take a Mi'kmaw Language course at the Mi'kmaw Native Friendship Centre, or show up at a protest when Indigenous Land Defenders ask for support.



Mi'kmaw Water Protectors sing the Honour Song on the banks of the Sipekne'katik River

ROGER LEWIS: *Mi'kmaw people were militarily the reason for these Peace and Friendship agreements, because the Mi'kmaq were still a military threat here. They had to assure Mi'kmaq that nothing was going to change, that things were going to be as they were in the ancient past. The beauty of our Peace and Friendship treaties was that they never ceded land. So as long as they could keep the peace and be on good behaviour and not be molested, the British were happy with that.*

JIM MALONEY: *The Shubenacadie River fed our people. But [in the late 1700s] the government made it illegal for us to fish there, and this went on for years. I mean, we had to have permission to leave the reservation. Up to 1954 you couldn't hire a lawyer, and it was against the law for a lawyer to represent Aboriginal rights. You couldn't buy land, as a Mi'kmaw—well, I agree with that because we own it anyway—but it gives you an idea when you are cast aside like that while they are giving out land like they're giving out lunch. They were giving out 200 acres, 400 acres for service people, just for showing up.*

ROGER LEWIS: *Now if you go back and look at all Mi'kmaw petitions through the 1700s and 1800s, they are always in reference to those promises that the Crown made [to allow Mi'kmaw people] to hunt, fish, and live unmolested. Then, all of a sudden, they came up with a new colonial policy in the 1800s that was the establishment of reserves. Because now they had an "Indian problem." "What are we Europeans going to do with all of these Indians that we've dislocated from their traditional lands?" In three decades from 1783-1820 they were completely shut off from their lands. I have to laugh when people say, "I learned this word, 'environmental racism,'" like it is a 1990s-2000s phenomenon, right? Environmental racism, really, dates back to those Indian reserves. Provincial statutes are coming into place where they say, "You can't dam rivers, you can't fish in them, you can only hunt one caribou and one moose." Now Mi'kmaw people are saying, "I can't feed my family on one moose or one caribou. I can't fish my weirs anymore. You've deprived me of these resources I've been dependent on for thousands and thousands of years." After 1821 the bottom falls out of the social structure and the Mi'kmaw structure basically collapses.*

JIM MALONEY: *So it was a big a day when we put those traps in there and set up the Treaty Truckhouse. Everybody was there hammering nails, right? Native and non-native. That strong push came as a result of a lot of support from our alliances. So there was confidence there that The Department of Fisheries and Oceans or the RCMP wouldn't come in like they did in Burnt Church, like they did in Elsipogtog, like in the St. Mary's Digby area, because there is a lot more political power allying with non-natives than we would have had by ourselves. The alliance process is very empowering for all of us, because we have the treaty and inherent right, and the allied groups are supporting that.*

Meanwhile, some say the mighty Sipekne'katik River has her own plans for asserting the Peace and Friendship treaties. As the Fundy tides have moved back and forth through Alton Gas' "mixing channel," the traps have been catching layer after layer of mud. In fact, the entire mixing channel filled in over a few months. As Truckhouse Water Protectors describe, "The River has healed herself."

Nonetheless, the work of asserting Peace and Friendship Treaties along the Sipek'nekatik is far from over. Along with the Nova Scotia Government, Alton Gas continues to ignore calls for meaningful engagement with Mi'kmaw communities and still intends to begin dumping brine waste this spring. As such, there will continue to be an important role for non-indigenous allies to stand with and amplify the voices of Water Protectors and Treaty Defenders.

Let's imagine a future when we are living in peace and friendship here in Mi'kma'ki. Someday archeologists will dig up the Sipekne'katik eel traps and mount them in a Museum of Environmental Justice. Picture interpretive signs telling the incredible story of how Mi'kmaw culture resisted 500 years of colonisation, and even helped non-indigenous Nova Scotians learn how to build alliances and live in peace and friendship with one another and with the River herself.

Sadie Beaton researches environmental justice issues through her work with the Community Conservation Research Network at EAC. She would like to express her utmost gratitude to the countless inspiring water, land, and treaty defenders on the Sipekne'katik Riverbank and beyond, and especially to Roger Lewis, Kevin Christmas, and Jim Maloney for sharing their words here. Another round of thanks goes out to Christen Kong and Robin Tress. Stay tuned for Season 2 of the Shades of Green podcast, featuring these voices and more at shadesofgreenweb.wordpress.com.

Sea Level Rising

by **ALEXA GOODMAN** /// Volunteer
& **SAMANTHA PAGE** /// EAC Staff

Think of our Earth's ocean as a bathtub. Except our bathtub is completely full and we left the tap running. That is what is happening with sea level rise, except instead of bath water overflowing onto the floor, coastal areas are being submerged. And while this is not a concern for Canada's interior regions, it is a major concern for Atlantic Canada where our combined coastline extends over 50,000 kilometres and 60% of our population lives within five kilometres of the coast.

Rising Seas

When thinking about sea level rise, it can be quite overwhelming to consider that in just a few years many coastal areas in Atlantic Canada may be underwater due to rising seas. Globally, scientists have projected that by 2100, sea levels will rise by up to two and a half metres. However, depending on your local conditions, the rate of change can be substantially different from the rate of sea level change globally and elsewhere. Take Halifax as an example, where local sea level projections for 2010-2100 (relative to 1986-2005) are 28% larger than global values for the same time frame! Local sea level rise, or relative sea level rise, is the specific change in the water level in your location and is the value that is most important to consider when making planning decisions for sea level rise in your community.

Atlantic Canada has over
50,000 km
of coastline.

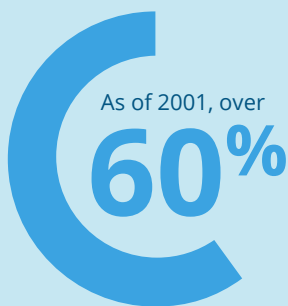
km of Coastline:

NEWFOUNDLAND & LABRADOR **29,000**

NOVA SCOTIA **13,300**

5,500 **NEW BRUNSWICK**

3,200 **PRINCE EDWARD ISLAND**



of the **population** in
Atlantic Canada lived within
50 km of the shoreline.

Nova Scotia will experience the
greatest local sea-level rise
amounts in Atlantic Canada.



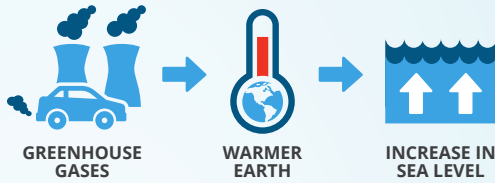
Which fish
is the best
dressed?

The swordfish.
It always looks
sharp!

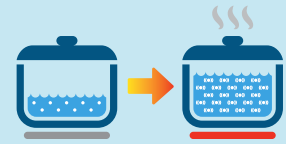
2 Main reasons

sea levels are rising globally:

These are **both** caused by a **warming Earth**.



1 **Thermal Expansion** = The oceans increase in volume and take up more space as they heat up.



2 **Melting Land Ice** (glaciers, ice caps, ice sheets)

As temperatures rise, land ice meltwater enters the ocean and causes sea levels to rise.



As a pot of water is heated, the water molecules move faster. The faster they move, the more space they take up, causing volume to expand.

The ocean is absorbing **90%** of the heat from global warming.

So what causes sea levels to rise? Globally this can be attributed to a warming Earth that causes land ice meltwater to enter the sea and the volume of the ocean to expand. This is called thermal expansion and explains how a set amount of water will take up more space when it is heated. Locally there are many factors that can cause deviations from global sea level rise amounts. In Canada the most important local factor is vertical land movement. Around 15,000 years ago, Canada was covered in an ice sheet that caused the center of our nation to sink and its edges to rise. Once the ice melted, the middle of Canada began to rebound to its initial level and the edges of Canada began to sink. This is still happening today and means that not only are sea levels rising in Atlantic Canada, but the land is also sinking!

