

EDITORIAL

Nova Scotia's many environmental issues – facilitating scientific understanding and action on multiple fronts

Since 1862, the Nova Scotian Institute of Science (NSIS) has been promoting science and the value to the province and all of Maritime Canada of scientific research and evidence-based information. Activities of NSIS have been to inform, discuss and sometimes to advise but not to advocate a particular position on a topic requiring scientific understanding. However, a question arises in these challenging times – should NSIS let its voice be heard more vigorously on some issues that are key to the province's future, especially those related to protecting and conserving its natural environment? For a learned scientific body and its members to remain silent in this era of rapid technological and environmental change is not really an option. Encouraging discussion and debate on important science-based topics has always been part of the Institute's mandate.

Currently, the Nova Scotia provincial government seems to be overwhelmed by a broad spectrum of environmental challenges. Many important issues demand attention, thoughtful discussion, and timely decisions and action. Amongst the most prominent ones are: the various effects of climate change, certainly a predominant issue (IPCC 2018, Wells and Richardson 2018); the potential impacts of treated pulp mill effluent to be discharged directly into the Northumberland Strait; the effects of brine discharges into the Shubenacadie River and its estuary; the impacts to wildlife and the forests from clear cutting huge swaths of our woodlands; the potential health effects of continued glyphosate spraying on forests and burning tires in cement plants; the health and ecological impacts of raw sewage still discharged from homes into the LeHave River, near Bridgewater; the potential damage to the salt marsh, albeit man-made, from twinning the highway at the Windsor causeway; and the continued pollution of lakes and rivers in south-western Nova Scotia from mink farms. The reader can likely identify others.

The current provincial government and the responsible departments have been quite slow to address these issues in a meaningful and comprehensive way. In some cases, e.g., the Northern Pulp mill at Pictou,

the government is in a conflict of interest. Overall, the situation points to significant barriers operating at the interface of relevant information, political will, and decision-making in the responsible provincial ministries. Clearly, there needs to be timely decision-making and action on these issues, based on the scientific and other evidence at hand. In the case of the new report on forestry (Lahey 2018), there should be a timely response to its extensive recommendations (Armstrong 2018, Guderley 2018, Pross 2018). Happily, as of late 2018, this has started. But unfortunately, too often the responsible departments and ministers are very slow at finding or suggesting workable solutions. Clear cutting continues unabated. Delay rather than resolution seems to be the mantra on such problems demanding action.

Given this situation, NSIS along with other organizations should consider being more engaged in helping to find resolutions to these issues. Actions could include fostering the exchange of reliable, i.e., scientifically credible, information; encouraging debate on the more contentious issues (most of them are!); and asking the government and the public to further engage with one another and to do so frequently and in a timely fashion.

For example, on the questions of how to protect, manage and our provincial forests on both private and crown lands, and whether or not to use forest debris and wood chips for generating electricity, we should encourage further discussion and support for ecological forestry, as put forth in Lahey's report (Lahey 2018). That would entail the broad public being well briefed on the contents and recommendations of the report, as well as informed about the concept of ecological forestry (what is it, can be done in a practical way, and why is it so important that it be attempted)? In this particular case, NSIS could facilitate this understanding and foster the linkage between the science and the required policy and decision making. NSIS could help the province move in the right direction on such contentious issues.

Further, there are connections between some, if not all, of these environmental issues as they impact the quality of the province's lands, forests and waterways - how we as a society manage the forests influences stream and river water quality; where we discharge industrial effluents may impact our fisheries and in some cases, migratory wildlife species; and how well our sewage is treated determines whether our health and aquatic ecosystems are protected. If terrestrial and aquatic environments are not protected comprehensively and so

continue to decline in quality, their capacity to support us and other species will be imperilled. On this point, it is extremely sobering to know that over 1000 species are listed as being at some level of risk in the Public Registry associated with the Canadian Species at Risk Act (D.H. Richardson, pers.comm.).

It is especially worth reading the recent IPCC report (IPCC 2018) and WWF report – the Living Planet 2018 (WWF 2018). These reports and their observations about what is happening to the planet do not stand alone; both reports point to the many changes and stresses faced on land and sea. Important to note is that there is a commonality in the breadth of the problems. As well, there is great scientific concern about cumulative change/impacts from multiple stressors acting together in time and space (Breitburg *et al.* 1998, among others). The quality of our land and our waters often declines slowly, piece by piece, one stress building upon another, and all unnoticed until the change is massive, reflecting a new state of the environment that is far from the natural state, a so-called “new normal” (MacKinnon 2013) or shifting baseline (Pauly 1995, Papworth *et al.* 2009). Indeed, this is exactly what has occurred with the loss over several centuries of our Acadian forest in Nova Scotia; our landscape is now largely covered by the impoverished “sticks” of a few species of trees rather than healthy, old growth, highly diverse forests. We take this new highly disturbed landscape as being natural and normal.

Despite this, optimism and commitment must fuel our way forwards as we collectively tackle these environmental issues, engage the public and support the government to foster better policies and effective solutions. NSIS can be engaged through its annual programs. The Institute also should be supportive of the considerable citizen science practised across the province on many of these issues (see previous editorial, Wells and Richardson 2015). Our lectures and other activities should recognize this immense effort and the value of natural history studies (Anderson 2017). Citizen science is carried out by volunteers devoted to the environment and the public good. Work done to conserve and protect species and habitats abound across the province. This work provides information directly relevant to the various current wildlife issues faced by the province. For example, amazing field work is conducted on turtles, snakes, fish, loons, terns and water quality conducted by the Friends of Keji Cooperating Association and the Mersey Tobeatic Research Institute (www.merseytobeatic.ca).

NSIS and its members across the province could work with one or more of the citizen science groups – volunteers are always needed and the new information is of interest to the wider public and invaluable to the responsible provincial and federal agencies.

Nova Scotia is part of a region with a plentiful and diverse natural environment but one continuing to suffer a range of threats and challenges. Tackling them demands timely decision making and effective policies informed by science. Hence, a greater engagement of NSIS can only be a positive contribution to understanding the issues and using our science-based information to aid their resolution. Protecting our natural world deserves nothing less than a full joint effort.

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P.G. Wells

Dalhousie University, Editor, PNSIS

