

# Stocking Strategy

## for the

# Canadian Waters of Lake Ontario

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**Produced by:**

**Ontario Ministry of Natural Resources and Forestry**

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## About this Document

The Stocking Strategy for the Canadian waters of Lake Ontario was developed by the Ontario Ministry of Natural Resources and Forestry's (OMNRF) Lake Ontario Management Unit (LOMU) with the support of the New York State Department of Environmental Conservation (NYSDEC), the advice of the Fisheries Management Zone 20 Advisory Council (FMZ 20), and input from public consultation. This Strategy is based on a review of the history of stocking in Lake Ontario, the current management goals and objectives, and stocking practices outlined in the Lake Ontario Stocking Review 2014. This document reflects the outcome of public review of the proposed strategy and options presented through the Environmental Registry (012-3046) at <http://www.ebr.gov.on.ca/>.

## Summary

This Strategy provides direction for stocking fish into the Canadian Waters of Lake Ontario. The Strategy is founded on the principles and objectives outlined in Ontario's Provincial Fish Strategy - Fish for the Future, the binational Joint Strategic Plan for Great Lakes Fisheries and the Lake Ontario Fish Community Objectives (FCO) 2013. The rights of First Nations communities must be respected. Since fish communities change over time, the Lake Ontario Management Unit will continue to share information with First Nation Communities to ensure that Lake Ontario and the St. Lawrence River fisheries management activities are consistent with the needs of First Nation Communities.

**Native Species Restoration** is the first priority of this Strategy. OMNRF will continue stocking native species to support fish community restoration under the direction of specific plans for species such as Atlantic Salmon, Lake Trout, Deepwater Cisco and Walleye, American eel and Lake Sturgeon.

**Recreational Trout and Salmon Fisheries** are socially and economically important. OMNRF will continue to stock Chinook Salmon, Coho Salmon, Rainbow Trout and Brown Trout to meet lake wide FCO targets using the following key strategies:

### Distribution of fish to support recreational fisheries:

1. Fish for stocking are allocated to one of seven sub-zones based on a number of factors including natural reproduction within the area, angler demand and suitable habitat.
2. Generally the western end of Lake Ontario from the Niagara River to Toronto will receive 74.4% of the recreational stocking while the north shore from Toronto to Kingston will receive 25.6%.
3. The Bay of Quinte (west of the Glenora Ferry) and the St. Lawrence River (from Wolfe Island to Lake St. Francis) will not be stocked with non-native species.

### Chinook Salmon Strategies:

1. Maintain the current lake wide stocking targets.
2. Continue to monitor predator prey balance and natural reproduction.
3. Stock fish within a sub-zone based on the following priority: 1) into approved streams 2) into net pens as per the net pen guidelines 3) directly into the lake.

4. Expand the net pen program to allow up to 100% of a sites allocation to be held in temporary net pens.
5. FMZ 20 Advisory Council will continue to review direct stocking sites and may move fish to other sites within a sub-zone.

#### **Rainbow Trout Strategies:**

1. Maintain the current lake wide stocking targets.
2. Focus stocking on approved tributaries with low natural reproduction located in western end of Lake Ontario.
3. Rainbow Trout should not be stocked in streams with sufficient self-sustaining wild populations of Rainbow Trout because stocking is not necessary to support the fishery. Generally, no stocking will occur in Sub-zones 5 and 6 because most streams have sufficient self-sustaining wild populations.
4. Rainbow Trout should be stocked into suitable streams to optimize the return to both the lake and stream fisheries and reduce the risk of straying.
5. Rainbow Trout will not be stocked in the Upper St. Lawrence River (Sub-zone 7) to reduce the risk of out- migration to Quebec.
6. Refresh the hatchery brood stock.

#### **Brown Trout Strategies:**

1. Increase the size of stocked Brown Trout to improve overall returns. The target size for Brown Trout has increased approximately 35% from 26 g to 40 g yearling.
2. Manage an increase to Ontario's total target for Brown Trout from 165,000 up to 200,000 to allow additional stocking from Community Hatcheries. Increase to be managed within total lake wide stocking level.
3. Stock fewer locations with more fish annually to increase fish density and angler success, creating high quality destination fisheries for Brown Trout. Community Hatcheries will be permitted to stock Brown Trout at Whitby and Kingston to enhance local nearshore fisheries.

#### **Coho Salmon Strategies:**

1. Continue to stock Coho Salmon in the Credit River to support a nearshore fall fishery and contribute to the diversity of the open lake fishery.
2. OMNRF may consider relocating Coho Salmon to another stream and/or establishing a second brood stock stream east of Toronto subject to local fisheries management plans.

**Monitoring and Assessment:** MNRF will continue to work with partners to monitor and assess the state of the Lake Ontario fish community and fisheries. Information will be available in the Lake Ontario Management Unit Annual Report and from special publications.

**Implementation:** This Strategy will be implemented through the Lake Ontario Management Unit in partnership with New York State Department of Environmental Conservation and with the ongoing advice of the FMZ 20 Advisory Council.

## 1 Introduction

Lake Ontario is stocked annually by New York State and the Province of Ontario with over 6 million fish. The Province of Ontario stocks more than 2.4 million fish into Lake Ontario and its tributaries. Stocking supports a world-class recreational trout and salmon fishery, assists in maintaining the predator-prey balance in the lake and is a key management tool for the restoration of native species. Fisheries managers strive to balance the social and economic benefits provided by introduced species and the need to restore native species while maintaining overall ecosystem health.

The Lake Ontario Fish Community Objectives (FCO) 2013, approved by New York State and the Province of Ontario guide the overall stocking program, in addition to local fisheries management plans and species specific management plans guide stocking activities. For additional information on the status of Lake Ontario fish communities and fisheries please refer to the following documents:

1. Lake Ontario Stocking Review 2014: [www.ebr.gov.on.ca](http://www.ebr.gov.on.ca) EBR Registry Number (012-3046)
2. Lake Ontario Management Unit Annual Reports: [www.glfco.org/lakecom/loc/mgmt\\_unit](http://www.glfco.org/lakecom/loc/mgmt_unit)
3. New York State Department of Environmental Conservation Lake Ontario Reports: [www.dec.ny.gov/outdoor/7969.html](http://www.dec.ny.gov/outdoor/7969.html)
4. Fish Community Objectives 2013: <http://www.glfco.org/lakecom/loc/LO-FCO-2013-Final.pdf>

## 2 Purpose of the Stocking Strategy

The purpose of this stocking strategy is to guide stocking practices from 2016–2025 to help achieve lake wide and local fisheries management objectives. A key management challenge is to balance the short-term social, economic, and cultural needs of fishery stakeholders with the long-term goals of restoring native species while maintaining a balanced Lake Ontario fish community.

## 3 Great Lakes and Lake Ontario Committee Framework

Fisheries management decisions for Lake Ontario are made within a bi-national management framework under the Great Lakes Fisheries Commission. Responsibility for Lake Ontario fisheries management, including stocking, is shared by the OMNRF for the Province of Ontario and the NYSDEC for the State of New York.

