

### Inland Seas Angler GREAT LAKES BASIN REPORT

Special Report – Lake Ontario

A Publication of the Great Lakes Sport Fishing Council http://www.great-lakes.org

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### **Highlights of the Annual Lake Committee Meetings**

#### **Great Lakes Fishery Commission proceedings**

This second of a series of annual special reports is an extensive summary of Lake Ontario. These lake committee reports are usually from the annual Lake Committee meetings hosted by the Great Lakes Fishery Commission, but the Lake Committee meetings were canceled for this year. We encourage reproduction with appropriate credit to the GLSFC and the agencies involved. Our thanks to the staffs of the GLFC, OMNRF, USFWS, USGS, NYSDEC and Ontario for their contributions to these science documents.

### Lake Ontario

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#### 6 Feet of Social Distance



#### Key:

CPH Catch per hectare = CPUE = Catch per unit effort CWT Coded Wire Tag = DEC NY Dept. of Environment Conservation =DFO Dept. of Fisheries and Oceans = LOC Lake Ontario Committee = ODNR = Ohio Dept. of National Resources OMNR = **ON Ministry Natural Resources** USFWS = U.S. Fish and Wildlife Service USGS = U.S. Geological Service YAO Age 1 and older = YOY Young of the year (age 0) = 2.205 lbs 1 kg = Kt = kilotonnes 1 kiloton (kt) = 1000 metric tons1 kilogram (kg) = 2.2 lbs. 1 hectre (ha) = 2.5 acres

### 2019 New York's Lake Ontario Fisheries Program Highlights

The following information summary is preliminary and selective. Comprehensive, final results will be reported in the "2019 Annual Report of the Bureau of Fisheries Lake Ontario Unit and St. Lawrence River Unit to the Great Lakes Fishery Commission's Lake Ontario Committee," which will be posted at <u>www.dec.ny.gov/outdoor/27068.html</u> in spring 2020. Results reported below were generated through collaborative fisheries and ecosystem monitoring and research programs conducted by the NYS Department of

Environmental Conservation (DEC), US Geological Survey (USGS), Ontario Ministry of Natural Resources and Forestry (OMNRF), US Fish and Wildlife Service (USFWS), and academic partners. For more information, contact: NYSDEC Lake Ontario Unit P.O. Box 292 Cape Vincent, NY 13618 (315) 654-2147 or <u>fwfishlo@dec.ny.gov</u> End ♦

### Lake Ontario Fishing Boat Survey

• Salmon and trout fishing on Lake Ontario was excellent again in 2019. After a record setting year in 2018, great fishing continued in 2019 with anglers catching an average of 4.0 salmon and trout per boat trip, the 5th highest catch rate recorded in the 35-year history of the survey (**Fig 1**).

• Much of the quality fishing in 2019 can be attributed to near-record Chinook salmon catches throughout the season and across all ports. Anglers caught an average of 2.8 Chinook salmon per boat trip, 76% above the previous tenyear average and ranked only second to the previous record high of 3.6 fish per boat trip set in 2018.



Fig 1-Average catch of salmon and trout per boat trip among fishing boats targeting trout and salmon, 1985-2019. The catch rate in 2019 was the 5th highest observed since 1985.

• Brown trout fishing success had its ups and downs in 2019, with total seasonal catch rates about 37% below the previous ten-year average. In April when anglers frequently target brown trout, catch rates were relatively good averaging 4.2 brown trout per boat trip, 25% above the previous 10-year average. From there, brown trout fishing declined and

reached a record low for the month of June (96% below average). Although good Chinook salmon fishing may have diverted some anglers from targeting browns, anglers specifically targeting brown trout in June noted an unusual absence of fish. Brown trout catches recovered somewhat during the rest of the year with September catch rates about 28% above average.

• Good Chinook salmon fishing can also affect catch rates for other species like rainbow trout and lake trout because many Lake Ontario anglers prefer catching Chinook salmon, and catching these other species often requires different tackle and techniques. Although angler catch rates for rainbow trout and lake trout in 2019 were 42% and 30% below previous ten-year averages, respectively, the Salmon River creel survey indicated the 2nd highest catches on record for rainbow trout in 2018/19, and gillnetting index surveys for lake trout indicated relatively high abundance in 2019, suggesting that low catch rates in the lake are partly attributable to excellent Chinook salmon fishing.

• Atlantic salmon are a relatively minor component of the Lake Ontario fishery but add to the diversity of trophy salmon and trout available to anglers. Atlantic salmon fishing success in 2019 was excellent with the 2nd highest catch rate observed.

• Due in part to the cold and windy conditions in April and the extremely high-water levels experienced on Lake Ontario in June and July, total fishing boat effort (46,309 trips) on Lake Ontario in 2019 was down about 18% relative to the previous 10-year average.

• Chinook salmon growth and condition are tracked each year to assess predator prey balance in Lake Ontario. In 2019, age-3 Chinook salmon dominated the harvest, making up about 60% of the total and leading to overall larger average size. However, the age-specific sizes of both age-2 and age-3 Chinook salmon were below average in 2019. Weight of age-3 Chinook salmon in August averaged 19.3

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lbs, the third lowest in the time series, but increased 0.9 lbs above the near-record low observed in 2018. Average weight of age-2 Chinook salmon decreased to a record low of 9.4 lbs in 2019.



