IP(19)17rev3

NASCO Implementation Plan for the period 2019-2024

Canada

(Revised October 2021)

IP(19)17rev3

North Atlantic Salmon Conservation Organization (NASCO)
Implementation Plan for the period 2019 – 2024

The main purpose of this Implementation Plan is to demonstrate what actions are being taken by the Parties / jurisdictions to implement NASCO's Resolutions, Agreements and Guidelines.

In completing this Implementation Plan please refer to the ***Guidelines for the Preparation and Evaluation of NASCO Implementation Plans and for Reporting on Progress****, CNL(18)49.*

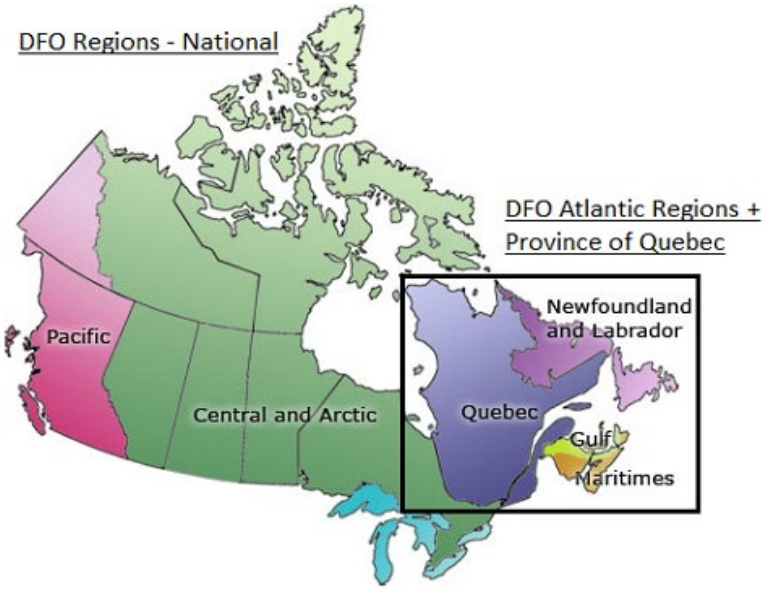
Questions in the Implementation Plan are drawn from the following documents:

- *NASCO Guidelines for Management of Salmon Fisheries, CNL(09)43 (referred to as the 'Fisheries Guidelines');*
- *Report of the Working Group on Stock Classification, CNL(16)11;*
- *Minimum Standard for Catch Statistics, CNL(93)51 (referred to as the 'Minimum Standard');*
- *Revised matrix for the application of the six tenets for effective management of an Atlantic salmon fishery, WGCST(16)16[1];*
- *NASCO Plan of Action for the Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat, CNL(01)51;*
- *NASCO Guidelines for Protection, Restoration and Enhancement of Atlantic Salmon Habitat, CNL(10)51 (referred to as the 'Habitat Guidelines');*
- *Williamsburg Resolution, CNL(06)48;*
- *Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks (SLG(09)5) (referred to as the 'BMP Guidance');*
- *Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach (CNL(04)57); and,*
- *Road Map' to enhance information exchange and co-operation on monitoring, research and measures to prevent the spread of G. salaris and eradicate it if introduced', NEA(18)08.*

Party:	**Canada**
Jurisdiction / Region:	Fisheries and Oceans Canada (DFO) is the federal administrative body responsible for the management of Atlantic salmon fisheries and habitat, with the exception of Province of Quebec, which bears this responsibility in its jurisdiction. All provinces, though, are granted exclusive jurisdiction over matters dealing with property, civil rights, the management of public lands and inland waters under Canada's *Constitution Act.* In Atlantic Canada, DFO has three

[1] This document can be obtained from the NASCO Secretariat; email hq@nasco.int

Regions referred to throughout this Implementation Plan (IP): Gulf, Maritimes, Newfoundland and Labrador:



Provincial jurisdictions referred to in the IP include Quebec as well those in Atlantic Canada (New Brunswick, Newfoundland and Labrador; Nova Scotia; and, Prince Edward Island).

1. Introduction

1.1 What are the objectives for the management of wild salmon? *(Max 200 words)*

The Government of Canada recognizes that wild Atlantic salmon is an important icon for Canadians. It is fished for food, social, and ceremonial (FSC) purposes by more than forty First Nations and many Indigenous communities. In central and coastal Labrador, it is relied on for local community food fisheries. Salmon angling is also a valued recreational activity by both local residents and non-residents. Wild Atlantic salmon are also considered an indicator of environmental

quality, an animal of respect, an attraction for eco-tourism and have an importance beyond economic returns.

Canada's national goals and objectives are to restore and maintain healthy wild Atlantic salmon populations. This will be achieved by rebuilding and protecting the biological foundations of wild Atlantic salmon while taking into consideration the social, cultural, ecological and economic benefits of wild salmon for now and for future generations of Canadians. Closely associated with these goals and resulting management actions is an enhanced understanding of all drivers affecting Atlantic salmon populations, such as climate change.

1.2 What reference points (e.g. conservation limits, management targets or other measures of abundance) are used to assess the status of stocks? *(Max 200 words)*
(Reference: Sections 2.4 and 2.5 of the Fisheries Guidelines)

Limit reference point (LRPs) have been defined and published for Atlantic salmon rivers in eastern Canada. Upper stock reference points (USRs), have been defined for salmon rivers in the Province of Quebec and for the rivers of Newfoundland and Labrador. The development of URPs in the Gulf Region is ongoing and is expected to be completed by the end of 2021. Where adult assessments are not available, other indicators of abundance, including fisheries harvests and catches, indices of catch per unit effort, indices of juvenile abundance, and trends in these indices are used to infer stock status.

Populations of Atlantic salmon can also be assessed by the Committee on the Status of Wildlife in Canada (COSEWIC), and listed under the *Species at Risk Act* (SARA), federal legislation designed to protect extirpated, endangered or threatened species and its habitats in Canada, as well as provide for the management of species of special concern. COSEWIC has defined 16 Designatable Units (DUs) of Atlantic salmon in eastern Canada and assessed its status as to the level of risk of extirpation. Six DUs were assessed as Threatened or Endangered, and Recovery Potential Assessments were completed for all of these. The inner Bay of Fundy (iBoF) population of Atlantic Salmon is the only population legally listed as Endangered under SARA (since 2003) and recovery planning and action are well underway.

1.3 What is the current status of stocks under the new classification system outlined in CNL(16)11?

Stock Classification Score	Salmon Classification Category	Number of rivers
0	Not at Risk	22
1	Low Risk	74
2	Moderate Risk	40
3	High Risk	99
N/A	Artificially Sustained	7
N/A	Lost	105
N/A	Unknown	510

Additional comments:

The NASCO Atlantic salmon rivers database was reviewed and revised in 2018. A technical report describing the information used to populate the database and to ascribe a classification according to NASCO CNL(16)11 is to be published. Specific information on adult abundance and impacts was used when available. Detailed information was not available for all of the over 1000 rivers in eastern Canada. In the absence of detailed information, regional information, at the scale of salmon fishing areas was used to classify the status of salmon rivers. The geographic isolation of many rivers in eastern Canada, particularly in the northern areas of the country, preclude the development of quantitative metrics. In a similar way, these geographically isolated rivers are generally subjected to low direct anthropogenic impacts.

1.4 How is stock diversity (e.g. genetics, age composition, run-timing, etc.) taken into account in the management of salmon stocks? *(Max 200 words)*

Atlantic salmon in Canada are divided into Designatable Units (DUs) based on stock diversity and defined using genetic discreteness and evolutionary significance. Variations in life history characteristics (i.e., smolt age, sea age, and run timing) determined using monitoring data provide additional evidence to support DU structure. Sixteen DUs for Atlantic salmon were defined on this basis and assessed in 2010 based on population trends over the previous three generations.

For fishery management purposes, the status of each DU is considered along with annual river-specific assessments against limit reference points. DUs that have been assessed as endangered are closed to salmon fishing, while other DUs of concern are limited to catch and release fishing only, or are subject to reduced harvest limits.

1.5 To provide a baseline for future comparison, what is the current and potential quantity of salmon habitat? *(Max 200 words)*
(Reference: Section 3.1 of the Habitat Guidelines)

The information provided in the NASCO Rivers database provides a baseline of the current quantity of salmon freshwater habitat; where available, estimates of freshwater fluvial habitat areas, and for Newfoundland lacustrine habitat, are provided. Watershed areas (km²) are provided for 768 of 857 rivers in the database (90 per cent). Estimates of fluvial habitat equivalents are provided for 520 rivers in eastern Canada; the fluvial habitat equivalents total 574 million m². Most rivers for which fluvial habitat has not been quantified are in the northern areas of Labrador and portions of Newfoundland and many of which are isolated rivers subjected to low direct anthropogenic impacts. For the Maritimes Region, detailed information on habitat quantity, access, and quality are provided in the recovery potential assessment reports and/or the recovery plans for the populations at risk of extirpation.