As described in the *Convention on Great Lakes Fisheries* between the United States and Canada (Great Lakes Fishery Commission 1956), Lake Ontario includes the Niagara River below Niagara Falls, and Lake Ontario proper (the main basin proper, including the Bay of Quinte), as well as the St. Lawrence River from Lake Ontario to the 45<sup>th</sup> parallel of latitude.

Lake Ontario fisheries at the lake wide scale are managed through the Lake Ontario Committee (LOC), which is comprised of both OMNRF and NYSDEC. The goal of the LOC is to achieve the lake wide FCOs and help meet local fisheries management goals through interagency cooperation and evidence-based decision making guided by science and management principles.

### 3.1 LOC Management Principles That Guide Stocking Decisions

The following principles guide lake wide management decisions related to stocking:

1. The FCOs provide overall fisheries management guidance related to stocking, recognizing that agency stocking activities must be consistent with applicable legislation, policy, and guidelines for either the NYSDEC or the OMNRF.
2. Lake Ontario fish stocking should support the overall goal of the Great Lakes Fishery Commission (GLFC) Joint Strategic Plan for the Management of Great Lakes Fisheries:

*To secure fish communities, based on foundations of stable self-sustaining stocks, supplemented by judicious plantings of hatchery-reared fish, and provide from these communities an optimum contribution of fish, fishing opportunities and associated benefits to meet needs identified by society for: wholesome food, recreation, cultural heritage, employment and income, and a healthy aquatic ecosystem.*

3. General stocking decisions (species, genetic strains, overall numbers, and life-stage) will be based on consensus within the LOC and will consider ecological, social and economic risks.
4. Stocking decisions will reflect a balance between fisheries management and ecosystem restoration objectives.
5. Management agency fish propagation and fish health protocols will adhere to guidelines established by the Great Lakes Fish Health Committee.
6. Agencies and partners that stock fish will cooperate to ensure that their actions support whole-lake stocking assessment initiatives including fish marking and tagging, recovery, assessment, data sharing, and reporting.

### 3.2 LOC Stocking Decision Process

The following transparent, evidence-based procedures will help to ensure that lake wide stocking decisions represent both Ontario and New York interests including their respective stakeholders' input:

1. The LOC will establish five-year stocking targets to support well planned fish production and guide assessment programs lake wide.
2. Lake wide stocking targets, while initially published in the 2013 FCO, may be reviewed periodically relative to fish community objective indicators such as growth and condition of fish and abundance and condition of prey species.
3. When overall stocking targets are adjusted, the Stocking Target Schedule will be amended and announced at the annual LOC meeting in March.
4. As stated in the FCO, the LOC may make in-year adjustments (increase or decrease) to the

actual stocking levels within  $\pm 5\%$  of the total stocking target. In-year adjustments are typically made to account for fish production variability.

5. The LOC will establish a decision-making process to adjust overall stocking targets; ensuring agencies' policies and procedures are followed including the consideration of stakeholder advice. Depending on the situation, LOC may establish a structured decision-making process or other methods to review and adjust stocking levels and species mix.
6. In the event that consensus cannot be reached regarding a general stocking decision, the LOC will ask the GLFC, in accordance with GLFC guidelines for dispute resolution, to arrange a mutually agreeable, third-party process to make a non-binding recommendation.

### 3.3 Management and Mitigating of Risk Associated with Stocking

Stocking fish presents risks that can be identified and managed to reduce the likelihood or severity of unintended consequences. This strategy identifies several risks related to stocking and proposes strategies to mitigate risk and deal with uncertainty.

#### 3.3.1 Fish Stocking Risk in the Lake Ontario Context

Lake Ontario's modern fish community is a mix of native and non-native species. The establishment of non-native species has generally been facilitated by humans. Human development disrupted the original ecosystem, suppressing native species and facilitating the establishment of non-native species. Some non-native species were unintentionally introduced via shipping ballast transfer (Zebra and Quagga Mussels, Spiny Waterflea, Fishhook Waterflea, Round Goby), and others via the construction of canals that connected previously separate water bodies (Sea Lamprey, White Perch, Alewife, Rainbow Smelt).

Even before some of these earliest arrivals, Lake Ontario had lost several native species. By the late 1960s, Lake Ontario had lost Atlantic Salmon (1898), Lake Trout (1950s), and Deepwater Cisco (1950s). Invasive Alewife and Rainbow Smelt abundance was allowed to grow unchecked by a depleted top predator community. An overabundance of Alewife and Smelt suppresses top predators and other native fish through predation on their larvae. Fish that have a diet high in Alewife accumulate high levels of an enzyme called thiaminase which breaks down thiamine (Vitamin B<sub>12</sub>). This can affect reproduction and overall health of native Lake Trout and other trout and salmon.

In the late 1960s and early 1970s, non-native top predators such as Coho and Chinook Salmon were introduced to suppress the non-native prey fish and to provide social and economic benefits from the fishery. The strategy was successful at reducing the hyper-abundant prey, and it subsequently provided a world-class fishery.

Today, non-native trout and salmon species have naturalized in Lake Ontario and its tributary fish communities, meaning they have established local self-sustaining wild populations in rivers with sufficient habitat. Non-native trout and salmon continue to provide both an ecological function and a

social and economic benefit. Stocking is still required to provide sufficient predator abundance so that Alewife and Smelt are controlled while supporting quality fisheries.

Risks associated with stocking programs have been well documented. It is the responsibility of resource managers to mitigate these risks to the maximum extent possible but some risks may be difficult to mitigate completely. For example, there may be a risk that non-native stocked species compete with native fish at a local scale and that stopping stocking may mitigate the local risk. However, an end to stocking could also increase the risk to native species at the lake wide scale since non-native salmon and trout control the abundance of Alewife and Smelt. Mitigating risk may therefore require trade-offs between local and lake wide scales.

### 3.3.2 Lake wide Risks:

The following lake wide risks are important considerations when determining stocking policy:

- **Risk of Overstocking**—Too many top predators could contribute to a collapse of the Alewife population. This could result in a severe disruption of the food web including the loss of many top predators and the associated social and economic benefits. It is unclear if a collapsed Alewife population would remain low, recover, or rebound to even higher levels in the absence of sufficient top predators. It is also unclear if native prey fish populations would recover in the absence of non- native prey fish.
- **Risk of Understocking**—Too few top predators may result in too many non-native prey fish which could hinder native species recovery and increase stress on other native species such as Yellow Perch.
- **Lake wide Competition**—Non-native species may compete with native species for the forage base in the open water. All top predators in Lake Ontario rely on Alewife for food to some degree. Chinook Salmon is almost totally reliant on Alewife. Lake Trout, Atlantic Salmon, and Rainbow Trout have more diverse diets and are less reliant on Alewife. All the top predator species have been able to find enough food and grow well, suggesting that under current conditions, competition is not likely limiting growth or abundance of native or non-native species. This would change with a collapse of Alewife.

### 3.3.3 Local Risks:

The following local risks are important considerations when determining stocking policy:

**Local Native Fish Populations**—Native and Migratory non-native species may compete for habitat or food within stream environments. Some species may also eat the young of other species. Mitigating the risk to native species at the local scale needs to be done in the context of deciding which species are most valued and considering the trade-offs between alternatives. For example, interactions between non-native and native species could be reduced by managing barriers or shifting stocking locations (reducing stocking in some streams, limiting stocking to below the first impassable barrier, moving stocking to the lake to discourage migration).