Fig 2-Average weight of age 2 and age-3 Chinook salmon in Lake Ontario 1991-2019. Dashed lines represent longterm averages. Both age-2 and age-3 Chinook salmon were either the lowest or among the lowest values observed since 1991.

#### 2020 Lake Ontario Fishing Boat Survey Canceled

In the interest of public and staff health during the COVID-19 pandemic, DEC has canceled the 2020 Lake Ontario fishing boat survey. The survey runs each year from April 15 through September 30 and utilizes two crews of two agents each who typically use boats to intercept and interview anglers returning from their fishing trip. Given that adequate social distancing cannot be effectively maintained during this interview process, DEC will not conduct the survey for the first time since 1985.

#### Salmon River Angler Survey 2018-2019

• DEC conducted a survey of Salmon River anglers from September 2018 through mid-May 2019.

• Total estimated fishing effort during the survey was 135,788 angler trips totaling 840,258 angler hours, the second highest effort estimate on record (2011-12 survey had 1,077,316 angler hours).

• Chinook salmon were the most abundant species caught, with an estimated 83,481 fish caught and 34,123 harvested.

• Steelhead were the second most caught species with an estimated 41,582 fish caught and 5,043 harvested. The steelhead catch in 2018-2019 was the second highest on record (2011-2012 had 96,398).

• Estimated catch and harvest of coho salmon were relatively low at 6,171 and 3,366 fish, respectively.

• Relatively few brown trout and Atlantic salmon were caught in 2018-2019 (1,577 and 160 fish, respectively).

# 2019 Lake Ontario Stocking and 2020 Stocking Levels

• Fish stocking in the New York waters of Lake Ontario in 2019 included approximately 1,006,970 Chinook salmon, 254,416 coho salmon, 598,710 rainbow trout, 527,270 brown trout, 119,631 Atlantic salmon, 401,027 lake trout, and 112,155 walleye.

• A multi-agency, international effort to rehabilitate native coregonines (members of the whitefish family) in Lake Ontario continued in 2019 with the stocking of approximately 22,070 yearling and older bloater by the USGS and USFWS. Bloater are one of four extirpated species of deep water coregonines that once dominated Lake Ontario's forage base. USGS and USFWS are also conducting research on cisco, a shallow water coregonine, to determine the feasibility of stocking to experimentally re-establish cisco spawning in Sodus and Irondequoit Bays. In 2019, a total of 248,276 fall fingerling cisco were stocked in Sodus Bay.

• In response to concerns over ongoing declines in Lake Ontario's adult alewife population, DEC and OMNRF reduced Chinook salmon and lake trout stocking by an additional 20% to provide adult alewife additional relief from predation. More information is available in the 2019 alewife bottom trawl survey section below and here http://www.dec.ny.gov/outdoor/111196.html

• This is the third successive stocking reduction in Lake Ontario since  $2017 \cdot 2017$  – Chinook salmon and lake trout stocking was reduced by 20%

• 2018 - Chinook salmon and lake trout stocking were maintained at 2017 levels

• 2019 – Chinook salmon stocking was reduced by an additional 20%, while lake trout stocking was maintained at the 2017 level

• 2020 – Chinook salmon stocking was reduced by 20% from the 2019 level, while lake trout stocking was reduced an additional 20% from the 2017 level o The 2020 DEC stocking target for Chinook salmon is 845,368 and the stocking target for lake trout is 320,000

 Chinook salmon stocking will be concentrated at seven locations in 2020 and all Chinook salmon stocked by DEC will be pen-reared or held as Salmon River broodstock. More information on the 2020 Chinook salmon stocking strategy can be found at http://www.dec.ny.gov/docs/fish\_marine\_pdf/2020lakeontari ochinookstock.pdf

• Lakewide salmon and trout stocking by DEC and OMNRF in Lake Ontario in 2020 will still exceed 3.6 million fish. These numbers do not consider wild Chinook salmon production and increased survival of pen-reared Chinook salmon. Given favorable wind and water temperature patterns, anglers should expect continued excellent fishing in 2020.

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#### 2019 Alewife Bottom Trawl Survey

• The Lake Ontario alewife population is assessed by the USGS, DEC, and OMNRF using a collaborative survey design that provides a whole lake estimate of alewife abundance and population structure. See Weidel et al. 2019 for a more detailed report.

• The 2019 survey was the most extensive fish survey ever conducted on Lake Ontario with 252 bottom trawls collecting 214,569 fish from 39 species, in main-lake and embayment habitats, at depths ranging from 5 to 225 meters (16.5 – 742.5 feet). • Alewife distribution was similar in U.S. and Canadian portions of the lake, which differs from the previous three years of whole-lake surveys when alewife, in April, were more abundant in either U.S. (2017) or Canadian (2016, 2018) waters.

• The lake-wide average biomass index for adult alewife (age- 2+) in 2019 (27.7 kg/ha) declined 29% relative to 2018 (39.1 kg/ha). The lake-wide biomass index for age-1 alewife in 2019 (2.2 kg/ha) also declined relative to 2018 (2.6 kg/ha) and was the lowest age-1 biomass observed since whole-lake sampling began in 2016 (**Fig 3**).

• The current biomass, size structure, and age structure of the adult alewife population reflect the lower-than-average alewife reproductive success observed in the 2013- and 2014-year classes.

