Agenda item 6.1
For information

Council

CNL(17)48

Policies and Regulatory Framework for Stocking Activities of Atlantic Salmon in Canada

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1. Introduction

As per the definition of "Stocking" in Annex 4 of the Williamsburg Resolution, stocking and hatchery interventions for anadromous Atlantic salmon in eastern Canada are currently conducted by the Government of Canada (Fisheries and Oceans Canada (DFO) and Parks Canada), by provincial governments, and by non-government organizations. Stocking and hatchery interventions are undertaken for three reasons:

- conserving biodiversity for populations at high risk of extinction;
- mitigating or compensating for habitat degradation or loss (e.g., the case of the Saint John River where hydro development has reduced production capability) (Mitigation stocking as per the definition in the Williamsburg Resolution Annex 1);
- conducting maintenance stocking with the objective of supporting fisheries) (Salmon enhancement as per the definition in the Williamsburg Resolution Annex 1).

Between the late 1860's and the 1990s, enhancement facilities in Newfoundland and the Maritime Provinces and Québec were used to augment production of salmon for enhanced economic returns in the commercial and recreational fisheries. These practices were terminated by DFO in the 1990's. Most hatcheries in the Maritime Provinces and the associated enhancement opportunities conducted by DFO were divested to not-for-profit stakeholders and an Aboriginal organization. The two facilities that are retained and operated by DFO are now focused on the maintenance of genetic diversity within those populations that are either listed as 'endangered' under the Species at Risk Act (SARA) or in the view of departmental staff have population trajectories which may lead to extirpation in the near future.

This change in policy direction within DFO in the mid 1990s did not, however, discourage (as borne out by the divestitures) the private sector, provincial governments, and First Nations and other Aboriginal organizations from maintaining or becoming involved in Atlantic salmon enhancement for social, economic or other reasons. In the province of Quebec, the single facility is now also used for conservation and restoration purposes whereas modest Atlantic salmon enhancement programs in the provinces of Nova Scotia, New Brunswick and Prince Edward Island are directed at supporting public fisheries. DFO continues to collaborate with private sector interests, provincial governments, and Aboriginal groups on salmon enhancement initiatives that require DFO licensing and to help ensure that the products for those enhancement initiatives meet DFO regulatory requirements for release into fish habitat (Section 3).

There is no federal policy that guides stocking and enhancement activities for Atlantic salmon in eastern Canada. Some provincial governments (New Brunswick, Quebec) have developed policies that guide their sponsored activities. The stocking activities by

governmental and non-governmental organizations (NGO) are reviewed by defined oversight committees and are authorized under the relevant acts and regulations (Section 3).

2. Current stocking activities

2.1. Federal Government

2.1.1 Fisheries and Oceans Canada

Until the mid-1990s, DFO, owned and operated several hatcheries in the three Maritimes provinces of eastern Canada. DFO was also involved in restoration programs on a few rivers in Newfoundland, the most important being the enhancement of the Exploits River. In the mid-1990s, following program review, the majority of DFO hatcheries were divested where possible to non-government organisations with the understanding that the NGO groups would continue the stocking activities at similar levels to those of the recent years prior to divestiture.

DFO currently owns and operates two fish culture facilities for Atlantic salmon. Hatchery activities supported by DFO are directed at recovery actions of endangered populations and to mitigate for habitat loss associated with the construction of the Mactaquac Dam in the lower portion of the Saint John River (New Brunswick).

1) Conservation programs

The conservation programs for the endangered Atlantic salmon populations of the Inner Bay of Fundy (iBoF) and the Outer Bay of Fundy (OBoF) consist of captive breeding and rearing activities; details of this program are provided in DFO (2008, 2010, 2016a) and scientific basis is described in O'Reilly and Doyle (2007), and O'Reilly and Harvie (2010). Live Gene Banks (LGB) for the iBoF Salmon population were initiated in 1998 with activities currently centered at the DFO Mactaquac and Coldbrook Biodiversity Facilities, in New Brunswick (NB) and Nova Scotia (NS) respectively (DFO 2016a). The goal of the LGB is preserving the remnant populations and remaining genetic diversity of the species (DFO 2010). The LGB is designed to have multiple year classes (a "year class" being those fish in a population born in the same year) of each of the principal LGB populations. The number integrated into the LGB for each population annually is 200-300 fish. Genetic data is used to develop annual mating plans (to minimize the risk of losing genetic variation and to avoid inbreeding by mating of genetically, closely-related individuals). Mating plans include a family equalization process (process that equalizes each mating cross to a known number) thus giving each family an equal opportunity for survival.