**Risk to Connected Fish Communities**— Through emigration, there is a risk that stocked non-native species may leave the Lake Ontario ecosystem and migrate to other areas such as Quebec and the Maritimes where they may be considered invasive.

**Risk Mitigation Strategies:**

The ongoing impact of invasive species and complex food web interactions creates a high degree of uncertainty in Lake Ontario fisheries. The following are key strategies to mitigate risk related to stocking non-native species:

1. Continue to monitor the abundance of top predators (both stocked and wild sources) and invasive prey species. This will help maintain optimal stocking levels to ensure that invasive prey fish do not overrun the system while providing consistent social and economic benefits.
2. Continue to follow the Great Lakes Fish Health Committee protocol to reduce risk of fish disease.
3. Continue to support research into native and non-native species interactions.
4. Continue to work with local watershed fisheries managers to mitigate local risks which may include local actions to address fish passage, barrier management and local stocking plans focused on species, levels and locations.
5. Avoid stocking migratory fish in the Upper St. Lawrence River which may increase the risk of emigration to Quebec and the Maritimes.
6. Continue efforts to diversify the prey fish community by re-establishing Deepwater Cisco and rehabilitating suppressed populations of Lake Herring.

## 4 Lake Ontario Fish Community Objectives

The Lake Ontario FCO 2013 describe the overall management goals and objectives. In some cases the objectives provide either explicit direction or implicit support for stocking. Each agency is guided by their own policies, legislation, and local management objectives that direct program priorities and stocking decisions in their respective jurisdictions.

### 4.1 Nearshore Fish Community Objectives

#### FCO 1.0 Nearshore Zone Goal

*Protect, restore, and sustain the diversity of the nearshore fish community, with an emphasis on self-sustaining native fishes such as Walleye, Yellow Perch, Lake Sturgeon, Smallmouth Bass, Largemouth Bass, Sunfishes, Northern Pike, Muskellunge, and American Eel.*

#### Nearshore Objectives

- 1.1 **Maintain healthy, diverse fisheries** — maintain, enhance, and restore self-sustaining local populations of Walleye, Yellow Perch, Smallmouth Bass, Largemouth Bass, Sunfishes, Muskellunge, and Northern Pike to provide high quality, diverse, fisheries.
- 1.2 **Restore Lake Sturgeon populations** — increase abundance of naturally produced Lake Sturgeon to levels that would support sustainable fisheries.
- 1.3 **Restore American Eel abundance** — increase abundance (recruitment and escapement) of naturally produced American Eel to levels that would support sustainable fisheries.
- 1.4 **Maintain and restore native fish communities** — maintain and restore native nearshore fish communities.

### 4.2 Offshore Fish Community Objectives

#### FCO 2.0 Offshore Pelagic Zone Goal

*Maintain the offshore pelagic fish community, that is characterized by a diversity of trout and salmon species including Chinook Salmon, Coho Salmon, Rainbow Trout, Brown Trout, and Atlantic Salmon, in balance with prey fish populations and lower trophic levels.*

#### Offshore Pelagic Zone Objectives

- 2.1 **Maintain the Chinook Salmon fishery** — maintain Chinook Salmon as the top offshore pelagic predator supporting trophy recreational lake and tributary fisheries through stocking.
- 2.2 **Restore Atlantic Salmon populations and fisheries** — restore naturally produced populations to levels supporting sustainable recreational fisheries in the lake and selected tributaries and also provide recreational fisheries where appropriate through stocking.

- 2.3 **Increase prey fish diversity** — maintain and restore a diverse prey fish community that includes Alewife, Lake Herring, Rainbow Smelt, Emerald Shiner, and Threespine Stickleback.
- 2.4 **Maintain predator/prey balance** — maintain abundance of top predators (stocked and wild) in balance with available prey fish.
- 2.5 **Maintain Rainbow Trout (Steelhead) fisheries** – maintain fisheries through stocking and, where appropriate, enhance naturally produced populations supporting recreational lake and tributary fisheries for Rainbow Trout.
- 2.6 **Maintain Brown Trout and Coho Salmon fisheries** – maintain the recreational lake and tributary fisheries for Brown Trout and Coho Salmon through stocking.

### 4.3 Deep Pelagic and Offshore Benthic Fish Community Objectives

#### FCO 3.0 Deep Pelagic and Offshore Benthic Zone Goal

*Protect and restore the diversity of the offshore benthic fish community composed of a mix of self-sustaining native species including Lake Trout, Burbot, Lake Whitefish, Round Whitefish, Deepwater Ciscoes, Slimy Sculpin, and Deepwater Sculpin.*

#### Deep Pelagic and Offshore Benthic Zone Objectives

- 3.1 **Restore Lake Trout populations** — restore self-sustaining populations to function as the top deepwater predator that can support sustainable recreational fisheries.
- 3.2 **Increase Lake Whitefish abundance** — increase abundance in northeastern waters and re- establish historic spawning populations in other areas.
- 3.3 **Increase prey fish diversity** — maintain and restore a diverse prey fish community that includes deepwater ciscoes, Slimy Sculpin, and Deepwater Sculpin.
- 3.4 **Control Sea Lamprey** — suppress abundance of Sea Lamprey to levels that will not impede achievement of objectives for Lake Trout and other fish.

### 4.4 Summary of Stocking Strategies linked to Fish Community Objectives

Stocking is a tool to help achieve fish community and fisheries management objectives. Other management tools include habitat protection and enhancement, water quality protection and enhancement including contaminant remediation, regulations, science and assessment and public education. **Table 1** provides a summary of stocking strategies linked to lake wide management objectives with indicators that will help assess the effectiveness of stocking at lake wide and sub-zone scales.

