



Lake Ontario Management Unit Predator / Prey Status Update

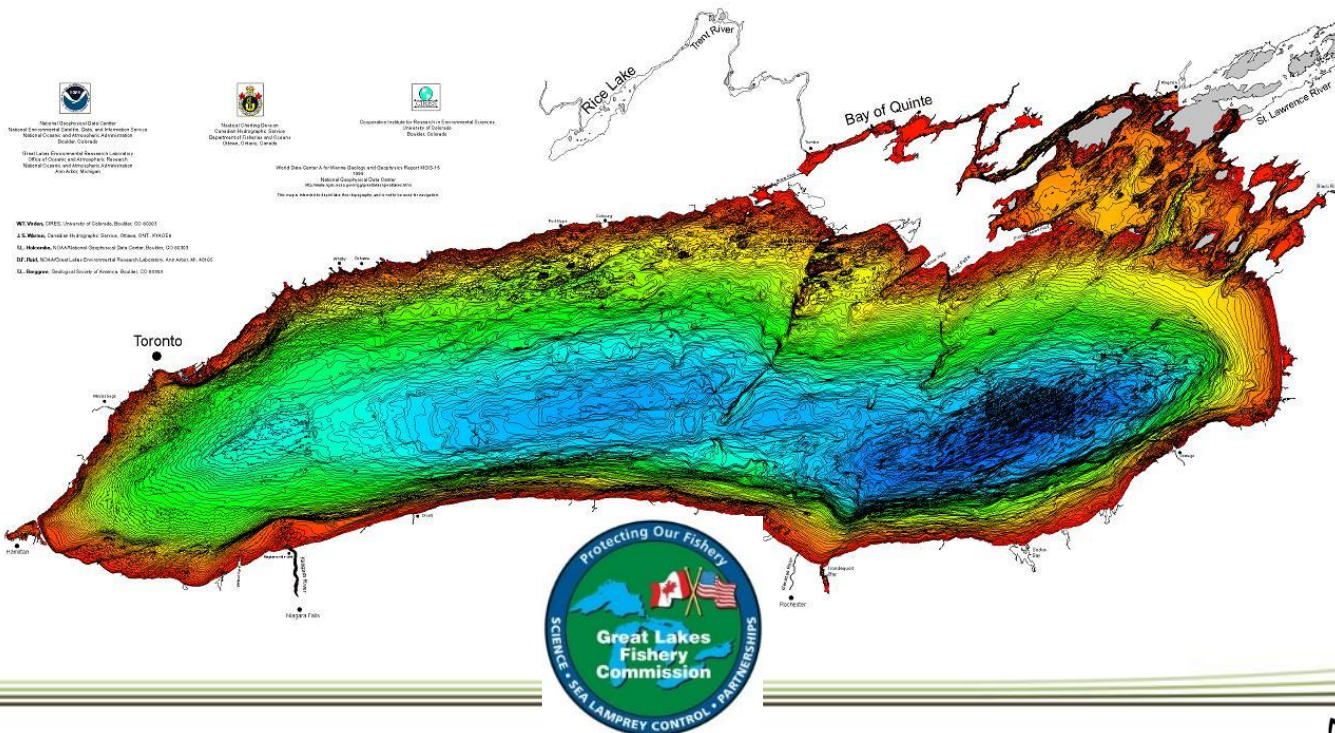
Port Credit Sept 19 & Whitby Sept 22, 2016

Contact Andy Todd andy.todd@ontario.ca

Outline

- Management Context
- Chinook and Alewife Dynamics
- Current Management Issue
- Proposed Management Action for 2017

Lake Ontario Committee New York State and Ontario



Management Context



Lake Ontario Trout and Salmon Fisheries: Strength in Diversity

- Chinook Salmon
- Rainbow Trout - Steelhead
- Coho Salmon
- Brown Trout
- Lake Trout
- Atlantic Salmon





Management Context: *A Joint Strategic Plan for Management of Great Lakes Fisheries*

Lake Ontario Committee

- Two Signatories – Ontario, New York
- Committed to the Joint Strategic Plan
- Management of issues of common concern by consensus
- Our “Fish Community Objectives”

Fish Community Objectives for Lake Ontario

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.