• Reproductive success was also lower than average in 2017 and 2018, suggesting the adult alewife biomass may continue to decline.





Fig 3-Lake Ontario average adult alewife (age-2+) biomass index (top) and the average age-1 alewife biomass index (bottom), 1997-2019. The blue dots represent estimates from U.S. waters, the red squares represent estimates from Canadian waters, and the black diamonds represent a lake-wide estimate

### Growth of Trout and Salmon Measured at the Salmon River Hatchery

• The average weight of age-1 Chinook salmon males (jacks) sampled in 2019 was 2.9 pounds, the lowest value in the 1986-2019 time series.

• Average weights of age-2 and age-3 Chinook salmon measured at Salmon River Hatchery were all among the lowest values observed

• Age-2 males were 10.9 pounds, 2.3 pounds below the long-term average

• Age-2 females were 11.9 pounds, 2.5 pounds below the long-term average

• Age-3 males were 13.4 pounds, over 5.2 pounds below average and the lowest value in the time series

• Age-3 females were 15.7 pounds, 3.0 pounds below the long-term average, and the third lowest value in the time series

• The average weight of age-2 female coho salmon in 2019 was 5.5 pounds, approximately 2.7 pounds less than the long-term average and the lowest value observed in the time series. Age-2 males weighed 5.4 pounds, 2.6 pounds less than the long-term average and the second lowest value on record.

• The mean weight of age-3 steelhead males was 5.6 pounds (similar to the long-term average), while age-3 females averaged 7.5 pounds (1.2 pounds above average).

• The mean weight of age-4 steelhead males was 8.5 pounds (similar to the long-term average), while females averaged 8.6 pounds (0.4 pounds below average).

#### Chinook Salmon and Steelhead Pen-Rearing Projects

• 2019 was the 22nd year of volunteer-based pen-rearing projects for Chinook salmon and steelhead. Pen-rearing projects were initiated with the intent of improving survival and homing of pen-reared fish when compared to traditionally shore-stocked fish.

• DEC studies documented that Chinook salmon raised by sportsmen in net pens survive 2X better than traditional, direct-stocked fish, on average.

• Approximately 558,570 Chinook salmon fingerlings were reared at nine pen sites, comprising 55% of DEC's 2019 Chinook salmon stocking allotment.

• Approximately 52,500 Washington strain steelhead yearlings were reared at six sites, representing 10 % of DEC's 2019 steelhead stocking allotment.

• DEC provided premium fish food for all Chinook salmon and steelhead pen projects in 2019. Premium fish food should improve growth and condition of pen-reared fish thereby increasing post stocking survival. Beginning in 2020, the entire DEC hatchery system will use premium fish food.

• The pen-rearing program continues to be an extremely successful partnership between the DEC and volunteer angling groups and has significantly benefited the Lake Ontario fishery.

#### Salmon River Wild Young-of-Year (YOY) Chinook Salmon Seining Program

• Seining has been conducted annually since 2001 to track wild YOY Chinook salmon production in the Salmon River, the largest source of wild Chinook salmon in New York.

• The mean peak catch in 2019 was 850 YOY Chinook per seine haul, the third highest catch recorded in the survey.

#### Eastern Basin Warmwater Fish Assessment

• Since 1976, DEC has conducted an annual index gill net survey to evaluate the status of warmwater fish populations in Lake Ontario's Eastern Basin.

• Consistent with previous years, yellow perch (45% of total catch), smallmouth bass (19%), white perch (10%) and walleye (8%) dominated the total catch in 2019.

• Catches of smallmouth bass in 2019 were lower (-17%) than the previous 10-year average, but higher (26%) than the record low catches observed between 2000-2004, with 18% of smallmouth bass caught in 2019 weighing more than 4 pounds.

• Yellow perch catches in 2019 were above (28%) the previous 10-year average, with 40% of yellow perch caught  $\geq 9$  inches in total length.

• Walleye catches in 2019 were higher (36%) than the previous 10-year average, with an average weight of 5.9 pounds. We anticipate that the population will remain at current levels given strong reproduction in recent years (production of strong year classes).

• Lake sturgeon catches were extremely rare in this assessment prior to 1995; however, at least one lake sturgeon was collected in 19 of the last 25 years, suggesting improved population status. Three lake sturgeon were captured during the 2019 survey.

#### Sea Lamprey Control

• The index of spawning adult sea lamprey abundance in 2019 was 11,844 fish. The 2019 estimate and the 3- year average are both below the target of 15,502 spawning adults.

• Sea lamprey control agents from Fisheries and Oceans Canada, contractors for the Great Lakes Fishery

Commission, conducted sea lamprey control treatments in four tributaries in New York during 2019. • An additional 22 NY tributaries were surveyed for the presence of larval sea lamprey, and post-treatment assessments were conducted in two NY tributaries.

• NY streams scheduled for sea lamprey treatments in 2020 include: South Sandy Creek, Little Sandy Creek, Salmon River, Snake Creek, Little Salmon River, and Ninemile Creek.