**Table 1. Summary of Lake Ontario FCO linked stocking actions**

FISH COMMUNITY OBJECTIVE	STOCKING STRATEGIES	LAKE WIDE INDICATORS OF SUCCESS THAT LINK TO STOCKING
<b>1.2 RESTORE LAKE STURGEON POPULATIONS</b>	<ul style="list-style-type: none"> <li>• Not currently stocked by Ontario.</li> <li>• Future stocking will depend on Species at Risk Recovery Strategy and Policy</li> </ul>	<ul style="list-style-type: none"> <li>• Within the next 20 years, increasing abundance of Lake Sturgeon</li> <li>• Longer term, progressing in establishment of at least four spawning populations, each having at least 750 sexually mature Lake Sturgeon in historical spawning areas</li> </ul>
<b>1.3 RESTORE AMERICAN EEL ABUNDANCE</b>	<ul style="list-style-type: none"> <li>• Stocked from 2006 to 2010.</li> <li>• Not currently stocked</li> <li>• Future stocking will depend on Species at Risk Policy and support from New York State DEC</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of previously stocked fish (2006-2010) is ongoing. Results of assessment may influence future stocking policy</li> </ul>
<b>1.4 MAINTAIN AND RESTORE NATIVE NEARSHORE FISH COMMUNITIES</b>	<ul style="list-style-type: none"> <li>• Stocking primarily used to reestablish degraded fish communities</li> <li>• Continue to stock Walleye into Hamilton Harbour and Toronto Harbour</li> <li>• Should not stock on top of healthy populations</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining or increasing native fish species richness and diversity in nearshore areas and embayments</li> </ul>
<b>2.1 MAINTAIN THE CHINOOK SALMON FISHERY THROUGH STOCKING, ACCOUNTING FOR NATURAL REPRODUCTION</b>	<ul style="list-style-type: none"> <li>• Maintain current lake wide stocking targets</li> <li>• Prioritize stocking locations for each sub- zone from shore and into approved streams and imprinting net pens</li> <li>• Expand the imprinting net pen stocking program</li> <li>• Review shore stocking locations and adjust within the sub-zone as needed</li> <li>• Continue to monitor the fishery to for stocking effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining Chinook Salmon average growth and condition at or above levels observed during 2007</li> <li>• Maintaining or increasing catch rates of Chinook Salmon in the lake and tributary fisheries</li> <li>• Need to maintain predator/prey balance see objective 2.4 section 6.2</li> </ul>
<b>2.2 RESTORE ATLANTIC SALMON POPULATIONS AND FISHERIES</b>	<ul style="list-style-type: none"> <li>• Continue stocking Atlantic Salmon considering the advice of the Atlantic Salmon Science Technical Team</li> <li>• Changes to the stocking program are anticipated once the management plan is updated in 2015</li> </ul>	<ul style="list-style-type: none"> <li>• Survival and growth of juvenile stocked fish, increasing adult spawning returns of stocked fish and wild production of Atlantic Salmon in the Credit River, Duffins Creek, Cobourg Brook, Humber River, and the Salmon River</li> <li>• Establishment of self-sustaining wild Atlantic Salmon populations in selected Ontario rivers</li> <li>• Increasing angler-catch of wild and stocked Atlantic Salmon in Lake Ontario and in the Salmon River, New York</li> </ul>

FISH COMMUNITY OBJECTIVE	STOCKING STRATEGIES	LAKE WIDE INDICATORS OF SUCCESS THAT LINK TO STOCKING
<b>2.5 MAINTAIN RAINBOW TROUT (STEELHEAD) FISHERIES</b>	<ul style="list-style-type: none"> <li>• Maintain current stocking targets</li> <li>• Focus stocking on approved tributaries with low natural reproduction (Sub-zones 1–4)</li> <li>• Avoiding stocking on top of self-sustaining wild populations of Rainbow Trout (Sub-zones 4–5)</li> <li>• Avoid direct lake stocking</li> <li>• Avoid stocking in the Upper St. Lawrence River (Sub-zone 7) to reduce the risk of out migration to Quebec</li> <li>• Refresh the hatchery brood stock</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining or increasing catch rates of Rainbow Trout in the lake and tributary fisheries</li> <li>• Maintaining or increasing population, recruitment, and growth of adult Rainbow Trout in selected tributaries (Salmon River, New York and Ganaraska River, Ontario)</li> </ul>
<b>2.6 MAINTAIN BROWN TROUT FISHERIES THROUGH STOCKING</b>	<ul style="list-style-type: none"> <li>• Concentrate MNRF Brown Trout stocking into 4 high-quality locations to develop destination fisheries</li> <li>• Concentrate community hatchery stocking in Kingston and Whitby areas (within overall lake wide stocking target)</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining or increasing catch rates of Brown Trout in the lake and tributary fisheries</li> </ul>
<b>2.6 MAINTAIN COHO SALMON FISHERIES THROUGH STOCKING</b>	<ul style="list-style-type: none"> <li>• Maintain current stocking targets focused on the Credit River</li> <li>• Consider increasing the target number, and establishing a second brood stock stream east of Toronto if possible</li> </ul>	<ul style="list-style-type: none"> <li>• Maintaining or increasing catch rates of Coho Salmon in the lake and tributary fisheries</li> </ul>
<b>3.1 RESTORE LAKE TROUT POPULATIONS</b>	<ul style="list-style-type: none"> <li>• Maintain current stocking program with enhancements based on recommendations from the Lake Ontario Technical Committee including: <ul style="list-style-type: none"> <li>• Increased stocking in US waters</li> <li>• Renewed emphasis on assessment of stocking methods</li> <li>• Reinstatement of coded wire tag use for Ontario stockings</li> <li>• Recognition of the need for suitable prey base, including restoration of native prey fishes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Increasing abundance of wild juveniles and stocked mature spawning adult Lake Trout</li> <li>• Increasing populations of wild Lake Trout across a range of age groups sufficient to maintain self-sustaining populations</li> <li>• Catch rates of stocked and wild Lake Trout in the lake fishery</li> </ul>
<b>3.3 INCREASE PREY FISH DIVERSITY</b>	<ul style="list-style-type: none"> <li>• Increase stocking program to reach the target with five years</li> <li>• Stocking program will develop under the advice of the Lake Ontario Technical Committee</li> </ul>	<ul style="list-style-type: none"> <li>• Detection of stocked adult and wild juvenile Deepwater Cisco</li> <li>• Maintaining or increasing populations and increasing species diversity of the deepwater and benthic prey fish community including Deepwater Sculpin, Slimy Sculpin, and Deepwater Cisco</li> </ul>

## 4.5 Lake Ontario Committee Stocking Targets

The lake wide stocking targets for 2015–2019 are shown in **Table 2**. The targets reflect total fish stocked (excluding eggs). For context, the estimated total weight in kilograms of the fish from Ontario and New York is also shown. Fish are stocked at different life stages, ranging from early fry to spring yearlings.

Fish stocked to support recreational put-grow-take fisheries including Chinook Salmon, Coho Salmon, Rainbow Trout, and Brown Trout, are generally stocked at a consistent size and age. Atlantic Salmon are stocked at various sizes and ages to support restoration. Please refer to the LOMU Annual report for detailed records of life stages stocked ([http://www.glf.org/lakecom/loc/mgmt\\_unit/index.html](http://www.glf.org/lakecom/loc/mgmt_unit/index.html)).