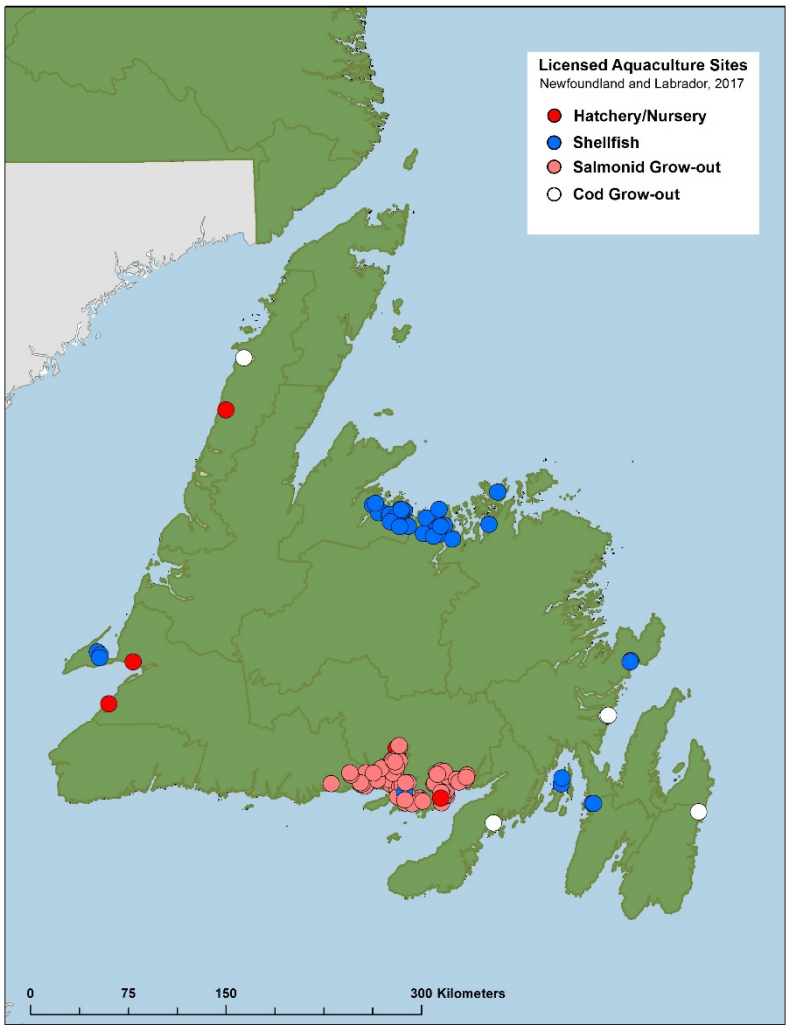
1.6 What is the current extent of freshwater and marine salmonid aquaculture?

Number of marine farms	As of 2018 in Atlantic Canada, there were 151 marine finfish sites.
Marine production (tonnes)	In 2017, marine production was 53,767 tonnes.
Number of freshwater facilities	In 2018, there were six freshwater cage sites and 116 land-based facilities in Atlantic Canada. This includes hatcheries, enhancement facilities, scientific research facilities, and grow-out operations. Many of these facilities are also farming multiple species and are not just limited to salmonid species.
Freshwater production (tonnes)	In 2017, there was 464 tonnes of freshwater production.

Maps showing the location of aquaculture facilities and aquaculture free zones in rivers and the sea:

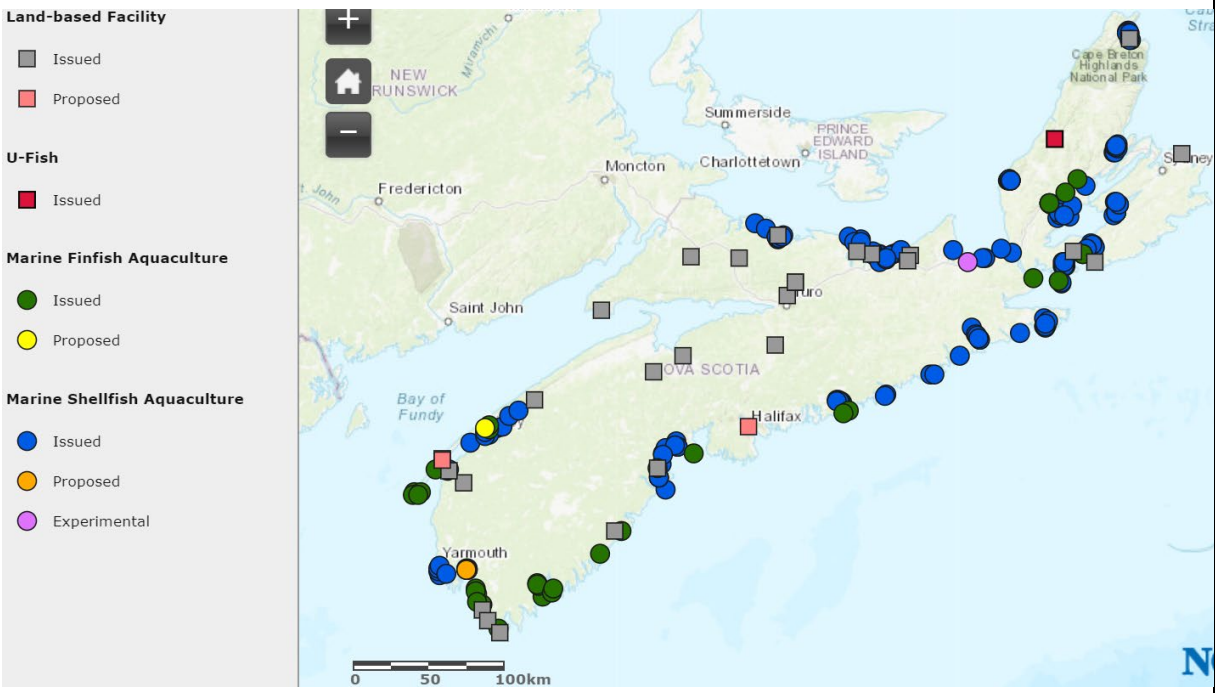
1. New Brunswick - Marine Aquaculture Site Mapping Program (For a more detailed and interactive view, use the following tool:):
   https://www2.gnb.ca/content/gnb/en/departments/10/aquaculture/content/masmp.html

2. Newfoundland and Labrador:



https://www.findnewfoundlandlabrador.com/invest/aquaculture/ (2017)

3. Nova Scotia:



Screenshot of high level overview. For a more detailed and interactive view, use the following tool: https://novascotia.ca/fish/aquaculture/site-mapping-tool/

1.7 Please describe the process used to consult NGOs and other stakeholders and industries in the development of this Implementation Plan. *(Max 200 words)*

DFO's primary consultative body for issues related to wild Atlantic salmon is the Atlantic Salmon Advisory Committee (ASAC). The ASAC consists of nearly 40 member organizations, each representing a variety of Indigenous groups, provincial and territorial governments, watershed and conservation groups, and umbrella organizations such as the Atlantic Salmon Federation. DFO has been consulting with the members of the ASAC over the past several years, particularly since 2014, which saw historically low returns of salmon in eastern Canada. This engagement has touched upon many of the issues and actions in this document, including through the revision of Canada's Wild Atlantic Salmon Conservation Policy.

For the purposes of developing Canada's 2019-2024 IP, members of ASAC have been engaged via teleconferences and through seeking written comments. The content of the Plan was informed by this process and the perspectives of the stakeholders were incorporated as appropriate.

2. Management of Salmon Fisheries:

In this section please review the management approach to each of the fisheries in your jurisdiction (i.e. commercial, recreational and other fisheries) in line with the relevant NASCO Resolutions, Agreements and Guidelines. For Parties / jurisdictions that prosecute mixed-stock fisheries, there should at least one action related to its management.

2.1 What are the objectives for the management of the fisheries for wild salmon? *(Max. 200 words)*

The primary objective is that conservation remains the first principle that all decisions are based on, utilizing strategies that promote sustainability, the principles of the precautionary approach (PA) and shared stewardship. Four objectives are outlined in Canada's *Wild Atlantic Salmon Conservation Policy* as follows:

1. Conservation: The conservation of wild Atlantic salmon populations, its genetic diversity and its habitats must be given the highest priority in management decisions;
2. Sustainable Use and Benefits: Management decisions must respect the rights of Indigenous peoples, reflect best available science, and consider local and Indigenous traditional knowledge as well as the biological, social and economic consequences for Canadians;
3. Precautionary Approach and Transparent Decision Making: Management decisions must apply the precautionary approach and must be made in an open, inclusive, and transparent manner;
4. Shared Stewardship: Conservation initiatives will be optimized with the active engagement of provincial governments, Indigenous peoples, other Indigenous organizations, volunteers and other stakeholders in the development and implementation of management decisions.

