# FISHERIES MANAGEMENT PLAN FOR THE OTTAWA RIVER

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Inset photos of Ottawa River fish:

First from top:  Live release of a Muskellunge, Jonathan Jordan

Second from top: 2012 Record Longnose Gar (20 lbs, 54" long), Rob Jackson

Third from top: Lake Sturgeon, Lower Allumette, Tania Baker and Rene Aubin, MNRF

Bottom: Kids Walleye fishing, Lake Temiskaming, Ilsa Schoenijahn

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# FISHERIES MANAGEMENT PLAN FOR THE OTTAWA RIVER

## EFFECTIVE DATE APRIL 2018

As the author, I hereby certify that this plan has been prepared using the best available science and is consistent with accepted principles of fisheries management. This plan was prepared in partnership with Quebec fisheries managers and with assistance of a multi-stakeholder Advisory Council. Thus, I recommend this fisheries management plan be approved for implementation.

| Prepared and Submitted by: | Signature | Date |
|---|---|---|
| Tania L. Baker, Management Biologist, Pembroke District | | March 27, 2018 |

## FISHERIES MANAGEMENT ZONE 12 IN ONTARIO

**Located within the Ontario Ministry of Natural Resources and Forestry Administrative Districts of North Bay, Pembroke and Kemptville.**

I further certify that this plan is consistent with the strategic direction, statement of environmental values and fisheries management policies of the Ontario Ministry of Natural Resources and Forestry. Thus, I recommended this fisheries management plan be approved for implementation.

| Recommended by: | Signature | Date |
|---|---|---|
| John Swick, Lead District Manager, Pembroke District | John Swick | March 29/2018 |
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# EXECUTIVE SUMMARY
# FISHERIES MANAGEMENT PLAN FOR THE OTTAWA RIVER

## Introduction

This Fisheries Management Plan will guide the management of the fisheries resources of the Ottawa River from the north shores of Lake Temiskaming to the south-east end of Lac Dollard des Ormeaux. Its goals, objectives, successes and future direction will be reviewed as new information becomes available or new management issues arise. The Plan is a dynamic document designed to be flexible and adaptable to a wide range of future conditions.

## Purpose and Scope

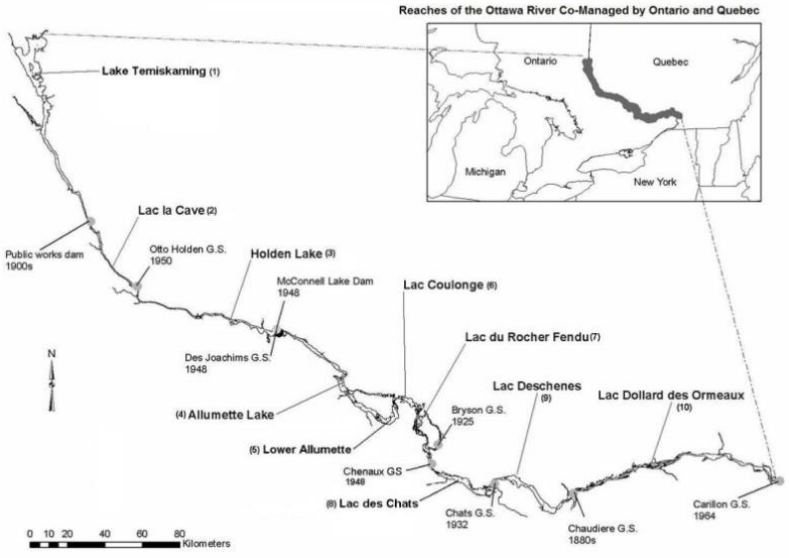
The Ottawa River supports a diverse fish community and offers a wide variety of angling opportunities. The Ottawa River fishery is economically and socially important. For instance, the river supports traditional values for Indigenous communities and provides subsistence fishing opportunities, while the recreational fishery and commercial fisheries contribute to the local economy.

The development of the Fisheries Management Plan for the Ottawa River was led by the Ontario Ministry of Natural Resources and Forestry (MNRF) with support of the Ministère des Forêts, de la Faune et des Parcs (MFFP) du Québec and assistance from an Advisory Council.
The planning area encompasses a section of the Ottawa River that is located along the interprovincial water boundary of Ontario and Quebec. Fisheries management for this part of the Ottawa River is a joint responsibility of both provinces: the Ontario-side of the Ottawa River is Fisheries Management Zone 12 under Ontario Fishing Regulations; and the Quebec-side of the Ottawa River is Fishing Zone 25 under Quebec Fishing Regulations.

The members of the Advisory Council represented different fishery users of the Ottawa River including but not limited to: recreational and tournament anglers, Ontario and Quebec anglers, specialty anglers of Muskellunge, Smallmouth and Largemouth Bass fisheries, tourist outfitters and fishing-related businesses, Algonquins of Ontario, Ottawa River Keeper and Ontario Power Generation. The Council helped identify the importance of fishery issues, management objectives and management actions.

This Fisheries Management Plan will replace the Strategic Fisheries Management Framework for the Ottawa River implemented in 1999. It may help the Ontario and Quebec government agencies in working together to manage fisheries of the Ottawa River consistently.

The Plan identifies monitoring that will take place to ensure that progress is being made towards the management objectives and targets. The Plan will be reviewed and updated as needed with assistance from the Advisory Council.



## Vision

“Healthy diverse ecosystems with native self-sustaining fish communities and quality fisheries that provide long-term ecological, social and cultural, economic and healthy food benefits for all users of the Ottawa River.”

## Goals

1. Healthy connected ecosystems that support self-sustaining native fish communities and quality fisheries.

2. Sustainable use of fish resources that enhances quality of life for users.

3. Effective joint management of Ottawa River fisheries by Ontario and Quebec through improved collaboration with Indigenous communities, adjacent Fisheries Management Zones, waterpower producers and other government agencies.

4. Enhanced understanding of the Ottawa River’s fisheries, fish communities and their supporting ecosystems to manage the resource effectively.

5. Stakeholders, partners and Indigenous communities that are informed and knowledgeable of fisheries management, fish communities and their supporting ecosystems.

6. Partnerships, stewardship, volunteerism and community involvement that enhance the management of fisheries, fish communities and their supporting ecosystems.

This Fisheries Management Plan is comprised of series of management strategies that reflect the management priorities, with each one identifying management goals, challenges, objectives and actions. Management direction is provided for the key fisheries of the Ottawa River which include: Walleye and Sauger, Smallmouth and Largemouth Bass, Northern Pike, Muskellunge, panfish (Yellow Perch, Pumpkinseed, Bluegill, Black Crappie, Rock Bass, and Brown Bullhead), Channel Catfish, and other minor fisheries. Strategies were also prepared for fish population monitoring, fish community diversity, fish habitat management, public education and stakeholder involvement, commercial fisheries, species at risk fish, invasive species and disease, and climate change.

No regulation changes are proposed at this time. During the past 10 years a number of regulation changes were completed as part of a harmonization project with the Province of Quebec. The most recent round of fishing regulation changes, that included a size limit for Walleye, were made in 2008. The Plan has an emphasis on providing a baseline of fisheries data that will be comparable to data obtained from future Broad-scale Monitoring Program cycles. Current fisheries regulations and management approaches are being maintained for the immediate future.

## Fishery Management Strategies

### Walleye and Sauger Fishery

Walleye is the most popular fish species on the Ottawa River. Both Walleye and Sauger are present in all reaches. Walleye are more abundant in the upper reaches of the Ottawa River including Lake Temiskaming, Lac la Cave, Holden Lake and Allumette Lake. Sauger are less abundant than Walleye in all reaches, except in Lake Temiskaming.

The management goal for the Walleye and Sauger fishery is to:

*"**Improve the quality of the Walleye and Sauger fishery throughout the Ottawa River**."*

The management objectives for Walleye and Sauger are to:

i) Maintain the sustainability of Walleye and Sauger populations
ii) Increase proportions of spawning-sized Walleye

The current regulations feature a size limit that offers protection to larger Walleye while they are spawning.

**Smallmouth and Largemouth Bass Fishery**

Smallmouth Bass occur throughout the Ottawa River while Largemouth Bass are only present in the lower reaches that have wetlands (absent from Temiskaming, La Cave and Holden). Bass are the most caught fish species and are second for angler preference on the Ottawa River. Bass are highly resilient, responding well to the high levels of catch and release by both recreational and tournament anglers. Bass will be monitored to ensure that mortality rates stay low and continue to produce large bass.

The management goal for the bass fishery is to:

***"Maintain a high quality bass fishery throughout the Ottawa River."***

The management objectives for bass:

i) Maintain sustainability of bass populations
ii) Maintain size quality of bass

**Northern Pike Fishery**

Northern Pike are present in all reaches of the Ottawa River and are the third most preferred fish by anglers. Concerns have been expressed about the size quality of Northern Pike. Future efforts will be made to evaluate the status of Northern Pike more closely during monitoring.

The management goal for the Northern Pike fishery is to:

***"Improve the quality of the Northern Pike fishery throughout the Ottawa River."***

The management objectives for Northern Pike:

i) Maintain sustainability of Northern Pike populations
ii) Improve size quality of Northern Pike

**Muskellunge Fishery**

Muskellunge have been detected in all reaches of the Ottawa River except Lake Temiskaming. The best quality Muskellunge fisheries are in the lower reaches of the Ottawa River. Muskellunge population trends will be monitored using the Muskies Canada's angler diary program.

The management goal for the Muskellunge fishery is to:

***"Maintain the world-class status of the Ottawa River Muskellunge fishery."***

The management objectives for Muskellunge:

i) Maintain sustainability of Muskellunge populations
ii) Maintain size quality of Muskellunge

**Panfish (Sunfish, Black Crappie, and Rock Bass), Yellow Perch and Bullheads**
Not much is known about the overall status of Ottawa River panfish fisheries. They are important recreational fisheries in the lower Ottawa River where Walleye are less abundant. Efforts will be made to collect the information to assess the status of these panfish populations.

The management goal for the panfish fishery is to:

***"Maintain or improve panfish fisheries of the Ottawa River."***

The management objectives for panfish:

i) Maintain sustainability of panfish populations
ii) Improve size quality of panfish

**Channel Catfish Fishery**
Channel Catfish are abundant in the lower reaches and absent in the upper reaches of the Ottawa River. Outreach efforts will be made to promote this recreational fishery and potentially expand the commercial fishery.

The management goal for Channel Catfish fisheries is to:

***"Promote the use of underutilized Channel Catfish fisheries by encouraging sustainable harvest activities and the development of local markets to use them."***

The management objectives for Channel Catfish:

i) Maintain sustainability of Channel Catfish populations
ii) Maintain size quality of Channel Catfish fishery
iii) Increase angler utilization and harvest levels for Channel Catfish

**Other Fisheries**
Lake Whitefish and Lake Trout populations are less abundant than in other parts of Ontario and Quebec, but still support minor fisheries on the Ottawa River. Longnose Gar is a challenging fish to catch and its ability to reach enormous sizes on the Ottawa River make it worthy of trophy status. Burbot and Mooneye also contribute to the diverse fishing opportunities available on the Ottawa River. American Shad are only found below Carillon dam during their spring spawning period where they support a significant recreational fishery; conservative catch limits and a fish sanctuary have been implemented for this fish species of conservation concern. These minor fisheries will be monitored as part of the fish community.

**Species at Risk Fish**
The MNRF is currently developing government response statements that will provide direction on management of American Eel (endangered) and Lake Sturgeon (threatened). Management of these species at risk will be revisited in the future.

The interim management goal for American Eel is to:

***"Support recovery of American Eel in the Ottawa River watershed."***

The interim management goal for Lake Sturgeon is to:

***"Support recovery of Lake Sturgeon in the Ottawa River watershed."***

## Management Strategies

### Fish Community Diversity

Fish communities of the Ottawa River are very complex and diverse, with over 85 native species of fish and approximately 20 freshwater mussel species. All fish play an important role in the ecosystem and are interconnected with other organisms. If native fish species are lost or depleted, the fish community, aquatic ecosystem and supported fisheries could also be affected. It is important to maintain naturally reproducing fish populations and to prevent native species from being lost. Fish diversity will be monitored using BsM. However, an alternate approach will be necessary for rare fish species and freshwater mussels not detected by netting protocols.

### Monitoring Strategy for Fisheries of the Ottawa River

Broad-scale Monitoring (BsM) will be used every five years as the core monitoring program for the fish communities and fish populations of the Ottawa River. BsM doesn't work well for all species. Once information gaps are identified, science recommendations will be sought. Enhancements may be made to BsM or addition of other supplemental protocols.

### Fish Habitat Management Strategy

Maintenance of fish habitat is critical to the sustainability of fisheries. Proponents of development are required to identify fish habitats that may be impacted and to include mitigation measures in development proposals. Key partners may assist in identifying fish habitat.

### Public Education and Stakeholder Involvement Strategy

Strategic partnerships will be sought with stakeholders of the Ottawa River to help with education and to complete key actions. Some projects could include production of educational materials, visual spawning surveys, ice cover duration observation or invasive species surveys.

### Commercial Fisheries Management Strategy

There are eight commercial fishing licenses on the Ottawa River: five in Quebec waters and three in Ontario waters The Ontario licenses typically harvest coarse fish (suckers, Channel Catfish) and panfish, while Quebec licenses only harvest Common Carp. This small commercial fishery will be monitored to ensure balance with the recreational fishery. The feasibility of enhancing the commercial Channel Catfish fishery will also be explored.

### Management Strategy for Invasive Species and Diseases

Zebra mussels, spiny waterflea, rusty crayfish and water chestnut are the most active invasive species currently spreading in the Ottawa River watershed. There are also concerns that Viral Hemorrhagic Septicaemia (VHS) and Asian Carp may spread from the Great Lakes or St. Lawrence. Communication efforts to promote control and eradication efforts through educational programs will be supported. As well, existing protocols will be followed to investigate fish die offs, track invasive species and to conduct regular disease testing.

### Climate Change Adaptation Strategy

An adaptive approach to fisheries management that allows us to anticipate, monitor and react to impacts of climate change is a goal of this Fisheries Management Plan. With the assistance of partners, baseline values will be established and monitored for climatic indicators important to the fisheries of the Ottawa River.

## Top Five Management Recommendations from the Ottawa River Advisory Council:

1. **Better Fish Habitat Protection and Ecosystem Level Management**:
   Identify and protect critical fish habitats from shoreline development, in-water work, water level/flow alterations and water quality issues; and make improvements to fish habitat where needed.

2. **Improve Quality of Walleye, Northern Pike and Muskellunge Fisheries**:
   Protect spawning-sized fish from overharvest, set fishery quality standards and consider using a size limit to improve the Northern Pike fisheries.

3. **Inter-Provincial Management of Ottawa River Fisheries:**
   All levels of government and fishery stakeholders need to work together. Harmonization of fishing regulations, cooperative enforcement efforts and consistent fisheries management approaches between Ontario and Quebec are important.

4. **Recovery Effort for American Eel and Lake Sturgeon:**
   Focus on habitat restoration for Lake Sturgeon and improving (upstream and downstream) passage for American Eel by working with waterpower producers.

5. **Regular Fisheries Monitoring:**
   Current fish population and fish community datasets are required for effective fisheries management. A comprehensive fisheries monitoring program is required for the Ottawa.

Muskellunge, Jonathan Jordan

# SOMMAIRE
# PLAN DE GESTION DES PÊCHES POUR LA RIVIÈRE DES OUTAOUAIS

## Introduction

Le plan de gestion des pêches guidera la gestion des ressources halieutiques de la rivière des Outaouais, des rives nord du lac Témiscamingue jusqu'à l'extrémité sud-est du lac Dollard-des-Ormeaux. Ses buts, objectifs, succès et orientation futurs seront examinés à mesure que de nouvelles données deviendront disponibles ou que de nouveaux problèmes de gestion surviendront. Le plan est un document dynamique, conçu pour être souple et adaptable à une vaste gamme de conditions futures.

## But et portée

La rivière des Outaouais abrite une communauté de poissons diverse et offre une grande variété de possibilités de pêche. La pêche dans la rivière des Outaouais est importante, des points de vue économique et social. Par exemple, la rivière soutient les valeurs traditionnelles de la communauté autochtone et fournit des possibilités de pêche de subsistance, tandis que les pêches récréatives et commerciales contribuent à l'économie locale.

L'élaboration du plan de gestion des pêches de la rivière des Outaouais a été dirigée par le ministère des Richesses naturelles et des Forêts (MRNF) de l'Ontario, avec l'appui du Ministère des Forêts, de la Faune et des Parcs (MFFP) du Québec et avec l'aide d'un conseil consultatif. La zone de planification englobe une partie de la rivière des Outaouais qui est située le long de la limite des eaux interprovinciales de l'Ontario et du Québec. La gestion des pêches pour cette partie de la rivière des Outaouais est une responsabilité conjointe des deux provinces : le côté ontarien de la rivière des Outaouais constitue la Zone de gestion des pêches 12 (ZGP 12) aux termes des règlements sur les pêches de l'Ontario; et le côté québécois de la rivière des Outaouais constitue la Zone de pêche 25, aux termes des règlements sur les pêches du Québec.

Les membres du conseil consultatif représentent différents utilisateurs des pêches de la rivière des Outaouais, y compris les suivants, sans s'y limiter : pêcheurs à la ligne récréatifs et de tournois, pêcheurs à la ligne de l'Ontario et du Québec, pêcheurs spécialisés dans la pêche au maskinongé et à l'achigan à petite bouche et à grande bouche, voyagistes et entreprises liées au secteur des pêches, Algonquins de l'Ontario, Sentinelle Outaouais et Ontario Power Generation. Le conseil a aidé à déterminer l'importance des enjeux, des objectifs et des mesures de gestion liés aux pêches.

Ce plan de gestion des pêches remplacera le Cadre de gestion stratégique des pêches pour la rivière des Outaouais, mis en œuvre en 1999. Il peut aider les organismes gouvernementaux de l'Ontario et du Québec à travailler ensemble de façon cohérente à la gestion des pêches de la rivière des Outaouais.


Le plan fait état de la surveillance qui aura lieu pour assurer que des progrès sont réalisés pour atteindre les objectifs et les cibles en matière de gestion. Le plan approuvé sera revu et mis à jour au besoin, avec l'aide du conseil consultatif.

**Vision**

« Écosystèmes divers sains soutenant des communautés de poissons indigènes viables et des pêches de qualité qui fournissent des avantages écologiques, sociaux et culturels, économiques et sains à long terme pour tous les utilisateurs de la rivière des Outaouais. »

**Buts**

1. Des écosystèmes branchés en santé qui soutiennent des communautés de poissons indigènes autonomes et des pêches de qualité.

2. L'utilisation durable des ressources halieutiques qui améliore la qualité de vie des utilisateurs.

3. Gestion conjointe efficace des pêches de la rivière des Outaouais par l'Ontario et le Québec grâce à une collaboration améliorée avec les communautés autochtones, les Zones de gestion des pêches adjacentes, les producteurs d'énergie hydroélectrique et d'autres organismes gouvernementaux.

4. Compréhension améliorée des pêches de la rivière des Outaouais, des collectivités de pêcheurs et des leurs écosystèmes de soutien, en vue de gérer la ressource efficacement.

5. Les intervenants, les partenaires et les communautés autochtones informés et informés de la gestion des pêches, des communautés de poissons et de leurs écosystèmes de soutien.

6. Partenariats, intendance, bénévolat et participation communautaire qui améliorent la gestion des pêches, des communautés de poissons et de leurs écosystèmes de soutien.

Le plan de gestion des pêches est composé d'une série de stratégies de gestion qui reflètent les priorités en matière de gestion, chacune établissant les buts, les défis, les objectifs et les mesures en matière de gestion. Une orientation en matière de gestion est fournie pour les pêches clés de la rivière des Outaouais, qui comprennent les suivantes : doré jaune et doré noir, achigan à petite bouche et à grande bouche, grand brochet, maskinongé, petits poissons-gibiers *(*crapets, perchaudes et barbottes brunes), barbue de rivière, et autres pêches mineures. Des stratégies ont également été préparées pour la surveillance de la population de poissons, la diversité des communautés de poissons, la gestion de l'habitat du poisson, l'éducation publique et la participation des intervenants, les pêches commerciales, les espèces à statut précaire, les espèces envahissantes et les maladies, ainsi que les changements climatiques.

Aucune modification de la réglementation n'est proposée à l'heure actuelle. Au cours des dix dernières années, un certain nombre de modifications réglementaires ont été apportées dans le cadre d'un projet d'harmonisation avec la province de Québec; par conséquent, des modifications réglementaires régissant notamment la limite de taille pour le doré jaune et le doré noir ont été apportées en 2008. Le plan met l'accent sur l'établissement de données de base sur les pêches qui seront comparables aux données obtenues des cycles futurs de surveillance à grande échelle. Par conséquent, pour toutes les pêches actuelles, les règlements et les méthodes de gestion sont maintenus et surveillés à l'avenir.

## Stratégies de gestion des pêches

**Pêche au doré jaune et au doré noir**

Le doré jaune est l'espèce de poisson pêchée la plus activement dans la rivière des Outaouais. Le doré jaune et le doré noir sont présents dans tous les cours de la rivière. Le doré jaune est plus abondant dans les cours supérieurs de la rivière des Outaouais, dont le lac Témiscamingue,

le lac La Cave, le lac Holden et le lac Allumette. Le doré noir est moins abondant que le doré jaune dans tous les cours, à l'exception du lac Témiscamingue.

Le but de gestion pour la pêche au doré jaune et au doré noir est le suivant :

***« Améliorer la qualité de la pêche au doré jaune et au doré noir dans toute la rivière des Outaouais ».***

Les objectifs de gestion pour le doré jaune et le doré noir sont les suivants :

i) maintenir la viabilité des populations de dorés jaunes et de dorés noirs;
ii) accroître les proportions de dorés jaunes en âge de frayer.

Les règlements actuels comportent une limite de taille qui offre une protection au doré jaune de grande taille pendant la fraie.

**Pêche à l'achigan à petite bouche et à grande bouche**
L'achigan à petite bouche se trouve partout dans la rivière des Outaouais, tandis que l'achigan à grande bouche n'est présent que dans les cours inférieurs comportant des zones humides (absent des lacs Témiscamingue, La Cave et Holden). L'achigan est l'espèce de poisson la plus pêchée et se classe deuxième dans les préférences des pêcheurs à la ligne de la rivière des Outaouais. L'achigan est très résilient, s'adaptant bien à des niveaux élevés de prises et remises à l'eau par les pêcheurs à la ligne récréatifs et de tournoi. L'achigan sera surveillé afin d'assurer que les taux de mortalité restent faibles et que la production de gros achigans se poursuit.

Le but de la gestion pour la pêche à l'achigan est de :

***« Maintenir une pêche à l'achigan de haute qualité partout dans la rivière des Outaouais ».***

Les objectifs de gestion pour l'achigan sont les suivants :

i) maintenir la viabilité des populations d'achigans;
ii) maintenir la qualité de taille de l'achigan.

**Pêche au grand brochet**
Le grand brochet est présent dans tous les cours de la rivière des Outaouais et se classe troisième dans les préférences des pêcheurs à la ligne. Des préoccupations ont été exprimées au sujet de la qualité de taille du grand brochet. Des efforts seront déployés pour évaluer l'état du brochet de plus près au cours de la surveillance.

Le but de la gestion pour la pêche au grand brochet est le suivant :

***« Améliorer la qualité de la pêche au grand brochet dans toute la rivière des Outaouais ».***

Les objectifs de gestion pour le brochet sont les suivants :
i) maintenir la viabilité des populations de brochets;
ii) améliorer la qualité de taille du brochet.

**Pêche au maskinongé**
Le maskinongé a été détecté dans tous les cours de la rivière des Outaouais à l'exception du lac Témiscamingue. Les pêches au maskinongé de meilleure qualité se font dans les cours inférieurs de la rivière des Outaouais. Les tendances de la population de maskinongés seront surveillées dans le cadre du programme de journal du pêcheur à la ligne de Muskies Canada.

Le but de la gestion pour la pêche au maskinongé est de :

***« Maintenir la réputation mondiale de la pêche au maskinongé dans la rivière des Outaouais ».***

Les objectifs de gestion pour le maskinongé sont les suivants :

i) maintenir la viabilité des populations de maskinongés;
ii) maintenir la qualité de taille du maskinongé.

**Petits poissons-gibiers (crapets, perchaudes et barbotte brune)**

On ne sait pas grand-chose de l'état général des pêches aux petits poissons-gibiers dans la rivière des Outaouais. Il s'agit d'une pêche récréative importante dans le cours inférieur de la rivière des Outaouais, où le doré jaune est moins abondant. Des efforts seront déployés pour recueillir des données afin d'évaluer l'état des populations de crapets, perchaudes et barbottes brunes.

Le but de la gestion pour la pêche aux petits poissons-gibiers est de :

***« Maintenir ou améliorer les pêches aux petits poissons-gibiers dans la rivière des Outaouais ».***

Les objectifs de gestion pour les petits poissons-gibiers sont les suivants :

i) maintenir la viabilité des populations de petits poissons-gibiers;
ii) améliorer la qualité de taille des petits poissons-gibiers.

**Pêche à la barbue de rivière**

La barbue de rivière est abondante dans les cours inférieurs et absente des cours supérieurs de la rivière des Outaouais. Des efforts de diffusion seront déployés en vue de promouvoir cette pêche récréative et, potentiellement, d'élargir la pêche commerciale.

Le but de la gestion pour la pêche à la barbue de rivière est de :

***« Promouvoir les pêches à la barbue de rivière de cette espèce sous-utilisée en encourageant des activités de récolte durable et le développement de marchés locaux en vue de l'utiliser ».***

Les objectifs de gestion pour la barbue de rivière sont les suivants :

i) maintenir la viabilité des populations de barbues de rivière;
ii) maintenir la qualité de taille des barbues de rivière pêchées;
iii) accroître l'utilisation par les pêcheurs à la ligne ainsi que les niveaux de récolte de la barbue de rivière.

**Autres pêches**

Les populations de grands corégones et de touladis sont moins abondantes que dans d'autres régions de l'Ontario et du Québec, mais elles soutiennent tout de même des pêches mineures dans la rivière des Outaouais. Le lépisosté osseux est un poisson difficile à capturer et sa capacité d'atteindre des tailles énormes dans la rivière des Outaouais le rend digne du statut de trophée. La lotte et la laquaiche argentée contribuent également aux diverses possibilités de pêche qui s'offrent dans la rivière des Outaouais. L'alose savoureuse ne se trouve qu'en aval du barrage de Carillon durant la période de fraie de printemps, où elle soutient une pêche récréative importante; des limites de capture conservatrices et un sanctuaire de poissons ont été mis en œuvre pour cette espèce de poisson dont la conservation est préoccupante. Ces pêches mineures seront surveillées en tant que partie de la communauté piscicole.

**Espèces de poissons à statut précaire**
Le ministère des Richesses naturelles et des Forêts est en train d'élaborer des énoncés de réponses du gouvernement qui fourniront une orientation en matière de gestion de l'anguille d'Amérique (en voie de disparition) et de l'esturgeon jaune (menacé). La gestion de ces espèces à statut précaire sera revue à l'avenir.

L'objectif de gestion provisoire de l'anguille d'Amérique est de :

***« Appuyer le rétablissement de l'anguille d'Amérique dans le bassin versant de la rivière des Outaouais ».***

L'objectif de gestion provisoire de Lake Sturgeon est de :

***« Soutenir le rétablissement de l'esturgeon jaune dans le bassin versant de la rivière des Outaouais ».***

## Stratégies de gestion

**Diversité des communautés de poissons**
Les communautés de poissons de la rivière des Outaouais sont très complexes et diverses, avec plus de 85 espèces indigènes de poissons et environ 20 espèces de moules d'eau douce. Tous les poissons jouent un rôle important dans l'écosystème et sont interconnectés avec d'autres organismes. Si les espèces de poissons indigènes venaient à disparaître, ou à s'appauvrir, la communauté de poissons, l'écosystème aquatique et les pêches qui en dépendent pourraient également être touchés. Il est important de préserver des populations de poissons qui se reproduisent naturellement et d'éviter la disparition des espèces indigènes. La diversité des poissons fera l'objet du Programme de surveillance à grande échelle. Toutefois, une autre approche sera nécessaire pour les espèces de poissons rares et les moules d'eau douce qui ne sont pas détectées par les protocoles de prise au filet.

**Stratégie de surveillance des pêches de la rivière des Outaouais**
Une surveillance à grande échelle (SGE) sera utilisée aux cinq ans en tant que programme de surveillance de base pour les communautés et les populations de poissons de la rivière des Outaouais. La SGE ne donne pas de bons résultats pour toutes les espèces. Une fois que les lacunes en matière de données seront cernées, des recommandations scientifiques seront recherchées. Des améliorations seront peut-être apportées à la SGE ou d'autres protocoles supplémentaires pourraient être ajoutés.

**Stratégie de gestion de l'habitat du poisson**
Le maintien de l'habitat du poisson est crucial pour la durabilité des pêches. Les promoteurs de projets de développement sont tenus d'identifier les habitats du poisson susceptibles d'être touchés et d'inclure des mesures d'atténuation dans leurs propositions de développement. Les partenaires clés peuvent aider à définir l'habitat du poisson.

**Stratégie d'information du public et de participation des intervenants**
Des partenariats stratégiques seront recherchés auprès des intervenants de la rivière des Outaouais afin d'aider à informer et pour exécuter des mesures clés. Certains projets pourraient inclure la production de documents éducatifs, des relevés visuels de fraie, des observations de la durée de la couverture de glace ou des relevés d'espèces envahissantes.

**Stratégie de gestion des pêches commerciales**
Il y a huit permis de pêche commerciale pour la rivière des Outaouais : cinq dans les eaux du Québec et trois dans les eaux de l'Ontario. Les permis de l'Ontario permettent habituellement la pêche aux poissons communs (meuniers, barbues de rivière) et aux crapets, tandis que les permis du Québec ne permettent la pêche que pour la carpe commune. Cette petite pêche commerciale sera surveillée afin d'assurer un équilibre avec la pêche récréative. La faisabilité de l'accroissement de la pêche commerciale de la barbue de rivière sera également explorée.

**Stratégie de gestion des espèces envahissantes et des maladies**
La moule zébrée, le cladocère épineux, l'écrevisse américaine et la châtaigne d'eau sont les espèces envahissantes les plus actives qui se propagent actuellement dans le bassin versant de la rivière des Outaouais. On craint aussi que la septicémie hémorragique virale (SHV) et la carpe asiatique se propagent à partir des Grands Lacs ou du Saint-Laurent. Des efforts de communication visant à promouvoir les activités de lutte et d'éradication, par le biais de programmes éducatifs, seront déployés. De plus, les protocoles existants seront suivis pour enquêter sur les morts massives de poissons, faire un suivi des espèces envahissantes et effectuer régulièrement des tests de dépistage.

**Stratégie d'adaptation aux changements climatiques**
Une approche adaptative en matière de gestion des pêches qui permet de prévoir et surveiller les incidences des changements climatiques et d'y réagir est un but de ce Plan de gestion des pêches. Avec l'aide de partenaires, des valeurs de base seront établies et suivies en vue de dégager des indicateurs climatiques importants pour les pêches de la rivière des Outaouais.

### CINQ PRINCIPALES RECOMMANDATIONS EN MATIÈRE DE GESTION DU CONSEIL CONSULTATIF DE LA RIVIÈRE DES OUTAOUAIS

1. **Amélioration de la protection de l'habitat du poisson et de la gestion au niveau des écosystèmes**
   Déterminer les habitats du poisson cruciaux et les protéger contre l'aménagement des rives, les ouvrages dans l'eau, les modifications du niveau/débit d'eau et régler les problèmes de qualité de l'eau; apporter des améliorations à l'habitat du poisson, au besoin.

2. **Amélioration de la qualité des pêches au doré jaune, au brochet et au maskinongé**
   Protéger le poisson de taille de fraie contre la surpêche, établir des normes de qualité des pêches et envisager l'établissement d'une limite de taille afin d'améliorer les pêches au grand brochet.

3. **Gestion interprovinciale des pêches dans la rivière des Outaouais**
   Tous les ordres de gouvernement et les intervenants du secteur des pêches doivent travailler ensemble. L'harmonisation des règlements sur les pêches, des activités coopératives d'application de la loi et des approches uniformes en matière de gestion des pêches entre l'Ontario et le Québec sont importantes.

4. **Activités de rétablissement pour l'anguille d'Amérique et l'esturgeon jaune**
   Focus sur la restauration de l'habitat pour l'esturgeon jaune et l'amélioration (en amont et en aval) passage pour l'anguille d'Amérique en travaillant avec les producteurs d'hydroélectricité.

5. **Surveillance régulière des pêches**
   Des ensembles de données sur les populations et les communautés de poissons actuelles sont requis pour une gestion efficace des pêches. Un programme exhaustif de surveillance des pêches est requis pour la rivière des Outaouais.

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# 1. INTRODUCTION

This Fisheries Management Plan provides direction for fisheries management on the Ottawa River from the top of Lake Temiskaming to Pointe Fortune immediately below Carillon dam southeast of Hawkesbury, Ontario.

This section of the Ottawa River is located along the interprovincial water boundary of Ontario and Quebec (See inset map of Figure 3). Fisheries management for this part of the Ottawa River is a joint responsibility of both provinces. The Ontario-side of the Ottawa River is Fisheries Management Zone 12 (FMZ 12) under Ontario Fishing Regulations and the Quebec-side of the Ottawa River is Fishing Zone 25 under Quebec Fishing Regulations.

The development of this Fisheries Management Plan was led by the Ontario Ministry of Natural Resources and Forestry (MNRF) with support of the Ministère des Forêts, de la Faune et des Parcs (MFFP) du Québec and assistance from a multi-stakeholder Advisory Council.

The members of the Advisory Council represented the different fishery users and stakeholders of the Ottawa River including but not limited to: recreational and tournament anglers, Ontario and Quebec anglers, specialty anglers of Muskellunge and bass fisheries, tourist outfitters and fishing-related businesses, Algonquins of Ontario, Ottawa Riverkeeper, academia and researchers, and Ontario Power Generation.

This Fisheries Management Plan will replace the Strategic Fisheries Management Framework for the Ottawa River implemented in 1999. It will help Ontario and Quebec government agencies work together to manage fisheries of the Ottawa River consistently.

Management direction is provided for the key fisheries of the Ottawa River which include Walleye and Sauger, Smallmouth and Largemouth Bass, Northern Pike, Muskellunge, Channel Catfish, and panfish (Yellow Perch, Pumpkinseed, Bluegill, Black Crappie, Rock Bass, and Brown Bullhead). Strategies were also prepared for fish community diversity, fish population monitoring, fish habitat management, public education and stakeholder involvement, commercial fisheries, species at risk fish, invasive species and disease, and climate change.

The Plan will be reviewed and updated as needed with assistance from the Advisory Council. Performance indicators will be monitored to ensure progress, success of the actions and to assess the achievement of the management objectives. Changes to the plan may be considered if new problems arise or if the management direction is not progressing as expected.

## 1.1 WHAT IS A FISHERIES MANAGEMENT PLAN?

A fisheries management zone plan outlines the management direction by which fish communities, fish populations and fisheries will be managed in the zone. It provides the status of fish communities and individual fishery stocks, identifies management objectives and actions for each fishery and the indicators by which attainment of objectives will be measured. The provisions of the plan will determine how fisheries will be managed and, where applicable, specify fishing regulations for recreational fisheries and influence commercial fishing licence conditions.

An advisory council of fishery users and stakeholders is engaged throughout the planning process by assisting with identification of issues and recommending management objectives and actions. Fisheries management strategies outlined in the plan are integrated into MNRF's and MFFP's other program areas as part of regular business (e.g. forest management plans, water management plans, municipal planning, environmental assessments and permitting).

## 1.2 Fisheries Management Zone Planning

The Ottawa River fisheries management review and planning process was a collaborative effort involving a Steering Committee, a Technical Working Group and an Advisory Council. The fisheries management planning process for the Ottawa River was initiated in January 2009.

### 1.2.1 Steering Committee

The Steering Committee functioned as both the Project Team and Steering Committee. The Lead Biologist / Plan Author and Advisory Council Chair led the planning process in consultation with the Project Manager and Technical Working Group. The Lead District Manager was consulted during key decision points in the planning process.

| | |
|---|---|
| Lead Biologist / Plan Author<br>Advisory Council Co-Chair | Management Biologist, Pembroke District<br>Ontario Ministry of Natural Resources and Forestry |
| Advisory Council Chair | Candidate recommended by Project Manager<br>Approved by Advisory Council |
| Project Manager | Resources Management Supervisor, Pembroke District<br>Ontario Ministry of Natural Resources and Forestry |
| Lead District Manager | Pembroke District<br>Ontario Ministry of Natural Resources and Forestry |

### 1.2.2 Technical Working Group

The Ottawa River [Fisheries] Management Group (ORMG) provided technical support to the Plan Author and the Advisory Council. ORMG is an interprovincial fisheries management group that has been jointly managing the fisheries of the Ottawa River since the early 1990s. This group consists of fisheries management and enforcement staff from Ontario and Quebec.

Ontario Ministry of Natural Resources and Forestry (MNRF) Members:
- Ontario Lead, Management Biologist, Pembroke District
- Management Biologists: Pembroke, Kemptville, and North Bay Districts
- Fisheries Specialist, Science and Research Branch
- Regional Fisheries Specialist, Southern Region
- Conservation Officers: Pembroke, Kemptville, and North Bay Districts

Ministère des Forêts, de la Faune et des Parcs (MFFP) du Québec Members:
- Biologistes, Direction de la gestion de la faune de l'Outaouais et de l'Abitibi-Témiscamingue
- Agents de la protection de la faune, Direction de la protection de la faune de l'Outaouais, de Laval et des Laurentides, et de l'Abitibi-Témiscamingue

Many other technical advisors and subject-matter experts were consulted or invited to provide learning-based presentations to the Advisory Council. See full list in Appendix A.

