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Editorial

Canadian aquatic science and environmental legislation under threat

Over the past 6 years, Canada has been governed by a Conservative government that has focussed on expanding Canada's resource- and energy-based economy, supported by large multinational corporations, and on eliminating the national deficit after years of overspending. At the same time, the government has suppressed the free flow of information, strictly controlled government communication, and reduced support for the public service and non-governmental organizations (NGOs). The mantra is: reduce the budget, reduce the number of civil servants regardless of their essential role to the country and the wider global community, and reduce funding to NGOs. It is important that the implications of these policies and actions be widely known, as ultimately they do affect our oceans.

One major impact of such governance, in the name of economic growth and budget reduction, has been to eviscerate Canada's federal, aquatic science programs – staff reductions, closures of laboratories, closures of marine science libraries, and cessation of key research programs. One long-lasting effect will be greatly reduced capacity in Canada for front-line, competitive, long-term and much needed research on the effects of toxic chemicals in marine ecosystems. Fisheries and Oceans Canada (DFO), the lead department on oceans, is ending all of its toxic chemicals research on exposure chemistry, ecotoxicology (monitoring and toxicology), and risk assessment, by letting go researchers, through firings or reassignments, and closing related research units. This includes the layoff of the only experts on contaminants in marine mammals and on marine oil pollution and oil spill countermeasures; the closure of the Experimental Lakes Area (ELA) Research Station in northern Ontario, which is an internationally renowned laboratory for field work on toxic chemicals, endocrine disrupting compounds, household products, and acid rain research; and fewer climate related studies in the Arctic. Other federal departments have faced similar reductions, e.g. Environment Canada–Atlantic Region has lost most of its toxicologists and risk assessors, despite the chemical and offshore petroleum issues facing North Atlantic waters. At the same time, DFO is reducing the number of its unique and invaluable marine science libraries in its research establishments and headquarters (9 of 11 are slated to close, see www.dfo-mpo.gc.ca/libraries-bibliotheques); reducing its involvement in long-term Arctic research; and discouraging studies on the ecological impacts of coastal open-water aquaculture. This government simply does not support evidence-based environmental regulation and policy pertaining to Canada's watersheds, and coastal and ocean spaces.

As eloquently commented upon recently by the President of the Royal Society of Canada, government scientists are being gagged and are forbidden to speak openly about or sometimes even write about their research (see Globe and Mail, January 4th, 2013); "the government has affirmed that it needs to control what its employees say." Intimidation of employees involved in research of public importance rules the day, much as it did when Rachel Carson was actively harassed by the chemical industry while writing and publishing *Silent Spring* in the 1960s, or when the respected United States Environmental Protection Agency was significantly downsized and its scientists silenced during the Reagan era of the 1980s.

Eliminating most of the Canadian DFO marine science libraries is particularly harmful. Such action cuts the heart out of vibrant productive institutes in Canada, and will likely affect information access from other countries. Libraries, staffed by dedicated information science and management professionals, are critical to the research enterprise. Libraries cannot simply be replaced by digitized collections of monographs, journals and grey literature (e.g., technical reports), much of which is not yet nor may ever be available in such a format. Libraries are often where research starts and ends, where expert advice is offered about how and where to find reliable information, where productive discussions occur between researchers, sometimes serendipitously, and where quiet time occurs, critical to writing original research proposals, papers and reports. Moving or abandoning collections of archival materials, important both regionally and nationally, may lead to irreparable loss of documents and information of scientific and historical importance. This action is being actively opposed by concerned citizens, such as at St Andrews, NB, and site of Canada's first marine biological station.

The cuts and impacts described above are dealing a major blow to Canada's once proud reputation and capacity in the aquatic and marine sciences. But the wider situation is even more dire. The government's approach to environmental policy has been to radically alter current resource and environmental legislation through the use of omnibus budgetary bills, i.e., proposed new legislation. Two of these (more are promised!) are Bill C-38 and Bill C-45, the latter the target of current First Nations protests. Both bills were moved, some say pushed, through Parliament in 2012. Bill C-38, according to the Toronto Star (Jan. 2nd, 2013), "included more than $160 M in cuts to environmental spending, significantly impairing our ability to measure or mitigate our impact on Canada's wilderness and wildlife". With the two bills, major changes have been made or are being considered to sections of the Fisheries Act, the Canadian Environmental Assessment Act, the Navigable Waters Protection Act, the Coasting Trade Act, and the Hazardous Materials Information Review Act. The result will be weakened or non-existent aquatic habitat and waterway protection across the country. Most rivers and lakes will not be protected from

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disturbance by resource development and other industrial activity. The bills essentially undo decades of progressive environmental and living resource legislation, quite unacceptable behavior by a developed country.

