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EDITORIAL

Addressing the crisis in biodiversity – our role

Across the globe, academic publications and the news increasingly carry stories about the growing crisis in biodiversity, both in terrestrial and aquatic environments. Biodiversity, or *biological diversity*, is "the variety of life found in a place on Earth or, often, the total variety of life on Earth" (www.Britanica.com). Globally, since the RIO World Summit of 1992 and the signing of the Convention on Biological Diversity, the United Nations Environmental Programme (UNEP) has led on this issue and has worked with the Global Environment Facility (GEF) "to arrest the decline in biodiversity and conserve ecosystem services for the benefit of current and future generations" (www.unenvironment.org/resources/factsheet/biodiversity-factsheet). Lately, various UN committees in New York have addressed the impacts of overfishing in international waters (areas beyond national jurisdiction) and the impending effects of industrial deep sea mining on species and habitats little studied or as yet unknown. Importantly, UNEP's latest report, concerned about the rate of biodiversity loss, "emphasizes that countries need to bring biodiversity into the mainstream of decision making and factored into policies across all economic sectors" (www.unenvironment.org/resources/report/global-biodiversity-outlook-5-gbo-5). A good source of the latest information on global biodiversity is also found at the UN's Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (www.ipbes.net).

Other groups have been actively involved in addressing the status and decline of global biodiversity. The World Wildlife Fund has just released its latest Living Planet report (WWF 2020), describing the rapid decline in a number of species populations since 1970 and the global implications for the natural world, human health, and our economies. The IUCN (International Union for the Conservation of Nature) has documented the biodiversity decline over decades and in recent years; of late, almost one quarter of the assessed species are threatened with severe loss or extinction. This is attributed to human population pressure and the resulting demand for space and resources, pollution, and climate change. Most recently, the American Association for the Advancement of Science (AAAS) has highlighted

the problem in an editorial, stating that "we are in danger of losing 80% or more of the world's species……..and have clearly entered the world's sixth major extinction event" (Raven and Miller 2020). Clearly, the problem is dire!

The IUCN recognized that "nature will recover if given half a chance", illustrated by some species being brought back from the edge of extinction (www.iucn.org/news/species/201912/species-recoveries-bring-hope-amidst-biodiversity-crisis-iucn-red-list). "W*hen governments, conservation organisations and local communities work together, we can reverse the trend of biodiversity loss"* (J. Smart, IUCN Biodiversity Conservation Group). In this spirit is the recent funding by Norway of mapping the worlds tropical forests, critical for assessing the Earth's species diversity and the role of forests in climate control (*BBC News*, 23-10-20); new insights about the recovery of marine ecosystems after conservation interventions (Duarte *et al.* 2020); and the role of social sciences and local communities in many aspects of coastal and ocean management (Manuel and MacDonald 2020, McKinley *et al.* 2020).

Bringing the biodiversity issue to public attention across the globe has been the role of many film makers, producing such television series as Nature and Nova seen on the US PBS channel. As with climate change, a large informed and concerned public will help convince politicians and policy makers to heed the importance of biodiversity and turn the situation around. Science has a key role here to provide reliable information and advice. Making this point has been the objective of the noted UK's Richard Attenborough, in his recent interviews, films and books.

Especially noteworthy and an engrossing read is his latest book, "*A Life on Our Planet*" (Attenborough and Hughes 2020). Attenborough provides a chronology of one person's observations of the dramatic changes to global ecosystems and species, and a template for how to arrest them over the next few decades. After a polemic on the problems, he describes a few actions that could be taken – switching to greener energy to arrest climate change and its broad effects on ecosystems, rewilding the oceans through establishing more protected areas and practising sustainable aquaculture, using land space within urban areas more efficiently, reducing deforestation, protecting more terrestrial wilderness, having so-called wildland farms (a mixture of agriculture and wild areas), introducing top predators into rural

areas, and planning for the impact of 2-3 billion more people within the next few decades. These suggestions are general and may need to be modified for specific regions. The main message is that humans across the planet have to rethink their interactions with nature, reverse the course of habitat and species loss, and slow the increase in our population. This must be done within the next few decades.

In Canada, the many status reports that are on the Species at Risk Public Registry for 2020, prepared for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2019), attest to the fact that Canada is not doing well to protect its biodiversity, in spite of considerable effort. Action is needed on all fronts. This should include greater protection and conservation efforts in both marine and terrestrial ecosystems.