### 1.2.3 Advisory Council

An Advisory Council was formed to participate in the fisheries management planning process on behalf of the fishery users and stakeholder groups.

The members of the Advisory Council were selected to represent the many different fishery users and full geography of the Ottawa River (See Table 1 for Council Member Affiliations). Every member brought expertise to the process and networked with other fishery stakeholders.

The Ottawa River Advisory Council members were officially appointed in February 2010, meeting for the first time on April 24, 2010. The Council met approximately five times per year throughout the planning process, with a total of 26 meetings to support plan production between 2010 and 2016. After consultation the Council met to review comments submitted and to provide advice on finalization of the Plan.

**Table 1 Affiliations of the Ottawa River Advisory Council**

| Members | Affiliation |
|---|---|
| Tom Adamchick (Council Chair) | Avid flyfishing angler, member of the Algonkin Fly Fishers Club, former Field Editor of Outdoor Canada and Research Committee member of Trout Unlimited Canada. |
| Doug Antler | Angling-based Lodge owner on Holden Lake. Representative of Ontario Federation of Anglers and Hunters (OFAH) Zone E and Nature and Outdoor Tourism Ontario (NOTO). |
| Pierre Boucher | Representative of OFAH Zone F, member of Canadian Forces Ottawa Fish and Game Club, avid angler of both Ontario and Québec, and supporter of urban fishing opportunities. |
| Meaghan Murphy | Senior Scientist for the Ottawa Riverkeeper. |
| Don Chartrand | Avid angler of Lake Temiskaming, competitive bass tournament angler, and member of Temiskaming Anglers and Hunters Association. Linkage to FMZ 8. |
| Vincent Gervais | “Central” Ottawa River angler, member of Valley Bass-Tards, competitive bass tournament angler, retired commercial sturgeon harvester, and has connections to the baitfish industry along the Ottawa River. Promoter of family and kids fishing. |
| Dr. Lee Gutowsky | Fisheries Scientist– Post-Doctoral Fellow at Trent University. |
| Grant Hopkins | Multi-species Ottawa River angler for 40 years, past President of the Ottawa Flyfishers Society, former Outdoors columnist for the Ottawa Citizen and a long-time contributor of angling articles to Ontario Out of Doors magazine. FMZ 18 link. |
| Jonathan Jordan | Avid angler of the Lac des Chats reach of the Ottawa River that is passionate about all species of fish. Member of Ottawa Chapter of Muskies Canada. |
| Rod LaSalle | Québec stakeholder from the Outaouais Region. Member of the Fédération québécoise des chasseurs et pêcheurs. |
| Larry Lambourne | Director at Large for the Ottawa Chapter of Muskies Canada. Avid Muskellunge and multi-species angler of the Ottawa River. |
| Randy Malcolm | Elected Chief and Algonquin Negotiation Representative for the Snimikobi Algonquins and part of the negotiation team for the Algonquins of Ontario. |
| Peter Sword | OFAH Board Director, OFAH Zone C representative, member of OFAH Fisheries Advisory Committee, and member of Temiskaming Anglers and Hunters Association. |
| Ron Threader | Former Sr. Environmental Advisor and Fisheries Scientist for Ontario Power Generation. Specialty is American Eel and Lake Sturgeon in the Ottawa and St. Lawrence Rivers. Has written several publications on these species. |

We also wish to acknowledge the contributions of former and alternate members not listed above.

## 1.3 Public and Indigenous Community Involvement

Public Involvement:
Fisheries management policy in Ontario stresses the importance of enhanced public involvement and stewardship. The primary source of public involvement during plan development came from the Ottawa River Advisory Council (See Council Membership and Affiliations in Table 1).

The members of the Advisory Council represented the different fishery users of the Ottawa River. Advisory Council members actively networked to collect feedback from other anglers, resource users and stakeholder groups throughout the planning process. The Council network has functioned well to both share information and to receive public input. The Council gathered information on fishery uses, user expectations, questions, concerns and potential stressors for the fisheries of the Ottawa River. Interests of fishery users not directly represented on the Council, such as commercial fishers and baitfish dealers, were acquired during Council networking efforts.

The broader public and stakeholder groups had the opportunity to fully review and comment on the Fisheries Management Plan. The Background Information Report, draft Fisheries Management Plan for the Ottawa River and Questionnaire were posted on the Environmental Registry (ER) for a 45 day comment period from April 15 to May 30, 2016.

Indigenous Community Involvement
The Advisory Council for the Ottawa River included one participant from an Indigenous community (See Council Membership and Affiliations in Table 1). In addition, the following communities were given the opportunity to fully review and comment on the draft Fisheries Management Plan and Background Information Report:

- Algonquins of Ontario
- Nipissing First Nation
- Temagami First Nation
- Teme-Augama Anishinabai
- Matachewan First Nation
- Wolf Lake First Nation
- Timiskaming First Nation
- Kitigan Zibi Anishinabeg
- Eagle Village First Nation
- Métis Nation of Ontario
- Temiskaming Métis Council
- Northern Lights Métis Council
- Timmins Métis Council
- Mattawa Métis Council
- Chapleau Métis Council

When contemplating modifications to the Fisheries Management Plan that may adversely impact asserted or established Aboriginal or treaty rights, MNRF and MFFP will consult, and where appropriate, accommodate Indigenous communities.

## 1.4 Overview of Fisheries Management Planning Process

Several steps were taken to develop the Fisheries Management Plan (see Figure 1).


**Figure 1 Fisheries Management Planning Steps and Advisory Council Roles**

## 1.5 Monitoring, Review and Amendment of the Fisheries Management Plan

Fisheries management plans use an adaptive management approach as outlined in Figure 2.

Since the fisheries management plan is adaptive, it is necessary to make a monitoring commitment. Indicators must be evaluated and compared with the benchmarks and targets to measure progress towards the achievement of goals and objectives.

Reviews will evaluate progress on the prescribed management actions, consider any new monitoring results and revisit the validity of the management direction being taken.

An implementation plan will be developed to allow for prioritization of the management actions. The Ottawa River Action Plan is presented in Section 6.

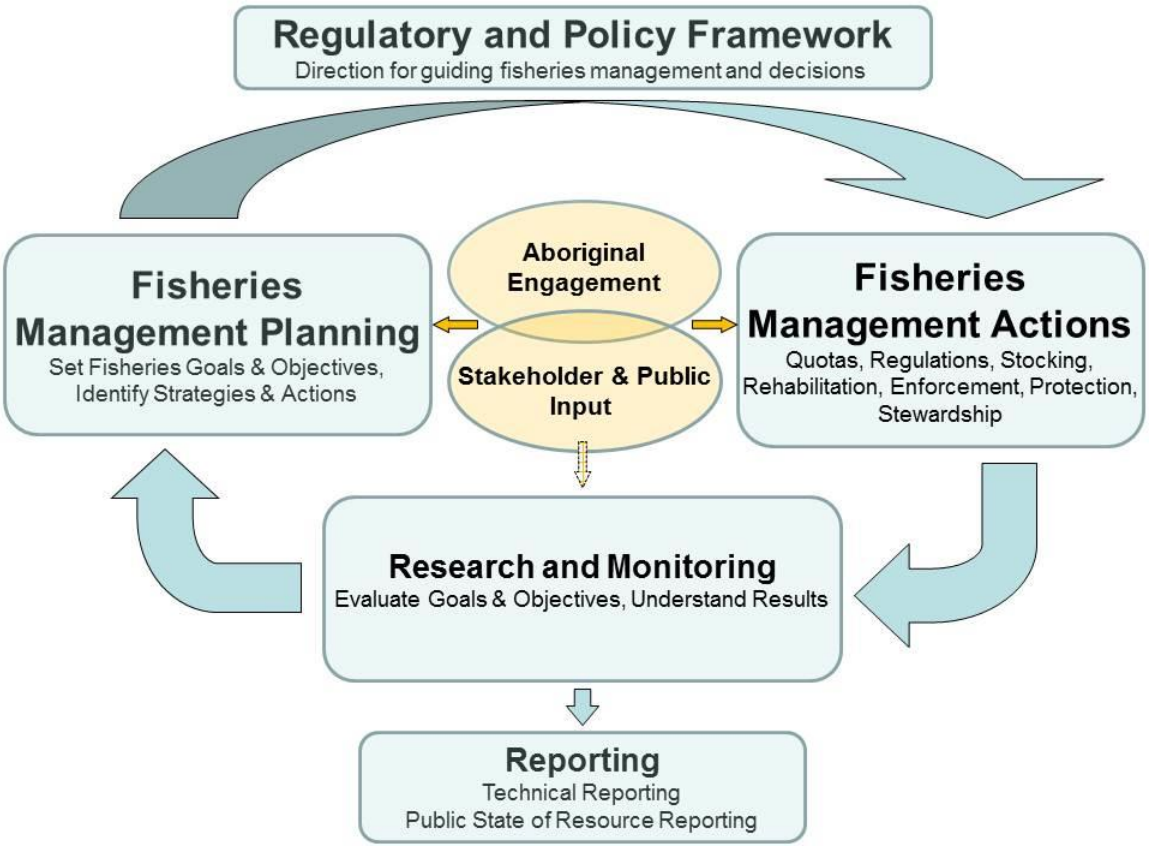



**Figure 2 Adaptive Management Approach to Fisheries Management**

## 1.6 Strategic Direction and Guiding Principles

The mandate for fisheries management is prescribed by provincial (Ontario and Quebec) legislation (e.g. *Fish and Wildlife Conservation Act; Endangered Species Act, Act Respecting the Conservation and Development of Wildlife; Act Respecting Threatened or Vulnerable Species*), federal legislation (e.g. *Fisheries Act, Constitution Act, Species at Risk Act*), and various interprovincial, national and international agreements (e.g. *National Species at Risk Accord, Ontario-Quebec agreements*).

Several agreements between Ontario and Quebec address the management of interprovincial boundary issues, such as: sustainable development of natural resources, fisheries management, water flow and level regulation, pollution and climate change.

*Agreement to Promote Sustainable Development of Crown Land and Natural Resources between the Government of Ontario and the Gouvernement du Québec -- June 2, 2006*

*Agreement Concerning Transboundary Environmental Impacts between the Government of Ontario and the Gouvernement du Québec -- June 2, 2006*

*Ottawa River Water Powers Act, 1943*

*Agreement Respecting the Ottawa River Basin Regulation, March 2, 1983*

*Trade and Cooperation Agreement between Ontario and Québec -- September 11, 2009*

## Ontario Fisheries Direction

In 2005, the Ministry recognized the need for a stronger emphasis on landscape level management of fisheries. The Ecological Framework for Recreational Fisheries Management in Ontario replaced the 37 existing fishing “divisions” with 20 Fisheries Management Zones (FMZs) based on biological, climatic and social considerations. Regulatory tool kits were developed for key sport fish establishing standards for setting fishing regulations. Key components included standardized Broad-scale Monitoring (BsM) approaches, adaptive management, enhanced public engagement, and state-of-the-resource reporting. FMZ 12 is one of the zones created which covers the Ontario-side of the Ottawa River.

The following principles of ecology and conduct will be used to guide fisheries management planning and decision making, and are considered fundamental in achieving the desired future state of the fisheries resources the Ottawa River. They are derived from broader MNRF strategic direction such as *Ontario’s Provincial Fish Strategy: Fish for the Future* (2015), *Horizons 2020* (2015), *Our Sustainable Future: A Renewed Call to Action* (2011), the *Ontario Biodiversity Strategy* (2011), and *MNRF’s Statement of Environmental Values*.

### *Ecological Principles:*

**Ecosystem Approach**: Fisheries will be managed using a holistic approach where all ecosystem components including humans and their interactions will be considered at appropriate scales. The application of the ecosystem approach includes the consideration of **cumulative effects**.

**Natural Capacity**: There is a limit to the natural capacity of aquatic ecosystems and hence the benefits that can be derived from them. Self-sustaining populations can provide long-term benefits when harvested at levels below Maximum Sustainable Yield (MSY).

**Naturally Reproducing Fish Communities**: Self-sustaining fish communities based on native fish populations will be the priority for management. Non-indigenous fish species that have become naturalized are managed as part of the fish community, consistent with established fisheries management objectives.

**Protect**: Maintaining the composition, structure and function of ecosystems, including fish habitat, is the first priority for management, as it is a lower-risk and more cost effective approach than recovering or rehabilitating ecosystems that have become degraded.

**Restore, Recover, and Rehabilitate**: Where native fish species have declined, or aquatic ecosystems have been degraded, stewardship activities such as restoration, recovery and rehabilitation will be undertaken.

**Fish and Aquatic Ecosystems are Valued**: Fisheries, fish communities, and their supporting ecosystems provide important ecological, social, cultural, and economic services that will be considered when making resource management decisions.

### *Principles of Conduct:*

**Aboriginal and Treaty Rights**: Aboriginal rights and interests in fisheries resources will be recognized and will help guide MNRF’s plans and activities. MNRF is committed to meeting the province’s constitutional and other obligations in respect of Aboriginal peoples, including the duty to consult.

**Informed Transparent Decision Making**: Resource management decisions will be made in the context of existing management objectives and policies, using the best available science and knowledge in an open, accountable way through a **structured decision making** process. The sharing of scientific, technical, cultural, and traditional knowledge will be fostered to support the management of fish, fisheries and their supporting ecosystems.

**Collaboration**: While MNRF has a clear mandate for the management of fisheries in Ontario, successful delivery of this mandate requires collaboration with other responsible management agencies, First Nations and Métis communities, and others who have a shared interest in the stewardship of natural resources.

### Quebec Fisheries Direction

The following Quebec strategic direction was also considered:

*MFFP's 2014-2018 Strategic Plan*
*Québec's 2016-2026 Walleye Management Plan*
*Québec's 2014-2020 Lake Trout Management Plan*

## Ottawa River Advisory Council Guiding Principles

The following guiding principles were adopted by the Ottawa River Advisory Council and were considered where appropriate during the development of this Plan:

**Ecological Approach**: An ecosystem approach to fisheries management, which considers the entire aquatic environment including the fish community when making decisions, will be followed to ensure conservation and use of the resource in a sustainable manner.

**Landscape Level Management:** Fisheries management planning will occur on a landscape scale, in this case at the Ottawa River (ON FMZ 12 / QC Zone 25) scale. Individual lake or reach management is discouraged. Harmonization of fishing regulations across the river is a priority.

**Balanced Resource Management:** Strategies and actions will consider the ecological, economic, social and cultural benefits and costs to society, both present and future.

**Sustainable Development:** The finite natural capacity of the resource is recognized in planning strategies and actions. Only natural resources over and above those essential for long-term sustainability requirements are available for use, enjoyment and development.

**Biodiversity:** Fisheries management will ensure the conservation of biodiversity by committing to healthy ecosystems, protecting native species and sustaining genetic diversity of fish populations. All species including non-sport fish and species at risk will be considered.

**Natural Reproduction:** Priority will be placed on native, naturally reproducing fish populations that provide sustainable benefits with minimal long-term cost to society.

**Habitat Protection:** The natural productive capacity of habitats for Canada's fisheries resources will be protected and habitat will be rehabilitated where possible.

**Valuing the Resource:** Stakeholders and other users will be invited to understand and appreciate the value of fisheries resources, and to participate in decisions made that may directly or indirectly affect aquatic ecosystem health.

**Collaboration / Shared Responsibility:** Local, regional, provincial and federal cooperation and sharing of knowledge, costs and benefits will be sought to manage fisheries of the Ottawa River.

**Multi-party Involvement:** A wide range of stakeholders, Indigenous peoples, and interested parties will provide fisheries management advice to ensure an open and transparent process that acknowledges their valuable role in the process.

**Indigenous Interests:** Ontario is committed to building better relationships with Indigenous peoples and in involving them in decisions that affect them.

**Knowledge for Informed Decision Making**: The best available information and science will be used for Zone-based objective setting, strategy development and implementation. Information from the BsM monitoring and reporting program will be considered.

**Adaptive Management**: An adaptive management approach will be taken. Objectives will be set, monitoring will occur, results will be compared against objectives, and management actions adjusted as necessary to ensure attainment of objectives.

**Precautionary Principal**: When an activity threatens to harm human health, fisheries or the environment, precautionary measures should be taken even if cause-and-effect relationships are not fully established scientifically.


Lake Sturgeon, MNRF

# 2. Ottawa River Fisheries Management Zone

## 2.1 Physical Description

This Fisheries Management Plan is for the portion of the Ottawa River that falls along the inter-provincial water-boundary of Ontario and Quebec (see inset map of Figure 3). The Ottawa River fisheries management zone is relatively unique in that it is entirely comprised of one large river and is co-managed with another province. Most other Ontario and Quebec fisheries management zones consist of multiple watersheds with numerous lakes, rivers and streams.

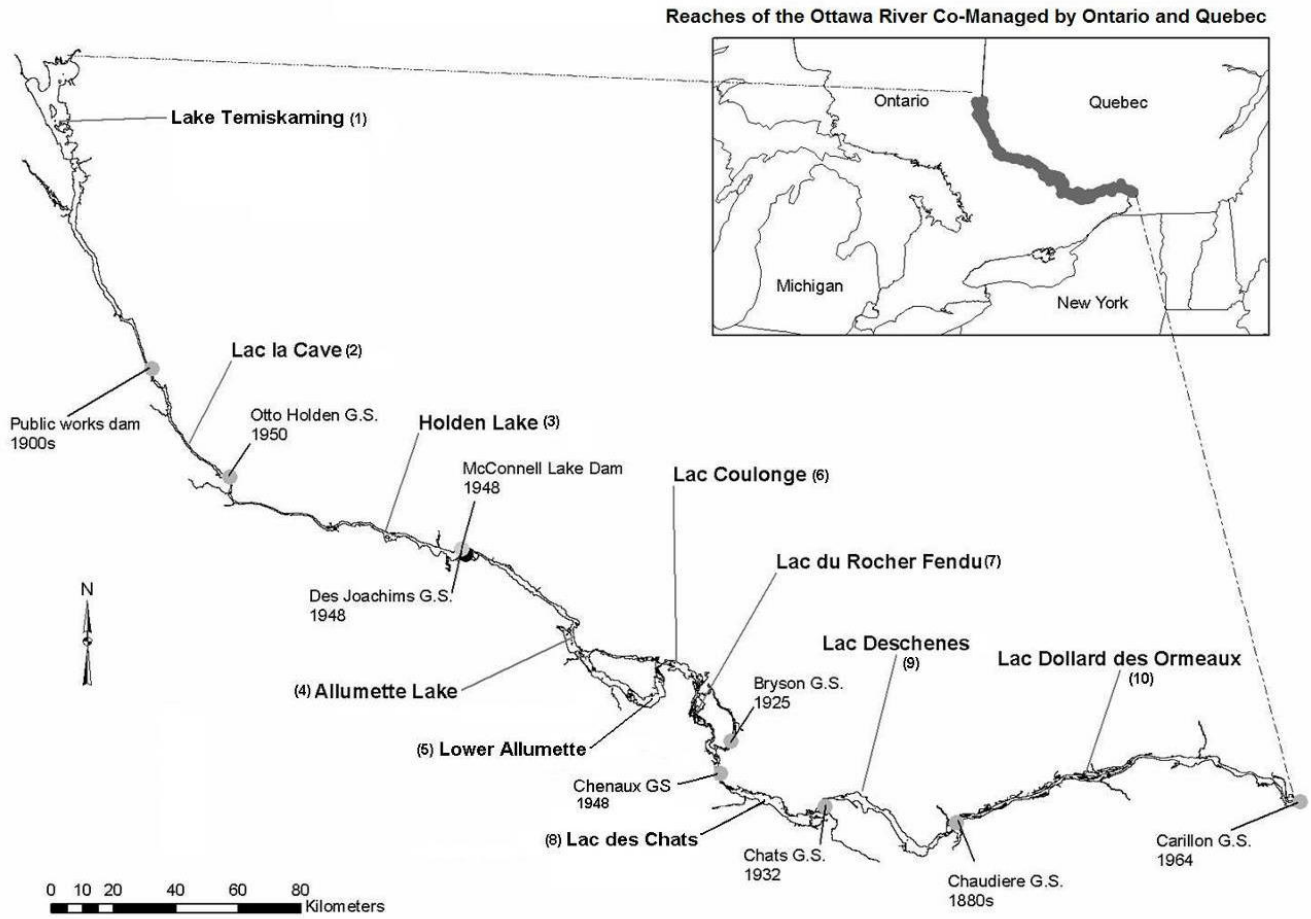



**Figure 3 Reaches of the Ottawa River Jointly Managed by Ontario and Quebec**

The Ottawa River fisheries management zone is approximately 590 km long and is comprised of 10 reaches that are separated by either dams or natural rapids. These 10 reaches from north to south are (as labeled in Figure 3):

1) Lake Temiskaming
2) Lac la Cave
3) Lake Holden
4) (Upper) Allumette Lake
5) Lower Allumette Lake
6) Lac Coulonge
7) Lac du Rocher Fendu
8) Lac des Chats
9) Lac Deschênes
10) Lac Dollard des Ormeaux

The physical characteristics of the Ottawa River are summarized by reach in Table 2. Further physical characteristics are presented in the Ottawa River Background Information Report in Section 2.4.

**Table 2 Physical Characteristics of the Ottawa River Summarized by Reach**

| Reach | Length (km) | Surface Area ($km^2$) | Depth (m) Avg | Depth (m) Max | Growing Degree Days | Natural Rapids | Water Level Changes (m) Avg | Water Level Changes (m) Max | Water Regime |
|---|---|---|---|---|---|---|---|---|---|
| **Lake Temiskaming** | 107.3 | 322 | 36 | 213 | 1701 | No | 2.9 | 4.0 | Reservoir Winter drawdown |
| **Lac la Cave** | 49.0 | 30 | 20 | 134 | 1762 | No | 3.3 | 4.1 | Reservoir Winter drawdown |
| **Holden Lake** | 90.0 | 76 | 17 | 174 | 1805 | No | 2.3 | 3.0 | Reservoir Winter drawdown |
| **Upper Allumette Lake** | 76.9 | 132 | 10 | 84 | 1955 | Yes | 0.72 | --- | Natural |
| **Lower Allumette Lake** | 22.3 | 46 | 3 | 18 | 1972 | Yes | 0.72 | --- | Natural |
| **Coulonge Lake** | 18.1 | 29 | 4 | 33 | 1983 | Yes | 0.72 | --- | Natural |
| **Lac du Rocher Fendu** | 31.1 | 39 | 8 | 64 | 1987 | Yes | 1.6 | 1.9 | Peaking |
| **Lac des Chats** | 40.0 | 75 | 5 | 48 | 2058 | No | 0.34 | --- | Run-of-the-River |
| **Lac Deschênes** | 52.8 | 109 | 5 | 49 | 2163 | Yes | --- | 0.9 | Run-of-the-River |
| **Lac Dollard des Ormeaux** | 113.1 | 144 | 6 | 94 | 2082 | No | 1.5 | 1.5 | Run-of-the-River Peaking (winter) |

Chaudière Falls Generating Station, Hydro Ottawa, MNRF

The Ottawa River supports a diverse fish community with over 85 native fish species recorded. A mix of cold, cool and warm water fish species are supported. The number and combinations of fish species are different in each reach. Fish species diversity (number of fish species), generally increases as you move from upper to lower reaches of the Ottawa River.

The fish species of the Ottawa River came from the Mississippian and Atlantic Coastal glacial origins (Mandrak and Crossman 1992). The fish communities of the Ottawa River are more similar to the Great Lakes and the St. Lawrence than adjacent in-land lakes or its tributaries. Inland lakes of Ontario and Quebec typically have fewer fish species, due to post-glacial dispersal, timing of colonization after glaciation and isolation of source populations.

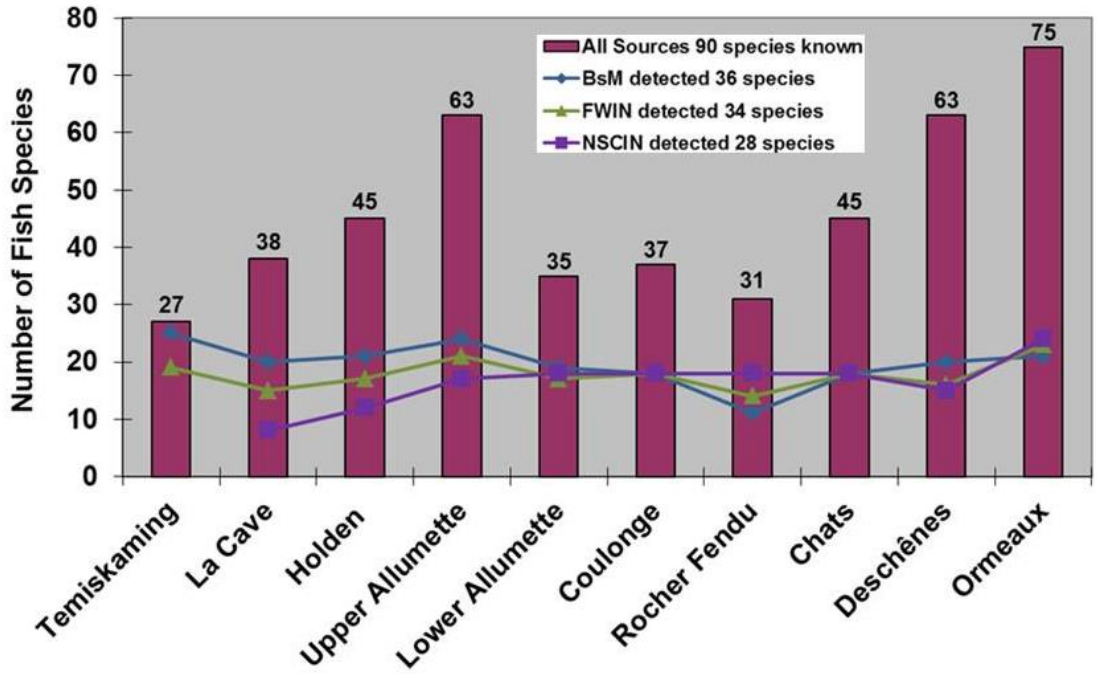



**Figure 4 Fish Species Diversity of the Ottawa River**

Fish species and communities of the Ottawa River based on Broad-scale Monitoring (BsM) are dominated by Channel Catfish, with Walleye, Sauger, Yellow Perch and Lake Sturgeon as the next most dominant fish species. For more information on fish species diversity and fish community structure by reach of the Ottawa River, refer to Sections 3.3 and 3.4 of the Ottawa River Background Information Report.

Longnose Gar, Jonathon Jordan

## 2.3 Cultural and Socio-Economic Description

### Recreational Fisheries

The largest use of fisheries resources on the Ottawa River is by recreational angling. The key recreational fisheries of the Ottawa River based on the Survey of Recreational Fishing in Canada are Walleye, Northern Pike, Smallmouth and Largemouth Bass, Yellow Perch, panfish and Channel Catfish (OMNR 2003, 2009, 2014).

Based fishermen residing in Ontario and non-resident licenses sold in Ontario (OMNR 2015) approximately 475,000 days of fishing were estimated on the Ottawa River. The majority (93.3%) of angling effort is from the local residents of Ontario with 6.7% from visiting non-resident anglers. Anglers residing in the Province of Quebec are not included in these estimates, therefore angling effort on the Ottawa River can be assumed to be much higher than the Ontario estimates.

The total economic value including expenditures and investments wholly attributable to fishing on the Ottawa River is estimated to be $32.1 million in 2010. Almost $1 million was from package deals offered by the tourist industry to residents and non-resident fisherman (OMNR 2015).

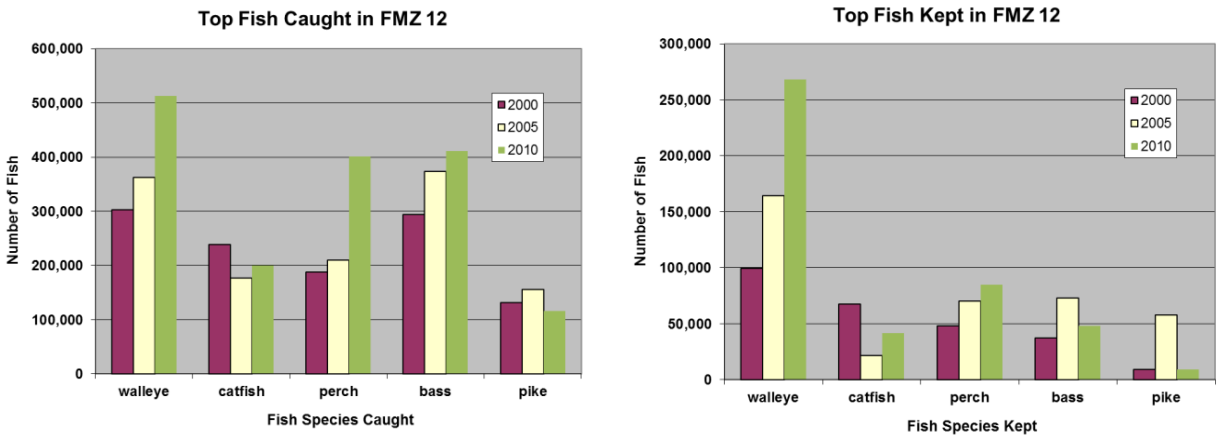



**Figure 5 Top Fish Caught and Kept by Recreational Anglers on the Ottawa River**
Source: Ontario excerpts from the Canadian Recreational Fishing Surveys 2003, 2009, and 2015

### Competitive Fishing Events

The Ottawa River is the third most popular water body for fishing events in Ontario (Kerr 2012). Bass (Largemouth and Smallmouth) are most commonly targeted by anglers in fishing events. Walleye, Northern Pike, panfish, Channel Catfish and Muskellunge are also used to lesser extents. Based on the Competitive Fishing Events Survey in 2012, 17 events targeted Smallmouth and Largemouth Bass, 10 events targeted Walleye and three events targeted Muskellunge. Many of the fishing events are family or charity oriented multi-species events. In 2012, 32 fishing events were held during the summer and 13 events were held during the winter months. From 2004 – 2012 there has been an increase in fishing events on the Ottawa River. Figure 6 outlines fishing events trends from 2004, 2008 and 2012. More information on competitive fishing events can be found in Section 4.1.2 of the Ottawa River Background Information Report.

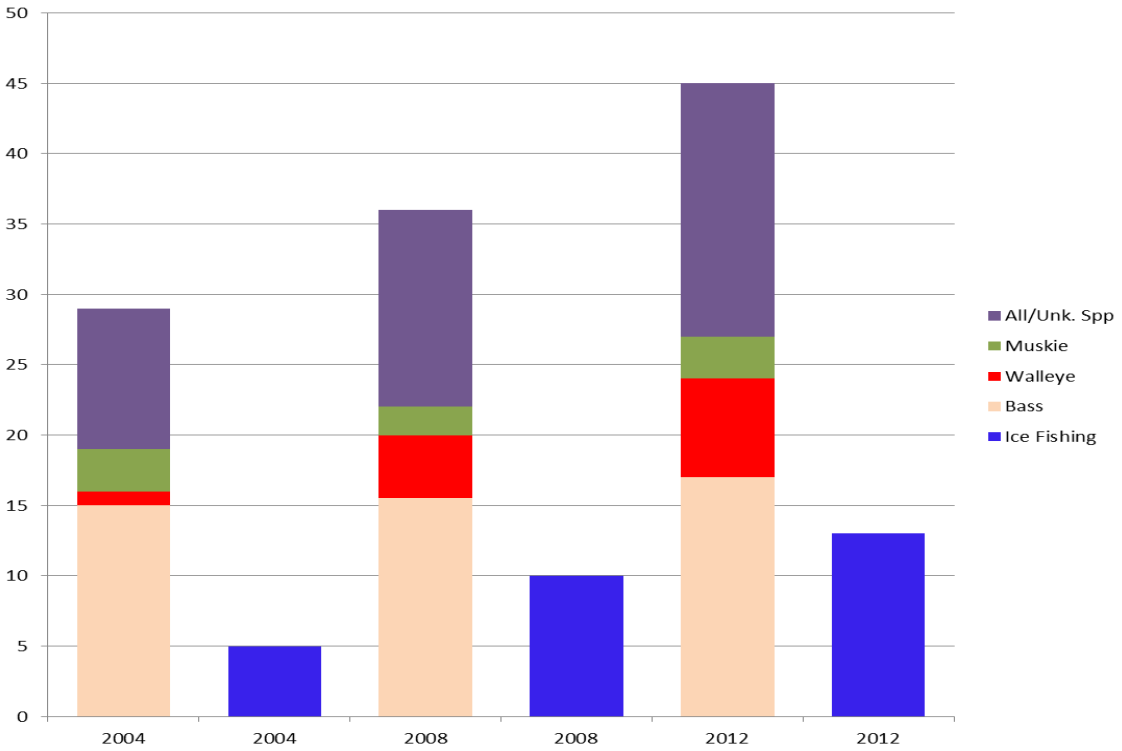



**Figure 6 Number of Competitive Fishing Events on the Ottawa River 2004, 2008 and 2012** (Kerr, 2004, 2008 and 2012)

## Commercial Fisheries

There is a small commercial food fishing industry on the Ottawa River, with three commercial licences in Ontario waters and five in Quebec waters, as of 2017. The commercial fisheries of the Ottawa River have diminished significantly since the closure of the most highly valued Lake Sturgeon and American Eel commercial harvest fisheries. Figure 7 outlines the main fish species harvested in the Ottawa River by Ontario commercial fishers. For more information on commercial fishing refer to Section 4.2.3 of the Ottawa River Background Information Report.

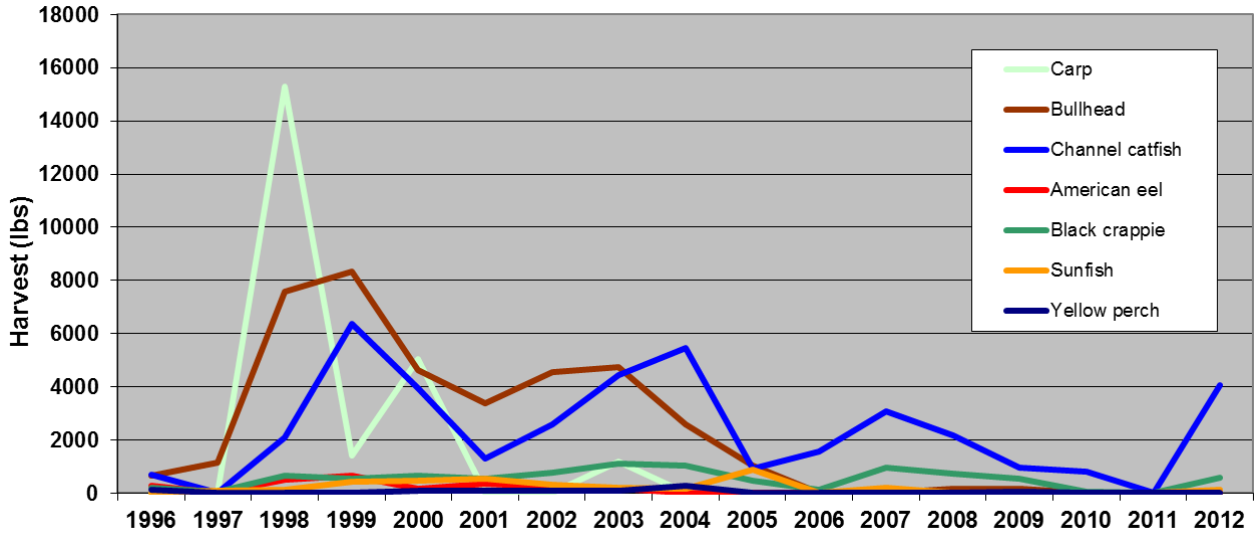



**Figure 7 Harvest Trends for Ontario Commercial Fisheries on the Ottawa River 1996-2012**

## Indigenous Fisheries

Fisheries of the Ottawa River are culturally important to Algonquin, Ojibwa and Metis communities of Ontario and Quebec. American Eel and Lake Sturgeon remain cultural symbols today and once supported seasonally important subsistence fisheries to Indigenous peoples living along the Ottawa River before European colonization.

The Algonquins of Ontario have expressed interest in the inclusion of an Indigenous Background Information Report to the Plan. Information received from the Algonquins of Ontario or other Indigenous communities will be added as it comes available.

## Land and Water Use Patterns

Most threats to fish habitat come from the various land uses and development that occur in the watershed. Fish habitats of the Ottawa River are currently stressed to varying degrees in each reach by urban, residential, commercial, industrial and agricultural sources. Being close to large population centers (e.g. greater Ottawa Area) can also provide heavy sources of fishing pressure.

A large percentage of aquatic life is found near the shoreline and in shallow margins of waterways (the littoral zone). Spring floodplains, wetlands and shallow littoral zones provide food, shelter, nesting and nursery areas for fish. Shoreline vegetation helps to maintain water quality by stabilizing riverbanks (preventing erosion), and acting as a filter that helps to limit residential and agricultural fertilizers, pesticides and herbicides from entering the river. Urban shoreline development, floodplain development, or agricultural development can result in degradation of shoreline and wetland habitats.

For a description of land and water uses along the Ottawa River refer to Section 4.1.1 in the Ottawa River Background Information Report.

Ottawa River, in downtown Ottawa, MNRF

## 2.4 Current Approach to Fisheries Management on the Ottawa River

The Ottawa River forms part of the boundary between Ontario and Quebec, making its management a joint responsibility of all levels of government (federal, provincial, and municipal). Many aspects important to fisheries management such as fish population health, fishing quotas, habitat protection, water levels and flows, contaminant levels and water quality monitoring are managed by different government agencies.

Ontario and Quebec each have a fisheries management zone for their side of the Ottawa River. The Ontario-side is FMZ 12 under Ontario Fishing Regulations and the Quebec-side is Fishing Zone 25 under Quebec Fishing Regulations.

