FORÊTS, FAUNE ET PARCS

Atlantic Salmon Management Plan 2016•2026

March 2016

ENSEMBLE on fait avancer le Québec

Québec

This work is dedicated to the memory of Pierre-Michel Fontaine, a biologist who commited much of his short life to the management of anadromous Atlantic salmon and habitat conservation. To this day, his work remains the foundation of the modern management of this iconic species in Québec.

Written by:

Julien April

Martin Arvisais

With contributions from:

Amélie Bérubé
Laurie Beaupré
François Barnard
Jean-Nicolas Bujold
Valérie Bujold
Hugo Canuel
William Cayer-Blais
Vanessa Cauchon
Véronik De La Chenelière
Denise Deschamps
Mélanie Dionne
Maxime Guérard
Richard Hamel
Johanne Labonté
Charlène Lavallée
Véronique Michaud
Amélie Pépin-Labbé
Christiane Picard
Sébastien Ross
Marc Talbot
Isabel Thibault
Benoit Thomas
Marc Valentine

Responsible manager: Jessy Dynes

Co-chair of the comité scientifique saumon: Serge Tremblay

References:

MINISTÈRE DES FORÊTS, DE LA FAUNE ET DES PARCS (2016). Plan de gestion du saumon atlantique 2016-2026, ministère des Forêts, de la Faune et des Parcs, Direction générale de l'expertise sur la faune et ses habitats, Direction de la faune aquatique, Québec, 40 p.

Legal Deposit

Bibliothèque et Archives nationales du Québec, 2016

ISBN : 978-2-550-77037-4 (PDF)
ISBN : 978-2-550-77036-7 (print)

The publication is available online at the following address:
faune.gouv.qc.ca/peche/plan-gestion-saumon.jsp

Table of Contents

1. Introduction

Renowned for its tenacity, admired for its prowess and pursued for its high quality flesh, Atlantic salmon (*Salmo salar*) has played a leading role in North America's history, including in Québec. This noble fish was first an important food source for the First Nations peoples, then for the first settlers. Although salmon is still a food staple for certain communities, it is now mainly sought after by anglers looking for excitement while enjoying spectacular, natural scenery.

Québec's exceptionally beautiful salmon rivers are internationally renowned for their clear water and natural appearance, even in suburban areas. Some of these rivers, such as the Moisie and Cascapédia rivers, also boast an abundance of large salmon, inspiring the dreams of salmon fishers worldwide. Both local and foreign fishers are eager for the chance to catch a record-sized fish.

There is no doubt that anadromous Atlantic salmon inspires the most excitement among anglers and receives the most attention from wildlife resource managers because of its complex life cycle and vulnerability to habitat changes. Thus, salmon fishing in Québec is governed by management measures that are continuously updated based on the best available scientific knowledge (figure 1).

Despite all the attention it receives, salmon suffered a sharp decline throughout its entire range during the 1980s and 1990s. Since 2000, Québec's salmon population has stabilized, but at a historically low level.

In recent decades, the status of Atlantic salmon populations has changed. At the same time, both the attitudes of anglers and recreational fishing as a whole have evolved. In this new context, Atlantic salmon management also had to evolve. The Atlantic Salmon Management Plan aims to promote population restoration and optimize the sustainable economic benefits of fishing for this iconic species. The management plan is supported by the best available science and is consistent with this specie's status in the North Atlantic. The plan specifically sets out new rules for managing recreational fishing and for fish stocking. It addresses the following elements:

- Biological profile;
- Management context;
- Management modalities adapted to the population's situation;
- General management modalities;
- Population restoration modalities;
- Awareness and education.

The Atlantic Salmon Management Plan will be effective from April 1, 2016, to March 31, 2026, with a mid-term review in 2020. This time frame is based on the salmon life cycle, which lasts an average of five years. Thus, by 2020, the management plan's biological impact should be measurable.

Figure 1. History of Atlantic salmon management in Québec.

Before 1980: Era of private clubs

The establishment of private clubs on salmon rivers led to the privatization of these rivers and restricted Québec citizens' access to this resource.

▼

1980: The salmon river management policy was developed

The policy advocated the optimum use of resources, a better distribution of salmon between users, greater river access for a larger number of anglers, increased management in the sector and increased economic returns from the fisheries.

▼

1984–1993: Five-year Atlantic salmon management plan

This plan, which was renewed in 1989, aimed to reduce the number of salmon intercepted in the ocean outside Québec waters, improve population management, maintain protection against poaching, serve as a statement on the development and marketing of salmon and a dialogue between users.

▼

1990–2000: General population decline

This period is characterized by a general decline of many salmon populations throughout their distribution range. The rise in sea mortality is the main reason for the collapse.

▼

1972–2000: Complete closure of the commercial fishery

The buyback of commercial fishing licences for Atlantic salmon from 1972 to 2000. Currently, there is no commercial Atlantic salmon fishing in Québec.

▼

2003: Atlantic salmon conservation and exploitation plan for 2004–2009

This plan was never formally endorsed by the ministerial authorities and wildlife partners. The management modalities advocated therein; however, were generally applied in Québec.

▼

2014–2016: Development of the Atlantic Salmon Management Plan 2016–2026

The plan has two objectives:

1. Ensure the conservation and long-term stability of Atlantic salmon populations;
2. Foster the optimal exploitation and economic development of recreational Atlantic salmon fishing.

2. Consultations

The Atlantic Salmon Management Plan 2016–2026 was subject to an extensive consultation process. This process included discussions with the Fédération québécoise pour le saumon atlantique (FQSA), the Fédération des gestionnaires de rivières à saumon du Québec (FGRSQ), the Fédération des pourvoiries du Québec (FPQ), the Fédération québécoise des chasseurs et pêcheurs (FédéCP), the Société des établissements de plein air du Québec (SEPAQ), the Fondation de la faune du Québec (FFQ), stakeholders in the Tables regionales de la faune (TRF) and the operators on the salmon rivers.

To complete the consultations and develop a standardized instrument for collecting the stakeholders' opinions, a survey was conducted of the concerned federations, the TRFs of the regions where salmon migrate and the operators on salmon rivers. The results of this survey allowed the Ministère des Forêts, de la Faune et des Parcs (MFFP) to identify clear trends and adopt a final position on the modalities that the management plan should include.

First Nations communities also took part during the development of this plan. The First Nations of Québec and Labrador Sustainable Development Institute (FNQLSDI) was invited to meetings with the national partners. The Makivik Corporation and the Hunting, Fishing and Trapping Coordinating Committee (HFTCC) were consulted. Finally, each indigenous community was consulted in writing and a meeting with some of these communities was held during the fall of 2015. In all of these cases, the informational meetings, consultations and the few written responses, these communities have reacted positively to the modalities set out in the management plan.

Not only did the consultations confirm that the majority of stakeholders were in favour of applying the modalities set out in the Atlantic Salmon Management Plan 2016–2026, but they also allowed certain management modalities to be modified according to the needs and concerns of the national wildlife partners and organizations that exploit this resource.

3. Anadromous Atlantic salmon in Québec

3.1 Biological profile

One species, two lifestyles

Atlantic salmon (*Salmo salar*) is a migratory fish that lives in various habitats that connect to the Atlantic Ocean. In North America, it is found from Connecticut to Ungava Bay, while in Europe it lives in rivers from Spain to northern Russia. This species is anadromous, which means it reproduces in freshwater, migrates to saltwater, and returns to freshwater to reproduce (figure 2). Unlike Pacific salmon species, Atlantic salmon is able to reproduce more than once.

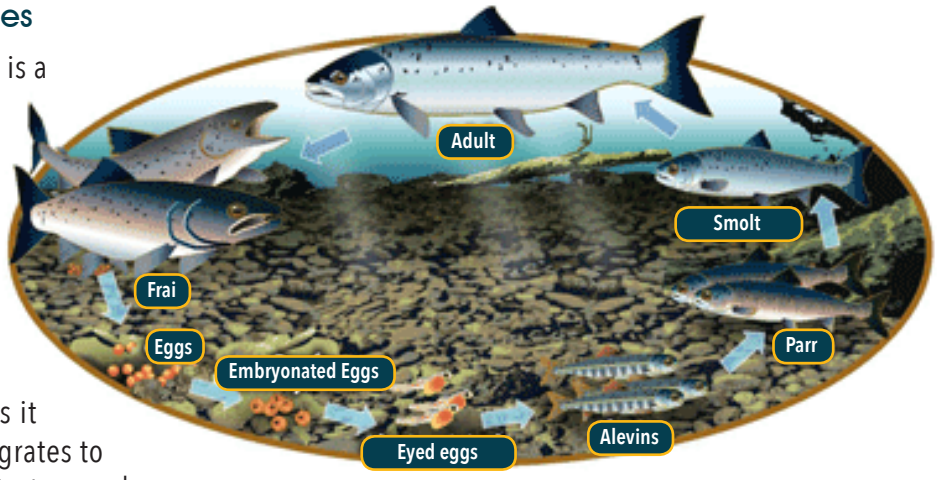


Figure 2. Life cycle of anadromous Atlantic salmon.
Source: Fisheries and Oceans Canada (DFO).

Although Atlantic salmon is migratory, some populations of this species do not migrate, spending their entire lives in freshwater. These populations are called "landlock salmons" or "ouananiche," a Native word meaning "to stray outside of one's environment," which is very appropriate for this fish. In Québec, ouananiche live mainly in the regions of Saguenay-Lac-Saint-Jean, the Côte-Nord and certain lakes in southern Québec. The Atlantic Salmon Management Plan 2016–2026 applies to anadromous salmon populations and does not address the management of ouananiche. For the remainder of this document, the term "salmon" refers exclusively anadromous Atlantic salmon.

The great migration

Atlantic salmon spend the first years of their lives (typically two to four) in rivers before migrating to the sea for a feeding period that lasts from one to three years. After this, they return to their natal river to spawn. This behaviour, called "homing," allows the salmon to adapt to the specific biological and environmental conditions in their native river. For this reason, each river represents a distinct salmon population.

When the salmon parr reach over 10 cm, their bodies lengthen and turn silver. The following spring, they leave their native river and begin their first migration to the sea. These juvenile salmon, now called smolts, leave the Gulf of Saint Lawrence toward the Atlantic Ocean before the cold winter sets in. The fish probably spend their winter off the coast of Newfoundland, where the water from the Gulf Stream usually keeps the temperature between 10 and 15°C. The following spring, some of the salmon, mostly males, will return to their natal river. Most of the females; however, will remain at sea for one or two more years. These salmon migrate to the North Atlantic, going as far as the coast of Greenland in the autumn, and then come back to their winter locations off the coasts of Newfoundland (figure 3).