Lake Ontario

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.

- 2.4 Maintain predator/prey balance** - maintain abundance of top predators (stocked and wild) in balance with available prey fish.

Predator/Prey Balance Or Chinook / Alewife Dynamics

At any one time:

- There are usually at least four year classes of Chinook in Lake Ontario
- There are usually 8-9 year classes of Alewife in the system.

Typically, age 3, 4, & 5 Alewife make up the bulk of the forage for Chinook.

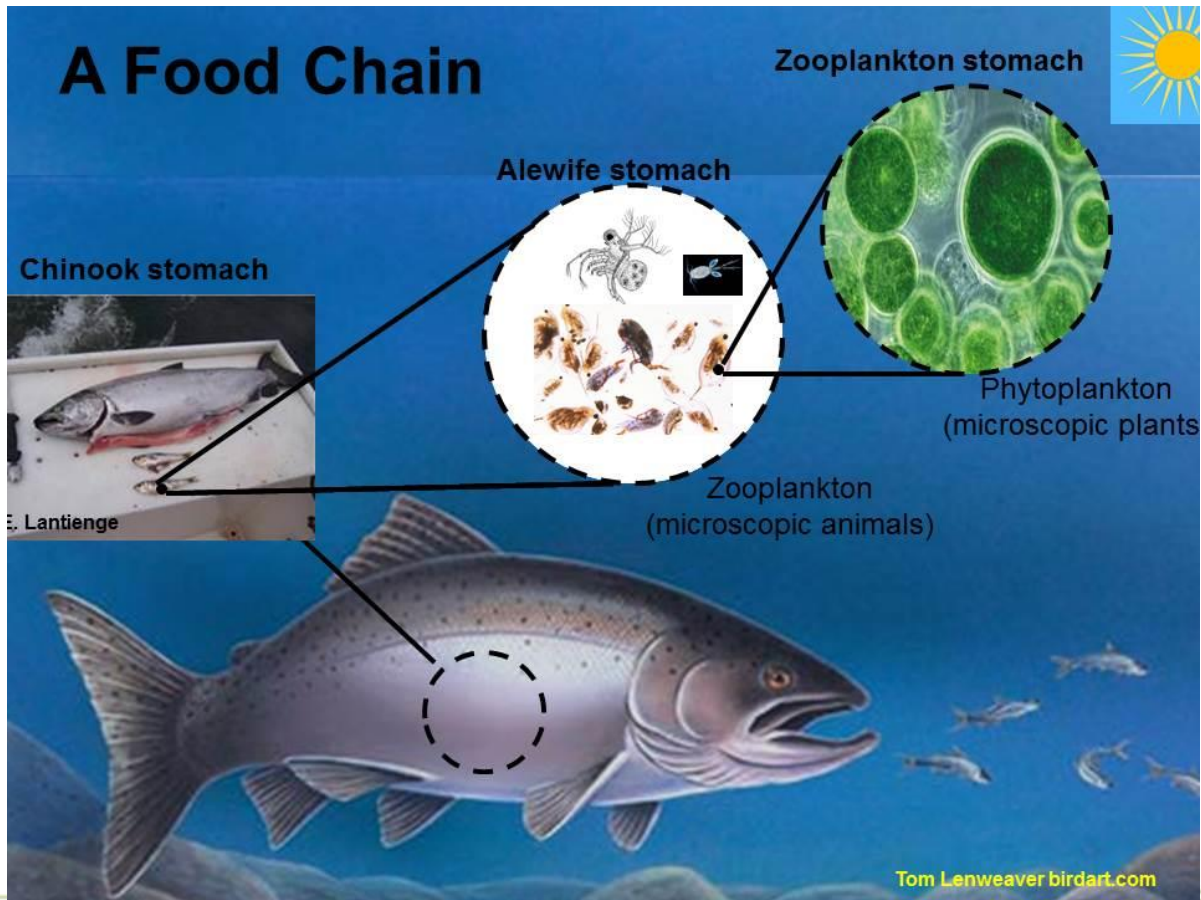
Predator/Prey Balance Or Chinook / Alewife Dynamics