Ontario and Quebec have an agreement to recognize each other's resident sport fishing licences so anglers may fish anywhere on the Ottawa River. Harmonized fishing regulations are required for the reciprocal licencing agreement to work seamlessly. Mismatched catch limits, fishing seasons, sanctuary dates and licence types between Ontario and Quebec fishing regulations have been problematic. Anglers must keep track of two sets of fishing and baitfish regulations relative to the unmarked inter-provincial water boundary while fishing on the Ottawa River.

**Past and Continuing Fisheries Management Challenges on the Ottawa River:**

- Many agencies have roles in fisheries management and habitat protection
- Invisible inter-provincial water boundary and two sets of fishing regulations
- Ontario and Quebec have different approaches to fisheries management
- Unique solutions are often required to harmonize fishing regulations on boundary waters

To overcome these challenges, an interprovincial fisheries management committee was formed for the Ottawa River in the early 1990s to begin a fishing regulation harmonization exercise. The Ottawa River Management Group (ORMG) has been a very successful management partnership. Membership consists of fisheries management and enforcement staff from Ontario and Quebec. This group meets at least once a year to work through fisheries issues and enforcement challenges. Much effort has been made to take consistent management approaches and to harmonize fishing regulations across the Ottawa River.

Fisheries managers of Ontario and Quebec have a long successful history of working together:

- Reciprocal Licencing Agreement (since 1960s) so anglers can fish across the river
- Regular meetings of the Ottawa River Fisheries Management Group (1990-present)
- Strategic Fisheries Management Framework for the Ottawa River (1999)
- Conducting fisheries assessments across the whole river and sharing results (since 1995)
- Harmonization of most Ottawa River fishing regulations and all fish sanctuaries (2008)
- Start-up of multi-stakeholder Ottawa River Fisheries Advisory Council (2010)
- Development of a Fisheries Management Plan for the Ottawa River (2010-present)

This Fisheries Management Plan will facilitate further coordination of management objectives, provide a monitoring framework, identify potential enforcement priorities, and initiate discussions on additional fishing regulations for harmonization. Fisheries management priorities, strategies and actions will be integrated into MNRFs and MFFP's other program areas as part of regular business (e.g. forest management plans, water management plans, municipal planning, environmental assessments and permitting). Fisheries management objectives will also be conveyed to other government agencies with supporting roles in fish habitat management.

### 2.4.1 Fisheries Management Zones of the Ottawa River

The Ontario-side is managed under Ontario Fishery Regulations as Fisheries Management Zone 12 (Figure 8) and the Quebec-side is managed under Quebec Fishing Regulations as Fishing Zone 25 (Figure 9). The Ottawa River downstream of Carillon dam is in Quebec Fishing Zone 8.

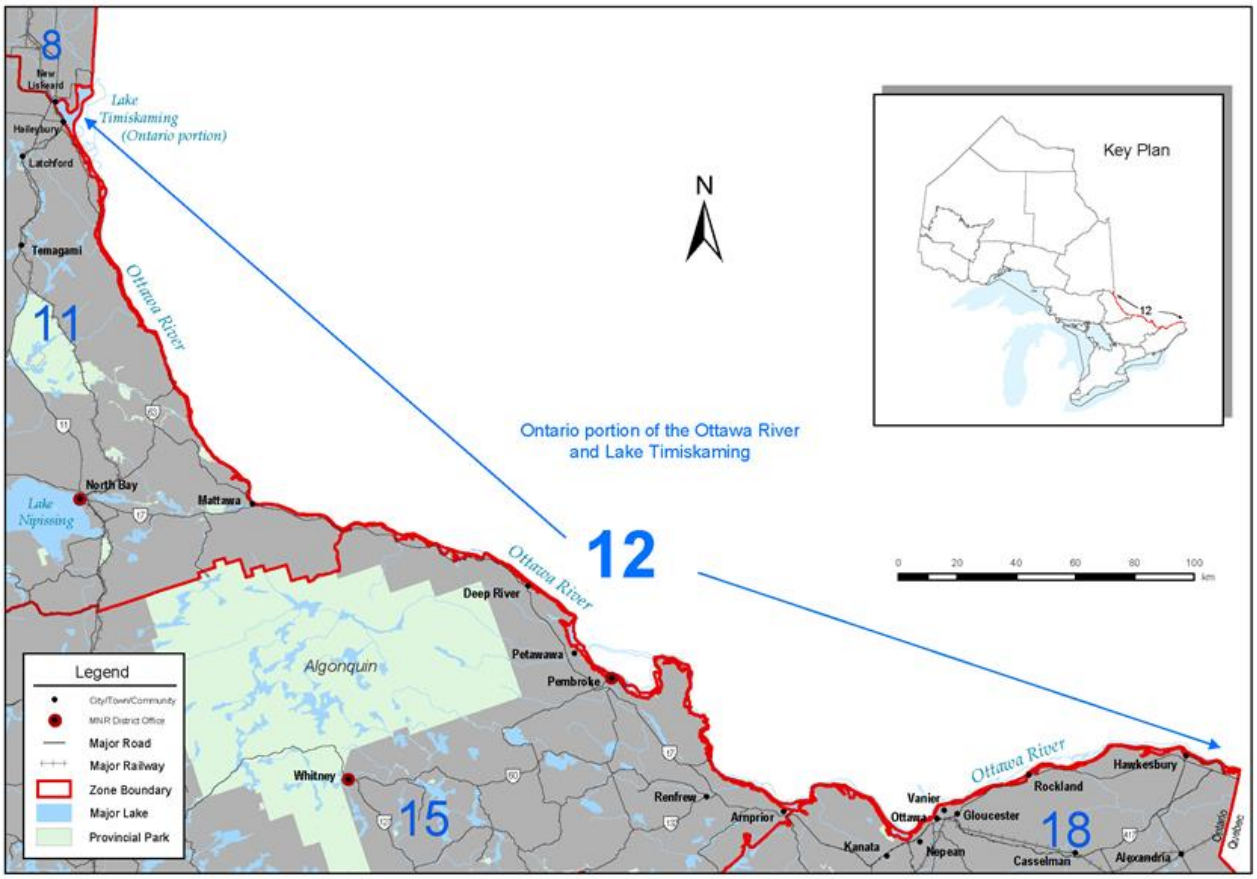



**Figure 8 Ontario Fisheries Management Zone 12**
This figure illustrates the location of FMZ 12 in Ontario (Key Plan inset) and an approximation of the boundaries. If more precise boundary information is required, the Fisheries Management Zone 12 Detail Maps (set of 7 map sheets) are available on the Ontario government website: https://www.ontario.ca/page/fisheries-management-zone-12-fmz-12

The inland boundary of Ontario FMZ 12 starts at the top of Lake Temiskaming, following the south-western shore of the Ottawa River all the way to Point Fortune below Carillon Generating Station, with the boundary crossing the mouths of small tributaries and occasionally following the banks of larger rivers inland to the first barrier. The north-eastern boundary of Ontario FMZ 12 and the south-western boundary of Quebec Fishing Zone 25 are shared, with both following the Ontario-Québec inter-provincial boundary, which is an unmarked water-boundary that follows the middle of the Ottawa River. The inland boundary of Quebec Zone 25 runs from the top of Lake Temiskaming initially following the north-east shore of the Ottawa River and then Highways 148 and 334 in places to include the larger side-channels, across the mouths of tributaries, downstream to Carillon dam.

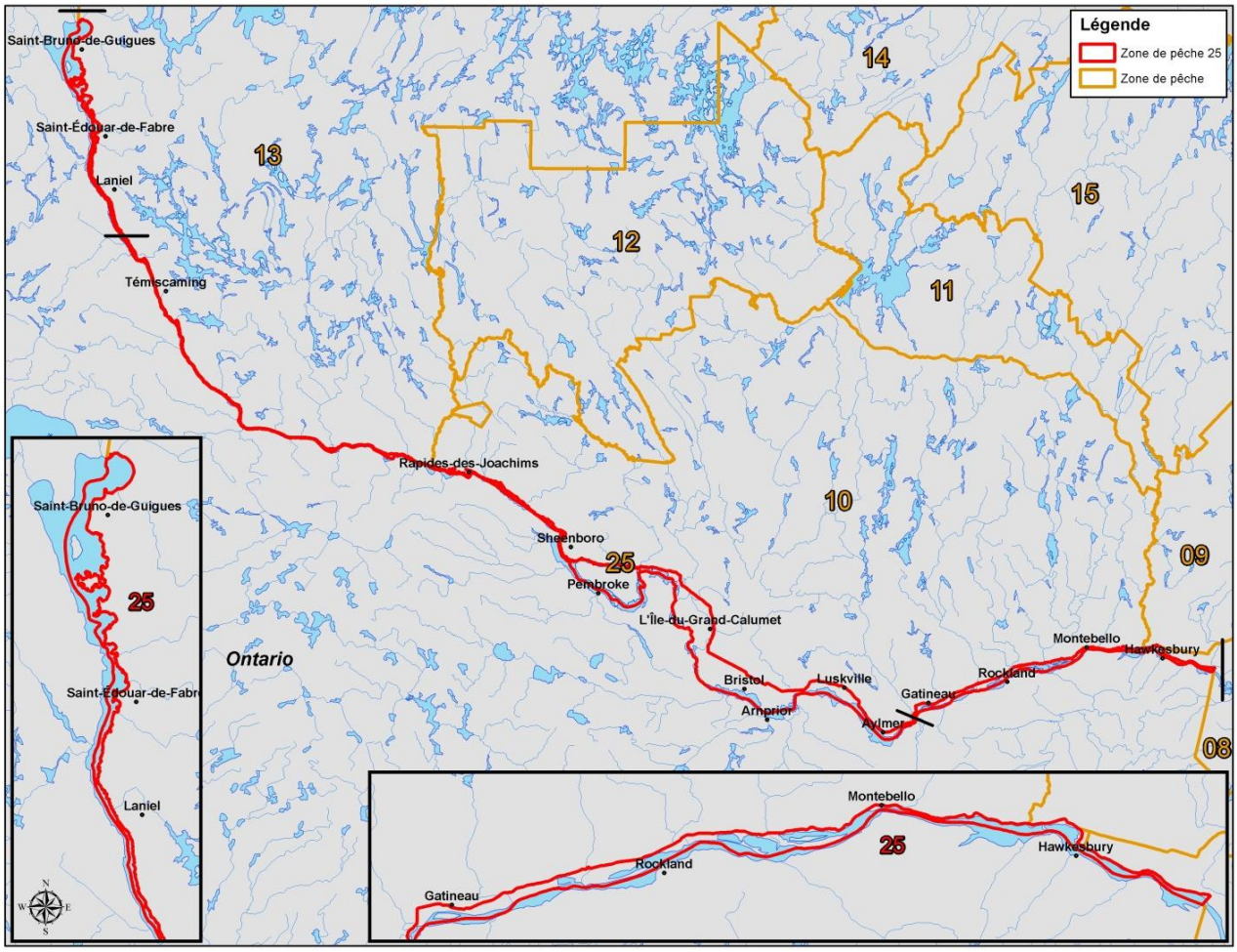



**Figure 9 Québec Fishing Zone 25**
This figure illustrates the location of Fishing Zone 25 in Québec and an approximation of the boundaries. If more precise boundary information is required, maps of Fishing Zone 25 are available on the Ministère des Forêts, de la Faune et des Parcs (MFFP) du Québec website: http://www.mffp.gouv.qc.ca/publications/enligne/faune/reglementation-peche/pdf/impression/Peche-Carte-Zone-25.pdf

The large side-channels of the Ottawa River located on the Quebec side, Chenal de la Culbute and Chenal du Grand Calumet, are included in Quebec Fishing Zone 25. There is a very tiny piece of Ontario waters at the bottom of FMZ 12 between the Carillon dam and Point Fortune that is part of Lac des Deux-Montagnes. Quebec manages the fisheries of Lac des Deux-Montagnes under the regulations for Fishing Zone 8 which start at Carillon dam.

Many tributaries flow into the Ottawa River, but most of them are managed as part of the adjacent FMZs 8, 11, 15, and 18 in Ontario; and Fishing Zones 13, 10, 9, and 8 in Quebec. Any Ottawa River fish that move into these tributaries will be managed under the fishing regulations of the adjacent fisheries management zones. Portions of some tributaries such as Wabi and Mackey Creeks and the Montreal, Madawaska, and Mississippi Rivers downstream of the first dam or bridge are included in Ontario FMZ 12. Similarly on the Quebec-side, portions of tributaries within the Hwy 148 boundary are included in Quebec Zone 25.

### 2.4.2 Fishing Regulations across the Ottawa River

**Reciprocal Licencing Agreement for Resident Anglers of Ontario and Quebec**
In general, resident anglers of Ontario and Quebec may fish across lakes and rivers that are bisected by the Ontario-Quebec interprovincial boundary using the fishing licence of the province in which they reside. This agreement was intended to allow anglers to fish anywhere on boundary waters such as the Ottawa River without worrying about the exact location of the inter-provincial boundary. Anglers may fish anywhere on the Ottawa River with either an Ontario or Quebec sport fishing licence but they must follow the fishing regulations for the side of the river they are on. Efforts to harmonize fishing regulations have been made, but some differences still exist.

**Resident Fishing Licences of Ontario and Quebec**
Any Ontario or Quebec fishing licence can be used to fish anywhere on the Ottawa River. Ontario has both a Sport Fishing Licence and a reduced limit Conservation Fishing Licence, while Quebec only has a full limit fishing licence. In Ontario, children under the age of 18, seniors over the age of 64 and persons with disabilities are deemed holders of a Recreational Fishing Licence and must follow the regulations associated with a Sport Fishing Licence. Everyone requires a fishing licence in Quebec, except children who may fish with a licenced adult. Enforcement officers of the Ottawa River recognize all resident sport fishing licences of both provinces, except the Ontario Conservation License.

**Table 3 Resident Fishing Licences of Ontario and Quebec**

| Ontario<br>Resident Fishing Licences | Quebec<br>Resident Fishing Licences |
|---|---|
| Sport Fishing Licence – full limit<br>Conservation Fishing Licence - partial limit | Sport Fishing Licence – full limit<br>Everyone requires a fishing licence |
| Children < 18 years old<br>proof of age = Sport Fishing Licence | Children < 18 years old may fish with a licenced adult (share limit) |
| Seniors 65 years and older<br>proof of age = Sport Fishing Licence | Spouse may fish with licenced spouse (share limit) |
| Disabled or blind<br>proof of disability = Sport Fishing Licence | Disabled or blind angler may fish with a licenced angler (share limit) |

**Fishing Regulations**
Anglers must have regard for both Ontario and Quebec fishing regulations while fishing across the interprovincial water boundary on the Ottawa River. The Ontario-side is regulated as FMZ 12 under Ontario Fishing Regulations, while the Quebec-side is regulated as Fishing Zone 25 under Quebec Fishing Regulations.

Fisheries managers of Ontario and Quebec have made excellent progress on fishing regulation harmonization. As of 2008, all fish sanctuaries and most fishing regulations were harmonized. Only a few minor fishing regulation differences remain, highlighted in Table 4 below.

The Ottawa River Fisheries Management Group has identified the following fishing regulation differences and management approaches for future discussion:

- Baitfish and other bait regulations
- Muskellunge fishing season end date
- Lake Trout size limit
- Number of ice fishing lines
- Sunfish and Brown Bullhead fishing regulation review
- Channel Catfish fishery development and management
- American Eel and Lake Sturgeon recovery efforts and fishery closures

**Table 4 Current Sport Fishing Regulations across the Ottawa River**
Existing Differences between Ontario and Quebec regulations are highlighted in blue.
S=Sport Fishing Licence limit (Ontario and Quebec) and C=Conservation Licence Limit (Ontario).

| | Ontario FMZ 12 | | Quebec FMZ 25 | |
|---|---|---|---|---|
| **Species** | **Season** | **Quota / Size Limit** | **Season** | **Quota / Size Limit** |
| Walleye & Sauger | Jan. 1 to Mar. 31 & Fri. before 3rd Sat. in May to Dec. 31 | S(5) C(2)<br><br>Maximum length 40 cm (total length) in season between March 1 and June 15 | Jan. 1 to Mar. 31 & Fri. before 3rd Sat. in May to Dec. 31 | 5<br><br>Maximum length 40 cm (total length) in season between March 1 and June 15 |
| Northern Pike | Jan. 1 to Mar. 31 & Fri. before 3rd Sat. in May to Dec. 31 | S(6) C(2) | Jan. 1 to Mar. 31 & Fri. before 3rd Sat. in May to Dec. 31 | 6 |
| Largemouth & Smallmouth Bass | Fri before the 4th Sat in June to Nov 30 | S(6) C(2) | Fri before the 4th Sat in June to Nov 30 | 6 |
| Muskellunge | Fri. before 3rd Sat. in June to Dec 15 | S(1) C(0)<br><br>Minimum length 137 cm (total length) | Fri. before 3rd Sat. in June to Nov 30 | 1<br><br>Minimum length 137 cm (total length) |
| Yellow Perch | Open all year | S(50) C(25) | Open all year | 50 |
| Crappie | Open all year | S(30) C(10) | Open all year | 30 |
| Sunfish | Open all year | unlimited | Open all year | unlimited |
| Brook Trout | Fri before the 4th Sat in Apr. to Sept. 30 | S(5) C(2) | Fri before the 4th Sat in Apr. to Sept. 30 | 5 |
| Brown Trout & Rainbow Trout | Fri before the 4th Sat in Apr. to Sept. 30 | S(5) C(2) | Fri before the 4th Sat in Apr. to Sept. 30 | 5 |
| Lake Trout & Splake | Fri before the 4th Sat in Apr. to Sept. 30 | S(2) C(1) | Fri before the 4th Sat in Apr. to Sept. 30 | 2<br><br>Minimum length 45 cm (total length) NEW 2014 |
| Atlantic Salmon | Fri before the 4th Sat in Apr. to Sept. 30 | S(1) C(0) | Fri before the 4th Sat in Apr. to Sept. 30 | 1 |
| Lake Whitefish | Open all year | S(12) C(6) | Open all year | 12 |
| Channel Catfish | Open all year | S(12) C(6) | Open all year | unlimited |
| Lake Sturgeon | Closed | Closed | June 15 to October 31 | 1<br><br>Maximum length 106 cm (total length) |
| American Eel | Closed | Closed | Open all year | unlimited |

| | Ontario FMZ 12 | | Quebec FMZ 25 | |
|---|---|---|---|---|
| **Species** | **Season** | **Quota / Size Limit** | **Season** | **Quota / Size Limit** |
| American Shad (exception regulation below Carillon dam in QC Fishing Zone 8) | Open all year | S(5) C(2) | Open all year | 5 |
| Other Species: Rock Bass, Brown Bullhead, Burbot (ling cod), Suckers, Carp, Mooneye, Freshwater Drum, Longnose Gar | Open all year | unlimited | Open all year | unlimited |
| Baitfish | Open all year | 120 possession limit<br><br>see list of permitted baitfish species<br><br>caught or purchased<br><br>transport of live baitfish is permitted in Ontario<br><br>no import of baitfish into Ontario<br><br>Draft Strategic Policy for Bait Management in Ontario proposed February 2017 (may lead to changes) | Open winter only (Dec 20 to Mar 31)<br><br>Changes implemented April 1, 2017 | no possession limit<br><br>dead baitfish only<br><br>caught or purchased<br><br>transport of live baitfish is prohibited in all Quebec Fishing Zones<br><br>no import of baitfish into Quebec |
| Ice Fishing Lines | | 2 | | 2 - Lake Temiskaming<br>5 - below Temiskaming |

**Fish Sanctuaries and other Fishing Regulation Exceptions**
All fish sanctuaries are listed as exceptions in either Ontario or Quebec fishing regulations.

Several fish sanctuaries have been applied to key fish spawning areas in many reaches of the Ottawa River. For those that span the full width of the Ottawa River, the regulated sanctuaries dates have been fully harmonized and described in both fisheries management zones of Ontario and Quebec. Fish sanctuaries that completely fall on the Ontario-side only show as exceptions in Ontario fishing regulations, while those that fall completely within Quebec waters only show up in Quebec fishing regulations. It is necessary for anglers fishing both sides of the Ottawa River to be aware of fish sanctuaries in both Ontario and Quebec fishing regulations. See Figure 10 for an overview of fish sanctuaries of the Ottawa River and its tributaries.

There is a fish sanctuary and American Shad regulations noted as exceptions below Carillon Dam in the Ontario FMZ 12 fishing regulations that match the regulations of Quebec Fishing Zone 8. This is the only location in Ontario where American Shad are caught, so it has been listed as an exception rather than a zone-wide regulation.

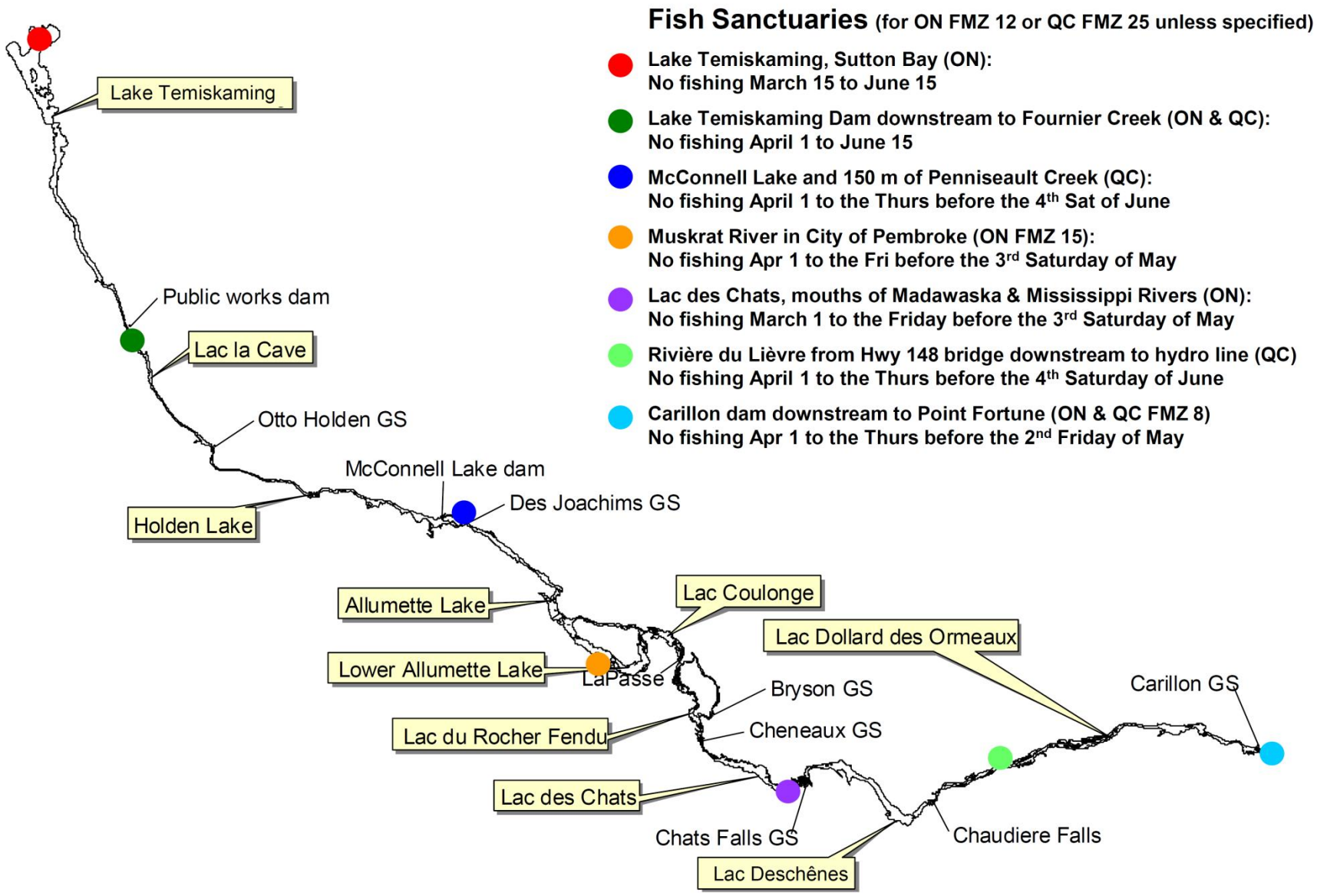



**Figure 10 Fish Sanctuaries of the Ottawa River and its Tributaries**

# 3. Vision and Goals for Fisheries Management on the Ottawa River

The vision and goals for the Ottawa River Fisheries Management Plan are based on the draft version of *Ontario's Provincial Fish Strategy: Fish for the Future (2016)* and the *MFFP's 2014-2018 Strategic Plan*. They are consistent with the guiding principles followed during fisheries management planning that were tailored to include challenges unique to the Ottawa River.

## Vision Statement for Fisheries of the Ottawa River

Healthy diverse ecosystems with native self-sustaining fish communities and quality fisheries that provide long-term ecological, social and cultural, economic and healthy food benefits for all users of the Ottawa River.

## Goals for Fisheries Management on the Ottawa River

1. Healthy connected ecosystems that support self-sustaining native fish communities and quality fisheries.

2. Sustainable use of fish resources that enhances quality of life for users.

3. Effective joint management of Ottawa River fisheries by Ontario and Quebec through improved collaboration with Indigenous communities, adjacent Fisheries Management Zones, waterpower producers and other government agencies.

4. Enhanced understanding of the Ottawa River's fisheries, fish communities and their supporting ecosystems to manage the resource effectively.

5. Stakeholders, partners and Indigenous communities that are informed and knowledgeable of fisheries management, fish communities and their supporting ecosystems.

6. Partnerships, stewardship, volunteerism and community involvement that enhance the management of fisheries, fish communities and their supporting ecosystems.

Lake Sturgeon, Lac des Chats, Ottawa River, MNRF

# 4. Management Challenges, Goals, Objectives and Actions

## Fisheries Management Issues and Challenges for the Ottawa River

The Advisory Council undertook extensive discussions of the issues and management challenges affecting the fisheries resources of the Ottawa River. A complete summary of the process used to identify and rank issues can be found in the *Background Information to the Fisheries Management Plan for the Ottawa River (OMNRF, 2016).* Management strategies were developed for each issue related to key fisheries and that are likely to affect the fish community.

### Management Goals and Objectives

*Management Goals* are overarching statements made about a desired state of the fishery. The management goals in this plan were developed with input from the Advisory Council.

*Management Objectives* describe the desired future state or end result. Objectives need to contribute to the broad and specific fisheries management goals for the zone, be consistent with strategic direction and guiding principles, and must be measurable. Objectives can reflect biological or social considerations. In most cases, objectives were identified to benefit both the sustainability and quality of fishery resources.

### Indicators, Benchmarks and Targets

*Indicators* are specific attributes that resource managers will measure to determine whether or not management objectives are being achieved. Indicators are directly linked to the management objectives and need to be measurable by monitoring programs.

*Benchmarks* are associated with each of the indicators. Benchmarks describe the baseline state or starting point for the indicators. Benchmarks will be compared to the future indicator status to measure progress towards the target and achievement of the objectives. Most benchmarks in this plan are based on a historical value or the most current value available for each indicator as of 2015 (most fish benchmarks are from 1998-2003 Fall Walleye Index Netting (FWIN) or 1997-2004 Nearshore Community Index Netting (NSCIN)).

*Targets* translate the management objectives into measureable numbers that describe a desired future value or describe the direction the indicator must move to achieve the objectives.

*Performance Measures* will be used for objectives that are difficult to measure. Performance measures are actions that have an easily measured outcome and they identify if an action was completed (e.g. a brochure for invasive species was produced (yes or no)). There will not be benchmarks or targets set for objectives if performance measures are used.

### Management Strategies and Actions

*Strategies* describe a general approach or decision-making process that must be taken on an ongoing basis.

*Actions* are the specific tasks that must be done to implement strategies, address specific issues and to meet management objectives.

For each of the following management strategies: the goal, objectives, indicators, benchmarks, targets and actions have been discussed and are compiled into summary tables in Section 4.1 and 4.2. Detailed information on benchmarks is provided in Appendix B.

## 4.1 Fish Community Diversity

Fish communities of the Ottawa River are complex and diverse, with over 85 native species of fish. Many different fisheries and fishing opportunities are supported across the extent of the Ottawa River. All native fish play an important role in the ecosystem and are interconnected with other organisms in the food web. For example, freshwater mussels require fish hosts to reproduce. If native fish species are lost or depleted, the fish community, other organisms and supported fisheries could also be affected. On large water bodies like the Ottawa River, fish stocking is often not a cost effective option to restore or create new fisheries. It is very important to maintain naturally reproducing fish populations and to prevent native species from being lost.

Fish species that do not support sport fisheries may require less intensive monitoring and management. If they are detected in similar abundances through time, they are assumed to be sustainable. Monitoring fish diversity in each reach of the Ottawa River can be used to measure change. If the number of fish species or their proportions in the fish community change, then something is occurring that may require further investigation.

The Broad-scale Monitoring (BsM) Program will be the monitoring framework for assessing fish communities and fish species diversity of the Ottawa River. While this standardized monitoring approach does not capture all fish species, it will provide an understanding of natural fish community variability and species diversity trends over time. Main sources of information for rarer fish species and freshwater mussels not detected by BsM have come from historical accounts, academic research, random surveys and fish collection reports submitted by environmental consultants – all of which are not sufficient to evaluate population characteristics or status for these species. Other means will need to be investigated for monitoring the presence of these rarer fish species.

The indicators selected for monitoring fish communities and fish species diversity are the number of species caught by reach, proportions of fish species in the fish community and the Shannon Index of Diversity. The Shannon Index of Diversity is a calculation that measures the number of fish species and “evenness” of fish species within a community. The higher the index value is the more diverse and evenly proportioned the fish community is. A community with 20 species in equal proportions in the fish community would have an index of approximately 3.0, whereas a community with few species and heavily proportioned to one species would have a low index approaching zero.

Based on 2008-10 BsM, the number of fish species ranges from 11 species in Lac du Rocher Fendu to a high of 25 species in Lake Temiskaming. Shannon Diversity Indices that consider the number of species in combination with their proportion in the fish community, range from a low of 1.63 in Lac des Chats to high of 2.21 in Lac Dollard des Ormeaux. The fish communities of the lower Ottawa River have many species but are dominated by Channel Catfish. See Benchmarks for Fish Community Diversity by reach in Section 4.1 of Appendix B. Since there are many species being undetected each time a survey is performed, there is potential for variation in the estimates of fish community structure and species abundance between monitoring cycles. Several BsM cycles will be required to establish baseline diversity levels and understand natural variability existing in fish communities of the Ottawa River.

It is important to maintain native, naturally reproducing fish species and communities. Decreases in native fish species diversity or relative abundance in the fish community are issues of concern. It is necessary to monitor the number of fish species and fish community structure in each reach of the Ottawa River. Significant changes in the fish community will trigger actions to investigate why a change has occurred.

Fish populations supporting significant harvest fisheries will require more intensive management. Species-specific management objectives for sustainability and quality will be developed for fish that support significant harvest or high quality fisheries. See quality-based management strategies for Walleye/Sauger, bass, Northern Pike, Muskellunge and panfish fisheries; and recovery-based strategies for American Eel and Lake Sturgeon.

**Fish Diversity Management Challenges:**

- Fish communities of the Ottawa River are complex and diverse
- Each reach has a different combination of fish species present
- Some fish species support multiple fisheries, while others support none
- Rare, less abundant fish species are difficult to monitor and not always detected

The management goal for fish community diversity is to:

***"Maintain the diversity of indigenous self-sustaining fish species, and fish communities of the Ottawa River."***

The following fish diversity objectives were established:

i) Maintain fish species diversity

The following management actions have been recommended to address fish diversity management challenges.

1) Use the results of BsM to track fish species diversity.
2) Seek science advice on the best approach for monitoring the presence of rare fish species not detected by BsM.

**Table 5 Management Summary for Fish Diversity of the Ottawa River**

| | |
|---|---|
| **Goal** | Maintain the diversity of indigenous self-sustaining fish species and fish communities of the Ottawa River |
| **Objectives** | i) Maintain fish species diversity |
| **Indicators** | i) Species diversity by reach<br>• Number of fish species<br>• Shannon Diversity Index<br>ii) Fish community composition by reach<br>• Proportion of each fish species in the fish community |
| **Benchmarks** (Values found in Appendix B - 4.1) | Fish diversity benchmarks are based on 2008-10 BsM |
| **Targets** | To be determined after BsM Cycle 2 |
| **Management Actions** | 1) Use the results of BsM to track fish species diversity.<br>2) Seek science advice on the best approach for monitoring the presence of rare fish species not detected by BsM. |

## 4.2 Management Strategies for Key Ottawa River Fisheries

Most fish are managed for sustainability, while some may also need to be managed for quality. Sustainability refers to the ability of a fish population to replace itself over the long term. A population must be able to produce enough young fish that survive long enough to offset losses due to mortality. Fish naturally enter the population through reproduction. All sources of death contribute to the total mortality rate, including natural sources such as disease, predation and old age and human-caused sources such as harvest by recreational fishing and commercial fishing.

Sustainable fish populations exhibit consistent reproduction levels and are comprised of all sizes. Population abundance and size distribution are strongly driven by reproduction. If a fish stock is declining in abundance and has more large fish than small fish, there is a reproduction problem. Amounts of spawning habitat along with prime water temperatures affect egg hatching rates and reproduction levels. The complexity of the fish community then impacts how many young fish survive long enough to enter the fishery or part of the fish population (i.e. recruitment) that can be surveyed with standardized fisheries assessment gears. Fish with poor reproduction rates sometimes need habitat restoration or enhancements to improve amount of functional spawning habitat (see Section 4.5 Fish Habitat Management Strategy).

Basic sustainability does not always provide desirable size characteristics or high abundances that derive the desired fishery benefits. It is possible to have a low abundance large-sized fish stock (low reproduction / low mortality rates) or an abundant but small-sized fish stock (high reproduction / high mortality rates). These populations may be self-sustaining but they lack quality. At minimum fish must reach the size of maturity so they can spawn and maintain the population. The size of maturity is not always consistent with what anglers think is the preferred eating size or trophy-sized fish.

Quality is a combination of size and abundance. Anglers for some species of fish such as panfish or Sauger, prefer larger fish and tend to selectively harvest them while releasing smaller ones. This increases the overall adult mortality rate of the fish stock and depletes larger fish from the population. Fish populations under extreme harvest stress, are often dominated by smaller fish. In high pressure fisheries, it is possible for anglers to overharvest larger fish, making it difficult for fish to reach the size of maturity. This can weaken the population's ability to generate enough young to maintain a healthy and sustainable fishery. Larger fish are the most prolific spawners. To manage for both sustainability and quality, angler harvest pressure on larger fish often needs to be managed using fishing regulations.

The Broad-scale Monitoring (BsM) Program is the 'monitoring component' of Ontario's ecological framework approach to fisheries management and will be the main monitoring program on the Ottawa River. The method involves using standardized gangs of small and large mesh gill nets, which are set during the summer in different depth strata. The results will provide a long-term, trend-through-time assessment that will monitor fish communities and fish species status at the zone level. Based on a five year cycle, BsM will assess all 10 lake-like reaches of the Ottawa River. The first cycle of BsM was completed from 2008-2010 and cycle 2 will be done in 2017.

Fall Walleye Index Netting (FWIN), is a rapid assessment protocol that uses gill nets in deep and shallow depth strata to gather biological information about Walleye populations. A high number of age classes, low mortality and high maximum age are indicative of successful annual recruitment and adult survival, which are critical to the health of the population (Morgan 2002). FWIN has also proven useful for assessing Sauger, Yellow Perch and Northern Pike populations. All reaches of the Ottawa River were assessed using FWIN between 1998 and 2003. FWIN is the standard for

comparison of Walleye populations in Quebec. Allumette and Temiskaming are evaluated every five years as part of Quebec's provincial Walleye monitoring program (using FWIN).

Nearshore Community Index Netting (NSCIN) use trapnets during the late summer. This type of index netting assesses the status of fish populations that occupy the littoral zone of a waterbody and is the standard for comparisons of centrarchid (bass and sunfish) populations across Ontario (Stirling 1999). Relative abundance is determined by calculating the average catch per net and is used with mean length as a criterion of comparison. The use of this protocol established baseline fisheries data that can be compared between reaches of the Ottawa River or with other water bodies across the province. NSCIN was conducted 1997-2004 on all reaches of the Ottawa River, except Lake Temiskaming.

Standard indicators for sustainability and quality are presented in the various fisheries tables, these standard indicators are:

**Sustainability Indicators**

Catch per Unit Effort (CUE): average number of fish caught per net

Catch per Unit Effort by Weight (CUEW): an average measure of fish weight per net

Mean length: the average length of all fish caught

Mean age: the average age of all fish caught

Mortality Ratio (Z/M < 2): Z is the total mortality rate and M is the natural mortality rate; a ratio < 2 is considered sustainable.

Total Mortality (Z) is a combination of all sources of mortality that effect a fish population. This includes fishing and natural mortality.

Natural Mortality (M) includes natural causes of death such as old age, predation and disease.

**Size Quality Indicators**

CUEW of fish > length (cm): an average weight of fish per net over a certain length; some species may have several for quality, preferred, memorable and/or trophy size classes.

Standard provincial fishing regulations are applied for fish species if they are consistent with the management objectives and to harmonize regulations across the Ottawa River. More conservative fishing regulations may be needed to maintain sustainability and quality of fisheries in some instances. Fish species may require protection from over harvest during seasonal concentration periods (i.e. spawning, nesting or overwintering) using season closures, sanctuaries and/or size regulations.