For SARA-listed populations, management decisions should be consistent with the SARA requirements (i.e. in compliance with the prohibitions of the act and consistent with the objectives for survival and recovery).

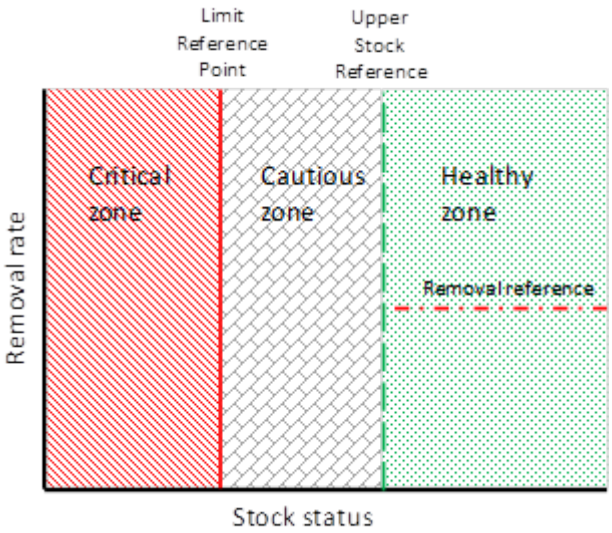
2.2 What is the decision-making process for the management of salmon fisheries, including predetermined decisions taken under different stock conditions (e.g. the stock levels at which regulations are triggered)? *(Max. 200 words)*

(This can be answered by providing a flow diagram if this is available.)
(Reference: Sections 2.1 and 2.7 of the Fisheries Guidelines)

In Canada, the priority right of access to Atlantic salmon is: conservation, Indigenous people's Food, Social and Ceremonial Fisheries (FSC), recreational fisheries, and commercial fisheries. Conservation is defined within the Precautionary Approach (PA) Framework and harvesting decisions are determined based on the status of Atlantic salmon relative to river-specific reference points. The river-specific reference points account for freshwater habitat areas of individual rivers and the variations in life history characteristics of adult salmon.

In rivers where reference points have been defined, no retention of large salmon is allowed in recreational fisheries unless status is above the upper stock reference (USR) point. Below the USR, recreational fisheries are restricted to retention of small salmon only, with area or river quotas or bag limits per licence based on status within that zone. When the stock status is below the limit reference point (LRP), reductions in Indigenous peoples fisheries are negotiated, recreational fisheries retention of small salmon is severely curtailed or prohibited but catch and release fishing may be permitted. When stock status falls to a state where the population is considered to be threatened or endangered, all fisheries for salmon can be prohibited. Decisions regarding access are guided by input from stakeholders, partners and Indigenous groups, and consider cultural and socio-economic factors.

For the Inner Bay of Fundy population group which is listed under Schedule 1 of SARA, prohibitions on harm to fish or fish habitat apply.



DFO Standard Precautionary Approach diagram showing the three status zones and the reference points which delimit the zones.

2.3 (a) Are any fisheries permitted to operate on salmon stocks that are below its reference point (e.g. Conservation Limits)? If so, (b) how many such fisheries are there and (c) what approach is taken to managing them that still promotes stock rebuilding? *(Max 200 words)*
(Reference: Section 2.7 of the Fisheries Guidelines)

A) Yes. A number of Indigenous fisheries and recreational fisheries, as well as a Labrador resident subsistence fishery, are permitted on stocks that are below their limit reference points (LRPs).

b) The following table outlines the number of rivers where at least some fisheries are permitted on stocks below the LRP, by DFO management region, while also noting the total number of rivers in that region. Note that these values include all rivers in which fisheries take place, irrespective of the specific type of fishery or the specific circumstances under which a fishery would be permitted to take place. For example, the fisheries permitted would include some retention fisheries but also many catch-and-release fisheries; and for many of the fisheries included, cold-water protocols and other management measures impose restrictions in certain circumstances.

Region	Number of rivers where at least some fishing is allowed	Total number of rivers in the region
Maritimes Region	3	188
Gulf Region	149	149
Quebec	16	113
Newfoundland	158	310
Labrador	28	97

c) Stock rebuilding is promoted by reducing exploitation and catch and release mortality where there is regional or river-specific conservation concern (populations below LRP).

Indigenous and subsistence fisheries are managed with annual allocations and gear and season restrictions to limit the harvest of large salmon and reduce interceptions from southern populations that are at risk.

Recreational fisheries are managed with annual retention and daily catch and release limits, as well as gear, area and season restrictions. Closures during warm and low water periods are also

used to minimize mortality from catch and release angling.

In Quebec, fisheries on stocks below the LRP are all characterised by the mandatory release of large salmon. Retention of small salmon is only allowed if less than 30 per cent of the total egg deposition is from those small salmon and if an organization with an official agreement with the government ensures protection against poaching and provides reliable catch data.

In-season reviews are conducted on some stocks to inform management measures within a given fishing season. There are a few rivers with special management plans to allow angling on stocks that have historically not achieved its LRPs, most are associated with stocks that are rebuilding following access to new freshwater habitat.

2.4 (a) Are there any mixed-stock salmon fisheries? If so (b) how are these defined, (c) what was the mean catch in these fisheries in the last five years and (d) how are they managed to ensure that all the contributing stocks are meeting its conservation objectives? *(Max. 300 words in total)*
(Reference: Section 2.8 of the Fisheries Guidelines)

(a) Yes

(b) As per NASCO definition, a salmon stock is defined on the basis of a river entering tidal waters. The Labrador FSC salmon fisheries and subsistence trout fishery with salmon by-catch take place in estuaries and coastal areas and are considered to be mixed-stock fisheries.

(c) The average harvest in the Labrador subsistence fisheries for the last five years (2015 to 2019) was 38.4 t, comprising 15.0 t of small salmon and 23.4 t of large salmon. This harvest represents approximately 13,500 salmon: 7,900 small salmon and 5,600 large salmon. Reported harvest in 2019 was 37.8 t (approximately 7,000 small salmon and 5,800 large salmon).

(d) Annual sampling of the Labrador subsistence fisheries catches provides biological data and tissues for genetic stock identification, allowing estimation of the proportion of catch coming from different contributing stocks. Genetic analyses from 2017-2019 indicate that the large majority (96 per cent to 99 per cent) of the salmon harvested in these fisheries originated from rivers in Labrador, with rare interceptions from the Gulf of St. Lawrence and USA rivers.

Fishing season and mesh sizes have been modified to reduce the capture of large, multi-sea winter salmon, while providing an opportunity to harvest small salmon, trout and char. While the net fisheries are authorized for coastal waters, fishing activity occurs very close to communities that are generally located in deep bays away from the headlands where interceptions would be more likely. All Indigenous fisheries are controlled through the issuance of a communal licence by DFO.

Management measures include:

- prohibition on the use of mono filament netting;
- maximum net length of 25 fathoms and nets set in a straight line;
- gear must be attended every 24 hours and a closure during weekends (nets taken up);
- all fish must be tagged; and,
- a completed logbook with catch and location of fishing must be submitted by end of season.

2.5 How are socio-economic factors taken into account in making decisions on management of salmon fisheries? *(Max. 200 words)*
(Reference: Section 2.9 of the Fisheries Guidelines)

All decision making is guided foremost by the principle of conservation of wild salmon populations, which requires that its genetic diversity and its habitat are given the highest priority in all management decisions, utilizing the precautionary approach. Decisions must also respect the rights of Indigenous peoples to priority access for FSC purposes, reflect the best available science, and consider local and Indigenous traditional knowledge as well as the biological, social, and economic

consequences for Canadians, aiming to provide the widest range of uses and benefits possible. Consultations are held with Indigenous groups and implicated stakeholders to ensure that the impacts of decisions being made are well understood by all involved.

2.6 What is the current level of unreported catch and what measures are being taken to reduce this? *(Max. 200 words)*
(Reference: Section 2.2 of the Fisheries Guidelines and the Minimum Standard)

Estimates of unreported catch for eastern Canada ranged between 21 t and 28 t during 2013 to 2017 (24 t in 2018), substantially less than the estimates ranging from 111 t to 284 t prior to the commercial salmon fishery moratorium in Newfoundland and Labrador in 1992.

Measures to reduce the level of unreported catch in legal directed salmon fisheries include improving the reporting of harvests through the use of logbooks, logbook reminders to anglers at the end of the season, and compliance monitoring. Social and local media are used to remind the public of the importance of reporting. Management measures are used to reduce the potential for bycatch and illegal retention in other fisheries, including prohibitions on the use of monofilament mesh in pelagic gillnets during peak periods of Atlantic salmon runs, restrictions on mesh size, sinking of head ropes on fixed gear sets, and restrictions on bait fisheries during peak migration periods of salmon, requirements to report all bycatch in commercial fisheries.

