ARCTIC
VOL. 67, NO. 1 (MARCH 2014) P. iii–v

Does Canada's New Fisheries Act Leave Some Arctic Fish or Habitats Behind?

Canada, internationally praised for its natural beauty and strong environmental legislation to protect its terrestrial, aquatic, and marine ecosystems, is undergoing a legislative makeover. With extraction of natural resources in Canada's North becoming more and more economically viable, the current Government of Canada has expressly committed to responsible resource development. Recent changes to the Fisheries Act (henceforth, "the Act"), expressly aimed at unleashing Canada's natural resources, came into effect on 25 November 2013, and focus now on commercial, recreational, and Aboriginal (CRA) fisheries (Government of Canada, 2013). The changes to the Act were contested by contributors to the careful maturation of the Act (Langer, 2012) and in court by First Nations (Ecojustice, 2013). Opposition and concerns have been expressed by scientists (de Kerckhove et al., 2013; Hutchings and Post, 2013), as the implications of these changes remain vastly untested (Walton, 2013). Fish communities in Canadian Arctic environments are particularly valuable to Arctic peoples and vulnerable to stressors such as climate change and resource development. Baseline information on Arctic oceans, lakes, and rivers and their ecology is sparse, with local indigenous ecological knowledge often representing the only long-term information available, which limits assessments of status and trends (CAFF, 2010). In addition, some Arctic fisheries (or their fishes) that were previously protected may not yet be commercially developed or even designated as CRA fisheries, and such fisheries, if not protected under the amended Act, could be lost. Moreover, and contrary to intuition, environmental regulation has been significantly weakened, while resource development and associated infrastructure in Canada's Arctic are expected to increase drastically. This imbalance is explored here, using a linear infrastructure project and the adjacent aquatic environments as an example.

In the shadow of high-profile oil sands and pipeline portfolios, a remarkable undertaking is underway farther north: the completion of the first all-weather highway to Canada's Arctic Ocean, the Inuvik-to-Tuk Highway (ITH). The ITH project, jointly proposed by the Government of the Northwest Territories Ministry of Transportation, Town of Inuvik, and Hamlet of Tuktoyaktuk, is co-funded by the territorial and federal governments (cost estimate ~$300M). This project in the Inuvialuit Settlement Region (ISR) has gained little public attention in southern Canada, although it has been anticipated and debated locally. The construction of the approximately 140 km section of highway will pose a range of economic, social, and environmental challenges and opportunities. A review of the project by the Environmental Impact Review Board (EIRB) examined the interactions of the construction, use, and weathering of the ITH and their potential impacts on the landscape, underlying permafrost, thousands of water bodies and their inhabitants, and migratory wildlife. The EIRB recommends approval of the project, with an extensive list of recommendations and conditions to alleviate concerns raised during the process (EIRB, 2013). Regulators and decision makers are now considering the recommendations regarding the construction of this challenging infrastructure project, considered critical for the region's (and country's) economy, as it will open access to new economic opportunity and resources in the ISR. Residents of Inuvik and Tuktoyaktuk are anxious to learn about the further fate of this project, as it pertains to their own livelihood and that of future generations.

The environment along the ITH corridor is characterized as ecologically diverse and of high cultural value to Inuvialuit (IRC, 2011). However, little is known about the aquatic environments within the ITH corridor, made up of more than 1000 small water bodies that drain into larger lakes and ultimately, the Arctic Ocean. These water bodies are vastly understudied; a preliminary assessment of 16 lakes along an existing segment of the ITH revealed that some 30% of small lakes are home to small-bodied fishes (ninespine stickleback, *Pungitius pungitius* L., Fig. 1) and provide rearing habitat for northern pike (*Esox lucius* L.) (Gantner, 2013). Some 10 to 15 larger lakes within the corridor support Aboriginal fisheries (or potentially, new Aboriginal or recreational fisheries) for lake trout (*Salvelinus namaycush* W.) or lake whitefish (*Coregonus clupeaformis* M.). A unique

FIG. 1. A ninespine stickleback (*Pungitius pungitius* L.) collected in August 2012 from an unnamed lake along the Tuk-177 access road on the Tuktoyaktuk Peninsula, 251 Inuvialuit Settlement Region, Northwest Territories, Canada. Photo © N. Gantner and FJMC.

landscape feature likely impacted by the ITH is the Husky Lakes ecosystem, locally renowned for its saline waters and high ecological diversity, which provides Inuvialuit with ample opportunity for traditional hunting and fishing (IRC, 2011). Yet, the ITH will run parallel to the Husky Lakes for approximately half its length (80 km). It will alter the timing and location of access to the lakes, likely increasing recreational and Aboriginal fishing pressures on areas that become easier to access. While studies supported by local communities, Aboriginal Affairs and Northern Development Canada, Fisheries and Oceans Canada, and the Fisheries Joint Management Committee (FJMC) have been conducted or are ongoing (Mills et al., 2008; Gantner, 2013; Gantner and Gareis, 2013; Roux et al., in press), the amendments to the Act may have significant impact on the protection of the diverse aquatic ecosystems, and more detailed studies within the corridor are needed. In response, the FJMC has made these concerns a new priority under its mandate. Water bodies that do not support CRA fisheries, but do support fish such as the ninespine stickleback, may receive little protection under the new Act. Use of existing and potential newly accessible lakes along the corridor as CRA fisheries will require careful assessment and regulation under the amended Act. Such lakes will be protected from "serious harm," but the proponents of resource development (which could include commercial fisheries), rather than the federal authorities, will now assess the likelihood of serious harm to these lakes. This change is of particular concern for the Husky Lakes, given their high cultural value to Inuvialuit (IRC, 2011). Using the ITH as a model project for the Arctic could help regulators and policy makers get environmental legislation right, benefiting the resource sector and the local inhabitants, people and fish alike.

The ITH is just one of likely hundreds of projects in remote regions of Canada that exemplify the need for science-based environmental legislation in order to appropriately regulate natural resource development, while protecting ecosystem components. This need is particularly great for the sparsely populated Canadian Arctic, where land, lakes, and oceans are fundamental to the livelihood of its people. In light of major infrastructure projects in highly sensitive ecological regions, we need an open exchange of information to update approaches to resource development and to develop and apply new models and concepts based on science. Unfortunately, the current Canadian government's communication strategies and policies on science effectively mute open scientific discourse. In the context of Arctic research, this silencing has been most evident since the IPY 2012 Conference in Montreal, Quebec. Moreover, to amend the Fisheries Act without a significant consultation process provides little opportunity to unleash the collective knowledge about fish, fish habitat, and fisheries in Canada that is required to protect Canada's aquatic resources for future generations. Environmental legislation in Canada must incorporate all relevant science, be open to concerns of the Canadian public, its representatives in the public service, and garner the consent of Canada's Aboriginal people.

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