In a related federal agency, Parks Canada, personnel have been fired or retired early, eliminating whole research units responsible for ecosystem and wildlife research in Canada's famed National Parks; for instance, 29 of 30 scientific researchers in Calgary responsible for work in the mountain parks have lost their jobs. Others have been told that *as public employees, their duty is to support the elected government*. As well, some National Parks are now closed seasonally, an unprecedented and amazingly unwise action given the conservation mandate of the National Parks Act. This could affect the UNESCO World Heritage status of several parks and National Historic Sites. Such cutbacks bode poorly for initiatives taken in Canada in recent years for the establishment of a network of MPAs (marine protected areas) that include National Marine Conservation Areas overseen by Parks Canada.

Finally, the government has eliminated an influential policy group, the National Round Table on the Environment and Economy established in the 1980s. It was reportedly closed down because it endorsed a carbon tax for Canadians and Canadian business. Altogether, marine and environmental law, policy, science, and institutional capacity in Canada have been set back by decades.

Given this situation, what are Canadian and international aquatic and marine scientists and other interested persons, such as coastal park managers, ocean managers, lawyers and policy specialists, to do? Some Canadians are simply retiring and/or leaving the country, but that does not help the future of Canadian marine waters, their living resources, and their ecosystems and biota! Several constructive actions seem viable:

(1) Not all of the cutbacks have yet been enacted. The omnibus legislation has been passed but specific changes to regulations and other sections within the affected laws still must be worked out and accepted. As well, some program cuts pertaining to people and specific research projects within the Public Service are passing through the system up to 2014. Hence, some changes and cuts could be reversed if protests were loud enough for the government to hear, and if government officials receive constructive critiques. Objections and opinions have been voiced by some organizations, such as the American Association for the Advancement of Science, the journal *Nature*, the Royal Society of Canada, the Nova Scotian Institute of Science, and the Canadian Parks and Wilderness Society. More commentary is needed from other professional organizations and individuals, especially from the international sphere. Canada's environments and ocean spaces belong to humanity, so a broad international appeal is needed.
(2) More well researched news articles are needed in the various media about the social, economic and environmental impacts of the massive changes taking place to Canadian environmental and resource legislation. The social media could be deployed to inform and advise on these issues.
(3) More commentary is needed from influential international figures in the marine environmental and conservation arenas, such as climate change, given that Canada withdrew from the Kyoto Protocol and is no longer is contributing meaningfully to climate change initiatives. Key leaders in United Nations agencies such as the heads of UNEP and UNESCO should take note. Canada's participation in global initiatives to protect and enhance marine ecosystems and biodiversity will likely have less authority and legitimacy.
(4) Court action should be considered by citizen groups and Canada's First Nations before most of Canada's waterways are left unprotected from future industrial development, e.g. oil pipelines. The challenge is to find funding for such action.
(5) Youth groups in schools, colleges and universities should be informed and engaged. The young represent the future. Environmental and resource mismanagement today puts tremendous burdens onto future generations.

Unless there are actions as above, it is another dark period for environmental and marine science and policy in Canada. Severe cuts have occurred over the past three decades to government operations, but somehow the affected departments rebuilt, albeit with smaller, focussed programs and very limited fiscal resources. Nothing of the current magnitude has happened before in Canada, inflicted upon the country by a government representing less than half (39.6%) of the voters. The question is – can we control or reverse the damage, or have these actions returned us to a pre - Earth Day (1970) or pre-Marine Pollution Bulletin period (1968)? Forty years of research capacity, enterprise and legislation are being reduced to a shadow of what is needed for adequate knowledge, protection and conservation of our aquatic ecosystems and species. An unnecessary crisis fuelled by political ideology, ignorance of the principles of sustainable development, and abandonment of the role of science in decision making is hurting Canada and diminishing our responsibilities for the blue planet.

Readers of the Marine Pollution Bulletin, at the vanguard of ocean policy, environmental protection and conservation, may have other suggestions as to what Canadians should do to either reverse or minimize damage to our science programs and legislation. Please let us know your thoughts and suggestions!

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