The courts have imposed substantial fines and forfeitures of catch, vehicles, boats etc. and often issue prohibitions against future fishing. This acts as a deterrent to not reporting or under-reporting landings in these fisheries.

2.7 Has an assessment under the Six Tenets for Effective Management of an Atlantic Salmon Fishery been conducted? If so, (a) has the assessment been made available to the Secretariat and (b) what actions are planned to improve the monitoring and control of the fishery? (c) If the six tenets have not been applied, what is the timescale for doing so? *(Max. 200 words)*
(Reference: Six Tenets for Effective Management of an Atlantic Salmon Fishery, WGCST(16)16)

(a) Yes, Canada's assessment has been conducted and submitted to the Secretariat.

(b) Newfoundland and Labrador:
The development of an angling mobile application to record fishing location, as well as catch and effort. Reminders to report (sent 3 times between October and January), advertising in local recreational fisher magazines, and the use of social media. A local conservation group has been approached to conduct a follow-up phone survey, and offer an incentive of a prize draw for anglers who send in its information stub.

Maritimes and Gulf: The Province of Nova Scotia intends to replace the current paper licencing system with an electronic licence system as early as 2020. This will provide real time information on the number of licences issued, provide for on-line reporting of catch and more efficiently track and notify anglers with delinquent catch reports. New Brunswick currently has online catch reporting and is undertaking various approaches to increase its information returns.

Quebec: Awareness campaigns to promote the reporting of salmon that were caught and released will continue. Funding has been secured to improve the monitoring of subsistence fisheries.

(c) Not applicable.

2.8 Identify the threats to wild salmon and challenges for management associated with its exploitation in fisheries, including bycatch of salmon in fisheries targeting other species.

Threat /	Survival of salmon at sea

challenge F1		
Threat / challenge F2	Illegal fishing	
Threat / challenge F3	Adaptive management of recreational fishing under warm water conditions	
Threat / challenge F4	Labrador mixed stock fishery	
2.9 What SMART actions are planned during the period covered by this Implementation Plan (2019 – 2024) to address each of the threats and challenges identified in section 2.8 to implement NASCO's Resolutions, Agreements and Guidelines and demonstrate progress towards achievement of its goals and objectives for the management of salmon fisheries?		
Action F1:	Description of action:	**Improve understanding of factors affecting survival of salmon at sea, to inform management** Throughout the North Atlantic, survival at sea of salmon has declined, particularly for populations in the southern and mid-range of the species. There is still no comprehensive understanding of why marine survival is lower than in previous decades. For example, predation factors hypothesized to be contributing to increased mortality, and which could potentially be managed include: predation by native fish such as striped bass; Atlantic cod on out-migrating smolt; seal predation on returning adult salmon in estuaries and rivers; and changes/reductions in the salmon food base (capelin, herring) that are also subject of fishing pressure. Research focused on the identification of the factors that are contributing to reduced sea survival is required to determine if fisheries management actions may contribute to improving marine survival. Even without a complete understanding of the mechanisms involved, scientific information enabling the prediction of salmon returns from the sea could improve management practices.
	Planned timescale (include milestones where appropriate):	Such research activities will be supported during the timeframe of Canada's IP through mechanisms such as the Atlantic Salmon Research Joint Venture (ASRJV) and its Science Plan for 2018-2023 to support strategic and collaborative research. In 2020 a five-year research project commenced to investigate the linkages between freshwater habitat conditions and marine survival.
	Expected outcome:	The objective of the ASRJV Science Plan is to guide the strategic planning and implementation of science initiatives in eastern North America that lead to improved understanding of the trends and causes of variation and/or decline in the abundance and distribution of wild Atlantic salmon.
	Approach for monitoring effectiveness & enforcement:	Annual reporting of research activities to the ASRJV Science Committee and Management Board.
	Funding secured for both action and	Yes

<table>
<tr><td></td><td>monitoring programme?</td><td></td></tr>
<tr><td>Action F2:</td><td>Description of action:</td><td>Action against illegal fishing

Newfoundland and Labrador Region will combat illegal salmon fishing activities based on strategic patrol plans developed with Intelligence Led Special Operations in cooperation with the inland guardian program, including deploying 90 Inland Fishery Guardians, three Marine Fishery Guardians, and 14 Aboriginal Fishery Guardians. These strategic operations will continue before, during and post-season. DFO plans to deploy these staff for a minimum 60,000 hours, conducting a minimum of 3,400 inspections/year. Provincial Wildlife Enforcement Officers and DFO will support both regular patrols and special operations.

Gulf and Maritimes regions have developed mapping software that contains historical angling activity along certain rivers in its regions and provide key information to enforcement officers about areas with illegal activity, creating more effective patrol planning and use of enforcement resources. The first river system where this pilot project has been implemented is the Saint John River, New Brunswick. The Miramichi River system will be added in the near future.

Even though all but three rivers in the Maritimes Region have been closed to salmon angling, catch and release became a practiced activity on a number of other major salmon rivers under the guise of angling for trout and smallmouth bass. DFO will continue to impose complete angling closures in important salmon holding pools and, in some cases, closures of 20 kilometres or more on specific rivers (Medway, Nova Scotia, and Tobique, New Brunswick).

A new IT system is being developed to improve catch registration and regulatory compliance monitoring in Quebec. Wildlife protection officers continue to fight against salmon poaching with the collaboration of wildlife protection assistants from controlled harvesting zones (ZEC).

DFO will continue to use social media in order to emphasize the consequences to salmon stocks of illegal activities and bring awareness to the penalties.

Planned Surveillance deployments by Region for 2019-2024:
<table>
<tr><td></td><td>Patrol Hours</td><td>Inspections</td></tr>
<tr><td>NL</td><td>48,000</td><td>3,500</td></tr>
<tr><td>Gulf</td><td>6,400</td><td>500</td></tr>
<tr><td>Maritimes</td><td>4,600</td><td>300</td></tr>
<tr><td>Quebec</td><td>40,000</td><td>No specific objectives</td></tr>
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<tr><td></td><td>Planned timescale (include milestones where appropriate):</td><td>The elements outlined are being implemented on an ongoing basis throughout the IP period.

The IT system being developed in Quebec is expected to be</td></tr>
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		implemented in 2024.
	Expected outcome:	Deterrence of illegal activity will be achieved through increased ability to detect such activities and by publicizing penalties on social media associated with resulting prosecutions.
	Approach for monitoring effectiveness & enforcement:	Measuring planning effectiveness will be accessed through post-season reviews of fishing activity, including reported and observed poaching activity, annual reporting of enforcement activities, observations, bycatch and prosecutions, including analysis of trends over the time period.
	Funding secured for both action and monitoring programme?	Yes
Action F3:	Description of action:	**Warm water protocols for adaptive management of recreational fisheries** Due to the warming of waters and the trends of declining returns of Atlantic salmon in the rivers of Eastern Canada, a number of measures have been put in place to limit fishing activity and to reduce fish mortality. The most significant measure is the use of warm water protocols to reduce stress on salmon during summer months. Warm water protocols for wild Atlantic recreational fisheries have been developed for some jurisdictions in eastern Canada (rivers of Gulf Region and all rivers in Newfoundland and Labrador) and are expected to be developed for other rivers (e.g., rivers with documented problems in Quebec), where they can be proven to function as a useful tool in supporting decisions to promote sustainability of the stocks.
	Planned timescale (include milestones where appropriate):	Where warm water protocols have not been established, they will be developed throughout the IP period. Reviews of existing protocols and its effectiveness will be ongoing throughout the IP period.
	Expected outcome:	Increased number of rivers with warm water protocol in Canada, and a reduction in the number and proportion of salmon that die as a result of catch and release associated with warm water conditions.
	Approach for monitoring effectiveness & enforcement:	Effectiveness will be assessed at the end of season in order to modify/refine protocols as needed.
	Funding secured for both action and monitoring programme?	Yes
Action F4:	Description of action:	**Monitoring and management of Labrador mixed-stock fishery** In order to reduce the interception of non-Labrador origin salmon in the Labrador mixed stock fishery, intervention in the

		fisheries that are most likely to intercept non-Labrador origin salmon will occur. These interventions include the relocation (time, space) of fishing effort away from areas with known interceptions of non-Labrador origin salmon. There is ongoing work to improve logbook reporting (including date and location of catches) and modified/enhanced sampling of the fishery catches to assess origin of the catches and effectiveness of the management interventions at reducing catches of non-Labrador origin salmon. Since 2019, fishery sample processing has been targeted to areas with higher probability of non-local stock interceptions. Partnerships with Indigenous groups will continue in these sampling activities.
	Planned timescale (include milestones where appropriate):	Annual
	Expected outcome:	Adaptive management of locations and timing of the fishery based on annual estimates of origin of salmon in the Labrador subsistence fisheries. Effectiveness of management actions will be shown by the absence or reduction over time of harvests of non-Labrador origin salmon.
	Approach for monitoring effectiveness & enforcement:	Three approaches will be used for monitoring progress: • Annual sampling of fishery catches conducted by Indigenous groups and DFO, analyses of biological characteristics, and origin of sampled catches using genetic stock identification tools; • Annual reports to ICES and NASCO on catches, biological characteristics, and origin of catches of the Labrador subsistence fisheries; and, • Annual fisheries management consultations with Labrador Indigenous groups to discuss findings of fisheries monitoring and to develop adaptive management approaches for the fishery.
	Funding secured for both action and monitoring programme?	Expected Annual sampling of fisheries catches is supported by DFO and Indigenous communities. Funding for genetic stock identification of fisheries catches is secured into 2019. Funding for subsequent years will be negotiated, with a focus on targeting areas with high risk of non-Labrador origin salmon interception.

