	Council *Annual Progress Report on Actions taken under the Implementation Plan for the Calendar Year 2022 Canada*	**CNL(23)41**

Annual Progress Report on Actions taken under the Implementation Plan for the Calendar Year 2022

The Annual Progress Reports allow NASCO to evaluate progress on actions taken by Parties / jurisdictions to implement its internationally agreed Resolutions, Agreements and Guidelines and, consequently, the achievement of their objectives and actions taken in accordance with the Convention. The following information should be provided through the Annual Progress Reports:

- any changes to the management regime for salmon and consequent changes to the Implementation Plan;
- actions that have been taken under the Implementation Plan in the previous year;
- significant changes to the status of stocks, and a report on catches; and
- actions taken in accordance with the provisions of the Convention.

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

These reports will be reviewed by the Council. Please complete this form and return it to the Secretariat **no later than 1 April 2023**.

Party:	**Canada**
Jurisdiction / Region:	

1: Changes to the Implementation Plan

1.1 Describe any proposed revisions to the Implementation Plan *(Where changes are proposed, the revised Implementation Plans should be submitted to the Secretariat by 1 November).*

Canada, did not submit a revised Implementation Plan in November 2022. Canada does not anticipate undertaking further revisions in autumn 2023, unless significant changes to policies and/or programs are made in 2023.

1.2 Describe any major new initiatives or achievements for salmon conservation and management that you wish to highlight.

Following the conclusion of the first-ever Wild Atlantic Salmon Conservation Implementation Plan (2019-2021), Canada conducted a thorough review of its actions and published a Status Report in 2022. The findings of the 2022 Status Report highlighted several successes and challenges, and demonstrated the need for a more comprehensive, strategic approach to Atlantic salmon conservation across its Canadian range. With that in mind, the Minister of Fisheries, Oceans and the Canadian Coast Guard was mandated to: "Work in close collaboration with provincial and territorial authorities, Indigenous partners, fishing and stewardship organizations and implicated communities to make new investments and develop a conservation strategy to

restore and rebuild wild Atlantic salmon populations and their habitats". This commitment represents a significant new initiative that will shape the next decade - and beyond - of Atlantic salmon conservation in Canada. In support of the new mandate commitment, Canada conducted extensive consultative activities in 2022, including more than 60 meetings with Indigenous peoples, Indigenous organizations, partners, and stakeholders representing approximately 80 organizations. Canada also invited feedback on draft elements of the conservation strategy through an online engagement platform. All feedback will be used to further develop and refine the conservation strategy, which we anticipate will be published in late 2023.

2: Stock status and catches.

2.1 Provide a description of any new factors that may affect the abundance of salmon stocks significantly and, if there has been any significant change in stock status since the development of the Implementation Plan, provide a brief (200 word max) summary of these changes.

No new factors affecting salmon abundance have been identified. Status of Atlantic salmon in eastern Canada is described in the Implementation Plan; stocks from the northern regions (Gulf, Quebec, Newfoundland, Labrador) are faring better than stocks in the Maritimes Region.

2.2 Provide the following information on catches: ***(nominal catch equals reported quantity of salmon caught and retained in tonnes 'round fresh weight' (i.e. weight of whole, ungutted, unfrozen fish) or 'round fresh weight equivalent').***

	In-river	Estuarine	Coastal	Total
(a) provisional nominal catch (which may be subject to revision) for 2022 (tonnes)	50.8	42.2	6.9	99.9
(b) confirmed nominal catch of salmon for 2021 (tonnes)	50.1	40.4	7.4	97.9
(c) estimated unreported catch for 2022 (tonnes)	N/A	N/A	N/A	18.4 (partial data)
(d) number and percentage of salmon caught and released in recreational fisheries in 2022	Provisional values for 2022: 53,002 salmon released comprising: 29,650 small salmon (FL < 63 cm) and 23,351 large salmon (FL >= 63 cm) Final values for 2021 (the 2021 APR included provisional values): 67,056 salmon released comprising: 47,969 small salmon (FL < 63 cm) and 19,087 large salmon (FL >= 63 cm)			

3: Implementation Plan Actions.