**Table 2. Lake Ontario five year stocking targets for 2015-2019.**

<i>Species</i>	<b>ONTARIO TARGETS</b>	<b>NEW YORK TARGETS</b>	<i>COMMONLY STOCKED LIFESTAGES</i>	<b>EST. WEIGHT Kg</b>	<b>EST. WEIGHT Kg NEW YORK</b>
<b>Atlantic Salmon</b>	750,000	50,000	Spring/fall fingerlings and yearlings	4,664	1,720
<b>Brown Trout</b>	165,000	400,000	fall fingerlings and yearlings	5,000	41,200
<b>Chinook Salmon</b>	600,000	1,761,600	spring fingerlings	4,000	8,455
<b>Coho Salmon</b>	80,000	245,000	fall fingerlings and yearlings	2,240	5,488
<b>Deepwater Cisco</b>	250,000	250,000	yearlings	6,650	6,650
<b>Lake Trout</b>	440,000	800,000	spring yearlings	13,200	36,000
<b>Rainbow Trout</b>	140,000	623,200	Spring/fall fingerlings and yearlings	2,000	24,928
<b>Walleye</b>	100,000	126,000	summer fry	50	38
<b>Lake Herring</b>	Not Stocked	TBD	TBD	0	TBD
<b>Lake Sturgeon</b>	Not Stocked	TBD	TBD	0	TBD
<b>Total (Excludes Eggs)</b>	2,525,000	4,255,800	N.A.	37,804	124,480

## 5 Canadian Waters - Lake Ontario Zone-wide and Sub-zone Planning

Lake Ontario is within Ontario’s Fisheries Management Zone 20 which includes the Ontario waters of the Niagara River below Niagara Falls, Lake Ontario proper (including the Bay of Quinte and other embayments) and the St. Lawrence River to the Quebec boarder. Within Lake Ontario proper, seven sub-zones have been defined as the basic scale for planning and management related to stocking (**Figure 1**). The sub-zones were originally developed to assess angler catch and effort, and therefore the long- term data set is well aligned to inform put-grow-take stocking activities related to recreational fisheries. The Upper Bay of Quinte (west of the Glenora Ferry) and Upper St. Lawrence River from Kingston to the Quebec border are not currently stocked by OMNRF. Future stocking in these areas should be limited to native species restoration and will be considered on a case-by-case basis.

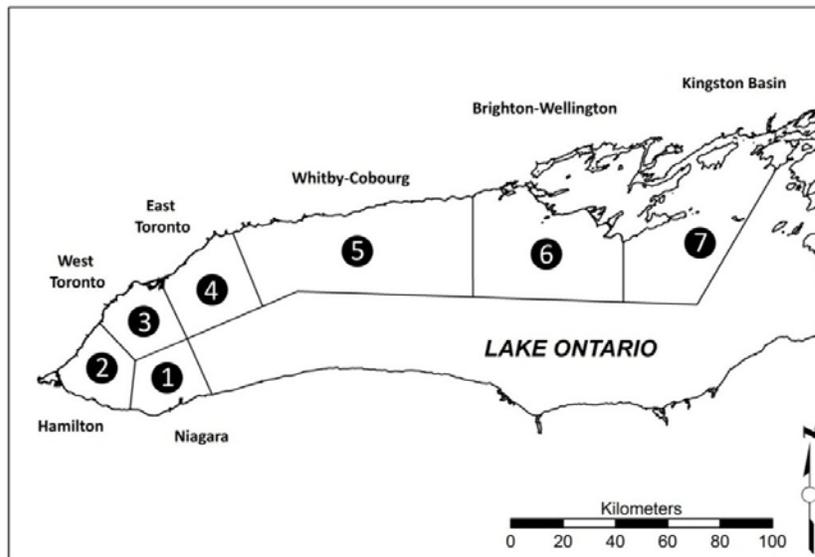


Figure 1. Map of the seven stocking zones in the Canadian waters of Lake Ontario.

## 5.1 Sub-Zone Descriptions

**Sub-zone 1** — *Niagara* — Niagara River/Dalhousie/Jordan Harbour to east of Grimsby

**Sub-zone 2** — *Hamilton* — Grimsby/Fifty Point/Hamilton/Bronte to Oakville Harbour

**Sub-zone 3** — *Toronto West and Toronto Harbour* — Port Credit to the eastern side of the Toronto Islands including Toronto Inner Harbour and the Don River

**Sub-zone 4** — *Toronto East* — Leslie Street Spit/Toronto Outer Harbour Marina to and including Frenchman’s Bay.

**Sub-zone 5** — *Pickering/Cobourg* — Pickering to Cobourg

**Sub-zone 6** — *East of Cobourg/Wellington* — East of Cobourg to Point Petre (Sandbanks Provincial Park)

**Sub-zone 7** — *Kingston/Eastern Basin* — East of Point Petre to Kingston including the eastern basin of Lake Ontario not including the Bay of Quinte west of the Glenora Ferry.

**Other areas:** Bay of Quinte west of the Glenora Ferry and the St. Lawrence River from Wolfe Island to Lake St. Francis

## 5.2 Recreational Fisheries Stocking Allocations by Sub-zone

The following section summarizes the stocking targets and rationale for each sub-zone for recreational species: Chinook Salmon, Coho Salmon, Rainbow Trout and Brown Trout. Increases or decreases are relative to the previous four year average. See **Table 6** for actual targets for each sub-zone.

### **Sub-zone 1—Niagara to Grimsby**

This zone receives a small increase in Chinook Salmon and Brown Trout and a small decrease in Rainbow Trout. Anglers in Sub-zone 1 benefit from the New York State– Niagara River stocking. The small reduction in Rainbow Trout reflects the need to optimize stocking to provide both lake and stream angling opportunities. The Chinook Salmon imprinting pen program can be expanded at Port Dalhousie.

### **Sub-zone 2—Fifty Point to Oakville**

This sub-zone receives a net increase of Chinook Salmon, Rainbow Trout, and Brown Trout to strengthen the fisheries from Fifty Point to Bronte/Oakville. Natural reproduction is limited in these areas and angler effort is high. A new Chinook Salmon imprinting net pen was established in 2015 at Bronte. Other pen locations will be considered. Oakville Creek (16 Mile) will be considered for stream stocking.

### **Sub-zone 3—Port Credit to Toronto Harbour**

This sub-zone receives a net increase of Chinook Salmon, Rainbow Trout, and Brown Trout to strengthen the fisheries around Port Credit, Humber Bay, and Toronto Harbour. Enhancing the nearshore urban fishery in the Greater Toronto Area is of particular interest. Natural reproduction is currently limited in this sub-zone. Shoreline angler effort is likely to increase. The imprinting pen program may be expanded in this Sub-zone.

### **Sub-zone 4—Ashbridges Bay to Pickering (Frenchman’s Bay)**

This Sub-zone receives a small increase in Chinook Salmon and Rainbow Trout (Rouge River) and a reduction of Brown Trout to zero (no stocking). This sub-zone has limited shoreline access areas and limited streams. The Chinook Salmon imprinting pen program can be expanded at Bluffers Park.

### **Sub-zone 5—Pickering to Cobourg**

This sub-zone will receive a slight increase in Chinook Salmon and an expansion of the imprinting pen program. Brown Trout stocking may be supported in this sub-zone by a community hatchery within the overall stocking target for Lake Ontario. Rainbow Trout are not stocked in this sub-zone due to sufficient natural reproduction.

### **Sub-zone 6—Cobourg to Wellington**

Sub-zone 6 receives a small increase in Chinook Salmon with a proposed expansion of the imprinting pen program. A reduction of Rainbow Trout to zero due to a lack of host streams in this sub-zone and an annual increase in Brown Trout. The Brighten net pen site may be moved to Wellington.

### **Sub-zone 7—Kingston/Eastern Basin**

Stocking of Rainbow Trout is not permitted in this sub-zone. Rainbow Trout will be reallocated to the western basin area for stream stocking. Brown Trout stocking will be allowed in this Sub-zone by a community hatchery within the overall stocking target for Lake Ontario. Kingston and the Eastern Basin will continue to receive approximately 50% of the Lake Trout stocking, and anglers in the Eastern Basin will benefit from New York stocking and the migratory movement of trout and salmon.