A variety of life stages of iBoF Salmon have been held in captivity or released. Monitoring of juvenile salmon in the wild has confirmed that the population can be maintained through this process of bypassing the marine phase of the life cycle. The program has been successful at increasing the abundance of juveniles in the wild and substantially reducing extinction risk. However, the LGB program alone is not expected to achieve recovery of this population.

2) Mitigation programs

The mitigation program produces and releases salmon at various life stages to mitigate the effects of hydroelectric development on salmon in the Saint John River associated with the construction of Mactaquac Dam hydro-electric facility in the lower portion of the Saint John

River in the late 1960s (Jones et al. 2014). From the early 1970s to the mid-2000s, hatchery broodstock for the program has consisted of 200-300 wild sea-run adults each year (Clarke et al. 2014). The intensity of smolt rearing and stocking has declined, from a range of 200,000 to just over 300,000 smolts annually between 1978 and 2002 to values less than 50,000 smolts since 2009 (Jones et al. 2014). Since the early 2000s, the program at the Mactquac Biodiversity Facility was re-focused with the objective of conserving and restoring a declining resource (Jones et al. 2004). The current program replaces a large portion of the traditional smolt production with production of age-0 fall parr. The program has also changed from collecting returning anadromous salmon as broodstock, to a captive reared program in which smolts or pre-smolts from the headwater areas are collected, reared at the biodiversity centre and a portion of these (90 males, 90 females) are spawned in the hatchery to produce smolts for mitigation stocking. The surplus juveniles (i.e. those that will not become one-year old smolts) are released in headwater areas in locations from which the juveniles that produced the parental stock were collected.

2.1.2 Parks Canada (federal agency)

Prior to 2010, adult Salmon, which were collected as juveniles from either Big Salmon River or Point Wolfe River, were released into the Point Wolfe River to spawn naturally, and contribute to the production of the next generation of iBoF Salmon. LGB operations for Fundy National Park (FNP) stocks also resulted in annual releases of fry and parr to the Upper Salmon River in FNP from approximately 2006-2011. FNP initiated a change to its iBoF Salmon recovery program in 2010 based on evidence suggesting that the unique Point Wolfe River genetic stock was being lost over generations of mating Big Salmon River and Point Wolfe River Salmon. The new program focused on Point Wolfe River ancestry Salmon selected from the mixed groups to minimize further loss of this unique genetic strain, and will produce high ancestry stock for release at various stages into FNP rivers. This approach is expected to continue until both FNP rivers contain only the unique Point Wolfe River high ancestry stock for broodstock collection.

In addition to the approach above, surplus high ancestry fish are reared to adults for release back into FNP rivers to spawn naturally in order to produce progeny free of captive exposure and to supplement the in-river populations. Wild juveniles collected in excess of those required for the live gene banking program (100 annual captive matings), are now transferred as smolts to a dedicated marine farm for rearing wild salmon. Wild smolts are reared to maturity at this marine farm operated by Cooke Aquaculture, which is isolated from the commercial aquaculture industry within Bay Management Area 5 of the Bay of Fundy. They are then transferred back to native rivers in FNP to spawn naturally. The resulting offspring are free of any captive exposure. Considering the IBoF population depends on supplementation to avoid extinction, migrating smolts from this program are anticipated to provide optimally fit individuals going out to sea as well as samples for perpetuating live gene banking activities.

