

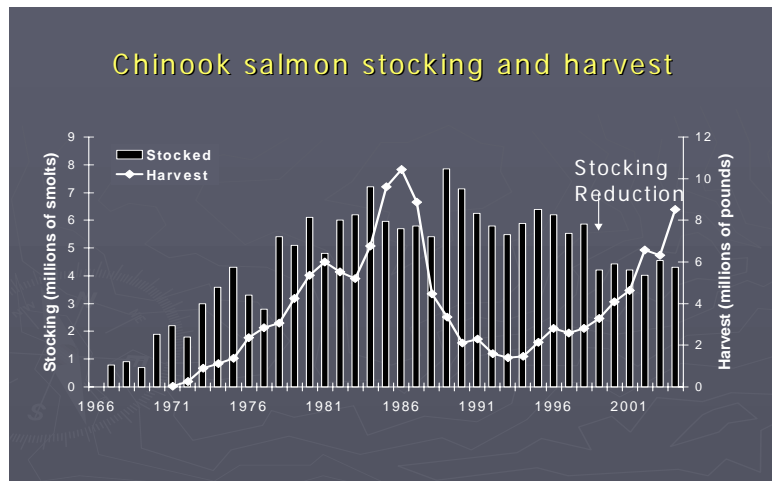
Lake Michigan Salmon and Trout Stocking Conference
Balancing the Future - September 24, 2005
Kenosha, Wisconsin

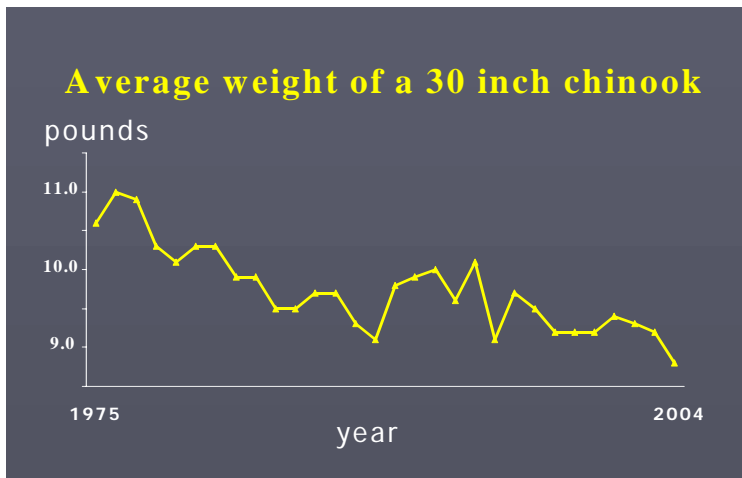
Overview . Predator and prey interactions play a key roll in balancing the abundance of fishes in every aquatic system, and Lake Michigan salmon and trout fisheries are no different. Over the past several years Chinook salmon fishing on Lake Michigan has been exceptional approaching 8.5 million pounds in 2004, the highest level since 1986. This is indicative of one of three things: either there are many more salmon in the lake than can be explained by stocking or there is not enough food and Chinook are hungry biting everything in sight, or a combination of both. Through extensive sampling managers have also identified a declining trend in the prey or forage base coupled with this rise in Chinook harvest. A similar trend was identified in Lake Michigan in the late 1990's and more recently in Lake Huron. In 1999 the Lake Michigan management agencies, in consultation with the interested public, reduced lake-wide Chinook salmon stocking by 27%, from 6,000,000 to 4,400,000 fish. Concerns that the high density of Chinooks may lead to a reoccurrence of bacterial kidney disease (BKD) epizootic, which significantly reduced the Chinook population in the late 1980's, partly justified this stocking reduction. Despite this reduction and subsequent increase in harvest, it appears that the forage base may still be at risk and that it may be prudent to make further stocking reductions in order to maintain a favorable balance of predators and their prey.