Attention must be paid to fish stocks that are heavily harvested or that support both recreational and commercial fisheries. Walleye and Northern Pike, being popular with anglers typically suffer declines in both abundance and size quality due to heavy selective harvest of larger fish. Bass often support high levels of catch and release by recreational anglers and fishing events, making the numbers of larger bass a key quality. Specialized fisheries, such as record-class trophy Muskellunge fisheries, also require higher size quality based objectives. Quality standards are different for each fishery.

### 4.2.1 WALLEYE AND SAUGER

Walleye is the most preferred fish species on the Ottawa River based on recreational fishing surveys (OMNR 2003, 2009, 2014). Both Walleye and Sauger are present in all reaches. Walleye are more abundant in the upper reaches of the Ottawa River (Lake Temiskaming, Lac la Cave, Holden Lake and Allumette Lake). Walleye support a popular spring fishery in all reaches and in some tributaries. Sauger are less abundant than Walleye in all reaches, except for Lake Temiskaming where they support a significant winter fishery.

Walleye and Sauger populations were assessed in all 10 reaches of the Ottawa River using FWIN between 1998 and 2003. Walleye had above average relative abundances in the upper reaches of the Ottawa River (Lake Temiskaming, Lac la Cave, Holden Lake and Upper Allumette Lake) ranging between 7 and 12 fish per net. Walleye abundances of the lower Ottawa River are much lower, averaging 1.5 fish per net. Sauger are most abundant in Lake Temiskaming with 13.7 fish per net, while the rest of Ottawa River had abundances between 0.6 and 3.7 fish per net. Relative abundances by reach for Walleye and Sauger are in Figures 11(A) and 12(A).

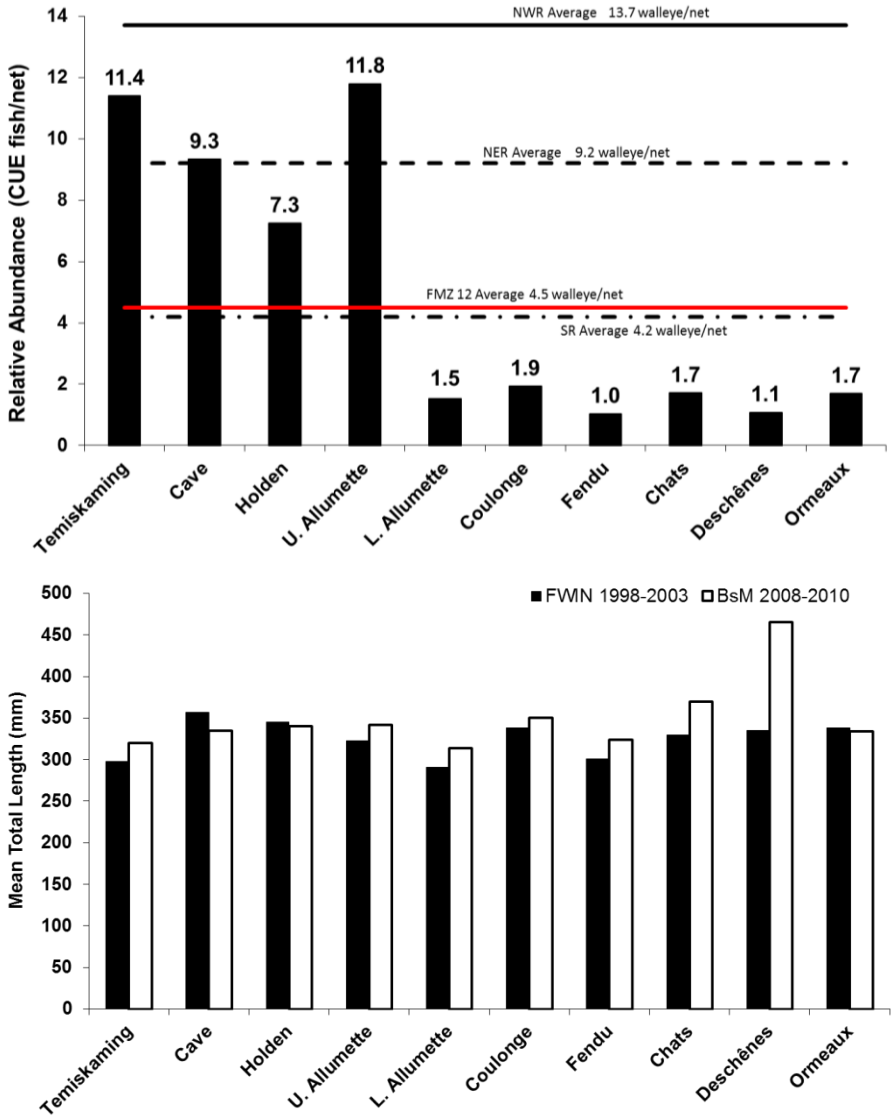



**Figure 11 Ottawa River Walleye Population Characteristics**
(A) Relative abundance of Walleye by reach of Ottawa River based on FWIN.
(B) Mean total length of Walleye by reach of the Ottawa River from FWIN and BsM.

Mean length of Walleye ranges from 30 cm in Lake Temiskaming to 36 cm in Lac La Cave. Mean length of Sauger ranges from 26 cm in Lake Temiskaming to 34 cm in Lower Allumette Lake. See mean lengths by reach for Walleye and Sauger in Figures 11(B) and 12(B). Mean size of maturity for female Walleye is near the provincial average of 44.1 cm for all reaches except Lake Temiskaming, where female Walleye are 50% mature at 38.9 cm, approximately 5 cm smaller. In most of the Ottawa River, 50% of female Walleye are mature by 4 years of age and 50% of males are mature by 1.5 years of age. In Lake Temiskaming, where growth rates are slower, 50% of female Walleye mature at 5.29 years of age and 50% of males are mature by 3.4 years of age.

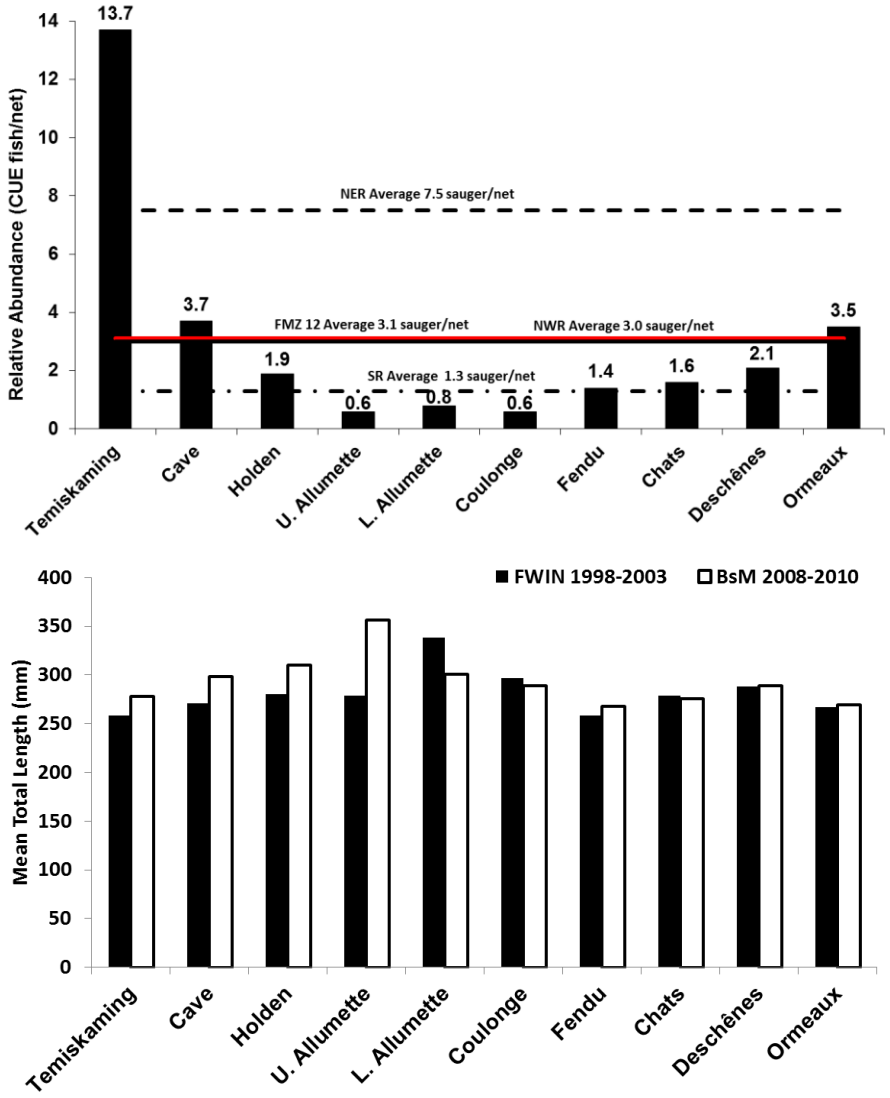



**Figure 12 Ottawa River Sauger Population Characteristics**
(A) Relative abundance of Sauger by reach of Ottawa River using FWIN.
(B) Mean total length of Sauger by reach of Ottawa River from FWIN and BsM.

Adult mortality rates above 30% indicate that Walleye and Sauger populations are under stress from angler harvest pressure. Total mortality rates for Walleye estimated using FWIN data (1998-2003) were below 30% for only 1 of the 10 Ottawa River reaches. Total mortality for Walleye estimated from BsM data (2008-10) was only possible in 4 reaches due to limited age samples. Total mortality for Walleye was below 30% in 2 of the 4 reaches.

A ratio of total mortality (Z) to natural mortality (M) of less than 2 indicates mortality rates that are sustainable. Even though several reaches of the Ottawa River are under stress, 6 out of 10 reaches have mortality ratios that are sustainable for Walleye (Figure 13 A). Based on 1998-2006 FWIN surveys Holden, Upper Allumette, Coulonge and Dollard des Ormeaux had mortality ratios over 2, indicating potentially unsustainable mortality rates at that time. A level of recovery appears to have occurred for Walleye in Holden and Upper Allumette based on BsM collected 2008-2010 (Figure 13 A), although we're not sure if mortality rates evaluated using these protocols are directly comparable due to different age sampling intensities. Sauger exhibited mortality ratios less than 2 in all reaches using FWIN data collected 1998-2003 (Figure 13 B). No Sauger were aged during cycle 1 of BsM, so it was not possible to reassess mortality rates during this period.

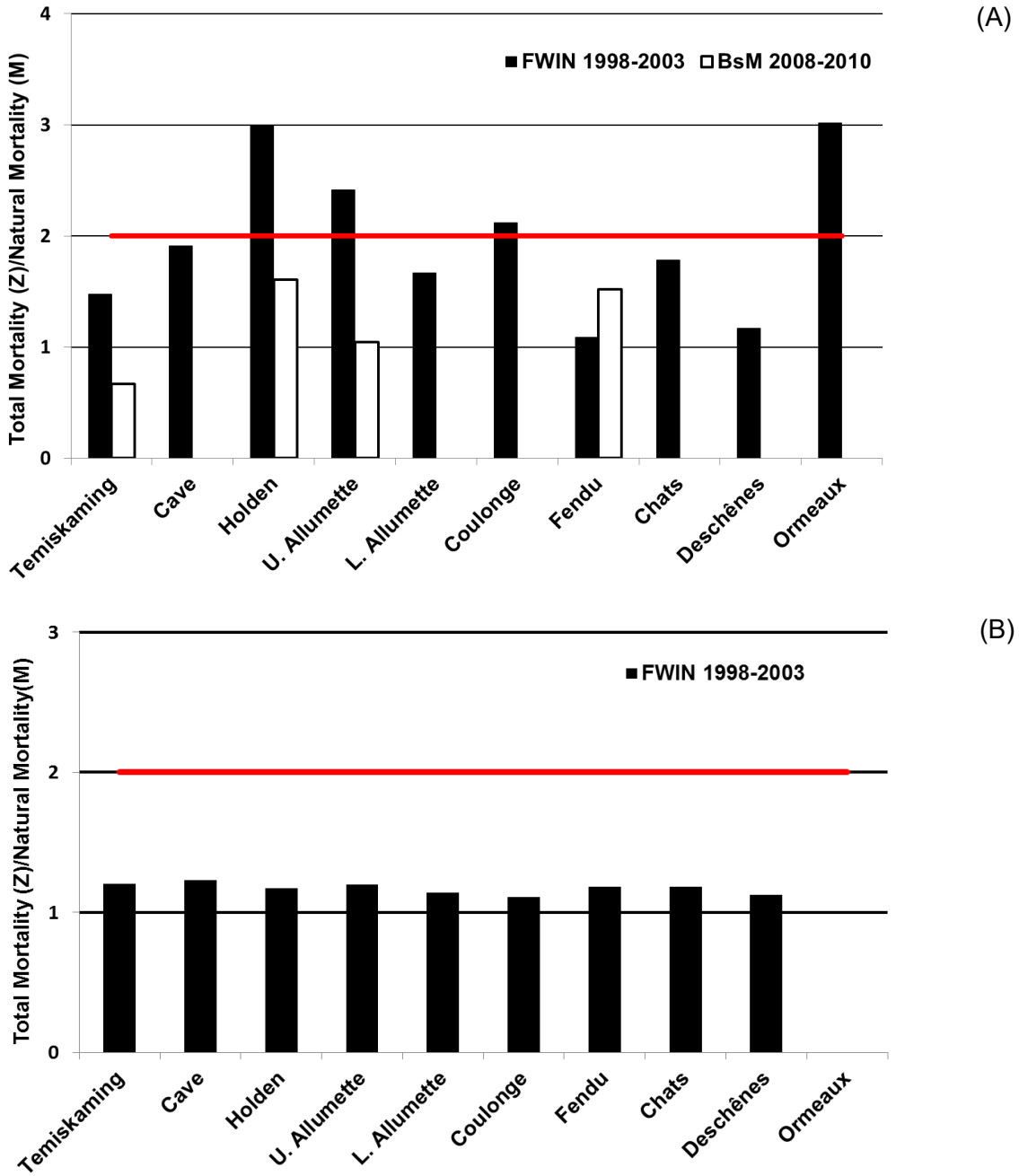



**Figure 13 Walleye and Sauger Mortality Ratios**
Total Mortality (Z) / Natural Mortality (M) by reach from FWIN (1998-2003) and BsM (2008-2010). Mortality ratios less than 2 are sustainable. (A) Walleye and (B) Sauger

Walleye and Sauger populations of the Ottawa River appear sustainable but are exhibiting size quality declines based on 1998-2003 FWIN surveys. BsM will be used to monitor Walleye and Sauger populations moving forward. However, the number of Walleye and Sauger aged during the first cycle of BsM were not adequate for the Ottawa River. Sampling intensities have been increased, so the next BsM cycle should provide conclusive results for all reaches of the Ottawa River. Future assessments will be compared to the 2003 benchmark state of Walleye and Sauger, to monitor any changes in their population status. For more details about Walleye and Sauger populations refer to Section 3.5.1 in Ottawa River Background Information Report.

Reproduction occurs annually in all reaches and is irregular in strength through time. Year-class distributions are driven by climatic factors, showing stronger years classes in El Nino years (with warmer than average temperatures) and very weak sometimes absent year classes in La Nina years (with colder than average spring temperatures).

Impacts of water regimes are not apparent through the strongly climate-driven reproduction patterns. The relative abundance of Walleye and Sauger are not expected to vary much. Walleye and Sauger are unlikely to ever be abundant in the lower reaches of the Ottawa River due to competition in the complex fish communities. Water regimes of the upper reaches favour production of Walleye and Sauger, producing above average abundances of Walleye in Lake Temiskaming, Lac La Cave, Holden Lake and Upper Allumette Lake, and Sauger in Lake Temiskaming. Extreme water drawdowns in these reaches simplify the fish community reducing competition and increasing plankton production which is an important food source to forage fishes eaten by Walleye and Sauger (Haxton and Findlay 2009).

Various angler creel surveys, spawning assessments and tag-return studies have confirmed that Walleye are spawning after the fishing season opens on the upper Ottawa River (above Chenaux generating station) and in tributaries of Lake Temiskaming. Walleye and Sauger spawn well into June most years on the upper Ottawa River, typically one to three weeks later than those in the tributaries and adjacent inland lakes. Walleye of the lower Ottawa River are done spawning by mid-May. Tag return studies documented high exploitation and mortality rates for spawning-sized Walleye while they are concentrated for spawning. Telemetry has confirmed that Walleye concentrate for spawning between late March and mid-June but are spread out the rest of the year. Seasonal tag return patterns suggest that Walleye are easier to catch during May and June than the rest of the year. Over 60% of tagged walleye reported were harvested in May and June.

Aerial surveys also confirmed that anglers take advantage of this spring fishing opportunity near spawning areas in the Ottawa River and its tributaries.

Ice fishing the Ottawa River, Larry Lambourne

To improve size quality of Walleye populations it is necessary to reduce adult mortality rates by reducing harvest pressure on larger fish. A size regulation implemented in 2008 prevents harvest of fish over 40 cm from March 1 to June 15 when they are most vulnerable to harvest.

Several fish sanctuaries were added in both Ontario and Quebec waters to provide additional protection to Walleye while they are spawning. Not all spawning areas could be protected this way as many are spread out in the main channel, around multiple islands or in tributaries located in other management zones. To provide additional protection the opening of the Walleye season was delayed by one week, harvest limits were slightly reduced from 6 to 5, and a maximum size limit of 40 cm was added to protect larger Walleye from harvest while concentrated for spawning. Spring fishing opportunities are maintained since Walleye and Sauger smaller than 40 cm (15.6 inches) can be harvested. These Walleye and Sauger regulations were put into effect across the Ottawa River by both Ontario and Quebec in 2008.

The current Walleye and Sauger regulations are:

- *Walleye & Sauger or any combination*
- *Open Season*: Jan. 1 to Mar. 31 and Fri. before 3rd Sat. in May to Dec. 31
- *Catch and Possession Limits:* Sport Fishing (S) – 5 and Conservation (C) – 2
- *Size Limit:* must be less than 40 cm (15.7 inches) from March 1 to June 15

The Advisory Council has recommended that the current Walleye regulations be maintained and evaluated for effectiveness. Of particular interest is the effectiveness of the size regulation on Lake Temiskaming where female Walleye are maturing at smaller sizes than the rest of the Ottawa River. Significant harvest of spawning Walleye and Sauger is still occurring in some tributaries of the Ottawa River, with Lake Temiskaming identified as an ongoing concern. The Advisory Council recommended that fish sanctuaries be placed on spawning tributaries receiving high levels of exploitation. Since many of these unprotected spawning locations are outside the boundaries of the Ottawa River fisheries management zone, fisheries managers must work cooperatively with the adjacent zones to find a solution to the issue.

**Walleye and Sauger Fishery Challenges**

- Fishery is dominated by smaller fish with relatively few large and trophy-sized individuals
- Walleye are the most sought after and heavily harvested fish on the Ottawa River
- Anglers target and keep Walleye during the spring spawning period as the season opens prior to the end of spawning in certain reaches and tributaries of the Ottawa River
- Walleye and Sauger spawn into early June most years on the upper Ottawa River
- Fishing regulations are not protecting spawners in all tributaries of the Ottawa River

The management goal for the Walleye and Sauger fishery is to:

***"Improve the quality of the Walleye and Sauger fishery throughout the Ottawa River."***

The management objectives for Walleye and Sauger are to:

i) Maintain the sustainability of Walleye and Sauger populations, and
ii) Increase abundance of spawning-sized Walleye

The following management actions have been determined to address Walleye and Sauger fisheries management challenges:

1) Work collaboratively with fisheries managers in adjacent zones to recommend management actions to protect Ottawa River Walleye and Sauger while spawning in tributaries in adjacent fisheries management zones.

2) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.
3) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity.
4) With assistance of partners prepare and disseminate communication materials describing the rationale for the Walleye size limit regulation and the benefit of releasing large fish.
5) Recommend Walleye size and harvest limits, and fish sanctuaries as spring enforcement priorities on the Ottawa River and its tributaries.

**Table 6 Management Summary for Walleye and Sauger Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Improve the quality of the Walleye and Sauger fishery throughout the river. |
| **Objectives** | i) Maintain sustainability of Walleye and Sauger<br>ii) Increase abundance of spawning-sized Walleye |
| **Indicators** | i) Sustainability indicators by reach:<br>• Relative abundance<br>• Mean length<br>• Mean age<br>• Total mortality<br>ii) Size quality indicator:<br>• CUEW of Walleye > 40 cm (16 inches) |
| **Benchmarks** (Values found in Appendix B – 4.2.1) | i) Sustainability benchmarks by reach using 1998-2003 FWIN data:<br>• CUEW<br>• Mean length<br>• Mean age<br>• # of reaches with Z/M < 2<br>ii) Size quality benchmark by reach using1998- 2003 FWIN data:<br>• CUEW of Walleye > 40 cm |
| **Targets** | i) Sustainability targets by reach:<br>• Maintain or increase the CUEW<br>• Maintain or increase the mean length<br>• Maintain or increase the mean age<br>• Mortality ratio (Z/M) < 2<br>ii) Size quality targets by reach:<br>• Increase the CUEW of fish > 40 cm |
| **Management Actions** | 1) Work collaboratively with fisheries managers in adjacent zones to recommend management actions that protect Ottawa River Walleye and Sauger while spawning in tributaries.<br>2) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.<br>3) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity.<br>4) With assistance of partners prepare and disseminate communication materials describing the rationale for the Walleye size limit regulation and the benefit of releasing large fish.<br>5) Recommend Walleye size and harvest limits, and fish sanctuaries as spring enforcement priorities on the Ottawa River and its tributaries. |

### 4.2.2 Smallmouth and Largemouth Bass

Bass are the most caught sportfish on the Ottawa River and are second on angler preference lists (OMNR 2003, 2009, 2014). Smallmouth Bass occur throughout the Ottawa River while Largemouth Bass are only present in the lower reaches that have wetlands (absent from Temiskaming, La Cave and Holden). Bass support a very active catch and release fishery with over 80% being released (OMNR 2003, 2009, 2014). The Ottawa River is the third most popular water body for competitive fishing events in Ontario, with bass being the number one species targeted. About 37% of fishing events are bass tournaments and another 40% are multi-species events. Most bass fishing events are held during the summer with some reaches of the Ottawa River supporting numerous fishing events each year (Kerr 2004, 2008, 2012).

Ottawa River bass populations were assessed between 1997 and 2004 using the NSCIN protocol. The bass population on Lake Temiskaming has never been assessed, but Smallmouth Bass are known to be present. Smallmouth Bass are abundant in all reaches of the Ottawa River except Lac Dollard des Ormeaux, where Largemouth Bass are more prevalent. Smallmouth Bass abundances range from a high of 8.9 fish per net in Holden Lake to a low of 0.8 fish per net in Lac Dollard des Ormeaux (Figure 14 A). General indications are that Largemouth Bass are most abundant in Lac Dollard des Ormeaux with a high of 1.2 fish per net, with the remaining reaches ranging between 0.7 and 0 fish per net (Figure 15 A). Largemouth Bass are potentially absent from Lake Temiskaming, Lac la Cave and Holden Lake.

Smallmouth Bass populations show consistent reproduction with fish of all sizes and ages in all reaches. Mean length of Smallmouth Bass is 34 cm for the Ottawa River ranging from 36 cm in Lower Allumette to 29 cm in Lac La Cave. Mean length of Largemouth Bass is 37cm for the Ottawa River. See mean lengths by reach for Smallmouth and Largemouth Bass in Figures 14(B) and 15(B).

Total mortality rates for Smallmouth Bass populations in each reach range from 19.2% in Lower Allumette to 38.5% in Lac la Cave. Mortality ratios (total mortality/natural mortality) are less than 2 for all reaches, indicating that Smallmouth Bass fisheries are sustainable in the Ottawa River. It was not possible to assess mortality rates for Largemouth Bass due to insufficient sample sizes. The impacts of fishing events and catch and release have been widely studied. Mortality on bass caught and released is dependent on numerous factors (e.g. water temperature, time in live-well etc.). The range of bass mortality is variable and based on numerous studies the range of mortality for Smallmouth Bass is between 4.9-11% mortality and Largemouth Bass 11.2-32% mortality (Casselman 2005). Oxygen shortages (anoxia) while fish are in live wells, handled, weighed and exposed to air during the event may lead to increased mortality. Tournament events can use padded live wells, oxygen monitoring, wet-weighing techniques and live-release boats to reduce fish stress. Multi-species events seldom use these practices and technologies.

Smallmouth Bass populations of the Ottawa River appear sustainable based on NSCIN surveys as of 2004. Smallmouth Bass populations are high quality with an abundance of larger fish and lower than average parasite loadings (e.g. yellow grub and black spot are rarely seen). The Smallmouth Bass fishery may be able to support more fishing and harvest opportunities.

Insufficient numbers of Largemouth Bass were sampled to accurately assess their relative abundance, population structure or mortality rates. The current BsM netting protocol may not be sampling the shallow wetland habitats that Largemouth Bass typically occupy. Additional nets set in shallow areas or implementing additional netting protocols may be required to collect sufficient biological samples to properly assess Largemouth Bass populations. The current Largemouth Bass populations are believed to be sustainable.

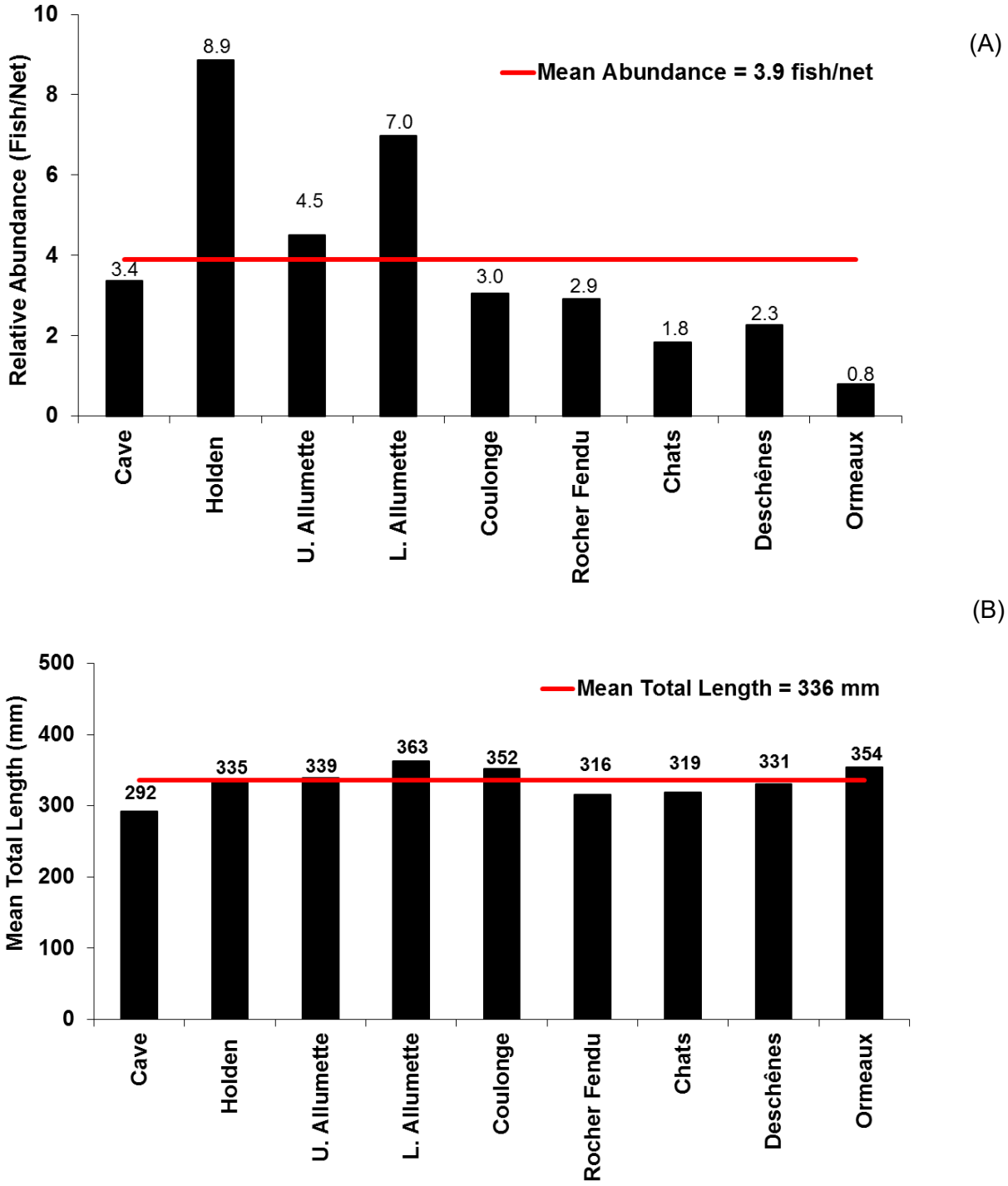



**Figure 14 Ottawa River Smallmouth Bass Population Characteristics**

(A) Relative abundance by reach of Ottawa River based on NSCIN 1997-2004

(B) Mean total length by reach of Ottawa River from NSCIN 1997-2004

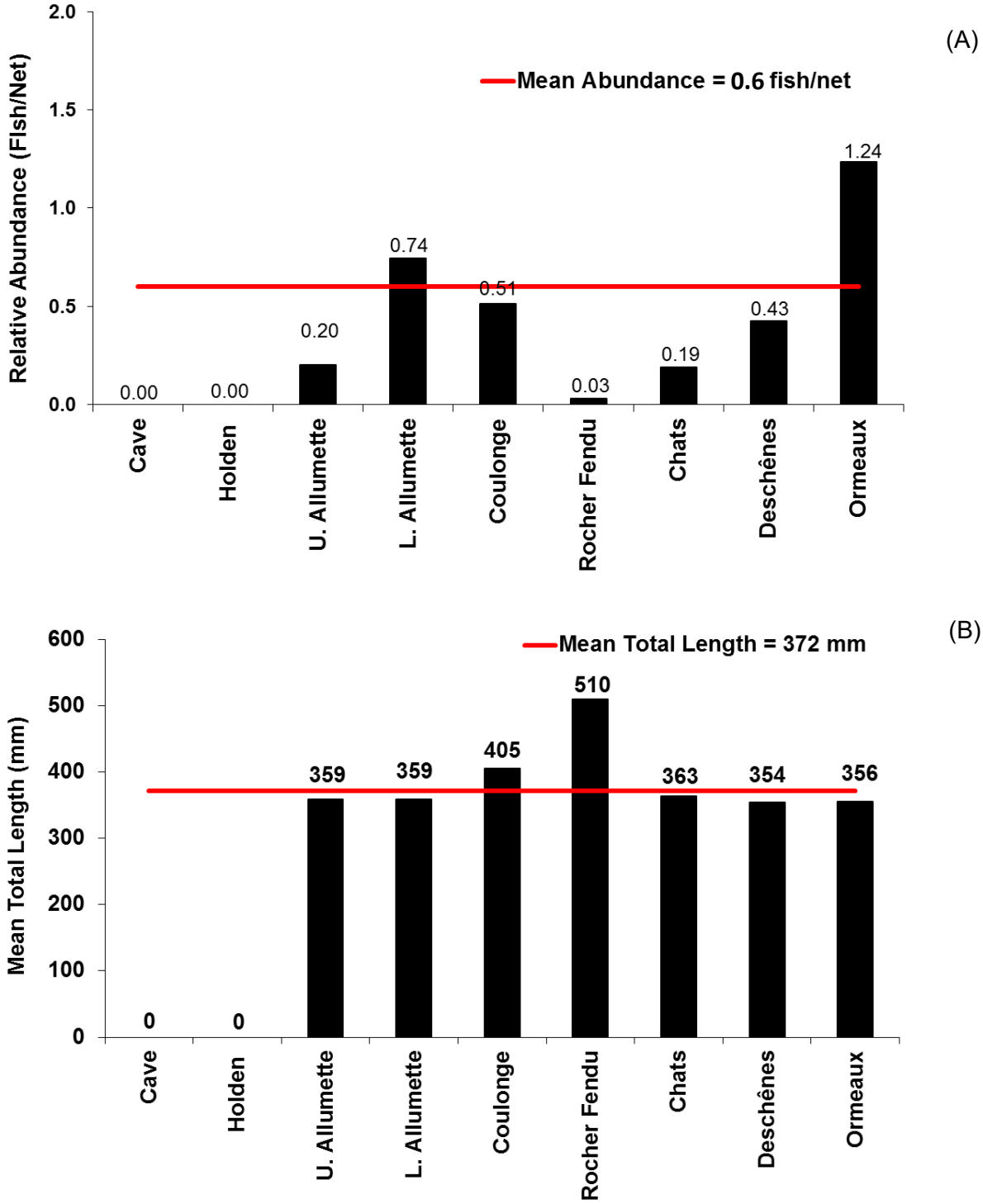



**Figure 15 Ottawa River Largemouth Bass Population Characteristics**
(A) Relative abundance by reach of Ottawa River based on NSCIN (1997-2004)
(B) Mean total length by reach of Ottawa River from NSCIN (1997-2004)

The Advisory Council recognized that both size and abundance of bass are important to recreational anglers and competitive fishing events. To help establish size quality benchmarks for bass we need to have a better understanding of what recreational anglers and competitive fishing events on the Ottawa River value about the fishery.

Bass nesting habitats are currently unmapped on the Ottawa River. It is difficult to protect nesting habitat from development or fishing impacts when they are not documented. The timing of bass nesting may be variable between upper and lower reaches due to the natural climatic gradient present. Bass typically nest mid-May to late June on the lower Ottawa River and are often nesting when the bass season opens. If the climate continues to warm, bass nesting will likely start earlier and shift outside the current bass fishing season. Some fisheries management zones in Ontario have elected to open the bass season earlier in response to changes in the timing of bass spawning, providing additional bass fishing opportunities while still affording required protection to nesting bass. Additional information regarding the timing of bass spawning throughout the Ottawa River will be needed before a spring extension of the bass fishing season can be considered.

Largemouth Bass and Smallmouth Bass are vulnerable to winter harvest since they concentrate in specific areas that are easily targeted by anglers. The bass fishing season is closed during winter dormancy and early summer nesting periods, consistent with provincial standards for bass fisheries, where they are native. Bass fishing regulations for the Ottawa River are the same in both Ontario and Quebec fishing zones.

The current bass regulations are:

- *Largemouth & Smallmouth Bass or any combination*
- *Open Season*: Fri. Before 4$^{th}$ Sat. in June to Nov. 30
- *Catch and Possession Limits:* Sport Fishing (S) – 6 and Conservation (C) – 2

The Advisory Council has recommended that the current regulations be maintained.

**Bass Management Challenges**

- BsM protocols are not sufficiently sampling Largemouth Bass habitat (wetlands)
- Bass nesting periods may shift as climate changes
- Bass are the most popular fish species used by competitive fishing events

The management goal for the bass fishery is to:

***"Maintain a high quality bass fishery throughout the Ottawa River."***

The management objectives for bass:

i) Maintain sustainability of bass population
ii) Maintain size quality of bass

The following management actions have been recommended to address bass fisheries management challenges:

1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.
2) Explore potential to monitor bass population using catch and weight data collected by competitive fishing events.
3) Develop size quality benchmarks for Ottawa River bass fisheries.
4) With assistance of partners and proponents of development conduct spawning bed surveys to determine timing, duration and spatial extent of spawning activity; and map overwintering areas for bass.

5) With assistance of bass clubs prepare and disseminate communication materials describing release techniques and the negative impacts of angling nesting bass.
6) With assistance of bass clubs provide best management practice information to competitive fishing events to reduce stress on bass, including anoxia prevention, handling techniques, weigh-in procedures, release practices and prevention of fish displacement.
7) Recommend tracking of the number and types of competitive fishing events on the Ottawa River.

