



Understanding Declining Productivity in the Offshore Regions of the Great Lakes

A report submitted to the International Joint Commission by the Great Lakes Science Advisory Board, Science Priority Committee Declining Offshore Productivity Work Group

In June 2020, the International Joint Commission's Science Advisory Board (SAB) completed a report entitled [Understanding Declining Productivity in the Offshore Regions of the Great Lakes](#). The report includes a number of findings and a recommendation aimed at improving coordination between water quality and fishery managers and improving the understanding of ecosystem impacts of nutrients in both nearshore and offshore waters of the Great Lakes.

The Great Lakes Water Quality Agreement recognizes the complexity of the Great Lakes basin ecosystem

and its interacting components of air, land, water and living organisms in lakes comprised of many different types of habitat in the nearshore and offshore regions. The Agreement embraces coordination, the ecosystem approach, adaptive management and science-based management as recommended principles and approaches. We find the subject report to be in line with these principles and approaches with advice to help managers evaluate and better understand the dichotomy between excess nutrient levels in the nearshore while levels are declining in the offshore. The reductions in the nutrient levels offshore are affecting ecosystem

services including restoration of fishery production. This report is a unique compilation of all available information about declining offshore productivity and shows this is a significant issue.

This report explores the dual challenges of nearshore nutrient enrichment and reduced ecosystem productivity in the offshore, with particular emphasis on the latter, and includes the completion of a [contractor report](#) under the guidance of a multidisciplinary SAB work group. This report includes sections on a description of the problem, a literature

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DEC May 20 Virtual Angler Outreach Event Updates on Status of Lake Erie and Upper Niagara River Fisheries

The New York State Department of Environmental Conservation (DEC) announced a virtual meeting on Thursday, May 20, at 7 p.m. to provide an opportunity for the public to learn about the status of Lake Erie and Upper Niagara River fisheries. "Lake Erie anglers are experiencing record fishing quality with unprecedented, once-in-a-generation walleye catch rates," said DEC Acting Regional Director Chad Staniszewski. "This annual meeting provides an excellent opportunity for anglers to interact directly with the biologists who study and manage Lake Erie and Niagara River fisheries and learn more about the strategies used to maintain these world-class fisheries."

This year's virtual meeting will be

in a webinar format and feature updates on the area's warm and cold water fisheries, the 2021 fishing forecast, a summary of emerging management issues, and a Lake Erie basin research update, followed by a 30-minute question-and-answer online chat session. Key members of the Lake Erie and Niagara River fisheries management and research community will present information on management and assessment activities for prominent Lake Erie sport fisheries. This webinar is sponsored by DEC's Lake Erie Fisheries Research Unit and Region 9 Fisheries offices.

The virtual meeting will be held on Thursday, May 20, from 7 to 8:30 p.m. To access the meeting, go to [WebEx meeting website](#). ✧

DNR taking aggressive action in Mississippi River, other waters on invasive carp

34 silver carp captured in recent multi-agency operation

The Minnesota DNR, in partnership with the Wisconsin DNR, the U.S. Geological Survey and the USFWS, is taking further action following the capture of 34 silver carp in Pool 8 of the Mississippi River near La Crosse, Wis. during a recent Modified Unified Method operation.

Next steps include increased commercial netting operations, tracking tagged carp, and perhaps another Modified Unified Method operation in the Mississippi River.

The USGS-developed Modified Unified Method combines netting and herding techniques to drive and concentrate invasive carp from a large area of water into a small zone for removal. Thirty-one silver carp were captured during the five-day operation earlier this month and three more were captured during follow-up work.

“This innovative multi-agency approach was the first time the Modified Unified Method was used anywhere as an early detection and rapid response technique,” DNR invasive species program supervisor Heidi Wolf said. “It worked so well that we’re already talking about perhaps doing this again next year.”

The Mississippi River in Minnesota has healthy populations of native fish and the removal of invasive carp helps to protect those native populations.

The DNR also continues to track several invasive carp that were previously captured in the Mississippi River, fitted with tracking devices and returned to the river to learn more about their movements and habits. The agency maintains relationships with commercial fishing operations that assist in the monitoring/detection of invasive carp in the Mississippi River.

Invasive carp have been progressing upstream since escaping into the Mississippi River in Arkansas in the 1970s. These large fish compete

with native species and pose a threat to rivers and lakes. No spawning populations have been detected in Minnesota waters to date.

Individual invasive carp have been caught as far upstream as Pool 2 of the Mississippi, near the Twin Cities (bighead, grass, and silver), the King Power Plant on the St. Croix River by Oak Park Heights (bighead), and just downstream of Granite Falls in the Minnesota River (bighead).