The chinook/alewife relationship is fairly simple but...

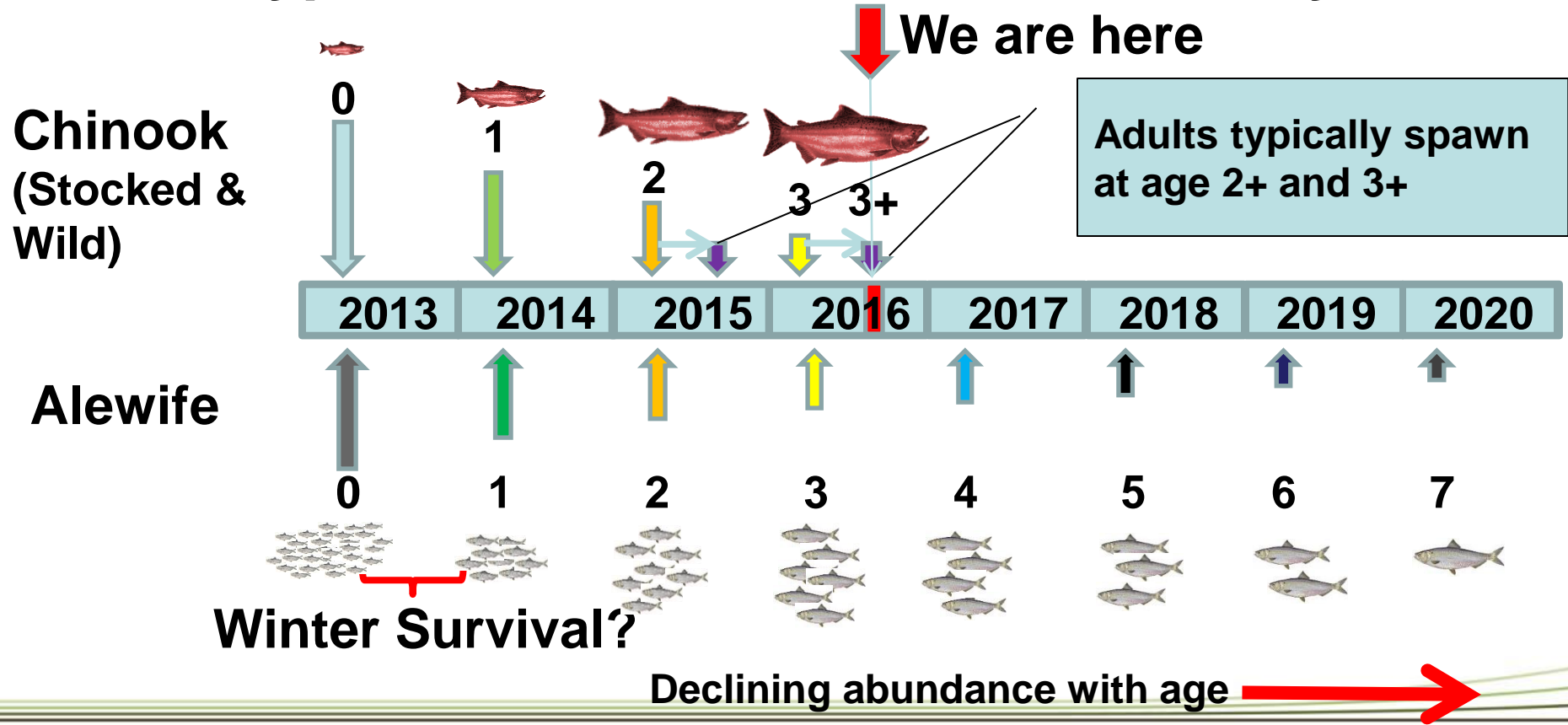
Assessing the fishery is difficult because

- a) it's a big lake and
- b) the time delay 1 to 3 years after age zero.

