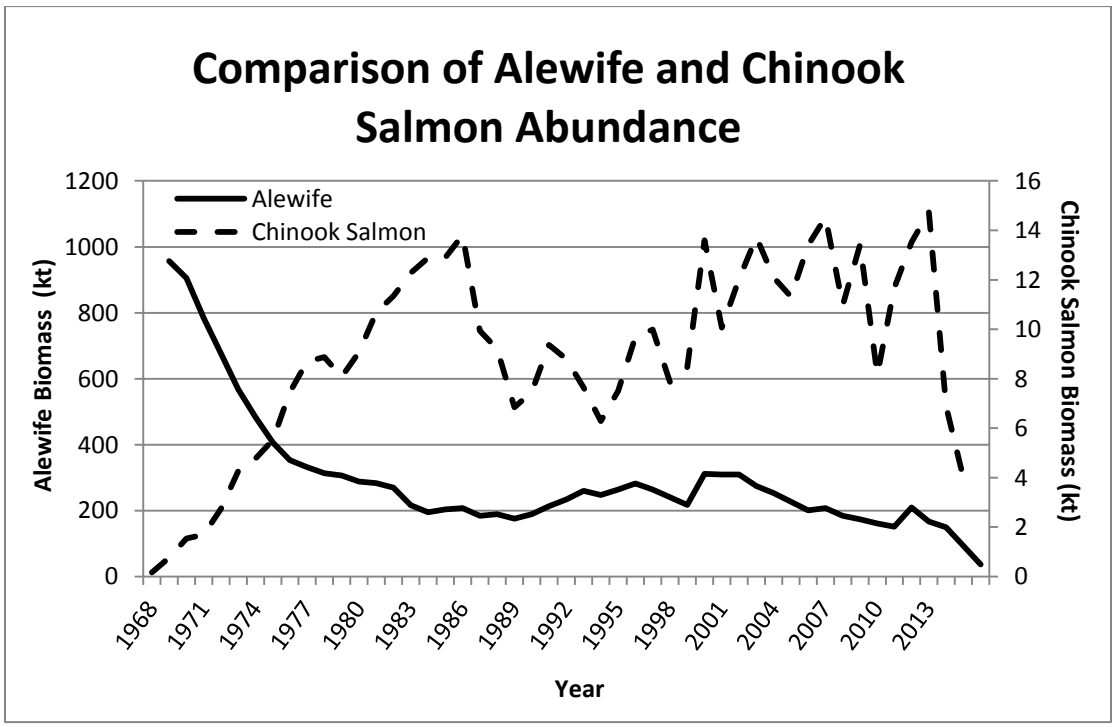
Lake Michigan Fishery Update

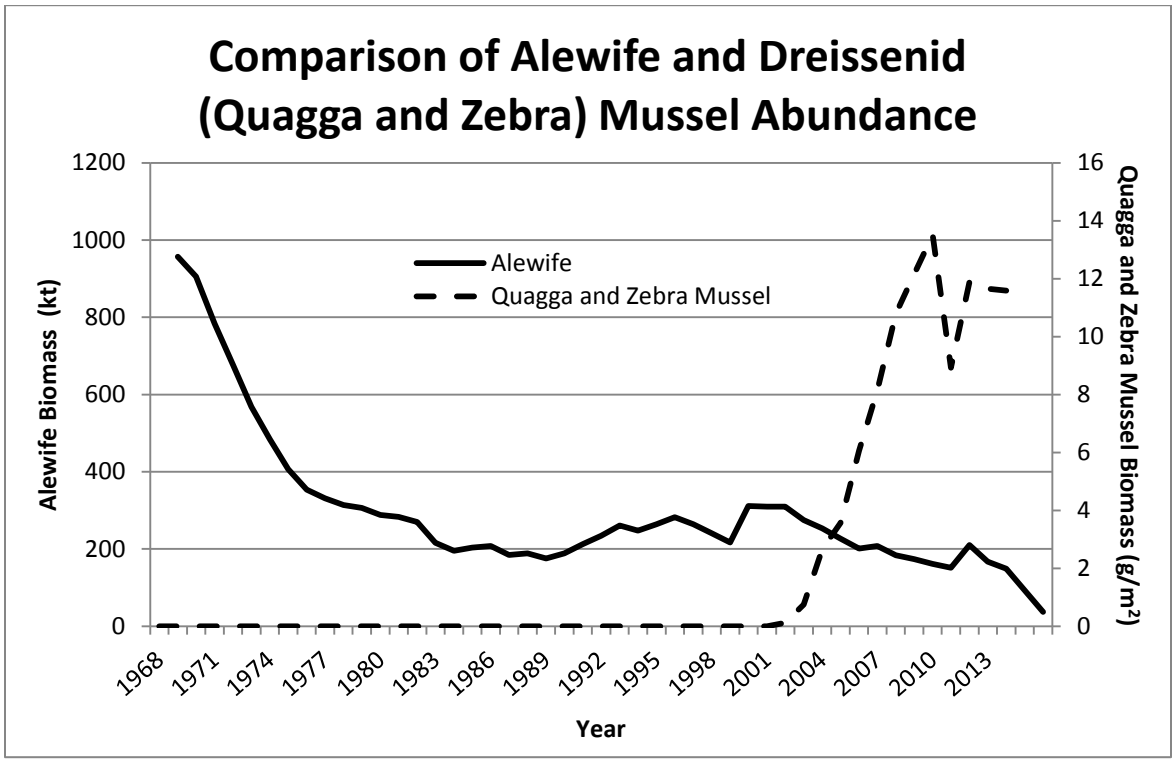
Answering the most Frequently-Asked-Questions about Lake Michigan's fishery