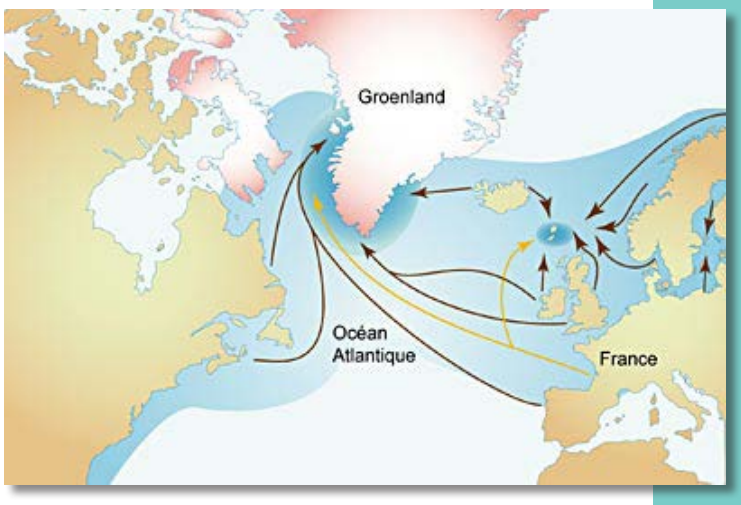


Figure 3. Marine migration paths of Atlantic salmon.

Salmon populations can differ greatly, particularly with respect to the average number of years they spend at sea, the age at which they migrate to the sea and the dates on which they travel upstream. Each population also has a unique genetic profile. Despite these differences; however, these populations all occupy the same areas at sea. Thus, they are similarly affected by changes in the marine ecosystem.

Large salmon, small salmon

Atlantic salmon have two distinct types of adults. In general, Atlantic salmon with a fork length of less than 63 cm (figure 4), called "small salmon" or "grilse," have only spent one winter at sea. These fish are predominantly males (85%). The females in this category lay an average of 4,000 eggs. "Large salmon" or "multi-sea winter" salmon, on the other hand, are 63 cm or more in length and have spent two or more winters at sea. These individuals are predominantly female (60%) and lay an average of 8,000 eggs. The proportion of males and females within these categories varies from one river to another, particularly depending on the proportion of small and large salmon in the population.

Large salmon, which are more productive, are crucial to the future of the salmon populations in many Québec rivers. Small salmon, whether male or female; however, also play an important reproductive role, particularly in rivers where the population is mainly composed of small salmon (e.g., Lower north shore).

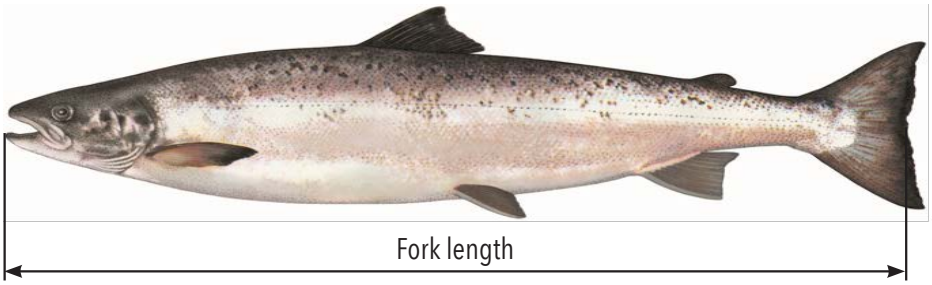


Figure 4. Distance between the tip of the fish's snout to the fork of its tail.

Distribution in North America

In North America, only one salmon species lives in the Atlantic Ocean while five live in the Pacific Ocean: Pink or humpback salmon, coho or silver, sockeye, chum or Keta and chinook. Canada has about 550 salmon rivers, 111 (plus tributaries) of these rivers are located in Québec (figure 5), in the administrative regions of the Côte-Nord, Gaspésie-Îles-de-la-Madeleine, Bas-Saint-Laurent, Saguenay-Lac-Saint-Jean, Capitale-Nationale and Nord-du-Québec. Since some of these salmon rivers have very large tributaries which harbour distinct salmon populations and are subject to specific fishing modalities, Québec actually manages its Atlantic salmon based on 114 rivers.

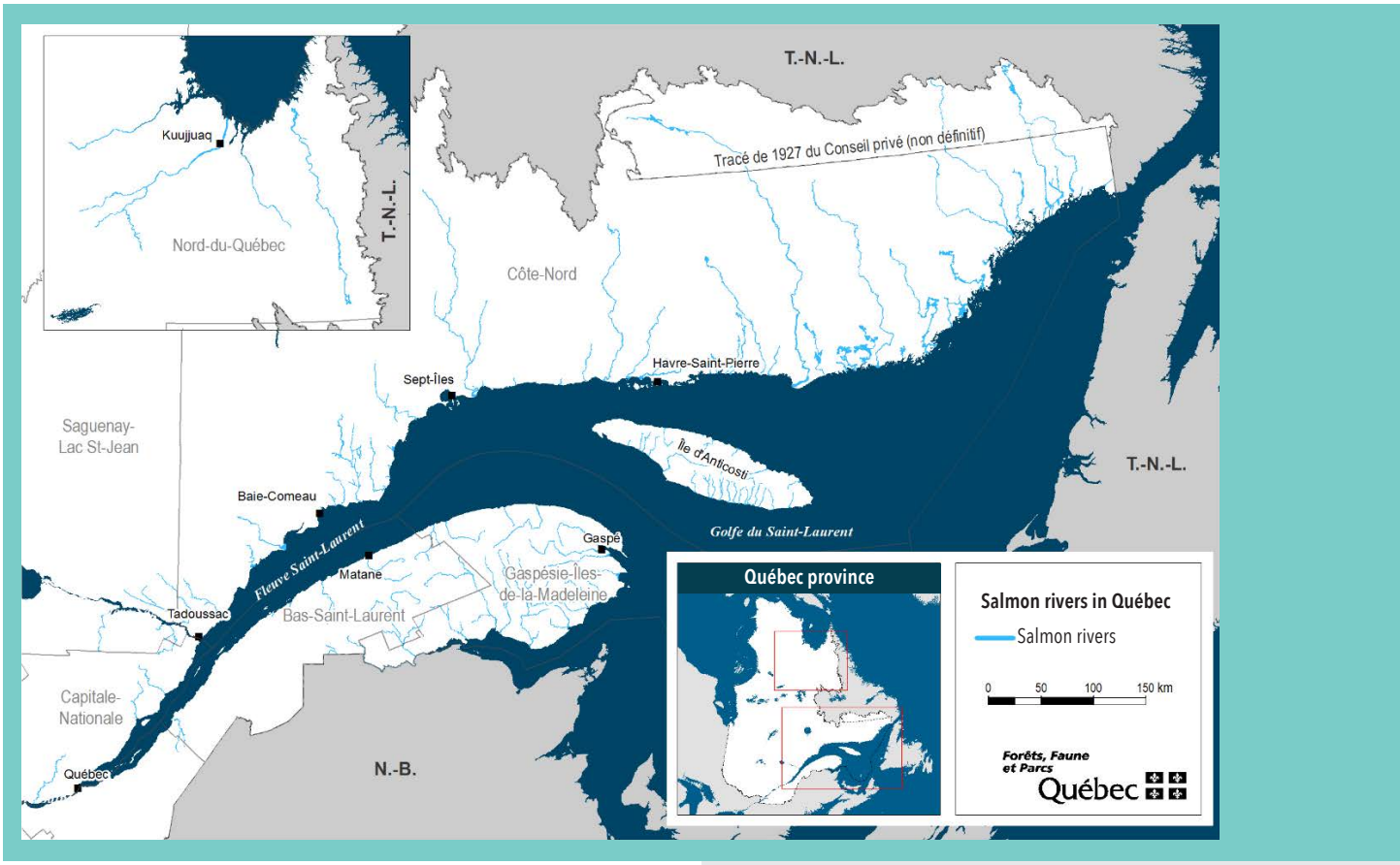


Figure 5. Distribution of the salmon rivers in Québec.

The decline of salmon

Salmon has suffered a steep population decline throughout its entire range. This decline is mainly caused by a general increase in mortality at sea, likely caused by changes in the ocean ecosystem. Despite the significant reduction of catches in recent decades, mainly from closing the commercial fishery, the populations have not recovered. In Québec, the decline during the 1980s and 1990s particularly affected large salmon (figure 6). Since the 2000s; however, Québec's salmon population has stabilized; even if upstream migration is particularly strong in some years, such as 2011, it has been particularly low in other years, such as 2014. In the United States, Nova Scotia and in several New Brunswick rivers, the situation is even more worrying.

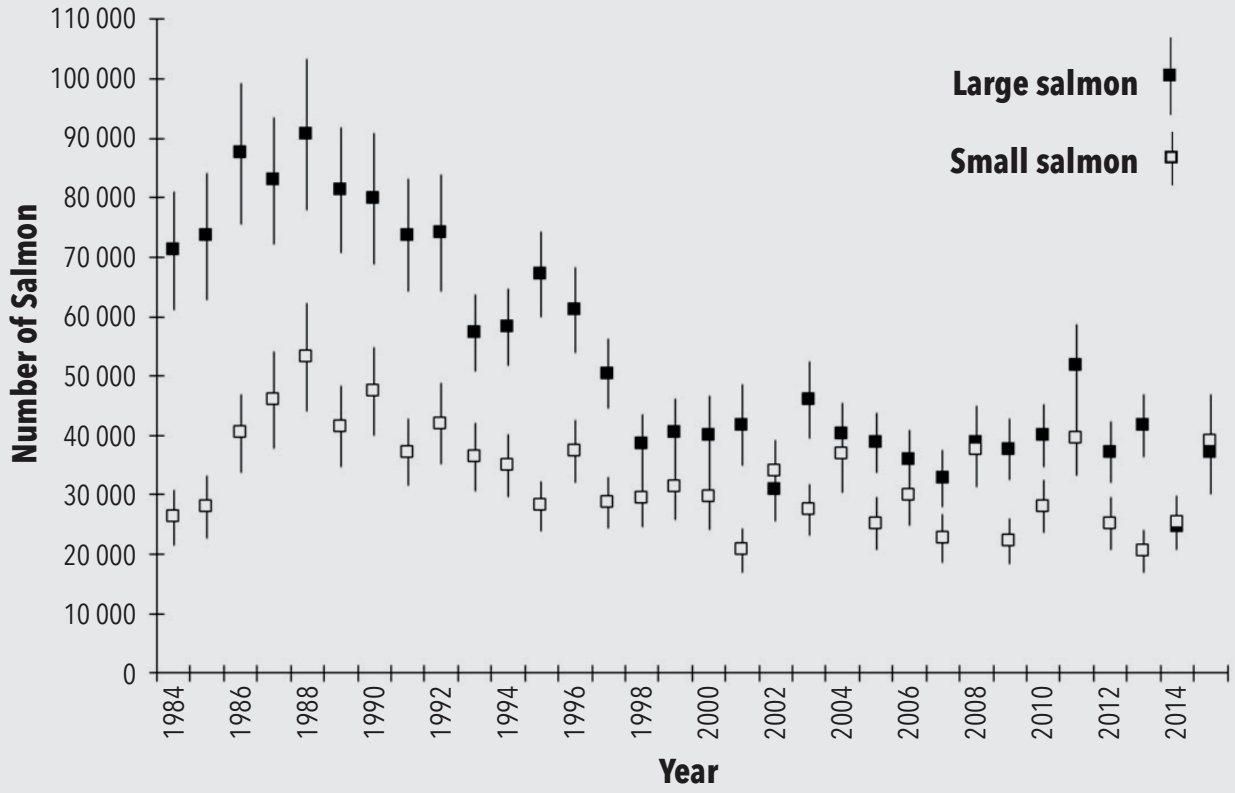


Figure 6. History of salmon runs in Québec from 1984 to 2015.