Thinking locally, what is the role of NSIS, its members, and the general public in Nova Scotia in the biodiversity issue? Nova Scotia has had a litany of biodiversity challenges for many decades. For example, the small population of mainland moose are of concern due to habitat alteration and loss, amongst other factors; they are considered endangered (Snaith and Beazley 2004, NSDNR n.d.). Freshwater turtles are often in the news too, due to concerns about the endangered Blanding turtles of SW NS; considerable conservation efforts continue for them, such as at Kejimkujik National Park. Other turtles (wood, snapping) may be at risk too. Sadly, our many roads continue to kill or injure countless small amphibians, reptiles and mammals.

However, it can be argued that the poster children of provincial biodiversity loss and needs are birds and whales. We need to think more about the fate of our songbirds and migratory shorebirds, many of which spend the winter thousands of km to the south and which continue to decline as a result of loss of their wintering habitat and the problems of migration in relation of more severe storms resulting from climate change (www.birdscanada.org; COSEWIC 2013a,b). Logging during the nesting season for newly arrived songbirds is a continued threat. For whales, the much diminished and endangered population of North Atlantic Right whales is in crisis with fewer than 366 individuals left and too few breeding females (Cooke 2020); in our waters, they formerly inhabited the outer Bay of Fundy in the summer months and now spend that period in the southern Gulf of

St. Lawrence (Gunn 2020), exposed to the pressures of ship strikes and entanglement with fishing gear.

The plight of the forest dwelling birds is connected to how we as citizens are looking after the land and the land-sea interface. The birds suffering the highest declines are the aerial feeders, such as swallows and swifts, and insect feeders such as flycatchers (Harding, G., pers. comm., Nebel *et al.* 2020). Large scale deforestation continues relentlessly around the clock in Nova Scotia, despite the 2-year old Lahey report on forest practices (Lahey 2018) and provincial government promises to redress the problem. The proportion of mature and old growth forest, where the greatest biological diversity occurs, continues to decline. To repeat, clear cutting occurs even during the spring nesting season for many songbirds, a huge concern due to its obvious impact and the blatant disregard for wildlife and the natural world shown by industry and government.

In contrast, on the positive side is the increasing effort and success of groups, such as the NS Nature Trust and the Nature Conservancy of Canada, amongst others, to conserve lands near Halifax, Cape Breton Island, south-west Nova Scotia and along the eastern shore, all of which offer habitat protection for wildlife and nature experiences for citizens. Our provincial biologists and ecologists work hard to document our fauna and flora and their population health. Many of our scientists, professional and amateur, contribute to the work of COSEWIC, documenting the status of species from lichens to mammals. That said, there needs to be more such recognition of the status and requirements of wildlife with which we share our province.

This Issue of PNSIS (51-1) features a research article by Dadswell and Rulifson (2021) on the fishes of Minas Basin in the upper Bay of Fundy, a highly diverse coastal ecosystem. Note the cover picture of the Atlantic sturgeon caught in a coastal weir; these magnificent ancient creatures still thrive, even under the pressures of fishing, river obstructions and general habitat deterioration (Bradford *et al.* 2016). In recent Issues, we also have had articles on species such as lichens (Cameron and Bayne 2020), endangered plants (Fancy *et al.* 2020), and biodiversity survey methods (Cameron 2019), to mention some of the scientific effort that contributes to provincial biodiversity conservation. The NSIS can initiate a number of actions to bring sustained attention to the need for biodiversity protection in our Province. These could include more lectures on the issue, focussed

field trips to places where endangered species reside (e.g., Brier Island, Kejimkujik National Park, the Tobeatic Wilderness Area), and the encouragement of student projects and papers on wildlife and their needs. NSIS could also encourage and support more citizen science, by individuals and NGOs, to help monitor and document the status of critical habitats and species. NSIS could interact with other scientifically based groups on this issue and make concerns known to policy makers and legislators in the provincial government. Finally, the PNSIS always welcomes papers on any aspect of the biodiversity of provincial lands and waters, as shown by the above examples. Great conservation science will support great protection policies. It is hoped that NSIS members and our readers will pursue some of these activities to help protect and conserve the rich biodiversity of Nova Scotia.

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ERRATA

In PNSIS 50(2), 2020, there was an error in one author's name:

1) In the Table of Contents, E. Porter's name was misspelled – it should be E. Porter, not Potter.
2) Page 283, same error - the correct spelling is Erica Porter.