Currently, FNP collects wild juvenile cohorts annually at the parr stage in late fall and at the smolt stage the following spring. Parr are held at a DFO Mactquac Biodiversity Centre over winter and transferred to the marine farm in spring depending on number of smolts captured for LGB requirements. Mature adults are released back to rivers of FNP in October. Numbers of individuals released in each river are targeted to exceed estimated minimum

viable effective population size of 300-475 individuals. The program currently focuses on one river, but is planned to include both FNP rivers eventually. In 2016, 845 mature adult salmon were released to the Upper Salmon river in FNP. Of note, Fort Folly First Nation, IBoF recovery team members and long-term partners on the FNP recovery program, lead a similar program on the Petitcodiac River, the largest river system in the IBoF. The program similarly collects juvenile salmon, rears at the same wild salmon farm until mature and releases the adults back to the Petitcodiac River. Transfer of fish to and from the wild and rearing facilities occurs under permit from DFO Introductions and Transfers committee which requires health screening to be completed and approved for each transfer.

2.2 Provincial governments

2.2.1 Province of New Brunswick

In the late 1970's, the New Brunswick Department of Energy & Resource Development (DERD) (formerly Natural Resources) began rearing fish for stocking purposes using its own provincial fish hatchery to support public fisheries. These fish included species such as anadromous Atlantic Salmon, landlocked Atlantic salmon, Brook Trout, Arctic Char, Lake Trout and Splake to name a few. In 2004, budget constraints forced the decommissioning of the provincial fish hatchery. In an effort to maintain the program, a mandatory five dollar *Fish Stocking Conservation Fee* was added to the cost of most angling licenses to generate revenue for the purchase of fish rearing services from outside sources. In light of the changes, DERD established a *Fish Stocking Policy* that specifies a number of conditions, including only stocking fish that are 1) native to NB, 2) of wild NB strain, and 3) certified disease free. The policy also states there would be no stocking where stocked fish could harm other species at a population level and, generally, where the species to be stocked is not native to those waters. The focus of the revised stocking program is to landlocked Atlantic Salmon and Brook Trout only; as well as a priority of lakes over streams, rivers and brooks.

Lakes stocked with landlocked salmon are generally stocked on an alternate year basis with nine lakes stocked every odd year and 16 lakes stocked every even year, for a total of 23 different lakes stocked (2 lakes are stocked every year). Each year, roughly 40,000 landlocked salmon are stocked, after being marked with an adipose, left ventral or right ventral fin clip.

2.2.2 Province of Newfoundland and Labrador

There is limited to no stocking activities in Newfoundland and Labrador. There are no hatcheries, either government operated or private that collect, hold, spawn, or release Atlantic salmon to public waters.

2.2.3 Province of Nova Scotia

The Province of Nova Scotia owns and operates three hatcheries which stock Brook Trout, Brown Trout, Rainbow Trout and anadromous Atlantic Salmon in support of the Province's sport fishery. Only two of the three provincial hatcheries culture anadromous Atlantic salmon.

Atlantic salmon are raised from wild broodstock captured annually and released at fry, parr and smolt stages specific to rivers from which the parents were collected. There are currently five rivers in the province that are supplemented with hatchery produced Atlantic salmon: Baddeck River and Middle River in eastern Cape Breton, Mabou River, Margaree River and West River Antigonish in the Gulf region of Nova Scotia. The annual collections from each river are modest, with the largest collection from the Margaree River of 25 pairs annually. All parr and smolt are adipose fin-clipped for identification as returning adults. To reduce the impact of the hatchery environment on natural selection, fin-clipped adults are not used as broodstock. Mating is carried out with a 1:1 male/female sex ratio. Atlantic salmon broodstock collection and release of juvenile fish is carried out under permit by DFO. The province regulates commercial aquaculture under the Fisheries and Coastal Resources Act and two separate sets of regulations including Aquaculture Lease and Licensing Regulation and Aquaculture regulations. These Regulations address aquatic animal health, fish containment, environmental monitoring, and farm operations.