To learn more about our project *Educating Coastal Communities About Sea Level Rise (ECoAS)*, please visit our website sealevelrise.ca.

What Can You Do?

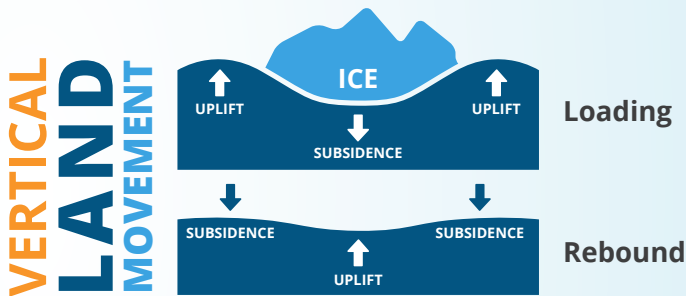
So when faced with the impacts of sea level rise what can you do? Incorporating sea level rise into future coastal management strategies and adaptation planning is the first step and will cost less in the long run. The adaptation process is a continual one and includes information gathering, public education and community outreach, adaptation tools, monitoring and evaluation.

The Ecology Action Centre has teamed up with the Department of Fisheries and Oceans Canada to create a website (sealevelrise.ca) that provides access to tools and adaptation approaches that have been developed locally with the latest climate change information available. Some of these adaptation options include horizontal setbacks, coastal vegetated buffers, living shorelines, coastal policies and strategies, and a decision tree tool to provide a slew of coastal flooding and erosion adaptation options for coastal communities throughout our region. However, at the heart of this website is CAN-EWLAT (Canadian Extreme Water Level Adaptation Tool), a tool developed by DFO that provides relative sea level rise and vertical allowance amounts for over 650 communities throughout Atlantic Canada. Vertical allowances are the recommended changes in the elevation of coastal infrastructure to accommodate rising seas.

In order to effectively plan for sea level rise in Atlantic Canada, everyone needs to be on board and committed to making adaptive changes. From federal and provincial government, to municipal councillors and planners, to community members; everyone's role is important in planning for coastal community resiliency in the face of sea level rise.

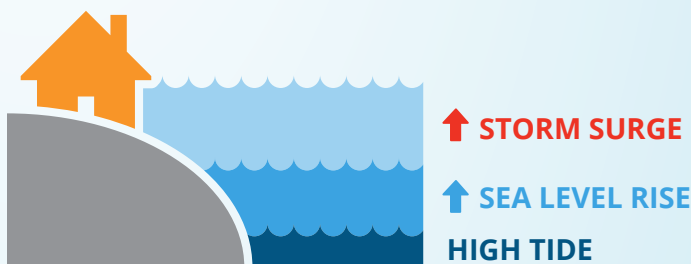
Samantha Page is the Coastal Adaptation Coordinator at EAC and is happiest when she is in or near the ocean.

Alexa Goodman is finishing up her undergraduate degree at Dalhousie University where she is studying Marine Biology and Environmental Sustainability and is very passionate about coastal community resiliency.



Sea Level Rise in Atlantic Canada

Everybody in Atlantic Canada has experienced the impact of sea level rise or at the very least, knows someone who has. Inundation, erosion, flooding from storm surges, and saltwater intrusion are the most well-known impacts of sea level rise. However, some of the most damaging impacts of sea level rise are a result of extreme water levels that occur when sea level rise combines with a storm surge, tide, and seasonal ocean variability. This creates water levels that can cause substantial damage to the coast. By the year 2020, it is estimated that the economic damages from sea level rise in Canada will be between \$1.6 and \$5.4 billion each year and by 2080 this amount could increase to \$48.1 billion.



Voices on the Ocean

by **ROBERT FAIRWEATHER** /// Volunteer

From the historic fishing town of Lunenburg to the cutting edge oceanographic research at the Bedford Institute of Oceanography, Nova Scotians have always had a deep connection to the ocean. The Mi'kmaq hunted everything from shellfish to seals, the British and French fought tooth and claw for control of the harbours, and the famous Bluenose racing schooner, Queen of the North Atlantic, to this day retains the International Fisherman's Trophy. In the Maritimes, the ocean shapes our lives as surely as it shapes the coves and harbours upon which they are built. But now for the first time in history we have the power to reciprocate, to reshape the oceans as we see fit, with effects that will last for generations. How we use this power, what kind of ocean we want to leave to our children is up to us.

We asked five Nova Scotians whose lives are even more deeply connected to the oceans than most about their vision for the future of our seas and how they think we can achieve it.

What kind of ocean do you want to pass on to future generations? And what will it take to achieve that?



Megan Bailey

“ The future ocean I'd like to see is one full of options. I believe strongly that intergenerational equity should be one of our biggest goals. Each generation should be left with a natural oceans endowment that allows them the same, or greater, opportunities to benefit from the oceans as the generation before. We can't control what the future will do with the ocean, nor should we think that we have any right to. But we can control what we leave for them. ”

Dr Megan Bailey is an assistant professor at Dalhousie University whose research is centred around the governance of marine resources.



Heike Lotze

“ I would like to pass on an ocean that is once again teeming with life. An ocean that is recovering and rebounding after centuries of exploitation, transformation and pollution. An ocean that smells, sounds and feels healthy, rich and productive. An ocean full of amazing sea creatures small and large, diverse and wild. An ocean that we deeply value, cherish and care for. ”

Professor Heike Lotze is a marine biologist at Dalhousie University whose research is shaped by a strong interest in past, present and potential future human impacts on marine species and ecosystems.



Sherry M. Pictou

“The vision I have for our ocean(s) for future generations is one where the ocean is a priority—as a healthy ecosystem that is managed by communities, not companies, as a source for food as opposed to just commodity. Secondly, as a transportation conduit, that the Convenience of Flag law is delegitimised: increased human rights for sealane and vessel workers, and strong sanctions against countries and companies that pollute and over-exploit foreign workers and ocean resources. And a third vision, is where there is support and prioritisation of small scale fishing technologies including indigenous technologies.”

Sherry M. Pictou is a Mi'kmaw woman from L'sit'kuk (water flows/cuts through high rocks) known as Bear River First Nation, a PhD Candidate at Dalhousie University, and member of the Coordinating Committee for the World Forum of Fisher Peoples.



Sherri and Ken Taylor

“We run three tours per day and see lots of seals, harbour porpoises, minke whales, sunfishes, leatherback turtles and tuna outside of our harbour and we would like to keep the sealife safe. We would like to see a restart of garbage collection from fishing vessels at the small wharves so that it is not discarded at sea. We would also like to see aquaculture carried out in the outer ocean, not inside the harbours. If aquaculture sites are left empty inside of the harbours, the owners should be made to vacuum the waste from the bottom with seiner pumps, and ropes and buoys should all be taken away, which is not being done at present.”

Ken and Sherri Taylor own and operate Shelburne Harbour Boat Tours.



Laurie Thurber

“Being able to maintain a clean and healthy ocean is vital to future generations for natural food sources that are essential to the world's population. The resources that we are able to utilise from a clean ocean should not be taken for granted nor should they be pushed to the limits of recovery. Cutting back on large scale operations and eliminating hazards to ocean life would be a good start to helping the oceans recover. Education, both in the fishing industry and other sectors of the environment and government, and enforcing regulations can only help in maintaining the sustainability in ocean health. Having a family involved in the fishing industry, it is essential that they have the ability and option to raise their families in the industry and pass it down to their children as well.”

Laurie Thurber works in the lobster industry as an owner/operator fisherman and a whale watching tour guide and naturalist. She is a wife, mother of three, step mother of four, grandmother of two, and an active community volunteer.

Bluefin tuna like me are the largest and most well known species of tuna. The largest bluefin ever caught was right here in Nova Scotia, at 1,496 lbs, about as heavy as a cow! Our province is also home to 3 other tuna species: Yellowfin, Albacore and Bigeye tuna.

In Atlantic Canada, there are 42 populations of marine species that are at-risk of extinction, which is twice as many as the West coast. I'd say we've got some serious work to do!