3.1 Provide an update on progress on actions relating to the Management of Salmon Fisheries *(section 2.9 of the Implementation Plan).*
Note: *the reports under 'Progress on action to date' should provide a* ***brief overview*** *of each action. Please report in relation to the reporting year only or the most relevant recent year. For all actions,*

	*provide **clear and concise quantitative** information to demonstrate progress. In circumstances where quantitative information cannot be provided for a particular action because of its nature, a clear rationale must be given for not providing quantitative information and other information should be provided to enable progress with that action to be evaluated. While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group.*	
Action F1:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	Annual reporting of research activities to the ASRJV Science Committee and Management Board.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)*	In 2022, the Atlantic Salmon Research Joint Venture (ASRJV) continued to expand its collaborative network across the Atlantic salmon science community both domestically and internationally, and accomplished a number of key milestones relating to the multi-year research project titled "Linking freshwater habitat conditions to Atlantic salmon marine survival". To collect data for collaborative project analysis, a multi-year collaborative trans-regional and international effort continued for a second consecutive year in spring of 2022. As historical data will also be used in the analysis, data-mobilization efforts are underway. To support the main research question, the Science Committee developed 15 "Priority Research Questions" to be approached through student-led projects. A funding partnership was leveraged through Mitacs (a nonprofit research organization), and resulted in the hiring of three Master's, PhD, and post-doctorate students to initiate three projects: (1) Modelling past and future hydrological and water temperature

		conditions of Atlantic salmon rivers, 2) Evaluating potential changes in biological characteristics of juvenile Atlantic salmon over the past 50 years and linkages to environmental factors, and 3) Defining effects of heat stress events and thermal refuge availabilities on juvenile Atlantic salmon growth condition and marine survival. To support information mobilization, a "JV Student Hub" was established; an innovative information and opportunity sharing network that aims to shape the next generation of salmon scientists by connecting student researchers and Atlantic salmon experts. The program allows experts to provide expertise and skill building opportunities to students that may lay outside the scope of their projects, and students can openly share research results with experts for guidance, promoting cross-project collaboration and encouraging data mobilization. DFO has funded the following additional research projects to advance knowledge on survival of salmon at sea: (1) Quantification of potential population-level changes in body size across Eastern Canada; (2) The effects of episodic river acidification and metals on salmon survival at sea in five rivers of Eastern Canada, (3) Marine growth profiles of Atlantic salmon in the North Atlantic over 50 years.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	
Action F2:	Description of action (*as submitted in the IP)*	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

<table>
<tr><td></td><td></td><td>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:
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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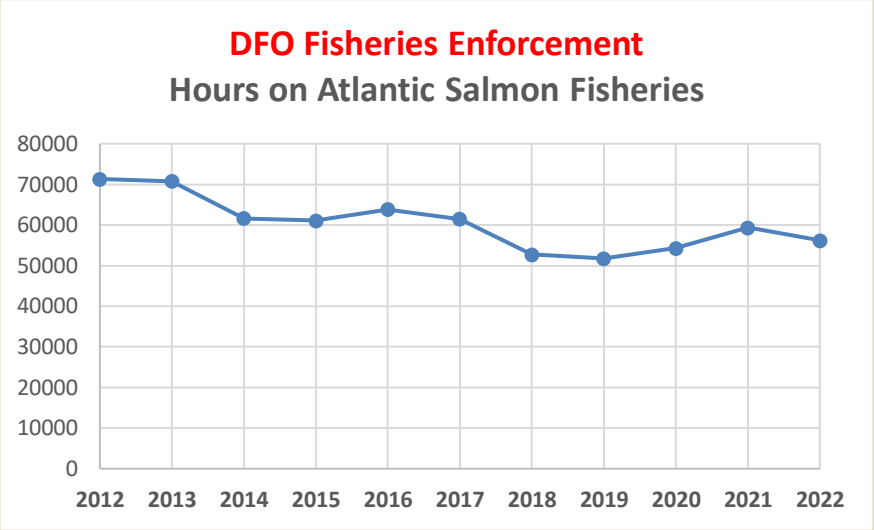
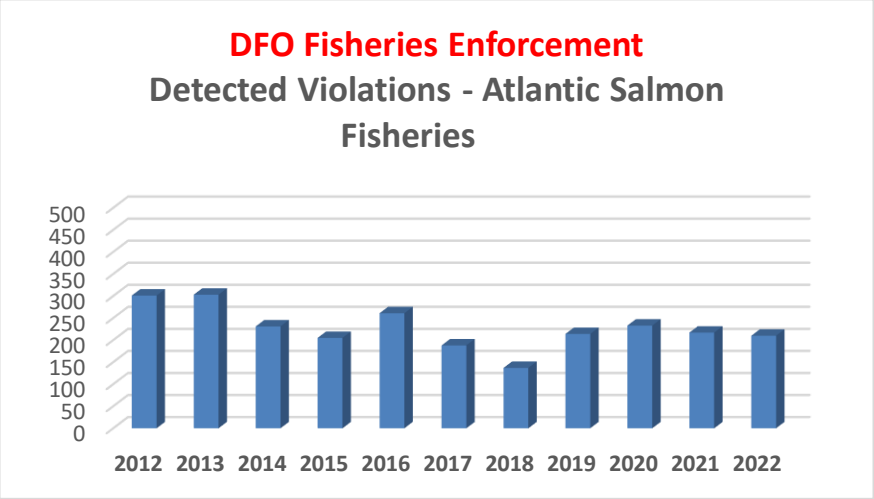
</td></tr>
<tr><td></td><td>Expected outcome (as submitted in the IP)</td><td>Deterrence of illegal activity will be achieved through increased ability to detect such activities and by publicizing penalties on social media associated with resulting prosecutions.</td></tr>
<tr><td></td><td>Approach for monitoring effectiveness & enforcement (as submitted in the IP)</td><td>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.</td></tr>
<tr><td></td><td>Progress on action to date (Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting</td><td>Enforcement trends (2012-2022):</td></tr>
</table>