3. Protection and Restoration of Salmon Habitat:

In this section please review the management approach to the protection and restoration of habitat in your jurisdiction in line with the relevant NASCO Resolutions, Agreements and Guidelines.

3.1 How are risks to productive capacity identified and options for restoring degraded or lost salmon habitat prioritised, taking into account the principle of 'no net loss' and the need for inventories to provide baseline data? *(Max. 200 words)*

(*Reference: Section 3 of the Habitat Guidelines)*

Strategic assessment and prioritization of salmon habitat restoration is most pronounced under the Species at Risk (SAR) process, which supports identification of stocks at risk. This process requires, for listed species, the identification of critical habitat and development of a plan to protect and/or restore, as appropriate, such habitat, taking into account other users of the relevant area and the broader socio-economic costs and benefits of such actions.

Risks to productive capacity are identified by various means, including tracking habitat quality and productivity through time and the identification of barriers to salmon passage. Habitat quality is monitored using data on environmental variables such as pH and water temperature, as well as through electrofishing surveys of salmon habitat to directly manage juvenile production as an index of habitat productivity. The collection of such data is primarily focused in areas with greater risk of anthropogenic impacts, while more limited data are collected in remote areas with lower risks and greater challenges in data collection.

These data are stored and tracked against baseline information about salmon habitat that has been collected and updated periodically over many decades, with data availability varying somewhat by area. Data typically include estimates of freshwater fluvial and lacustrine habitat areas for most catchments, with more extensive data (e.g., on habitat quality) collected and available in some high-risk areas as noted above.

3.2 How are socio-economic factors taken into account in making decisions on salmon habitat management? *(Max. 200 words)*

(Reference: Section 3.9 of the Habitat Guidelines)

DFO's decisions about the management of fish habitat include the assessment and management of various biological, social, economic and cultural risks. This risk management is part of the decision-making process and is documented accordingly.

The modernized *Fisheries Act* includes several provisions to identify how decisions will be made while balancing various socio-economic factors. These provisions signal the intent, and in certain cases the requirement, to include factors like the following in decisions related to the management of fish and fish habitat, including Atlantic salmon habitat.

- Indigenous, scientific, and community knowledge
- Social, economic and cultural factors
- Fisheries management objectives

Under SARA, socio-economic factors are taken into account in the Regulatory Impact Analysis Statement (RIAS) required to put Critical Habitat Orders in place to protect critical habitat.

3.3 What management measures are planned to protect wild Atlantic salmon and its habitats from (a) climate change and (b) invasive aquatic species? *(Max. 200 words each)*

(Reference: Section 3.2 of the Habitat Guidelines)

(a) DFO continues to work collaboratively to address water and land-use management issues through ongoing partnerships with the Provinces and resource users to focus on non-fisheries related management measures. Past focus has been on measures such as riparian buffer zones but

increasingly are examining habitat response to climate change, such as more extreme high and low water flows.

In addition to the fisheries management actions taking place with respect to warm water protocols to restrict angling (see 2.9 Action F4), measures are also taking place from a habitat perspective. For example, in the Miramichi River, cold water pools are being enhanced and maintained to provide refuge to adult Atlantic salmon. In Quebec, the new *Regulation respecting the sustainable development of forests in the domain of the State* stipulates that a strip of woodland at least 60 m wide must be preserved on both sides of a salmon river. This riparian buffer zone contributes to countering water warming.

(b) The management of aquatic invasive species (AIS) is a shared responsibility among federal, provincial and territorial governments where roles align with the formal delegation of fisheries management authorities. To address the threats posed by AIS, DFO's National Core Program works with federal, provincial, territorial governments, and other partners to administer the Aquatic Invasive Species Regulations (AISR) that came into force in 2015. The Regulations are operationalized through four pillars: prevention; surveillance and early detection; response; and control and management. These pillars are implemented through engagement, outreach, education, collaboration, and partnerships.

For example, the AISR enable measures to treat or destroy an aquatic invasive species, treat a conveyance or structure, establish temporary barriers, or post signs to prohibit access. These measures are assessed on a case by case basis, taking into account the particular circumstances related to the aquatic invasive species in question and potential habitat impacts.

3.4 Identify the main threats to wild salmon and challenges for management in relation to estuarine and freshwater habitat.	
Threat / challenge H1	Wide-ranging threats to Canada's Atlantic salmon habitat continue to originate from a variety of activities including, but not limited to, transportation infrastructure, power generation, agriculture, forestry and mining operations (i.e. industrial land-use activities).
Threat / challenge H2	Acid rain, resulting from emission of pollutants from industrial sources is a serious problem known to cause sub-lethal impacts, premature mortality, and in some cases, extirpation of wild Atlantic salmon populations. In Canada, the area most impacted is southern Nova Scotia, where acid rain has a chronic impact in rivers because the geology of the area does not provide sufficient natural buffering.
Threat / challenge H3	Aquatic invasive species and non-indigenous species such as smallmouth bass have been identified in at least two salmon watersheds. These species can out-compete other fish species, including Atlantic salmon, and can become the dominant component of the food web. For example, a peer-reviewed risk assessment conducted shortly after the identified presence of smallmouth bass in the headwaters of the Miramichi River in 2010 determined that there was a high risk to Atlantic salmon in the headwater lake environments and a moderate risk to Atlantic salmon in riverine environments.

3.5 What SMART actions are planned during the period covered by this Implementation Plan (2019 – 2024) to address each of the threats and challenges identified in section 3.4 to implement NASCO's Resolutions, Agreements and Guidelines and demonstrate progress towards achievement of its goals and objectives for the Protection, Restoration and Enhancement of Atlantic Salmon Habitat?		
Action H1:	Description of action:	**Management of threats related to**

		industrial land-use activities DFO will identify and begin development of additional tools and investments in water quality protection, flow management, and fish passage protection, as well as work with partners, including Indigenous peoples and organizations, to identify priority areas for existing habitat programs. The recently modernized *Fisheries Act* includes provisions related to fish and fish habitat protection, including: • measures relating to authorization and permitting of works, undertakings and activities; • creation of fish habitat banks by a proponent of a project; • establishment of standards and codes of practice; • establishment of a public registry; and, • establishment of ecologically significant areas.
	Planned timescale (include milestones where appropriate):	The modernized *Fisheries Act* came into force in 2019. Regulatory tools are being developed throughout the IP period.
	Expected outcome:	Greater variety of options for regulatory tools and partnerships to reduce the threat to Canada's Atlantic salmon habitat.
	Approach for monitoring effectiveness & enforcement:	DFO is committed to strengthening compliance and effectiveness monitoring to better understand the outcomes of fish and fish habitat protection efforts; as well as improve transparency and openness by providing Canadians with information about DFO's regulatory activities.
	Funding secured for both action and monitoring programme?	Expected
Action H2:	Description of action:	**Management of Acid Rain** Reduction and elimination of acid rain-causing emissions need to be fully implemented in most areas to mitigate losses of wild Atlantic salmon due to acidification. Some liming of watersheds is being used to buffer acidity, especially in Nova Scotia. The West River Acid Mitigation Project, led by the Nova Scotia Salmon Association (NSSA), commenced in 2005 using liming as a buffering technique. The first decade of this project was funded by the NSSA with recent funding coming from collaboration

		between the federal and provincial governments and continued funding from the NSSA. The following activities will continue during the 2019-2024 IP cycle: 1) Lime dosing using two dosers to directly treat salmon habitat units affected by acid rain; 2) Having completed the first experimental tributary (~180ha of limed land), the helicopter catchment liming project will extend to the next priority tributary of the West River watershed; 3) Physical habitat restoration within the West River is addressing a legacy of log driving and nearby road construction, to increase water depth of coldwater habitat pools; 4) Continued monitoring, including: operation of the adult salmon counting fence; operation of smolt assessment facilities; and, ongoing electrofishing and water chemistry monitoring; 5) Expanding research to include the interplay between forest resiliency/ productivity and catchment liming to integrate salmon and forest economics; 6) Expanding research on the interplay of acid mitigation of salmon rivers and the potential for carbon sequestration to address national carbon targets with regard to climate change policy; and, 7) A regional acid rain mitigation strategy is being developed based on the experience of the West River project. This strategy will identify priority sites for future acid mitigation strategies based on updated water chemistry and salmon resource data (eDNA) and other considerations.
	Planned timescale (include milestones where appropriate):	Ongoing. Liming of salmon waters should be planned for the long term (up to 50 years or more) to re-establish natural pH buffering capacity.
	Expected outcome:	The liming project in West River has had very positive results. Parr numbers have increased by more than 300 per cent and new sections of the river are being recolonized. Liming can be fairly expensive and must be done repeatedly as long as the source of acidity remains.
	Approach for monitoring effectiveness & enforcement:	Parr numbers will continue to be monitored in limed areas to assess the continued effectiveness of these efforts.