Robert Fairweather is a graduate marine biologist from the UK who studies fish in trendy jeans... sorry, trends in fish genes. His five year goals are to gain a PhD, qualify as a diving instructor, and become an honorary Maritimer.

Haunting the Bay of Fundy

by **IAN JOHNSTON** /// E&A Editorial Committee Volunteer

There are many ghost stories told of the seas. Seeing *The Flying Dutchman* is an ill omen, but that ship is just a myth. What isn't mere superstition is the very real problem of ghost gear. It's fishing gear that has been lost, abandoned, or otherwise discarded in the water. But just because it's lost, doesn't mean it stops working. Lost nets and traps continue to catch and injure marine life. It's a problem recognised worldwide by the Global Ghost Gear Initiative, founded in 2015. They estimate that such gear makes up 10% of marine litter. More locally, the Fundy North Fishermen's Association (FNFA) has been tackling the problem of ghost gear since 2008 and have developed a Ghost Gear Retrieval Manual, that is available on their website.



Ghost Gear

The FNFA and its membership began work combating ghost gear. The clean up effort required the design of new grapnels that could more efficiently sweep the ocean floor and retrieve large amounts of gear. They also began using side sonar to search for ghost gear. Their efforts in Saint John Harbour recovered 662 lost lobster traps over four years. Fishermen working the Bay of Fundy developed even larger grapnels and concentrated their search in areas where gear was commonly lost.

Retrieving lost gear meant saving money on replacements and preserving fish stocks. It also helped prevent ghost gear from multiplying. Traps, nets, chain, wire and plastic tangle together, forming snarls that only get bigger. Ghost gear can grab and ensnare active equipment, creating more ghost gear and making the snarl heavier and harder to retrieve. According to the FNFA's manual, these snarls can weigh several tons. Retrieving them is dangerous and requires great care, extra crew, and added fuel expenses. Notably, after these cleanup efforts fishermen have reported significantly less gear lost each year. Now gear loss is reported and efforts are made to retrieve lost gear and return it so it can be used again.

Visit fundynorth.org for more information about the Fundy North Fishermen's Association, including their Ghost Gear Retrieval Manual and two films about ghost gear.



Prevention

The FNFA represents small scale fishermen working on the New Brunswick side of the Bay of Fundy and nearby river systems. Fishermen have good reason to prevent gear loss. Neighbouring industries, such as aquaculture and shipping, don't have those incentives. "When other industries are working around lobster gear they can cut it off or drag it," says FNFA Executive Director, Maria Recchia. She adds, "They need to use certain protocols to not destroy gear or create ghost gear."

"We've had some pretty good success with the shipping industry in Saint John harbour." Working with the port authority they have more clearly defined lanes for commercial shipping, with fishermen keeping their traps out of these lanes and ships staying clear of the traps.

Aquaculture vessels and cages also operate in close proximity to fishing vessels and lobster traps. "We've been trying for years," says Recchia, "we haven't had a great success. We have one pretty detailed protocol in place, but it still isn't being followed."

Destruction or loss of fishing gear doesn't cost the aquaculture industry anything, while following the protocols require them to use more fuel or modify their vessels with proper propellor cages.

"They don't really get anything for it except they don't have to listen to fishermen complaining and they aren't entangling whales. If a whale gets entangled with rope and traps it's assumed it's the fishing industry's fault. There's no way of knowing who is responsible for creating that ghost gear. So none of it falls back on these neighbouring industries. So that prevention piece has been very difficult," says Recchia.

2015 was a year with lots of gear lost to aquaculture. The FNFA requested compensation for the lost gear, and had details, dates and locations of lost gear. Usually the losses corresponded to the moving of large salmon cages from one area to another. None of the aquaculture companies paid. They said the FNFA couldn't prove it was their fault. Even with photographs it's difficult to get detailed, actionable evidence.

“ Destruction or loss of fishing gear doesn't cost the aquaculture industry anything, while following the protocols require them to use more fuel or modify their vessels with proper propellor cages. ”

Going Forward

Another problem, then, is what to do with old fishing gear. It tends to end up sitting and decaying in people's backyards. It's not easy to haul gear one truckload at a time to a landfill that can be several hours from the fishing community. The FNFA has a new project to bring recyclers and disposal companies to central locations where fishermen can bring their old gear. According to Recchia, much unusable fishing equipment can be recycled, with new ways of recycling being developed every day.

People are aware that the oceans are threatened. "It used to be very commonplace for fishermen to throw garbage overboard. There's been a lot of education around that," says Recchia. Fishermen know that plastics in the water can be eaten by lobsters and can cause shell disease. "That has really changed. Really there is a culture now of not just not dumping garbage, but also, when they see it, to bring it in." To succeed, everyone has a part to play. One amazing example is that of Jim Young. He volunteered to painstakingly untangle the rope from snarls retrieved in the Head Harbour Passage area. All reusable rope was given back to fishermen and damaged rope went into the hands of local craftspeople to make rope mats. Without his effort all of it would have gone to the landfills.

With an eclectic background, **Ian Johnston** has written on diverse topics including literature, real estate, executive leadership and mental health. He received an Master of Arts from The University of Western Ontario and a Master of Education from The University of Ottawa. He lives in Dartmouth, Nova Scotia.

Wonders on the Seafloor

by **SUSANNA FULLER** /// EAC Staff

A Timeline of EAC's Actions to Protect Corals and Sponges

In the early 1990s, fishermen started to come to EAC with concerns about what was happening to the “trees.” The trees in this case were deep-sea corals. At that time, the idea that we might have corals off Atlantic Canada was really only something known to local fishermen. Fisheries observers and fisheries technicians on trawl survey vessels had never been asked to actually write down their observations. Protecting deep-sea corals became a major part of the work of EAC's Marine staff and volunteers and it continues to this day.

Corals and sponges can be long-lived and slow growing and offer important structure on the seafloor. Studies have shown that hundreds of other species make their homes within the structure provided by these creatures, and, as a fisherman once told the EAC, “fish need corals like moose need trees,” both for shelter and for food.

As part of the Deep Sea Conservation Coalition we have worked at the United Nations General Assembly to get commitment from countries to avoid areas defined as vulnerable marine ecosystems. We have been instrumental in protecting over 25 areas in the North Atlantic from the impacts of bottom trawling both within Canadian waters and on the high seas. As a result of the work at the UN, Canada adopted its own Sensitive Benthic Areas Policy in 2009 and implementation of this policy in Canadian waters remains a high priority for EAC. Our work in this area is an example of how we start off protecting Nova Scotia's environment, but ultimately need to be involved with national and international policies as well: the ocean has few boundaries.

This timeline maps out the highlights of our work and key science and management decisions along that have lead to significant protections from bottom trawling in the Northwest Atlantic and set the stage for more protections in the years to come.

Early 1990s

Fishermen raise issue of deep-sea corals and EAC gets involved.

1997

The EAC publishes first report on the distribution of deep-sea coral off Nova Scotia.

1998

The EAC publishes report on impacts of human activities on the seafloor.

2000

The EAC co-hosts an international coral symposium in Halifax (this is now a bi-annual international conference!)

2001

Following the coral conference, the Department of Fisheries and Oceans starts \$2 million coral research program.

2002

The EAC takes the federal government to court for allowing bottom trawling under Section 35.2 of the Fisheries Act.

2002

The first deep-sea coral closure (424 km²) is put in place by DFO in the Northeast Channel, between Georges and Browns Bank.

2003

The only known remaining patch on the Scotian Shelf of reef forming coral *Lophelia pertusa* is protected from bottom contact fishing gear (15 km²).

2005

The EAC joins the Deep Sea Conservation Coalition's campaign for a moratorium on bottom trawling on the high seas. We run a blog and photo campaign, before we even knew about Facebook. :)

2006

DFO completes first science review of fishing gear impacts on seafloor habitats.

2008

EAC joins the Northwest Atlantic Fishing Organization and at its Annual Meeting and NAFO agrees to first coral closures.

2013

The first formal application of Sensitive Benthic Areas policy in Canada to close glass sponge areas on the Scotian Shelf to bottom trawling.