2.2.4 Province of Prince Edward Island

There are no government owned or operated fish culture facilities in the Province of Prince Edward Island (PEI). Priority stocking activities are for brook trout. The limited stocking of anadromous Atlantic salmon that occurs is from production contracted to private facilities. The current stock enhancement program on PEI has two primary goals: to supplement natural populations and to improve recreational fishing opportunities. Currently, the emphasis for stocking of Atlantic salmon is the Morell River, which receives the first 50,000 salmon fry, with any additional fry available to stock another system. Broodstock salmon, less than 50 adults annually are collected from the wild. To monitor the success of stocking feeding Atlantic salmon fry, a tributary of the West River (Brookvale) was chosen as a test site. Salmon fry were stocked in 2015 and 2016 and electrofishing surveys indicate good survival over the two years. The site will continue to be monitored and the ultimate indicator of success will be evidence of spawning.

2.2.5 Province of Quebec

The province of Quebec has owned and operated since 1875 one fish culture facility which is primarily used for Atlantic salmon. With the exception of a few activities related to hydro-electric mitigation projects, this is the only facility in which spawning and rearing of juvenile salmon for enhancement purposes takes places. In all instances, the objectives of the enhancement activities are for conservation and restoration of Atlantic salmon populations.

In addition to the acts and regulations described in section 3 for regulating enhancement activities, a number of administrative processes have been developed to maximize the benefits and to reduce the risks associated with enhancement activities. These are presented in the recently revised Atlantic Salmon management Plan 2016-2026 (MFFP 2016) and in internal policy documents.

With the objective of reducing intra-specific competition, enhancement activities are only permitted on rivers which are below their optimal conservation level, as defined in the management plan. The stocking of salmon is only permitted in sections of the rivers that are under-utilized by wild salmon. To maximize the survival of stocked fish, candidate rivers for

enhancement must also have sufficient quantities of high quality habitat as defined by the Index of Habitat Quality.

The impacts associated with the loss of genetic diversity are reduced by using a number of broodstock in the hatchery that represents a significant proportion of the wild population; at least 30 spawners for populations with less than 500 wild anadromous salmon or 10% of the total wild anadromous population if the wild population exceeds 500 fish. To further safeguard the genetic diversity, the broodstock must be comprised of equal numbers of male and female spawners with spawning crosses of a minimum of 3 females and 3 males. One-third of the broodstock held in captivity is replaced on annual basis and no individual is spawned more than three times.

Since 2012, the number of juveniles stocked in rivers identified in the Government of Quebec's five-year enhancement program for salmon is determined based on an analysis of the expected demographic gains and on theoretical genetic concepts for each river. The analysis, based on a mathematical model described by Ryman and Laikre (1991), provides a stocking number that will result in at least a 15% increase in abundance while limiting the reduction in the effective population size, a genetic diversity parameter, to less than 10%. The loss of genetic integrity is further controlled by using broodstock specific to the river that will be enhanced. In the rare instances where the number of spawners in the wild is insufficient to respect this objective, and in order to prevent extirpation of the population, broodstock from another population that is genetically related may be used. Since the initiation of this condition, only enhancement activities in the Sheldrake River required the use of non-river specific broodstock as the most recent assessments indicated that the wild anadromous returns to the river were less than 10 adults. Before this decision is made, other options for enhancement are considered including recourse to live gene banking or the use of juvenile to adult supplementation.

In order to assess the results of the enhancement activities undertaken by the government of Quebec, all stocked juvenile salmon since 2012 are marked in a way that allows them to be distinguished from wild salmon at enumeration facilities or in recreational fisheries catch.

2.3 Non-Governmental-Organization (NGO) activities

2.3.1 Juvenile stocking programs

Since the divestiture of the DFO hatcheries, a number of watershed and conservation groups have continued or initiated modest stocking programs in support of public fisheries in several rivers in Gulf Region New Brunswick. Stocking activities currently occur primarily at early juvenile stages, most at the unfed fry stage. No inter-river transfers are allowed and in the larger Miramichi River, no intra-river transfers occur. Wild anadromous broodstock are collected specific to the river for which stocking is proposed and in the Miramichi River, the collections and subsequent releases take place specific to tributaries. The financial costs of the operations are borne by the NGO groups.