A Food Chain



Typical Chinook and Alewife Maturity



How old is that Alewife?

Lake Ontario, **Aug 3, 2016**

Age 0
(young of year)

Age 1
(yearling)

Age 4
(adult)



Hatched June/July 2016
(size variation due
to hatch date)

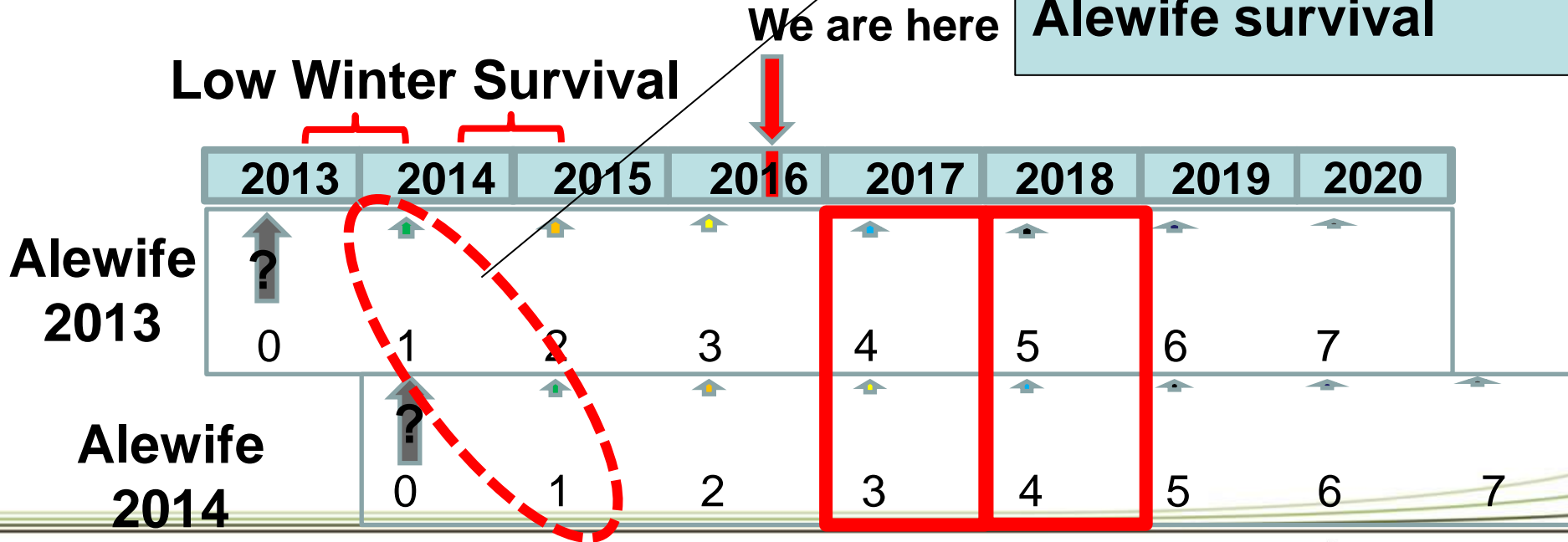
Hatched in 2015
(were 3-4"
in spring 2016)