3.2 Management context

Legal framework

Since Atlantic salmon migrate through the territorial waters of different countries and into international waters, effective management depends on cooperation between these countries. The North Atlantic Salmon Conservation Organization (NASCO) plays a major role in this cooperative effort. This organization brings together management officers from the countries concerned, representatives for anglers and representatives for the salmon aquaculture industry. Québec regularly attends these meetings as a member of the Canadian delegation. Depending on the condition of the fish stocks, NASCO decides the size of the harvestable surplus and how it will be divided. NASCO members also commit to sustainably manage the salmon populations. NASCO; however, cannot enforce its decisions regarding how each member country manages the salmon in their region. Despite this, these countries usually fulfill their NASCO commitments and comply with its decisions.

In Québec, the Ministère des Forêts, de la Faune et des Parcs (MFFP) is responsible for sustainably managing fish populations (freshwater and migratory) and their habitats. This department is entirely responsible for monitoring fish populations and their habitats, and employing conservation methods and sustainable exploitation procedures. Thus, the MFFP is responsible for allocating, managing and protecting this resource. While in other provinces with migratory Atlantic salmon, Fisheries and Oceans Canada manages the migratory fish populations, in 1922, the Canadian government delegated the management of Québec's migratory fish to the province. Certain fishing rules; however, are still governed by federal regulations, such as the Québec Fishery Regulations derived from the Government of Canada's Fisheries Act.

According to the Act Respecting the Conservation and Development of Wildlife in Québec, the apportionment of halieutic resources must be done according to the following order of priorities: 1) the reproductive stock; 2) fishing for food purposes; 3) recreational fishing; 4) commercial fishing (figure 7). Thus, depending on the abundance of salmon, certain groups may be prohibited from harvesting this resource according to an established order. In this way, commercial fishing in Québec has been completely banned since 2000. The current management system aims to maintain an adequate amount of reproductive stock to ensure the natural renewal, of the highest quality ritual, social, food and recreational fisheries.

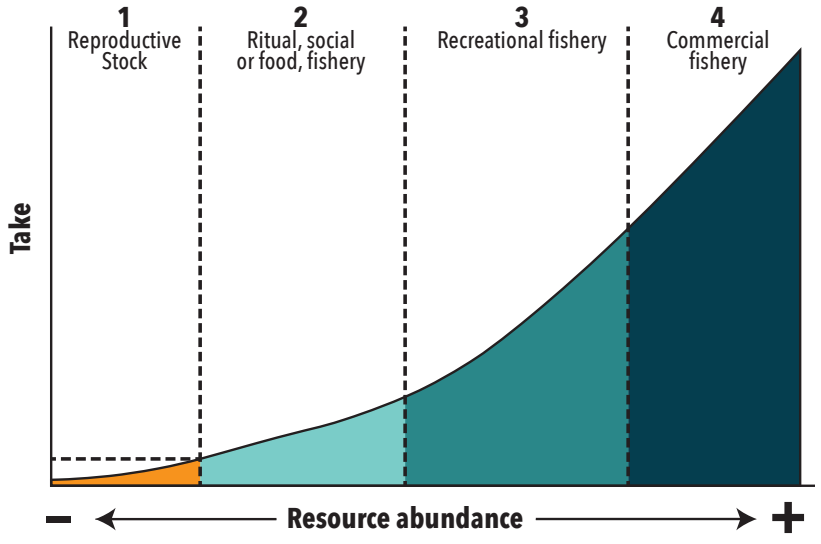


Figure 7. Resource allocation priority in Québec.

Fishing for food, ritual and social purposes

In some First Nations communities, Atlantic salmon is prized both as a food and for cultural reasons. In areas where the James Bay and Northern Quebec Agreement and the Northeastern Quebec Agreement apply, First Nations' fishing practices are governed by a special regime. For First Nations communities without a special treaty-based regime, the government aims to facilitate food, ritual or social fishing. These activities can be governed by communal fishing licences or agreements granted by the minister responsible for wildlife management, according to the terms agreed upon with the band councils. According to available data, First Nations annually harvest approximately 5,000 fish. For some rivers; however, data on the number of fish caught by First Nations communities is incomplete. This means that the annual values are underestimated.

Recreational fishing

An estimated 15,000 anglers annually fish for salmon in the rivers of Québec (12,000 residents and 3,000 non-residents). On average, salmon anglers annually fish for approximately 60,000 fishing days. The resulting annual catch is about 17,000 salmon. Nearly 8,000 of these are kept, including just over 3,000 large salmon. Annually, this activity generates an estimated $50 million (box 1).

The voluntary release of fish back into the water is common among a sizeable number of salmon anglers. This habit, which is gaining popularity in Québec, is already well established in the United States. This practice is an excellent way of offering quality fishing while preserving Atlantic salmon populations. Currently, more than 55% of the Atlantic salmon caught in Québec are returned to the water. The survival rate for released fish is estimated at 93% when the release follows the proper practices. Thus, a document outlining proper catch and release practices is available on the Ministry's website (mffp.gouv.qc.ca/la-faune/peche/remise-eau-poisson/). Other awareness promotion instruments will also be produced as part of the Salmon Management Plan 2016–2026 (see section 4.2).

Box 1. Recreational fishing for Atlantic salmon in Québec in 2014[1].

Some numbers	
Anglers:	**14,590**
Fishing days:	**58,271**
Take:	
Catches:	**11,525 catches**
Harvest:	**5,013 kept salmon**
Release[2]:	**6,512**
Release rate:	**≥ 57%**
Average daily success:	**0.2 salmon/day/angler**
Total expenditures:	**50M$[3]**

Catching salmon from Québec in mixed stock fisheries

While in Québec, as elsewhere, fishing for Atlantic salmon is generally done in the salmon's natal river, some fisheries are conducted in areas where the fish caught may come from different rivers and countries. This is called a mixed fishery. There are two mixed fisheries that really affect Québec salmon populations; the Greenland and Saint-Pierre and Miquelon fisheries. For example, in 2014, about 1,000 salmon from Québec rivers were caught by Saint-Pierre and Miquelon fishermen. In the same year, fishermen in Greenland caught about 5,000 salmon. In Québec, about 12, 000 salmon are caught annually through recreational, food, ritual or social fishing. Greenland and Saint-Pierre and Miquelon do not have large-scale commercial fisheries. This fishing is done using small boats, their catches are not exported outside of the islands, and for many isolated communities, such fishing is vital to their livelihoods. However, while Québec, like almost all NASCO members, has spent decades reducing the scale of its catch to help conserve the species, many observers feel the fishing trends in Greenland and Saint-Pierre and Miquelon are dangerous. Québec, like many other NASCO members, has argued for Greenland and Saint-Pierre and Miquelon to reduce their annual catch and thus, their impact on the source populations.

1 Given the very low number of returning salmon in 2014, and due to the particularly restrictive recreational fishing modalities, the traffic on the rivers and the number of catches have reduced compared to the average over the last 10 years.

2 Because the catch and release of salmon is not mandatory, the number of declared releases is lower than the real number of releases. This affects the number of catches, the release rate and the average daily success in this document.

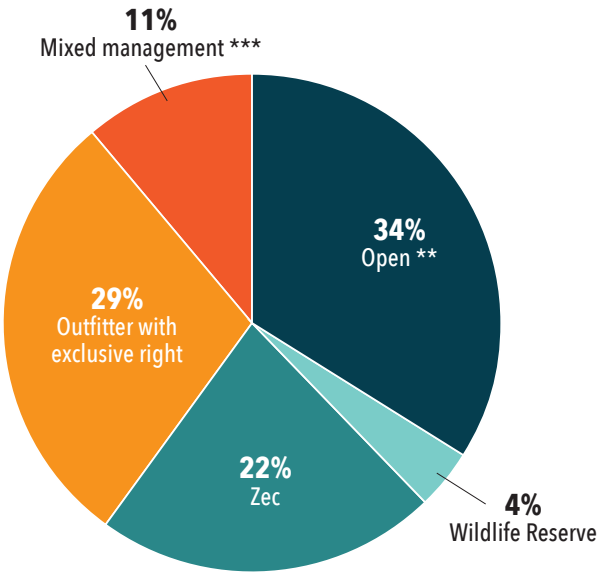
3 Data taken from: Gardner Pinfold (2011), Economic Value of Wild Atlantic Salmon, Atlantic Salmon Federation.

Salmon river exploitation

About half of the salmon rivers in Québec are exploited by a food, ritual and social or recreational fishery. On thirty rivers; however, salmon fishing is completely prohibited because the salmon populations they harbour are particularly small.

For most rivers that are exploited for recreational fishing, the department responsible for wildlife delegates exploitation management to structured wildlife territories, whether they are controlled harvesting zones (ZEC), wildlife reserves or outfitters with exclusive rights. On these rivers, non-profit organizations, businesses and SEPAQ are mandated to manage the exploitation of the resource (box 2).

Box 2. Delegation distribution for Québec salmon rivers*.



* This profile does not take indigenous fishing rights into account.

** The "open" status includes rivers bordered by private property, for which some owners are party to a memorandum of agreement for the purpose of wildlife management and accessibility, under Sections 36 and 37 of the Act Respecting the Conservation and Development of Wildlife (RLRQ, chapter C-61.1).

*** The term "mixed management" means that the river is shared between several statutes (ZEC, open, etc.).

Regardless of the above profile, fishing on several Québec rivers is prohibited in both the structured wildlife territories and open access rivers. Regulatory information from the Ministère des Forêts, de la Faune et des Parcs on fishing, available at http://mffp.gouv.qc.ca/english/publications/online/wildlife/fishing-regulations/index.asp, must be consulted before a fishing trip.