	year, this should be made clear. Other material (e.g. website links) will not be evaluated)	  The following table provides more detailed information on activities in 2022, by DFO region for three of the Atlantic regions. DFO Region / Hours / Fishers checked / Fishing sites checked Gulf / 5,678 / 888 / 4,746 Maritimes / 2,897 / 311 / 2,157 Newfoundland and Labrador / 47,455 / 3,725 / 7,932 Total / 56,029 / 4,924 / 14,835 In the Province of Quebec, the development of the new IT system to improve catch registration and regulatory compliance monitoring is ongoing. Some regulations are currently being changed to allow its implementation. Provincial wildlife protection officers continue to fight against salmon poaching with the collaboration of wildlife protection assistants from controlled harvesting zones (ZEC). The total preliminary number of patrol hours focused on Atlantic salmon

		in Quebec in 2022 was 39,496. The hours are in addition to those noted in the table above.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	
Action F3:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	Effectiveness will be assessed at the end of season in order to modify/refine protocols as needed.
	Progress on action to date *(Provide a brief overview with a*	Recreational fisheries are managed at the regional level in Canada, using slightly different approaches, therefore, outcomes are reported in this section separately for each region.

	quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)	In 2022, there was no increase in the number of rivers having warm water protocols. Existing warm water protocols continued to be used, as needed, for the adaptive management of recreational fisheries in all regions. However, there is no effectiveness monitoring of the warm water protocols in the Gulf and Maritimes regions, and Quebec. In Newfoundland and Labrador Region, 113 rivers closed throughout the season, of which 20 remained closed for the rest of the season as conditions did not improve to warrant re-opening. In lieu of detailed population and river specific data, analyses indicate that catch and release angling has small effects on salmon mortality when a river experiences large reductions in angler catch during the summer and periodic warm water periods. Additionally, rivers experiencing large reductions in angler catch during the summer and moderate warm water periods, show that additional angling opportunities may be added at minimal conservation cost to the salmon population by applying morning angling only protocols. However, the costs to salmon populations will be higher in situations where high catch and release rates overlap continuously with warm water periods (e.g., when day-night water temperatures remain in excess of 20°C or remain high during the summer) or occur over prolonged periods of extreme warm water temperatures. In the Maritimes Region and many rivers in Gulf Region, rivers are closed to angling during the summer months. In Maritimes, of the three rivers with recreational fisheries, only one was open in the summer (June 1 to July 14). In Gulf Region, warm water closures were implemented in three of the four rivers with warm water protocols. Closures varied by river and ranged from 3 days to 33 days. The Region has requested a science review related to the effectiveness of current protocols and the temperature thresholds that are used to initiate angling restrictions/closures on these four rivers. In Quebec, no warm water fisheries closures were implemented in 2022 although the temperature threshold was almost reached on a few occasions.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an*	Ongoing

	ongoing action that is reported on annually, it should be marked as 'Ongoing')	
	If 'Completed', has the action achieved its objective?	
Action F4:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	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.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during*	Work to manage the Labrador mixed-stock fishery as outlined in the Implementation Plan is ongoing and continued in 2022. In 2022, 900 samples were collected from salmon harvested in the Labrador Indigenous and subsistence fisheries. Genetic analysis was conducted on all samples and the results are being summarized for the ICES Working Group on North Atlantic Salmon (WGNAS) annual report. Final results will also be provided along with information on harvests as part of a report to be tabled at the North American Commission ahead of the June 2023 Annual Meeting.

