



WHAT'S GOING ON?

"Oh, mercy, mercy me; oh, things ain't what they used to be."

Marvin Gaye - 1971



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Our Place

The Maritimes share a common ecological zone with the Appalachian region of Québec, shaped by climate, topography, geology and ocean currents. It stretches from Gaspé, Cape Breton Island and the Magdalen Islands in the east, to the Eastern Townships in the west. This region is known as the *Atlantic Maritime Ecozone* and includes the Gulf of St. Lawrence, the Bay of Fundy and the Scotian Shelf.



The Atlantic Maritime Ecozone looks seaward to the Gulf, to Fundy and to the open Atlantic. Its cool moist maritime climate and moderate temperatures support a diverse community of life, including a diversity of peoples: Acadian and Passamaquoddy, Maliseet and Mi'kmaq, Maritimers and Québécois.



As peoples, we have long been concerned with our survival in North America. What we have neglected is the survival of our home. The news is not good. Decades of scientific research have now been assembled into report cards on the health of our ecosystems.^{1,2,3,4,5} They tell a disturbing story of decline.

Over the past 50 years our societies and economies have done much to undermine nature's integrity, stability and beauty. It's time we put things right.

WHAT'S GOING ON?

Like most people you probably have a sense that something's not quite right. The weather is weird. Swallows and sparrows have virtually vanished. Mosquitoes seem to be more plentiful. Your garden isn't visited by as many butterflies, bees and toads. And the Gulf of St. Lawrence and Bay of Fundy lack fish.

Scientists in our region have been taking the pulse of Mother Nature, and what they are finding is upsetting. The Conservation Council itself has done some of this work – literally diving into our bays and estuaries to understand what is going on.

We are part of an intricate web of life where all living things are mutually dependent. When one corner of the web of life loses its anchor hold, the integrity of the whole is lost.

Stricken

The ocean waters of the Gulf of St. Lawrence and the Bay of Fundy are among the most productive marine systems in the world, known the world over for their diverse fisheries. However, on just about every measure they are deathly ill, according to the key findings of DFO's 2010 report on the status of our marine ecosystems.³

The structure of the marine food web has been fundamentally altered by excessive and damaging fishing practices carried out on an industrial scale. Plankton, which anchor the marine food web, have declined in a number of areas. At the same time, the very oceanography of our region has been altered by climate change, making a return to how things once were – impossible.

Average surface sea temperatures in the Gulf have increased approximately 2°C in the last 25 years. Ocean currents and upwellings in the Bay of Fundy have changed, affecting the availability of nutrients. In the Gulf, oxygen levels have dropped to a point in its estuary that the growth and survival of groundfish, such as cod, are compromised. And because excessive carbon dioxide emissions have swamped the ability of our oceans to absorb them, seawater in both the Gulf and the Bay of Fundy is acidifying. This will eventually compromise the ability of creatures such as plankton and lobsters to make shells.^{4,5}

¹ Federal, Provincial and Territorial Governments of Canada. 2010. Canadian Biodiversity: Ecosystem Status and Trends 2010. Canadian Councils of Resource Ministers. Ottawa, ON (www.biodivcanada.ca/ecosystems).
² ESTR Secretariat. 2012. Atlantic Maritime Ecozone evidence for key findings summary. Canadian Biodiversity: Ecosystem Status and Trends 2010. Canadian Councils of Resource Ministers. Ottawa, ON (www.biodivcanada.ca/ecosystems).
³ Department of Fisheries and Oceans Canada. 2010. 2010 Canadian Marine Ecosystem Status and Trends Report. DFO Can. Sci. Adv. Sec. Sci. Adv. Rep. 2010/030 (www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_030_e.pdf).
⁴ Department of Fisheries and Oceans Canada. 2010. Research Document - 2010/030, Ecosystem status and trends report: Estuary and Gulf of St. Lawrence ecozone, R. Dufour, H. Benoit, M. Castonguay, J. Chassé, L. Devine, P. Galbraith, M. Harvey, P. Larouche, S. Lessard, B. Petrie, L. Savard, C. Savenkoff, L. St-Amand and M. Starr.
⁵ Department of Fisheries and Oceans Canada. 2010. Research Document - 2010/070, Ecosystem Status and Trends Report for the Gulf of Maine and Scotian Shelf. T. Worcester and M. Parker.

Developed

The news is equally bad for coastal habitats such as salt marshes, mudflats, and estuaries. These are among the most biologically productive ecosystems and important nurseries for our oceans, but they have been exploited for waste disposal and sacrificed for development.

The "canary in the coal mine" along our coasts can be found among the sandpipers. Populations of nine out of 15 species of shorebirds summering in the region have declined in population by more than half over the past 40 years.¹ While some of these shorebirds may be affected by habitat loss in their winter breeding grounds outside of the region, shorebird species that remain in our region to breed, such as the killdeer, are also showing declines.