		Additionally, adult salmon will be measured by a counting fence. Raised awareness or the restoration project by DFO and Provincial enforcement will target known by-catch or poaching areas.
	Funding secured for both action and monitoring programme?	Expected
Action H3:	Description of action:	**Management of Aquatic Invasive Species (AIS)** In New Brunswick, since 2008, DFO and NGO partners have used physical control methods to contain and reduce Smallmouth bass in Miramichi Lake. A 2018 review of this program indicated that there was evidence of depletion of Smallmouth bass in Miramichi Lake but the extent of the reduction could not be quantified. Given that an eradication program, using rotenone, had been proposed for some time, in 2021 federal and provincial regulatory approval was given to a stakeholder consortium to apply rotenone in Miramichi Lake and the immediate downstream river sections where Smallmouth bass were detected. Although planned for the fall of 2021 the rotenone project has been postponed to 2022. In Nova Scotia, the Province and DFO have collaborated to undertake targeted physical removals of Smallmouth bass and Chain pickerel on selected rivers. In 2020, the Province applied rotenone to Piper Lake to eradicate Smallmouth bass from the headwaters of the St. Mary's River.
	Planned timescale (include milestones where appropriate):	In Nova Scotia, annual physical removal efforts continue with one lake rotenoned in 2020 to eliminate smallmouth bass. In New Brunswick, the Miramichi River watershed rotenone program is planned to proceed in 2022.
	Expected outcome:	The invasive species in Piper Lake, Nova Scotia, is expected to be eliminated. Smallmouth bass in the headwaters of the Miramichi River are expected to be eradicated in 2022.
	Approach for monitoring effectiveness &	In the Miramichi River, the annual surveillance

	enforcement:	for the presence of Smallmouth bass will continue using eDNA methods and during regular fish population monitoring primarily through electrofishing and long-term trap-net stations. In Piper Lake, gillnetting and electrofishing will be undertaken to monitor whether any Smallmouth bass remain.
	Funding secured for both action and monitoring programme?	Yes for monitoring programs. Large eradication projects require special funding. Funding is secured for the consortium conducting rotenone eradication and follow-up monitoring in the Miramichi River watershed, New Brunswick. Funding for control and monitoring activities in Piper Lake, Nova Scotia, has been provided by the Province.

4. Management of Aquaculture, Introductions and Transfers, and Transgenics:

Council has requested that for Parties / jurisdictions with salmon farms, there should be a greater focus on actions to minimise impacts of salmon farming on wild salmonid stocks. Each Party / jurisdiction with salmon farming should therefore include at least one action relating to sea lice management and at least one action relating to containment, providing quantitative data in Annual Progress Reports to demonstrate progress towards the international goals agreed by NASCO and the International Salmon Farmers Association (ISFA):

- *100 per cent of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms;*
- *100 per cent farmed fish to be retained in all production facilities.*

In this section please provide information on all types of aquaculture, introductions and transfers, and transgenics (including freshwater hatcheries, smolt-rearing etc.

4.1 (a) Is the current policy concerning the protection of wild salmonids consistent with the international goals on sea lice and containment agreed by NASCO and ISFA? (b) If the current policy is not consistent with these international goals, when will current policy be adapted to ensure consistency with the international goals and what management measures are planned to ensure achievement of these goals and in what timescale? *(Max. 200 words for each)*
(Reference: BMP Guidance)

(a) Yes, eastern Atlantic provinces with salmon aquaculture production (New Brunswick, Newfoundland and Labrador, and Nova Scotia) have policies in place that are consistent with the international goals on sea lice and containment. Regulatory or licence conditions related to sea lice management and containment are requirements of all aquaculture facilities.

Containment
In New Brunswick, containment is a regulatory requirement overseen by the Aquaculture Containment Liaison Committee, which is made up of representatives from provincial and federal governments, NGOs, and industry. Progress includes continued communication with industry and NGOs on breaches, and identification of the origins of captured aquaculture escapees.

Newfoundland and Labrador's Code of Containment for the Culture of Salmonids is a condition of the Province's finfish aquaculture licence. The Province conducts bi-annual inspections of net-cage and surface mooring components. There are also periodic audits of cage systems which include net strength testing, inventory counts, and annual reporting and review.

In Nova Scotia, as part of the *2015 Aquaculture Management Regulations*, the Province established a containment management section within its annual farm management plans (FMPs) that support regulatory requirements. The FMP details the minimum compliance requirements for infrastructure and holding systems, equipment maintenance, and equipment inspection.

Sea Lice
In New Brunswick, sea lice monitoring is also a regulatory requirement. Integrated sea lice management, including cleaner fish, warm water baths, and high pressure water sprays, has led to marked decreases in therapeutant use in the past two years.

Newfoundland and Labrador recently updated its fish health policies, which include a Sea Lice Integrated Pest Management Plan (IPMP). The IPMP uses a combination of pest management approaches. Accurate and timely counting and audits are critical components to IPMPs.

In Nova Scotia, as part of the *2015 Aquaculture Management Regulations*, the Province has established a sea lice management section within its annual FMPs that support regulatory requirements. Sea lice management in the FMP outlines requirements for regular sea lice counts and record keeping.

(b) Not applicable.

4.2 (a) What quantifiable progress can be demonstrated towards the achievement of the international goals for 100 per cent of farms to have effective sea lice management such that there is no increase in sea lice loads, or lice-induced mortality of wild salmonids attributable to sea lice? (b) How is this progress monitored, including monitoring of wild fish? (c) If progress cannot be demonstrated, what additional measures are proposed and in what timescale?
(Max. 200 words each)
(Reference: BMP Guidance)
The measures by which these goals may be achieved, and against which the Review Group will be measuring the effectiveness of the Implementation Plan, are set out in the BMP Guidance SLG(09)5 (Best management practice; reporting and tracking; factors facilitating implementation) as agreed by NASCO and ISFA.

(a) Progress toward the international goal with respect to sea lice is described each year in Canada's Annual Progress Report to NASCO.

(b) Progress on sea lice levels is monitored by the three Atlantic provinces with salmon aquaculture. Sea lice are regularly counted at marine cage sites on representative samples of fish as required in provincial regulations. Further information on this monitoring is contained in Canada's Annual Progress Reports to NASCO, and in section 4.11 of this IP.

To supplement the information provided elsewhere, some details on select provincial approaches to monitoring sea lice are as follows:

- New Brunswick has a comprehensive sea lice monitoring program that requires licence holders, through regulation, to conduct sea lice counts on a weekly basis. Other provisions include reporting and notification of treatment uses. New Brunswick also conducts a series of sea lice audits to ensure accuracy in the counts being provided;
- In Newfoundland and Labrador, this information is contained within company records and is made available for review upon site visits by provincial staff; and,
- In Nova Scotia, comprehensive health management is required as part of the Aquaculture Management Regulations including all aspects of sea lice prevention, surveillance, notification, and provincial approvals.

(c) Plans to make further progress are outlined in section 4.11 of this IP.

4.3 (a) What quantifiable progress can be demonstrated towards the achievement of the international goals for achieving 100 per cent containment in all (i) freshwater and (ii) marine aquaculture production facilities? (b) How is this progress monitored, including monitoring of wild fish (genetic introgression) and proportion of escaped farmed salmon in the spawning populations? (c) If progress cannot be demonstrated, what additional measures (e.g. use of sterile salmon in fish farming) are proposed and in what timescale? *(Max. 200 words each)*
(Reference: BMP Guidance)
The measures by which these goals may be achieved, and against which the Review Group will be measuring the effectiveness of the Implementation Plan, are set out in the BMP Guidance SLG(09)5 (Best management practice; reporting and tracking; factors facilitating implementation) as agreed by NASCO and ISFA.