	the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)	
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	

3.2 Provide an update on progress on actions relating to Habitat Protection and Restoration *(section 3.5 of the Implementation Plan).* ***Note:*** *the reports under 'Progress on action to date' should provide a* ***brief overview*** *of each action. Please report in relation to the reporting year only or the most relevant recent year. For all actions, provide* ***clear and concise*** *quantitative information to demonstrate progress. In circumstances where quantitative information cannot be provided for a particular action because of its nature, a clear rationale must be given for not providing quantitative information and other information should be provided to enable progress with that action to be evaluated. While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group.*		
Action H1:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	Greater variety of options for regulatory tools and partnerships to reduce the threat to Canada's Atlantic salmon habitat.
	Approach for monitoring effectiveness & enforcement (*as submitted in the IP*)	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.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)*	In collaboration with a range of stakeholders and partners, Canada has continued to develop tools and invest in projects designed to reduce threats to the habitat of Canada's Atlantic salmon population in 2022. Some of the broad initiatives and tools developed included: • Releasing a policy statement that summarized the key provisions in Canada's recently modernized Fisheries Act, as well as guidance for proponents applying for Fisheries Act authorizations; • Releasing two interim codes of practice and developing additional ones to improve clarity and transparency about regulatory requirements for project proponents; • Solidifying the processes necessary to release supporting decision documents on the Fisheries Act online registry; and • Drafting a framework which will provide transparency on how ecologically significant areas will be identified, established and used to regulate projects. A selection of the specific initiatives and projects undertaken and/or funded in collaboration with a range of partners included: • Work led by the Nova Scotia Salmon Association (NSSA) on integrated watershed planning for eight priority Southern Uplands watersheds in which Atlantic salmon are a valued species. In 2022, analysis of the monitoring data that has been collected throughout the eight watersheds was undertaken. These data sets were combined to build predictive models of habitat quality and fish distribution; • Work undertaken by Fort Folly First Nation to restore salmon populations and their habitat in the Petitcodiac River watershed in New Brunswick. In 2022, restoration

		activities focused on stabilization of a severely eroding bank near previously identified salmon redds; • Work led by Fort Folly on the collaborative Fundy Salmon Recovery project, which focuses on the release of mature adult salmon into their native rivers to drive population recovery. In 2022, wild salmon smolts and parr were collected from the Petitcodiac watershed and transported to the marine conservation farm for rearing to maturity; and • Funds totalling CA$ 5.2 million (since 2005) contributed by Nova Scotia anglers to the NS sport fish habitat fund, the majority of which goes towards habitat restoration for salmonids.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	
Action H2:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	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 This is filled in by the Secretariat
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)*	The following work was undertaken by the Nova Scotia Salmon Association (NSSA) in 2022. Instream lime dosing and terrestrial catchment liming in the watershed of the West River near Sheet Harbour, have continued. Expansion occurred to the second cold-water site where 274 ha were treated between 2019-2021, and 120 ha completed the project in 2022. Monitoring continues in support of an assessment of acid mitigation techniques. Specifically, the annual smolt estimate and some limited electrofishing are providing the highest quality data. An adult salmon counting fence was not operated in 2022. However, limited redd counting surveys are conducted to estimate adult returns.