Hatched in 2012

Illustration – 2013 and 2014 Poor Alewife Year Classes

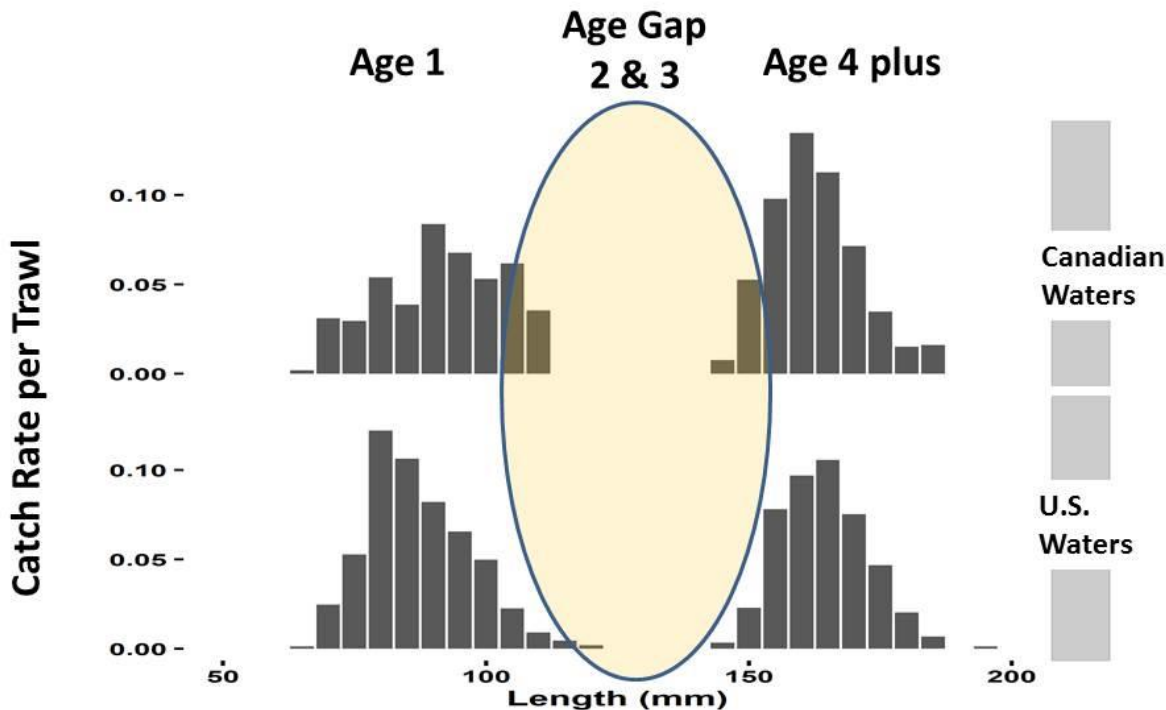
Starting in 2017: Alewife from the 2012 will be 5 years old and declining & abundance of age 3 and 4 Alewife will be low.