July 2016

1. **What is going on with salmon in Lake Michigan?**
   The current status of salmon is that the population is down more than 75% from the peak in 2012. The decline can be attributed to two factors: (1) the Michigan Department of Natural Resources (DNR) has reduced stocking rates since 1999 while maintaining higher bag limits since 2005, and (2) natural reproduction and recruitment of salmon has declined substantially since 2013 because there is less prey in the lake.

2. **Why is the DNR managing for less salmon in Lake Michigan?**
   The DNR recognizes that salmon populations are highly stressed because alewives, their primary prey, have been declining since the mid-1990s and have never stabilized since the start of the decline. Alewives are declining because they are being out-competed by zebra and quagga mussels for the same nutrients in the lake (zebra and quagga mussels invaded the Great Lakes in the mid-1990s). Also, high stocking rates by state agencies responsible for managing Lake Michigan in the early 1990s led to very high predation on an already unstable alewife population. The combination of increased salmon predation and the competition from zebra and quagga mussels squeezed the alewife population from the top and bottom and was likely the reason we saw salmon crash in Lake Huron in the mid-2000s.





3. **Will Lake Michigan follow Lake Huron?**
   DNR biologists do not want Lake Michigan to follow the same path as Lake Huron. That is why DNR Fisheries Division staff worked with Lake Michigan anglers to reduce annual stocking levels from 7 million to 2.5 million Chinook salmon through coordinated lake-wide stocking cuts in 1999, 2006 and 2013. These reduced stocking levels have helped decrease the predation pressure on alewife by salmon. Additionally, the DNR has maintained higher bag limits in an attempt to use angling as another method to relieve even more predation pressure on alewives.

4. **Will the stocking cuts and bag limits be enough?**
   In theory, populations are most stable when there is enough prey to feed all the predators. If predators become too abundant and prey too scarce, then predators will eat all the prey, starve and not survive. Stocking cuts and bag limits only work if they reduce predators in the lake to levels that prey can sustain. But what if prey continues to decrease no matter how few predators are out there?

   This is the question DNR biologists are focusing on right now. Fisheries management agencies do not have the ability to directly influence the number of alewives in Lake Michigan but can only indirectly affect pressure by reducing predation. The DNR can, however, apply new approaches for assessing the salmon and alewife balance through population modeling. The modeling allows us to use all of the available data on fish populations, produce estimates of absolute abundance of salmon and alewives, and ultimately determine the exact ratio of predator to prey. A full description of the predator-prey ratio, also referred to as the PPR, is available online. DNR biologists believe the only way to keep Lake Michigan from following Lake Huron is to manage the fisheries by balancing predator (salmon) and prey (alewife) so neither collapse.