### **Bay of Quinte (west of the Glenora Ferry) and the St. Lawrence River from Wolfe Island to Lake St. Francis**

The Bay of Quinte and the St. Lawrence River are not currently stocked with any species. The fish community is a mix of native and introduced species and the fisheries are self-sustaining. The primary management tool is habitat protection and enhancement including water quality, water levels and harvest regulations for commercial and recreational fisheries. Stocking may be considered for native species restoration if necessary.

## **5.3 Sub-Zone Stocking Targets**

Species-specific stocking targets and practices may be adjusted to achieve the desired outcomes defined in the FCO and local and species specific fisheries management plans. Decisions related to stocking all species must be consistent with the Province of Ontario policy and the LOC principles and process outlined in Sections 3.1 and 3.2 and they should strive to mitigate risk as discussed in Section 3.3.

**Table 3** and **4** below provide the overall stocking target for each sub-zone. A more detailed description of stocking strategies for each species is provided in Section 6.0. See Appendix 1 for a list of Sub-zone stocking locations for non-native species that support Lake Ontario Fish Community Objectives.

**Table 3. Proposed stocking allocations by sub-zone for native species. LT = Lake Trout; AT = Atlantic Salmon; WA = Walleye; DW = Deepwater Cisco.** Data is presented as total numbers stocked and as percentage of total numbers stocked.

SUB-ZONE	NUMBER OF LAKE TROUT STOCKED	NUMBER OF ATLANTIC SALMON STOCKED	NUMBER OF WALLEYE STOCKED	NUMBER OF DEEPWATER CISCO STOCKED	TOTAL	PERCENT LAKE TROUT STOCKED	PERCENT ATLANTIC SALMON STOCKED	PERCENT WALLEYE STOCKED	PERCENT DEEPWATER CISCO STOCKED	TOTAL
1	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%
2	100,000	-	100,000	-	200,000	22.7%	0.0%	100.0%	0.0%	13.4%
3	-	407,000	-	-	407,000	0.0%	58.1%	0.0%	0.0%	27.3%
4	-	159,000	-	-	159,000	0.0%	22.7%	0.0%	0.0%	10.7%
5	75,000	134,000	-	-	209,000	17.0%	19.1%	0.0%	0.0%	14.0%
6	75,000	-	-	100,000*	175,000	17.0%	0.0%	0.0%	40.0%	11.7%
7	190,000	-	-	150,000*	340,000	43.2%	0.0%	0.0%	60.0%	22.8%
<b>TOTAL</b>	<b>440,000</b>	<b>700,000</b>	<b>100,000</b>	<b>250,000*</b>	<b>1,490,000</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

\*The Deepwater Cisco target is a long term goal

**Table 4. Stocking targets by sub-zone for recreational species. CH = Chinook Salmon; CO = Coho Salmon; RT = Rainbow Trout; BT = Brown Trout.** Data is presented as total numbers stocked and as percentage of total numbers stocked.

SUB-ZONE	NUMBER OF CHINOOK SALMON STOCKED	NUMBER OF COHO SALMON STOCKED	NUMBER OF RAINBOW TROUT STOCKED	NUMBER OF BROWN TROUT STOCKED	TOTAL	PERCENT CHINOOK SALMON STOCKED	PERCENT COHO SALMON STOCKED	PERCENT RAINBOW TROUT STOCKED	PERCENT BROWN TROUT STOCKED	MNRF TOTAL
1	133,000	0	28,000	41,250	202,250	22.2%	0.0%	20.0%	25.0%	20.5%
2	105,000	0	28,000	41,250	174,250	17.5%	0.0%	20.0%	25.0%	17.7%
3	165,000	80,000	70,000	41,250	356,250	27.5%	0.0%	50.0%	25.0%	36.2%
4	57,000	0	14,000	0	71,000	9.5%	0.0%	10.0%	0.0%	7.2%
5	75,000	0	0	MEA*	75,000	12.5%	0.0%	0.0%	TBD%	7.1
6	65,000	0	NRGC*	41,250	106,250	10.8%	0.0%	0.0%	25%	10.8%
7	0	0	0	NRGC*	0	0.0%	0.0%	0.0%	0.0%	0.0%
<b>TOTAL</b>	<b>600,000</b>	<b>80,000</b>	<b>140,000</b>	<b>165,000</b>	<b>985,000</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%**</b>	<b>100%</b>

\*Community Hatchery targets to be determined and will be calculated as yearling equivalents for Metro East Anglers and Napanee Rod and Gun Club.

\*\* Brown Trout target may exceed 100%. Ontario will manage the additional Brown Trout within the overall lake wide stocking target as per Section 5.2.

## 6 Rationale for Species Specific Stocking

The stocking approach for each species is summarized in the following section. For native species restoration programs (Atlantic Salmon, Lake Trout, Walleye, Deepwater Cisco), detailed stocking methods and locations are guided by species-specific restoration plans.

### 6.1 Lake Trout

Efforts to restore native Lake Trout in partnership with New York State will continue as directed in the FCO and are outlined in more detail in the Management Strategy for the Restoration of Lake Trout in Lake Ontario, 2014 Update\*. Related stocking activities to restore native prey fish are also important and should continue.

\*([http://www.glfcc.org/lakecom/Lake%20Ontario\\_Lake\\_Trout\\_Strategy\\_Nov\\_2014.pdf](http://www.glfcc.org/lakecom/Lake%20Ontario_Lake_Trout_Strategy_Nov_2014.pdf))

### 6.2 Atlantic Salmon

Efforts to restore Atlantic Salmon will continue as directed in the FCO. The restoration program is currently under a review which is examining the science and updating the management strategies as needed. An updated Five Year Implementation Strategy is expected in 2016 which will guide future program efforts including fish stocking. For more information, see the Atlantic Salmon Science Review at [www.bringbackthesalmon.ca](http://www.bringbackthesalmon.ca).

### 6.3 Deepwater Cisco (Bloater)

Efforts to restore native Deepwater Cisco (Boater) in partnership with New York State will continue as directed in the FCO and outlined in more detail in the strategic plan for the reestablishment of native Deepwater Cisco in Lake Ontario. Enhancing the native prey fish community by restoring Deepwater Cisco will help restore native species such as Lake Trout and Atlantic Salmon.

### 6.4 Walleye

Walleye stocking in Lake Ontario, the embayments and the St. Lawrence River is primarily done to help restore fish communities that do not have a self-sustaining wild populations. OMNRF will continue Walleye restoration stocking in Hamilton Harbour and initiate restoration stocking in Toronto Harbour when fish currently allocated to Hamilton become available. Walleye restoration efforts will continue to be monitored.

Stakeholders have proposed stocking Walleye into additional areas that have existing populations to improve overall abundance. Generally, Walleye should not be stocked on top of existing self-sustaining populations. When Walleye abundance is a concern, the factors that may have led to a decline in Walleye abundance need to be investigated to determine whether stocking is an appropriate course of action. Other management actions should also be considered such as habitat improvement, harvest regulation and enhanced monitoring.