Useful data for management

Québec has the most powerful system in Canada for adequately monitoring the status of salmon populations. Thanks to the significant involvement of the delegated organizations, the annual upstream migration of salmon is measured in about 40 rivers, including most of the rivers that are popular among anglers. Thus, 80% of the fishing days in Québec take place on rivers with salmon counts. There is relatively less information; however, on the upstream migration of salmon in the Côte-Nord and Nord-du-Québec regions. This can partially be blamed on the river water's dark colour, which hinders counts performed by snorkelling or canoeing, the low number of salmon rivers with dams and therefore, fishways, and the large size and inaccessibility of some of these rivers.

Fish counts are sometimes performed using fishways and counting fences, continuously providing abundance data in real time. Other counts are conducted by snorkelling or canoeing. These counts can be done multiple times in the season to monitor the changes in upstream migration. When compared with the temporal pattern of upstream migration recorded in previous years, the upstream data measured in the mid-season can be used to estimate the total salmon run by late autumn.

In addition to these observations which exclusively target adult salmon, the Ministry also monitors the annual downstream migration of smolts as compared to the upstream migration of adults on three reference rivers: The Saint-Jean River in Gaspésie (since 1984), Trinité rivers (since 1984) and Vieux-Fort (since 2011) in the Côte-Nord. This data is used to calculate the river and sea survival rates.

Catch data is another important source of information for population management. As Québec is the only province in Canada that requires the number of salmon caught to be reported, the province has very precise data on the number of fish harvested through recreational fishing. Thus, by subtracting the number of individual fish that anglers catch and keep from the number that migrated upstream, biologists can estimate how many eggs are deposited annually in most of the rivers where fishing occurs.

Management decisions can be based on the abundance levels recorded for previous years, as is usually the case elsewhere in Canada. Monitoring upstream migration, combined with the mandatory reporting of catches also allows exploitation methods to be modified in real time. These adjustments are particularly useful when the upstream salmon migration in a given year is different from the recent trends. Thus, when the data recorded during the season indicates that salmon is very abundant, the exploitation rate can be increased to maximize the socio-economic benefits. Conversely, if the trend suggests that salmon is scarce, the exploitation rate may be reduced during the season to help conserve the populations. In the summer of 2014, for example, because the recorded upstream migration rates in almost all Québec rivers were very low in the first half of the season, in the second half of the season, a policy was introduced that required the release of large salmon caught in all salmon rivers in the Capitale-Nationale, Saguenay-Lac-Saint-Jean, Bas-Saint-Laurent, Gaspésie and Côte-Nord regions.

4. Modalities for managing Atlantic salmon

The Atlantic Salmon Management Plan has two objectives:

1. Ensure the long-term conservation and persistence of Atlantic salmon populations;
2. Promote the optimal development and sustainable economic growth of the recreational Atlantic salmon fishery.

To achieve these objectives, salmon fishing is governed by management modalities that are adapted according to each river's specific situation. The fishery is also governed by general fishing modalities that are consistent with the current status of Atlantic salmon in the North Atlantic and with the economic importance of the recreational fishing industry for the province of Québec and certain regions in particular.

4.1 River specific management modalities

Many of the management decisions that aim to conserve and promote salmon in Québec, are tailored to the specific situation of each salmon population. Considering that the salmon population in every river is distinct, management modalities are established on a "river by river," basis.

Categorizing populations for management purposes

Salmon populations are categorized into three broad categories, called "stock status zones," according to their situation (figure 8).

- A healthy zone is one where the population is considered adequately abundant. A relatively sustained exploitation rate in this zone would not put the population at risk.
- A caution zone is one where the population is lower than the ideal level, but is not dangerously low. The exploitation rate in this zone is reduced to encourage an increase in the population.
- A critical zone is one where the population is very low. To preserve this vulnerable population, the management modalities applied must minimize the mortality rate.

This method of categorizing populations to help manage them essentially aims to ensure a maximum number of populations in the healthy zones and to minimize the number of populations that fall into and stay in critical zones.

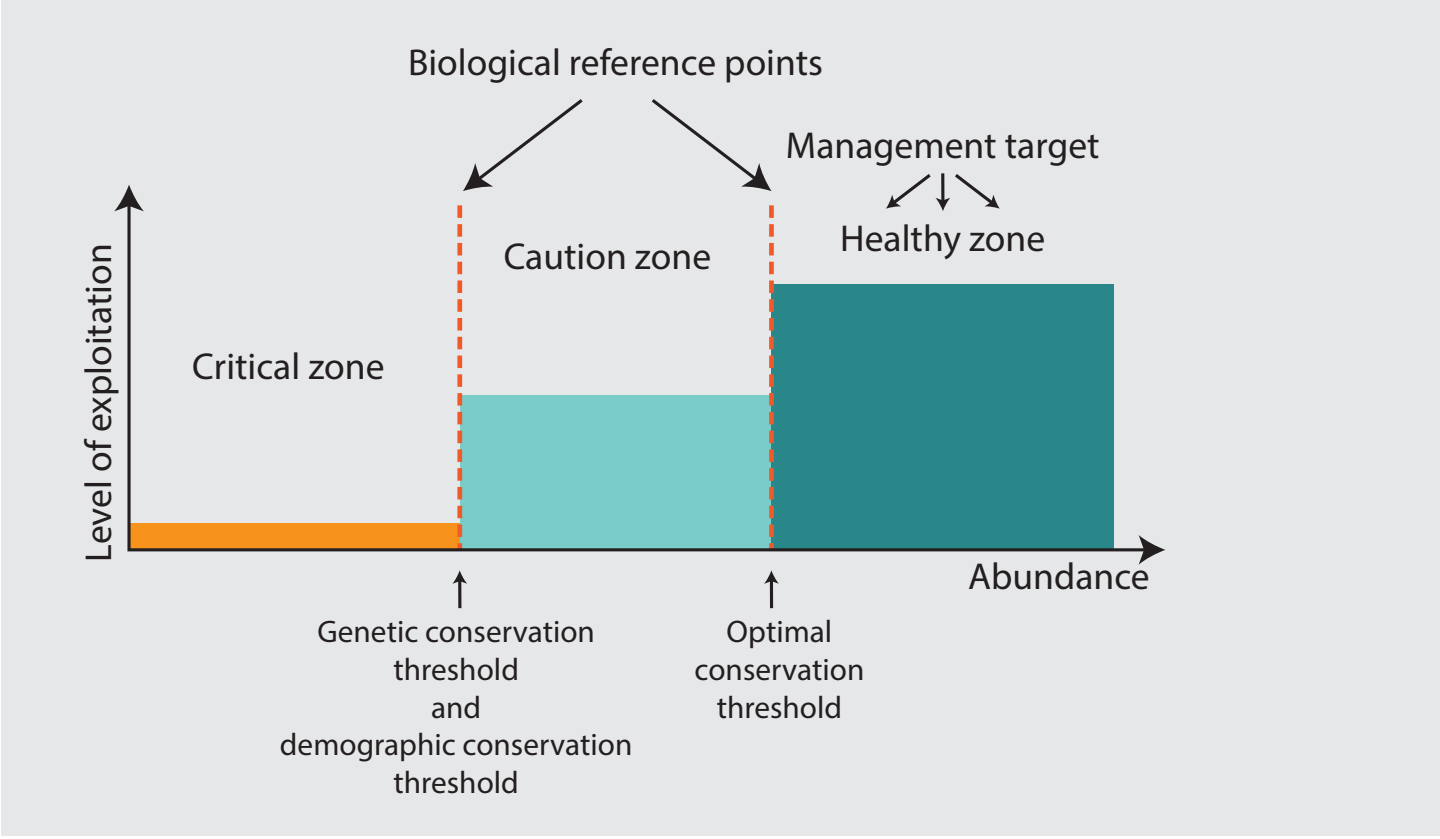


Figure 8. Management categorization of salmon populations.

Biological reference points

The different stock status zones are identified by biological reference points (figure 8). Therefore, these reference points represent abundance thresholds at which the population's status can be determined. The Atlantic Salmon Management Plan 2016–2026 uses two reference points that are based on demographic criteria and determined using a stock-recruitment model (figure 9 and box 3). It also uses another reference point based on genetic criteria. These thresholds were established according to the highest internationally recommended management standards.

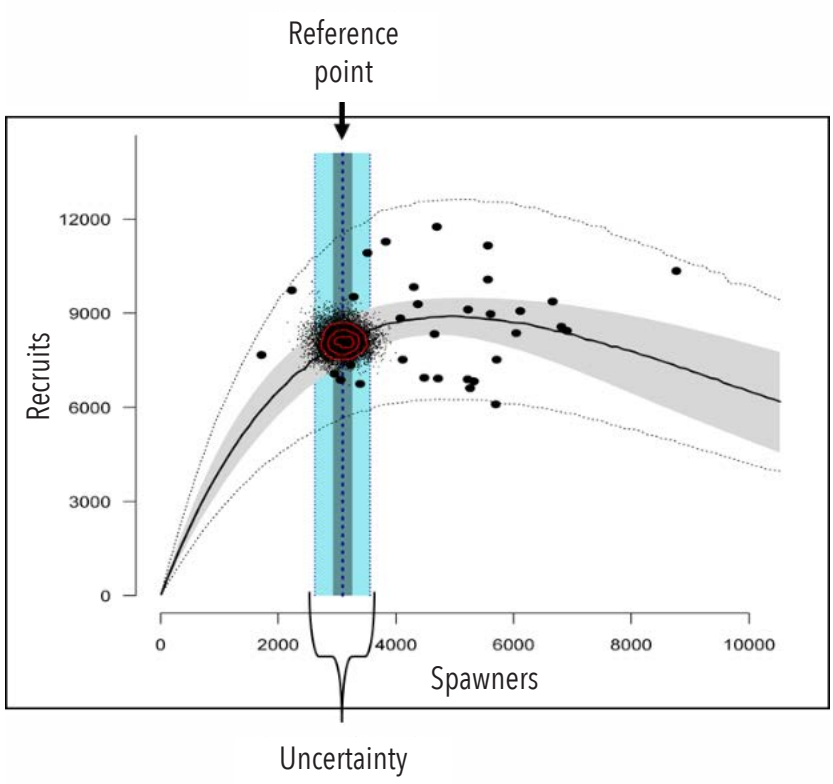


Figure 9. Example of a stock-recruitment-type demographic model which presents the value of a biological reference point and the degree of certainty associated with its estimate.

Box 3. Stock recruitment models

For a given population, a stock-recruitment model defines the relationship between the quantity of spawners and the quantity of recruits they produce. This relationship can be expressed by a curve that first increases, then tends to form a plateau, or possibly decrease gradually as the number of reproducers increases (figure 9). This curve is caused because the population reaches the river's carrying capacity. Indeed, when there are many young salmon in the river, the strong competition between them is reflected in a decline of individual growth and survival.