2.3.2 Smolt to captive reared adult supplementation

In response to particularly low returns of Atlantic salmon to the Northwest Miramichi River in 2012 to 2014, a group of NGOs in New Brunswick proposed a stock supplementation program consisting of the capture of wild Atlantic salmon smolts, rearing these in captivity in freshwater to the adult stage, and subsequently releasing the adult captive-reared fish back to the river. This activity is intended to circumvent the low marine smolt to adult return rates of Atlantic salmon and to increase spawning escapement. As a precedent setting activity for supplementation of Atlantic salmon populations, DFO undertook a science peer review of the risks and benefits of such programs to wild Atlantic salmon fitness in order to provide advice to DFO Fisheries and Aquaculture Management, the sector responsible for issuing the permits for such activities (DFO 2016b). Smolt collections for captive rearing occurred in 2015 and 2016, but no captive-reared adults have been released to date. Regulatory decisions on authorizing further collections of smolts and the release of captive-reared adults are pending.

The first smolt to adult supplementation program in the province of Quebec has been initiated on the Romaine River by the Société Saumon de la Rivière Romaine. The number of spawners in this river was estimated to be in the range of 50 to 100 adults and the removal of broodstock was considered to pose a risk to the viability of the population. The spawners reared in captivity from smolt collections were spawned in a hatchery with stocking of unfed fry to the river.

2.4 Compliance with directives in Annex 4 of the Williamsburg Resolution

With few exceptions, the Atlantic salmon stocking programs in eastern Canada are consistent with the guidelines for conducting stocking as detailed in Annex 4 of the Williamsburg Resolution.

- Rivers where stocking has recently occurred or is currently occurring are classified as Class II rivers (having had some alterations to habitat, primarily associated with land use activities).
- Non-indigenous salmon (European origin, including Icelandic origin) have never been used in stocking activities in eastern Canada.
- Prior to any transfer of eggs, juveniles or broodstock, health inspections of the products are required (see Section 3).
- Hatchery programs for release of Atlantic salmon to the wild are conducted according to the following principles:

    - Wild fish are used as broodstock.
    - Broodstock removals represent a small proportion of the wild salmon runs.
    - Broodstock collections represent all phenotype age groups and components of a donor population.
    - Matings are generally one male per female, or in some cases paired matings occur without prior mixing of milt before fertilization.
    - Juvenile stages are generally released in areas where there are low densities of wild salmon juveniles and the habitat is considered to be under-utilized.

- Stocking programmes take account of population structuring and no inter-basin transfers are allowed. In large rivers such as the Miramichi and Restigouche, hatchery programmes target specific tributaries and juveniles are stocked in the parental origin tributaries (no intra-basin transfers).

The only guideline that is generally not respected relates to the number of broodstock. Activities conducted by provincial governments (except Quebec) and NGO groups are modest in scale and the number of broodstock collected are generally low, and with few exception, less than 10 pairs for the river-specific or tributary-specific programs. As such, the recommendation that a minimum of a random group of 50 pairs be used for each cohort, is not achieved. Due to the modest scale of the river-specific supplementation programs, this is not considered to be a risk to the genetic integrity of the salmon populations. The activities directed at mitigation and for conservation/restoration of endangered salmon populations (section 2.1.1, 2.1.2) exceed the minimum guideline for broodstock numbers and in the case of the live gene bank program, hatchery mating is guided by a plan informed by genetic analysis pre-mating.

3. Regulatory Framework

Guidelines for authorising Stocking are described in the following section and conform to the directives described in Annex X of the Williamsburg Resolution. Fish health and genetic protocols are followed and risk assessments where required are conducted on the basis of health, genetic and ecological factors.

Except in Québec, permission under the Fisheries Act or the *Fisheries (General) Regulations* is required to obtain wild fish for stocking or artificial breeding purposes and for releasing Atlantic salmon (eggs, larvae, or fish) into habitat:

- Authorization under Section 4 of the *Fisheries Act*, is required from the DFO to collect fish for broodstock from the natural producing waters
- A license, under Section 56 of the *Fisheries (General) Regulations*, is required from DFO to release or transfer live fish into fish habitat or to a fish rearing facility. A report of number of fish released or transferred is a condition of the License.
- A provincial Aquaculture License is required to operate a fish culture facility. The exceptions to this requirement are those hatcheries operated by federal and provincial governments, and in Nova Scotia, facilities exclusively for enhancement purposes.
- Satellite sites of any hatchery operation also require an Aquaculture License.