2016

NAFO agrees to close an additional sea pen areas to bottom trawling, closures over the last 8 years total 380,511 square kilometres.

2009

Canada adopts the Policy for the Management of Fisheries Impact on Sensitive Benthic Areas as part of its Sustainable Fisheries Framework, which allows for fisheries closures for corals, sponges and other seafloor areas.

2016

Canada announces closure of 9,000 square kilometres to bottom trawling in Corsair Canyon and Jordan Basin (Georges Bank/Gulf of Maine) at the Our Oceans Conference in Washington, DC to coincide with US announcement on canyon closures.

2016

DFO science process to include additional data on coral and sponge areas in the Northwest Atlantic within Canadian waters and fishing footprints are established for all types of fishing from Hague line to Eastern Arctic.

2010

The EAC participates in a DFO science process and publishes on delineation of corals and sponges in Canada.

2013

The EAC attends Eastern Arctic fisheries management meeting and advocates for mapping of a fishing footprint and protections for corals and sponge areas.

2017


The EAC begins work to further protect coral and sponges on the Labrador shelf and Eastern Arctic.

2011

The United Nations General Assembly (UNGA) bottom trawling workshop and review of measures in place, resulting in a conclusion that countries needed to do more to reduce impacts of bottom trawling on the high seas.

2017

The Fisheries Act review report recommends that amendments to the Fisheries Act include provisions **“to protect fish habitat from key activities that can damage habitat, such as destructive fishing practices and cumulative effects of multiple activities.”**



Nova Scotia is home to several species of deep sea corals and sponges, including the Russian Hat sponge (*Vazella pourtalesii*) which is usually found 500m below the surface and has a skeleton made of glass. An individual Russian hat sponge can live 100 years or more.

Susanna Fuller is a Senior Marine Coordinator at the Ecology Action Centre and completed her Phd on sponges, following working at the EAC. She returned to the EAC in 2006.

There's A Whale In My Carbon Sink!

by **AMBER TUCKER** // EAC Editorial Committee

Many whale species are threatened or endangered. Levels of climate-altering carbon dioxide gases are rising. Unrelated issues, you say? In fact, the causes and possible solutions for these pressing ecological concerns are more closely linked than most of us realise. Could “saving the whales” be part of a holistic plan to regulate atmospheric carbon dioxide?

As With so Many Good Things in Life, it Starts With Meal Time

Many large whale species, such as sperm and blue whales, dive over a kilometre below the surface in order to feed on nutritious delicacies like squid and fish. After feeding, they go back up to breathe. This creates a massive amount of turbulence that helps to mix nutrients from the bottom to the top of the water column. When close to the surface, they defecate a huge amount of incredibly nutrient-rich, liquid poop. Marine biologists sometimes call it a “poo-nami,” or more technically, a faecal plume. Faecal plumes carry nutrients like phosphorus, iron, zinc, and trace metals that are otherwise scarce in the in the photic zone—where photosynthesis is possible—near the ocean’s surface. Phytoplankton and algae, the basis of the ocean’s food chain, live in this upper ocean and proliferate thanks to this nutrient delivery system. The more whales there are, the more phytoplankton and algae thrive.

Here’s why this matters as far as climate goes: these hungry, single-celled plants take in much more CO₂ (dissolved into the ocean) than is released by their bodies when they die. Their bodies hold carbon

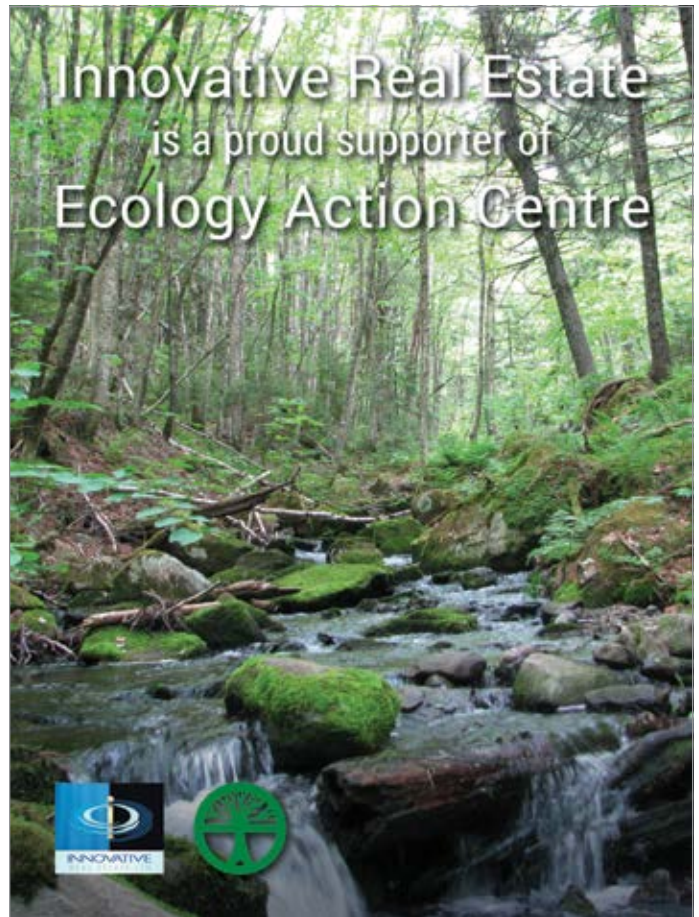
as they sink to the bottom of the ocean, and this creates a carbon sink. The same is true of larger organisms including whales. A 2010 study published by the Royal Society found that sperm whales in the Southern Ocean, for example, remove 200,000 tonnes more CO₂ from the atmosphere than they add during respiration. They also sequester quantities of carbon in their bodies that sink into the deep sea when they die. A healthy whale population means a healthier population of phytoplankton, all reducing the CO₂ in the atmosphere. About a quarter of the CO₂ released through human activity is dissolved in the ocean.

Nutrient-cycling by whales doesn’t benefit only marine life. Krill feed on phytoplankton, and fish and squid eat krill; they are in turn consumed by land species such as bears and fish-eating birds. Thus, whales are one of the main vectors by which nutrients travel from the bottom of the ocean upwards onto land. This lends new meaning to the idea of ‘upcycling!’





PHOTO: Gabriel Barathieu (CC BY-SA-2.0)



No Easy Way Out

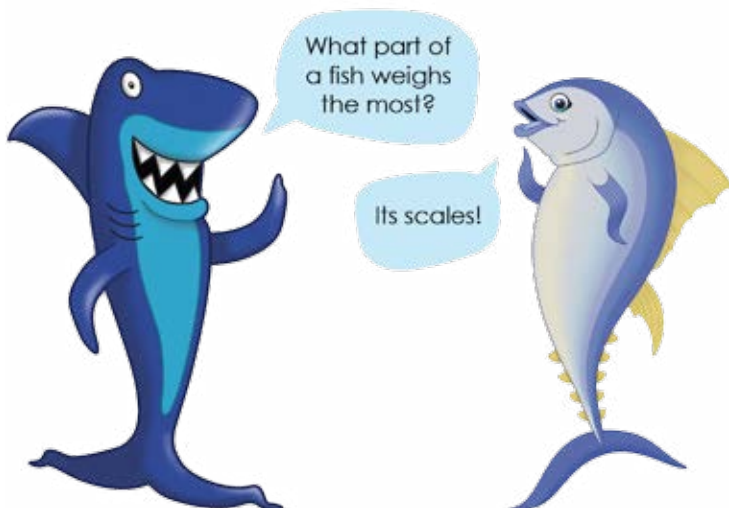
It's hard to predict how the ocean's carbon cycle will operate as the climate and ocean continue to change. The decrease in great whale numbers—reduced by as much as 90% in the last three hundred years—also means that far fewer nutrients are carried upward from the deep sea. There's no easy way out of this problem. A study on sperm whales in the Southern Ocean, a particularly iron-poor region, found that fertilising the sea artificially with iron was less effective in stimulating marine plant growth. This is probably because the iron becomes more bioavailable to other creatures when it is first processed through the digestive system of a whale.