## 6.5 Lake Sturgeon

There are no plans to stock Lake Sturgeon in Lake Ontario at this time. The future of stocking depends on the overall policy direction related to the Species at Risk Recovery Strategy for Lake Sturgeon, the Government Response Statement, and the support of the NYSDEC.

## 6.6 American Eel

Stocking occurred from 2006–2010 under an agreement with Ontario Power Generation. Currently, there are no plans to stock additional American Eel in Lake Ontario. However, the results of past stocking efforts are still being evaluated. The future of stocking depends on the overall policy direction related to the Species at Risk Recovery Strategy for American Eel, the Government Response Statement, assessment results of previous eel stocking and the support of the NYSDEC.

## 6.7 Chinook Salmon

Chinook Salmon have naturalized in several tributaries, and wild fish account for approximately 50% of the open water fishery in 2014. Chinook Salmon are stocked at more than twenty locations to support a nearshore fall fishery and provide a world-class open lake fishery. Stocking of Chinook Salmon, as well as other non-native salmonids, plays an important role in maintaining predator-prey balance in the offshore pelagic fish community.

Chinook Salmon typically return to spawn after four summers in the lake at age 3 or greater. During their time in the lake, Chinook Salmon range widely in search of food and grow rapidly. How and where Chinook Salmon are stocked does not generally determine where they are captured in the open water offshore boat fisheries. Fish movement within the lake and subsequently boat angler success from port to port is largely a function of temperature structure and baitfish availability which influences Chinook Salmon movement and concentrations. However, since mature salmon generally return to their natal stream or stocking location, where and how fish are stocked can impact the quality of angling for staging fish in the nearshore and tributary fisheries. Staging Chinook Salmon are mature fish that hold or stage off stream mouths or harbours prior to the start of their spawning migration up the tributary (or harbour).

The overall Chinook Salmon stocking approach is designed to enhance nearshore fisheries by stocking more fish into areas with low natural reproduction and avoid or reduce stocking into areas with sufficient natural reproduction to support nearshore fisheries. In addition, areas with more angling effort and higher nearshore fishing potential should also be considered when determining the overall stocking level. Also, since Pacific salmon die after they spawn, the potential implications of creating a high density of carcasses in confined areas should be considered.

The nearshore fishery for staging fish can be enhanced through improved imprinting of stocked fish, thereby increasing the likelihood that adult Chinook Salmon will return to desired locations. Starting in 2015, the following stocking changes should improve nearshore Chinook Salmon fisheries:

## **Stocking Location Priorities**

Chinook Salmon stocking should be based on the following priorities within a sub-zone:

1. Into approved streams that provide optimal imprinting and survival.
2. Into imprinting net pens, in accordance with the imprinting net pen guidelines.
3. Directly from the shore if the first two priority areas cannot be found.

This strategy proposes that approximately 90,000 Chinook Salmon are direct stocked or 15% of Ontario's total lake target and that approximately 85% of Chinook Salmon are either stocked into streams or net pens.

Decisions on where to stock fish within a sub-zone are made in the context of the risks outline in Section 5.3 taking into account local or species specific management plans and operational consideration such as weather, access, and local water quality.

## **Expand the Imprinting Net Pen Program**

Ontario currently has nine imprinting net pen sites located in Port Dalhousie, Bronte Harbour, Port Credit, Bluffer's Park, Whitby Harbour, Oshawa Harbour, Port Darlington, Brighton, and Wellington. Additional pen locations may be considered. Imprinting net pen sites must meet the criteria set out in the net pen guidelines, including sufficient water quality and land owner permission. Host clubs must follow the imprinting net pen protocol and provide ongoing monitoring and reporting.

Based on the best available information and current policy, OMNRF will allow up to 100% of fish stocked at a location to be held in imprinting net pens. The total amount of fish in pens at a site will depend in part on the past pen performance and the site characteristics including depth, flow, and water quality. Imprinting net pen allocations are subject to new information and/or policy.

To achieve 100% allotment at imprinting pen locations, clubs will be expected to provide enhanced monitoring and timely reporting to LOMU. In addition, LOMU will provide an expanded reporting section in the annual report.

## **Pen Site Maximum Allocations**

- Port Dalhousie, Bluffer's Park, Whitby Harbour, Oshawa Harbour, Port Darlington and Brighton locations may increase pen allocation to 100%.
- The Port Credit is a demonstration net pen located at the municipal dock along the river and will be limited to 10,000 fry at that location.
- The Bronte Harbour pen is a new site and may increase their allocation based on proven performance.
- The Wellington location will be held at 50%.

## **Review Shoreline Locations**

Chinook Salmon stocking may be reallocated from one site to another within the sub-zone. Initial sites to be reviewed include Hamilton Harbour, Jordan Harbor, and Lakeport.

LOMU will review shoreline stocking locations and make adjustments considering the advice of the FMZ 20. Options include:

1. Use imprinting net pens if the water quality is sufficient and there is a host club.
2. Move the fish to another current stocking location within the same sub-zone.
3. Moving the fish to a new location within the sub-zone that is consistent with the overall goals of the FCO and other management plans.

## 6.8 Coho Salmon

Coho Salmon are stocked in the Credit River to support a nearshore fall fishery and contribute to the diversity of the open lake fishery and also to maintain a brood stock for further stocking. Coho Salmon have naturalized in several tributaries and wild fish contribute to the lake and stream fisheries.

The overall stocking approach is to maintain stocking in the Credit River at the current target level. LOMU may consider increasing the overall target number pending LOC review. If an increase is supported, OMNRF would consider establishing a second brood stock stream east of Toronto. Selection of a second stream will need to be consistent with existing watershed fisheries management plans and consider risk as discussed in Section 5.3.

## 6.9 Rainbow Trout

Rainbow Trout have naturalized in several tributaries. The overall stocking approach to support Rainbow Trout management is to stock fish into areas with low natural reproduction and avoid stocking into areas with sufficient wild populations. In addition, stocked fish should provide optimal benefits to both stream and lakes fisheries.

Stocking strategies to support Rainbow Trout fisheries:

1. Maintain the current lake wide stocking targets.
2. Focus stocking on approved tributaries with low natural reproduction located in Sub- zones 1, 2, 3 and 4. Table 4 outlines the proposed sub-zone allocations.
3. Rainbow Trout should not be stocked in streams with sufficient self-sustaining wild populations of Rainbow Trout because stocking is not necessary to support the fishery. Generally, no stocking will occur in Sub-zones 5 and 6 because most streams have sufficient self-sustaining wild populations.
4. Rainbow Trout should be stocked into suitable streams to optimize the return to both the lake and stream fisheries and reduce the risk of straying.
5. Do not stock Rainbow Trout in the Upper St. Lawrence River (Sub-zone 7) to reduce the risk of out- migration to Quebec.
6. Refresh the hatchery brood stock.