Salt marshes, along with eelgrass beds and oyster reefs are important nursery areas for inshore and offshore fish, and shellfish. Salt marshes recycle nutrients for plants and animals, protect human communities from the impacts of storm surges and are biodiversity hotspots. It has been said that the destruction of salt marshes in our region is one of the most severe cases of wetland loss in Canada.

In 2005, the Conservation Council conducted a survey of thirty salt marshes along the east coast of New Brunswick between Point Escuminac and Cape Jourimain² to assess the degree of disturbance. In addition to outright destruction, we found the remaining salt marshes were experiencing a 'coastal squeeze', boxed-in by roads, houses and breakwaters.

Slimed

There are creeping dead zones in the waters of our region's estuaries. Agricultural runoff, sewage and industrial effluent, and atmospheric fall-out from car exhaust and power plants have overloaded the system with nutrients. Nutrient pollution fuels massive blooms of algae, from microscopic phytoplankton to slimy mermaid hair. As these algae die, they sink to the

bottom and decompose, robbing the water of oxygen, releasing gases toxic to marine life. High levels of nutrients can transform a healthy marine ecosystem teeming with a life into a sterile dead zone suitable only for worms and bacteria. This is happening now. In PEI, episodes of oxygen starvation and subsequent fish kills are reported annually in 18 estuaries. A 2003 Conservation Council survey of New Brunswick's east and north coasts found creeping dead zones in seven of the 10 bays and estuaries investigated.³

¹Gratto-Trevor, C., Morrison, R.I.G., Collins, B., Rausch, J. and Hohnston, V. 2011. Trends in Canadian shorebirds. *Canadian Biodiversity: Ecosystem Status and Trends 2010. Technical Thematic Report No.13.* Canadian Council of Resource Ministers. (www.biodivcanada.ca).
² Salt Marsh Restoration Survey for the Eastern Coast of New Brunswick: Point Escuminac to Cape Jourimain, 2006. Conservation Council of New Brunswick. (http://www.conservationcouncil.ca/Chaleur-to-Tormentine/Salt-Marsh-Loss.aspx).
³Nutrient Pollution: A Eutrophication Survey of Eelgrass Beds in Estuaries and Coastal Bays in Northern and Eastern N.B. 2003. Heike K. Lotze, Inka Milewski, Boris Worm and Zsofi Koller. Conservation Council of New Brunswick. (www.conservationcouncil.ca/Chaleur-to-Tormentine/Creeping-Dead-Zones.aspx).



The "canary in the coal mine" along our coasts can be found among the sandpipers.



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Drenched

Forests regulate the flow of water into our rivers and streams from rainfall and snow-melt.



It is no exaggeration to say that water is our lifeblood. And its flow in our rivers and streams is like our blood pressure. When elevated, it is a warning to be heeded and, if ignored, can cause us great harm.

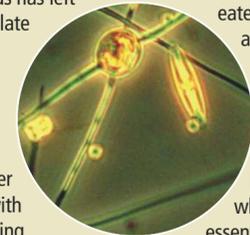
One big change in our region has been the significant increase in the maximum flows of our rivers. These heavy river flows are increasingly destructive, unleashing a cascade of consequences from bank erosion and floods to the destruction of fish fry and a decrease in ocean productivity.

Forests regulate the flow of water into our rivers and streams from rainfall and snow-melt. However, when there are too many clearcuts in a river's headwaters, the forest has difficulty retaining water, resulting in unstable and damaging flows of water. Research from Québec has shown that when more than 50% of a watershed is covered with clearcuts, cleared land and

forests younger than 35 years, the ability to regulate the flow of water is compromised.¹

Unfortunately, extensive logging throughout our watersheds has left our forests' ability to regulate water flows diminished – and at the worst possible time. Climate change has already brought us a five-fold increase in heavy downpours,² sending water roaring down our rivers with unprecedented fury, scouring river banks, tearing out trees by their roots, flooding homes and properties, and unexpectedly changing the very nature of the sea into which it flows. Researchers from the Bigelow Laboratory for Ocean Sciences in Maine have documented evidence of a five-fold decline in the growth rate of phytoplankton in the Gulf of Maine/³

outer Bay of Fundy.³ These microscopic single-celled plants anchor the marine food web. They are eaten by larval fish and zooplankton, which in turn are eaten by fish and whales alike.