In Québec, the capture of wild fish or gamete extraction for stocking for artificial breeding purposes and the release of live fish into fish habitat is governed by the Règlement sur l'aquaculture et la vente des poissons (Regulations Respecting Aquaculture and the Sale of Fish, thereafter called RAVP) and the Règlement sur les catégories de permis d'aquaculture (Regulations Respecting Aquaculture and the Sale of Fish, thereafter called RCPA), which both derive from the Loi sur la conservation et la mise en valeur de la faune (Act respecting the conservation and development of wildlife). When supplementation is entirely assumed by the government (capture, production and stocking), no license is required. Stocking must nevertheless respect the activities authorized by the RAVP. In the rare cases not completely conducted by the Quebec government, licences are required under the RAVP and RCPA.

3.1 National Code for Introductions and Transfers

In Canada, DFO issues licences under Section 56 of the *Fishery (General) Regulations* to intentionally release and transfer live aquatic organisms into fish bearing waters or fish rearing facilities. The issuance of these licences is managed through an Introduction and Transfers Committee (ITC) who is responsible for considering the three key provisions of Section 56 of the *Fishery (General) Regulations*:

1. Is the request in keeping with the proper management and control of fisheries?
2. Do the fish have any disease or disease agent(s) that maybe harmful to the protection and conservation of fish?
3. Will the fish introduction or transfers have an adverse effect on local fish stock size or genetic characteristics of fish?

In 2010, under the legislative authority of the *Health of Animals Act and Regulations*, the Canadian Food Inspection Agency (CFIA) began to implement the National Aquatic Animal Health Program (NAAHP). Under the NAAHP, CFIA assumed a new federal leadership role in managing the disease risks associated with movements of aquatic animals - a federal leadership role that had traditionally resided with DFO. The CFIA implemented the final portion of NAAHP, the Domestic Movement Control Program (DMCP), which came into effect on December 31, 2015. Under DMCP, CFIA will enact new measures, such as zonation and permitting, to support domestic movements of aquatic animals.

CFIA assesses disease risks associated with aquatic animal imports and domestic movements under a risk framework based on internationally accepted principles of the World Organisation for Animal Health (OIE). This framework provides the foundation for assessing permit applications under the NAAHP. CFIA carries out the management of disease risks associated with importations and domestic movements of aquatic animals in collaboration with the provinces, territories and industry.

While federal roles and responsibilities have changed with regards to the management of disease risks, the goal has not: the Code's signatories and the federal–provincial–territorial governments remain committed to delivering an effective and integrated Code that effectively manages ecological, disease, and genetic risks. The foundation of the Code remains the utilization of science-based, objective risk assessment frameworks to inform the licensing/permitting process required to move aquatic organisms.

3.1.1 Introductions and Transfers Committees

Introductions and Transfers Committees (ITCs) operate in each province or territory with representation from DFO and the provincial/territorial government. DFO and provinces/territories collaborate to manage disease risks pertaining to the intentional movement of aquatic organisms falling outside the scope of the NAAHP as specified in each committee's terms of reference. Currently, the guiding policy followed by each ITC is the *2013 Code on Introductions and Transfers* (the Code) that establishes an objective decision-making framework and consistent national process for assessing and managing the potential ecological, disease and genetic risks associated with intentionally moving live aquatic organisms into, between or within Canadian watersheds and fish-rearing facilities. The Code

recognizes and reflects the shared federal–provincial–territorial jurisdiction in managing the intentional movements of live aquatic organisms and responsibilities under the advisory and liaison function of the ITCs established in each province/territory. While the roles, responsibilities and legal authorities of jurisdictions may differ within the committee structure, the collective expertise in managing these movements ensures a well-coordinated, nationally consistent management structure.

