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**Assessing Present Threats to Freshwater Aquatic Ecosystems in Canada**

We're dead without water, and we suffer, along with our fellow water-based creatures when water quality suffers; hence, it is crucial that we both assess and manage the threats to our waters. I have been asked to review the current threats to aquatic resources in Canada, but such an assessment is not currently possible for two reasons. Assessment requires a comparison of environmental facts with environmental targets. I will argue that we don't

have the current facts, and our current targets are often flawed. We don't have the facts because governments, with rare exceptions, are no longer conducting large scale environmental assessments. Instead they have downloaded the work to the volunteer and the regulated industrial sectors. While their work is good, the former group will sample mainly their own lakes, while the latter samples their discharge points plus controls, and in neither case will the large scale, randomly allocated data sets that are needed for trustworthy national assessments be generated. There is also a problem with our current targets. Targets for water quality normally do not reflect multiple stressor interactions, including climatic change. In this talk, I will argue that it is critical that we adopt a multiple stressor framework for aquatic ecosystem management in Canada for many reasons:

- (1) Most Canadian waters are now exposed to more than one class of ecological threat, including, alterations in habitat physics (e.g. climate change), habitat chemistry, the introduction of damaging non-indigenous species, and over-harvesting of resources.
- (2) I will argue that aquatic communities have limited capacity to adapt to second and subsequent stressors, because community-wide responses to the initial stressor guarantee that the responses to subsequent stressors with different mechanisms of impact will be non-additive.
- (3) I will demonstrate the difficulty of predicting the effects of interacting stressors, with the examples of both more-than-additive effects of acid and nutrient additions, and less-than-additive interactive effects of salt and metal additions.
- (4) I will argue that aquatic community biodiversity must be protected to prevent shifts from complex interacting webs of species to simple trophic chains, which are much more sensitive to regime shifts, and that
- (5) The introduction of invading species can produce such regime shifts.

(6) I will argue that our water quality standards must be re-evaluated in the face of climate warming, using as an example of the interactive effects of warming and environmental Ca decline.

(7) Finally, I will argue that while the current issues are very serious, recent environmental history provides seeds of hope for our water resources.

We have solved enormous environmental problems in the past, making good progress on all of the issues that started the North American environmental movement. Further new legislation, such as that enacted to protect Lake Simcoe, fosters both detection of novel problems and the remediation of historical ones. Despite these efforts, our water resource problems will continue to worsen as long as we continue to strip ecological capital, and expect downstream ecosystems and communities to manage wastes we supply from upstream. We all suffer when our water resources suffer. Such suffering is preventable, but prevention is a choice we have to make.