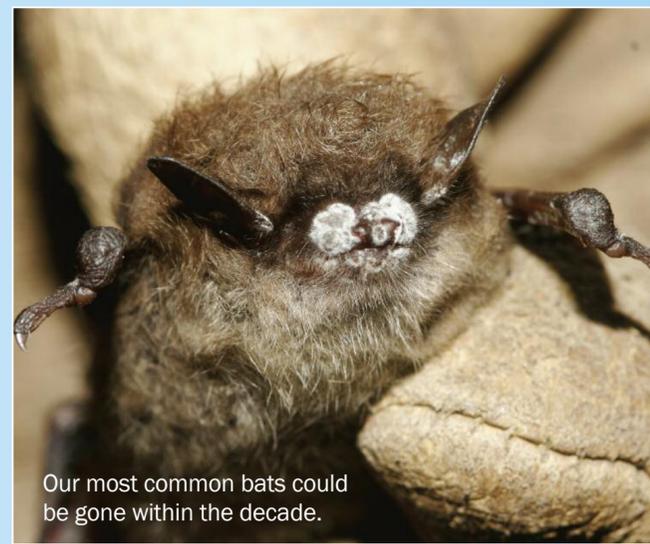


It appears that increased river discharge is preventing deep North Atlantic water, which carries nutrients essential for phytoplankton growth, from entering the Gulf of Maine/Bay of Fundy. The increased river flow is also increasing the amount of sediment flowing into the sea, reducing the light needed by phytoplankton for photosynthesis and growth.

Bitten

The spring-time scourge of mosquitoes is as Canadian as it gets. Traditionally, we just grin and bear it. However, it may be about to get a lot worse. Wetter springs brought to us by climate change may be swelling mosquito populations, which now carry the West Nile virus. But that's not all. There is something seriously wrong with the birds and bats that normally keep mosquito populations under control.

In recent decades there has been a dramatic decline in the birds that eat insects on the fly. According to the Atlantic Maritime ecosystem report card, since the 1970's populations of chimney swifts have declined by 87%, barn swallows by 81%, and nighthawks by 73%. It's no wonder we haven't seen much of these birds in recent years. Once so numerous, swallows were among the short-list of birds that every child could name – a favourite visitor to backyard birdhouses. Today they're so scarce most children wouldn't recognize them. Scientists are unsure why the populations of these bird species have crashed.



Our most common bats could be gone within the decade.



To make a bad situation worse, our most common bats could be gone within the decade. In a desperate attempt to slow the massive die-off of bats in Eastern Canada, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the national body that assesses species for protection, recommended in 2012 that an "emergency" order be issued to declare three common bat species as endangered. Their survival is threatened by a rapidly spreading fungus that causes white nose syndrome, killing the bats while they hibernate in their caves.

White nose syndrome first appeared in a bat cave in New York in 2006 and has spread like wildfire, decimating bat

colonies in the Maritimes, Québec and Ontario. Scientists believe the fungus was likely brought to North America from Europe by travellers.

In calling for an emergency order to declare three bat species as endangered, COSEWIC said the dramatic decline in bat populations could precipitate an ecological disaster that would completely change ecosystems, much as happened with the destruction of Atlantic cod stocks. Bats, of course, are principal predators of mosquitoes and other nocturnal insects.

Uch.

WHAT'S GOING ON?

Bat with white nose syndrome. Photo courtesy Ryan von Linden/New York Department of Environmental Conservation.

Spineless

Bees, worms, beetles, butterflies, spiders, and plankton are among the spineless creatures that run the world. Known collectively as invertebrates, we cannot live without them. They pollinate wild plants and food crops, decompose waste and recycle the nutrients to fertilize soils, filter water, store carbon at the bottom of the sea, and anchor the food web in our oceans.

Consider bees. Neither ecosystems nor people can do without their services. The consequences of their disappearance would be massive. Without insect pollination, many flowering plants would vanish, as would animals that depend on their seeds and fruit for food. Crops such as blueberries, cranberries, strawberries and alfalfa would disappear. **In fact, one third of the crops that make up our global food supply depend on bees to reproduce.** Yet we don't routinely monitor and protect the health of our wild bee populations, or any other populations of invertebrates for that matter – though they are essential to the healthy functioning of our world.

As the report card for the Atlantic Maritime Ecozone says, "Comprehensive scientific data on the status and trends of invertebrate species in the ecozone is lacking at this time."

You can read about birds, ducks, amphibians, salmon and caribou, but not bees or worms. We've always assumed they are so abundant and commonplace they didn't need our attention.

It's no wonder that a humble bumblebee is now on Canada's endangered species



One-fifth of the world's invertebrates may be threatened by extinction.



list – a first for North America. The rusty-patched bumblebee was one of the most common bees in southern Ontario and Québec, but now it is on the verge of extinction and scientists don't understand why. We know this because a PhD student at York University uncovered the calamity in the course of her research.¹ This has helped focus scientific attention on the plight of the bumblebee.