The DNR is actively engaged with several other prevention efforts:

- The DNR is an active partner in the Upper Mississippi River Invasive Carp Workgroup. The group includes representatives from Minnesota, Wisconsin, Iowa, Illinois, Missouri, and several federal agencies.
- In partnership with the DNR, the Minnesota Aquatic Invasive Species Research Center at the University of Minnesota is testing and evaluating carp deterrents in Mississippi River locks and dams.
- The DNR leads a program to monitor fish population changes and impacts of management actions.
- The DNR is designing a process to work closely with stakeholders on updating the [Minnesota Invasive Carp Action Plan](#).
- The DNR is helping to plan an upcoming statewide Invasive Carp Forum hosted by the Stop Carp Coalition.

Invasive carp captures must be reported to the DNR immediately by calling 651-587-2781 or emailing invasivecarp.dnr@state.mn.us. Take a photo and transport the carp to the nearest DNR fisheries office or make arrangements for it to be picked up by a DNR official. Do not release captured invasive carp. A [permit can be requested](#) to keep captured invasive carp for personal use.

More information about invasive carp is available on the [DNR website](#).

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Position Statement

Representing a major interest in the aquatic resources of the Great Lakes states and the province of Ontario, the Great Lakes Sport Fishing Council is a confederation of organizations and individuals with a concern for the present and future of sport fishing, our natural resources and the ecosystem in which we live. We encourage the wise use of our resources and a search for the truth about the issues confronting us.

Inland Seas Angler

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DNR seeks input on Lake Superior and tributaries; survey open through May 31



Fisheries biologists, technicians and management teams from the Michigan Department of Natural Resources are constantly working to make decisions on how best to manage Michigan's fisheries. But the list of key roles doesn't stop there. Michigan anglers also can play a role in fisheries management by participating in opportunities for public input, such as the [Lake Superior Management Plan survey](#).

The information obtained in this survey will be used along with biological data to develop a 10-year management plan for Lake Superior and its tributaries. The survey was designed to gather public perspective about recent fishing activity and opinions regarding fisheries management.

“Many opinions from anglers are readily conveyed to the department at citizen advisory committee meetings and other public meetings; however, not everyone attends those meetings,” said Patrick Hanchin, the DNR's Lake Superior basin coordinator. “Broad survey participation from the diversity of anglers on Lake Superior and its tributaries will ensure that the DNR considers the opinions of all anglers in a management plan for Lake Superior.”

The survey takes about 10-15 minutes to complete and respondents' answers are strictly confidential. Some questions are asked separately with respect to Lake Superior proper or tributaries to Lake Superior, as fisheries management and regulations occasionally differ between the two. This survey will not be the only opportunity for the public to provide input on the management plan. As plan development continues, the DNR will offer different ways for the public, angling groups and citizen advisory committees to stay involved.

The Lake Superior Management Plan survey will be open to the public until May 31.

To learn more about how the DNR manages Michigan's fisheries, visit our [fisheries resource management webpage](#). ✧

Links to recordings from the April 22 Lake Michigan Sea Grant Workshop

This presentation was part of the Southern Lake Michigan Fishery Workshop offered by Michigan Sea Grant via Zoom on April 22, 2021.

Dan O'Keefe

<https://youtu.be/fKYTOsIDvWM>

Dan O'Keefe, a Sea Grant Extension Educator, discussed angler satisfaction, species preference, and tips for identifying salmon and trout this spring.

For more information on the Michigan River Steelhead Project visit the link below:

<https://www.michiganseagrant.org/to-pics/fisheries-and-aquaculture/angler-citizen-science/great-lakes-angler-diary/>

Brian Roth

<https://youtu.be/K1IBS8S5qA0>

Dr. Brian Roth, Associate Professor at Michigan State U, gave an overview of diet results from a multi-year study on Lake Huron and Lake Michigan.

For more information on the Huron-Michigan Diet Predator Diet Study visit the link below: www.michiganseagrant.org/diet

Matt Kornis

<https://youtu.be/1U3tiX1NgVk>

Matt Kornis, Fish Biologist with the U.S. Fish & Wildlife Service, gave an update on mass marking of Chinook salmon, lake trout, and steelhead in addition to touching on fish diets and the impact of sea lamprey.

For more information on the Great Lakes Mass Marking Program see the fact sheet below:

<https://www.fws.gov/midwest/greenb-ayfisheries/documents/Mass-Marking2013.pdf>

Jay Wesley

<https://youtu.be/9F-Cs0E4bFU>

Jay Wesley, Lake Michigan Basin Coordinator for Michigan DNR, discussed steelhead bag limits, stocking levels, and other management issues.