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### Status of Lake Ontario Alewife and 2020 DEC Stocking Plans

Lake Ontario's sportfisheries are world renowned, providing opportunities to catch trophy size fish from a diversity of trout and salmon species. Lake Ontario and its tributaries receive the highest angler effort of all New York's fresh waters, generating over \$112 million in angler expenditures annually. In 2019, Lake Ontario anglers continued to experience near-record high fishing quality, particularly for Chinook salmon. Alewife are the primary food for Chinook salmon, and due to concerns with a declining alewife population the New York DEC is further reducing Chinook salmon and lake trout stocking levels in 2020. The DEC remains committed to responsible, science-based management of this critical resource to protect the long-term sustainability of the world class trout and salmon fishery and its associated economic benefits.

#### 2020 Stocking Plans

• The DEC plans to stock a total of 845,568 Chinooks in the lake and in the Salmon River this year. All the fish stocked in the lake will be at pen-rearing sites before being released, with the remaining fish being stocked directly in the Salmon River. • The locations and the planned stocking numbers are: Salmon River (300,000 fish); Eighteen Mile Creek (111,392 fish); Genesee River (111,392 fish); Oswego River (111,392 fish); Oak Orchard Creek (111,392 fish); Niagara River (50.000 fish) and Black River (50,000 fish).

• In response to concerns over ongoing declines in Lake Ontario's adult alewife population, DEC must reduce Chinook salmon and lake trout stocking further to provide adult alewife additional relief from predation.

• For 2020 Chinook salmon and lake trout stocking will be reduced by an additional 20% from 2019 levels. Naturally reproduced or "wild" fish also contribute significantly to sportfisheries, comprising approximately 50% of Lake Ontario's adult Chinook salmon population.

• Most Chinook salmon stocked by DEC and the Ontario Ministry of Natural Resources and Forestry (OMNRF) are reared by cooperating sportsmen in net pens, a practice that, on average, doubles fish survival.

• Lakewide salmon and trout stocking by DEC and OMNRF in Lake Ontario in 2020 will still exceed 3.6 million fish (**Table 1**). Given favorable wind and water temperature patterns, anglers should expect continued, excellent fishing in 2020.

• Failure to reduce stocking levels would serve to extend the severity and duration of low adult alewife abundance, with greater potential impacts to the sportfishery.

Table 1-Anticipated lakewide (DEC/OMNRF) 20	20
Stocking	

Species	Life stage	Stocking '20
Chinook Salmon	Spring Yearlings	1,161,568
Lake Trout	Yearling	601,60
Rainbow Trout	Spring Yearlings	755,700
Brown Trout	Spring Yearlings	556,755
Atlantic	Spring Yearlings	240,000
Coho Salmon	Fall Fingerlings	235,000
Coho Salmon	Spring Yearlings	90,000

• The majority of Chinook salmon will be raised by sportsmen in "net pens," which increases their survival by approximately 2X.

#### Background

• Lake Ontario supports a world class fishery for salmon and trout and in years of good growth produces the largest Chinook salmon in the Great Lakes, with many individuals exceeding 30 pounds.

• The primary prey fish in Lake Ontario is the alewife, a type of herring native to the Atlantic Ocean that invaded the Great Lakes over 100 years ago.

• Lake Ontario Chinook salmon feed almost exclusively on adult alewife, requiring large numbers of alewife to support a

voracious appetite that allows a salmon to grow to over 30 pounds in four years.

• In 2016, Lake Ontario fisheries management agencies were concerned about declining numbers of adult alewife in future years due to consecutive, poor alewife reproduction in 2013 and 2014 (2013 and 2014 "year classes"). These poor year classes will continue to affect the overall stability of Lake Ontario's alewife population for several more years.

• In 2016, the Lake Ontario Committee (DEC and OMNRF) announced that stocking levels for Chinook salmon and lake trout would be adjusted down 20% in 2017 to reduce predator demand on adult alewife in order to protect the valuable fishery.

• Chinook salmon and lake trout stocking targets remained at the 20% reduced level in 2018.

• Chinook salmon stocking was reduced by an additional 20% in 2019.

#### The 2019 Alewife Bottom Trawl Survey

• The alewife population is monitored by the U.S. Geological Survey, DEC and OMNRF with bottom trawls in early spring, and the 2019 survey was the most extensive fish survey ever conducted on Lake Ontario with 252 bottom trawls.

• The 2019 lakewide adult alewife (age 2 and older) biomass index declined 29% relative to 2018.

• The lake-wide age-1 alewife biomass index in 2019 declined relative to 2018 and was the lowest value observed since whole-lake sampling began in 2016.

• Managers were pleased to see strong alewife reproduction in 2016. Those fish now appear to be under intense predation pressure.

• The current biomass, size structure, and age structure of the adult alewife population reflect the relatively poor alewife reproductive success observed in the 2013- and 2014- year classes.

• Alewife reproductive success was also below average in 2017 and 2018, suggesting adult alewife biomass will decline further in 2020

2020 Chinook Salmon and Steelhead Pen-Rearing Projects Each year, DEC word

Each year, DEC works with volunteer groups to stock a portion of the Lake Ontario Chinook salmon and steelhead in



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pen-rearing projects where the fish are held at the stocking location for 21 days prior to release. Previous studies have shown that pen-rearing improves both the survival of stocked fish and adult returns to the stocking site.

This spring, the volunteer groups were able to develop alternate plans to operate the pen-rearing projects while still maintaining effective social distancing. Stocking of Lake Ontario pen-rearing projects began on April 3rd and was completed on April 14th. We were able to stock all planned Chinook salmon pen-rearing sites and three out of four planned steelhead pen-rearing sites this year. The pen-rearing program is a great example of DEC and anglers working together to provide enhanced management of the Lake Ontario fishery.