3.1.2 Aquatic Organism Risk Assessment Process

To evaluate the risks associated with the introduction or transfer of aquatic organisms, it is necessary to assess both the probability that a species will become established and the consequences of that potential establishment. The assessment process addresses the major environmental components. It provides a standardised approach to evaluating the risk of genetic and ecological impacts, as well as the potential for introducing a "fellow-traveller" or parasite that might impact the native species of the proposed receiving waters. The risk assessment process is to be conducted recognizing the existing industries and the historic transfers of the species that have been approved for use.

The quantity and quality of information required to complete the formal risk assessment is at the committee's discretion and is factored into the level of certainty associated with the risk assessment.

- The formal risk assessment—based on classifications of high, medium and low risk—will form the basis of the evaluation provided by the ITC to the decision-making authority on all requests for introductions and transfers of aquatic organisms that are subject to the assessment process.
- Where the proposed introduction or transfer is deemed to be medium- or high-risk, the ITC may offer the applicant the opportunity to identify further mitigation measures that could be used to reduce the risk.
- The ITC will provide the risk assessment and the certainty surrounding the risk assessment, as well as how and why it was determined to the decision-making authority.
- In addition to science-based information, the ITC may draw on relevant local ecological knowledge, such as from Aboriginal groups, aquaculturists, local groups or fishers.
- The decision-making authority will consider the risk assessment and level of certainty provided by the ITC. The decision-making authority may take into account socio-economic factors and Aboriginal considerations, and will determine whether the risk is acceptable.

3.1.3 Audit and monitoring activities

The 2013 Code enhances commitments on the part of all jurisdictions to maintain, store and share information on introductions and transfers. A National Introductions and Transfers Database and Risk Assessment Library enables the ITCs to share information across jurisdictions and support Canada's domestic and international reporting requirements.

Data is provided to the Aquaculture Management Directorate from each ITC to submit to the North American Commission and NASCO to meet reporting requirements on movements of salmonids.

3.1.4 Compliance

DFO promotes compliance with the *Fisheries Act* and other related acts and regulations through education and awareness activities directed at both industry and the public. Fishery officers conduct inspections to validate licence reporting, and to determine compliance with licences, conditions of licence and other applicable legislation.

3.1.5 Service Delivery

Service delivery under the 2013 Code incorporates defined service standards for each stage of the application, review and decision-making process for authorizations to move aquatic organisms. Jurisdictional collaboration in delivering introduction and transfer licences under a measurable set of standards provides the transparency, predictability and responsiveness that Canadian companies and institutions moving aquatic organisms expect.

3.1.6 Other regulations, policies and guidelines

DFO can issue licences and conditions pursuant to resource access requests for stocking and enhancement purposes. Section 7(1) of the *Fisheries Act* can be used to provide access to fish outside of the normal fishing season. Section 4 of the *Fisheries Act* authorizes collection of fish for the purposes of stocking or artificial breeding or for scientific purposes.

ITCs also refer to other domestic and international regulations, policies and guidelines when assessing risks or identifying mitigation measures for stocking activities, including:

- *Recovery Potential Assessments (RPA) and Action Plans developed under the Species at Risk Act*
- *Food and Agriculture Organization of the United Nations (FAO) Codes of Practice and manual of procedures for consideration of Introductions and Transfers of marine and freshwater organisms*
- *International Council for the Exploration of the Sea (ICES)*
- *Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks The Williamsburg Resolution (CNL)06)48.*

The North American Commission (NAC) of NASCO recognizes the potential effects that introductions and transfers of aquatic species can have on fish health, genetics, and their ecology. In 2003, NASCO adopted the Williamsburg Resolution which referenced the NAC Protocols as contained in NAC(92)24 and ancillary document NAC(94)14. In Canada, the National Code on Introductions and Transfers of Aquatic Organisms was adopted in 2001. It is acknowledged that Canada and the United States utilize different methods for authorization of introductions and transfers. This Memorandum of Understanding is meant to reconcile these differences while recognizing the common goal is the conservation and protection of

wild Atlantic salmon. Canada and the United States have agreed to record the following in connection with the introductions and transfers of salmonids in the North American (NAC) area: i) authorizations of introductions and transfers, ii) requirement to report, iii) requirement to consult, and iv) need for review.