Recovery is Possible

Conservation efforts have already helped bring many whale species back from near-extinction. As we continue to find better ways to understand and protect them, we discover how they act as ecological engineers, benefiting their marine ecosystem and beyond. In order for our planet to be healthy, our oceans must be full of vibrant life, from the biggest whale to the tiniest phytoplankton.

Amber Tucker writes and edits in Halifax. Having migrated from Newfoundland, she is a lifelong lover of oceans and a believer in the healing power of salty air.

“ The decrease in great whale numbers—reduced by as much as 90% in the last three hundred years—also means that far fewer nutrients are carried upward from the deep sea. ”



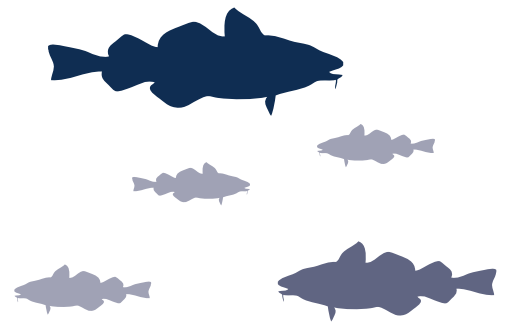


Hot, Sour, and Breathless

by **KATIE BRENNAN** /// Volunteer

We see the effects of climate change all around us, but understanding how climate change is affecting the marine environment is beyond our visible human realm. What does climate change feel like to fish in Atlantic Canadian waters?

It turns out that the iconic Atlantic cod are threatened by climate change. Centuries of fishing for teeming cod stocks in Atlantic Canadian waters were followed by the more recent and troubled history of fish stock mismanagement, which culminated in the collapse of Atlantic cod in the early 1990s. While overfishing is the primary threat to fish species in general, the Atlantic cod remaining on the Scotian Shelf face a growing threat from climate change.



What's Happening to the Water?

Anthropogenic climate change has warmed the atmosphere and the ocean, but the ocean is warming much faster than the atmosphere due to its large mass and mixing that transports heat from the near surface to the deep. About 90% of the Earth's anthropogenic warming is stored as heat in the ocean. On top of that, climate change doesn't just warm the ocean, it also makes it more acidic and less oxygenated.

The expression “hot, sour, and breathless” has been a widely-used descriptor of climate change in the ocean. “Hot” is higher water temperatures, especially near the ocean surface. “Sour” is increased amounts of carbon dioxide invading the ocean, resulting in more acidic seawater. “Breathless” is lower oxygen levels, since warmer water holds less oxygen and a warmer sea surface prevents oxygenated water from mixing deeper, which deprives deep water of oxygen. The extent of future warming, acidification, and deoxygenation will depend on how much carbon is emitted in total, as well as how much we emit from year to year.

Environment and Prediction

I recently published a paper cataloging the known environmental preferences and thresholds of 54 marine fishes and other marine life. This dataset allows us to evaluate species physiological stress and mortality given predictions of future ocean conditions. Climate change in the marine environment will not feel good to cod living on the western Scotian Shelf. The water is about as warm as they can tolerate already. Currently, adult Atlantic cod are found in temperatures between 0-17°C and prefer temperatures below 10°C, but cod on the Scotian Shelf are observed in a narrower range, from 0-13°C and preferring 3-7°C. Adult cod experience stress at oxygen levels below 28% saturation. At 21% oxygen we see significant deaths of cod. Cod cannot survive at 10% or less oxygen saturation. The thermal and oxygen tolerances of juvenile cod are unknown, but we know they grow more slowly under acidic seawater conditions.

So what does the future look like for our cod? In our research, we evaluated two hypothetical descriptions of the future of the Scotian Shelf. One model of Emerald Basin shows oxygen decline that would stress cod by 2050. However, because variability is so large, cod could experience critical oxygen levels decades sooner. Using the second model, we compared cod environmental preferences and thresholds against an ocean-model of future warming and deoxygenation on the Scotian Shelf. Adult Atlantic cod would lose preferred temperature conditions at depths between 60 and 160 metres, and would experience oxygen stress at the deeper end of this range in this scenario. This represents a large swath of shelf habitat that could become unsuitable for Atlantic cod, mostly due to warming.

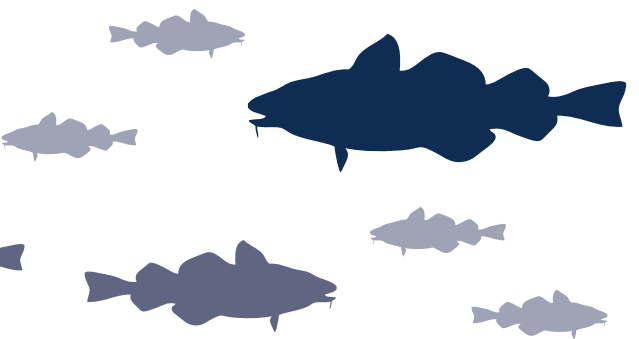
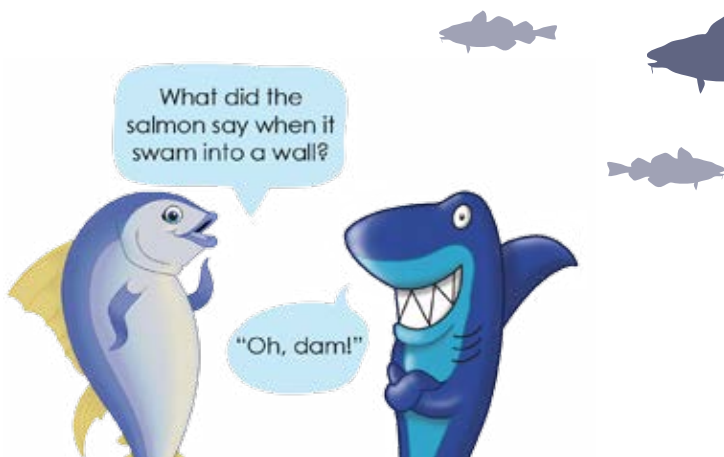
It's hard to predict climate change trends on the Scotian Shelf because of the variety of forces affecting the region. Coastal marine environments are influenced by coastal currents that interact with shallow shelves, steep topography, and river runoff. The Atlantic Canadian marine environment is especially variable because we are located where the subpolar and subtropical gyres interact via the meeting of the Labrador Current from the north and the Gulf Stream from the south. Lower resolution ocean models do not represent these currents well, and how these currents may shift in the future is unknown. Atlantic Canada is therefore particularly poorly represented in the Intergovernmental Panel on Climate Change's models, further challenging our ability to predict future impacts to the marine environment. We can make progress predicting climate impacts in Atlantic Canada by combining our understanding of regional oceanography with insights from a limited number of high resolution ocean models.

“ Fish dwelling near the bottom like cod are particularly threatened by climate change, as their habitats are squeezed by warming from above and oxygen declines from below. ”

The Future for Cod

Fish can avoid environmental stress. For example, fish can move deeper and/or poleward to cooler water in response to warming. However, fish dwelling near the bottom like cod are particularly threatened by climate change, as their habitats are squeezed by warming from above and oxygen declines from below. A recent study considering the metabolic interactions of warming and deoxygenation predicted large-scale habitat loss for Atlantic cod on the Scotian Shelf by the end of the century due both to vertical habitat compression and a shorter habitable season. Alternatively, fish may be able to adapt or evolve to future conditions. Atlantic cod on the Scotian Shelf, however, may not be able to adapt fast enough, since the water is about as warm as they can stand, and it's getting warmer quickly.

To an Atlantic cod on the Scotian Shelf, while there is significant uncertainty about what scenario future climate change will most resemble, it will include components of warming, deoxygenation, and acidification. Barring immediate and important reductions in carbon emissions, the likely result is widespread habitat loss on the western Scotian Shelf, happening soon. This will bring a tragic conclusion in the long and storied tale of Atlantic cod off our coasts.