As part of the Atlantic Salmon Management Plan 2016–2026, a new Ricker stock-recruitment model was developed using a Bayesian hierarchical approach. This model combines data from 12 reference rivers for the 1972–2005 cohorts. The model also includes habitat (production units) as a co-variable, allowing the stock-recruitment relationship to be applied to rivers without biological data. Compared to the previous model that was used to manage Atlantic salmon in Québec, this new model more adequately describes the province's current salmon population fluctuations and allows for a better assessment of the uncertainty associated with calculating thresholds.

Optimal conservation threshold

The optimal conservation threshold is the biological reference point, based on demographic criteria, that determines whether or not a population is classified within the healthy zone. A population that reaches or exceeds this abundance level is considered healthy. This threshold marks the level at which the population is abundant enough that it can allow for a maximum sustainable yield with 95% certainty or more. The optimal conservation threshold resembles the conservation threshold that was used in Québec from 1999 to 2015, but is on average 1.5 times higher. Please note; however, that the magnitude of the difference between these two values varies from river to river (appendix 1). As with the values of the second reference point based on demographic criteria, the values of this reference point are typically expressed by the number of eggs deposited and vary from river to river depending on the river's size and habitat quality.

Demographic conservation threshold

The demographic conservation threshold is the biological reference point, based on demographic criteria, that determines whether a population is classified in the critical zone. A population's situation is considered critical if its abundance level is lower than this value. At this level of abundance, it is 75% certain at least 50% of the maximum recruitment will be produced. In other words, below this level, there is a real risk of extinction.

Genetic conservation threshold

The genetic conservation threshold is the level of abundance that allows 90% of the population's genetic diversity to be preserved for 100 years, as recommended by the International Union for Conservation of Nature (IUCN). In the case of salmon, a population is considered to be in a critical situation if it has fewer than 200 adults. Unlike the optimal and demographic conservation thresholds, the genetic conservation threshold is expressed as the number of adult salmon and is static from one population to another.

Management target

While biological reference points are determined using a fully scientific approach, some management decisions must take socio-economic factors into account. These factors are included in the management targets. Whether or not large salmon may be harvested is not only decided based on the optimum conservation threshold, but also on the management target, which is set at a higher abundance level than the optimum conservation threshold. The Ministry can set the management target within this limit, in collaboration with the operator exploiting salmon on a given river. The operator must evaluate his risk tolerance and the type of fishing he wants to offer. Indeed, the closer a management target is to the optimal conservation threshold, the greater the number of large salmon that may be harvested in the short-term. This; however, also increases the risk that the population will fall below the optimal conservation level in the medium-term, thus, prohibiting the harvest of all large salmon. Since some management organizations want to maximize the number of salmon in the river and not the number harvested, establishing a high management target can force anglers to practise the catch and release of large salmon on a river that has reached its optimal conservation threshold. Thus, management targets offer flexibility and help maintain the specific character of different salmon rivers in Québec.

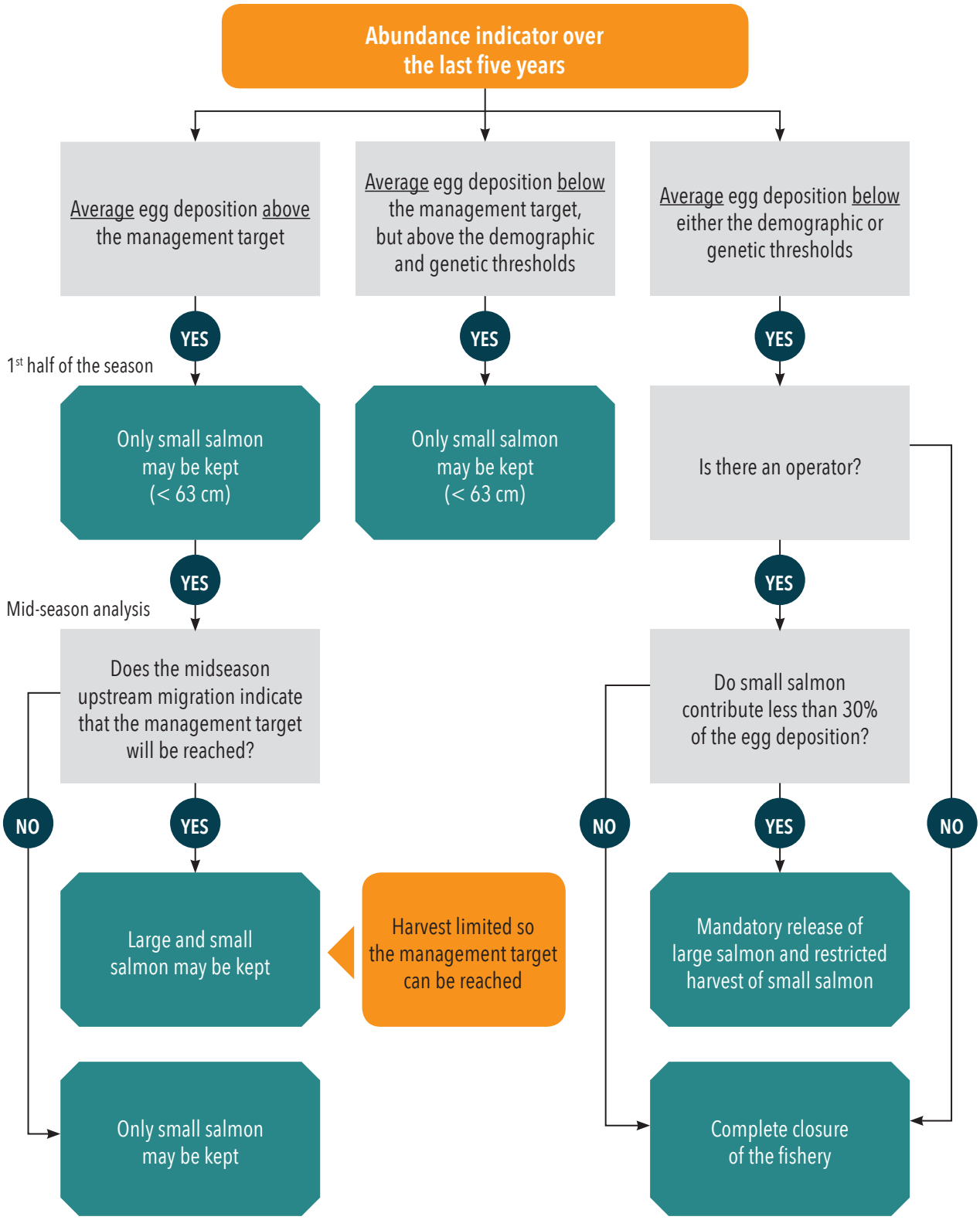
Fishing modalities based on population status

The fishing modalities that are applied to Québec salmon rivers are chosen based on the river's classification into one of the stock status zones.

Since the upstream migration of salmon varies significantly from one year to another and the life cycle of salmon is about five years, analyses are based on the average salmon abundance over the last five years instead of simply from the previous year.

For many rivers, the precise level of upstream migration can be obtained through direct counts made by snorkelers or using fishways. For many other rivers; however, direct counts are not possible. In these cases, abundance levels are estimated indirectly by using the reported catch data for the river and the upstream migration data from nearby rivers.

The fishing modalities for each Québec river are determined according to the decision tree presented in figure 10. This tree represents the "river by river" management system. Measures for making exceptions may; however, be analyzed by a Ministerial expert committee that will take the issues surrounding the conservation and development of the species into account. The applicable fishing modalities for each of the population categories are presented in the following pages.



Exceptions: Exceptions will be analyzed by an MFFP committee of experts that will take into account the conservation and development issues surrounding the species.

Figure 10. Decision tree used to determine the fishing modalities specific to a given river.

Fishing modalities for healthy zone populations

For rivers that, on average, have reached or exceeded their management target and optimal conservation threshold over the past five years, small salmon may be harvested starting at the beginning of the season. Large salmon on these rivers can usually be harvested starting in mid-season, provided that the population is on track to meeting its management target. If applicable, this harvest of large salmon must be limited so as to ensure that the river reaches its management target at the end of the season. If the river's upstream migration is insufficient and the population is not on track to meet its management target, the release of large salmon remains mandatory until the closure of the fishery and only small salmon may be harvested. For the vast majority of rivers in the healthy zone, abundance levels are evaluated at the end of July so that if the upstream migration is sufficient, the harvest of large salmon may be permitted starting on August 1st.

Fishing modalities for caution zone population

For rivers that, on average, have not reached their optimal conservation threshold over the past five years, but have still reached their demographic and genetic conservation thresholds, only small salmon may be harvested.

Fishing modalities for critical zone populations

For rivers that, on average, have not reached either their demographic or genetic conservation thresholds over the past five years, the salmon mortality rate must be minimized. As presented in figure 10, the fishery may be completely closed in some of these cases, while in others, the removal of large salmon is prohibited and the harvest of small salmon is greatly restricted.

To assess what management modalities are most appropriate, it must first be determined whether or not the river is managed by an operator, as this provides the river with some protection against poaching and supplies useful data for sound population management. In the absence of such an operator, the fishery will be completely closed.

- If there is an operator, but small salmon significantly contribute to the population's percentage of deposited eggs (over 30%), the fishery will usually be closed.
- If there is an operator and if small salmon do not significantly contribute to the population's percentage of deposited eggs (equal to or less than 30%), a limited harvest of small salmon may be permitted so as to promote both the conservation of the population and the continuation of socio-economic activity. For example, a lower annual quota than the average harvest over the last five years could be applied. Another option is to reduce the daily quota on the river. The exact nature of the harvesting restrictions for small salmon may be determined by the Ministry in collaboration with the operator.

Closing the fishery on a river is often the best way to protect the resource. However, in exceptional circumstances, other measures may sometimes be employed. For example, on popular rivers that are used by a large number of anglers, salmon fishing may be allowed, but any salmon caught, whether large or small, must be released. Sometimes, the presence of recreational anglers can serve as a form of surveillance and protection for the resource. Thus, this sort of activity can positively affect salmon populations.

Exceptions may also be granted if fishing for other species, such as brook trout, can be performed without adversely affecting the salmon population. For example, this can be done by targeting areas rarely used by salmon and requiring fishing gear and methods that are unlikely to hurt salmon, such as fly fishing.

4.2 General fishing modalities

In addition to the fishing modalities for each river, general fishing modalities are established based on the overall situation of the salmon populations, ethical principles and socio-economic factors (table 1). It may be appropriate to modify some of these modalities according to specific regional characteristics.