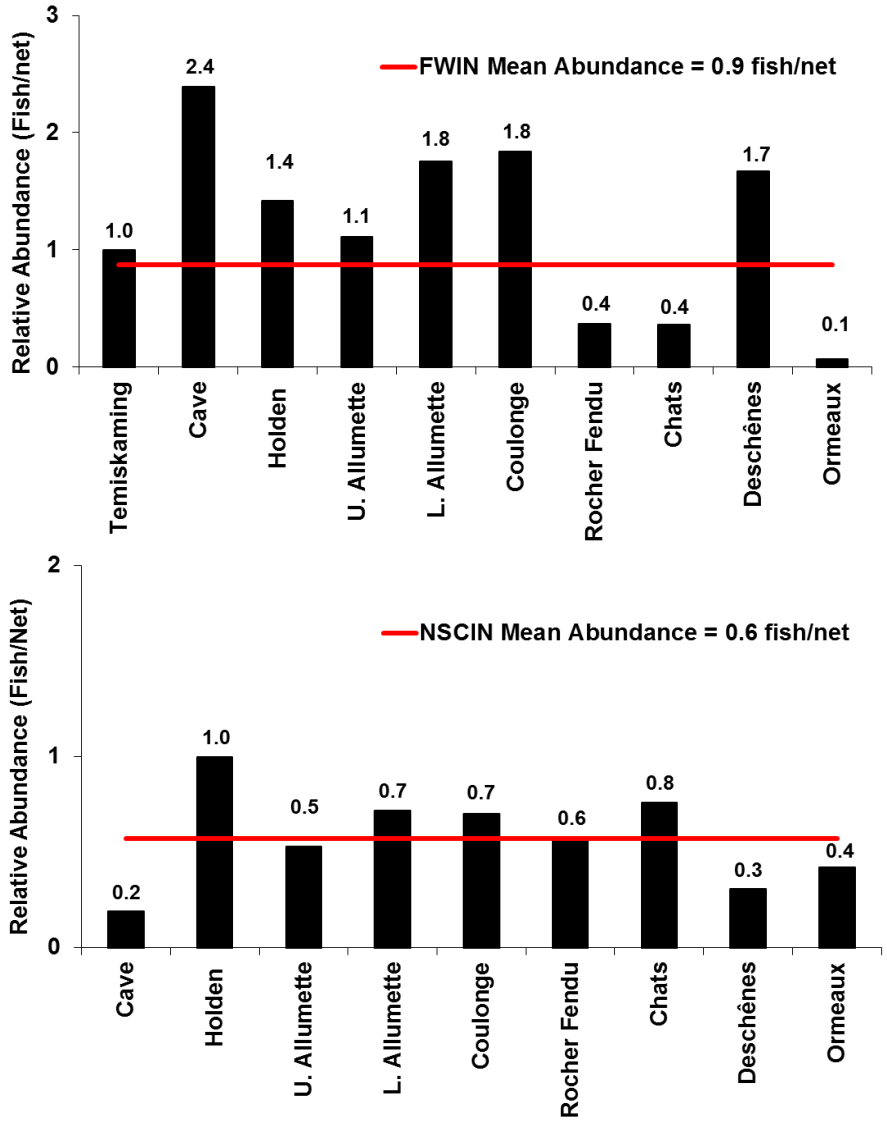
**Table 7 Management Summary for Bass Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Maintain a high quality bass fishery throughout the Ottawa River. |
| **Objectives** | i) Maintain sustainability of bass populations<br>ii) Maintain size quality of bass |
| **Indicators** | i) Sustainability indicators by reach:<br>• Relative abundance<br>• Mean length<br>• Mean age<br>• Total mortality<br>ii) Size quality indicators for bass:<br>• CUEW of large and trophy sized fish |
| **Benchmarks** (Values found in Appendix B – 4.2.2) | i) Sustainability benchmarks by reach as of 2015 using NSCIN and BsM<br>• CUEW<br>• Mean length of fish<br>• Mean age of fish<br>• # of reaches with Z/M < 2<br>ii) Size quality benchmark by reach as of 2015 using NSCIN and BsM<br>• CUEW of large and trophy sized fish |
| **Targets** | i) Sustainability targets by reach:<br>• Maintain or increase the CUEW<br>• Maintain or increase the mean length<br>• Maintain or increase the mean age<br>• Mortality ratio (Z/M) < 2<br>ii) Size quality targets by reach:<br>• Maintain CUEW of large and trophy fish |
| **Management Actions** | 1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.<br>2) Explore potential to monitor bass population using catch and weight data collected by competitive fishing events.<br>3) Develop size quality benchmarks for Ottawa River bass fisheries.<br>4) With assistance of partners and proponents of development conduct spawning bed surveys to determine timing, duration and spatial extent of spawning activity; and map overwintering areas for bass.<br>5) With assistance of bass clubs prepare and disseminate communication materials describing release techniques and the negative impacts of angling nesting bass.<br>6) With assistance of bass clubs provide best management practice information to competitive fishing events to reduce stress on bass, including anoxia prevention, handling techniques, weigh-in procedures, release practices and prevention of fish displacement.<br>7) Recommend tracking of the number and types of competitive fishing events on the Ottawa River. |

### 4.2.3 Northern Pike

Northern Pike are the third most preferred fish targeted by anglers on the Ottawa River. Northern Pike are present in all reaches of the Ottawa River. They are not heavily harvested when compared to other fish, as over 85% of angled Northern Pike are released in the Ottawa River. Anglers are known to selectively harvest larger Northern Pike since they are easier to clean. Northern Pike fisheries are used by resident and non-resident anglers. Pike are a popular fish for ice fishing and multi-species fishing events. (OMNR 2003, 2009, 2014) (Kerr 2004, 2008, 2012).

Northern Pike populations were assessed in all 10 reaches of the Ottawa River using FWIN in 1999 to 2003. Northern Pike had above average relative abundances in the upper reaches of the Ottawa River (Lake Temiskaming, Lac la Cave, Holden Lake and Upper Allumette Lake, Lower Allumette and Lac Coulonge) ranging between 1 and 2.4 fish per net. Northern Pike abundances in most of the lower reaches are much lower; usually 0.4 fish per net or less. Lac Deschênes was the exception with 1.7 fish per net. Northern Pike populations were also assessed using NSCIN in 1997 to 2004. The pattern of relative abundance across reaches were somewhat similar to FWIN data with above average relative abundance in upper reaches of the Ottawa River and lower abundance in the lower reaches. However, this pattern was not as pronounced. BsM may be used to monitor Northern Pike populations in the future.




(A)

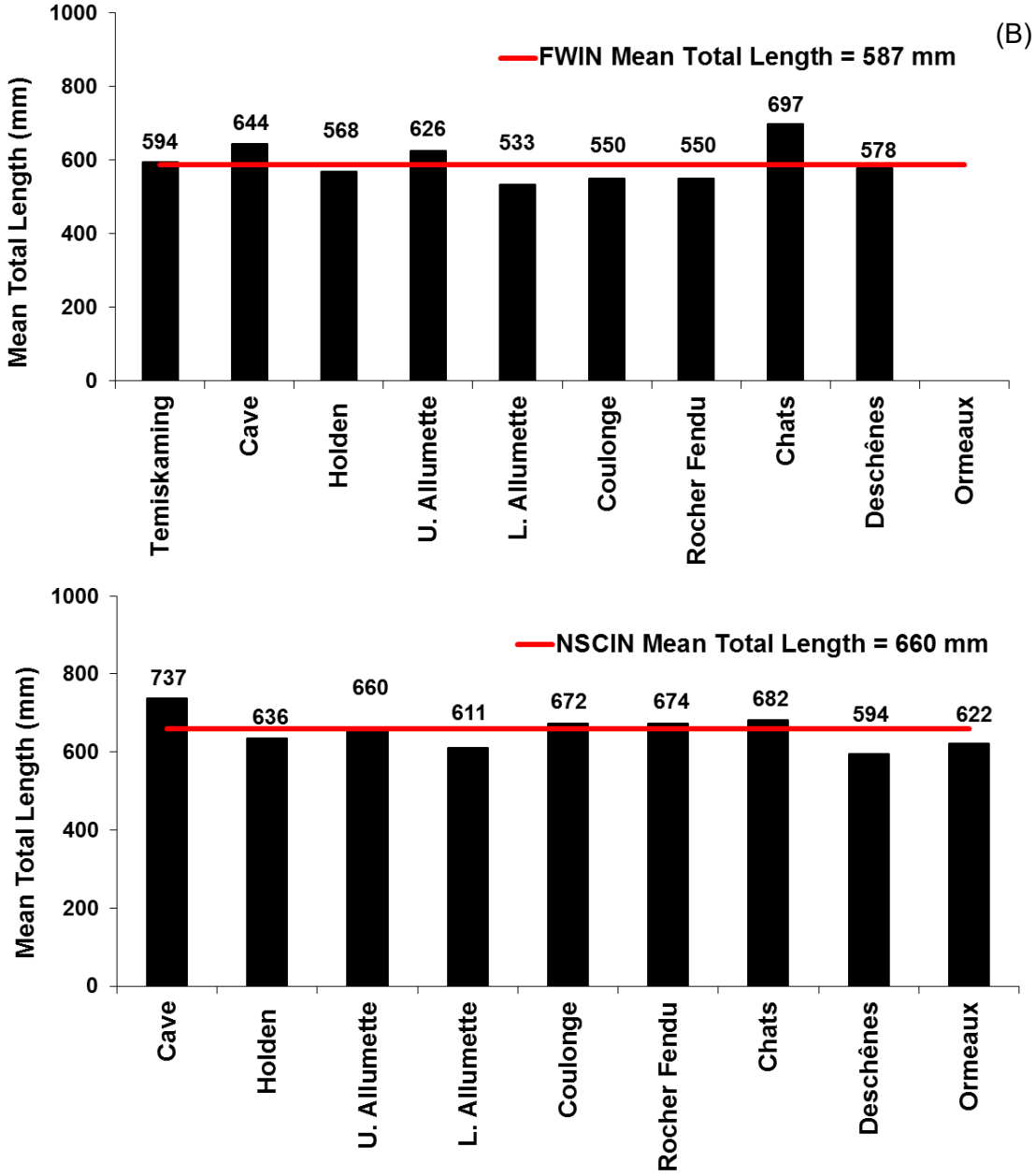



**Figure 16 Ottawa River Northern Pike Abundance and Mean Total Length**
(A) Catch per unit effort from FWIN (1999-2003) and NSCIN (1997-2004)
(B) Mean total length from FWIN (1999-2003) and NSCIN (1997-2004)

Based on FWIN (1998-2003), mean length of Northern Pike ranges from 50 cm in Lac Coulonge to 70 cm in Lac de Chats. However recent declines in size quality of Northern Pike have been reported by anglers and the Advisory Council. Limited maturity information is available for Northern Pike in the Ottawa River. Male Northern Pike in Holden Lake mature at 1.3 years, less than the provincial average of 1.8 years of age.

Total mortality rates (Z) for Northern Pike range from 28.8% in Allumette Lake to 58.8% in Lac du Rocher Fendu based on FWIN 1998-2003, and 33% in Lac Coulonge and 77.3% in Lac Deschênes based on BsM 2008-2010. Mortality rates appear high in many reaches however the mortality ratios are all below 2 suggesting that Northern Pike populations may be sustainable.

Northern Pike are vulnerable to angling and are susceptible to overharvest. Large individuals are especially vulnerable to harvest since they are preferred by anglers (OMNR, 2006). Northern Pike spawn immediately after ice out each spring. The exact timing of the Northern Pike spawning period is heavily dependent on the length of the ice cover season and varies from year to year. Anglers report that large egg-filled female pike are easily caught and harvested each winter.

To make enforcement more efficient, the Northern Pike fishing season matches the Walleye fishing season on the Ottawa River. Northern Pike fishing regulations for the Ottawa River are the same in both Ontario and Quebec fishing zones.

The current Northern Pike regulations are:

- *Open Season*: Jan. 1 to Mar. 31 and Fri. before 3rd Sat. in May to Dec. 31.
- *Catch and Possession Limits:* Sport Fishing (S) – 6 and Conservation (C) – 2

Anglers and members of the Advisory Council have expressed concerns about the poor size quality of the Northern Pike fishery. This could be a sign of population decline as seen with other Northern Pike fisheries in Quebec and Ontario. Size limits have been successfully used to improve the size quality of Northern Pike fisheries in northern Ontario. To help develop a size limit appropriate for the Northern Pike fishery of the Ottawa River, additional information is needed on the current state of the Northern Pike population and how anglers use the Northern Pike fishery. If Ottawa River Northern Pike have similar life history requirements and population characteristics as northern Ontario populations, similar size limits may be effective if there is a size quality problem. Additional public consultation will be undertaken before a size limit is implemented for the Northern Pike fishery.

**Northern Pike Management Challenges**

- Large and trophy-sized Northern Pike are not abundant
- Anglers prefer to harvest larger Northern Pike since they are easier to clean
- Large gravid female Northern Pike may be vulnerable to late winter harvest
- Status of the Ottawa River Northern Pike fishery is unknown

The management goal for the Northern Pike fishery is to:

***"Improve the quality of the Northern Pike fishery throughout the Ottawa River"***

The management objectives for Northern Pike:

i) Maintain sustainability of Northern Pike populations
ii) Improve size quality of Northern Pike

The following management actions have been recommended to address Northern Pike fisheries management challenges:

1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.
2) Develop quality benchmarks for Ottawa River Northern Pike fisheries based on the preferred sizes for eating and trophy fishing.
3) Develop size limit options to improve the size quality of the fishery.
4) With assistance of partners produce educational material to increase angler awareness about cleaning Northern Pike, best size for harvest, importance of releasing large Northern Pike, and distinguishing between Northern Pike, Muskellunge and their hybrids.
5) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity.

**Table 8 Management Summary for Northern Pike Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Improve the quality of the Northern Pike fishery throughout the Ottawa River. |
| **Objectives** | i) Maintain sustainability of Northern Pike populations<br>ii) Improve size quality of Northern Pike |
| **Indicators** | i) Sustainability indicators by reach:<br>• Relative abundance<br>• Mean length<br>• Mean age<br>• Total mortality<br>ii) Size quality indicators by reach:<br>• CUEW of larger fish (preferred, memorable and trophy sized) |
| **Benchmarks** (Values found in Appendix B – 4.2.3) | i) Sustainability benchmarks by reach as of 2003 using FWIN:<br>• CUEW<br>• Mean length<br>• Mean age<br>• # reaches with Z/M < 2<br>ii) Size quality benchmarks by reach:<br>• CUEW of larger fish (preferred, memorable and trophy sized) |
| **Targets** | i) Sustainability targets by reach:<br>• Maintain or increase the CUEW<br>• Maintain or increase the mean length<br>• Maintain or increase the mean age<br>• Mortality ratio (Z/M) < 2<br>ii) Size quality target by reach:<br>• Increase CUEW of larger fish |
| **Management Actions** | 1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.<br>2) Develop quality benchmarks for Ottawa River Northern Pike fisheries based on the preferred sizes for eating and trophy fishing.<br>3) Develop size limit options to improve the size quality of the fishery.<br>4) With assistance of partners produce educational material to increase angler awareness about cleaning Northern Pike, best size for harvest, importance of releasing large Northern Pike, and distinguishing between Northern Pike, Muskellunge and their hybrids.<br>5) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity. |

Young of the Year Northern Pike, MNRF

### 4.2.4 MUSKELLUNGE

The Ottawa River is known for its self-sustaining 'record class' trophy Muskellunge fishery. It is one of only seven water bodies in Ontario, identified for its potential to produce record-class Muskellunge (OMNR, 1999). Muskellunge have been recently detected in all reaches of the Ottawa River except Lake Temiskaming. The best quality Muskellunge fisheries are in the lower reaches of the Ottawa River. Muskellunge are particularly abundant in Lac des Chats and Lac Dollard des Ormeaux. Muskellunge populations support a predominantly catch and release trophy fishery, with nearly 100% release rates among specialty anglers.

Most of what we know about Ottawa River Muskellunge fisheries has been collected by angler diary programs, researchers and a few specimens caught during Nearshore Community Index Netting (NSCIN) assessments. Standardized index netting techniques do not catch Muskellunge very well, making it impossible to assess their population status with any level of certainty. Muskellunge have naturally low densities in the Ottawa River. Large Muskellunge are difficult to age accurately using their scales and the collection of cleithrum requires lethal sampling. Catch rates and size trends recorded by anglers are currently the best way to monitor Muskellunge fishery trends on the Ottawa River.

Ottawa River Muskellunge populations were assessed between 1997 and 2004 using NSCIN. Lake Temiskaming has never been assessed but few, if any, Muskellunge would be expected. A total of 18 Muskellunge were caught in three out of the nine reaches surveyed: nine from Lac des Chats, eight from Lac Dollard des Ormeaux and one from Allumette Lake. Combined NSCIN results estimate the relative abundance (CUE) of Muskellunge in the Ottawa River to be 0.18 fish per net. The few Muskellunge collected were predominantly from 1992 to 1996 year classes.

Ontario sets Muskellunge size-limits based on the growth potential, indicated by the ultimate size of female Muskellunge. The mean ultimate length of Ottawa River female Muskellunge is estimated to be 134 cm (52.7 inches) with an upper 99% confidence limit of 141 cm (55.4 inches) based on four female specimens from the Cleithrum Database Project (Casselman, 2007).

Muskies Canada anglers have been present on the Ottawa River since the fall of 1988 when the Ottawa chapter was first initiated. Muskellunge angler effort increased from 500 to 3000 angler rod hours between 1989 and 2009. Average lengths of Muskellunge caught have been consistently between 35 and 42 inches, implying there are Muskellunge of all sizes being caught and present in the population. Maximum sizes caught each year have been consistently between 50 and 58 inches, which indicate many Muskellunge are reaching the predicted ultimate size range under the current fishing regulations (Figure 19). Angler catch rates have ranged from 0.08 fish/angler hour in 1989, to a peak of 0.12 fish/angler hour in 1997 and have dropped down to 0.07 fish/angler hour by 2009 (Figure 18). This increasing then declining trend in CUE is likely more reflective of Muskellunge angler skill levels than actual Muskellunge abundances, as only skilled Muskellunge anglers were participating initially, with many new relatively inexperienced anglers joining the program in 1996 and beyond. If there were an actual decline in Muskellunge populations, mean and maximum sizes being caught would also have declined. It is not possible to determine the status of Muskellunge by reach of the Ottawa River, as anglers are not recording detailed catch locations. However, Muskellunge populations are considered sustainable and provide a high quality fishery in the Ottawa River.

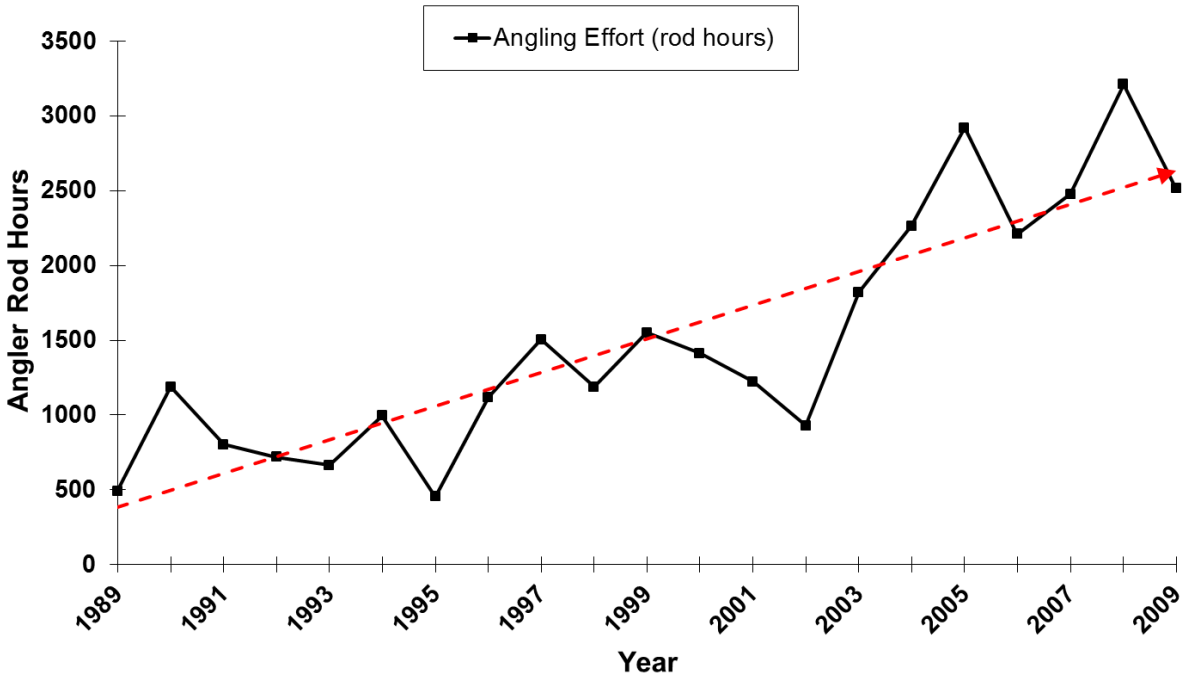



**Figure 17 Angling Trends for Muskellunge on the Ottawa River**
From Muskies Canada Angler Diary Program. Source: Kerr 2010

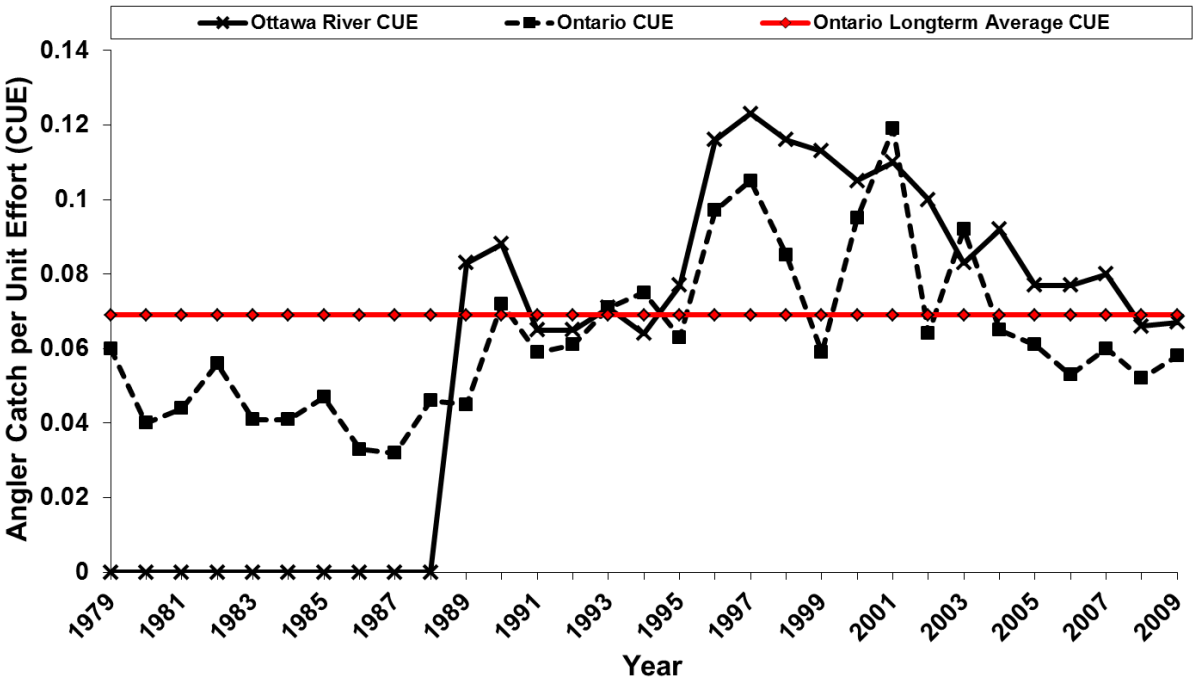



**Figure 18 Muskellunge Catch per Unit Effort (fish/angler hour) for Ottawa River and Ontario**
From Muskies Canada Angler Diary Program. Source: Kerr 2010

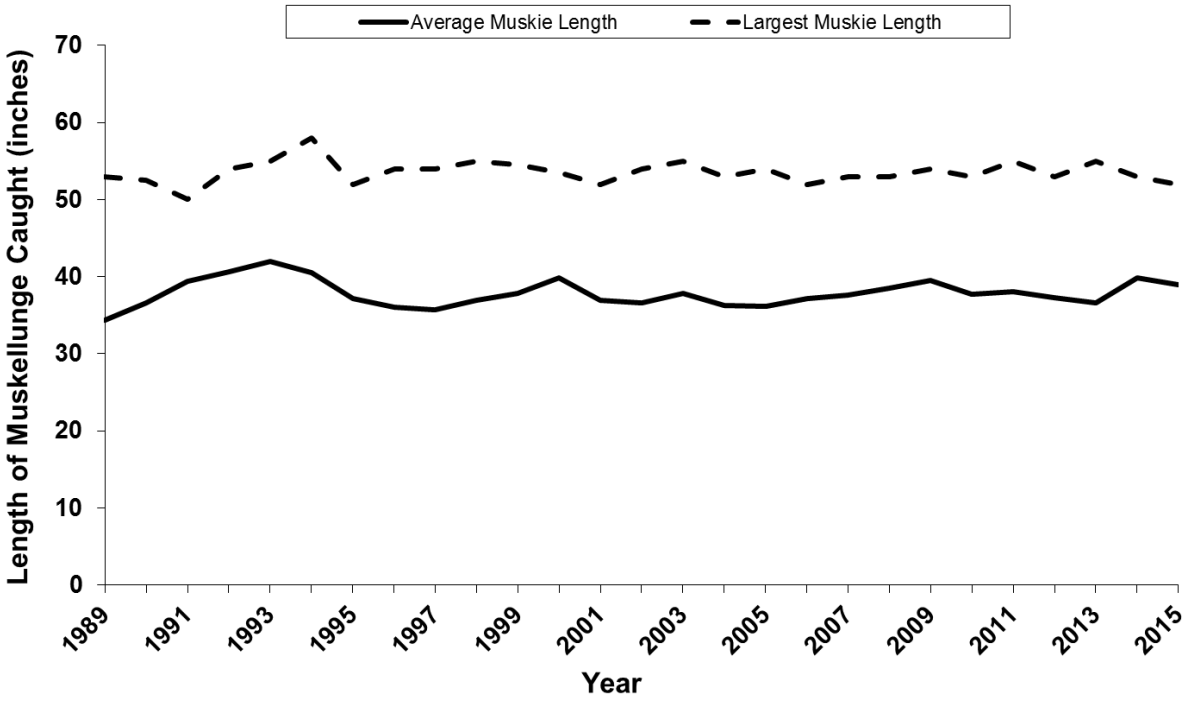



**Figure 19 Average and Largest Length of Muskellunge based on Angler Diaries**
From Muskies Canada Angler Diary Program (1998-2015). Sources: Kerr 2010 and Taillon 2016

The use of large minimum size limits has been proven as an effective management approach for maintaining record-class size quality of Muskellunge fisheries. Using catch and release allows the larger trophy sized fish to remain in the fishery long enough to spawn multiple times and to achieve their ultimate potential size. Allowing anglers to catch fish multiple times also maximizes the opportunity to catch trophy Muskellunge. Graduate research studies have documented post release survival rates of 100% for Ottawa River Muskellunge when the Muskellunge fishing practices promoted by Muskies Canada are used (Landsman et al, 2011).

Education about Muskellunge vs. Northern Pike identification and best angling practices to use for effective of catch and release of Muskellunge are an important component of the management approach for this fishery. Fortunately, Muskies Canada has been a very effective advocate and promoter of this highly valued catch and release trophy fishery. Our partner's efforts in this regard should continue to be supported.

Categories of minimum size limits for Muskellunge have been established based on the growth potential of the population. A 137 cm (54 inch) minimum size limit was implemented in 2001 after a provincial review of Muskellunge regulations. The minimum size limit ensures that undersized Muskellunges caught by anglers are released so they can grow to their full potential size (Casselman 2009, OMNR 2009).

Muskellunge spawn each spring after the ice cover melts and water levels rise. The Muskellunge season is closed from December 16 until late June each year to protect Muskellunge from angling during the winter and while spawning. Muskellunge fishing regulations are the same across the Ottawa River except for the ending date for the fishing season. The Muskellunge fishing season ends on December 15 in Ontario FMZ 12 and November 30 in Quebec Fishing Zone 25.

The current Muskellunge regulations are:

- *Open Season*: Fri. before 3rd Sat. in June to Dec. 15. (Nov. 30 on Quebec-side)
- *Catch and Possession Limits:* Sport Fishing (S) – 1 and Conservation (C) – 0
- *Size Limit:* must be greater than 137 cm (54 inches)

The current trophy minimum size limit will be maintained. The Muskellunge season was extended from November 30 to December 15 on the Ontario-side of the river as part of a provincial initiative to provide more Muskellunge angling opportunities. Fishery users would like to have a harmonized closing date on both sides of the Ottawa River if possible.

Concerns have been expressed about the vulnerability of Ottawa River Muskellunge that move into tributaries located in adjacent Fisheries Management Zones with less protective size limits and seasons. The specific locations and full extent of where this is occurring will need to be investigated. It may be possible to work with adjacent fisheries management zones to identify possible solutions. Sanctuaries or exception regulations could be considered for problem areas.

**Muskellunge Management Challenges**

- Overall status of the Muskellunge population is unknown
- Effective population assessment techniques are not available for Muskellunge
- Large Muskellunge must be killed to accurately determine their age
- Some anglers do not know the difference between Muskellunge and Northern Pike
- Muskellunge using tributaries are not well protected by less restrictive fishing regulations

The management goal for the Muskellunge fishery is to:

***"Maintain the world-class status of the Ottawa River Muskellunge fishery."***

The management objectives for Muskellunge:

i) Maintain sustainability of Muskellunge populations
ii) Maintain size quality of Muskellunge

The following management actions have been recommended to address Muskellunge fisheries management challenges:

1) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity.
2) Recommend management actions to protect Ottawa River Muskellunge while in tributaries located in adjacent fisheries management zones.
3) Recommend a harmonized Muskellunge season.
4) Recommend improvements to the content of angler diary entries to include reporting of catch locations by reach of the Ottawa River.
5) Use angler diary program data and information from the Survey of Recreational Fishing in Canada to monitor Muskellunge fishery trends (i.e. catch and release rates, size).
6) Support efforts of Muskellunge fishing clubs to educate, promote, monitor, enhance and protect muskellunge fisheries.

**Table 9 Management Summary for Muskellunge Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Maintain the world-class status of the Ottawa River Muskellunge fishery. |
| **Objectives** | i) Maintain sustainability of Muskellunge populations<br>ii) Maintain size quality of Muskellunge |
| **Indicators** | i) Sustainability indicators for Muskellunge:<br>• Angler catch rates<br>• Sizes caught by anglers<br>ii) Size quality indicators for Muskellunge:<br>• Numbers of trophy sized fish caught by anglers |
| **Benchmarks** (Values found in Appendix B – 4.2.4) | i) Sustainability benchmarks for 2011 to 2015 using angler diary data:<br>• CUE<br>• Mean length<br>ii) Size quality benchmarks for 2011 to 2015 using angler diary data:<br>• Maximum size<br>• Proportion of fish greater than 127 cm (50 inches) |
| **Targets** | i) Maintain or increase angler catch rates for Muskellunge<br>ii) Maintain numbers of trophy-size Muskellunge being caught |
| **Management Actions** | 1) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity.<br>2) Recommend management actions to protect Ottawa River Muskellunge while in tributaries located in adjacent fisheries management zones.<br>3) Recommend a harmonized Muskellunge season.<br>4) Recommend improvements to the content of angler diary entries to include reporting of catch locations by reach of the Ottawa River.<br>5) Use angler diary program data and information from the Survey of Recreational Fishing in Canada to monitor Muskellunge fishery trends (i.e. catch and release rates, size).<br>6) Support efforts of Muskellunge fishing clubs to educate, promote, monitor, enhance and protect muskellunge fisheries. |

Muskellunge, Larry Lambourne

### 4.2.5 Panfish (Sunfish, Black Crappie, and Rock Bass), Yellow Perch and Bullheads

In reaches of the Ottawa River where Walleye are less abundant, many anglers are switching to panfish fisheries which consist of Yellow Perch, Black Crappie, sunfish (Pumpkinseed and Bluegill), Rock Bass and Brown Bullheads. National Recreational Fishing Surveys indicate that sunfish, Black Crappie, Rock Bass and Yellow Perch collectively support the most popular fishery on the Ottawa River. In 2005 there were 171,599 panfish (sunfish, Rock Bass and Black Crappie) caught and 6,936 kept according to the Recreational Fishing Survey. The Ottawa River is the third most popular water body for fishing events in Ontario (Kerr, 2012) with 50% being family and children oriented multi-species events for panfish in 2012. Fishing events increased to 45 events by 2012 with most panfish fishing events held during the summer. Yellow Perch are often targeted during winter fishing events as well.

The status of panfish populations are not well understood on the Ottawa River. There have been anecdotal reports of declining sunfish, Black Crappie, Yellow Perch and bullhead catches from both recreational anglers and commercial fishers that warrant further investigation.

Yellow Perch are present in all reaches of the Ottawa River with an overall average of 1.9 fish per net according to 1998-2003 FWIN surveys. They are most abundant in Lake Temiskaming (5 fish per net), Lac la Cave (4 fish per net) and Holden Lake (2.7 fish per net). Yellow Perch are on average 17cm (7 inches) in total length.

Rock Bass are present in all reaches of the Ottawa River. Based on 1997-2004 NSCIN, Rock Bass are most abundant in Upper Allumette (2.7 fish per net) and Lower Allumette (2.3 fish per net); and least abundant in Lac Deschênes (0.8 fish per net) and Lac Dollard des Ormeaux (0.6 fish per net).

Black Crappie is present in the lower reaches of the Ottawa River. They are most abundant in Lac Deschênes (2.95 fish per net) and Lac Dollard des Ormeaux (5.66 fish per net) based on 1997-2004 NSCIN.

Bluegill is present in the lower reaches of the Ottawa River. They are most abundant in Lac Dollard des Ormeaux (0.6 fish per net) based on 1997-2004 NSCIN. Most Bluegill are less than 20 cm (8 inches) in length.

Pumpkinseed is limited to the lower reaches of the Ottawa River. They are absent from Lake Temiskaming and Lac la Cave. Based on 1997-2004 NSCIN they are most abundant in Lac Deschênes (4.5 fish per net) and Lac Dollard des Ormeaux (2.1 fish per net).

Brown Bullhead are likely present in all reaches of the Ottawa River. During 1997-2004 NSCIN the highest abundances were in Lower Allumette (20.3 fish per net) and Coulonge (24.9 fish per net). Relative abundances of Brown Bullhead were much lower in reaches where both recreational and commercial fisheries occured: Chats (0.6 fish per net), Deschênes (2.1 fish per net), and Ormeaux (1 fish per net). Brown Bullhead support a popular spring fishery with anglers harvesting them in large quantities. Brown Bullhead were also a heavily harvested commercial fish species before their numbers declined. Recreational and commercial users of this fishery have reported declining catch rates and size.

Panfish abundances in the Ottawa River are generally low when compared to other adjacent Fisheries Management Zones in Ontario. Since panfish are small, anglers tend to harvest larger quantities of the larger fish caught. These fisheries may be vulnerable to overfishing due to their close proximity to the greater Ottawa area and sharing with commercial harvest fishery. The panfish fisheries of the Ottawa River that have catch and possession regulations are: Yellow Perch and Black Crappie. Sunfish, Rock Bass and bullhead currently have no catch limits. FMZ 12 is the only Ontario Fisheries Management Zone that doesn't have catch limits for sunfish. Fishing regulations for these species are harmonized across the Ottawa River in both Ontario and Quebec fishing regulations.

The current panfish regulations are:

| Panfish Species | Fishing Season | Catch and Possession Limits |
|---|---|---|
| Yellow Perch | Open all year | Sport Fishing (S) – 50<br>Conservation (C) – 25 |
| Crappie | Open all year | Sport Fishing (S) – 30<br>Conservation (C) – 10 |
| Sunfish | Open all year | Unlimited |
| Rock Bass | Open all year | Unlimited |
| Brown Bullhead | Open all year | Unlimited |

The collection of additional biological samples is needed to characterize panfish populations so their status can be examined. Ages from approximately 50 - 75 individual fish are required from each panfish population in each reach of the Ottawa River. Relative abundances, size distributions, age distributions and total mortality rates will need to be determined. BsM from 2008-2010 in all reaches combined caught adequate samples of Yellow Perch (1403) and Rock Bass (141), however sampling for Brown Bullhead (28), Pumpkinseed/Bluegill (16) and Black Crappie (5) are too low to assess population characteristics. To determine panfish population characteristics by reach the current amount of sampling may not be adequate.

If assessments indicate population-level consequences from harvest, then catch limits and potentially size limits may be required. Reduced fishing seasons may be considered if these species are particularly vulnerable to harvest during their nesting or spawning periods. If fishing season changes are being considered, it may be necessary to confirm the nesting/spawning periods of these species on the Ottawa River.

Addressing knowledge gaps that will enable panfish fishery management through enhanced monitoring, research and partnerships may be future considerations.

Key panfish knowledge gaps are:

- Current abundance and size/age distributions
- Angler quality preferences and size standards for panfish species
- Amount of recreational harvest and fishing event use
- Total mortality rates

More conservative fishing regulations may be implemented as needed to maintain sustainability and quality of panfish fishery stocks. A review of catch limits for Black Crappie, sunfish and Brown Bullhead may be required.

**Panfish Management Challenges:**

- Panfish are key fisheries in reaches where Walleye are less abundant
- Overall status and characteristics of panfish populations are unknown
- BsM catches low numbers of panfish species
- Overlap between recreational and commercial harvest fisheries for these species

The management goal for the panfish fishery is to:

***"Maintain or improve panfish fisheries of the Ottawa River."***

The management objectives for panfish:

i) Maintain sustainability of panfish populations
ii) Improve size quality of panfish

The following management actions have been recommended to address panfish fishery management challenges:

1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.
2) Review fishing regulations for Sunfish and Brown Bullheads.

**Table 10 Management Summary for Panfish Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Maintain or improve panfish fisheries of the Ottawa River. |
| **Objectives** | i) Maintain sustainability of panfish populations<br>ii) Improve quality of panfish |
| **Indicators** | i) Sustainability indicators by reach:<br>• Relative abundance<br>• Mean length<br>• Mean age<br>• Total mortality<br>ii) Size quality indicators by reach:<br>• CUEW of larger fish (preferred, memorable and trophy sized) |
| **Benchmarks** (Values found in Appendix B – 4.2.5) | i) Sustainability benchmarks by reach using NSCIN, FWIN or BsM:<br>• CUEW<br>• Mean length<br>• Mean age<br>• # of reaches with Z/M < 2<br>ii) Size quality benchmark by reach:<br>• CUEW of larger fish (preferred, memorable and trophy sized) |
| **Targets** | i) Sustainability targets by reach:<br>• Maintain or increase the CUEW<br>• Maintain or increase the mean length<br>• Maintain or increase the mean age<br>• Mortality ratio (Z/M) < 2<br>ii) Size quality target by reach:<br>• Increase CUEW of larger fish |
| **Management Actions** | 1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information.<br>2) Review fishing regulations for Sunfish and Brown Bullheads. |

### 4.2.6 Channel Catfish

Ottawa River Channel Catfish populations were assessed between 1997 and 2004 using NSCIN. All reaches of the Ottawa River were assessed except Lake Temiskaming. Channel Catfish are not abundant in Lake Temiskaming, Lac la Cave or Holden Lake as Channel Catfish productivity is depressed by the intensive winter drawdowns that occur in these reaches (Haxton and Findlay, 2009). Proportionately, Channel Catfish make up 42 to 73% of the fish community in the lower reaches of the Ottawa River in Figure 20, including Lac Dollard des Ormeaux which is not depicted.