In the Atlantic Ecozone, both the cuckoo and yellow-banded bumblebees are in trouble and being considered for listing as species at risk in Canada. Researchers at Cape Breton University² are finding dramatic declines in the formerly commonplace yellow-banded bumblebee. At the same time, a

number of other bumblebee species found in urban and suburban areas seem to be increasing.

In 2010, the Conservation Council co-sponsored the Maritime Action Forum on Pollination Research with Blueberries New Brunswick, which attracted scientists from across Canada to Moncton to discuss the health and conservation of bees. It was surprising to learn how little we actually know about bees.

The vast majority of invertebrates are a mystery to us, despite the fact they are the foundation of our ecosystems. A recent report by the IUCN concludes that one-fifth of the world's invertebrates may be threatened by extinction.

¹ Colla SR & L Packer. 2006. Evidence for the decline of eastern North American bumble bees, with special focus on *Bombus affinis* Cresson. *Biodiversity and Conservation*. 17: 1379-1391.

² David McCorquodale and James Postlethwaite, Cape Breton University.

³ Collen, B, Bohm, M, Kemp, R and Baillie, E.M. 2012. *Spineless. Status and trends of the world's invertebrates.*

Yellow-banded bumblebee: Photo courtesy of Leif Richardson.

Silly

In 1948, Lucy Sprague Mitchell wrote "Silly Will", a children's story about a boy who was disrespectful of other living creatures. One night, while sound asleep, Will was woken by a cast of characters from the fields and forest who had arrived in his bedroom. A sheep said, "I take back my wool" and the boy's woolen clothing disappears off his back. A goose said, "I take back my feathers" and his down pillows and bedding vanish. A cow takes back his hide, and the trees take back their wood, causing his bed and house to collapse around him. This leaves Will standing naked and shivering in the night in front of the ruins of his home until he wakes up from his bad dream. Needless to say, Will's relationship with the natural world was forever changed.

Like Silly Will, our society's relationship with the rest of nature has been disrespectful – but the consequences we are experiencing are not a bad dream from which we can wake up. The web of life is losing its anchor-holds. Cod and wild Atlantic salmon no longer support commercial fisheries. Our forests' ability to hold back the floodwaters is diminished. The ocean's food web is unravelling. Bumblebees are joining bison and whales on the endangered species list. The birds and bats that keep mosquitoes in check are vanishing.

Like Silly Will, we are beginning to see the consequences of our dysfunctional relationship with the rest of nature. It's no longer an endangered whale here or a threatened wilderness area there. We are experiencing a system-wide decline.

Establishing more protected areas and protecting species facing extinction are no longer adequate responses. We need to fundamentally change our relationship with nature. Recognizing this, governments in Bolivia and Ecuador have entrenched rights for nature into their national constitutions. We have yet to even acknowledge we've got a problem.



Environmental and conservation groups in our regions are coming together to develop a plan of action. Contact the following organizations to see how you can help.

Act



CCNB
180 St. John St., Fredericton, NB E3B 4A9
(506) 458-8747 info@conservationcouncil.ca,
www.ccnbaction.ca

CPAWS NB
180 St John St., Fredericton, NB. E3B 4A9
(506) 452-9902 cpawnsb@nb.sympatico.ca

Ecology Action Centre
2705 Fern Lane Halifax, NS B3K 4L3
(902) 429-2202 info@ecologyaction.ca

ECO-PEI
81 Prince St., Charlottetown, PEI C1A 4R3,
(902) 651-257 mail@ecopei.ca

SNAP-Québec
7275, St-Urbain, Suite 303, Montréal, QU H2R 2Y5 (514) 278-7627

Nature Québec
870, avenue De Salaberry, bureau 207,
Québec, QU G1R 2T9 (418) 648-2104
conservons@naturequebec.org

Sierra Club Atlantic Chapter
1657 Barrington, Halifax, NS B3J 2A1
(902) 444-3113
atlanticcanadachapter@sierraclub.ca

WE NEED TO CHANGE OUR RELATIONSHIP WITH NATURE!

¹ Langevin, R. and Plamondon, A. P. 2004. *Méthode de calcul de l'aire équivalente de coupe d'un bassin versant en relation avec le débit de pointe des cours d'eau dans la forêt à dominance résineuse*. Ministère des Ressources naturelles, de la Faune et des Parcs (MRNFP) du Québec.

² New Brunswick Department of the Environment (NBDENV). *Climate Action Plan 2007-2012*. See: <http://www.gnb.ca/0009/0369/0015/0003-e.ppt#376, 8>, Climate Observations in NB.

³ Balch WM, Drapeau DT, Bowler BC, Huntington TG. 2012. Step-changes in the physical, chemical and biological characteristics of the Gulf of Maine, as documented by the GNATS time series. *Marine Ecology Progress Series*. Vol. 450:11-25, 2012.