		A MSc manuscript was submitted in 2022 which includes an economic assessment of the return-on-investment for catchment liming specifically, focused on forestry products.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	
Action H3:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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. t
	Approach for monitoring effectiveness & enforcement (*as submitted in the IP*)	In the Miramichi River, the annual surveillance 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.
	Progress on action to date	In September 2022, a rotenone treatment was carried out downstream from Miramichi Lake. However, following

	(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)	protests and opposition to the project, a second treatment was not completed and the proponent informed DFO that it was pausing it. No subsequent rotenone treatment was applied and as of February 2023, there is no proposal to continue the eradication project. DFO will continue to collect information to assess the spread of smallmouth bass and will resume its activities to control and contain the species in 2023. In summer 2022, following the successful Piper Lake smallmouth bass eradication project, exclusion screens were removed from the outflow of Piper Lake, and natural connectivity to the St. Marys River watershed was restored. The Province of Nova Scotia continues to monitor Piper Lake and the surrounding area (committed to monitoring until 2025). Cyprinid species were observed in Piper Lake in the autumn 2022. Monitoring in 2023 will focus on assessing lake recovery and ongoing detection of AIS.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	

3.3 Provide an update on progress on actions relating to Aquaculture, Introductions and Transfers and Transgenics *(section 4.11 of the Implementation Plan).* ***Note**: the reports under 'Progress on action to date' should provide a **brief overview** of each action. Please report in relation to the reporting year only or the most relevant recent year. For all actions, provide **clear and concise** quantitative information to demonstrate progress. In circumstances where quantitative information cannot be provided for a particular action because of its nature, a clear rationale must be given for not providing quantitative information and other information should be provided to enable progress with that action to be evaluated. While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group.*		
Action A1:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	The results of this and other research will be published in peer-reviewed journals and other publications.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)*	Federally-funded research to support the assessment of potential impacts of sea lice from farmed fish on wild Atlantic salmon stocks and mitigation measures is ongoing. This includes funding for several ongoing multi-year collaborative research projects with industry in 2022, such as: 1. Looking into a new sea lice chemical alternative with the objective of identifying less persistent pesticides for use in feed. 2. Performing transcriptomics and whole gene sequencing to understand the molecular basis of virulence in sea lice, as part of DFO's St. Andrews Biological Station laboratory experiments to compare the virulence of sea lice originating from farmed and wild salmon. The data generated are currently being analysed. Future studies may compare the expression of virulence on both wild and farmed hosts. 3. Assessing the evolution of virulence of the salmon louse (Lepeophtheirus salmonis) in the Bay of Fundy. This research suggests that this louse may be evolving to be more successful in attachment to farmed salmonids and is becoming increasingly resistant to treatments available. Other ongoing research projects related to sea lice are as follows: 1. Assessing family selection in Atlantic salmon for lice resistant families within the Saint John River strain breeding population.

		2. Testing the role of sea lice on marine survival of wild Atlantic salmon using tagged Atlantic smolts that are exposed to sea lice prior to migration from the Conne and Campbellton Rivers in Newfoundland. In relation to the use of cleaner fish by industry as a mitigation measure against sea lice, lumpfish are under consideration for listing under Canada's Species at Risk Act and if listed, prohibitions would apply.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	
Action A2:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	The results of this and other research will be published in peer-reviewed journals and other publications.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g.*	Federally-funded research to support assessment of genetic introgression and mitigation measures is ongoing. This includes funding for several ongoing and new multi-year research projects in 2022, such as: 1. Finalizing a genomic testing tool and software package to detect low levels of European genetic introgression. The newly developed tool has been verified to provide

	website links) will not be evaluated)	rapid, cost effective and accurate determination of North American vs. European ancestry. 2. Genotyping wild-type salmon using a 220,000 single nucleotide polymorphism (SNP) array. These data were combined with existing aquaculture SNP genotypes, and DFO attempted to extract a subset of SNPs which, collectively, would allow the differentiation of farmed from wild salmon. Confirmation of the diagnostic power of these SNPs, including their utility for identifying hybrids is ongoing. DFO is in the process of developing a Genotyping-in-Thousands by sequencing primers and a protocol to allow unknown samples to be screened at this set of SNPs. DFO intends to screen several hundred samples in 2023 in an effort to add to the confirmation of the utility of this protocol for its intended purpose. 3. Studying potential effects of hybridization between wild Saint John River Atlantic salmon and the European strain to help understand the consequences of introgression into the wild salmon.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	
Action A3:	Description of action (*as submitted in the IP)*	**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.
	Expected outcome (*as submitted in the IP*)	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 (*as submitted in the IP*)	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.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. If sub-actions are completed during the reporting year, this should be made clear. Other material (e.g. website links) will not be evaluated)*	Federally-funded research with respect to wild and farmed fish health and emerging diseases is ongoing. This includes funding for several ongoing multi-year research projects, including collaborations with industry. New multi-year research projects were also funded in 2022, including: 1. A temporal survey of ISAv detection in marine farms to better understand the dynamics of how this virus persists in the environment, how it can transition from the non-virulent form to virulent forms, and the key environmental factors that increase the risk of it becoming virulent. 2. A project examining wild fish-salmon farm interactions to look at the associations, movements and disease transfer potential of commonly found species of fish in and around fish farms. Fish species are being collected from around farms and some will be tagged to monitor their movements to better understand the connectivity of these species between farms.