Table 1. Summary of the changes made to the general fishing modalities set out in the Atlantic Salmon Management Plan 2016–2026

Condition	Effective in 2015	Management Plan 2016–2026
Annual quota	7 (small or large)	4 (only 1 large)[1]
Short-term licence	Valid for 1 day	Valid for 3 days
Daily harvest quota	0, 1, 2 or 3 (depending on the river)	0, 1 or 2 (depending on the river)
Daily catch and release quota	None	3[2]
Tagging of salmon by person who hooked it	Several rivers	All rivers
Harvest of large salmon caught outside salmon rivers	Authorized	Prohibited

1. Exception for the Nord-du-Québec region (limit of four salmon, large or small). This derogation is especially justified by the considerably limited effect of recreational fishing on these salmon populations.
2. Exception for the Nord-du-Québec region and the rivers east of the Natashquan River (no limit). This derogation is particularly justified by the favourable conditions for the survival of salmon after catch and release and by the very low impact of recreational fishing on these salmon populations.

Annual fishing licence

As part of the Atlantic Salmon Management Plan 2016–2026, two types of annual salmon fishing licences will be offered to anglers:

- Annual licence for catch and release (these licences have been available since 1997);
- Annual licence with four tags which only permits one large salmon to be kept, except for the Nord-du-Québec, where the limit is four salmon, large or small (this replaces the licence with seven tags which allowed seven salmon, large or small, to be harvested).

On its own, reducing the number of tags is expected to save more than 1,000 large salmon and hundreds of small salmon across Québec. The new annual quota in Québec will be closer to those established in 2015 in the other Canadian provinces (0 in New Brunswick, 0 in Nova Scotia, 0 in Prince Edward Island, usually 4 in Newfoundland and Labrador, with an exception for some rivers of 6).

As recreational fishing does not place a significant strain on the status of the populations in the Nord-du-Québec, the annual quota per angler is four salmon, large or small.

Short-term fishing licence

Previously, anglers could obtain a one-day salmon fishing licence. However, licences that were valid for such a short period of time did not promote the optimal recruitment of new anglers or increase the economic benefits to the regions. As part of the Atlantic Salmon Management Plan 2016–2026, the daily licence has been replaced by a licence that is valid for three consecutive days with a tag that allows one small salmon to be harvested.

The daily quota

Previously, in rivers where Atlantic salmon could be harvested, one, two or three salmon per day could be kept, depending on the river. Considering the general condition of the resource, the number of tags provided with the annual fishing licence and the very high level of satisfaction already expressed among anglers who are able to keep two salmon per day, this quota has been lowered. In rivers where Atlantic salmon may be harvested, each angler may keep one or two salmon per day, depending on the river.

The catch and release daily quota

Historically, the number of salmon that each angler may catch and release per day has not been regulated. Although the most common code of ethics recommends limiting catch and release to two or three salmon per day, it is common knowledge that anglers can sometimes catch and release more than 10 salmon in one day of fishing. Since catch and release is a method of conservation, it is essential to limit the mortality rate caused by this practice. Although this rate is generally low after release (about 7%), different factors, such as the technique used and the water temperature, may influence it. Furthermore, limiting the amount of catch and release promotes equal access to the resource among anglers. The Atlantic Salmon Management Plan 2016–2026, now limits each angler to the catch and release of three salmon per day, except in the Nord-du-Québec and Basse-Côte-Nord regions where there is no regulated limit. These two regions are excluded from the regulatory limit because the water in these areas is usually at the optimal temperature for the survival of the released salmon. In addition, the anglers who fish in these areas are generally very experienced and use good release techniques and guides are commonly present. Moreover, recreational fishing does not usually place much pressure on the resource in these regions.

Harvesting outside of salmon rivers

Previously, large salmon caught outside of rivers or the stretches of rivers covered under Annex 6 of the Quebec Fishery Regulations (e.g., the St. Lawrence River) could be kept. Since these salmon will eventually breed in their natal rivers and because it is impossible for an angler to know for sure whether this river is healthy or not, harvesting these salmon could negatively affect rivers in difficulty. Therefore, large salmon caught outside of rivers or stretches of rivers covered under Annex 6 of the Quebec Fishery Regulations may no longer be kept.

Salmon tagging

Even before the Atlantic Salmon Management Plan 2016–2026 was implemented, individuals who hooked and kept salmon in certain rivers located in regulated wildlife areas, had to tag them using a valid tag that was issued with their licence. This measure was introduced to prevent some anglers from catching more salmon than the annual quota permits by using another person's tags. As part of the Atlantic Salmon Management Plan 2016–2026, this measure is extended to the entire province.

5. Population restoration methods

Fish stocking and introduction may represent attractive options for increasing the abundance of populations. Nevertheless, these practices must be regulated so as to maximize their benefits while minimizing their potential negative effects. Recent scientific studies, both in Québec and elsewhere, have helped determine when the introduction of salmon is beneficial for the population. Using this new information, the fish stocking management modalities have been updated.

5.1 Population abundance

Given the possible negative effects of any kind of fish stocking (intra- and interspecies competition, loss of genetic diversity and integrity, introduction of disease, etc.) and the costs (financial and labour) associated with producing native salmon in a fish hatchery, only rivers where the abundance levels pose a problem are targeted for fish stocking. Thus, waterways where the populations exceed their optimum conservation threshold shall not be selected for fish stocking.

The reproducers used to produce broodstock must come from the introduced population in order to maintain the genetic integrity of the populations. However, for populations in critical situations, where there are too few adults to be used, the use of reproducers from another river may be evaluated on a case-by-case basis by a Ministerial expert committee insofar as the reproducers belong to the same genetic region as the population where the fish will be introduced (figure 11).

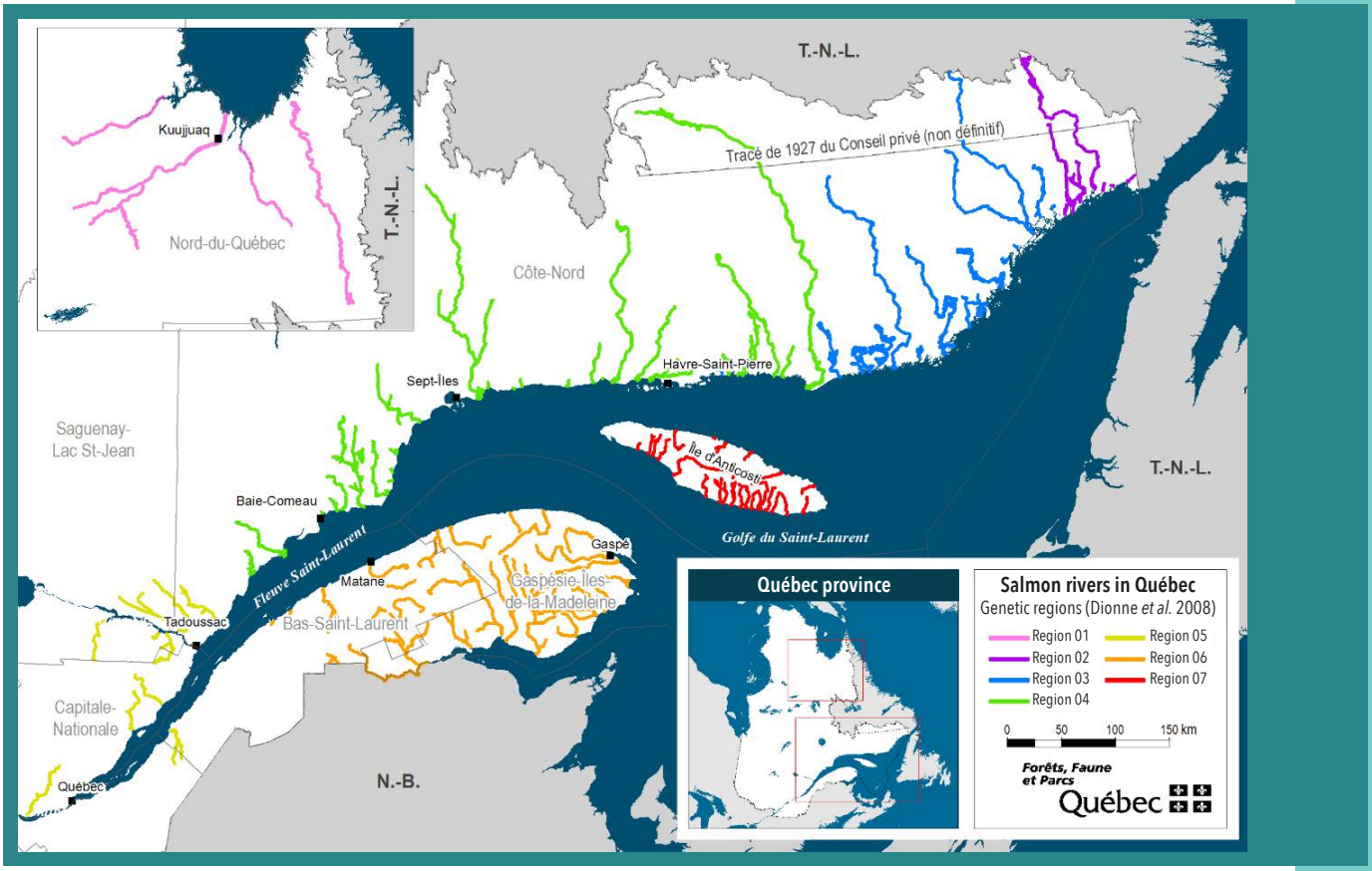


Figure 11. Genetic regions of Atlantic salmon in Québec.

5.2 Habitat quality

The availability of quality habitat must be taken into account when considering fish stocking. Even the best fish stoking will not produce the desired results if the fish are not able to survive in their new environment. In the case of salmon, the juvenile salmon that are introduced must have access to a nursery habitat that allows them to eat properly and survive until their migration to the ocean. In addition, as the ultimate objective of stocking is to increase the population size, we must ensure that the reproducers that come from the stocking process and that may return to the river, are able to reproduce, hence the need for an adequate and accessible spawning habitat in the stocked river.

An instrument which integrates the different abundance and habitat criteria for deciding which rivers qualify for conservation stocking has been developed to help management efforts (figure 12). Certain exceptions may be analyzed on a case-by-case basis by a Ministerial expert committee.