5. **Why is there a proposal to reduce Chinook salmon stocking again in 2017?**
   Population models indicate the predator (Chinook salmon) and prey (alewife) are still out of balance. Alewife abundance was at historic lows as measured in 2015. The alewife population is comprised of

three main year classes including the 2010 and 2012 adult year classes along with a recent 2015 year class of small alewives. DNR biologists are interested in reducing the predation pressure on these remaining year classes, so the prey base can rebound. The proposal by the Lake Michigan managers (Indiana, Illinois, Michigan, Wisconsin and Tribes) is to reduce Chinook salmon stocking from 1.8 million to 690,000 lake-wide.

6. **Why are there so many alewives in the harbors this spring?**
   The larger alewives are in shallow water areas to spawn. The smaller (one to three inches) alewives are in the shallow areas to feed in the more nutrient rich waters. When the alewives are nearshore, their abundance can appear very high. However, out in the open water and offshore areas, their population is low and very patchy. It is a good sign that we have enough adult alewives for spawning. The DNR will be monitoring their offspring closely to see if they survive and contribute to the population, as it will be needed to help balance the predator and prey populations.

7. **What about the other predators?**
   In addition to Chinook salmon, the Lake Michigan fishery is supplemented by stockings of brown trout, coho salmon, steelhead and lake trout. Although the primary prey for Chinook salmon is alewives, other predators have a much more diverse diet. Since the introduction of zebra and quagga mussels, the round goby has established abundant populations in the Great Lakes. Round gobies are able to consume mussels and can spawn multiple times in a single season. In Lake Michigan specifically, the abundance of round gobies has skyrocketed, and they are now being consumed by almost every predator, except Chinook salmon. Therefore, reductions in stocking levels for other predators may not be as effective for reducing alewife consumption if the prey consumed is mostly gobies. In addition, we manage for a diversity of both prey and predators in the Lake Michigan fishery. If the abundance of other predators, such as lake trout, expands beyond the levels that can be supported by the prey populations, we will evaluate management actions (e.g., changing harvest or stocking policies) to manage those populations similar to Chinook and alewives.

8. **Is the lake trout population expanding?**
   Angler catches of lake trout have gone up the last few years because of increased stocking rates, nearshore stocking locations, increased natural reproduction, and a decline in Chinook salmon populations. Anglers target and catch more lake trout when Chinook salmon are not available. Overall, the lake trout abundance has been increasing steadily since 2002 and is currently at a similar abundance last seen in the 1980s.

9. **Will the DNR reduce lake trout stocking?**
   Lake trout are a native species to Lake Michigan and their population collapsed in the 1950s due to predation from the invasive sea lamprey and high commercial harvest levels. The purpose of stocking is to rehabilitate the lake trout population and to provide a diverse sport fishery. With increasing abundance of lake trout and with evidence of natural reproduction, the states and Tribes that co-manage Lake Michigan will evaluate opportunities to adjust stocking in the future. Even so, stocking changes will have a limited and delayed impact on forage levels. For example, stocking changes will not impact wild production for lake trout and will take years before the changes in stocking impact the lake trout populations. Managers are working together to evaluate all policies, including stocking and harvest, to manage lake trout in Lake Michigan.

10. How abundant are the gobies in Lake Michigan?

It has been suggested they are the top prey species in Lake Michigan today and may have reached levels comparable to alewives when they were at their peak levels in the 1960s and 1970s. However, the absolute abundance of gobies is hard to estimate because of their patchy distribution (they prefer rocky habitats), their reproductive strategy (they spawn multiple times in a year), and because their mortality rates are very high (the population of gobies changes substantially throughout the year). We do know they are being consumed at a high rate by most of the other predators and are likely the dominate prey species for most predators.

11. Why won't Chinook eat gobies?

Chinook salmon are biologically designed to feed on open-water prey such as alewives. They are not, however, designed to feed on the bottom. In the 20+ years of dissecting the stomach contents of Chinook salmon in Lake Michigan, the DNR has only found a few instances where gobies were consumed by Chinook salmon and it was less than 1% of the diet composition.

12. What will the 2016 Lake Michigan fishery look like?

There will be lower Chinook salmon catch rates but more diverse fisheries represented. With the production of the 2015 alewife year class, anglers should see more small (age-1, 12 to 22 inches) Chinook salmon in the fishery this year. Brown trout, steelhead, coho salmon and lake trout catch rates should increase. Nearshore predators, such as bass, walleye and northern pike will increase. Even nearshore species such as rock bass, freshwater drum and yellow perch will benefit from the goby buffet.

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