A detailed investigation of the Channel Catfish populations in Upper Allumette downstream to and including Lac Deschênes characterizes the Channel Catfish populations as follows:

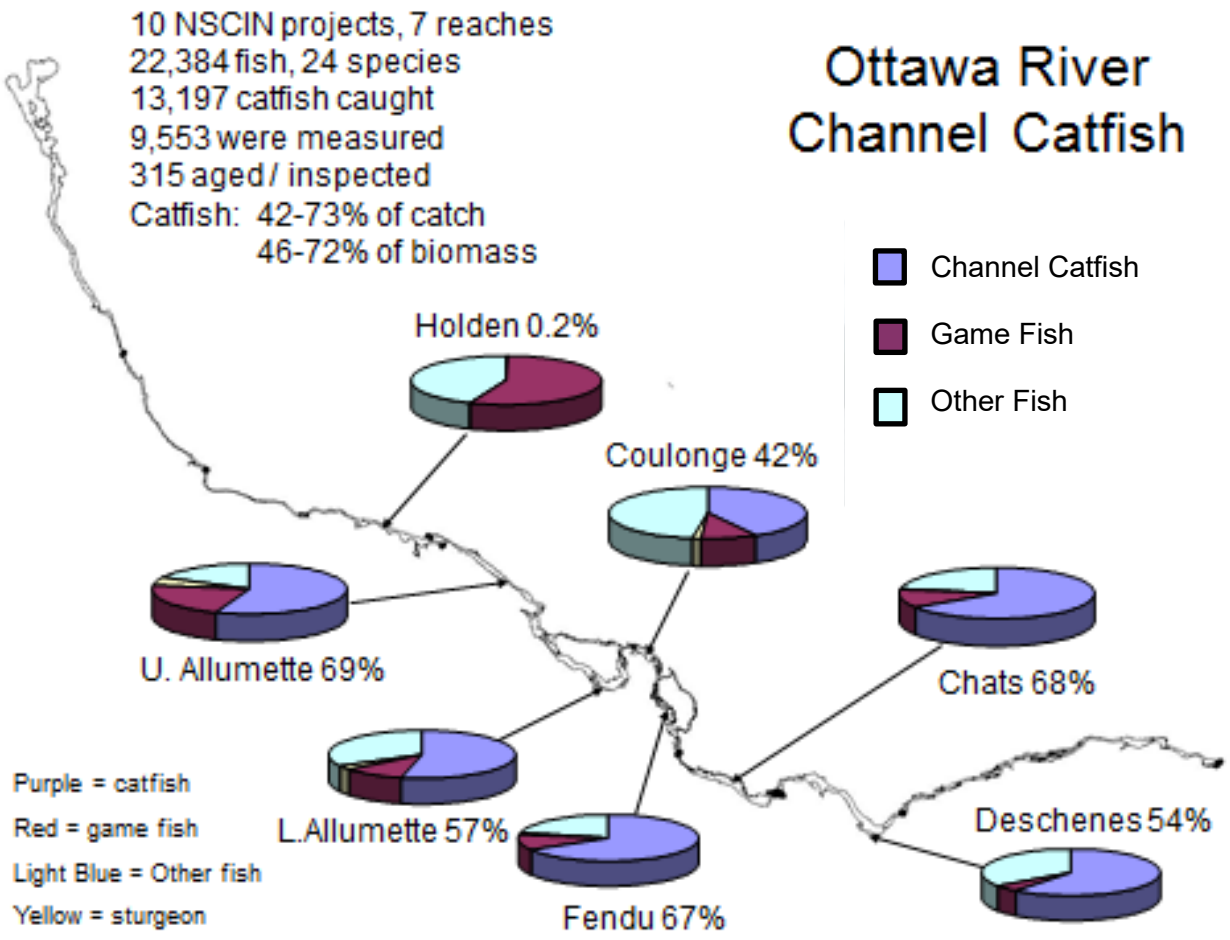



**Figure 20 Channel Catfish Populations of the Ottawa River**

Channel Catfish have irregular reproduction rates that show a strong correlation with mid-summer water temperatures. Channel Catfish have strong year class strengths in El Nino (warmer summers) and weaker year classes in La Nina (cooler summers). Ottawa River Channel Catfish population has expanded significantly since the 1980s which coincides with the end of log running and the decline of American Eel on the Ottawa River. The oldest Channel Catfish was 28 years old with large old Channel Catfish over 55 cm in size making up less than 25% of the population. The total mortality rate was estimated to be 15%. Average length at maturity is 41.5 cm (16 inches) for both male and female Channel Catfish. Channel Catfish mature between 11 and 14 years of age (Haxton and Punt 2004).

There are very few Channel Catfish over 55 cm in size, however these individuals contain high contaminant levels (MOECC, 2013) and are not recommended for eating. These large fish offer potential trophy fishing opportunities for recreational anglers and competitive fishing events.

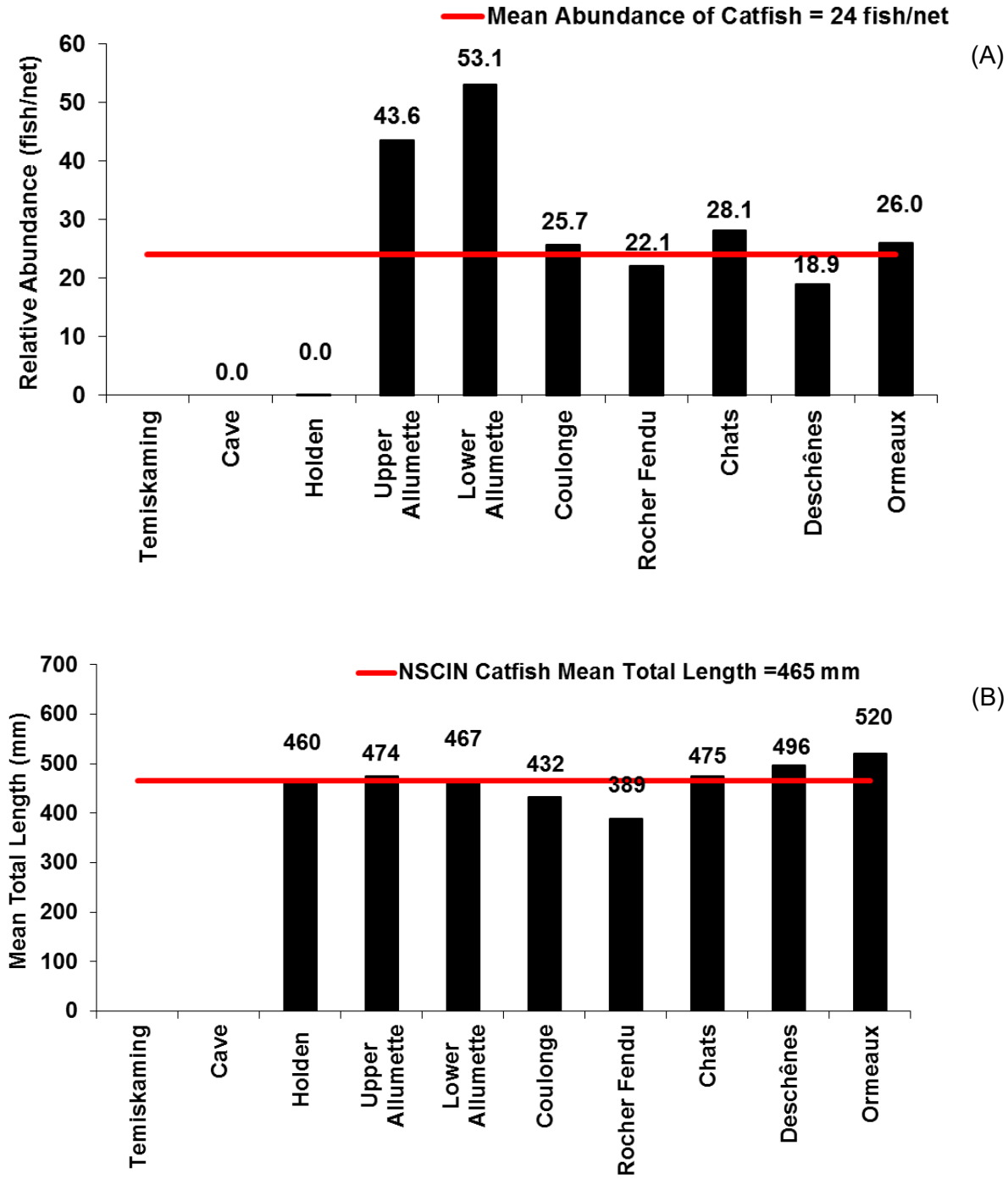



**Figure 21 Ottawa River Channel Catfish Population Characteristics**
(A) Relative abundance (fish/net) using NSCIN (1997-2004)
(B) Mean total length by reach using NSCIN (1997-2004)

Channel Catfish are abundant in the Ottawa River. However, they are not as abundant as southern populations. Densities in the Ottawa River were estimated up to 31.7 fish/ha, whereas in Ohio, densities range from 10.9 to 201.7 fish/ha (Haxton and Punt 2004).

Ottawa River Channel Catfish are slower growing and later maturing than other fish species (i.e. Walleye mature in 2-5 years) and other southern Channel Catfish populations. If the Ottawa River Channel Catfish fishery becomes popular, careful harvest management will be necessary to keep this fishery sustainable. Fisheries' modeling shows that Channel Catfish populations are very sensitive to overharvest. Channel Catfish populations would likely decline significantly under the high fishing pressure endured by Walleye fisheries. If promotion of this fishery is successful, regular assessment will be necessary to ensure sustainability indicators are not being exceeded. For more information on the channel catfish population see Section 3.5.5 of the Ottawa River Background Information Report.

This abundant population of Channel Catfish has the potential to support additional recreational and commercial harvest fisheries. Any new markets that are developed will need regular supplies of Channel Catfish to maintain stable markets over the long-term. Developing markets to use Channel Catfish is outside the scope of fisheries management. Instead, the availability of this fishery will be promoted for recreational and potentially commercial uses.

As fisheries become popular for harvest it is sometimes necessary to set catch limits, size limits and seasons to maintain fishery quality or to protect them from overharvest. Since the Channel Catfish fishery is being promoted, catch and possession limits in Ontario were established on a proactive basis to promote the fishery. It was thought that setting limits might attract anglers to this fishery as this puts a qualitative value on the resource and makes them visible in the fishing regulation summary. This fishery is being monitored and assessed against the benchmarks to learn if increased utilization of the fishery is occurring.

Ontario and Quebec currently have different regulations for Channel Catfish. It would be beneficial for Ontario and Quebec to revisit Channel Catfish management strategies and to develop a harmonized fishing regulation. Ontario implemented the current fishing regulations for Channel Catfish in 2003 to give them official sport fish status and to promote catfish as a viable angling opportunity. A size limit should be reconsidered to maintain the few trophy-sized Channel Catfish (>55 cm) that are present in the population.

The current Channel Catfish regulations are:

- *Open Season*: Open all year (Ontario and Quebec)
- *Catch and Possession Limits:* - Sport Fishing (S) – 12 and Conservation (C) – 6 (Ontario)
  - Unlimited (Quebec)

**Management Challenges of Underutilized Channel Catfish Fisheries:**

- It is difficult to shift angler preference towards Channel Catfish
- Trophy-sized Channel Catfish are less abundant and contain high levels of contaminants

The management goal for Channel Catfish fisheries is to:

***"Promote the use of underutilized Channel Catfish fisheries by encouraging sustainable harvest activities and the development of local markets to use them."***

The management objectives for Channel Catfish:

i) Maintain sustainability of Channel Catfish populations
ii) Maintain size quality of Channel Catfish fishery
iii) Increase angler harvest levels for Channel Catfish

The following management actions have been recommended to address Channel Catfish fisheries management challenges:

1) Develop options to track Channel Catfish fishery use and harvest rates.
2) Seek harmonized Channel Catfish fishing regulations and management approach.
3) With assistance of partners produce and disseminate educational materials to promote Channel Catfish including information on where to find them, how to catch them and how to prepare them.
4) Communicate the potential for a Channel Catfish fishery to commercial fisherman.

**Table 11 Management Summary for Channel Catfish Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Promote the use of underutilized Channel Catfish fisheries by encouraging sustainable harvest activities and the development of local markets to use them. |
| **Objectives** | i) Maintain sustainability of Channel Catfish populations<br>ii) Maintain size quality of Channel Catfish fishery<br>iii) Increase angler harvest levels for Channel Catfish |
| **Indicators** | i) Sustainability indicators by reach as of 2004 using NSCIN:<br>• Relative abundance<br>• Mean length<br>• Mean age<br>• Total mortality<br>ii) Size quality indicators by reach:<br>• CUEW of Preferred, Memorable and Trophy size classes<br>iii) Angler catch and harvest rates |
| **Benchmarks** (Values found in Appendix B – 4.2.6) | i) Sustainability benchmarks by reach as of 2010 using NSCIN and Recreational Fishing Survey:<br>• CUEW<br>• Mean length<br>• Mean age<br>• # of reaches with (Z/M) < 2<br>ii) Size quality benchmarks by reach:<br>• CUEW of Preferred, Memorable and Trophy size classes<br>iii) Angler catch and harvest rates |
| **Targets** | i) Sustainability targets by reach:<br>• Maintain CUEW<br>• Maintain mean length<br>• Maintain mean age<br>• Mortality ratio (Z/M) < 2<br>ii) Size quality target by reach:<br>• Maintain CUEW of Preferred, Memorable and Trophy size classes<br>iii) Increase angler catch and harvest rates |
| **Management Actions** | 1) Develop options to track Channel Catfish fishery use and harvest rates.<br>2) Seek harmonized Channel Catfish fishing regulations and management approach.<br>3) With assistance of partners produce and disseminate educational materials to promote Channel Catfish including information on where to find them, how to catch them and how to prepare them.<br>4) Communicate the potential for a Channel Catfish fishery to commercial fisherman. |

### 4.2.7 Other Fisheries

All fish species have potential to support a fishery of some kind, whether it is for harvest and consumption, competitive fishing, memorable trophies, commercial harvest, or catch and release. In addition, fisheries do not necessarily have to be harvest-based to be valuable. Fish viewing opportunities, such as watching fish climb ladders or gather for spawning, are often found interesting to nature watchers and could offer additional tourism options.

There are many fish species in the Ottawa River that have potential to provide a wide diversity of fishing opportunities. However, it is not possible to intensively monitor or manage all fisheries. The other fisheries outlined here will be monitored and managed as part of the fish community diversity of the Ottawa River. Efforts will be made to maintain their presence in the fish community but they may never receive intensive management efforts.

The minor fisheries of the Ottawa River that have fishing regulations are: Lake Trout, Lake Whitefish, and American Shad. Many other less popular fish species such as Burbot (Ling Cod) and various species of suckers have no catch limits and open all-year seasons. Fishing regulations for most minor fisheries are the same on both sides of the Ottawa River with exception of Lake Trout. See comparison of Ontario and Quebec fishing regulations on the Ottawa River in Table 4.

Lake Whitefish are present in Lake Temiskaming, Lac la Cave and Holden Lake with relative abundances of 1.3 fish per net in Temiskaming, 0.6 fish per net in Lac la Cave, and 0.4 fish per net in Holden (FWIN 1998-2003). Lake Whitefish are a key fishery in other parts of Ontario, its significance and overall abundance in the Ottawa River is not well understood. There is an Indigenous fishery for Lake Whitefish below Lake Temiskaming dam. Efforts should be made to collect Lake Whitefish population attributes, so this fishery can be monitored for sustainability. Dip-netting of Lake Whitefish is not permitted on the Ottawa River.

Lake Trout are not common in the Ottawa River. A remnant natural population is known in Lake Temiskaming and re-introduction attempts were made to Upper Allumette Lake in the mid-1990s. Lake Trout are sometimes caught in other reaches. Ontario and Quebec fishing regulations are different on the respective sides of the Ottawa River. Management efforts are needed to harmonize the Lake Trout regulations, as Quebec has a size limit and Ontario does not.

American Shad are only found below Carillon dam. This is the only location for this species in Ontario. American Shad are a species of conservation concern in Quebec. American Shad are from the Atlantic Ocean and only frequent the Ottawa River during their spring spawning period. American Shad are targeted during their spawning period by recreational anglers and often during commercially guided fishing trips. American Shad have a five fish catch limit to match fishing regulations in Quebec Fishing Zone 8 located downstream of Carillon dam.

Longnose Gar is a challenging fish to catch and its ability to reach enormous sizes on the Ottawa River make it worthy of trophy status. Longnose Gar are present in most reaches but are locally distributed in wetlands. The largest Longnose Gar records in Ontario Federation of Anglers and Hunters Record Fish Registry were caught in the Ottawa River. They have potential to support a catch and release trophy fishery. They are not edible.

Burbot are present in all reaches of the Ottawa River but their abundances are low (<0.7 fish per net) based on 1998-2003 FWIN. Burbot are a freshwater cod and considered good table fare. Burbot are benthic (near the bottom) and typically inhabit deeper areas of the Ottawa River.

Mooneye are present in all reaches of the Ottawa River based on FWIN 1998-2003 with an average relative abundance of 0.28 fish per net. Mooneye are caught occasionally by anglers.

Minor fisheries will be monitored along with the rest of the fish community unless a problem is identified that requires further investigation or more intensive management. All these fish species contribute to the diverse fishing opportunities available on the Ottawa River.

Spreading fishing pressure to underutilized fish species will reduce pressure on more heavily harvested sportfish such as Walleye.

The following management actions have been recommended to address other fisheries:

1) With assistance of partners produce and disseminate educational materials to promote other fisheries, including information on how to identify them, where to find them, best times to catch them, how to fish them, and how to prepare them if they are edible.
2) Harmonize Lake Trout fishing regulations.
3) Identify the monitoring information required to evaluate Lake Whitefish population status by reach and solicit science recommendations on how to collect missing information.

**Table 12 Management Summary for Other Fisheries of the Ottawa River**

| | |
|---|---|
| **Management Actions** | 1) With assistance of partners produce and disseminate educational materials to promote other fisheries, including information on how to identify them, where to find them, best times to catch them, how to fish them, and how to prepare them if they are edible.<br>2) Harmonize Lake Trout fishing regulations.<br>3) Identify the monitoring information required to evaluate Lake Whitefish population status by reach and solicit science recommendations on how to collect missing information. |
| **Performance Measures** | i) # of promotional materials produced for promoting the other fisheries and educational materials for the public.<br>ii) A harmonized Lake Trout regulation. |

Freshwater Drum, Grant Hopkins

## 4.3 Species at Risk Fish

Species at risk have been designated due to being very rare or declining and at risk from habitat loss or changes to water quality. American Eel and Lake Sturgeon supported commercial fisheries that were recently closed. It is standard practice to close fisheries for endangered or threatened species to reduce sources of mortality potentially impeding their recovery.

**Table 13 Species at Risk Fish of the Ottawa River**

| Species | Designation* | | |
|---|---|---|---|
| | **Ontario** | **Quebec** | **Federal** |
| American Eel (*Anguilla rostrata*) | Endangered | Susceptible | Under Review (Threatened) |
| Lake Sturgeon** (*Acipenser fulvescens*) | Endangered | Susceptible | Under Review (Threatened) |
| Cutlip Minnow (*Exoglossum maxillingua*) | Threatened | Not Designated | Under Review (Special Concern) |
| Channel Darter (*Percina copelandi*) | Special Concern | Vulnerable | Under Review (Special Concern) |
| River Redhorse *(Moxostoma carinatum)* | Special Concern | Vulnerable | Special Concern |
| Northern Brook Lamprey (Ichthyomyzon fossor) | Special Concern | Threatened | Special Concern |
| Bridle Shiner (*Notropis bifrenatus*) | Special Concern | Vulnerable | Special Concern |
| Silver Lamprey (*Ichthyomyzon unicuspis*) | Special Concern | Not Designated | Under Review (Special Concern) |
| American Shad (*Alosa sapidissima*) | Not Designated | Vulnerable | Not Designated |
| Brassy Minnow (*Hybognathus hankinsoni*) | Not Designated | Susceptible | Not Designated |
| Margined Madtom (*Noturus insignis*) | Not Designated | Susceptible | Threatened |
| Yellow Bullhead (*Ameiurus natalis*) | Not Designated | Susceptible | Not Designated |

* Designations up to date as of November 2018
** Great Lakes – Upper St Lawrence Population

Sources:

Ontario Endangered Species Act, 2007
(Uses terms Endangered, Threatened and Special Concern)
http://www.ontario.ca/laws/regulation/080230?search=endangered+species+act

Ontario species at risk webpage: https://www.ontario.ca/page/species-risk

Federal Species at Risk Act, Schedule 1 http://www.sararegistry.gc.ca/sar/index/default_e.cfm

Quebec's Act Respecting Threatened or Vulnerable Species
(Uses terms Threatened, Vulnerable, and Susceptible)
http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/E-12.01,%20r.%202/

### 4.3.1 AMERICAN EEL

American Eel were historically present in the entire Ottawa River watershed. They were very abundant, accounting for over 60% of the fish community biomass based on historical commercial fishing records. American Eel were an important food item for Indigenous people and remain a cultural symbol today. After European colonization, modern-day commercial American Eel fisheries were also supported. Today, in the Ottawa River watershed, American Eel are only found in the lower Ottawa River. American Eel have been reduced to very low numbers and are extirpated from most rivers that flow into the Ottawa River. Many dams have been built in the Ottawa River watershed that block American Eel from moving upstream. American Eel numbers are now too low to support harvest.

All American Eel are born in the Sargasso Sea. Larval "glass" eels then drift to rivers along the east coast of Canada and the United States. "Yellow" eels move upstream and live in freshwater on average 20 years, until they mature. Adult "silver" eel go back downstream to the Sargasso Sea to spawn and die. American Eel in Ontario waters, including the Ottawa River are mainly female. It is estimated that few adult American Eels emigrate out of the Ottawa River due to turbine mortality associated with hydro-electric facilities. A large decline of over 90% was observed in the number of American Eels migrating up the St. Lawrence between 1970 and 1990, with some minor improvements since 2004. American Eel abundances in the Ottawa River, a tributary of the St. Lawrence River, are assumed to have suffered similar declines.

American Eels are declining throughout their global range and are also threatened by factors outside of the province that affect their status provincially (i.e. habitat loss, changing ocean currents, warming water in spawning areas and commercial harvest of all life stages). American Eel are "Endangered" under the Ontario *Endangered Species Act, 2007* (ESA). American Eel are also being considered for designation under the Federal *Species at Risk Act* (SARA).

To reduce sources of mortality affecting populations, both recreational and commercial American Eel fisheries have been closed in Ontario waters since 2004. Quebec commercial American Eel fisheries were closed on the Ottawa River in 2013 in response to national recovery recommendations.

**American Eel Management Challenges**

- Upstream and downstream movement of American Eel is impaired on the Ottawa River
- American Eel populations can no longer support sustainable harvest

The MNRF is currently developing a government response statement that will provide direction on actions to help recover American Eel in Ontario. Upon completion of the government response statement, the zone-specific goals, objectives and actions required to support the recovery of American Eel will be reviewed.

The interim management goal for American Eel is to:

***"Support recovery of American Eel in the Ottawa River watershed."***

The following interim management actions have been recommended to address management challenges for American Eel:

1) Collaborate with Indigenous communities and other jurisdictions, as well as assist MNRF/MFFP science and other partners with American Eel stewardship, research and monitoring projects in the Ottawa River watershed that:

a) establish current abundance and distribution of American Eel in the Ottawa River and its tributaries
b) determine overwintering habitat requirements and locations
c) evaluate mortality rates at individual hydro-electric facilities, and the cumulative effects on downstream passage of American Eels
d) assess the effectiveness of existing up and downstream passage at dams and hydro-electric facilities
e) investigate methods for provision of safe and effective downstream passage for American Eel.

2) Maintain closures of commercial and recreational American Eel fisheries until populations can support sustainable harvest.
3) Protect American Eel habitat throughout their current range in the Ottawa River.
4) Support the development and use of mitigation measures and best management practices at hydro-electric generating stations to reduce impacts on American Eel (e.g. eel passage, fish-friendly turbines, flows, etc).
5) Increase public awareness of the cultural and ecological significance of American Eel, and the threats they are facing.
6) Collect reports of American Eel sightings (dead or alive).

**Table 14 Management Summary for American Eel of the Ottawa River**

| | |
|---|---|
| **Goal (Interim)** | Support recovery of American Eel in the Ottawa River watershed. |
| **Indicators** | TBD |
| **Benchmarks** | TBD |
| **Targets** | TBD |
| **Management Actions (Interim)** | 1) Collaborate with Indigenous communities and other jurisdictions (e.g. international, federal, and provincial), as well as assist MNRF/MFFP science and other partners with American Eel stewardship, research and monitoring projects in the Ottawa River watershed that:<br>a) establish current abundance and distribution of American Eel in the Ottawa River and its tributaries<br>b) determine overwintering habitat requirements and locations<br>c) evaluate mortality rates at individual hydro-electric facilities, and the cumulative effects on downstream passage of American Eels<br>d) assess the effectiveness of existing up and downstream passage at dams and hydro-electric facilities<br>e) investigate methods for provision of safe and effective downstream passage for American Eel.<br>2) Maintain closures of commercial and recreational American Eel fisheries until populations can support sustainable harvest.<br>3) Protect American Eel habitat throughout their current range in the Ottawa River.<br>4) Support the development and use of mitigation measures and best management practices at hydro-electric generating stations to reduce impacts on American Eel (e.g. eel passage, fish-friendly turbines, etc).<br>5) Increase public awareness of the cultural and ecological significance of American Eel, and the threats they are facing.<br>6) Collect reports of American Eel sightings (dead or alive). |

### 4.3.2 LAKE STURGEON

Lake Sturgeon populations vary from very poor to good in the reaches of the Ottawa River and they are no longer present in many tributaries. The water levels and flows of the Ottawa River and its tributaries are highly regulated by multiple hydro-electric generating stations and control dams. These dams result in highly fragmented populations and may also block access to important habitats throughout the year (e.g. spawning, nursery habitats). Lake Sturgeon productivity is affected to some degree by water management in all reaches. Lake Sturgeon numbers are lowest in reaches with extreme water drawdowns and highest in reaches where more natural flow regimes are maintained.

In the past, Lake Sturgeon supported commercial harvest fisheries and are currently under illegal harvest pressure to supply caviar markets. Most global sturgeon fisheries are already closed as result of over harvest and habitat loss. The Lake Sturgeon population in the Ottawa River watershed has been impaired by the impacts of historical log-running activities and present day hydro-electric developments. Lake Sturgeon populations of the Great Lakes and St. Lawrence region including the Ottawa River are designated as "Threatened" under the Ontario *Endangered Species Act* (ESA). Lake Sturgeon are under review for designation under the Federal *Species at Risk Act* (SARA).

Ontario closed all commercial Lake Sturgeon fisheries in the 1980s and recreational fisheries in 2009. Quebec closed commercial fisheries of the Ottawa River in 2013 and closure of the recreational fishery is under consideration.

**Lake Sturgeon Management Challenges**

- Each reach has different water management regimes and habitat quality
- Cost-effective fish passage technology is not available for Lake Sturgeon
- Lake Sturgeon populations can no longer support sustainable harvest

The MNRF is currently developing a government response statement that will provide direction on actions to help recover Lake Sturgeon in Ontario. Upon completion of the government response statement, the zone-specific goals, objectives and actions required to support the recovery of Lake Sturgeon will be reviewed.

The interim management goal for Lake Sturgeon is to:

***"Support recovery of Lake Sturgeon in the Ottawa River watershed."***

The following interim management strategies and actions have been recommended to address management challenges for Lake Sturgeon:

1) Collaborate with Indigenous communities and other jurisdictions, as well as assist MNRF/MFFP science and other partners with Lake Sturgeon stewardship, research and monitoring projects in the Ottawa River watershed that:
    a) establish Lake Sturgeon population benchmarks
    b) investigate methods for provision of safe and effective fish passage technology for Lake Sturgeon
    c) determine requirements for, and availability of, Lake Sturgeon spawning and nursery habitats, including larval drift
    d) develop mitigation measures for Lake Sturgeon affected by water level manipulation
    e) evaluate specific sources, rates and cumulative effects of Lake Sturgeon mortality
2) Maintain closures of commercial and recreational Lake Sturgeon fisheries until populations can support sustainable harvest.

3) Protect Lake Sturgeon habitat throughout their current range in the Ottawa River.
4) Support the development and use of mitigation measures and best management practices at hydro-electric generating stations to reduce impacts on Lake Sturgeon (e.g. sturgeon passage, fish-friendly turbines, flows, etc.).
5) Increase public awareness of the cultural and ecological significance of Lake Sturgeon, and the threats they are facing. Encourage the enjoyment of Lake Sturgeon viewing opportunities.
6) Collect reports of Lake Sturgeon sightings (dead or alive).

**Table 15 Management Summary for Lake Sturgeon of the Ottawa River**

| | |
|---|---|
| **Goal (Interim)** | Support recovery of Lake Sturgeon in the Ottawa River watershed. |
| **Indicators** | TBD |
| **Benchmarks** | TBD |
| **Targets** | TBD |
| **Management Actions (Interim)** | 1) Collaborate with Indigenous communities and other jurisdictions (e.g. federal and inter-provincial), as well as assist MNRF/MFFP science and other partners with Lake Sturgeon stewardship, research and monitoring projects in the Ottawa River watershed that:<br>a) establish Lake Sturgeon population benchmarks<br>b) investigate methods for provision of safe and effective fish passage technology for Lake Sturgeon<br>c) determine requirements for, and availability of, Lake Sturgeon spawning and nursery habitats, including larval drift<br>d) develop mitigation measures for Lake Sturgeon affected by water level manipulation<br>e) evaluate specific sources, rates and cumulative effects of Lake Sturgeon mortality<br>2) Maintain closures of commercial and recreational Lake Sturgeon fisheries until populations can support sustainable harvest.<br>3) Protect Lake Sturgeon habitat throughout their current range in the Ottawa River.<br>4) Support the development and use of mitigation measures and best management practices at hydro-electric generating stations to reduce impacts on Lake Sturgeon (e.g. sturgeon passage, fish-friendly turbines, flows, etc).<br>5) Increase public awareness of the cultural and ecological significance of Lake Sturgeon, and the threats they are facing. Encourage the enjoyment of Lake Sturgeon viewing opportunities.<br>6) Collect reports of Lake Sturgeon sightings (dead or alive). |

Juvenile Lake Sturgeon, Tim Haxton, MNRF

### 4.3.3 Other Species at Risk Fish

Other species at risk identified above in Table 13 occur in the Ottawa River. Very few of these species at risk and other less common fish species have been detected by any of the fish monitoring protocols used on the Ottawa River to date. Main sources of information on these rare fish have come from historical accounts, academic research, non-standardized surveys, impact assessments and fish collection reports – all of which are not sufficient to evaluate population characteristics, status or distribution for these species.

Small species at risk fish that could potentially be used as or mistaken for other baitfish species are typically excluded from the regulated list of permitted baitfish species in Ontario. Additionally, the Ottawa River is a refuge for species at risk freshwater mussels (see section 3.5.3.4 in Background Information Report). Should a management plan or government response statement ever be produced for species at risk fish present in the Ottawa River, their management will be revisited.

## 4.4 Monitoring Strategy for Fisheries of the Ottawa River

Monitoring of the Ottawa River fish populations is a critical component to managing fisheries in a sustainable manner. A number of assessment tools have been used over the past two decades, each with inherent biases in terms of target species, size of fish caught, catch rates, timing, etc. Early survey methods targeted a single species of interest to fisheries managers, providing detailed information to support management decisions. Since 2008, techniques have been implemented that target key fish species and provide a measure of fish community composition. Even though these recent survey methods are meant to sample a wide variety of fish species, not all fish species of the Ottawa River are caught in sufficient quantities to assess population status. Enhancement to existing methods or use of additional survey methodologies may be required.

Standardized index netting methods are used to monitor the health of individual fish populations and the composition of fish communities. Fish caught in nets are counted, identified to species and usually sampled for length, weight, age, sex and maturity. Aspects of fish populations examined often include relative abundance, size distribution, age class frequency (number of young produced each year), growth rates and mortality rates. Fish population health is assessed by comparing survey results against scientifically determined reference points of population health. Population surveys must be repeated using the same assessment protocols to detect changes in population status and trends through time. Detailed descriptions of assessment protocols used can be found in the Ottawa River Background Information Report in Section 3.2.

In addition to fish population information, the amount of fishing activity (pressure) can be assessed by conducting creel surveys (angler interviews), aerial angler counts, fishing diaries or angler questionnaires. These surveys collect information about how many anglers are fishing, where, when and how long anglers are fishing, and what they are catching, releasing and harvesting. Angler creel surveys are expensive and many fisheries of the Ottawa River have not been evaluated. Other ways to gather fishing effort information should be explored. Indigenous Traditional Knowledge, diaries and anecdotal reports from various fishery users may be useful.

Ontario and Quebec have a history of working together since 1997 to monitor the fisheries of the Ottawa River. All major reaches have been surveyed, except for the two side-channels located on the Quebec-side of the Ottawa River. Index netting and angler creel surveys have focused primarily on Walleye. Index netting surveys have not been repeated using the same assessment methods, so it has been difficult to evaluate the trend of fish population health, or the long-term effectiveness of fishing regulations. Fish population and angler creel datasets are incomplete for most species.

Three different netting surveys have been conducted on the Ottawa River since 1998. Fall Walleye Index Netting (FWIN) was used between 1998 and 2003 to assess the Walleye populations in all reaches of the river. Nearshore Community Index Netting (NSCIN) was used between 1997 and 2004 in 9 of 10 reaches to assess fish in the near shore habitat. All reaches of the Ottawa River were sampled using BsM starting in 2008 and will be repeated every five years.

BsM appears to be effective for Walleye, Northern Pike, Lake Sturgeon and possibly other fish species. BsM, at its designed level of sampling intensity does not catch American Eel, Muskellunge, Largemouth Bass or panfish (Brown Bullhead, Black Crappie, sunfish, and Rock Bass) in sufficient numbers to allow meaningful assessment of mortality rates or size distributions for these fish. Enhanced sampling intensity may be required to catch enough fish to allow assessment of population attributes and status. Other types of standard netting surveys should be explored and possibly implemented to supplement the BsM program.

At present, useful baseline population information is available for Walleye, Sauger, Northern Pike, Channel Catfish and Lake Sturgeon. Information is insufficient for bass, Muskellunge, American Eel, Black Crappie, Yellow Perch and Brown Bullheads.

The following strategies should be pursued to develop a comprehensive monitoring program for the Ottawa River:

- Explore increasing BsM netting intensity to collect sufficient numbers of the key fish species to allow assessment of population status and trends.
- Consider using other index netting protocols to collect fish population information that cannot be collected by BsM program.
- Explore options to gather required panfish population information, including enhanced monitoring, research and partnerships.
- Explore potential to monitor bass population using catch and weight data collected by competitive fishing events.
- Determine if more intense monitoring is required for reaches that support harvest from both commercial and recreational fisheries.
- Support the development of conversion factors to allow comparison of BsM data with NSCIN and FWIN datasets.
- Continue using the Ontario results of the Survey of Recreational Fishing in Canada to track angler effort and species preferences.
- Explore the possibility of adding questions regarding the Ottawa River to the Quebec version of the Survey of Recreational Fishing in Canada
- Continue to coordinate interprovincial fisheries monitoring.

**Fisheries Monitoring Challenges**

- Fish population information is incomplete for many important fisheries
- Each reach of the Ottawa River has different fish species and fish communities
- Fishery use and harvest levels differ by reach
- Status and mortality rates of fish populations are different by reach

The management goal for fisheries monitoring is to:

***"Develop a monitoring strategy for key fisheries of the Ottawa River that provides information needed to make sound management decisions."***

The following management actions have been recommended to address fisheries monitoring challenges:

1) Implement BsM as the primary survey to assess fish populations of the Ottawa River every five years.
2) Implement science recommendations for enhanced or supplemental monitoring to collect population and/or distribution information for Walleye, Sauger, Northern Pike, Smallmouth and Largemouth Bass, Panfish (Sunfish, Black Crappie and Rock Bass), Yellow Perch, Brown Bullhead, Channel Catfish, Lake Whitefish, and other rare fish species.
3) Use angler diary programs and recreational fishing surveys to monitor fishery trends (i.e. catch, harvest and release rates, and sizes).

**Table 16 Management Summary for Monitoring the Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Develop a monitoring strategy for key fisheries of the Ottawa River that provides information needed to make sound management decisions. |
| **Management Actions** | 1) Implement BsM as the primary survey to assess fish populations of the Ottawa River every five years.<br>2) Implement science recommendations for enhanced or supplemental monitoring to collect population and/or distribution information for Walleye, Sauger, Northern Pike, Smallmouth and Largemouth Bass, Panfish (Sunfish, Black Crappie and Rock Bass), Yellow Perch, Brown Bullhead, Channel Catfish, Lake Whitefish, and other rare fish species.<br>3) Use angler diary programs and recreational fishing surveys to monitor fishery trends (i.e. catch, harvest and release rates, and sizes). |
| **Performance Measures** | i) All 10 reaches of the Ottawa River re-assessed every five years.<br>ii) Number of fish species with sufficient biological samples collected.<br>iii) Number of angler diaries and survey responses received. |

## 4.5 Fish Habitat Management Strategy

Fish need water, oxygen, food and shelter so they can live, feed, grow and reproduce. Healthy sustainable fisheries require suitable amounts of fish habitat. Most threats to fish habitat come from the various land uses and development that occur along the shorelines of the watershed. Fish habitats of the Ottawa River are currently stressed to varying degrees in each reach by urban, residential, commercial, industrial and agricultural sources.