		DFO is also working to determine the risk posed by the transmission of ISAv from farmed salmon to wild salmon in southwest New Brunswick. This is achieved by: 1) measuring the ISAv shedding rate of infected salmon, minimal infectious dose required to infect salmon, characterising ISAv strains using in vivo challenges, measuring the impact of temperature on ISAv infection dynamic, evaluating the prevalence of non-infectious ISAv on farms and the risk of emergence of infectious ISAv; 2) modeling the dispersal of ISAv viral particles from a hypothetical outbreaks at various salmon aquaculture sites in conjunction with an ocean circulation model; 3) modeling the exposure of wild salmon post-smolts to ISAv plumes predicted to occur from these outbreaks; and 4) assessing the consequences of these exposures at the population level. The federal Emerging Disease Evaluation Committee continued to meet regularly. Activities for 2022 focused on identifying and evaluating aquatic emerging diseases.
	Current status of action *(Please note: 'Completed' means that the overall action is complete for the lifetime of the third reporting cycle. If it is an ongoing action that is reported on annually, it should be marked as 'Ongoing')*	Ongoing
	If 'Completed', has the action achieved its objective?	

4: Additional information required under the Convention

4.1 Details of any laws, regulations and programmes that have been adopted or repealed since the last notification.

In New Brunswick, a new Aquaculture Act and supporting regulations were enacted on July 1, 2022, enabling the province to continue its regulatory authority over the practice of aquaculture.

In 2022, the Province of Newfoundland and Labrador updated the Code of Containment for the Culture of Salmonids in Newfoundland and Labrador to delineate the provincial and federal regulator's role as it pertains to reporting, fish containment and recapture. The new updates also included: requirement for company annual escape prevention training; expanded cage and mooring installation requirements to make them more robust and site specific under the approval of manufacturers guidelines and a third party engineer. Specifically, the 2022 Code

emphasises the 2021 requirements for salmonid net pen operations to have marine site cage system components and installations that meet ISO or certified third-party engineering standards.
4.2 Details of any new commitments concerning the adoption or maintenance in force for specified periods of time of conservation, restoration, and other management measures.
In its 2021 APR, Canada had indicated that DFO had requested advice (anticipated in 2022) through the Canadian Science Advisory Secretariat for the development of a risk assessment framework to inform decisions on stocking of wild Atlantic salmon. This process did not happen as planned in 2022, and is not currently on CSAS's schedule for now. However, the process should occur in 2023 or 2024 if no other priority emerge. Canada has no update on the planned implementation in 2022 of the Province of New Brunswick's Finfish Aquaculture Growth Strategy.
4.3 Details of any new actions to prohibit fishing for salmon beyond 12 nautical miles.
N/A.
4.4 Details of any new actions to invite the attention of States not party to the Convention to matters relating to the activities of its vessels which could adversely affect salmon stocks subject to the Convention.
Canada continued to engage with France about the status of their plans to limit the total catch per recreational license in Saint Pierre and Miquelon (SPM), and encouraged France to accede to the NASCO Convention. This was done as part of the annual meeting of the North American Commission, as well as in separate bilateral discussions in spring 2022.
4.5 Details of any actions taken to implement regulatory measures under Article 13 of the Convention including imposition of adequate penalties for violations.
N/A.
North American Commission Members only:
4.6 Details of any new measures to minimise bycatches of salmon originating in the rivers of the other member.
During the 2022 Nunatukuvut Food, Social, and Ceremonial fishery, it was recommended that harvesters move gillnets for the community freezer program from the head lands of coastal waters into the bays to prevent incidental catches of U.S.-origin salmon.
4.7 Details of any alteration to fishing patterns that result in the initiation of fishing or increase in catches of salmon originating in the rivers of another Party except with the consent of the latter.
N/A.