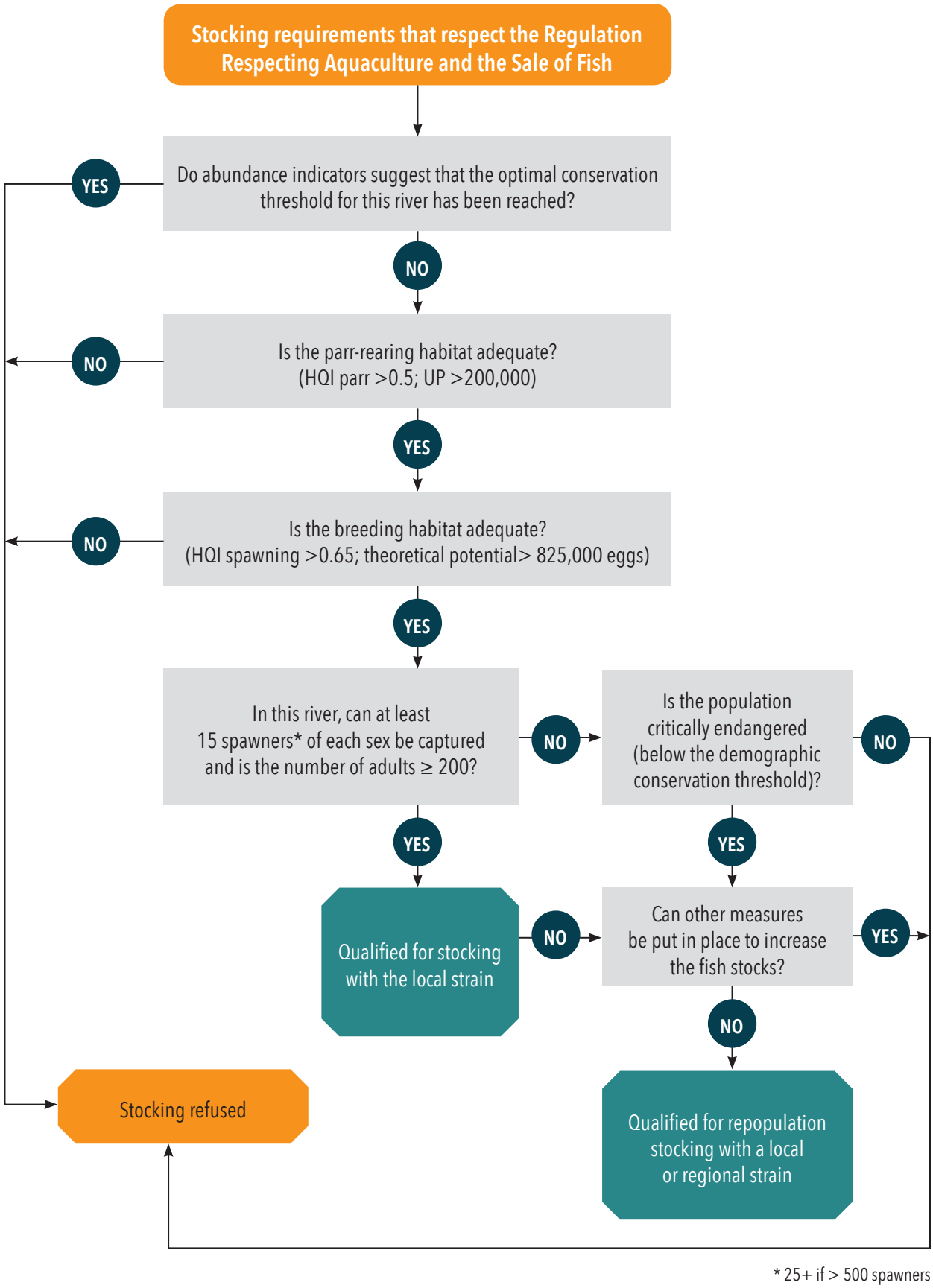
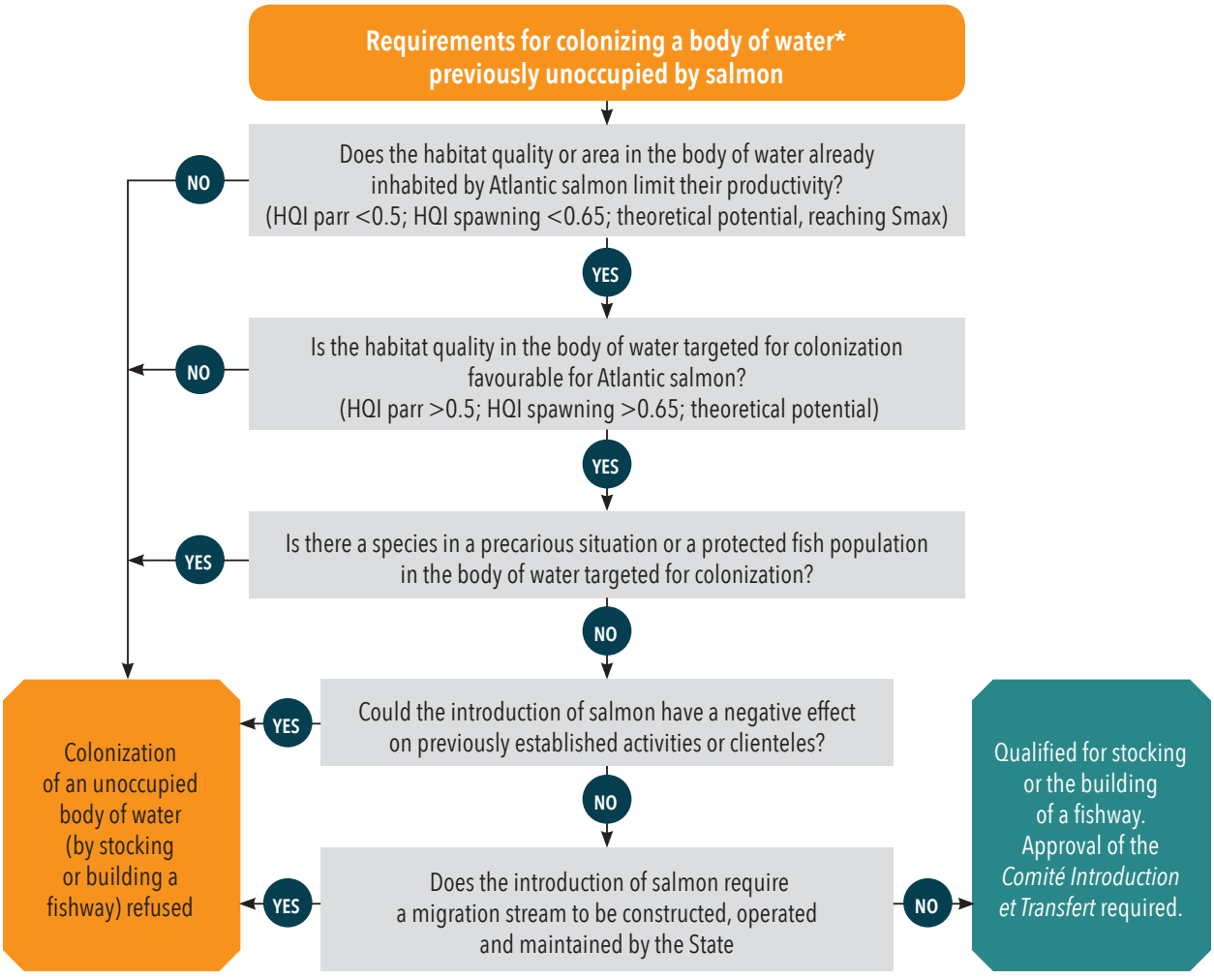


Figure 12. Management framework for stocking Atlantic salmon in Québec.

5.3 Colonizing new bodies of water

Under the Regulation Respecting Aquaculture and the Sale of Fish under the Act Respecting the Conservation and Development of Wildlife (ARCDW), introducing a species of fish into a body of water to which it is not endemic is usually prohibited. In the case of salmon, this ban has implications for rivers that are divided by impassable barriers (i.e. waterfalls, dams). Thus, salmon should not enter sections of the rivers that are naturally inaccessible to them, either by stocking, the moving of individuals or by building a fishway. However, the introduction of juvenile salmon into these habitats free of intraspecies competitors, or the movement of reproducers to protect them from poaching, may be advantageous. In other cases, access to more habitat can increase the population's productivity and improve the local fish supply.

Colonizing inaccessible areas of rivers with salmon could; therefore, be an acceptable management strategy. A set of criteria has been established to regulate this exception (figure 13). Each project will be analyzed on a case-by-case basis by a Ministerial expert committee.



* For the purposes of this document, the term "body of water" is defined as a watercourse (river, pond or stream) that constitutes a unique body of water from its mouth to its source, except if it is divided by a riverine lake or a natural barrier to the movement of the fish, in which case, each section is considered a separate body of water.

Figure 13. Instrument to help decide whether to authorize the introduction of anadromous Atlantic salmon into a body of water in Québec.

6. Establishing the management plan

6.1 Implementing the management modalities

Due to the nature of the regulatory changes required for their application, the management modalities included in the Atlantic Salmon Management Plan 2016–2026, will be progressively implemented. Some of these changes may be made by the province of Québec through the powers delegated to it by the federal government under the Quebec Fishery Regulations (QFR) (federal regulations), particularly, by using the power to issue orders (daily quotas, time periods, length and weight limits). For other changes (annual quotas, tagging rules, changes to licences), Québec has no authority to make these changes without first requesting that the QFR be amended by the federal government. The QFR regulatory amendment process usually takes a minimum of two years. Consequently, certain modalities in the management plan will not apply in 2016 (table 2).

Table 2. Implementation schedule for the general management modalities and those adjusted to the conditions of each river

River by River management modalities	
Biological reference points	2016
Decision tree	2016
General management modalities	
Annual quota*	As soon as possible
Daily catch quota	2016
Daily catch and release quota	2016
Consecutive three-day licence*	As soon as possible
Tagging of salmon by the individual who hooked it*	As soon as possible
Catch and release of large salmon caught outside of salmon rivers	2016

* Request for a change to the Quebec Fishery Regulations by the federal government.

Although certain modalities contained in the management plan shall be implemented gradually, the resource shall continue to be extremely efficiently managed, particularly through the implementation of fishing modalities that are modified to meet the conditions of each river. In addition, the Ministry has the power to intervene to ensure the conservation of the species, for example, by completely prohibiting the retention of large or small salmon, whether for one or several rivers or for all of Québec. Moreover, this gradual implementation has socio-economic benefits, as the transition to often stricter management modalities will be less abrupt for the anglers.

Finally, as with the recent management plans for lake trout and walleye, a mid-term effectiveness review of the implemented management modalities will be carried out so that corrective measures can be made to the regulations, if necessary. This assessment is planned for the end of the 2020 fishing season. In addition to surveying customer satisfaction, the mid-term review will include an update and guidelines for the following:

- Updating the habitat quality index;
- Updating the boundary of upstream migration for all rivers;
- Consolidate the salmon river temperature monitoring network;
- Developing a system for recording catches and releases.

