



CHARLEVOIX FISHERIES RESEARCH STATION 2014 FIELD SEASON NEWSLETTER

Produced by Nathan Skop and Patrick O’Neill

The Charlevoix Fisheries Research Station (CFRS) staff and research vessels are employed to provide information, models and advice to make possible science-based management of Michigan's fishery resources. CFRS is responsible for MDNR Fisheries Division research needs in the Lake Michigan basin. This annual newsletter is designed to summarize the field and lab activities completed during the past year by CFRS staff. *[Note: Sample processing and data analysis are incomplete for some 2014 sampling activities. In those cases, complete results for 2013 surveys are presented.]*



Featured Story: Are you concerned about the Chinook salmon fishery in Lake Michigan? Well we’re on it!

The CFRS, which has evolved with the introduction of the Pacific salmon fishery to the Great Lakes in the late

1960’s, is the place to go to get all your salmon questions answered. Many CFRS programs and surveys are designed to track the status of the Lake Michigan salmon population; currently the CFRS has more resources devoted to improving management of Pacific salmon than any other research station in the state. The following programs and surveys are designed to give managers the best data to make informed decisions concerning salmon management:

Charter Program-analyzing catch rates and fishing effort in real time with advanced reporting systems

Coded Wire Tag Program-collecting data on size-at-age, diet, wild recruitment, and movement (both within- and among-lake)

Statewide Angler Survey (Creel) Program-collecting size-at-age, lake wide catch rates, and localized harvest estimates

S/V Steelhead Hydro-Acoustics Survey-a cooperative study with USGS and USFWS to measure lake wide preyfish abundance

Weir Survey-determining salmon size/age at maturity and year-class strength

What’s the problem? The Lake Michigan Stocking Strategies document put out by the multi-agency Lake Michigan Committee refers to Lake

Michigan as "...a dynamic ecosystem that is changing rapidly due to the introduction of exotic species. Quagga and zebra mussels have shifted most of the productivity to the bottom of the lake leaving few nutrients for the production of plankton and zooplankton. This shift in productivity has contributed to reduced and sporadic prey fish production, which then results in variable growth and survival of salmon and trout. The most sensitive species in this prey and predator relationship are the alewife and Chinook salmon."

How do we plan to manage? The Lake Michigan community of fisheries managers has developed a strategic plan to give us the best chance to have a successful fishery, especially with emphasis towards Chinook management. The number one thing to have under a scrupulous eye is the predator/prey relationships. If the ratio of predator versus prey gets too far out of whack we could have a salmon collapse or a population so low it becomes unfishable. Other important data that needs to be considered to have a better chance for success are things like fish condition (size at age), catch rates (# of fish/hour), weight at maturity, total fall salmon harvest, ratio of other Salmonids in Lake Michigan, and alewife age structure. When all this data is compiled annually, managers use the results to determine which management tools (e.g.; stocking, regulation, etc.) are triggered.

What's the data say? The abundance of Chinook salmon produced naturally in the lake decreased from one of our highest estimates in 2012 (65% of all salmon produced from the 2011 salmon run were wild fish) to 37% in 2013. Low water levels restricted access to many natal streams in the fall of 2012

and then a year and half later the same streams were blasted out due to high water in early 2014. Although expectations are low for the 2014 Chinook year class, the true success won't be known until this summer when salmon are recruited to the sport catch as Age 1's. These fluctuations in natural reproduction have certainly had an effect on the lake wide salmon population.

Lately it has become apparent that due to the shaky Lake Huron alewife population, many Lake Huron Chinook salmon are moving to Lake Michigan to feed before returning back to their natal stream in Lake Huron to spawn. In 2014, almost 60% of the Lake Huron (CWT) fish that were captured in the open lake fishery (Spring-August) were caught in Lake Michigan. In contrast, only 7% of Lake Michigan-stocked fish were caught in Lake Huron. That results in extra mouths to feed in Lake Michigan, and difficulties for managers who must plan for stocking levels a year in advance. Starting in early 2015, Chinook salmon movement between Lake Michigan and Lake Huron will be included in managers' models that estimate the population sizes of Chinook and the prey that they rely on.

The Chinook salmon continue to live or die by the success of the alewife population, which represents more than 93% of the predator's diet. Therefore, it's essential that managers stay one step ahead of the game by tracking alewife populations. The total lake-wide alewife abundance remained low in 2014 with yet another poor year class and the percentage of salmon with empty stomachs (another measure of the scarcity of alewife) increased from 36% empty stomachs in 2013 to 47% in 2014.