Katie Brennan is a climate & ocean scientist and former co-chair of EAC's Marine Action Committee and lives in Halifax, Nova Scotia.

Who will be 2017 Miss Deep Sea?

by **EMMA BOARDMAN** /// E&A Editorial Committee

The excitement! The glamour! Who will be crowned most beautiful and fascinating deep sea creature of the North Atlantic? Meet a few of our friendly North Atlantic neighbourhood deep sea creatures. Root for your local favourite as it vies for the coveted title.*

"Atlantic Canada is home to 21 species of shark, including the Greenland shark which was recently discovered to live for roughly 400 years!"



Greta the Greenland Shark

This voluptuous beauty (Greenland sharks can grow to 6.4 metres and 1,000 kilograms) is a favourite to win. She's charismatic and experienced. With an expected lifespan of over 400 years, she's in it for the long haul. A late bloomer, she reached sexual maturity around age 150. Greta refuses to go anywhere without her best friend: a small copepod who attached itself to her eye. With no need of sight in her cold, dark home 2,200 metres beneath the ocean's surface, Greta's boarder gets nutritious eye meat and safe space. In return, the copepod glows magnificently with bioluminescence that attracts prey for Greta to eat.

Mona the Monk Fish

Mona expects to score big in the talent portion of the contest. She can "walk" on the sea floor, using her pectoral and ventral fins as "legs". Like most angler fish, she has a long piece of filament (three, actually) on her head. She uses the first one to attract prey, much like a fishing lure. Unsuspecting fish swim towards it and straight into her huge mouth, where they then get crushed by her gigantic and powerful jaws. Mona is also a master of disguise, with mad skills at burrowing into sandy ocean bottoms to hide.



**Note: They don't actually care. They're fish. They didn't evolve to care about the opinions of land dwelling primates. Unfortunately though, the reality is their existence may depend on whether or not we humans, with all our propensity for destruction, care about conserving them and their home.*

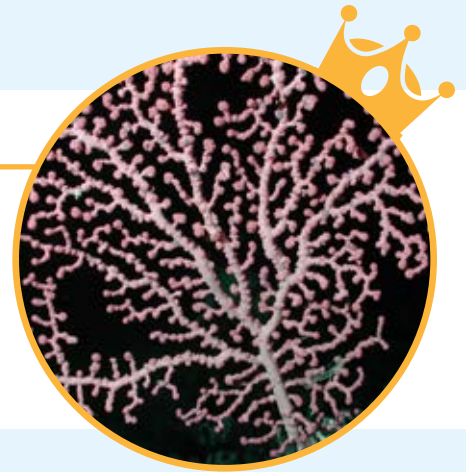


Charlene the Knifenose Chimaera

A rare and mysterious beauty known for her magnificent nose, Charlene likes to hang out in deep, dark waters up to 2000 metres below the surface. Despite her professed love of privacy, deep water paparazzi can't get enough of her. She's a budding YouTube dancing sensation: find her on YouTube by searching "Seltsame Tiere-Langnasenchimären."

Blake the Bubblegum Coral

Socially conscious Blake is part of a large tree-like colony, which provides important shelter, protection and after-school activities for juvenile fish species. Unlike tropical corals, Blake grows in the dark, cold depths of the ocean, and is one of many deep-sea corals that call Nova Scotia home. Though she likes to reproduce by casting out eggs into the ocean column to mingle with her male counterpart's sperm, Blake is also an activist for gender equality. She believes the many amazing habitat-creating hermaphroditic coral and sponge species deserve equal treatment in anthropomorphic beauty pageants.



Sean the Blue Angel Sea Slug

If looks were the only factor in this beauty pageant, this proud hermaphrodite would be a shoo-in to win. Not just a pretty face though, Sean is a master of self-defense and multitasking: after snacking on the tentacles of venomous hydrozoans, Sean saves the most potent nematocysts (the cell containing the venom) for their own protection later. Sean likes to swim upside down in warmer waters, but sometimes makes their way to Nova Scotia via the Gulf Stream. Sean's species is one of about fifty sea slug species that have been spotted in these parts.

Alicia the Clam Worm

This petite (up to 15 centimetres long) firecracker may not wear glasses, but is still called four eyes because—you guessed it—she actually has four eyes. This spring, she'll undergo a coming of age ritual called epigamy. Her body will make major changes as she reaches full reproductive maturity and her body swells with eggs. She'll release the eggs in a full moon co-ed gathering of other young clam worms nearer the ocean's surface. In this hard-core ritual, she will be expected to sacrifice her own life for the next generation.



PHOTOS:

- Greenland Shark - NOAA Photo Library (CC-BY-2.0)
- Blue Angel - Sylke Rohrlach (CC BY-SA 2.0)
- Bubblegum Coral - NOAA Photo Library (CC BY 2.0)
- Clam Worm - Hans Hillewaert (CC BY-SA 4.0)
- Knifenose Chimaera - NOAA Photo Library (CC BY 2.0)
- Monk Fish - OAR/NURP (Public Domain)
- Monk Fish 2 - NOAA FishWatch (Public Domain)

Emma Boardman is a longtime E&A committee member. She first developed an interest in ocean life as a child snorkelling on the Great Barrier Reef. She believes deep sea North Atlantic species are just as fascinating as those flashy warm water fish.

Action is our Middle Name

FOOD

Catalyzing the Food Movement

The last few months we've been busy connecting and convening conversations around food. We co-hosted a province-wide gathering on Edible School Gardens, where over 60 people came together to learn, share, and celebrate the over 100 diverse edible school gardens in Nova Scotia. Food Leaders also exchanged knowledge and shared their experiences at gatherings focused on food skills programming in Cape Breton and in Cumberland. In addition, 70 people shared their successes and challenges at a workshop focused on sustainable food procurement within publicly funded institutions. We completed "Stories from the Food Movement," a collection of interviews that depict the forward momentum of the past 4 years, in gardens, communities, schools, policy forums, and other arenas across Nova Scotia and South East New Brunswick. Last but not least, a group in Cumberland is concerned with the rapid decline in farming and is exploring ways of getting more sustainable farms in the county. Check out adventuresinlocalfood.wordpress.com for more.

MARINE

Seafood Labelling, Forage Fish and the Fisheries Act

Together with SeaChoice, we released a report on seafood labelling where we reviewed regulations of other countries and found that Canada's seafood labelling regulations fall far short of our major export countries. In February, we co-presented alongside Ecotrust at the 2017 Annual Fishermen and Scientists Research Society conference on innovation in fisheries monitoring. In March, we presented our 2016 report on forage fish management in Atlantic Canada at the International Symposium on Drivers of Dynamics of Small Forage Fish Resources in Victoria, BC. We are working closely with the David Suzuki Foundation, West Coast Environmental Law and the Canadian Parks and Wilderness Society to ensure that Canada will meet and exceed the international target of protecting 10% of our marine environment by 2020. We continue our work to protect corals and sponges in Atlantic Canada and the Eastern Arctic and to advocate for better protections for marine fish and shellfish that are considered at risk. We also gave input to the Standing Committee of Fisheries and Oceans' review of changes to the federal Fisheries Act, and several of our recommendations were included in the final release in February.

WILDERNESS

Money for Parks, Vexed by Clearcutting

We welcomed the first ever Regional Parkland Acquisition fund in the Halifax municipal budget. \$5.6 million was approved for parkland acquisition with a further commitment to \$20 million over the next four years. The funds will be used to begin acquiring key pieces of private land needed for new regional parks at Blue Cove Lakes and Purcell's Cove Backlands. Halifax Mayor Mike Savage also assured the public that opportunities for large land purchases to fulfill City parks commitments could also be financed through various existing reserve funds as they arise. After a decade of going nowhere fast, the City is finally kicking parkland development into high gear. We couldn't be happier! Meanwhile, along with our allies in the Healthy Forest Coalition, we continue to tackle clearcutting and other poor forestry practices following the government's recent killing of the Natural Resources Strategy. The strategy contained key commitments including to reduce clearcutting to no more than 50%. A new poll released by EAC in December confirmed strong public support for a crackdown on these practices with over 94% of Nova Scotians supporting either strict regulations (72%) or a complete ban (22%) on clearcutting.