(a) Progress toward the international goal with respect to containment is described each year in Canada's Annual Progress Report to NASCO. Additional information is provided in Canada's annual reports to the North American Commission, with the most recent being NAC(20)08. Nevertheless, select information is provided here to supplement information previously provided.

(i) The majority of freshwater hatchery facilities for salmonids are land-based recirculating aquaculture systems, for which the risk of escape is extremely low. Moreover, operating licences and related policies dictate technical requirements for containment at freshwater facilities. For example, hatcheries in the Atlantic provinces require either double or triple layers of screening on effluent pipes to reduce the risk of escapes.

(ii) All marine aquaculture sites in Atlantic Canada have provincial regulatory and operational measures, including containment protocols, in place to help reduce/prevent farmed fish escapes. Guidelines and codes of containment have been developed and implemented on salmon farms that are consistent with the *Guidelines on Containment of Farm Salmon* (CNL(01)53). Atlantic provinces with net-pen salmon farms have standard operating procedures in place for containment. Fish escapes are reported to the provincial authorities, as per regulatory requirements.

(b) Progress on containment is monitored by the provinces. Further information on this monitoring is contained in Canada's Annual Progress Reports to NASCO, and in section 4.11 of this IP.

To supplement the information provided elsewhere, some detail on select provincial approaches to monitoring containment is as follows:

- In New Brunswick, to assess progress and to increase transparency, a committee, which includes representatives from government, industry and NGOs, meets to review escape events;
- Under the Newfoundland and Labrador's Code of Containment, operators are required to submit annual reports of cage inventories and numbers of escapes; and,

- In Nova Scotia, the holder of a marine finfish aquaculture licence is required to immediately notify the province of a known or suspected breach, including details such as the suspected date of breach, species, age, size and weight of fish, approximate number, freshwater place of origin, suspected or confirmed cause and any mitigation efforts.

(c) Plans to make further progress are outlined in section 4.11 of this IP.

4.4 What adaptive management and / or scientific research is underway that could facilitate better achievement of NASCO's international goals for sea lice and containment such that the environmental impact on wild salmonids can be minimised? *(Max 200 words)*
(Reference: BMP Guidance and Article 11 of the Williamsburg Resolution)

1. The federal Program for Aquaculture Regulatory Research (PARR) funds research that advances the understanding of interactions between aquaculture and the aquatic environment. The program is designed to increase scientific knowledge, inform regulatory decision-making and policy development.

   Research funded through this program has resulted in the development of tools to differentiate between wild, farmed, hybrid, and subsequent generations of introgression of farmed Atlantic salmon into wild Atlantic salmon populations. Additionally, this program has provided support and leadership in an international effort to further develop, refine, and implement models to predict the extent and effect of escaped and successful spawning of farmed Atlantic salmon with native populations. These models have been implemented in Canada to provide advice on the population level impacts of the expansion of the salmon aquaculture industry.

2. The federal Aquaculture Collaborative Research and Development Program (ACRDP) fosters government and industry collaboration for research on fish health and ecosystem interactions. Provinces are active members and participate in the review and development of the ACRDP process.

   Alternative sea lice management research has been funded as part of this program, including research such as: warm water bath treatments; genomic selection for resistance to infection by sea lice; use of cleaner fish; and, understanding the early life history dynamics of sea lice and the role of salmon farms during the larval sea lice stage.

4.5 What is the approach for determining the location of aquaculture facilities in (a) freshwater and (b) marine environments to minimise the risks to wild salmonid stocks? *(Max. 200 words for each)*

(a) Within NASCO's Commission area in Canada, the responsibility for determining and licensing the location of freshwater aquaculture facilities is led by the provinces. DFO supports provincial governments when they are considering site locations by providing scientific information and analysis on fish and fish habitat, and ecology related to the review of a particular facility site / licence application.

The siting review processes and timelines vary between provinces, but generally they include a comprehensive internal technical review, which includes looking at impacts to wild populations, consultations with First Nations, and obtaining comments from relevant provincial and federal network partners. Details of each provincial siting review can be found here:

- Nova Scotia: https://novascotia.ca/fish/aquaculture/starting-an-aquaculture-site/
- Newfoundland and Labrador: https://www.gov.nl.ca/ffa/licenses-permits-and-fees/licensing/aquaculture/
- New Brunswick: N/A

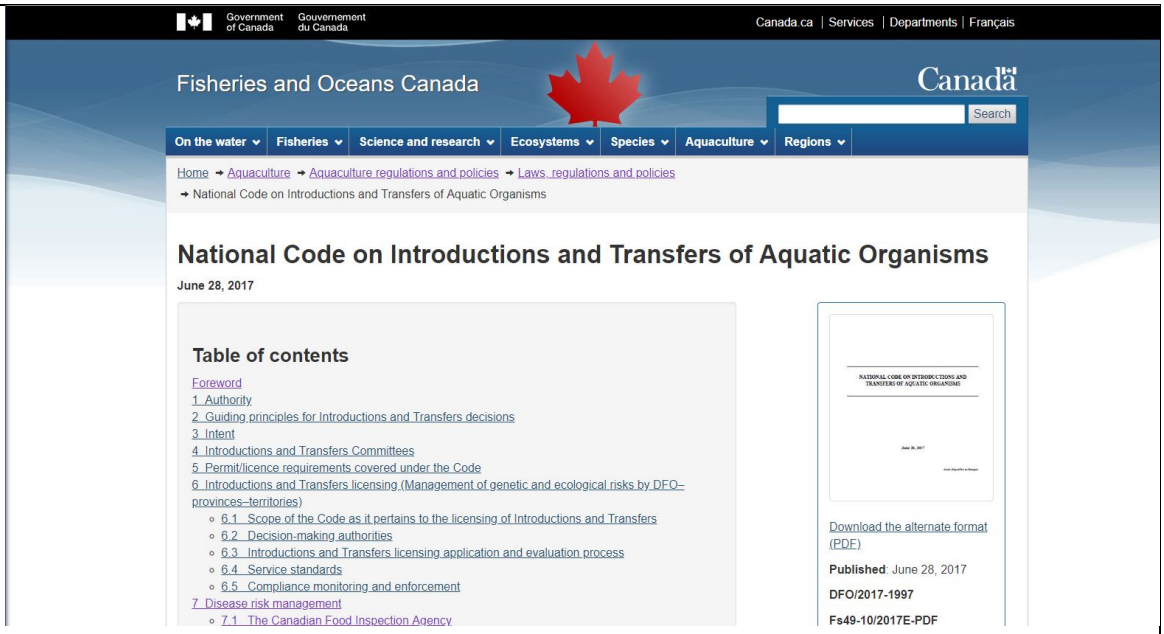
(b) Within NASCO's Commission area in Canada, provinces have the authority to lease and license marine finfish aquaculture. During a provincial siting review process, DFO provides advice to the provinces on potential impacts to fish and fish habitat, and ecological impacts.

The siting review processes and timelines vary depending on the province, but generally they include a comprehensive internal technical review of the application and a scoping assessment of potential environmental and wild fish impacts, consultations with First Nations and stakeholders, and obtaining analyses by relevant provincial and federal network partners. The details of each provincial siting review can be found here:

- Nova Scotia: https://novascotia.ca/fish/aquaculture/starting-an-aquaculture-site/
- Newfoundland and Labrador: https://www.gov.nl.ca/ffa/licenses-permits-and-fees/licensing/aquaculture/
- New Brunswick: https://www2.gnb.ca/content/gnb/en/departments/10/aquaculture/content/site_allocation_policy.html

4.6 What progress has been made to implement NASCO's guidance on introductions, transfers and stocking? *(Max. 200 words)*
(Reference: Articles 5 and 6 and Annex 4 of the Williamsburg Resolution)

With respect to NASCO guidance, under the *Fishery General Regulations* (FGR), DFO administers the National Code on Introductions and Transfers of Aquatic Organisms (http://www.dfo-mpo.gc.ca/aquaculture/management-gestion/it-code-eng.htm) and issues Introduction and Transfer (I&T) licences for the intentional release and transfer of live aquatic organisms into fish bearing waters or fish rearing facilities within NASCO's Commission area in Canada. The National Code is consistent with NASCO's guidelines. Genetic, ecological, and disease risks are addressed.



With respect to Article 5, the Federal Government will continue to manage the potential disease, genetic, and ecological risks to wild Atlantic Salmon associated with introductions and transfers through a variety of federal statutory and other instruments, including the *Fisheries (General) Regulations;* the *Health of Animals Act*; the National Code on Introductions and Transfers of Aquatic Organisms (the Code); and, the National Aquatic Animal Health Program (NAAHP), which is managed by the Canadian Food Inspection Agency (CFIA).

DFO, CFIA, and the provincial authorities are committed to working together to identify and control diseases of concern.