#### Steelhead Egg Take Complete

DEC Salmon River Hatchery staff completed the steelhead egg take on March 26, 2020. Hatchery staff were able to

implement a modified egg collection protocol that allowed egg collections to be completed while maintaining proper social distancing and protecting the health and safety of the Hatchery staff. The egg take resulted in over 1.75 million eggs collected from 435 Washington strain steelhead and over 168,000 eggs collected from 41 Skamania strain steelhead.

Fish hatched from these eggs will be raised in the hatchery for approximately one year and will be stocked as spring yearlings in tributaries to Lake Ontario and Lake Erie where they contribute to both tributary and open lake fisheries. Current Lake Ontario Steelhead stocking includes 497,700 Washington strain yearlings and 43,000 Skamania strain yearlings. Lake Erie stocking includes 255,000 Washington strain yearlings.

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### Additional Information for Anglers 2020 Lake Ontario Stocking Decision

# Q: How will this stocking reduction impact fishing in 2020?

A: The reductions being implemented in 2020 will have little impact on fishing in the near term as the fish that anglers will catch next year have already been stocked in the system. In addition, about 50% of the adult Chinook salmon in Lake Ontario are naturally reproduced or "wild" fish.

#### Q: How will this impact fishing in the future?

A: If alewife abundance continues to decline, the size of Chinook may decline, but angler success (i.e. catch rate) may remain high as Chinook salmon become more vulnerable to angling.

#### **Q: Are other fish species slated for reductions?** A: Not at this time.

# **Q:** What are the actual numbers of fish being stocked?

A: Even with these reductions, lake-wide salmon and trout stocking in Lake Ontario in 2020 will exceed 3.6 million fish, including approximately 1.1 million Chinook salmon, 755,000 rainbow trout/steelhead, 556,000 brown trout, 601,000 lake trout, 325,000 coho salmon and 200,000 yearling Atlantic salmon.

# **Q:** Why isn't the stocking of other species of trout and salmon being reduced?

A: While other trout and salmon species eat alewife, Chinook salmon consume the largest amount in the shortest timespan. Reducing Chinook salmon numbers provides the greatest reduction of alewife consumption in the short-term. Further reducing lake trout stocking is intended to provide more long-term relief, since they grow slower and live longer than Chinook salmon. Lake Ontario's diversity of trout and salmon supports a world-class fishery, and managers want to maintain that diversity to the extent possible.

# **Q:** Will lake trout stocking cuts affect the lake trout fishery?

A: No; these cuts will not result in measurable changes, if any, to the adult lake trout population or angler success for 4 - 6 years. The adult lake trout population is currently healthy.

# **Q:** Is the Province of Ontario also cutting stocking?

A: The Ontario Ministry of Natural Resources and Forestry continues to make stocking reductions commensurate with New York's.

# **Q:** Do naturally produced fish contribute to the fishery?

A: All trout and salmon species in Lake Ontario reproduce naturally to varying degrees, with Chinook salmon being the most successful. Fish produced via natural reproduction can contribute significantly to the overall population of Chinooks in the lake.

#### Q: When will stocking numbers be increased?

A: It is not possible to forecast when that might occur. Scientists from the US Geological Survey, Ontario Ministry of Natural Resources and Forestry and the DEC will continue to monitor the status of the alewife population, sportfisheries, and Chinook salmon growth to assess the balance between predators and available alewife. Fisheries managers are currently managing in an adaptive fashion, hence future stocking will increase or decrease based on the amount of prey available.

# **Q:** Will there be a negative economic impact from these stocking reductions?

A: As we anticipate that fishing quality will remain high, angler participation and associated economic benefits are not expected to decline.

# **Q:** Three successive stocking reductions seems extreme?

A: A binational science committee called for deeper stocking cuts including other trout and salmon species, however, managers chose to continue with a more measured approach.

# **Q:** What caused the alewife population to decline?

A: The severe winters of 2013/2014 and 2014/2015 likely contributed to poor alewife reproduction in both years. Alewife reproduction was excellent in 2016, but likely due to the relative absence of fish produced in 2013 and 2014, the 2016 fish are being eaten faster than anticipated. Relatively low alewife reproduction in both 2017 and 2018 has exacerbated the situation, making these additional stocking cuts critical in maintaining the word-class fishery.

#### **Q:** Why not stock alewife?

A: It is not logistically and economically feasible to stock Alewife. Even if DEC was could devote all of its current hatchery production to alewife, no trout and salmon would be available for stocking, and the amount of alewife stocked would feed Lake Ontario predators for less than 1 month End  $\diamond$ 

# Status of Lake Ontario Alewife based on the 2019 Spring Trawl Survey (USGS)

#### Summary

• The 2019 spring prey fish trawl survey was the most extensive fish survey ever conducted on Lake Ontario with 252 bottom trawls collecting 214,569 fish from 39 species, in main-lake and embayment habitats, at depths ranging from 5 to 225 meters (16.5-742.5').

• Alewife distribution was similar in U.S. (southern) and Canadian (northern) portions of the lake, which differs from the previous three years of whole-lake surveys when Alewife in April were more abundant in either U.S. (2017) or Canadian (2016, 2018) waters.