Two back to back hard winters with low Alewife survival



Current Management Issue

New York State and Ontario Spring Alewife Trawling 2016



Missing Alewife age 2 and 3 in both Ontario and New York State waters

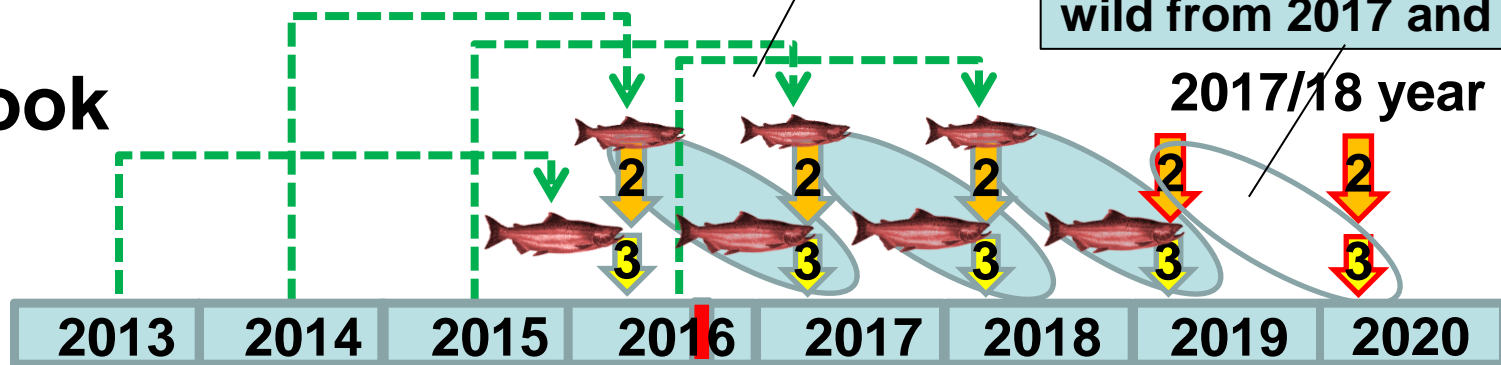
Starting in 2017 – fewer adult Alewife for Chinook that are already in the lake

- Chinook from 2013 now age 3+ in 2016
- Chinook from 2014 are age 2+ in 2016 and 3+ in 2017

Chinook from 2013/14/15/16 stocking and wild are now in the lake out to 2019

Chinook stocked or wild from 2017 and beyond

Chinook



2017/18 year class

Alewife



3-4 Age 4-5
"very few"
Alewife

Future
unknown

Current Management Issue

Perspective - Chinook demand on alewife

- Lake-wide Chinook stocking target = **2.3 million**
- We have effectively been stocking more than **3 million** Chinook (2X survival of 700,000 Chinooks in net pens).
- Stocking **31% over** the Lake Ontario Committee target in recent years.
- Contribution of wild Chinook = **40-60%**
- Chinook Salmon eat about **75 million pounds or 1 billion Alewife every year!**

PROPOSED MANAGEMENT ACTIONS TO PROTECT THE CHINOOK SALMON FISHERY

- 1. Reduce demand on Alewife**
- 2. Continue to monitor the fishery**

Reducing Demand On alewife

- **2017 – 20% Chinook Stocking Reduction**
 - Will help meet objectives - maintain predator/prey balance and protect the future Chinook Salmon fishery.
 - Short term relief starting in 2018 and by 2020 – estimate 7.5 million pounds of Alewife not consumed (Chinook fast growing; short lived).

Reducing Demand On Alewife

- **2017 – 20% Lake Trout Stocking Reduction**
 - should not compromise restoration objectives
 - no short term relief on alewife but long term will reduce demand starting 2021 (LT slow growing, long lived).

Rainbow Trout (Steelhead), Brown Trout, Coho Salmon and Atlantic Salmon

No stocking reductions proposed for 2017

Chinook Salmon, because of their abundance, growth rate and feeding preference, are the main predator on alewife. Reducing Coho, Brown Trout and Atlantic Salmon stocking would do very little to decrease predatory pressure on Alewife in the short term. While steelhead consume considerable numbers of Alewife, there is reason for concern over recent population levels.

When will stocking be increased?

Lake Trout – if adult abundance falls below restoration targets stocking may be increased.

Chinook Salmon:

- ✓ Alewife abundance and age structure is restored
- ✓ Chinook growth and condition is on target and
- ✓ Nutrients/lower food web are stable,

We will consider increasing the stocking target.

How will the reductions be implemented?

- New York State and Ontario will develop their own implementation plans to meet the new stocking targets.
- Chinooks in existing net pens will be “grandfathered” at a 1:1 ratio with direct stocked fish at that site, however...
- Future increases to net pens will be considered (as per agency guidelines) and counted at a 2 to 1 ratio. (i.e. 20,000 direct stocked = 10,000 pen stocked).

How will this impact the sportfishery?