Degradation and loss of fish habitat include changes to the following:

- habitat areas critical for natural fish reproduction (spawning and nursery habitats)
- in-water fish habitats associated with shorelines, shallow water, wetlands and tributaries
- fish movement corridors and access to critical fish habitats
- water quantities, levels, flows and temperature
- water quality, shoreline stability, sediments and sources of contaminants

Each fish species has different habitat requirements and needs. It is not possible to map all habitats or to measure the absolute amount of fish habitat. Effort tends to be focused on key habitats that support reproduction as they are often the limiting factor to fish populations. Fortunately, spawning habitats associated with specific water features such as rapids are easiest to identify. Few habitat mapping projects have been undertaken on the Ottawa River. Limited information is available about spawning areas for Walleye, Sauger, Lake Sturgeon and Muskellunge. Key habitats are not mapped for many key fish species.

Monitoring the size or age distributions of sentinel fish species is an indirect way of assessing spawning habitat supply. An overall reduction in abundance or the loss of small fish in a population is often indicative of either a spawning or nursery habitat deficiency. Caution must be taken using this approach, as it is difficult to fix habitat problems after failed fish reproduction is observed. Reproduction can also be altered by changes to the fish community.

Shoreline, floodplain, wetland and shallow water nesting/spawning and nursery habitats benefit Muskellunge, Northern Pike, bass, crappie, and bait / forage fishes. Fast water, rocky riffle spawning habitats benefit Walleye, Sauger, Lake Sturgeon, suckers, and redhorse species. Protecting the abundance of these general habitat features will benefit many fish species. It is also particularly important to focus protection and restoration efforts on habitats critical to recovery of species at risk and migration routes to / from spawning areas. Special attention must be paid to key supporting habitats located in tributaries and impacted by waterpower facilities.

Many types of habitat cannot be restored once lost. Habitat protection must be done on a proactive basis, maintaining habitat during development proposals. Fish habitat is maintained through avoidance, mitigation and/or off-setting measures as appropriate on a case by case basis. If this is not done, there will be a gradual loss of habitat that will eventually reduce overall fish community and fishery production levels. It is necessary to ensure impacts to fish habitat are addressed during various government reviews and approvals by working with other agencies and developers.

Fish habitat protection and restoration priorities for the Ottawa River are:

- Shoreline, floodplain, wetland and shallow water nesting/spawning and nursery habitats to benefit Muskellunge, Northern Pike, bass, crappie, and bait / forage fishes
- Fast water, rocky riffle spawning habitats to benefit Walleye, Sauger, and suckers
- Habitats critical to recovery of species at risk
- Migration routes to / from spawning areas for all species
- Key supporting habitats located in tributaries or below waterpower facilities

Regulatory responsibilities for fish habitat, water levels and flows, water quality, contaminants and shoreline development are divided between several government agencies (e.g. Fisheries and Oceans Canada, Ontario/Quebec environment and natural resource Ministries, municipalities and Conservation Authorities). To avoid the loss and degradation of fish habitat a coordinated approach and sharing of fish habitat information between agencies is necessary. MNRF and MFFP will collaborate with other government agencies to address issues impacting fisheries and fish habitat for which they are responsible.

Priority should be given to minimize impacts from the following development activities:

- Waterpower facilities, control dams and water management
- Shoreline development and removal of natural vegetation
- Industrial water-taking and effluent discharge
- Run-off from urban and agricultural land uses
- In-water development, filling, dredging and other alterations
- Road and water crossing infrastructure

**Fish Habitat Challenges**

- It is not possible to map all habitats or to measure the amount of habitat
- There are many direct and indirect man-made threats to fish habitat
- Fish habitat cannot be easily restored or replaced once it is lost
- Many agencies are responsible for different aspects of fish habitat management

The management goal for fish habitat is to:

***"Maintain, enhance and restore fish habitats critical to the sustainability of fisheries and to produce healthy fish that are safe to eat".***

The following management actions have been recommended to address fish habitat management challenges:

1) Identify critical fish habitats with assistance of partners and proponents of development.
2) Compile fish habitat information from consultant reports and stakeholder groups.
3) Communicate with waterpower producers about water management during critical time periods for fish (i.e. spawning, incubation, larval drift and migration).
4) Support the review and assessment of proposed development projects that may pose risk to fish communities, habitats and ecosystems.
5) Continue to look for new opportunities to incorporate aquatic ecosystem protection strategies into land-use, resource management and watershed planning at appropriate scales.

**Table 17 Management Summary for Fish Habitat of the Ottawa River**

| | |
|---|---|
| **Goal** | Maintain, enhance and restore fish habitats critical to the sustainability of fisheries and to produce healthy fish that are safe to eat. |
| **Management Actions** | 1) Identify critical fish habitats with assistance of partners and proponents of development.<br>2) Compile fish habitat information from consultant reports and stakeholder groups.<br>3) Communicate with waterpower producers about water management during critical time periods for fish (i.e. spawning, incubation, larval drift and migration).<br>4) Support the review and assessment of proposed development projects that may pose risk to fish communities, habitats and ecosystems.<br>5) Continue to look for new opportunities to incorporate aquatic ecosystem protection strategies into land-use, resource management and watershed planning at appropriate scales. |
| **Performance Measures** | i) Number fish habitat surveys conducted by partners and consultants.<br>ii) Number of fish habitats compiled into government databases from consultant reports and stakeholder groups.<br>iii) Number of contacts made with waterpower producers about water level management and critical time periods for fish.<br>iv) Number of projects and plans reviewed. |

Lac du Rocher Fendu, Ottawa River, Tania Baker, MNRF

## 4.6 Public Education and Stakeholder Involvement Strategy

There are many advantages to involving stakeholders in the decision-making processes of fisheries management. Resource users know fisheries well. Active public participation allows fishery users to inform fishery managers about how fisheries are used, what defines quality fisheries and issues threatening fishery health. Action strategies designed by stakeholders tend to be more widely accepted since they work towards a shared vision of an improved fishery.

Direct involvement through partnerships is a great way to complete much needed projects while giving stakeholders and volunteers a stronger appreciation of fisheries management. Educational outreach on topics important to the fisheries helps create public awareness and improves the use of best fishing practices. Engaged stakeholders assist with education by sharing information and experiences with others. Many partners are already very active educators on topics important to fisheries. We should support partner programs rather than duplicating efforts whenever possible.

Established partners with outreach programs that will support efforts on the Ottawa River include but are not limited to the following:

- Muskies Canada: Muskellunge Angler Diary Program and Know the Difference Campaign
- Ontario Federation of Anglers and Hunters: Ontario Invading Species Awareness Program and Trophy Fish Registry
- Ottawa Riverkeeper: Riverwatch Network

The recommendations included in this fisheries management plan for the Ottawa River were provided by a multi-stakeholder Advisory Council. Feedback was gathered from stakeholder networks to include interests of additional fishery users not represented by council members.

Council members represented the interests of many fishery users and stakeholders including:

- Anglers from all reaches of the Ottawa River in both Ontario and Quebec
- Ontario Federation of Anglers and Hunters and several fishing clubs
- Fédération Québécoise des Chasseurs et Pêcheurs
- Muskies Canada, various bass fishing clubs and the urban fishing community
- Professional and casual competitive fishing events (anglers and organizers)
- Nature and Outdoor Tourism Ontario, fishing-based businesses and outfitters
- Industrial river users -- Ontario Power Generation and Canadian Nuclear Laboratories
- Algonquins of Ontario and other local Indigenous communities
- Ottawa Riverkeeper and other environmental supporters
- Academic and research community
- Commercial fishers and baitfish harvesters

The Advisory Council identified issues of concern, ranked their importance and helped select management actions to address them. The Council will be retained to guide implementation, form partnerships, assist with communication and conduct reviews.

Direct involvement of fishery users and stakeholders in management decisions made for fisheries of the Ottawa River will include:

- Multi-stakeholder representation on Advisory Council
- Active networking with fishery users and stakeholders
- Public review of proposed Fisheries Management Plan
- Participation in plan reviews and amendment decisions
- Input on fishing regulation development and changes
- Regular progress reporting and communications

The Advisory Council will assist with our continuing efforts to form partnerships with fishery users to involve them in fisheries management activities and to complete key actions. All interest groups on the Advisory Council have expressed interest in networking and acting as partners to assist with plan implementation.

Some potential partnership projects include:

- mapping and monitoring of fish spawning areas
- invasive species surveys
- collection of Indigenous Traditional Knowledge
- angler diary programs
- fish habitat enhancement and restoration
- shoreline naturalization
- educational outreach on key messages important to fisheries
- marketing of unique and alternative fishing opportunities
- promotion of Ottawa River catfish
- enhanced accessibility to fisheries, and
- boat launch inventory

Identifying and using innovative ways and social media to get key messages out to everyone is important. Additionally, efforts are necessary to avoid duplication by supporting partnership initiatives first (i.e. OFAH Invading Species Awareness Program and Muskies Canada Know the Difference campaigns).

**Management Challenges to Public Education and Stakeholder Involvement:**

- Many fishery stakeholders and users, each with their own expectations
- It is difficult to get fisheries information and knowledge out to all fishery users

The management goal for public education and stakeholder involvement is:

***"Improve stakeholder awareness and involvement in fisheries management on the Ottawa River."***

The following management actions have been recommended to address public education and stakeholder involvement challenges:

1) Use the Ottawa River Management Group to determine a cross-border communication approach that includes fishery users on both sides of the Ottawa River in management decisions and announcements.
2) With assistance of partners produce and share educational materials as described in each management strategy in Section 4 of this Plan.
3) Develop strategic partnerships that directly involve stakeholders in fisheries management activities and to help complete key actions.
4) Increase public awareness of opportunities to report fishing violations through available enforcement tips hotlines.

**Table 18 Management Summary for Stakeholder Involvement on the Ottawa River**

| | |
|---|---|
| **Goal** | Improve stakeholder awareness and involvement in fisheries management on the Ottawa River. |
| **Management Actions** | 1) Use the Ottawa River Management Group to determine a cross-border communication approach that includes fishery users on both sides of the Ottawa River in management decisions and announcements.<br>2) With assistance of partners produce and share educational materials as described in each management strategy in Section 4 of this Plan.<br>3) Develop strategic partnerships that directly involve stakeholders in fisheries management activities and to help complete key actions.<br>4) Increase public awareness of opportunities to report fishing violations through available enforcement tips hotlines. |
| **Performance Measures** | i) Number of projects started and completed using partnerships.<br>ii) Number of educational outreach events/types being used.<br>iii) Implementation of a cross-border communication approach.<br>iv) Number of fishing violation tips received by hotlines. |

Winter view of Ottawa River near Petawawa, Tania Baker, MNRF

## 4.7 Commercial Fisheries Management Strategy

There are eight commercial fishing licences on the Ottawa River as of March 2014: five in Quebec waters and three in Ontario waters. Five commercial fishing licences are located in Lac Dollard des Ormeaux below the City of Ottawa: three Ontario and two Quebec licenses. The other three Quebec commercial licenses are assigned to Lac des Chats, Lac Deschênes and the stretch of river from Fort William in Upper Allumette to Chenaux dam at the southern end of Lac du Rocher Fendu.

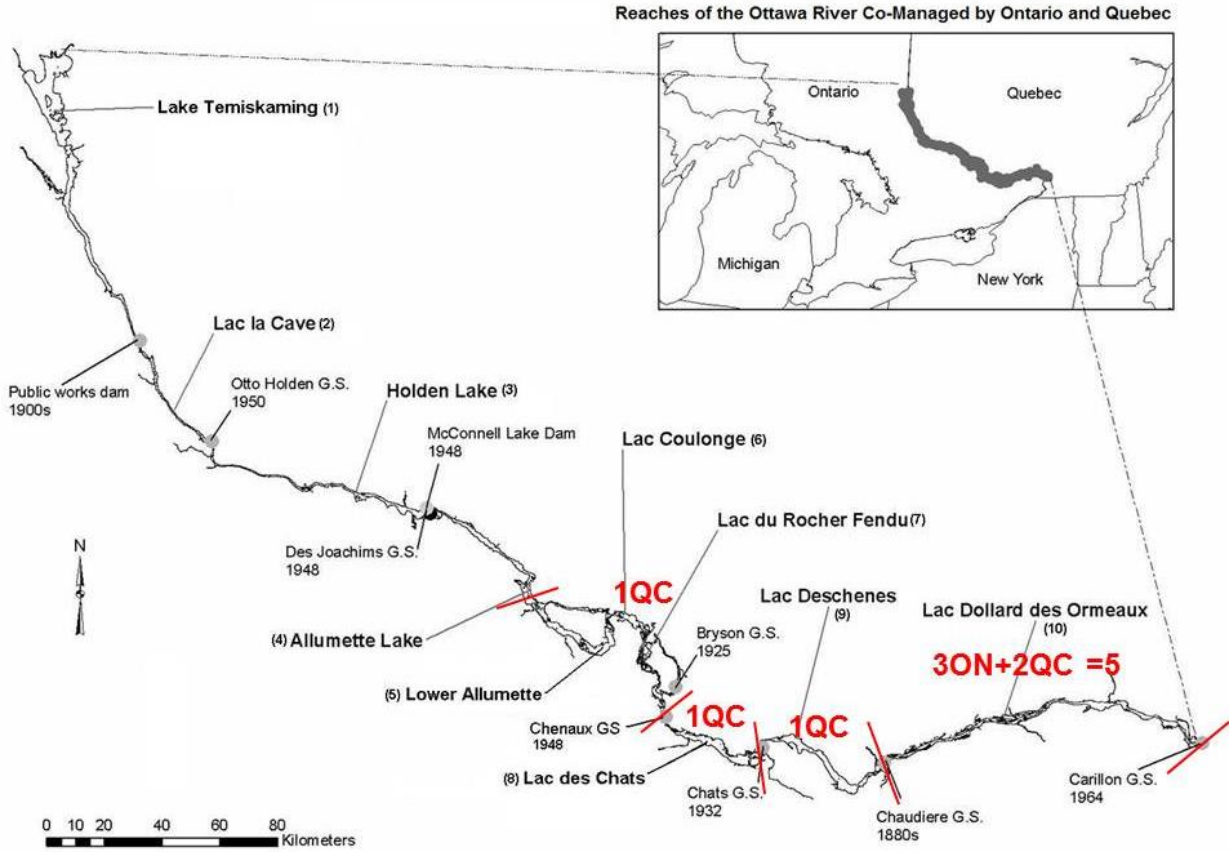



**Figure 22 Commercial Fishing Licences of the Ottawa River**

Commercial harvest has been limited to coarse fish (i.e. Channel Catfish, bullheads, Common Carp, suckers, Freshwater Drum, and Mooneye) and some panfish species (i.e. Yellow Perch, Black Crappie, sunfish and Rock Bass) on the Ottawa River. There is no commercial harvest of traditional sport fishes such as Walleye, Northern Pike, bass or Muskellunge on the Ottawa River. Commercial fisheries for American Eel and Lake Sturgeon are closed. Declines of Brown Bullhead and Yellow Perch have also been reported by the recreational fishing community. Abundant Channel Catfish populations may offer additional commercial opportunities (see Channel Catfish Strategy in Section 4.2.6).

The commercial fishers of the Ottawa River have harvested little over the last 15 years due to problems accessing stable fish markets, rising fuel costs and closure of key fisheries (i.e. Lake Sturgeon and American Eel).

**Table 19 Commercial Fishing Quotas for the Ottawa River for 2009 and 2014**

| Fish Species | Ontario Quotas (lbs) | | Quebec Quotas (lbs) | |
|---|---|---|---|---|
| | 2009 | 2014 | 2009 | 2014 |
| Sunfish | 10,992 | 10,992 | unlimited | closed |
| Yellow Perch | 4,020 | 4,020 | none (0) | closed |
| Black Crappie | 2,536 | 2,536 | unlimited | closed |
| Rock Bass | 992 | 992 | unlimited | closed |
| American Eel | closed | closed | unlimited >20 cm | closed |
| Lake Sturgeon | closed | closed | 2950 | none (0) |
| Bullheads | 36,000 / 1-unlimited | 36,000 / 1-unlimited | unlimited | closed |
| Channel Catfish | 10,000 / 2-unlimited | unlimited | unlimited | closed |
| Carp | unlimited | unlimited | unlimited | unlimited |
| White sucker | unlimited | unlimited | none (0) | closed |
| Drum | unlimited | unlimited | none (0) | closed |
| Mooneye | none (0) | none (0) | unlimited | closed |

Sources:
Ottawa River Harvest Records, Lake Ontario Management Unit, OMNRF
Gazette Officielle du Québec

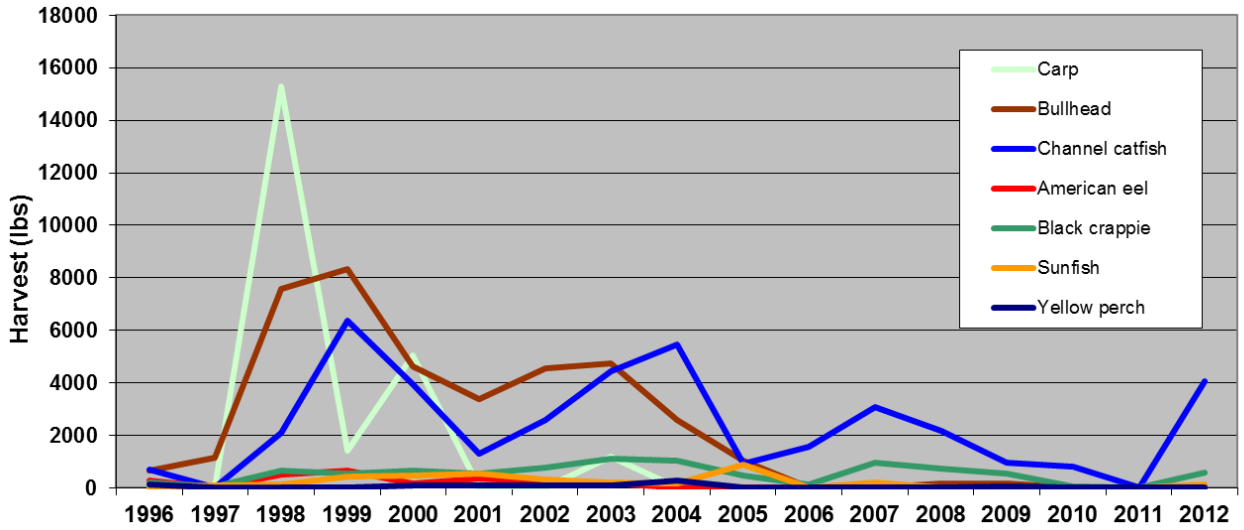



**Figure 23 Ontario Commercial Fishery Harvest Trends for the Ottawa River 1996-2012**

There is potential to develop or expand a commercial Channel Catfish fishery on the Ottawa River using existing licences. Strong “Ottawa River catfish” branding and spin-off catfish products could be developed by the industry. MNRF/MFFP could facilitate this shift in the fishery, by managing commercial harvest quotas in balance with other fishery users to ensure sustainability.

Since there are commercial fishing licences in both Ontario and Quebec waters it would be beneficial to conduct a joint quota review. Use of quotas for fish species shared with recreational users should be considered. The use of live-capture gear will continue to be encouraged, so non-target fish species can be released. Work directly with commercial fishers to identify potential fishery problems and see if the commercial fisheries of the Ottawa River can be revitalized through the development of an expanded Channel Catfish fishery.

**Commercial Fisheries Management Challenges**

- Managing quotas of multiple licences located in two provinces
- Maintaining overall abundance and size quality of commercially used fish populations

The management goal for commercial fisheries is to:

***"Maintain commercial fish harvest within sustainable limits and in balance with other fishery uses."***

The following management actions have been recommended to address commercial fisheries management challenges. They were developed to be consistent with the Strategic Policy for Ontario's Commercial Fisheries (2011) and MFFP's 2014-2018 Strategic Plan.

1) Assess commercial fishing quotas to ensure sustainability and balance with other users.
2) Work with partners to produce and disseminate communication materials about commercial fishing on the Ottawa River, outlining economic value and how harvest is regulated.
3) Explore potential to expand commercial Channel Catfish fishing to other reaches and if feasible work with commercial fishers to take advantage of underutilized catfish fisheries.
4) Communicate with partners and other relevant governments about the catfish fishery as a potential commercial fishery.

**Table 20 Management Summary for Commercial Fisheries of the Ottawa River**

| | |
|---|---|
| **Goal** | Maintain commercial fish harvest within sustainable limits and in balance with all other fishery uses. |
| **Management Actions** | 1) Assess commercial fishing quotas to ensure sustainability and balance with other users.<br>2) Work with partners to produce and disseminate communication materials about commercial fishing on the Ottawa River, outlining economic value and how harvest is regulated.<br>3) Explore potential to expand commercial Channel Catfish fishing to other reaches and if feasible work with commercial fishers to take advantage of underutilized catfish fisheries.<br>4) Communicate with partners and other relevant governments about the catfish fishery as a potential commercial fishery. |

Channel Catfish, MNRF

## 4.8 Management Strategy for Invasive Species and Diseases

Non-native species and diseases can have lasting impacts on native fisheries and ecosystems. Zebra mussels, rusty crayfish and spiny waterflea have already spread into many tributaries of the Ottawa River, putting the fisheries at risk. Other harmful species such as Quagga Mussels, Round Goby, Asian Carp and many foreign plants are nearby in Lake Ontario and downstream in the St. Lawrence River. There are also concerns that Viral Hemorrhagic Septicaemia (VHS) may spread from the Great Lakes, St. Lawrence or Lake Simcoe. Invasive species and disease are easily moved to other water bodies unknowingly by anglers, sportsmen and recreationalists on boats, recreational gear and in bait buckets. Once unwanted species or diseases are established they are nearly impossible to eradicate. There is an active eradication / control program for water chestnut in Voyager Provincial Park on the Ottawa River that invests 100s of hours each year attempting to control the spread of this plant.

The OFAH has a website entitled Early Detection and Distribution Mapping System (EDDMapS Ontario) that is based on public and government reporting. The website can be found at the following link: http://www.eddmaps.org/ontario/ The Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) pilots a similar website for Quebec (SENTINELLE): https://www.pub.mddefp.gouv.qc.ca/scc/#no-back-button/

Aquatic invasive species are also monitored during BsM; the results are reported to OFAH and updated in the MNRF Land Information Ontario (LIO) database. Table 21 is a compendium of aquatic Invasive species from these sources. In Quebec, all monitoring programs sample for aquatic invasive species. Positive results are sent to the MDDELCC SENTINELLE website. Ottawa River will be part of the Quebec Asian carp early detection program which uses environmental DNA. MFFP also monitors the Ottawa River for VHS every 2 years. Efforts are needed to establish a baseline inventory of aquatic invasive species for the reaches and tributaries of the Ottawa River based on Ontario and Quebec datasets.

**Table 21 Aquatic Invasive Species active in the Ottawa River**

| Scientific name | Common name | LIO | EDD | (Total LIO+EDD) - Duplicates | Type |
|---|---|---|---|---|---|
| Dreissena polymorpha | Zebra Mussel | 37 | 77 | 91 | Invertebrates (Non-insects) |
| Bythotrephes longimanus | Spiny waterflea | 0 | 69 | 69 | Invertebrates (Non-insects) |
| Trapa natans | Water Chestnut | 15 | 14 | 15 | Vascular Plants |
| Orconectes rusticus | Rusty Crayfish | 6 | 5 | 10 | Invertebrates (Non-insects) |
| Gasterosteus aculeatus | Threespine Stickleback | 5 | 5 | 5 | Fish |
| Hydrocharis morsus-ranae L. | European frog-bit | 0 | 3 | 3 | Vascular Plants |
| Astronotus ocellatus | Oscar | 1 | 1 | 1 | Fish |
| Iris pseudacorus L. | Yellow iris | 0 | 1 | 1 | Vascular Plant |
| Carassius auratus | Goldfish | 1 | 0 | 1 | Fish |

Sources:
Land Information Ontario (LIO)
EDDMapS Ontario, database of OFAH Invading Species Awareness Program

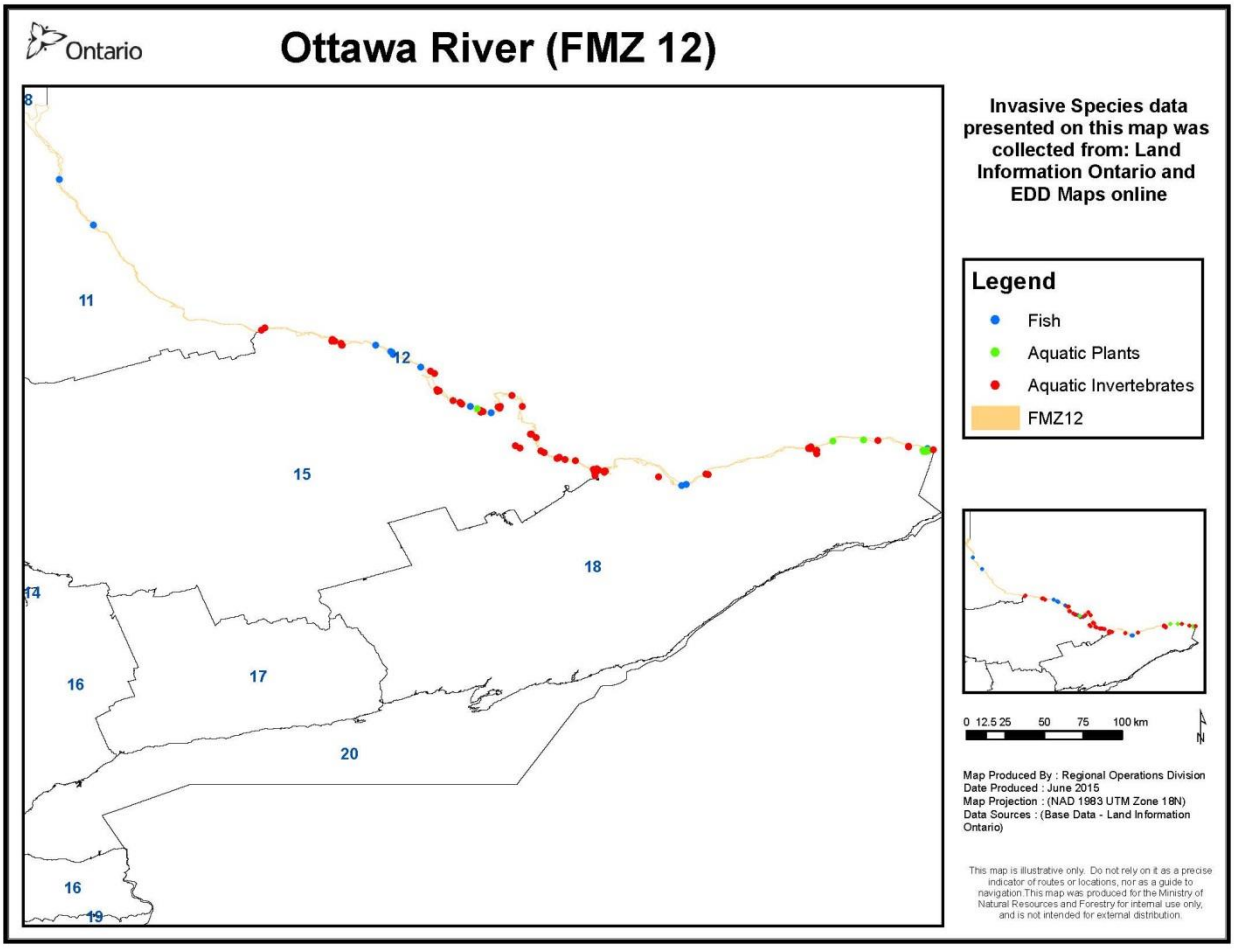



**Figure 24 Distribution of Aquatic Invasive Species in the Ottawa River**

Movement of boats, bait and gear are likely the main sources of invasive species and disease being spread in the Ottawa River watershed. There is little evidence that regular boat washing has been adopted by boat owners travelling from other parts of Ontario, as spiny waterflea and zebra mussel are actively spreading in adjacent Fisheries Management Zones.

The use and transport of live crayfish, salamanders and fish have been heavily regulated to slow the spread of invasive species and diseases. In response to ongoing threats of invasive species and disease, Quebec and most other provinces in Canada have restricted the use of live baitfish. Quebec has completely banned the use of live baitfish and stopped the use of dead baitfish during summer in all fishing zones, including the Ottawa River. Ontario bait regulations are currently under review and could change. Bait regulations are currently different on each side of the Ottawa River. Efforts should be made to harmonize baitfish regulations if possible. However, regulations alone are not a full solution. Anglers and boaters must still do their part to avoid spreading these harmful species and diseases.

The potential sources of invasive species and disease are:

- use and movement of live baitfish and leeches
- all activities that use boats, including fishing events
- fish stocking of non-native trout species
- unauthorized stocking and illegal transfers of fish
- water gardens, aquariums and live food markets

The following management strategies have been recommended to address the challenges of invasive species and disease management. They were developed based on the *Ontario Invasive Species Strategic Plan* (2012) and advice from the Advisory Council:

- Determine the presence and monitor the distribution of aquatic invasive species and disease in the Ottawa River watershed.
- Promote sharing of invasive species / disease information between Ontario and Quebec.
- Monitor the spread of established invasive species within reaches, between reaches and from connecting tributaries.
- Adopt risk assessments prepared provincially or nationally for high risk aquatic invasive species.
- Focus efforts on high risk aquatic invasive species and diseases.
- Conduct a risk assessment to determine the likelihood of high risk aquatic invasive species or disease being introduced and becoming established in the Ottawa River.
- Confirm potential pathways for new high risk species and disease.
- Implement better control measures to prevent the spread and introduction of additional invasive species and disease to the Ottawa River watershed.
- Increase public awareness and use of preventative measures.
- Focus eradication and control efforts on new introductions, unless effective long-lasting control options become available for established species.
- Offer unlimited harvest opportunities for invasive / non-native fish species. (e.g. unlimited Common Carp limits for both recreational and commercial fisheries).

**Invasive Species and Disease Management Challenges**

- Many harmful invasive species and diseases are present in nearby waters and tributaries
- Invasive species / disease are easily transferred undetected among water bodies
- Education alone is not preventing the spread of invasive species and disease
- Invasive species and disease are often impossible to eradicate once established

The management goal for invasive species and disease is to:

***"Prevent the introduction and limit the spread of aquatic invasive species and disease in Ottawa River."***

The management objectives for invasive species and disease:

i) No introductions of new invasive species and diseases
ii) Minimize the spread of invasive species and diseases already present

The following management actions have been recommended to address invasive species and disease management challenges:

1) Work with adjacent fisheries management zones to track and eradicate aquatic invasive species in the Ottawa River watershed.
2) Increase public awareness and use of preventative measures by supporting the OFAH Invading Species Awareness Program and similar programs in Quebec.
3) Investigate fish die offs and assist with disease testing as required.
4) Identify priority areas for: signage, education/awareness and boat washing.
5) Conduct a risk assessment to determine the likelihood of invasive species / disease introduction and establishment.
6) Recommend science needs to address eradication, control and "easy to use" prevention measures for aquatic invasive species.
7) With assistance of partners produce and disseminate communication materials to promote prevention, eradication and control efforts for new introductions.

**Table 22 Management Summary for Invasive Species and Disease**

| | |
|---|---|
| **Goal** | Prevent the introduction and limit the spread of aquatic invasive species and disease in Ottawa River. |
| **Objectives** | i) No introductions of new invasive species and diseases<br>ii) Minimize the spread of invasive species and diseases already present |
| **Indicators** | i) Number of established aquatic invasive species and diseases by reach<br>ii) Distribution of aquatic invasive species and diseases in watershed |
| **Benchmarks** | TBD |
| **Targets** | i) No introductions of new invasive species and diseases<br>ii) Maintain or reduce the distribution of invasive species and diseases |
| **Management Actions** | 1) Work with adjacent fisheries management zones to track and eradicate aquatic invasive species in the Ottawa River watershed.<br>2) Increase public awareness and use of preventative measures by supporting the OFAH Invading Species Awareness Program and similar programs in Quebec.<br>3) Investigate fish die offs and assist with disease testing as required.<br>4) Identify priority areas for: signage, education/awareness and boat washing.<br>5) Conduct a risk assessment to determine the likelihood of invasive species / disease introduction and establishment.<br>6) Recommend science needs to address eradication, control and “easy to use” prevention measures for aquatic invasive species.<br>7) With assistance of partners produce and disseminate communication materials to promote prevention, eradication and control efforts for new introductions. |

European water chestnut control program, Voyageur Provincial Park, Ontario Parks

## 4.9 Climate Change Adaptation Strategy

How climate change will alter habitats and fisheries on the Ottawa River is unknown. North to south climate and fish diversity gradients are naturally present. As climate warms, fish habitat, fish diversity, fish communities and fisheries available to anglers will change. There will be changes to water temperatures, amounts of flowing water, ice-cover duration and the timing of the seasons (i.e. spring, summer, fall and winter). Fish life-functions that are influenced by climate, such as the timing or success of reproduction will be affected. Some fish species may no longer be able to live in the Ottawa River as the result of water temperature changes.

Each fish species' ability to adapt to climate driven changes to water temperature is directly linked to their species-specific water temperature requirements and tolerance ranges. Warmer water temperatures will lower the number of cold-water fish species present and affect the productivity of many popular fisheries. Fish species that require cold water such as Lake Trout and Whitefish will likely become less common or disappear. Warm-water fish such as bass and sunfish will likely become more abundant. Cool-water fish species such as Walleye, Northern Pike and Channel Catfish may be positively affected by warming water temperatures and longer growing seasons.

Black Crappie, Petrie Island Ice Fishermen's Association

Although temperature changes as a result of climate change cannot be controlled or mitigated before fish populations are affected, we can monitor the effects on parameters that are important to fish (e.g., water temperature, dissolved oxygen), observe how fish communities and fish populations change, and adjust our management approaches. The following management strategies have been recommended to address the challenges of managing for climate change. They were developed based on *Climate Ready*, *Ontario's Adaptation Strategy and Action Plan* (2011-2014) and advice from climate change experts.

It would be valuable to complete a climate change vulnerability and risk assessment for fisheries and fish communities of the Ottawa River, so impacts can be anticipated. Climate change models could be used to predict population expansion or contraction patterns for native fish species. This assessment would identify which fish species and fisheries are most likely to benefit or be disadvantaged by a warming climate. Then it is a matter of monitoring the effects of climate on parameters important to fish, so we know when to react.

Climatic related parameters important to fish include:

- onset, duration and end of ice cover season
- timing, magnitude, and duration of spring freshet flow conditions
- length of open water season and mean annual growing degree days
- spring/summer seasonal temperature patterns (e.g. el Niño and la Niña years)
- water temperature/dissolved oxygen profiles and thermal stratification

There are many different agencies collecting and tracking various aspects of climate change. It will be necessary to compile or collect the climatic information required for establishing baseline values for climatic indicators important to fish. Efforts should be made to seek opportunities to

work with others (government, NGOs, academia, stakeholders, etc.) to strategically manage, monitor and react to climate change.

At minimum we can track the effects of climate change on Ottawa River fisheries by monitoring:

- fish diversity and community compositions of cold, cool and warm water fish
- timing and duration of spawning periods, and the resulting
- abundance and population structures of key fish species

As fisheries change, the following climate adaptation measures can be incorporated into recreational and commercial fisheries management strategies:

- Adjust timing of regulated fishing seasons, sanctuaries and size limits so they continue to align with spawning or overwintering periods as needed for each fish species.
- Consider more liberal regulations for abundant fish species and restrictions for those in decline.
- Avoid loss, unsustainable use or investment in fisheries that will decline while taking advantage of emerging unexploited fisheries.

Ensure that practical measures are considered to address climate change resilience of aquatic ecosystems and fisheries (link to Habitat and Invasive Species Management Strategies):

- maintain healthy shorelines, wetlands and littoral zones
- water conservation and adaptive water management
- water quality management and pollution abatement
- prevent introduction and spread of invasive species

**Climate Change Management Challenges**

- Climate is changing but how it will affect the fisheries of the Ottawa River is unknown
- Undesirable fish species may become more abundant, while key fisheries may decline
- Many agencies are tracking different climate attributes in different ways
- Lack of data on climate parameters important to fish

The management goal for climate change is to:

***"Take an adaptive approach to fisheries management that allows us to anticipate, monitor and react to the impacts of climate change."***

The following management actions have been recommended to address climate change management challenges:

1) With assistance of partners establish and monitor baseline values for climate related parameters important to fish.
2) Complete a climate change risk assessment for the fisheries and fish communities of the Ottawa River.

**Table 23 Management Summary for Climate Change on the Ottawa River**

| | |
|---|---|
| **Goal** | Take an adaptive approach to fisheries management that allows us to anticipate, monitor and react to the impacts of climate change. |
| **Management Actions** | 1) With assistance of partners establish and monitor baseline values for climate related parameters important to fish.<br>2) Complete a climate change risk assessment for the fisheries and fish communities of the Ottawa River. |
| **Performance Measures** | i) Establishment of benchmarks for climatic parameters important to fish.<br>ii) Completion of a climate change risk assessment for the Ottawa River. |

# 5. Top Recommendations for Ottawa River Fisheries Management

The Advisory Council recommended over fifty management actions to address the fisheries issues identified through the planning process. Since it will not be possible to complete all actions at once, each action was flagged as high, medium or low priority. The Advisory Council provided Top Recommendations so fisheries managers know where to start.

1. **Better Fish Habitat Protection and Ecosystem Level Management**:
   Identify and protect critical fish habitats from shoreline development, in-water work, water level/flow alterations and water quality issues; and make improvements to fish habitat where needed.

2. **Improve Quality of Walleye, Northern Pike and Muskellunge Fisheries**:
   Protect spawning-sized fish from overharvest, set fishery quality standards and consider using a size limit to improve the Northern Pike fisheries.

3. **Inter-Provincial Management of Ottawa River Fisheries:**
   All levels of government and fishery stakeholders need to work together. Harmonization of fishing regulations, cooperative enforcement efforts and consistent fisheries management approaches between Ontario and Quebec are important.