• The 2019 lake-wide average biomass index for adult Alewife (Age2+) declined 29% relative to 2018.

• The lake-wide biomass index for Age-1 Alewife in 2019 (2.2 kg/ha) declined relative to 2018 (2.6 kg/ha) and was the lowest Age-1 biomass observed since whole-lake sampling began in 2016.

• The current biomass, size structure, and age structure of the adult Alewife population reflect the lowerthan-average Alewife reproductive success observed in the 2013- and 2014-year classes. • Reproductive success was also lower than average in 2017 and 2018, suggesting the adult Alewife biomass may continue to decline.

#### Introduction

Alewife are the dominant prey species supporting Lake Ontario's multi-million dollar native and stocked salmonid fisheries. Management decisions depend on the status and trends of the Alewife population in concert with other indicators to balance predator stocking levels with available prey (Great Lakes Fishery Commission Lake Ontario Committee, 2016; New York State Department of Environmental Conservation, 2018; Ontario Ministry of Natural Resources and Forestry, 2019). This report informs stakeholders, the Great Lake's Fishery Commission's Lake Ontario Committee (LOC), regional fisheries managers and advisors on the preliminary status of Lake Ontario's Alewife population based on the 2019 spring prey fish trawl survey. Discussions on Lake Ontario fish populations occur among stakeholders, biologists, and managers throughout the year, requiring the most recent information be available as early as possible. Survey and analytical methods are described at the end of this report.

Results The 2019 Lake Ontario Spring Prey Fish Survey collected 252 bottom trawls at depths from 5 to 225m from April 3 to May 3 (**Fig 1**). The survey captured 214,569 fish from 39 different species (**Table 1**).



Fig 1-Lake Ontario bottom trawl locations (N=252) from the 2019 Spring Prey Fish Survey.

#### **Alewife Distribution**

This survey historically sampled only U.S. waters of Lake Ontario from 1978-2015 but was expanded lake-wide in 2016. Four years of lake-wide surveys have dramatically changed our understanding of how the spatial distribution of Alewife can vary during the survey in April. This variability in lake-wide Alewife distribution influences how we interpret the previous survey results, since Alewife may have been aggregated in either the U.S. or Canadian portions of the lake in any given year (**Fig 2**).



Fig 2-Spatial distribution of Lake Ontario Alewife biomass, 2016-2019. The area of a gray circle is proportional to the biomass caught (standard scale across all plots). Red 'x' symbols denote where trawls did not

catch any Alewife. The largest catch (2016) represented a biomass of approximately 2100 kilograms per hectare (kg/ha). One kilogram (kg) is approximately equal to 2.2 pounds and a hectare (ha) is approximately 2.5 acres.

#### **Alewife Population Status**

Estimates for whole-lake adult (Age-2 and up) and Age-1 Alewife biomass declined in 2019 relative to 2018 (Fig 3). The 2019 estimate follows a general trend of declining biomass over the past five years and is likely among the lowest biomasses estimated in Lake Ontario over the past two decades. Observations from 2006 and 2010 were similarly low, but subsequent year's data illustrated those survey estimates were biased low. In those years a large proportion of the Alewife population was likely in Canadian waters, where the trawls did not sample. We measure Alewife reproductive success in a year or the strength of an Alewife "year class" when the fish are Age-1. The current observed decline in adult Alewife biomass is the result of the lower than average year classes produced in 2013 and 2014, and likely higher than average predation on the remaining adult Alewife. Lower than-average Alewife reproduction in both 2017 and 2018 (Fig 3, right side) suggests that adult biomass will continue to decline through 2019 and into 2020.



Fig 3-Lake Ontario average adult Alewife biomass index (above left in kilograms per hectare) and the average Age 1 Alewife biomass index (above right), 1997-2019. Error bars represent two standard errors. The term 'index' is used because trawl catchability is not accounted for in the estimates.

The reproductive success of Alewife in Lake Ontario and other Great Lakes has been shown to be influenced by the number of adults, climate, and predation. Alewife typically spawn in July, and warm conditions allow the spawn to occur earlier and provide more time for Alewife to grow before their first winter. In contrast, cold springs delay spawning and reduce growth of young fish, and colder than average winters can potentially reduce survival. Accurately predicting Alewife reproductive success is difficult, but the colder than average spring experienced in 2019 suggests the 2019 Lake Ontario Alewife reproductive success may be lower than average.

Figure 5 illustrates how Alewife size and age structure have changed over the past four years. Small or non-existent red and turquoise bars in the 2019 panels (Fig 4 lower panels) reflect the lower the average reproduction observed in 2013 and 2014 (Fig 3). The substantial decline in large Alewife

from 2018 to 2019 suggests predation pressure may have been higher than average in that time period. Additionally, we have observed the maximum age of Alewife has declined slightly in recent years. This also indicates predation on the oldest, largest Alewife may have increased.



Fig 4-Lake Ontario Alewife size and age structure based on whole-lake survey results, 2016-2019. The horizontal position of a bar indicates Alewife length, while the bar height illustrates the number or weight. The year in which Alewife are born (year class) is depicted by the different colors and is the same across each panel.

### Why use Alewife biomass as a population index?

As the Lake Ontario Alewife population changes it becomes increasingly important to understand how current abundance estimates relate to predator consumption levels, to historic values in the time series, and to other lakes where Alewife have experienced declines. Understanding how the Alewife population responded to previous declines may provide insight into how the population may respond in the future. Historic abundance indices reported total Alewife number or combined Alewife weight per 10- minute trawl.