- We have experienced Chinook stocking shortfalls of greater magnitude in the past with no measurable impact on Chinook fishing quality.
- OMNRF proposed Lake Ontario stocking target for 2017 is **1,917,000** trout and salmon combined, and fishing quality is resilient due to multiple ages of fish across six species of trout and salmon.



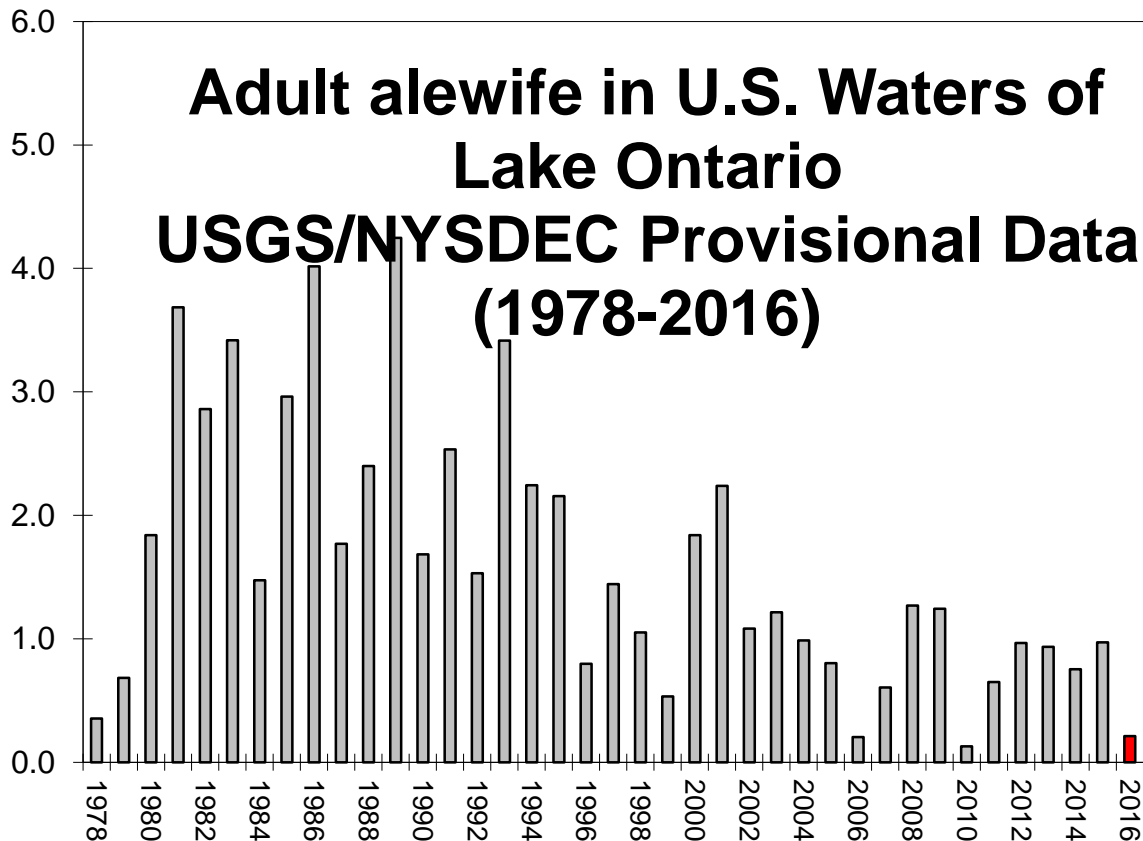
Discussion



Species	Life-Stage	Proposed OMNRF Stocking 2017
Chinook Salmon	Spring Fingerlings	480,000
Lake Trout	Yearlings	352,000
Rainbow Trout	Yearlings	140,000
Brown Trout	Yearlings	165,000
Atlantic Salmon	Fry/Fingerlings/Yearlings	700,000
Coho Salmon	Fall Fingerlings	80,000
	<u>COMBINED TOTAL</u>	1,917,000