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Overall, the increase in empty stomachs observed in 2014 can be alarming. However, if you break it down by size Chinooks greater than 500 mm long (about 20 inches) exhibited a decrease in empty stomachs in 2014; that's a good thing! Younger fish (those less than 500 mm in length) still showed an increase in empty stomachs, to almost 60%. This means older fish are still finding food while the younger ones are struggling. The pattern holds true in the 2014 weight-at-age breakdown; the average weight of age 3 (4 summers in the lake) fish stayed the same, but average weight on Age 1 (2 summers in the lake) and age 2 (3 summers in the lake) salmon declined in 2014, probably as a result of reduced diet.

What is the plan for 2015? The plan is to manage what we have control over. So we plan to continue with the lower Chinook salmon stocking levels and keep the daily bag limit to 5 fish. Currently we'd like to see the number of predators stay low while the prey population rebounds, all the while not eliminating a year class of salmon. The unfortunate part is that we are relying on Mother Nature to help us out by creating favorable conditions that allow for increased alewife populations.

What should anglers anticipate this year? The immature fish from last year that were plentiful but had empty stomachs should be available this year (Age 3). However, expect their average size to be down. Also, don't plan on as many of the younger immature fish in your catch this year; remember we had a bad 2013 year class. As for alewives, the reduced predation pressure from salmon (fewer mouths to feed), will likely have a positive impact on the

survival of last year's smaller alewives. However, the colder than normal winter could have resulted in significant overwinter mortality of alewives. In either case, we're hoping that the few adult year classes of alewives remaining can pull off a successful spawn in 2015.

LARGE VESSEL ACTIVITIES



S/V Steelhead leaving Charlevoix in route to Manistee.

Lake-wide Assessment Plan (LWAP):

Each spring the CFRS vessel *S/V Steelhead* conducts a survey of the Lake Michigan fish community. The main goal is to determine relative abundance of lake trout, lake whitefish, burbot, and yellow perch. Fish are collected from 7 locations: South Haven, Saugatuck, Grand Haven, Arcadia, Leland, Elk Rapids, and Charlevoix using 6 foot-high, graded mesh (1.5" to 6") bottom gill nets.



Crew members prepare a bottom gill net for deployment.

In 2014 the *S/V Steelhead* departed from Charlevoix on April 28th to head to southern Lake Michigan to begin the LWAP survey. Due to the extremely

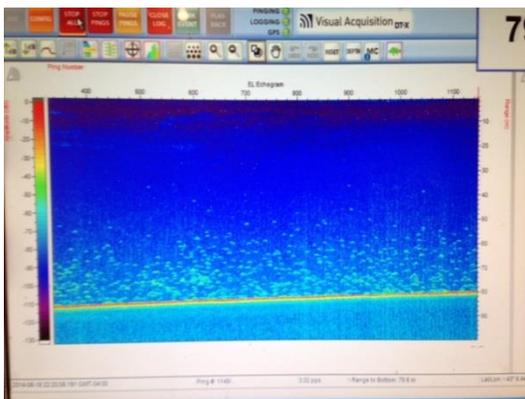
cold winter – leading to cooler spring water temperatures – the number of fish collected in 2014 was lower than in previous years. Between April 30th and June 26th a total of 1,058 lake trout were collected, with 346 of those coming from Elk Rapids. Lake whitefish catch totaled 206, which was nearly 200 less fish than were sampled in 2013. Like whitefish, the 2014 yellow perch catch was half that of the 2013 catch.



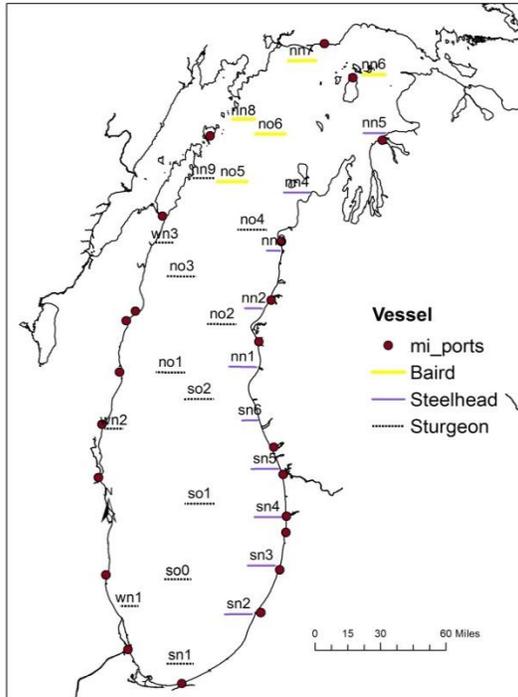
Acoustic Survey: A lake-wide prey fish survey is conducted in August each year to estimate prey fish distribution, abundance, and biomass. An overall goal of the acoustics survey is to predict forage fish abundance and to make recommendations to reduce a potential food chain imbalance which in turn could cause a fisheries collapse. The *Steelhead* is charged with collecting data in the Michigan waters of Lake Michigan.