The Lake Michigan management agencies will sponsor a conference to discuss the question of whether or not to implement stocking reductions, starting in 2006. **The thoughts, advice, and opinions of all interested users of Lake Michigan will be appreciated.**

Chinook Stocking History. The chart at right illustrates a nearly 40-year history of Chinook salmon stocking and harvest in Lake Michigan. For the first 20 years stocking levels steadily increased as agencies developed hatchery capacity and expertise, and the harvest increased almost every year. An outbreak of (BKD) in the late 1980's decimated the Chinook population and caused the management agencies to question stocking policies. This disease

incidence may have been provoked by conditions similar to what we are experiencing today, lower prey abundance and high numbers of predators. By the early 1990's Chinook fishing started to improve, but believing that substantial cuts were necessary to assure the long-term stability of the forage base the agencies reduced Chinook salmon stocking by 27% in 1999. Since then Chinook salmon fishing has been outstanding.

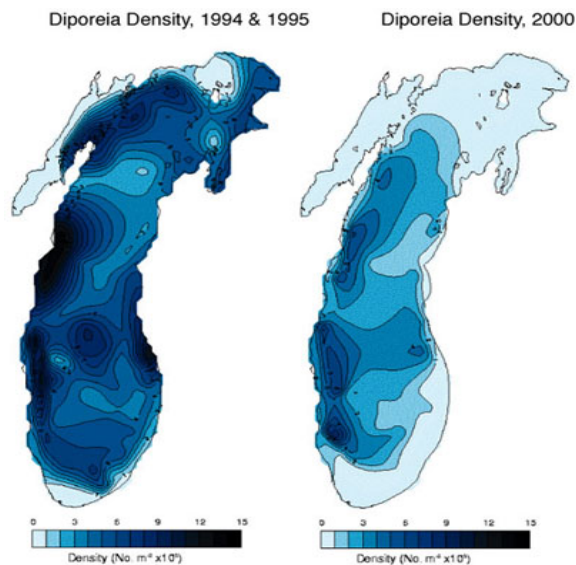




Recent Concerns. A number of indicators suggest that the great fishing anglers are currently experiencing may not last. Fisheries research scientists on Lake Michigan have developed a series of indicators that are now referred to as “red flags”. These indicators provide managers long term trend information necessary to make decisions on when management practices need to be adjusted in order to meet objectives. First among

these is the decline in size-at-age of Chinook salmon. As shown in the chart, the average weight of a 30-inch Chinook salmon returning to Wisconsin’s Strawberry Creek Weir has declined over two pounds since the late 1970s, and almost one full pound between 2001 and 2004.

The number of salmon that Lake Michigan can sustain may change over time as new species and habitat alterations affect the ecosystem. Scientists with the Great Lakes Science Center (USGS, Ann Arbor) have documented a 14% decline since the mid 1990s in the condition (weight at a given length) of Lake Michigan alewives, the primary prey utilized by Chinook. Similar declines in the estimated abundance and biomass of alewife have also been documented over the last three years. That decline might be a consequence of underlying ecosystem changes reflected in the rapid disappearance in bottom dwelling amphipods known commonly as scuds and scientifically as *Diporeia*. Scientists with the NOAA’s Great Lakes Environmental Research Laboratory have studied the distribution and abundance of *Diporeia* in Lake Michigan and other lakes, and documented the reduction illustrated in the accompanying figure. This decline may partially explain the decline in condition of alewives. Significantly lower densities of *Diporeia* may partially explain the decline in condition of alewives. These observations and long-term trend data showing decreasing abundance of prey species suggest that the ability of Lake Michigan to support top predators, including Chinook salmon, may have changed.



Lake Michigan Management Goals. The Lake Michigan fishery is managed through a cooperative process called “A Joint Strategic Plan for Management of the Great Lakes Fisheries” (Great Lakes Fishery Commission 1980, revised 1997). The plan outlines the goal of securing fish communities, based on foundations of stable, self-sustaining stocks, supplemented by stocking of hatchery-reared fish with the objective of providing an optimum contribution of fish,

fishing opportunities and associated benefits to meet the needs identified by society for food, recreation, employment and income, and a healthy human environment.

