

## ABSTRACT

Freshwater resources are under increasing threat from anthropogenic activities. Increasing societal demands have led to substantial flow alterations in rivers across Canada and globally. Flow alteration can impact the physical attributes of rivers which in turn results in ecological changes that can impact the health of river ecosystems. In addition, the cultural values of rivers are increasingly being acknowledged and also require protection. With many emerging and competing needs for water, there is an urgent need to develop guidelines for sustainable flows that manage the risk associated with alterations to flow regimes across jurisdictions including New Brunswick. Managed flows are described as “environmental flows” and the requirements are indirectly mandated by federal legislation via the Canadian Environmental Assessment Act (CEAA), which prohibits activities that cause an environmental effect as defined, for example, by the Fisheries Act, Species at Risk Act, and Migratory Birds Convention Act. There are currently no federal guidelines regarding determination of holistic environmental flows in Canada, i.e., guidelines to safeguard the wellbeing of aquatic life and maintain ecosystem integrity. New Brunswick has not experienced serious pressure related to surface water abstraction to date, but that will change as the Province develops more of its natural resources. Therefore, there is a strong need to define policy guidelines and best practices for New Brunswick’s environmental flow needs.

This document serves as a scientific review to provide background information on environmental flow assessment approaches and on the current status of environmental flow guidelines used in jurisdictions across Canada and internationally. It is recommended that New Brunswick begin the process of adopting the globally accepted “Holistic Framework for Environmental Flows” as the standard for all surface water withdrawal activities in all sectors. Specifically, an “Ecological Limits of Hydrologic Alteration (ELOHA)” approach is recommended. Several challenges and technicalities are expected to influence a full implementation of the ELOHA approach. New Brunswick has already accumulated a significant amount of the required data and thus, the cost of the ELOHA approach is economically feasible. It is recommended that New Brunswick in the interim, immediately initiate a generalized, hydraulic method which can be later integrated with the ELOHA process across all provincial waters. It is recommended that this method be adapted from the current national policy for ecological flow requirements used by Fisheries and Oceans Canada (DFO). Moreover, a number of technical recommendations are proposed to ensure that a sustained effort in scientifically sound research and monitoring of environmental and biological conditions is put in place to support informed decision making. It is recommended that a GIS-based central archiving repository be established that is transparent, publicly accessible, and which contains all prescribed water withdrawal or augmentation licences across the province. Focus on a conservative, adaptive management approach is also recommended to guarantee that the policy and water allocations: 1) are not static but instead, allow for revision of permits and water allocations if justified on ecological grounds; and 2) are applied across all sectors that use water.