During the 2014 acoustic survey, crew aboard the *S/V Steelhead* conducted 11 transects at offshore locations from Charlevoix to St. Joseph. The results from the survey concluded that the density of the 2014 alewife year class was the lowest recorded in 19 years of sampling; the 2014 estimate was only 3% of the long-term mean. However, it is possible that the density of alewives was higher than measured, due to delayed hatching, growth, and dispersal from near shore areas caused by low water temperatures. Rainbow smelt continue to be present at low densities in Lake Michigan waters.

Biomass density of large bloater in 2014 increased to nearly four times that observed in 2013. However, this was still only 20% of the time series mean.



2014 screen shot of a thick bloater chub layer.



Map shows each vessel's transects for the 2014 survey.

Large vessel bottom trawling: In September the *S/V Steelhead* headed back south to conduct a bottom trawl survey, primarily to assess yellow perch populations and near shore fish communities. In 2014, we sampled South Haven, Grand Haven, Pentwater, and Petoskey. During the trawl sampling a total of 200 yellow perch were caught and used for year-class strength determination. During trawling, other fish species included suckers, catfish, and round gobies. Over 3,500 gobies were trawled off the bottom during the survey.



Large haul of round gobies.



Common white suckers: Little Traverse Bay.

CODED WIRE TAG PROGRAM

The mass-marking initiative continues to be at the forefront of the Coded-Wire Tagging (CWT) Program. This endeavor is only accomplished because of the strong commitment of multiple agencies, supplying staff and equipment for the tagging, recovery, extraction and database management that are essential to the success of this program. Without the data collected through a large-scale fish marking program, fisheries managers would struggle to have all the essential information needed to take the proper management actions. For example, Chinook salmon management depends on estimates of wild contributions, size-at-age, and movement – estimates that come directly from tagging studies (see “Featured Story”, above). DNR staff asks for your continued support in the collection of

trout and salmon head samples from fish which were given an adipose clip to signify they were tagged. CWT head drop sites and data results are available at the MDNR internet site.

http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_10951_11301-97831--,00.html

CHARTER BOAT SURVEY

The objective of the state-wide Charter Boat Program is to obtain a continuous annual record of charter boat fishing effort, harvest, and harvest rate of the major sport fish in the Michigan waters of the Great Lakes. The “real time” harvest results which are collected monthly allow managers to notice the status of the fishery almost immediately. Detailed charter fishing results from previous years and information on what you need to do to register as a charter captain is available on the MDNR internet site

http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_47568---,00.html

SMALL VESSEL ACTIVITIES



R/V Pimephales

Small Boat Bottom Trawl: The bottom trawl survey is used to collect important near shore fish community information, with a primary focus on yellow perch recruitment. The survey was successful yet again at getting out to our pre-determined ports (South Haven, Grand Haven, Pentwater, Charlevoix, and

Petoskey). However, this year’s yellow perch numbers were low. Lake Michigan took so long to warm up this year and time will tell if our drowned river mouth lakes (e.g.; Lake Charlevoix, Muskegon Lake) will help supplement the Lake Michigan population.

Elk Lake Lake Trout Study: The lake trout study on Elk Lake has entered the next phase. After proving the remnant population of lake trout is different than all known forms in the Michigan region, the next step is to investigate their lifecycle. From preliminary sampling, the lake trout in Elk Lake appear to be spawning in deep water. This is different than the shallow water spawners found in the north end of Lake Michigan.



To attempt to verify their spawning behaviors, a new Central Michigan University (CMU) graduate

student (with assistance from CFRS) is tagging a number of lake trout with hydro acoustic tags. These allow researchers to determine where fish are located. In fact, a few of the tags being used will identify the depth and temperature of the individual lake trout. This will especially help during spawning season. Once researchers determine the depth, the search for eggs and spawning habitat can begin.

Elk Rapids Reef Restoration: For several years, CFRS, The Nature Conservancy (TNC), and Central

Michigan University (CMU) have been monitoring the complex life cycles and species interactions on spawning reefs around the Elk Rapids Harbor. In 2015, we will be restoring a small section of one of these reefs (an old loading dock) that has been used for spawning by lake trout, herring and whitefish. Unfortunately this spawning location has become degraded from wave and ice energy and is no longer providing the great habitat it once did. This restoration project will give researchers an opportunity to study the effects of mitigation techniques on spawning reefs in Lake Michigan. The results will also be able to be compared to those from similar reef restoration projects recently completed in Lake Huron and Lake St. Clair.



R/V Char

Asian Carp Exercise: In August, staff traveled down to Lake Erie with the vessel *R/V Char* for an Asian carp early response exercise with seven state and federal agencies. Our goal was to attempt to capture a species of Asian carp known as the grass carp, which appears to have established populations in Lake Erie. The exercise was a major success, with agencies practicing coordination of a large scale effort, learning new sampling techniques, and developing the network that will allow us to better address problems that might arise in AIS emergencies.