Ten guiding principles for Lake Michigan exist to provide a decision-making framework for restoring and maintaining the integrity of Lake Michigan’s fish communities. They include:

- ✓ Recognize the limits on lake productivity.
- ✓ Preserve and restore fish habitat.
- ✓ Preserve native species.
- ✓ Enhance natural reproduction of native and desirable introduced fishes.
- ✓ Acknowledge the role of planted fish.
- ✓ Recognize naturalized species.
- ✓ Adopt the genetic stock concept.
- ✓ Recognize that fisheries are an important cultural heritage.
- ✓ Prevent the unintentional introduction of exotic species.
- ✓ Protect and enhance threatened and endangered species.

Within these goals are defined objectives to guide management decisions better know as “fish community objectives” or FCO. Within that framework, there are additional specific objectives to guide the current stocking discussion, including:

- ✓ Maintain salmonid catch rates of 15-20 fish per 100 hours.
- ✓ Maintain a diversity of fishing opportunities.
- ✓ Promote lake trout restoration and fishing.
- ✓ Maintain alewives at levels that minimize negative effects on native species while supporting the other objectives.
- ✓ Minimize the risk of disease outbreaks.
- ✓ Reduce reliance on stocking to sustain the fishery.
- ✓ Maintain a fishery in which the Chinook salmon make up around 50% of the total salmon and trout harvest.

Red Flags Summary Table

Variable	Index	Level I	Level II
Abundance	Harvest	No	No
	Catch rate	Yes	Yes
Reproduction	Total Recruits	No	No
Growth & ration	Wt Age 2	No	No
	Wt Age 3	Yes	No
	Age 2 ration	No	No
Forage	Age 3 ration	Yes	No
	Bottom trawl	Yes	No
	Acoustics	Yes	No
Fish health	Survey visual	No	No
	Weir visual	No	No
	SC DFAT	No	No

Two Approaches: “Red Flags” and “Decision Analysis”. To evaluate the need for changes to the Lake Michigan stocking policy, the agencies have pursued two approaches. Biologists have tracked a number of indices of the condition of this particular predator-prey community identifying six variables, salmon abundance, reproduction, growth, ration, and health as well as forage abundance (primarily alewife) that are collectively

know as “Red Flags”. Level I flags indicate the index has exceeded the standard for one year while Level II flags indicate the standard has been exceeded three of the last five years. While all the data for 2005 is not yet available it does appear that many of these flags continued to exceed the standard again this year.

Decision analysis involves the use of mathematical models to project possible future states of the salmon and alewife populations. These models incorporate uncertainty about future events and force us to realize that desirable future conditions cannot be guaranteed. They also allow us to see the trade-offs between different management objectives.

Both the “Red Flags” and “Decision Analysis” process will be presented at the conference.

Decision Analysis

- Consider the possible consequences of a decision, rather than just predicting the most likely consequence
- Define objectives and options for management
- Assess key uncertainties
- Models are used to forecast possible consequences
- Compare possible consequences to objectives

Stocking Options. The Lake Michigan management agencies will consider the following options at the conference:

- ✓ Status quo, maintaining current stocking levels for all salmonids
- ✓ Reduce Chinook salmon stocking by 25%
- ✓ Reduce Chinook salmon stocking by 50%
- ✓ Reduce stocking of all salmon and trout by 25%, except lake trout.

It is the job of professional fishery managers to make sure that management actions are proactive and thoughtful responses to changes observed in the lake and not just reactive.

The conference will be held at University of Wisconsin – Parkside in Kenosha, Wisconsin. For information about the conference, call 920-683-4697 or visit www.seagrant.wisc.edu/Fisheries/ and click on “**Salmon Stocking Conference**”.