COASTAL & WATER

A Wave of Change

As part of the Educating Coastal Communities About Sea Level Rise (ECoAS) project, the Coastal and Water Team recently launched sealevelrise.ca—an informative website that helps communities learn about sea level rise. It includes information on how sea level rise affects different communities and provides access to tools to help incorporate sea level rise into future planning strategies. We also hosted two workshops about planning for sea level rise in St Margaret's Bay and Musquodoboit Harbour. Participants used interactive mapping to discuss potential solutions for sea level rise in their regions. One of the top solutions? Get the province to develop a coastal policy that helps guide municipalities in coastal management. We couldn't agree more! We also hosted a series of stormwater management workshops for residents and municipal staff in New Minas, Wolfville, Kentville, Bridgewater, and Mahone Bay. Understanding how to reduce flooding from stormwater and protecting our coasts will help alleviate the effects of climate change in communities across the province.

TRANSPORTATION

We Walk the Talk!

School Travel Planning is back and already we've engaged 90 schools and 18,000 students in active transportation activities! We have also been busy advocating for policy changes with Halifax Regional School Board to promote active transportation. Through our Welcoming Wheels program, 45 more new Canadians have been gifted refurbished bikes, new safety equipment and basic cycling education. Making Tracks also hit a new milestone, having reached 13,000 children and youth since 2008. We continue to respond to the Halifax Integrated Mobility Plan to push for best practices and sustainable transportation options for citizens. As sidewalk maintenance in winter is an important issue across Nova Scotia, we continue to advocate for better sidewalk access as well as bicycle lane maintenance. Join EAC's Sustainable Transportation Action Team the first Monday of every month from 5:30 pm to 7:00 pm to help grow sustainable transportation in NS.

ENERGY

More Energy in 2017!

In November 2016, under federal and local pressure, the provincial government announced that it will develop a "Cap and Trade" carbon pricing system in Nova Scotia. Few policy details have been released and many questions remain about the proposed system. We are hosting a series of panel discussions on the proposed Cap and Trade system, in order to better work together toward a system that effectively reduces emissions and equitably accounts for low and middle income Nova Scotians. The series takes place between March and May. Learn more at ecologyaction.ca/issue-area/energy-action-team We're also pleased to welcome our third staff member, Rebecca Moore, as the Community Energy Campaigner! She will add much-needed capacity as we work toward a justice-based transition to a carbon-free future.

BUILT ENVIRONMENT

A Greenbelt for Halifax!

Built Environment has had a transitional few months, with the arrival of new Sustainable Cities Coordinator, Jenny Lugar. These days our efforts are focused on making the Halifax Greenbelt a reality. This has been encouraging work since Halifax is currently finalising the implementation strategy for the Halifax Green Network Plan. We've spent our time advocating for strong implementation tactics of this Plan, working on outreach and awareness, and also looking to the future hoping to find more ways to help with sustainable development in suburban and rural parts of the municipality. Meanwhile, we hosted a panel in January featuring David Donnelly, a Toronto-based environmental lawyer and greenbelt advocate. In a crowd of over 100 people, we learned all about curbing taxes and strengthening our communities through the creation of a greenbelt. Keep your eyes peeled for consultations on the Halifax Green Network Plan implementation strategy in the spring, or visit ourhrmalliance.ca to join the greenbelt newsletter.

The Seasonal Gourmet

Satay Buckwheat Noodle Bowl with Hana Tsunomata Seaweed

Did you know that seaweed is from the algae family? It is an extraordinary source of iodine that helps to regulate healthy thyroid function. It contains iron, vitamin A, vitamin C and calcium. It's also tasty! We asked local Halifax business, Mermaid Fare, to share a favourite seaweed recipe.



PHOTO: Mermaid Fare

TOPPING OPTIONS FOR A BUDDHA BOWL

Toasted sesame seeds, grated carrot, grilled tofu, cucumber slices, red cabbage, red onions, tempeh, chopped cilantro, edamame beans, additional chili peppers, avocado—think whole, nutrient packed, and nourishing.

INGREDIENTS (SERVES 2-4)

- ½ cup** dried Hana Tsunomata rehydrated in cool water for 6-8 minutes
- 2 portions** of buckwheat noodles
- 4** dried shiitake mushrooms
- Handful** of thinly sliced napa cabbage
- ½ cup** almond butter, sesame seed paste or peanut butter
- 2 tbsp** tamari
- 2 tbsp** mirin or rice vinegar
- Juice of **1** lime
- 1 tbsp** maple syrup
- 1 tsp** chili flakes
- 1 tbsp** sesame oil
- 2** green onions, sliced diagonally

DIRECTIONS

- Bring 6 cups of water and the dried mushrooms to a boil for 15 minutes or until soft, remove the mushrooms to cool and measure ¼ cup cooking water for the satay sauce.
- Add buckwheat noodles for 3-4 minutes. Do not overcook! Reserve ½ cup of cooking water, and drain the noodles using a fine mesh strainer.
- For the satay sauce whisk together tamari, maple syrup, vinegar, chili flakes, lime juice, sesame oil, nut butter, and ¼ cup of mushroom cooking water, set aside. Drain Hana Tsunomata seaweed after 6-8 minutes with a fine mesh strainer and shake off excess water.
- Remove the stems from mushrooms and slice caps into bite size strips. Heat remaining ½ cup cooking water in a wok or saucepan, adding mushrooms, satay sauce, and cabbage, cooking for another 5 minutes on medium heat.
- Toss with buckwheat noodles and top with Hana Tsunomata or Mermaid Fare's Kaiso Seaweed Salad recipe. Enjoy warm!



Mermaid Fare provides sustainably harvested, wild and cultivated edible sea vegetables for the retail and foodservice markets, as well as specialty sea vegetable ingredients. They are passionate about sea vegetables, promoting healthy food, and safeguarding the health of our oceans. For more information about Mermaid Fare, visit: mermaidfare.com

Action in Verse

What Sounds Did the Ocean Make

before catastrophe?
did it burble, eons ago, as each wavelet birthed
new creatures onto vast beaches, did it sing
within its swells where swarms of simple beings
rippled and darted, differentiated?

did it hum and purr as the wind stroked
its surface, happily bubbling its broods?
did it lullaby and murmur – la mer, la mère –
mother of all things, nest brimming
In those long, bright days
before disaster?

-Basma Kavanagh



Niche is a collection of work that provokes recollection, remorse, and renewal. It looks at its subject matter through a human lens as well as the ways in which the natural world relates to itself. *Niche* consistently reveals the wonder and beauty of living diverse life and natural environments; both of things that are—and things that used to be. Different cultural perspectives are illuminated by the artful use of Mi'kmaq, French, Gaelic, Latin and English, mostly in reference to a Northern temperate biome. Reading *Niche* is an exquisite way to remind ourselves why we need to tread lightly; with respect, empathy and remembrance. *What Sounds Did the Ocean Make* works well as a microcosm of this book.

Written by visual artist/poet Basma Kavanagh, *Niche* was published by Frontenac House in 2015. Kavanagh is a CBC Poetry short-list (2014) and long-list (2016) finalist who hails from Nova Scotia; she presently lives in Newfoundland. Her work can be found at basmakavanagh.ca



Richard Nickerson, CFP, CDFA
Financial Planning Advisor
Assante Capital Management Ltd.
rnickerson@assante.com

AssanteHydrostone.com

phone: 902-423-1200
201-5548 Kaye St, Halifax, NS

Take a **FRESHER** look at your financial wealth.

At Assante Hydrostone, we believe that you can make environmental, social and ethical values part of your investment strategy. Socially responsible investing is not just about being green, it also involves good corporate governance, safety, human rights, and community protection. As members of the Social Investment Organization, we are here to help you achieve your goals.



Hydrostone

ASK FOR MORE.