6.2 Awareness Campaigns

While the success of several management elements depends on appropriate regulation and the appropriate application of these regulations, other elements depend on the awareness of anglers. Thus, communication products will be developed and distributed to provide salmon anglers with information on the following themes:

- Sound catch and release practices;
- The importance of reporting catches and releases;
- The effect of fishing during critical temperature episodes.

6.3 Other issues and challenges

Although the anadromous Atlantic Salmon Management Plan 2016–2026 adequately addresses the majority of issues related to biological conservation and the exploitation of the species, certain additional issues and challenges have been highlighted. Several of these issues concern the gathering of essential knowledge for sound management, including the following:

- Consolidate the upstream migration monitoring network;
- Refining the indirect abundance assessment methods;
- Updating and expanding the coverage of production unit estimates;
- Gathering further knowledge about the effect of fishing when the water temperature is very high.

Three other challenges remain outside the normal scope of a management plan. The first challenge involves protecting the resource against poaching. This issue must not only be dealt with punitively, but also with education and awareness. Particular attention should be focused on certain areas.

Gathering reliable and comprehensive data on food, social and ritual fishing represents another major challenge, since the proper management of a species is mainly based on the quality of abundance and catch estimates. Establishing and complying with quotas that are both consistent with the salmon population's situation and with the daily and cultural aspects of the indigenous community is also an important issue.

The third challenge concerns the fishery's sustainability in a context of variable resource abundance and catch restrictions. Indeed, this industry has an aging clientele and has placed a priority on recruiting new participants. Encouragingly, many young anglers are happy to adopt the practice of catch and release.

7. Conclusion

Healthy salmon management in Québec has already been a source of pride for many years, in particular because of excellent population monitoring and fishing methods adapted to the specific conditions in each river. The Atlantic Salmon Management Plan 2016–2026, is part of this tradition of excellence. It meets the highest international standards, incorporating innovative features, such as the principles of population genetics, for the rational management of this species which is exploited for recreational fishing. This management plan balances the conservation and exploitation of salmon. Several regulations are certainly more restrictive than those that have been applied in recent years. These measures; however, are generally welcomed by the main actors in Québec salmon fishing and the fishing quality that will result from these regulations should convince everyone that the effort is well worth it.

Appendix 1

Values of biological reference points used to manage salmon rivers in Québec.

Region	River	Conservation thresholds			
		Genetic (adults)	Demographic (eggs)	Optimal (eggs)	Effective from 1999–2015 (eggs)
1	Causapscal	200	755 395	2 420 400	**1 650 000**
1	Kedgwick	200	308 241	1 027 468	**970 000**
1	Matane	200	1 852 699	4 594 372	**3 180 000**
1	Matapédia	200	3 123 439	10 415 492	**5 990 000**
1	Mitis	200	946 516	3 029 144	**2 050 000**
1	Ouelle	200	499 240	1 633 977	**1 120 000**
1	Patapédia	200	887 333	2 806 048	**1 920 000**
1	Rimouski	200	438 143	1 445 240	**990 000**
1	Sud-Ouest	200	27 696	92 320	**80 000**
2	À Mars	200	397 713	1 337 763	**1 080 000**
2	Sainte-Marguerite	200	1 069 677	3 385 218	**1 410 000**
2	Sainte-Marguerite Nord-Est	200	592 217	1 914 250	**1 320 000**
2	Saint-Jean (Saguenay)	200	125 694	476 106	**400 000**
3	Du Gouffre	200	595 247	1 938 396	**1 600 000**
3	Jacques-Cartier	200	1 588 324	5 068 344	**3 000 000**
3	Malbaie (Charlevoix)	200	906 248	2 896 380	**280 000**
3	Petit Saguenay	200	497 709	1 629 532	**1 400 000**
9	À la Loutre	200	98 911	384 831	**240 000**
9	À la Patate	200	48 226	208 871	**118 000**
9	À l'Huile	200	76 785	308 956	**188 000**
9	Aguanish	200	107 555	401 642	**291 000**
9	Au Bouleau	200	30 012	144 806	**77 000**
9	Aux Anglais	200	20 002	102 655	**51 000**
9	Aux Cailloux	200	77 720	311 473	**191 000**
9	Aux Plats	200	71 883	292 089	**175 000**
9	Aux Rochers	200	1 814 352	5 805 294	**2 276 000**
9	Aux Saumons	200	333 564	1 150 082	**796 000**
9	Bec-Scie	200	59 491	245 803	**145 000**
9	Bell	200	86 335	341 683	**209 000**
9	Betsiamites	200	1 589 378	5 101 065	**3 286 000**

Region	River	Conservation thresholds			
		Genetic (adults)	Demographic (eggs)	Optimal (eggs)	Effective from 1999–2015 (eggs)
9	Brador Est	200	35 103	158 562	**91 000**
9	Chaloupe	200	358 360	693 087	**581 000**
9	Chécatica	200	1 754	13 217	**4 000**
9	Chicotte	200	80 826	326 066	**199 000**
9	Coacoachou	200	32 499	149 027	**82 000**
9	Coxipi	200	505 480	1 629 405	**1 120 000**
9	Dauphiné	200	173 844	632 072	**426 000**
9	De la Corneille	200	33 273	149 574	**85 000**
9	Des Escoumins	200	784 650	2 502 874	**1 700 000**
9	Du Calumet	200	22 695	110 021	**58 000**
9	Du Gros Mécatina	200	29 578	139 548	**75 000**
9	Du Pavillon	200	48 562	213 242	**121 000**
9	Du Petit Mécatina	200	51 790	225 995	**137 000**
9	Du Renard	200	84 736	337 060	**206 000**
9	Du Vieux Fort	200	119 676	446 732	**318 000**
9	Étamamiou	200	1 234 106	3 872 476	**2 615 000**
9	Ferrée	200	67 098	277 224	**163 000**
9	Franquelin	200	52 699	228 515	**142 000**
9	Galiote	200	161 649	590 059	**192 000**
9	Godbout	200	1 762 935	5 600 105	**3 573 000**
9	Jupitagon	200	141 310	525 932	**377 000**
9	Jupiter	200	797 788	1 398 978	**1 982 000**
9	Kécarpoui	200	23 736	114 968	**60 000**
9	Kégaska	200	101 587	385 926	**116 000**
9	Laval	200	292 910	1 002 390	**441 000**
9	Maccan	200			**200 000**
9	Magpie	200			
9	Matamec	200	141 310	603 671	**445 000**
9	McDonald	200	77 865	310 698	**191 000**
9	Mingan	200	877 809	2 813 664	**1 927 000**
9	Mistassini	200	41 845	181 038	**111 000**
9	Moisie	200	8 915 716	32 257 174	**20 391 000**
9	Musquanousse	200	25 516	121 857	**65 000**
9	Musquaro	200	2 693	19 216	**7 000**

Region	River	Conservation thresholds			
		Genetic (adults)	Demographic (eggs)	Optimal (eggs)	Effective from 1999–2015 (eggs)
9	Nabisipi	200	1 171 203	3 679 351	**2 483 000**
9	Napetipi	200	440 719	1 467 049	**993 000**
9	Natashquan	200	17 372 725	68 329 934	**17 864 000**
9	Nétagamiou	200	13 237	72 489	**31 000**
9	Olomane	200	540 198	1 747 657	**1 205 000**
9	Pentecôte	200	141 572	518 302	**380 000**
9	Petite rivière de la Chaloupe	200			**200 000**
9	Petite rivière de la Loutre	200	98 829	380 861	**238 000**
9	Petite rivière de la Trinité	200	53 120	223 983	**142 000**
9	Petite rivière Watshishou	200	75 410	301 765	**202 000**
9	Piashti	200	29 600	137 070	**75 000**
9	Pigou	200	4 068	26 992	**10 000**
9	Romaine	200	1 996 136	6 428 429	**4 058 000**
9	Ruisseau au Saumon	200	60 035	250 802	**162 000**
9	Ruisseau Box	200	70 273	284 003	**172 000**
9	Ruisseau des Belles Amours	200	2 388	17 058	**6 000**
9	Ruisseau Martin	200			**260 000**
9	Saint-Augustin	200	2 165 511	6 986 852	**4 356 000**
9	Saint-Augustin Nord-Ouest	200	303 336	1 014 499	**794 000**
9	Sainte-Marie	200	69 022	284 478	**166 000**
9	Saint-Jean (Côte-Nord)	200	3 504 818	11 685 446	**6 721 000**
9	Saint-Paul	200	2 268 793	7 432 926	**4 514 000**
9	Sheldrake	200	26 593	131 833	**68 000**
9	Trinité	200	607 950	1 657 261	**1 630 000**
9	Vauréal	200	57 381	243 996	**140 000**
9	Véco	200	5 106	33 083	**13 000**
9	Washicoutai	200	15 200	81 282	**39 000**
9	Watshishou	200	652 918	2 117 344	**1 448 000**
10	À la Baleine	200			
10	Aux Feuilles	200			
10	George	200			
10	Koksoak	200			
11	Bonaventure	200	1 343 847	3 934 847	**4 620 000**
11	Cap-Chat	200	358 219	1 187 275	**820 000**

Region	River	Conservation thresholds			
		Genetic (adults)	Demographic (eggs)	Optimal (eggs)	Effective from 1999–2015 (eggs)
11	Cascapédia	200	2 493 620	7 164 417	**5 650 000**
11	Darmouth	200	723 555	1 872 198	**1 940 000**
11	De Mont-Louis	200	53 219	177 398	**160 000**
11	Du Grand Pabos	200	395 253	1 298 130	**900 000**
11	Du Grand Pabos Ouest	200	198 458	717 321	**460 000**
11	Du Petit Pabos	200	395 085	1 301 773	**890 000**
11	Grande Rivière	200	375 712	996 519	**1 430 000**
11	Madeleine	200	966 491	2 179 543	**2 600 000**
11	Malbaie (Gaspésie)	200	104 394	347 981	**2 450 000**
11	Nouvelle	200	877 687	2 806 365	**1 910 000**
11	Petite rivière Cascapédia	200	950 915	3 076 258	**2 050 000**
11	Petite rivière Port-Daniel	200	77 855	259 518	**190 000**
11	Port-Daniel Nord	200	124 488	414 961	**330 000**
11	Sainte-Anne	200	452 123	1 294 229	**1 260 000**
11	Saint-Jean (Gaspésie)	200	793 040	2 121 400	**1 880 000**
11	York	200	1 253 715	3 513 543	**2 640 000**

Note: For some rivers where salmon fishing is prohibited, some conservation thresholds have not been calculated. Work is underway to evaluate the productivity of the salmon rivers in Ungava.

Forêts, Faune
et Parcs
Québec

W26-02-1603