For more information on steelhead bag limits see the fact sheet below:

https://www.michigan.gov/documents/dnr/ShouldLakeMISteelheadBagLimitsBeReduced_495766_7.pdf

Kelly Robinson

<https://youtu.be/RrsUne6v2wk>

Dr. Kelly Robinson, Assistant Professor at the Quantitative Fisheries Center at Michigan State University, presented an overview of a Multispecies Predator-Prey Ratio project, which uses structured decision-making (SDM) to engage stakeholders and scientists in choosing the preferred salmon and trout stocking policy for Lake Michigan.

For more information on the SDM project see the fact sheet below:

<https://www.michiganseagrant.org/wp-content/uploads/2020/07/Robinson-Updating-predator-prey-stocking-models-and-strategies-in-Lake-Michigan.pdf> [Great Lakes Angler Diary | Michigan Sea Grant](#) ✧

Successful annual egg collections - walleye & steelhead

The annual egg take at the NYS Oneida Hatchery began on March 31st this year. Despite staffing limitations due to COVID-19 restrictions, seven



nets were set and a total of 12,424 walleye were collected. Staff processed 5,190 females to obtain this year's 270 million egg quota in a mere eight days! Eggs are currently hatching, and stocking across the state is underway.

Salmon River Hatchery staff completed the steelhead egg take on April 1st, resulting in over 1.5 million eggs collected from 445 Washington strain steelhead. Fish hatched from these eggs will be raised in the hatchery for approximately one year and stocked as spring yearlings in 2022. Steelhead are stocked every spring 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 yearlings and Lake Erie stocking includes 127,500 yearlings. ✧

Fun Facts about Walleye

- They're members of the perch family.
- They have a reflective membrane in their eye called the tapetum lucidum that allows them to see better at night when they primarily feed.
- The [New York State Record](#) walleye was caught in 2018 by Brian Hartman from the St. Lawrence River. It weighed 18 lbs. 2 oz.! ✧



Upper Red Lake walleye regs for open water season

Anglers fishing during the summer season on Upper Red Lake in northern Minnesota will have a three-walleye bag limit, with only one walleye longer than 17" allowed, according to the Minnesota DNR. Anglers had an excellent winter season, harvesting 143,000 lbs. of walleye. The annual harvest by state anglers is anticipated to fall within 120,000-240,000 lbs.

The three-walleye bag limit, with one over 17 inch size restriction, is intended to keep annual harvest within the target harvest range. Last summer, anglers harvested 131,000 pounds with a four-fish limit with one over 17 inches. "Anglers need to remember to bring a good measuring device along with them on their trip to Upper Red Lake," said Andy Thompson, Bemidji area fisheries supervisor. "Many walleye will measure just above, or just under, the 17-inch size restriction."

The Red Lake Nation and the Minnesota DNR manage walleye harvest on Red Lake under a joint harvest plan. The DNR will determine the 2021/2022 winter harvest regulations after the summer fishing season and the completion of fall assessment netting. Upper Red Lake fishing regulations are available on the [Minnesota DNR fishing regulations page](#). ✧

Use new DNR StreamFinder to find places to fish

Whether you're new to the sport or an experienced trout angler, the DNR has new information on Minnesota's trout streams and lakes available on its website. Modeled after the DNR's popular LakeFinder tool, StreamFinder provides anglers with a description, species list, regulations and access information for trout streams throughout Minnesota. More details: [DNR trout fishing page](#) ✧

2021 Spring Hearing results now available

MADISON, Wis. – The Wisconsin DNR announced the 2021 Spring Hearing questions and results are now available. Due to COVID-19, the in-person public meetings known as the Spring Hearings were cancelled, but the public was still able to participate online April 12-April 15. More than 12,600 people provided input. Statewide hearing results and the questions are [available online here](#).

Public input received through this process is advisory to members of the natural resources board, department staff, and anyone who is working on these issues. No final decisions have been made at this time, rather results of this public input will be considered by the Conservation Congress, DNR and Natural Resources Board in the coming months ✧



Whitmer signs \$37.8 million Trust Fund bill for outdoor recreation and grants

Against the backdrop of West Grand Traverse Bay, Gov. Gretchen Whitmer recently signed legislation authorizing \$37.8 million in grants that will support outdoor recreation projects throughout Michigan.