Number Index (1000s)

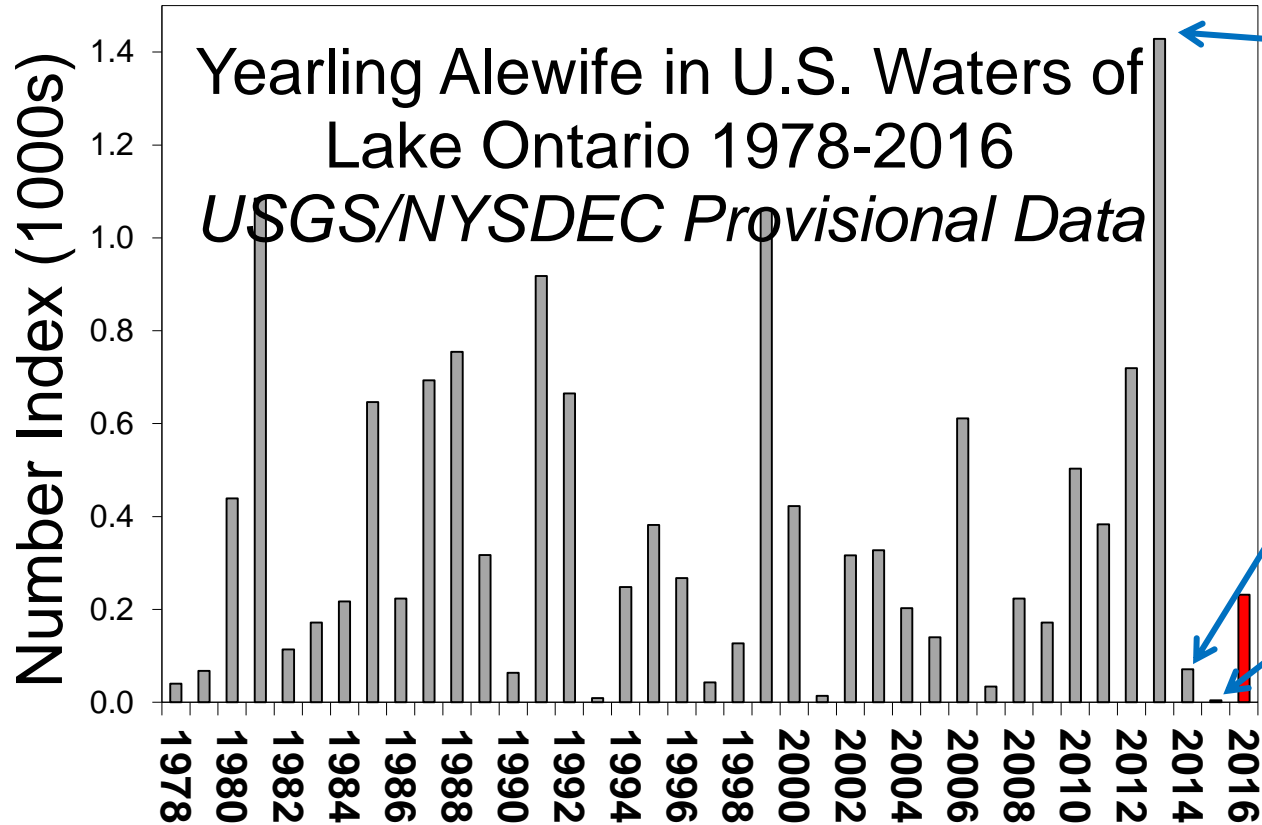
Adult alewife in U.S. Waters of Lake Ontario USGS/NYSDEC Provisional Data (1978-2016)



This index is average adult catch per 10-min bottom trawl tow from April assessments



One Year Old Alewife Index



2012 year class = high

2013 year class = low

2014 year class lowest