4. **Recovery Effort for American Eel and Lake Sturgeon:**
   Focus on habitat restoration for Lake Sturgeon and improving (upstream and downstream) passage for American Eel by working with waterpower producers.

5. **Regular Fisheries Monitoring:**
   Current fish population and fish community datasets are required for effective fisheries management. A comprehensive fisheries monitoring program is required for the Ottawa.

Walleye, Baitshop Bay near Petrie Island. Ottawa River, Petrie Island Ice Fishermen's Association

# 6. OTTAWA RIVER FISHERIES "ACTION" PLANNING

Following finalization of the Fisheries Management Plan, an "Action Plan" will be developed to outline how the management recommendations will be "put into action" over the next 5 to 10 years. The Action Plan will be dynamic, allowing for the assignment of action timelines, adjustment of action by dates and priorities as actions are completed.

Many actions were recommended to address each issue. Since it will not be possible to complete all actions simultaneously, each action was flagged as high, medium or low priority by the Advisory Council. Management and partnership efforts will focus on high priority action items first.

The priority categories for the actions are:

- High: important to do now and may be essential before other actions can happen
- Medium: aren't urgent but should be done sooner if an opportunity presents itself
- Low: Can wait and may be done after other higher priority actions are completed

## OTTAWA RIVER ACTION PLAN

All Actions identified in this Fisheries Management Plan have been consolidated in the following table. The Advisory Council priority rankings are also provided (High, Medium and Low). The Action Plan will be considered to inform annual work planning and strategic partnerships.

| Management Actions | Priority Ranking H,M,L |
|---|---|
| **Fish Community Diversity** | |
| 1) Use the results of BsM to track fish species diversity. | M |
| 2) Seek science advice on the best approach for monitoring the presence of rare fish species not detected by BsM. | L |
| **Walleye and Sauger** | |
| 1) Work collaboratively with fisheries managers in adjacent zones to recommend management actions that protect Ottawa River Walleye and Sauger while spawning in tributaries. (Lake Temiskaming – H) | H-L |
| 2) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information. | H |
| 3) With assistance of partners and proponents of development conduct night spawning surveys to determine timing, duration and spatial extent of spawning activity. | H |
| 4) With assistance of partners prepare and disseminate communication materials describing the rationale for the Walleye size limit regulation and the benefit of releasing large fish. | M |
| 5) Recommend Walleye size and harvest limits, and fish sanctuaries as spring enforcement priorities on the Ottawa River and its tributaries. | H |
| **Smallmouth and Largemouth Bass** | |
| 1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information. | M |
| 2) Explore potential to monitor bass population using catch and weight data collected by competitive fishing events. | M |

| Management Actions | Priority Ranking H,M,L |
|---|---|
| 3) Develop size quality benchmarks for Ottawa River bass fisheries. | M |
| 4) With assistance of partners and proponents of development, conduct spawning bed surveys to determine timing, duration and spatial extent of spawning activity; and map overwintering areas for bass. | M |
| 5) With assistance of bass clubs prepare and disseminate communication materials describing release techniques and the negative impacts of angling nesting bass. | M |
| 6) With assistance of bass clubs provide best management practice information to competitive fishing events to reduce stress on bass, including anoxia prevention, handling techniques, weigh-in procedures, release practices and prevention of fish displacement. | L |
| 7) Recommend tracking of the number and types of fishing events on the Ottawa River. | L |
| **Northern Pike** | |
| 1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information. | H |
| 2) Develop quality benchmarks for Ottawa River Northern Pike fisheries based on the preferred sizes for eating and trophy fishing. | H |
| 3) Develop size limit options to improve the size quality of the fishery. | H |
| 4) With assistance of partners produce educational material to increase angler awareness about cleaning Northern Pike, best size for harvest, importance of releasing large Northern Pike, and distinguishing between Northern Pike, Muskellunge and their hybrids. | M |
| 5) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity. | M |
| **Muskellunge** | |
| 1) With assistance of partners and proponents of development conduct spawning surveys to determine timing, duration and spatial extent of spawning activity. | H |
| 2) Recommend management actions to protect Ottawa River Muskellunge while in tributaries located in adjacent fisheries management zones. | H |
| 3) Recommend a harmonized Muskellunge season. | H |
| 4) Recommend improvements to the content of angler diary entries to include reporting of catch locations by reach of the Ottawa River. | H |
| 5) Use angler diary program data and information from the Survey of Recreational Fishing of Canada to monitor Muskellunge fishery trends (i.e. catch and release rates, size). | M |
| 6) Support efforts of Muskellunge fishing clubs to educate, promote, monitor, enhance and protect Muskellunge fisheries. | M |
| **Panfish (Sunfish, Black Crappie and Rock Bass), Yellow Perch and Brown Bullhead** | |
| 1) Identify the monitoring information required to evaluate population status by reach; identify information gaps and solicit science recommendations on how to collect the information. | M |
| 2) Review fishing regulations for Sunfish and Brown Bullhead. | M |

| Management Actions | Priority Ranking H,M,L |
|---|---|
| **Channel Catfish** | |
| 1) Develop options to track Channel Catfish fishery use and harvest rates. | L |
| 2) Seek harmonized Channel Catfish fishing regulations and management approach. | H |
| 3) With assistance of partners produce and disseminate educational materials to promote Channel Catfish including information on where to find them, how to catch them and how to prepare them. | M |
| 4) Communicate the potential for a Channel Catfish fishery to commercial fisherman. | M |
| **Other Fisheries** | |
| 1) With assistance of partners produce and disseminate educational materials to promote other fisheries, including information on how to identify them, where to find them, best times to catch them, how to fish them, and how to prepare them if they are edible. | M |
| 2) Harmonize Lake Trout fishing regulations. | M |
| 3) Identify the monitoring information required to evaluate Lake Whitefish population status by reach and solicit science recommendations on how to collect missing information. | L |
| **Other Ottawa River Management Group Discussion Items** | |
| 1) Baitfish and other bait regulations | H |
| 2) Number of ice fishing lines | L |
| **American Eel** | |
| 1) Collaborate with Indigenous communities and other jurisdictions (e.g. international, federal, provincial), as well as assist MNRF/MFFP science and other partners with American Eel stewardship, research and monitoring projects in the Ottawa River watershed that:<br>a) establish current abundance and distribution of American Eel in the Ottawa River and its tributaries<br>b) determine overwintering habitat requirements and locations<br>c) evaluate mortality rates at individual hydro-electric facilities, and the cumulative effects on downstream passage of American Eels<br>d) assess the effectiveness of existing up and downstream passage at dams and hydro-electric facilities<br>e) investigate methods for provision of safe and effective downstream passage for American Eel | H |
| 2) Maintain closures of commercial and recreational American Eel fisheries until populations can support sustainable harvest. | H |
| 3) Protect American Eel habitat throughout their current range in the Ottawa River. | H |
| 4) Support the development and use of mitigation measures and best management practices at hydro-electric generating stations to reduce impacts on American Eel. | H |
| 5) Increase public awareness of the cultural and ecological significance of American Eel, and the threats they are facing. | H |
| 6) Collect reports of American Eel sightings (dead or alive). | H |

| Management Actions | Priority Ranking H,M,L |
|---|---|
| **Lake Sturgeon** | |
| 1) Collaborate with Indigenous communities and other jurisdictions (e.g. federal and provincial), as well as assist MNRF/MFFP science and other partners with Lake Sturgeon stewardship, research and monitoring projects in the Ottawa River watershed that:<br>a) establish Lake Sturgeon population benchmarks<br>b) investigate methods for provision of safe and effective fish passage technology for Lake Sturgeon<br>c) determine requirements for, and availability of, Lake Sturgeon spawning and nursery habitats, including larval drift<br>d) develop mitigation measures for Lake Sturgeon affected by water level manipulation<br>e) evaluate specific sources, rates and cumulative effects of Lake Sturgeon mortality | H |
| 2) Maintain closures of commercial and recreational Lake Sturgeon fisheries until populations can support sustainable harvest. | H |
| 3) Protect Lake Sturgeon habitat throughout their current range in the Ottawa River. | H |
| 4) Support the development and use of mitigation measures and best management practices at hydro-electric generating stations to reduce impacts on Lake Sturgeon. | H |
| 5) Increase public awareness of the cultural and ecological significance of Lake Sturgeon, and the threats they are facing. Encourage the enjoyment of Lake Sturgeon viewing opportunities. | H |
| 6) Collect reports of Lake Sturgeon sightings (dead or alive). | H |
| **Monitoring** | |
| 1) Implement BsM as the primary survey to assess fish populations of the Ottawa River every five years. | H |
| 2) Implement science recommendations for enhanced or supplemental monitoring to collect population and/or distribution information for Walleye, Sauger, Northern Pike, Smallmouth and Largemouth Bass, Panfish (Sunfish, Black Crappie and Rock Bass), Yellow Perch, Brown Bullhead, Channel Catfish, Lake Whitefish, and other rare fish species. | H-L (species dependent) |
| 3) Use angler diary programs and recreational fishing surveys to monitor fishery trends (i.e. catch, harvest and release rate, and sizes). | H |
| **Fish Habitat Management** | |
| 1) Identify critical fish habitats with assistance of partners and proponents of development. | H |
| 2) Compile fish habitat information from consultant reports and stakeholder groups. | H |
| 3) Communicate with waterpower producers about water management during critical time periods for fish (i.e. spawning, incubation, larval drift, migration). | H |
| 4) Support the review and assessment of proposed development projects that may pose risk to fish communities, habitats and ecosystems. | H |
| 5) Continue to look for new opportunities to incorporate aquatic ecosystem protection strategies into land-use, resource management and watershed planning at appropriate scales. | H |

| Management Actions | Priority Ranking H,M,L |
|---|---|
| **Stakeholder Involvement** | |
| 1) Use the Ottawa River Management Group to determine a cross-border communication approach that includes fishery users on both sides of the River in management decisions and announcements. | H |
| 2) With assistance of partners produce and share educational materials as described in each management strategy in Section 4 of this Plan. | M |
| 3) Develop strategic partnerships that directly involve stakeholders in fisheries management activities and to help complete key actions. | H |
| 4) Increase public awareness of opportunities to report fishing violations through available enforcement tips hotlines. | H |
| **Commercial Fisheries** | |
| 1) Assess commercial fishing quotas to ensure sustainability and balance with other users. | L |
| 2) Work with partners to produce and disseminate communication materials for commercial fishing on the Ottawa River, outlining economic value and how harvest is regulated. | L |
| 3) Explore potential to expand commercial Channel Catfish fishing to other reaches and if feasible work with commercial fishers to take advantage of underutilized Channel Catfish fisheries. | M |
| 4) Communicate with partners and relevant government agencies about the Channel Catfish fishery as a potential commercial fishery. | M |
| **Invasive Species and Diseases** | |
| 1) Work with adjacent fisheries management zones to track and eradicate aquatic invasive species in the Ottawa River watershed. | H |
| 2) Increase public awareness and use of preventative measures by supporting the OFAH Invading Species Awareness Program and similar programs in Quebec. | H |
| 3) Investigate fish die offs and assist with disease testing as required. | H |
| 4) Identify priority areas for: signage, education/awareness and boat washing. | M |
| 5) Conduct a risk assessment to determine the likelihood of invasive species / disease introduction and establishment. | M |
| 6) Recommend science needs to address eradication, control and “easy to use” prevention measures for aquatic invasive species. | M |
| 7) With assistance of partners produce and disseminate communication materials to promote prevention, eradication and control efforts for new introductions. | M |
| **Climate Change** | |
| 1) With assistance of partners establish and monitor baseline values for climate related parameters important to fish. | H |
| 2) Complete a climate change risk assessment for the fisheries and fish communities of the Ottawa River. | M |

## ACRONYM GLOSSARY

| | |
|---|---|
| BsM | Broad-scale Monitoring |
| CUE | Catch per Unit Effort |
| CUEW | Catch per Unit Effort by Weight |
| DFO | Department of Fisheries and Oceans (Fisheries and Oceans Canada) |
| EFFM | Ecological Framework for Fisheries Management |
| FMZ | Fisheries Management Zone |
| FWIN | Fall Walleye Index Netting |
| MFFP | Ministère des Forêts, de la Faune et des Parcs (Québec) |
| MNRF | Ministry of Natural Resources and Forestry (Ontario) |
| MOECC | (Ontario) Ministry of Environment and Climate Change |
| NER | Northeast Region (of Ontario) |
| NOTO | Nature and Outdoor Tourism Ontario |
| NSCIN | Nearshore Community Index Netting |
| NWR | North West Region (of Ontario) |
| OCFA | Ontario Commercial Fishing Association |
| OFAH | Ontario Federation of Anglers and Hunters |
| ORMG | Ottawa River Management Group |
| SR | Southern Region (of Ontario) |
| VHS | Viral Hemorrhagic Septicaemia |
| Z/M | Total Mortality / Natural Mortality (Mortality Ratio) |

## REFERENCES


Casselman, John (2005) Catch-and-release angling: a review with guidelines for proper fish handling practices. Fish & Wildlife Branch, Ontario Ministry of Natural Resources, Peterborough, Ontario

Casselman (2007) Determining minimum ultimate size, setting size limits, and developing trophy standards and indices of comparable size for maintaining quality Muskellunge populations and sports fisheries. Environ. Biol. Fish (2007) 79:137-154

Haxton and Chubbuck (2002) Natural Environment Report for the Ottawa River. Ontario Ministry of Natural Resources, Science and Information Branch

Haxton, T J, and C S Findlay (2009) Variation in large-bodied fish-community structure and abundance in relation to water-management regime in a large regulation river. Journal of Fish Biology Volume 74: pp 2216-2238

Haxton, Tim and Kirby Punt. (2004) Abundance and Demography of Channel Catfish in a Larger Northern River. North American Journal of Fisheries Management 24:1440-1446

Kerr, S. J. (2010) Muskellunge in the Ottawa River. Ontario Ministry of Natural Resources

Kerr, S. J. (2004, 2008, 2012) Survey(s) of Competitive Fishing Events in Ontario. Fish and Wildlife Branch, Ontario Ministry of Natural Resources, Peterborough, Ontario

Kerr, S. J. (2009) A survey of 2008 competitive fishing events in Ontario. Ontario Ministry of Natural Resources, Peterborough, Ontario

Landsman, Sean J., Hedrick J. Wachelka, Cory D. Suski and Steven J. Cooke. (2011) Evaluation of the physiology, behaviour, and survival of adult Muskellunge captured and released by specialized anglers. Fisheries Research 110: 377-386

Mandrak, Nicholas E., and E. J. Crossman. (1992) Postglacial dispersal of freshwater fishes into Ontario. Can. J. Zool. Volume 70: 2247-2259

OMNR. (1999) Size Limit Regulation for Ontario Muskellunge: A New Approach. Ontario Ministry of Natural Resources

OMNR (2006) Guidelines for Managing the Recreational Fishery for Northern Pike in Ontario. Fisheries Section, Fish and Wildlife Branch, Ontario Ministry of Natural Resources

OMNR. (2003, 2009, 2014) Survey of Recreational Fishing in Canada: Selected Results for Ontario Fisheries. Fish and Wildlife Branch, Ontario Ministry of Natural Resources, Peterborough, Ontario

OMNR. (2011) Strategic Policy for Ontario's Commercial Fisheries, Biodiversity Branch, Ontario Ministry of Natural Resources, Peterborough, ON

OMNR. (2012) Ontario Invasive Species Strategic Plan. Ontario Ministry of Natural Resources, Peterborough, ON

OMNRF (2016) Ontario Provincial Fish Strategy: Fish for the Future. Fisheries Policy Section, Species Conservation Branch, Ontario Ministry of Natural Resources and Forestry, Peterborough, ON

OMNRF. (2017) Background Information to the Fisheries Management Plan for the Ottawa River. Ontario Ministry of Natural Resources and Forestry.

OMNR and QFP. (1999) A Strategic Fisheries Management Framework for the Ottawa River. Ontario Ministry of Natural Resources and Gouvernement du Québec Faune et Parcs

MOE. (2013) Guide to Eating Ontario Sport Fish 2013-2014

Taillon, D. (2016) Characteristics of Ottawa River muskellunge based on Muskies Canada Angler Diaries 1996-2015. Policy Division. Species Conservation Policy Branch. Ontario Ministry of Natural Resources and Forestry. Unpublished.

# APPENDIX A
## TECHNICAL ADVISORS AND PRESENTERS

| Name | Position / Credentials | Presentation Topic / Area of Expertise |
|---|---|---|
| Tania Baker | Management Biologist<br>Pembroke District MNRF | Fisheries / Co-Management of Ottawa River<br>• Bass Fishery Status<br>• Walleye/Sauger Fishery Status<br>• Muskellunge/Pike Fishery Status<br>• Panfish Fishery Status<br>• Lake Sturgeon Fishery Status<br>• Lake Sturgeon Recovery Plan<br>• Other/Underutilized Fisheries<br>• Biology of Bait Species<br>Fishing Regulations as Mgmt. Tool<br>Fishing Regulations across the Ottawa R<br>Enforcement Challenges of the Ottawa R<br>Water Quality History of the Ottawa River |
| Chuck Mccrudden | Management Biologist,<br>North Bay District MNRF | Fisheries of Lake Temiskaming |
| Sean Landsman | M.Sc.,<br>Carleton University | Bass Biology and Bass Fishery Stressors |
| Dan Taillon | Aquatic Ecologist,<br>Fisheries Section,<br>Southern Region MNRF | Muskellunge/Northern Pike Biology and Management<br>Panfish/Sunfish Biology and Management |
| Tim Haxton | Fisheries Specialist<br>Southern Region MNRF | Waterpower impacts on Ottawa R Fisheries<br>Lake Sturgeon Biology / Management |
| Jason Thiem | Ph.D. Candidate,<br>Carleton University | Fishways for Lake Sturgeon and Other Fish |
| Kirby Punt | Management Biologist,<br>Pembroke District MNRF | American Eel Biology and Ottawa R Studies |
| Anne Bendig | Management Biologist,<br>Kemptville District MNRF | Fisheries of Lower Ottawa River<br>American Eel Recovery Planning<br>Biology of Walleye and Sauger |
| Bob Bergmann | Regional Fisheries Biologist, Southern Region MNRF | FMZ Council Updates across Ontario<br>Walleye and Sauger Management<br>Process for Changing Fishing Regulations |
| Dr. David Rowan | Research Scientist,<br>Atomic Energy of Canada<br>Chalk River Laboratories | Walleye Food-web in the Ottawa River |
| Julie Deschênes | Biologist, Outaouais Region Quebec MFFP | Bait Management in Quebec |
| Brenda Koenig | Aquatic Ecologist,<br>Southern Region MNRF | Bait Management in Ontario<br>Bait and Gear Regulations as Mgmt. Tool |
| Don Lewis | Sr. Fish & Wildlife Tech,<br>Pembroke District MNRF | Baitfish Allocation and Management |
| Gary Nielsen | Climate Change Project Coordinator, Southern Region MNRF | Introduction to Climate Change |
| David Copplestone | Biodiversity Conservation Biologist, SR MNRF | Impacts / Threat of Invasive Species |

| Name | Position / Credentials | Presentation Topic / Area of Expertise |
|---|---|---|
| Ethan Huner | Resource Technician, Algonquins of Ontario Consultation Office | Traditional Fisheries Perspectives of the Kitchisippi / Ottawa River |
| Mark Robbins | Provincial Enforcement Advisor, MNRF | Ontario Approach to Enforcement |
| Donald Duquette | Coordinator of Operations, Enforcement Services Quebec MFFP | Quebec Approach to Enforcement |
| Bruce Morrison | Assessment Supervisor, Lake Ontario Management Unit, MNRF | Commercial Fishing in Ontario |
| Todd Chaput | Atomic Energy of Canada Chalk River Laboratories | AECL Environmental Monitoring Program |
| Dr. Bruce Tuffs | Queens University | Impacts of Competitive Fishing Events |
| Dr. John Casselman | Senior Scientist Emeritus, Aquatic Research and Monitoring Section, MNRF | Impacts of Climate Change on Fisheries |
| Jackie Madill | Canadian Museum of Nature | Freshwater Mussels of the Ottawa River |
| Dr. Ron Threader | Environmental Advisor, Ontario Power Generation | OPG Sturgeon and Eel Initiatives |
| Marc Bisson | Water Resources Engineer, Ontario Power Generation | OPG Water Management Regime on the Ottawa River |
| Dr. Chip Weseloh | Retired Biologist from Environment Canada | Cormorants on the St. Lawrence River |
| Dr. Mark Ridgway | Research Scientist, Aquatic Research and Monitoring Section, MNRF | Impacts of Cormorants on Fisheries<br>MNRF Policies for Cormorants |

# APPENDIX B
# FISHERIES MANAGEMENT BENCHMARKS FOR THE OTTAWA RIVER

## 4.1 Benchmarks for Fish Community Diversity

Benchmarks are derived from the 2008-2010 Broad-scale Monitoring Program. For pie-charts of fish species proportions by reach, see sections 3.3 and 3.4 in Ottawa River Background Information Report.

| | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux |
|---|---|---|---|---|---|---|---|---|---|---|
| **# of Species** | 25 | 20 | 21 | 24 | 19 | 18 | 11 | 18 | 20 | 21 |
| **Shannon Index** | 2.15 | 1.73 | 2.08 | 2.13 | 2.05 | 1.95 | 1.79 | 1.63 | 1.85 | 2.21 |
| **Fish Spp/Proportions** | | | | | | | | | | |
| 031 -Sturgeon | 0.002 | 0.001 | 0.000 | 0.043 | 0.066 | 0.300 | 0.042 | 0.005 | 0.015 | 0.101 |
| 041- Longnose Gar | 0.000 | 0.000 | 0.000 | 0.004 | 0.008 | 0.000 | 0.000 | 0.011 | 0.010 | 0.002 |
| 081- Lake Trout | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 091- Lake Whitefish | 0.003 | 0.007 | 0.008 | 0.023 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 093- Cisco | 0.056 | 0.002 | 0.003 | 0.018 | 0.000 | 0.009 | 0.000 | 0.000 | 0.016 | 0.000 |
| 131- N. Pike | 0.009 | 0.004 | 0.018 | 0.002 | 0.008 | 0.016 | 0.019 | 0.007 | 0.012 | 0.002 |
| 132- Muskellunge | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 |
| 151- Goldeye | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 152- Mooneye | 0.048 | 0.006 | 0.003 | 0.008 | 0.075 | 0.022 | 0.000 | 0.002 | 0.012 | 0.023 |
| 161- Quillback | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 |
| 162- Longnose Sucker | 0.018 | 0.030 | 0.028 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 163- White Sucker | 0.027 | 0.015 | 0.066 | 0.023 | 0.064 | 0.034 | 0.033 | 0.039 | 0.051 | 0.080 |
| 168- Silver Redhorse | 0.000 | 0.000 | 0.005 | 0.012 | 0.029 | 0.006 | 0.051 | 0.040 | 0.004 | 0.005 |
| 171- Shorthead Redhorse | 0.006 | 0.008 | 0.013 | 0.010 | 0.027 | 0.019 | 0.037 | 0.018 | 0.006 | 0.110 |
| 173- River Redhorse | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 |
| 192- Hornyhead Chub | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 196 - Emerald Shiner | 0.177 | 0.028 | 0.000 | 0.002 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 198- Common Shiner | 0.003 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 201- Spottail Shiner | 0.016 | 0.026 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.007 |
| 212- Creek Chub | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 213- Fallfish | 0.002 | 0.003 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 233- Brown Bullhead | 0.003 | 0.000 | 0.003 | 0.012 | 0.019 | 0.006 | 0.000 | 0.002 | 0.001 | 0.005 |
| 234- Channel Catfish | 0.000 | 0.000 | 0.003 | 0.405 | 0.443 | 0.334 | 0.484 | 0.586 | 0.499 | 0.255 |
| 271- Burbot | 0.013 | 0.008 | 0.023 | 0.037 | 0.002 | 0.009 | 0.000 | 0.002 | 0.030 | 0.000 |
| 291- Trout-Perch | 0.008 | 0.005 | 0.003 | 0.004 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 311- Rock Bass | 0.006 | 0.007 | 0.102 | 0.014 | 0.012 | 0.019 | 0.088 | 0.048 | 0.022 | 0.007 |
| 313- Pumpkinseed | 0.000 | 0.000 | 0.003 | 0.008 | 0.002 | 0.003 | 0.000 | 0.004 | 0.007 | 0.002 |
| 314- Bluegill | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 316- Smallmouth Bass | 0.010 | 0.020 | 0.081 | 0.029 | 0.052 | 0.038 | 0.019 | 0.058 | 0.040 | 0.025 |
| 317- Largemouth Bass | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| 319- Black Crappie | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.005 |
| 331- Yellow Perch | 0.277 | 0.462 | 0.348 | 0.072 | 0.070 | 0.019 | 0.074 | 0.051 | 0.146 | 0.152 |
| 332- Sauger | 0.137 | 0.106 | 0.099 | 0.110 | 0.060 | 0.066 | 0.121 | 0.083 | 0.095 | 0.161 |
| 334- Walleye | 0.171 | 0.242 | 0.178 | 0.147 | 0.056 | 0.091 | 0.033 | 0.042 | 0.018 | 0.021 |
| 342- LogPerch | 0.003 | 0.018 | 0.008 | 0.002 | 0.002 | 0.003 | 0.000 | 0.002 | 0.000 | 0.000 |
| 371- Freshwater Drum | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.023 |

### 4.2.1 Benchmarks for Walleye and Sauger

Benchmarks are derived from Fall Walleye Index Netting 1998-2003

**Walleye**

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | 2.24 | 4.82 | 3.24 | 3.62 | 0.3 | 0.29 | 0.15 | 0.44 | 0.69 | 0.46 | 1.29 |
| Mean Total Length (mm) | 298 | 357 | 345 | 323 | 291 | 338 | 301 | 330 | 335 | 338 | 326 |
| Mean Age (years) | 4.1 | 3.1 | 3.0 | 2.6 | 3.0 | 4.6 | 4.4 | 4.2 | 4.2 | 2.9 | 3.6 |
| CUEW > 40 cm | 0.30 | 0.63 | 0.21 | 0.36 | 0.67 | 0.55 | 0.60 | 0.51 | 0.45 | 0.44 | 0.47 |
| Z/M < 2 (Y/N) | Y | Y | N | N | Y | N | Y | Y | Y | N | |

**Sauger**

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | 1.91 | 0.99 | 0.36 | 0.13 | 0.29 | 0.12 | 0.2 | 0.25 | 0.4 | 0.6 | 0.53 |
| Mean Total Length (mm) | 258 | 271 | 280 | 279 | 338 | 297 | 258 | 279 | 288 | 267 | 281 |
| Mean Age (years) | 4.2 | 3.3 | 4.0 | 3.3* | 5.4 | 4.9 | 4.0 | 5.1 | 5.0 | * | 4.4 |
| Proportion ≥ | | | | | | | | | | | |
| Quality (198 mm) | 0.94 | 0.76 | 0.94 | 0.87 | 1.0 | 0.95 | 0.89 | 0.96 | 0.96 | 0.87 | |
| Preferred (254 mm) | 0.55 | 0.47 | 0.71 | 0.56 | 0.97 | 0.81 | 0.55 | 0.6 | 0.78 | 0.66 | |
| Memorable (333 mm) | 0.05 | 0.09 | 0.19 | 0.22 | 0.53 | 0.29 | 0.08 | 0.06 | 0.09 | 0.11 | |
| Trophy (417 mm) | 0 | 0.03 | 0.01 | 0.07 | 0.1 | 0 | 0 | 0 | 0 | 0.02 | |
| Z/M < 2 (Y/N) | Y | Y | Y | Y | Y | Y | Y | Y | Y | * | |

### 4.2.2 Benchmarks for Smallmouth and Largemouth Bass

Benchmarks are derived from Nearshore Community Index Netting 1997-2004 and Broad-scale Monitoring for Lake Temiskaming 2009

**Smallmouth Bass**

| Benchmarks | Temiskaming** | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | 0.13 | 1.41 | 6.0 | 2.87 | 5.56 | 2.07 | 1.35 | 1.04 | 1.08 | 0.57 | 2.44 |
| Mean Total Length (mm) | 317 | 292 | 335 | 339 | 363 | 352 | 316 | 319 | 331 | 354 | 336 |
| Mean Age (years) | * | 4.0 | 5.6 | 5.6 | 5.7 | 5.9 | 5.8 | 5.8 | 4.6 | 5.0 | 5.5 |
| Proportion ≥ | | | | | | | | | | | |
| Preferred (275 mm) | 0.21 | 0.0 | 0.12 | 0.10 | 0.17 | 0.17 | 0.05 | 0.10 | 0.07 | 0.23 | 0.11 |
| Memorable (360 mm) | 0.32 | 0.0 | 0.0 | 0.01 | 0.01 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 |
| Trophy (450 mm) | 0.05 | | | | | | | | | | |
| Z/M < 2 (Y/N) | * | Y | Y | Y | Y | Y | Y | Y | Y | | |

** Values for Lake Temiskaming derived from BsM Cycle 1

**Largemouth Bass**

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu** | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | * | 0 | 0 | 0.12 | 0.92 | 0.68 | 0.06 | 0.16 | 0.7 | 1.03 | 0.6 |
| Mean Total Length (mm) | * | 0 | 0 | 359 | 395 | 405 | 510 | 363 | 354 | 356 | 372 |
| Mean Age (years) | * | 0 | 0 | 4.6 | 5.0 | * | 13 | 5.5 | 3.6 | 5.0 | 4.0 |
| Proportion ≥ | | | | | | | | | | | |
| Preferred (252 mm) | * | 0 | 0 | 0.90 | 0.93 | 1.00 | 0 | 0.88 | 0.94 | 0.81 | |
| Memorable (330 mm) | * | 0 | 0 | 0.75 | 0.93 | 0.91 | 0 | 0.75 | 0.91 | 0.70 | |
| Trophy (413 mm) | * | 0 | 0 | 0.15 | 0.45 | 0.41 | 0 | 0.25 | 0.09 | 0.30 | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

** values for Fendu are based on a single individual

### 4.2.3 Benchmarks for Northern Pike

Benchmarks are derived from Fall Walleye Index Netting 1998-2003.

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | 1.66 | 5.11 | 2.32 | 1.95 | 2.05 | 1.24 | 0.35 | 0.27 | 2.18 | * | 1.9 |
| Mean Total Length (mm) | 594 | 644 | 568 | 626 | 533 | 550 | 550 | 697 | 578 | * | 587 |
| Mean Age (years) | 5.0 | 3.4 | 3.4 | 4.8 | 3.2 | 3.5 | 3.1 | 4.6 | 3.2 | * | 3.7 |
| Proportion ≥ | | | | | | | | | | | |
| Preferred (572 mm) | 0.49 | 0.74 | 0.51 | 0.68 | 0.29 | 0.35 | 0.27 | 0.92 | 0.38 | * | |
| Memorable (750 mm) | 0.11 | 0.23 | 0.08 | 0.16 | 0.09 | 0.10 | 0.0 | 0.25 | 0.15 | * | |
| Trophy (940 mm) | 0.05 | 0.02 | 0.04 | 0.04 | 0.02 | 0.02 | 0.0 | 0.0 | 0.0 | * | |
| CUEW > 860 mm ** | 0.38 | 0.14 | 0.28 | 0.33 | 0.28 | 0.08 | 0 | 0.13 | 0 | * | |
| Z/M < 2 (Y/N) | Y | Y | Y | Y | Y | Y | Y | Y | Y | * | |

* No Northern Pike data was collected for Ormeaux

**CUEW > 860 mm represents the relative biomass of fish > 860 mm

### 4.2.4 Benchmarks for Muskellunge

Benchmarks are derived from the Muskies Canada Angler Diary Program for a five year period from 2011 to 2015.

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Ottawa River All Reaches |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Angler CUE (fish/hour) | * | * | * | * | * | * | * | * | * | * | 0.06±0.01 |
| Mean Length/year (cm) | * | * | * | * | * | * | * | * | * | * | 97±1.49 |
| Maximum Size/year (cm) | * | * | * | * | * | * | * | * | * | * | 136.14 |
| Size Class Proportions: | * | * | * | * | * | * | * | * | * | * | |
| 61-89 cm | | | | | | | | | | | 0.27 |
| 89-102 cm | | | | | | | | | | | 0.26 |
| 102-114 cm | | | | | | | | | | | 0.27 |
| 114-127 cm | | | | | | | | | | | 0.14 |
| >127 cm / > 50 inches | | | | | | | | | | | 0.06 |

Note: Muskie Canada angler diary information is not available by reach of the Ottawa River

### 4.2.5 Benchmarks for Panfish (Sunfish, Black Crappie, and Rock Bass) Yellow Perch and Brown Bullhead

**Yellow Perch**

Benchmarks derived from Fall Walleye Index Netting 1998-2003

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | 0.28 | 0.33 | 0.24 | 0.1 | 0.03 | 0.04 | 0.03 | 0.13 | 0.08 | * | 0.14 |
| Mean Length (mm) | 181 | 171 | 182 | 155 | 140 | 162 | 171 | 167 | 164 | * | 172 |
| Mean Age (years) | * | 2.6 | * | 2.3 | * | * | * | * | * | * | 2.5 |
| Proportion ≥ | | | | | | | | | | * | |
| Quality (139 mm) | 0.87 | 0.72 | 0.85 | 0.66 | 0.55 | 0.82 | 0.73 | 0.83 | 0.82 | * | |
| Preferred (178 mm) | 0.72 | 0.42 | 0.59 | 0.28 | 0.23 | 0.41 | 0.55 | 0.47 | 0.46 | * | |
| Memorable (233 mm) | 0.14 | 0.21 | 0.17 | 0.06 | 0.00 | 0.05 | 0.09 | 0.06 | 0.06 | * | |
| Trophy (291 mm) | 0.01 | 0.04 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | * | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

*no data collected for perch in Ormeaux

**Bluegill**

Benchmarks derived from Near-shore Community Index Netting 1997-2004

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | | | | | | | | | | 0.3 | |
| Mean Length (mm) | | | | | | | | | | 145 | |
| Mean Age (years) | | | | | | | | | | 2.5 | |
| Proportion ≥ | | | | | | | | | | | |
| Quality (120 mm) | | | | | | | | | | 0.96 | |
| Preferred (160 mm) | | | | | | | | | | 0.57 | |
| Memorable (180 mm) | | | | | | | | | | 0.28 | |
| Trophy (230 mm) | | | | | | | | | | 0.04 | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

Note: Bluegill only captured in one reach (Ormeaux)

**Pumpkinseed**

Benchmarks derived from Nearshore Community Index Netting 1997-2004

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | | | | | | | | | | 0.09 | |
| Mean Length (mm) | | | | | | | | | | 133 | |
| Mean Age (years) | | | | | | | | | | 2.3 | |
| Proportion ≥ Preferred Memorable Trophy | | | | | | | | | | | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

**Black Crappie**

Benchmarks derived from Nearshore Community Index Netting 1997-2004

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | | | | | | | | | | 0.91 | |
| Mean Length (mm) | | | | | | | | | | 230 | |
| Mean Age (years) | | | | | | | | | | 3.4 | |
| Proportion ≥ Preferred Memorable Trophy | | | | | | | | | | | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

## Rock Bass

Benchmarks derived from Nearshore Community Index Netting 1997-2004

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | | | | | | | | | | 0.05 | |
| Mean Length (mm) | | | | | | | | | | 158 | |
| Mean Age (years) | | | | | | | | | | 5 | |
| Proportion ≥ Preferred Memorable Trophy | | | | | | | | | | | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

## Brown Bullhead

Benchmarks derived from Nearshore Community Index Netting 1997-2004

| Benchmarks | Temiskaming | Lac la Cave | Holden Lake | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | * | 0 | 0.01 | * | 39.9 | 11.3 | 0.23 | 0.26 | 0.91 | 0.24 | |
| Mean Length (mm) | * | * | * | * | * | * | * | * | 310 | 282 | |
| Mean Age (years) | * | * | * | * | * | * | * | * | * | * | |
| Proportion ≥ | | | | | | | | | | | |
| Preferred (401 mm) | * | * | 1.00 | * | * | * | * | * | 1.0 | 1.0 | |
| Memorable (525 mm) | * | * | 0.60 | * | * | * | * | * | 0.98 | 0.91 | |
| Trophy (658 mm) | * | * | 0.00 | * | * | * | * | * | 0.53 | 0.12 | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | |

Note: CUEW was estimated using mean weight from literature

### 4.2.6 Benchmarks for Channel Catfish

Benchmarks derived from Nearshore Community Index Netting 1997-2004

| Benchmarks | Temiskaming** | Lac la Cave | Holden Lake* | U. Allumette | L. Allumette | Lac Coulonge | Lac du Rocher Fendu | Lac des Chats | Lac Deschênes | Lac Dollard des Ormeaux | Zone Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CUEW (kg/net) | * | 0 | 0.1 | 30.3 | 50.9 | 21.7 | 11.7 | 20.7 | 25.9 | 17.6 | 48.2 |
| Mean Length (mm) | * | 0 | 460 | 474 | 467 | 432 | 389 | 475 | 496 | 520 | 465 |
| Mean Age (years) | * | * | * | 17 | * | 14 | * | * | * | * | 15 |
| Proportion ≥ | | | | | | | | | | | |
| Quality (312 mm) | * | * | * | 0.99 | 0.99 | 0.93 | 0.88 | 0.99 | 0.99 | 0.99 | |
| Preferred (401 mm) | * | * | * | 0.86 | 0.80 | 0.63 | 0.34 | 0.87 | 0.96 | 0.96 | |
| Memorable (525 mm) | * | * | * | 0.25 | 0.24 | 0.15 | 0.05 | 0.22 | 0.26 | 0.49 | |
| Trophy (658 mm) | * | * | * | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.03 | |
| Z/M < 2 (Y/N) | * | * | * | * | * | * | * | * | * | * | * |

* only two were caught in Holden Lake

** NSCIN was not conducted in the Lake Temiskaming