The governor signed House Bill 4469 at Greilickville Harbor Park in Elmwood Charter Township. The township, one of more than 70 Trust Fund grantees, will receive \$300,000 to further the recreation-based development of the pier area around the city's old coal dock. More: <https://content.govdelivery.com/accounts/MIEOG/bulletins/2d7fb64> ✧

DEC starts 2021 Striped Bass Season

Hudson River season opened April 1; Marine Waters opened April 15

State to finalize circle hook regulation consistent with cooperative interstate management requirement to address release mortality

The New York State Department of Environmental Conservation (DEC) announced the start of the recreational striped bass fishing season in the Hudson River and its tributaries north of the George Washington Bridge. The recreational striped bass fishing season opened on April 15 in New York State marine coastal waters south of the George Washington Bridge. DEC continues to work collaboratively with the Atlantic States Marine Fisheries Commission (ASMFC) to require the use of circle hooks when fishing for striped bass with bait. This new requirement is intended to increase the survival rate of striped bass in the recreational fishery. The circle hook regulations took effect April 15.

In the tidal Hudson River north of the George Washington Bridge, the recreational slot limit is 18 to 28 inches, no less than 18 inches nor greater than 28 inches, and the season is open April 1 through November 30. In marine waters, the recreational slot limit is 28 to 35 inches, no less than 28 inches nor greater than 35 inches, and the season is open April 15 through December 15. The recreational striped bass possession limit for all New York State waters is one fish per angler.

The Atlantic coast-wide harvest of striped bass is managed by ASMFC, which initiated and approved [Addendum VI to Amendment 6 \(PDF\)](#) of the Interstate Fishery Management Plan for Atlantic Striped Bass to reduce harvest, end overfishing, and bring fishing mortality to the target level. ASMFC required that all coastal states adopt circle hook requirements when fishing for striped bass with bait for the 2021 fishing season. In January 2021, DEC proposed regulations to meet this requirement. The 60-day public comment period on the proposed rulemaking closed on March 8, 2021. DEC received more than 800 written comments on the proposed rule

and over 700 of these comments expressed support for requiring the use of circle hooks when fishing for striped bass with bait.

On March 25, ASMFC issued new modifications to guidance on the circle hook requirements.

Anglers should use circle hooks, required as of April 15, when fishing for striped bass using part or whole of any marine/aquatic organisms or terrestrial invertebrates as bait. Circle hooks will not be required when fishing with an artificial lure, whether or not they are tipped with bait as previously described. Visit [DEC's Best Practices for Saltwater Fishing](#) webpage for more information on circle hooks and fish handling tips.

Anglers who fish for striped bass are encouraged to participate in [DEC's Striped Bass Cooperative Angler Program](#). For more information, anglers north of the George Washington Bridge in the tidal Hudson River should email HUDSONANGLER@DEC.NY.GOV or visit [DEC's Hudson River Striped Bass webpage](#). Anglers who fish for striped bass in New York's marine waters south of the George Washington Bridge can email SBCAPROGRAM@DEC.NY.GOV or visit [DEC's Striped Bass Cooperative Anglers webpage](#).

DEC also encourages anglers to check DEC's [Recreational Saltwater Fishing Regulations](#) for the most up-to-date information before going fishing and to enroll in the annual no-fee [Recreational Marine Fishing Registry](#) before fishing in New York's Marine and Coastal District waters or when fishing in the Hudson River and its tributaries for "migratory fish of the sea," including striped bass. Anglers can enroll in the registry online or by phone or by visiting a license issuing agent location. [To enroll, go to DEC's website.](#) ✧

Understanding Declining Productivity

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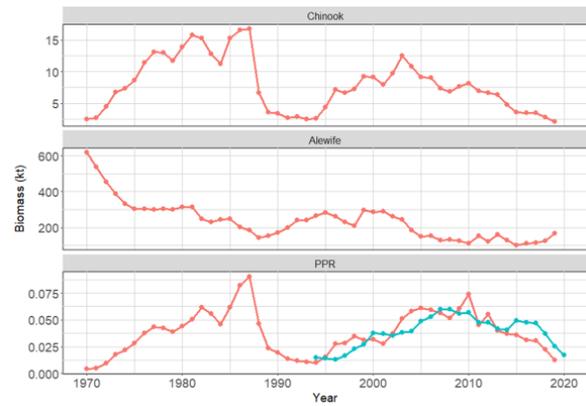
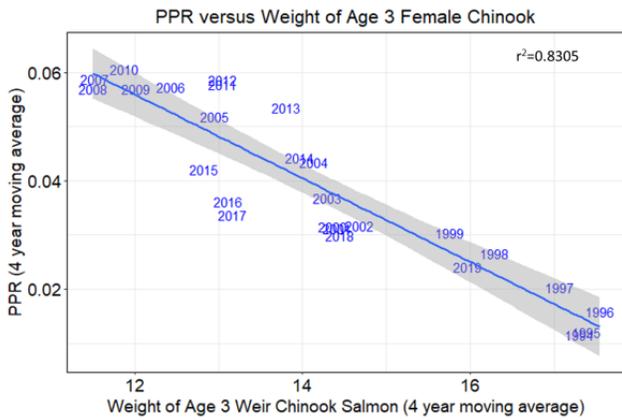
review, an analysis of recent Great Lakes trends, an examination of various models, findings, knowledge gaps and a recommendation.