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Figure 1. Map of eastern Canada showing the provincial jurisdictions mentioned in text.

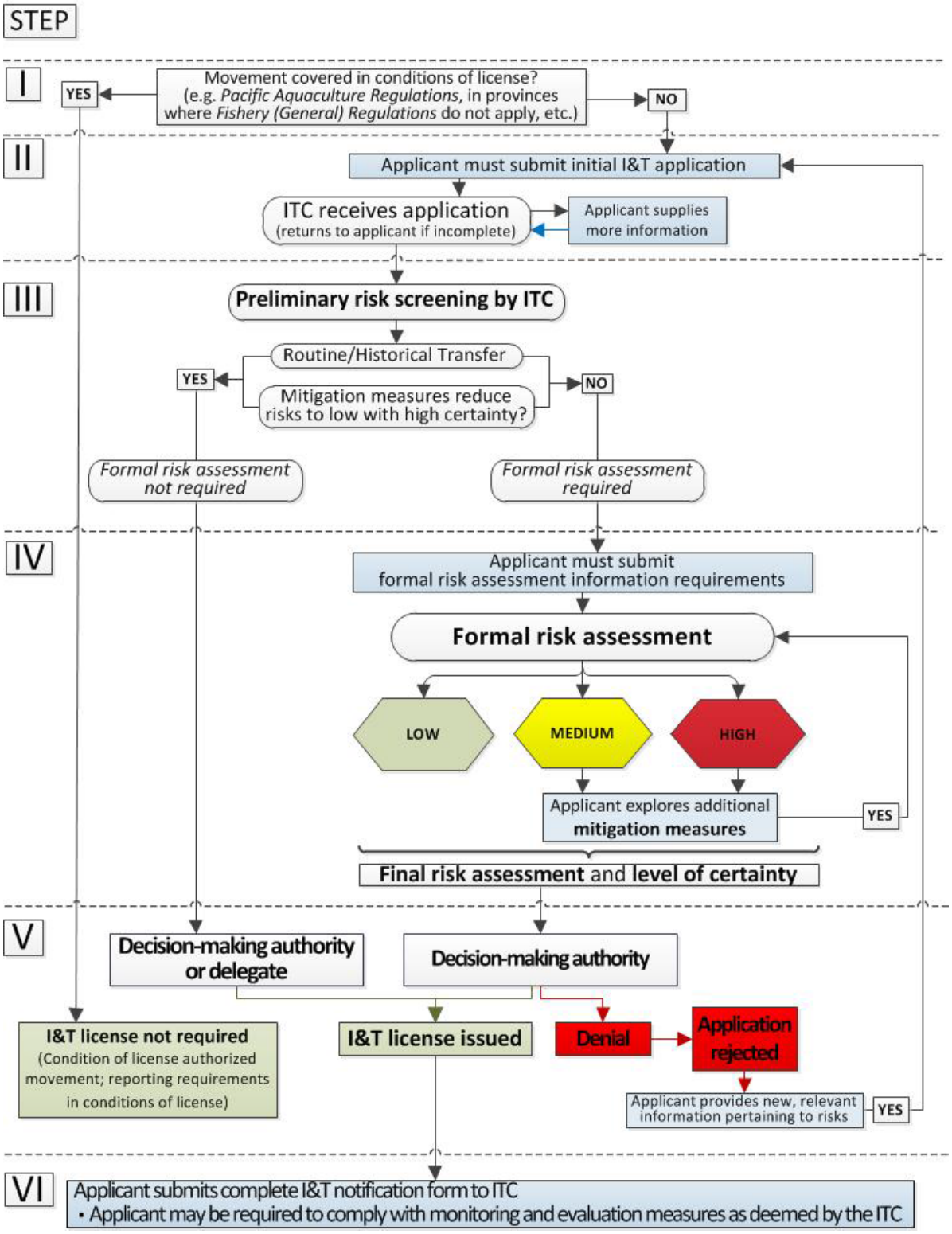

Figure 2. Flow chart illustrating the introduction and transfer (I&T) licensing process.