OTHER ACTIVITIES

Hunt Creek Sampling: For the second year a crew from CFRS conducted the annual Hunt Creek trout survey. The Hunt Creek Fisheries Research Station located near Lewiston, Michigan was established in 1939 to conduct inland trout research. In early September, staff using electro-fishing equipment collected fish within four sections of Hunt Creek. A total of 4.2 miles of Hunt Creek was sampled during both the mark and recapture run. Common species observed were sculpin, brown trout, and brook trout – with brown trout being the dominant species.



2 1/2 inch Hunt Creek brown trout.



Crew prepares to work up fish at the end of a section of Hunt Creek.

Musky Genetics Sampling: During the spring of 2014 a crew went to the St. Mary's river in the eastern Upper Peninsula to collect musky genetic samples. This sampling is part of a large-scale effort to evaluate musky stock structure throughout the Great Lakes. Understanding the differences between musky populations within the

Great Lakes will help biologists better manage musky fisheries. The CFRS crew primarily focused on finding musky in the Munuscong Bay area on the St. Mary’s river. The crew used gill nets, trap nets, fyke nets, and electro fishing to capture and release musky. By the end of the week-long sampling event, seven musky were captured and genetic samples were acquired.



42 inch Munuscong Bay musky.

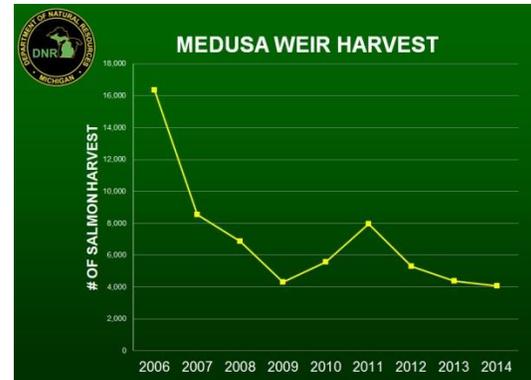


Munuscong River musky.



Gogomain River musky.

Weir Harvest: Every year the CFRS staff assists in the harvest, bio-sampling, and evaluation of salmonid returns to weirs in Michigan’s waters of the Great Lakes. The objective is to annually monitor and record returns of Chinook and Coho salmon to Michigan weir operation facilities.



The salmon harvest from the Medusa Creek (Charlevoix) weir stayed relatively stable in the fall of 2014, unlike most of the other Lake Michigan weir’s which saw dramatic reductions in numbers of returning salmon.

Otolith Microchemistry: What if most of the wild fish (for example, Steelhead and/or Chinook salmon) produced in a lake are only coming from one or two tributaries? Wouldn’t managers like to know so they could do everything possible to protect the tributary?

The collection of wild Steelhead smolts around Lakes Michigan and Huron with the goal of identifying the specific natal stream of adult steelhead has continued in 2014. The collaborative project with CMU has entered into a second phase; to determine if the elemental signatures known to a specific stream can be identified from different fish species. For example, can we collect the required

signatures of a specific stream to identify where an adult Steelhead came from using an otolith from a coho salmon, darter, or creek chub? Also this year, MSU has joined this collaboration with the goal of expanding investigations to include Chinook salmon rivers of origin.



Spring yearling that will help researchers someday determine which river wild steelhead come from.

State-Wide Stocking Program:



Every year, staff from the CFRS assists in the stocking of trout and salmon from state hatchery facilities to designated lakes and rivers.

Beaver Island Smallmouth Bass Study:

CFRS staff once again assisted CMU in conducting a smallmouth bass population and movement study in the waters around the Beaver Island Archipelago, Waugoshance Point, and Grand Traverse Bay.

Charlevoix Fisheries Res. Station staff:

David Clapp, Research Station Manager
 Randy Claramunt, Research Biologist
 Dave Caroffino, Tribal Unit Biologist
 John Clevenger, CWT Program
 Patrick Hanchin, Tribal Unit Biologist
 Jory Jonas, Research Biologist
 Wayne Heinzman, Fisheries Assistant
 Patrick O'Neill, Fisheries Technician
 Rebecca Parker, Seasonal Worker
 Kendra Porath, Creel Clerk
 Jerry Ranville, Boat Captain
 Nathan Skop, Assistant Boat Captain
 [Vacant], Fisheries Technician
 Jeff Stevens, Trades Helper
 Cathy Sullivan, Station Administration
 Donna Wesander, Charter Boat Program

Charlevoix Fisheries Research Station
 96 Grant Street
 Charlevoix, MI 49720
 231-547-2914 (PHONE)
 231-547-6031 (FAX)
clappd@michigan.gov (EMAIL)

Web page:

http://www.michigan.gov/dnr/0,1607,7-153-10364_52259_10951_11301---,00.html