The importance of biomass metrics is further highlighted due to the dramatic changes in Lake Ontario Alewife growth and size at age over the past four decades (**Fig 5**). Initial analyses suggest that growth variability may be due to changes in the number of non-native predatory zooplankton (i.e. fish hook fleas). When these zooplankton are abundant they comprise a large portion of Alewife diets, especially in the fall.



Fig 5-Lake Ontario Alewife weight at age, 1984-2019. Alewife age interpretations are from whole saggitae otoliths. For reference, a gram is approximately the weight of a small paper clip.

We feel biomass provides a more integrated description of Alewife population dynamics as it includes both measures of density and fish size. Adult Alewife size can vary substantially from year to year (Fig 4 and 5). Many small adult Alewife may not provide as much forage potential to predators as an Alewife population with fewer but larger individuals. While density increased markedly from 2017-2018, the decrease in average weight from 2017-2018 meant that the biomass increased slightly, then declined. End  $\diamond$ 

### 2020 Chinook Salmon Stocking

- West
- West Central
- East Central
- East



DEC monitors the Lake Ontario fishery annually and reports results based on four geographic lake areas

•Chinook salmon stocking numbers were reduced in 2017, 2019, and 2020 due to concerns over predator prey balance in Lake Ontario

•More information on why stocking numbers were reduced can be found here: <u>http://www.dec.ny.gov/outdoor/</u>111196.html

•New York's 2020 stocking target for Chinook salmon is 845,568

•Most of the Chinook salmon stocked in 2020 will be raised in the pen-rearing program

#### Pen-rearing program

• Chinook salmon and steelhead are stocked into holding pens and cared for by volunteers for 21 days prior to being released

• Pen-rearing Chinook salmon has been shown to increase post stocking survival by 2X compared to direct stocked fish

• Pen-reared Chinook salmon also tend to have improved imprinting, resulting in improved adult returns to the stocking location at most sites

#### 2020 Chinook Salmon Stocking Overview

•545,368 Chinook salmon will be raised in the pen-rearing program in 2020

•The remaining 300,000 Chinook salmon will be stocked in the Salmon River as broodstock

•These fish are held in the hatchery until they reach a size of 60 fish per pound

•These fish are typically larger than pen-reared Chinook salmon and have post stocking survival similar to pen-reared fish

#### Lake Ontario Stocking Strategy

•DEC is developing a new Lake Ontario salmon and trout stocking strategy

•A plan that outlines where, when, how many, and what life stage we will stock each species of salmon and trout in Lake Ontario

•DEC is working with the Lake Ontario Fisheries Management Focus Group (8 open lake anglers and 8 tributary anglers) and consulted the Group for initial public feedback on this Chinook salmon stocking strategy

## Why do we need a new salmon and trout stocking strategy?

•Current Lake Ontario salmon and trout stocking allocations were set decades ago based on shoreline distance within each DEC Region

•Current allocations do not necessarily account for:

- •Angler preferences
- •Fishing effort in a particular area
- •Geographic and seasonal differences in fish distribution
- •Potential to benefit both open lake and tributary
- fisheries

#### An outcome based approach

DEC is using an "outcome based" approach to develop new Lake Ontario salmon and trout stocking strategies:

• Define the specific fisheries management outcomes that we

want to achieve from our salmon and trout stocking program
Develop stocking allocations that contribute to achieving those outcomes

# Fisheries management outcomes for the Chinook salmon stocking were based on the following:

• DEC's management philosophy for Chinook salmon

• How the Chinook salmon fishery currently operates

• How stocking location influences the Chinook salmon fishery

· Chinook salmon management philosophy

• Chinook salmon provide the primary fishery in Lake Ontario and are an important component of the fall tributary fishery

#### Chinook salmon fishery

The Chinook salmon fishery has three distinct phases:

Open lake mixed fishery

The mixed fishery occurs from April – July when fish from all stocking and wild production sites are mixed throughout the lake.

Staging fishery

The staging fishery occurs during August and September as mature fish move toward/stage near, and ultimately return to their stocking location or natal stream. Note - the transition between the open lake mixed fishery and the staging fishery is gradual and does not necessarily occur on August 1.

Tributary fishery

Chinook salmon are the most abundant and most sought after salmonine species in Lake Ontario tributaries during September and October.

# How stocking influences the Chinook salmon fishery

• Pen-reared and direct stocked Chinook salmon stocked in 2010, 2011, and 2013 were adipose fin clipped and coded wire tagged, allowing us to identify the specific stocking location for angler caught fish in the open lake, staging, and tributary fisheries.

#### Stocking locations of fish caught in four areas

• Results of the study indicate:

• Pen-reared Chinook salmon survive, on average, twice as well as direct stocked fish

• Pen-rearing also provided improved imprinting, and adult returns, to the stocking location at some sites and in some years

• Open Lake

Chinook salmon harvested by anglers at a given port from April – July were comprised of fish stocked at sites throughout the lake, indicating a well mixed population

• On average, only 10% of the Chinook salmon harvested at a specific port, from April – July, were stocked at that port

• The majority of Chinook salmon harvested at a specific port from April – July were stocked at locations greater than 20 miles away

• Pen rearing improves the open lake fishery only due to improved fish survival

Bowmanville Creek

Oak/Sandy



• Total recoveries of coded wire tagged Chinook salmon from the 2010 year class from April – July

• The underlined label at the top of each pie chart (for example Niagara/ Olcott) indicates the port where the fish were harvested. The labels on each color of the pie indicate where the fish was stocked

• At every locale, the vast majority of Chinook salmon harvested in a given area from April through July were not stocked there.