Atlantic provincial governments have implemented transfer controls under the Certificate of Health for Transfers. This policy, implemented under provincial regulation, outlines the fish health requirements prior to the movement of fish.

4.7 Is there (a) a requirement to evaluate thoroughly risks and benefits before undertaking any stocking programme and (b) a presumption against stocking for purely socio-political / economic reasons? *(Max. 200 words each)*
(Reference: Guidelines for incorporating social and economic factors in decisions under the Precautionary Approach and Annex 4 of the Williamsburg Resolution)

(a) Canada's *Wild Atlantic Salmon Conservation Policy* is explicit that resource management as well as all other decisions must protect the biological foundations of wild Atlantic Salmon populations, including its genetic diversity, and habitats. Under the *Fisheries (General) Regulations*, release of live fish into any fish habitat requires a licence, which may be issued only: if the release would be in keeping with the proper management and control of fisheries; if the fish are free of disease; and, if they will not have an adverse effect on the stock size of fish or the genetic characteristics of fish or fish stocks. These risks and benefits are evaluated by DFO scientists.

The Government of Canada complements these legislative and policy instruments by also referencing other tools and guidelines such as the: *2013 Code on Introductions and Transfers* (concerned with the moving of live aquatic organisms) and the *Williamsburg Resolution,* and outlines a series of principles, for stocking. Provincial governments also have specific guidelines and policies concerning stocking activities. Lastly, the Government of Canada frequently undertakes Canadian Science Advisory Secretariat (CSAS) reviews and ad hoc science advice when evaluating specific stocking proposals or programs.

In Québec, stocking is further controlled by the *Regulation respecting aquaculture and the sale of fish* and by administrative processes developed to maximise the benefits and to reduce the risks associated with enhancement activities. These are presented in the Atlantic Salmon Management Plan 2016 - 2026 (MFFP 2016) and in internal policy documents.

(b) There is no presumption against stocking for purely socio-political/economic reasons. However, all stocking programs must be evaluated as per paragraph 4.7 (a). For populations that are species at risk (threatened or endangered), stocking programs for the purpose of increasing populations to levels that could support fisheries (enhancement) are unlikely to satisfy the regulatory constraints relative to genetic, disease or other adverse effects set out in the *Fishery (General) Regulations*.

4.8 What is the policy / strategy on use of transgenic salmon? *(Max. 200 words)*
(Reference: Article 7 and Annex 5 of the Williamsburg Resolution)

Canada's policy on the use of transgenic salmon is stated in the *Canadian Environmental Protection Act, 1999* and implemented through the *New Substances Notification Regulations*. The Regulations state that information must be provided to the Government of Canada at least 120 days prior to the proposed import or manufacture in Canada of a transgenic salmonid. This information is used to conduct a scientific risk assessment to determine whether the transgenic salmonid may have an immediate or long-term harmful effect on the Canadian environment or its biological diversity. The environmental assessment considers potential ecological, genetic, disease and other risks that the transgenic salmonid may pose, including potential impacts on wild salmon populations in Canada. Where such harmful effects are suspected, control measures, including containment requirements, may be imposed as required to manage those risks to the environment. Where such harmful effects are not suspected, the import or manufacture of the transgenic salmonid may proceed as proposed. Where it is suspected that a "significant new activity" (i.e., an activity other than that originally proposed) may pose a risk to the environment, the Government may specify the requirement to submit further information for consideration prior to the commencement of the significant new activity.

4.9 *For Members of the North-East Atlantic Commission only:* What measures are in place, or are planned, to implement the eleven recommendations contained in the 'Road Map' to enhance information exchange and co-operation on monitoring, research and measures to prevent the spread of *Gyrodactylus salaris* and eradicate it if introduced, including the development and testing of contingency plans? *(Max. 200 words)*
(Reference 'Road Map' to enhance information exchange and co-operation on monitoring, research and measures to prevent the spread of G. salaris and eradicate it if introduced, NEA(18)08)

N/A

4.10 Identify the main threats to wild salmon and challenges for management in relation to aquaculture, introductions and transfers, and transgenics.

Threat / Challenge A1	**Sea lice** Salmon stocked into marine cages are initially free of sea lice, but may acquire sea lice from wild marine fish or from other farmed fish in the area. The result is that many salmon farming areas experience some level of sea lice parasitism. There is concern that salmon farms may locally amplify the abundance of sea lice, some of which may then be transferred back to wild fish, potentially impacting wild salmon populations. Heavy infestations of sea lice on fish may pose a threat to

	wild fish and negatively impact fish welfare and farm productivity.
Threat / challenge A2	**Escapement of Farmed Fish and Transgenic Impacts** Escape of farmed fish from its containment structures may pose a threat to wild Atlantic Salmon, primarily through the in-river migration of farmed fish, its subsequent spawning, and the introgression of farmed fish genes, including those from transgenic fish, into the wild salmon gene pool.
Threat / challenge A3	**Fish Health and Emerging Diseases** Potential emerging disease risk is a challenge for aquaculture management and a potential threat to the health of wild salmon.

4.11 What SMART actions are planned during the period covered by this Implementation Plan (2019 – 2024) to address each of the threats and challenges identified in section 4.10 to implement NASCO's Resolutions, Agreements and Guidelines and demonstrate progress towards achievement of its goals and objectives for aquaculture, introductions and transfers, and transgenics?

Action A1:	Description of action:	**Research to support assessment of potential impacts of sea lice from farmed fish on wild Atlantic salmon stocks and mitigation measures** Ongoing efforts aim to determine the potential impacts of sea lice from farms to wild Atlantic salmon populations. This includes research on sea lice tolerance to various environmental conditions, virulence of sea lice, impacts of co-infections and potential mitigation measures of sea lice on farms. The results of these efforts may inform, as appropriate, any potential new legislative or regulatory approaches to manage sea lice on salmon farms and impacts on wild salmon.
	Planned timescale (include milestones where appropriate):	These activities are expected to be ongoing through the IP period.
	Expected outcome:	Improved understanding of the potential impacts of sea lice from farms to wild Atlantic salmon populations and recommendations for effective mitigation measures, if applicable.
	Approach for monitoring effectiveness & enforcement:	The results of this and other research will be published in peer-reviewed journals and other publications.
	Funding secured for both action and	Yes for actions listed above.

	monitoring programme?	
Action A2:	Description of action:	**Research to support assessment of genetic introgression and mitigation measures.** Federally-funded research is ongoing to quantify hybridization and introgression of farmed and wild Atlantic salmon in Atlantic Canada using genomic tools. The results of this research may inform, as appropriate, any potential new legislative or regulatory approaches for the management of containment and the impacts of escapement.
	Planned timescale (include milestones where appropriate):	This research is expected to be ongoing through the IP period.
	Expected outcome:	Improved understanding of the consequences of introgression for wild populations in Atlantic Canada and recommendations for effective mitigation measures, if applicable.
	Approach for monitoring effectiveness & enforcement:	The results of this and other research will be published in peer-reviewed journals and other publications.
	Funding secured for both action and monitoring programme	Yes for actions listed above.
Action A3:	Description of action:	**Research with respect to wild and farmed fish health and emerging diseases** Fish health research contributes to the Government of Canada's ability to identify and address threats to wild fish and ecosystem health. Ongoing fish health research on the east coast of Canada includes studies of: • impacts on wild Atlantic salmon of the transmission of Infectious Salmon Anaemia virus (ISAv) originating from Atlantic salmon farms in Atlantic Canada; • disease transfer potential between wild fish and salmon farms; • Piscine orthoreovirus (PRV) susceptibility of Atlantic salmon; and • virulence of *Renibacterium salmoninarum* in New Brunswick. Additionally, a federal Emerging Disease Evaluation Committee was established by the Canada Food Inspection Agency – the lead federal regulatory authority for aquatic

		animal health – and DFO to identify, evaluate, report, and recommend potential management actions of emerging infectious disease of wild and cultured aquatic animals.
	Planned timescale (include milestones where appropriate):	Research on fish health and emerging aquatic diseases is ongoing and expected to be delivered throughout the IP period. A proposed risk assessment with respect to ISAv is anticipated to be completed and formal advice delivered within the IP period.
	Expected outcome:	Efforts related to fish health are expected to provide improved scientific advice for the management of risks related to disease associated with wild-farmed salmon interactions in Atlantic Canada, and may inform, as appropriate, any potential new legislative or regulatory approaches to mitigate disease impacts on wild fish. The joint CFIA-DFO Committee is expected to improve the process of understanding and evaluating potential emerging diseases of wild and cultured aquatic animals. The committee will improve interdepartmental communication and enable a coordinated federal response.
	Approach for monitoring effectiveness & enforcement:	The results of this and other research will be published in peer-reviewed journals and other publications. A review of the policy governing the emerging disease committee is conducted every five years.
	Funding secured for both action and monitoring programme?	Yes