Assante Capital Management Ltd. ("ACM") and Assante Financial Management Ltd. ("AFM") are indirect, wholly-owned subsidiaries of CI Financial Corp. ("CI"). The principal business of CI is the management, marketing, distribution and administration of mutual funds, segregated funds and other fee-earning investment products for Canadian investors through its wholly-owned subsidiary CI Investments Inc. Wealth Planning Services may be provided by an accredited Assante Advisor or Assante Private Client, a division of CI Private Counsel LP. ACM is a member of the Investment Industry Regulatory Organization of Canada and the Canadian Investor Protection Fund. AFM is a member of the Mutual Fund Dealers Association of Canada ("MFDA"), and MFDA Investor Protection Corporation. The Social Investment Organization is a third party organization that is not affiliated with Assante Wealth Management.

The Ecology Action Centre celebrates the essential support of our

SUSTAINABILITY ALLIES



Helping Nature Heal
ECOLOGICAL LANDSCAPING



Bonnyman's
Wild Blueberries
wild blueberry farmers
for three generations



Ecology Action Centre

LEARN MORE

www.ecologyaction.ca/sustainabilityallies

EAC Staff & Contacts

OPERATIONS STAFF

Policy Director: **MARK BUTLER** (902) 429-5287 /// action@ecologyaction.ca
Managing Director: **MARLA MACLEOD** (902) 429-5287 /// centre@ecologyaction.ca
Financial Director: **CARLA VANDENBERG** (902) 442-0254 /// eac@ecologyaction.ca
Community Giving Coordinator: **RYAN O'QUINN** (902) 442-0300 /// ryan@ecologyaction.ca
Facilities and Operations Officer: **CORMEKIA CLAYTON** (902) 454-5226 /// info@ecologyaction.ca
Finance Manager: **JULIA POLLACK** (902) 442-0254 /// julia@ecologyaction.ca
Volunteer and Events Coordinator: **JOANNA BULL** (902) 454-5226 /// communications@ecologyaction.ca
Data and Systems Officer: **SARAH WILKIN** /// sarah.wilkin@ecologyaction.ca

MEMBERSHIP STAFF

Membership Coordinator: **DANA LIPNICKI** /// dana@ecologyaction.ca
Canvass Supervisor: **JULIA MCKAIG** /// julia.mckaig@ecologyaction.ca
Membership Relations Officer: **HOPE PEREZ** (902) 487-4173 /// membership@ecologyaction.ca
Membership Relations Officer: **ROWAN SWAIN** (902) 429-0924 /// membership@ecologyaction.ca

PROJECT STAFF

Built Environment

Sustainable Cities Coordinator: **JENNY LUGAR** (902) 454-6199 /// jlugar@ecologyaction.ca

Coastal & Water

Freshwater Coordinator: **LARISSA HOLMAN** (902) 442-5046 /// water@ecologyaction.ca
Coastal Adaptation Coordinator: **SAMANTHA PAGE** (902) 442-5046 /// coastal@ecologyaction.ca
Community Conservation Researcher: **SADIE BEATON** (902) 221-1953 /// sadie@ecologyaction.ca

Energy

Energy Coordinator: **STEPHEN THOMAS** (902) 442-0199 /// acsec@ecologyaction.ca
Energy Efficiency Coordinator: **EMMA NORTON** (902) 442-0199 /// efficiency@ecologyaction.ca
Community Energy Campaigner: **REBECCA MOORE** (902) 442-0199 /// rebecca@ecologyaction.ca

Food

Senior Coordinator, Community Food: **AIMEE GASPARETTO** (902) 442-1077 /// aimee@ecologyaction.ca
Senior Coordinator, Community Food: **SATYA RAMEN** (902) 442-1077 /// foodaction@ecologyaction.ca
Research and Evaluation Coordinator, Community Food: **MIRANDA COBB** (902) 442-1077 /// miranda@ecologyaction.ca
Community Food Coordinator (Halifax): **JENNIFER ORGAN** (902) 442-1077 /// jenorgan@ecologyaction.ca
Community Food Coordinator (Cape Breton): **JODY NELSON** /// jody@ecologyaction.ca
Community Food Coordinator (Cumberland): **SU MORIN** /// su@ecologyaction.ca
Food Programs Coordinator (Cape Breton): **GEORGIA MCNEIL** /// georgia@ecologyaction.ca

Marine

Marine Conservation Coordinator: **SUSANNA FULLER** (902) 446-4840 /// marine@ecologyaction.ca
Marine Campaign Coordinator: **KATIE SCHLEIT** (902) 446-4840 /// kschleit@ecologyaction.ca
Marine Policy Coordinator: **SHANNON ARNOLD** (902) 446-4840 /// sarnold@ecologyaction.ca
Sustainable Seafood Coordinator: **COLLEEN TURLO** (902) 446-4840 /// cturlo@ecologyaction.ca
Marine Communications Coordinator: **HEATHER GRANT** (902) 446-4840 /// heatherg@ecologyaction.ca
Marine Conservation Officer: **CHELSEY KARBOWSKI** (902) 446-4840 /// ckarbowski@ecologyaction.ca
Marine Conservation Officer: **TRAVIS ATEN** (902) 446-4840 /// taten@ecologyaction.ca

Transportation

Making Tracks Coordinator: **JULIAN WEST** /// mt@ecologyaction.ca
Youth Active Transportation Coordinator (Cape Breton-Eastern NS): **STEPHANIE JOHNSTONE-LAURETTE** /// stp-cb@ecologyaction.ca
Youth Active Transportation Coordinator (Mainland NS): **NATALIA DIAZ-INSENSE** /// walk@ecologyaction.ca
Sustainable Transportation Coordinator: **ELIZA JACKSON** (902) 446-0209 /// stc@ecologyaction.ca
Making Tracks Project Officer: **ADAM BERRY** (902) 446-0209 /// adam@ecologyaction.ca

Wilderness

Wilderness Coordinator: **RAYMOND PLOURDE** (902) 442-5008 /// wilderness@ecologyaction.ca

NICE MOVES

JULESCHAMBERLAIN.CA
AGENT IMMOBILIER / REALTOR®
902 817 6007

Red
DOOR
REALTY



If you think of a good fish pun, let minnow! You can follow Tina & me on Twitter and Facebook



Recent Successes

- In partnership with Nourish NS, we **co-hosted a province-wide gathering on Edible School Gardens**. **Over 60 stakeholders** came together to connect and celebrate the more than **100 diverse edible school gardens** that thrive across Nova Scotia.
- **EAC reached a record 5,000 members!** Thank you to our fabulous membership canvass team and each of our members for helping us reach this incredible milestone.
- We successfully **advocated against the “sustainable” certification of the Spanish longline swordfish fishery** by the Marine Stewardship Council. They actually catch more sharks than swordfish in contravention of Spanish laws. We also saw a small step forward for blue shark catch limits at an international fisheries management meeting that was attended by EAC staff.
- We welcomed the first ever Regional Parkland Acquisition fund in the Halifax municipal budget. **\$5.6 million was approved for parkland acquisition** for new parks at **Blue Mountain-Birch Cove Lakes and Purcell’s Cove Backlands** with a further commitment to at least \$20 million over the next four years.

WHAT WILL YOUR LEGACY BE?

Leave a gift to the EAC in your will to ensure a healthy future for generations to come. Please call us at 902-442-0300 or email us at ryan@ecologyaction.ca



“As long time proud supporters with passionate concerns for the environment, it was easy for us to decide to leave a gift to the EAC in our wills. We have long respected the work EAC does for the environment and know that its strong voice must continue into the future.” - Karen Hollett & Fred Harrington

**WANT TO KNOW WHAT IT FEELS LIKE TO JOIN
WITH 5,000 OTHER VOICES FOR CHANGE?**

Become a member of the Ecology Action Centre today and find out.

HOW?

Sign up in person with a member of our membership team.

CALL US AT 902-429-2202

WALK, BUS OR BIKE TO OUR OFFICE AT

2705 Fern Lane, Halifax, NS, B3K 4L3

www.ecologyaction.ca