#### **Staging and Tributary**

• Staging and tributary fisheries are greatly influenced by stocking location

Chinook salmon straying is relatively low in Lake Ontario

• Chinook salmon tend to return to the tributary where they were stocked

Chinook salmon that do stray tend to stray to nearby sites

• Straying back to Salmon River Hatchery is generally low, only about 10% of the stocked Chinook salmon sampled at the hatchery are from other stocking locations

• Stocking locations without significant tributaries (Sodus Bay and little Sodus Bay) tend to stray back to the hatchery more than other sites

• Pen-reared Chinook salmon tend to imprint and return to the stocking site better than direct stocked fish

#### **Fisheries management outcomes**

Desired fisheries management outcomes for Chinook salmon stocking are primarily based on the staging and tributary fisheries because stocking location has no influence on where Chinook salmon are caught in the open lake mixed fishery from April – July

Given our current stocking target of 845,568 Chinook salmon we have two options:

1. Continue to distribute stocked fish evenly around the lake

• May result in poorer survival of stocked fish and lower catch rates in staging/tributary fisheries at many locations

2. Concentrate our stocking at fewer locations

• Should provide higher catch rates in staging/tributary fisheries at a few locations

• Concentrating stocking and providing high catch rate fisheries is the best use of stocked Chinook salmon

Desired fisheries management outcomes for Chinook salmon stocking:

1. Provide sufficient adult returns to Salmon River Hatchery so that Chinook salmon egg take targets can be met for all Lake Ontario stocking sites

2. Provide a minimum of one high catch rate staging and tributary fishery within each of the four Lake Ontario geographic areas:

- West: Eighteenmile Creek
- West Central: Genesee River
- East Central:Oswego River
- East:Salmon River

3. Provide additional staging and tributary

• Chinook salmon stocking will be concentrated at seven locations in 2020

• These stocking locations all have a history of high fishing effort in both the open lake and staging/tributary fisheries

• Some locations where Chinook salmon have traditionally been stocked will not be stocked in 2020

•The decision to stop stocking some locations, including some pen-rearing projects, was not taken lightly and was done with the best interest of the overall Lake Ontario fishery in mind

### Concentrated Chinook salmon





### 2020-2021 Freshwater Fishing Digest

The 2020-2021 Freshwater Fishing Digest is now available. Normally, hard copies are available where fishing licenses are sold, but most businesses remain closed due to the COVID-19 pandemic. We encourage anglers to download the <u>digital</u> or <u>PDF</u> version.

End  $\diamond$ 



### Be Safe While Fishing

#### **6 Feet of Social Distance**



DEC would like to remind all anglers to maintain safe social distancing while fishing this year to help stop the spread of COVID -19.

- Fish local: Stay close to home. Keep your fishing trip short. Avoid high-traffic destinations.
- Be safe: Avoid crowds and groups. Keep a distance of six feet or more from others. When fishing from a boat, make sure it's large enough so persons on board are at least six feet from one another.
- Stay Home: If you're not feeling well, stay home. Anyone 70 and older or with a compromised immune system should postpone their trip.
- Be Adaptive: Move quickly through parking lots and paths. If crowded, <u>choose a different fishing location</u>, or time to visit.

End ∻

### Sporting Licenses available online

To limit the community spread of COVID-19, DEC is encouraging hunters, trappers, and anglers to purchase sporting licenses online. <u>Sporting licenses may be</u> <u>purchased online</u> at any time, and anglers may use their privileges immediately by simply carrying their transaction number (DEC-LS#) with them while afield.

Anglers, hunters, and trappers may also use the **HuntFishNY mobile app** to display an electronic copy of

their license. The HuntFishNY app is available for download through the Apple App or Google Play stores. Back tags and carcass tags must still be mailed, and customers should allow 10-14 days for receipt of their tags. DEC will provide updates periodically via email, social media, and at <u>www.dec.ny.gov</u>. We will also be available to respond to questions or concerns regarding visitation opportunities at <u>contact@dec.ny.gov</u>.

End ∻

### **Response to COVID-19: Boat Launches & Marinas**

To support the alignment of policies in New York, New Jersey, and Connecticut and the region's ongoing response to COVID-19, Empire State Development (ESD) issued <u>updated guidance on marinas and the use of boats</u>. Access to boat launches will be allowed if strict adherence to the CDC/New York State Department of Health guidelines for preventing the spread of colds, flu, and COVID-19 is followed:

- Try to keep at least six feet of distance between you and others.
- Avoid close contact, such as shaking hands.
- Wash hands often or use a hand sanitizer when soap and water are not available.
- Avoid surfaces that are touched often, such as rails, posts, and tie off cleats.

The essential business guidance continues to determine that commercial fishing remains essential, but fishing charters and guides are not. Decisions about the operation of municipally-owned boat launches will be made by the municipality. End  $\diamond$