## 6.10 Brown Trout

Brown Trout have naturalized in several tributaries; however, the lake fishery primarily relies on stocked fish. Past stocking strategies were not providing the expected returns to the fishery (see Stocking Program Review). Stakeholders considered two options; 1) to concentrate stocking into four key areas or to 2) rotate stocking every other year between 6 areas. Based on public consultation, MNRF will implement the following changes to improve the Brown Trout fishery:

1. **Increase the size of stocked Brown Trout** to improve overall returns. The target size for Brown Trout has increased approximately 35% from 26 g to 40 g yearling.
2. **Manage an increase to Ontario’s total target for Brown Trout** to allow additional stocking from Community Hatcheries. The LOC supports an additional number of Brown Trout from 165,000 up to 200,000 based on stocking yearlings. This increase will be managed within the overall limits of the lake wide stocking target.
3. **Stock fewer locations with more fish** to increase fish density and angler success, creating high quality destination fisheries for Brown Trout. Community Hatcheries will be permitted to stock Brown Trout at Whitby and Kingston to enhance localized nearshore fisheries (targets to be set by the LOC)

**Table 5. Sub-zones and locations to focus Brown Trout stocking populations.**

LOCATION	SUB-ZONE	STOCKING SCHEDULE
ST. CATHERINES/PORT DALHOUSIE	1	MNRF Yearlings
GRIMSBY/HAMILTON	2	MNRF Yearlings
HUMBER BAY/TORONTO HARBOUR	3	MNRF Yearlings
WHITBY	5	Metro East Anglers Fall Fingerlings
WELLINGTON/ATHOL	6	MNRF Yearlings
KINGSTON	7	Napanee Rod And Gun Club Fall Fingerlings

## 7. Monitoring and Assessment of Stocked Fish

The OMNF in partnership with New York State, the US Geological Survey, Canadian Department of Fisheries and Oceans, Conservation Authorities, and other partners monitor the Lake Ontario fish community and fisheries and conduct research. Several OMNRF long-term monitoring programs provide lake wide information while short-term monitoring projects focus on more immediate management priorities. **Table 6** provides a summary of the current monitoring programs conducted by OMNRF. Other monitoring programs conducted by the NYSDEC and US Federal partners also provide critical information to inform management decisions.

**Table 6. OMNRF Lake Ontario Fish Community and Fisheries Monitoring Programs.**

<b>Field And Lab Projects</b>	<b>Species Assessed or Monitored</b>	<b>Start-up Year</b>	<b>Sampling Frequency</b>	<b>Project Type</b>
Ganaraska Fishway Adult Rainbow Trout Assessment	Adult Rainbow Trout	1974	Annual to every two years	Long-term monitoring
Credit River Atlantic Salmon Smolt Survey	Atlantic Salmon	2011	Annual	Focused assessment
Duffins Creek Weir (Adult Atlantic Salmon Assessment)	Adult Atlantic Salmon	2013	Annual	Focused assessment
Chinook Salmon Mark/Tag Monitoring And Western Lake Ontario Boat Angling Survey	Salmon and Trout	1977	Mostly annual	Long-term monitoring
Lake St. Francis Open Water Angling Survey	Walleye, Perch, Bass, Pike	1982	Periodic	Long-term monitoring
Bay Of Quinte Ice Angling Survey	Walleye and Perch	1982	Mostly annual	Long-term monitoring
Coordinated Science Monitoring Initiative	Nearshore & Offshore Food Webs		Every five years	Long-term monitoring
Station 81: Offshore Benthos And Zooplankton Survey	Lower Food Web	2007	Annual	Long-term monitoring
Eastern Lake Ontario And Bay Of Quinte Community Index Netting	Fish Community	1958	Annual	Long-term monitoring
Lake wide Hydroacoustic Assessment of Prey Fish	Prey Fish Community	1991	Annual	Long-term monitoring
Prince Edward Bay Nearshore Community Index Netting	Nearshore Fish Community	2001	Annual	Long-term monitoring; different embayments each year
East/West Lake Nearshore Community Index Netting	Nearshore Fish Community	2001	Annual	Long-term monitoring; different embayments each year
Upper Bay Of Quinte Nearshore Community Index Netting	Nearshore Fish Community	2001	Annual	Long-term monitoring
St. Lawrence River Fish Community Index Netting - Thousand Islands	Fish Community	1984	Alternate annually: Thousand Islands– Lake St. Francis	Long-term monitoring
Credit River Streetsville Fishway	Adult Atlantic Salmon	1992, 2001	Annual	Monitoring, Focused assessment
Credit River Norval Fishway	Adult Atlantic Salmon	2011	Annual	Focused assessment
Credit River Chinook Assessment And Egg Collection	Chinook Salmon	1989	Annual	Long-term monitoring and operational management
Credit River Juvenile Atlantic Salmon Electrofishing	Juvenile Atlantic Salmon	2009	Annual	Focused assessment
Atlantic Salmon Adult Assessment Credit River/Duffins Creek	Adult Atlantic Salmon and other species	2009	Annual	Focused fishway and weir assessment
Credit River Juvenile Atlantic Salmon Electrofishing	Juvenile Atlantic Salmon	2009	Annual	Focused assessment
Atlantic Salmon Adult Assessment Credit River/Duffins Creek	Adult Atlantic Salmon and other species	2009	Annual	Focused fishway and weir assessment

## Appendix 1: Sub-zone Stocking Locations for Non-native Species.

Stocking locations for each sub-zone. CH = Chinook Salmon; CO = Coho Salmon; RT = Rainbow Trout; BT = Brown Trout. Note: additional stocking locations in streams may occur to meet inland stream fisheries objectives. NYS indicates New York State stocking event for the Niagara River

Table 7. Stocking Locations for Each Sub-Zone.

SUB-ZONE	STOCKING LOCATION	CH	CO	RT	BT	COMMENTS
1	Niagara River/Bar	NYS	NYS	NYS	NYS	NYSDEC stocks Niagara River regularly
1	Port Dalhousie	Yes		Yes	Yes	Imprinting pen site
1	Jordan Harbour	Yes				Under review
2	Fifty Point				Yes	
2	Hamilton Harbour					potential net pen site for CH
2	Burlington Canal	Yes				Under review
2	Red Hill Creek			Yes		Potential for CH
2	Grindstone Creek					Potential for CH / RT
2	Bronte Harbour	Yes			Yes	Net pen site
2	Bronte Creek	Yes		Yes		Potential stocking location
3	Port Credit Harbour	Yes			Yes	Imprinting pen site
3	Credit River	Yes	Yes	Yes		BT stocking in the river above Streetsville Dam is under the Credit River Management Plan.
3	Humber Bay				Yes	
3	Humber River	Yes				Potential stocking location for Rainbow Trout
3	Don River	Yes				
4	Bluffer Park	Yes				Imprinting pen site
4	Ashbridges Bay	Yes				
4	Highland Creek	Yes				
4	Rouge River			Yes		
5	Whitby Harbour	Yes			Yes	Imprinting pen site BT from classroom Hatchery
5	Oshawa Harbour	Yes				Imprinting pen site
5	Port Darlington	Yes				Imprinting pen site
6	Lake Port	Yes				Under review
6	Brighton	Yes				
6	Scotch Bonnet Shoal					
6	Wellington	Yes		Yes*		Imprinting pen site for Chinook, Rainbow location for community hatchery
6	Athol Bay				Yes	
7	Eastern Basin				Yes	BT Community Hatchery