The report identifies the need for Great Lakes water quality managers to partner with fishery managers to break down information silos and adopt an adaptive management framework that considers both the upper and lower food webs. Targets set for nutrient reductions under the GLWQA require an ecosystem-level analysis to consider potential impacts on offshore waters and strike a balance between ecosystem services. A key finding in the report describes how invasive mussels are implicated in sequestering nutrients in the nearshore. This underscores the importance of applied research and the work of the Invasive Mussel Collaborative to control invasive mussels. As such, GLEC may wish to explore with the Great Lakes Commission and the Invasive Mussel Collaborative how they might provide insight and support in addressing this issue. The Commission will partner with the Great Lakes Fishery Commission to communicate key messages from this study to, and seek feedback from, fishery managers and other organizations in the context of other work being carried out on nutrient management. We expect that this report will be useful to governments to inform actions under Annex 2 (Lakewide Action and Management Plans), Annex 4 (Nutrients) and Annex 10 (Science) as managers strive to control excess nutrients, maintain algal species consistent with healthy aquatic ecosystems while at the same time taking steps to restore and protect native fish species. ✧

Lake Michigan Citizen’s Fishery Committee April 7 Minutes

The Relationship between Chinook Salmon Weir Weight and the Predator Prey Ratio (Ben Turschak)

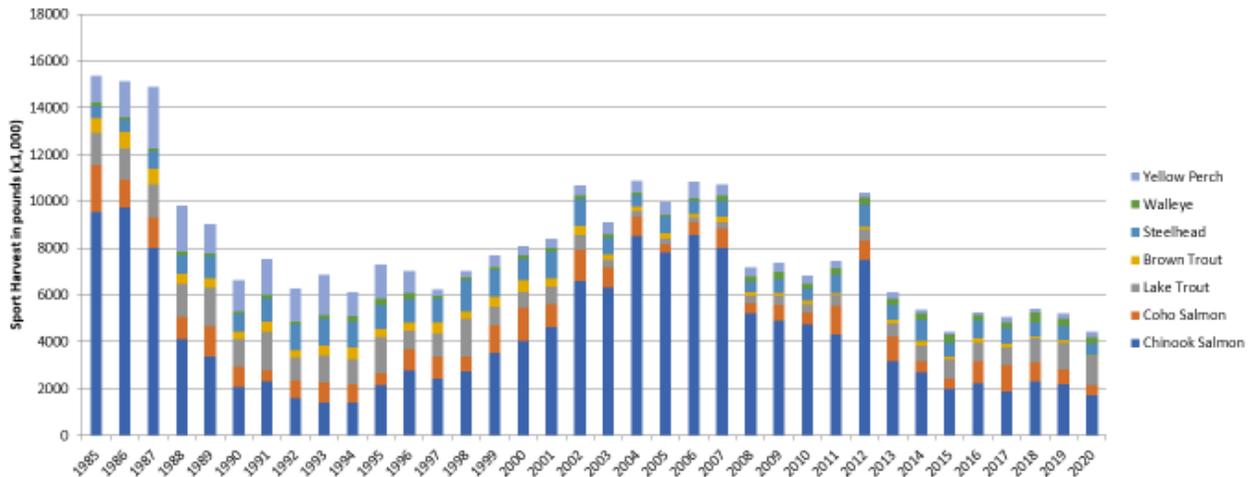
- With a lack of data collection in 2020 due to pandemic, there was a need to gage where the predator prey ratio might be even though the model could not be run.
 - No harvest or effort until June, No ages, No length or weight, Limited prey fish surveys, No hydroacoustic survey, Only 3 bottom trawl ports
- Ben Turschak and Jory Jonas worked on a relationship between Michigan Weir Chinook Salmon weights and the PPR and found a good relationship.
- 2020 average of 17 lbs. – age 3
- At a high predator prey ratio not a lot of prey for predators – this happened around 2007/2008
- Can predict the predator prey for 2020 – produced estimate around 0.0125 kt
- In good shape for predator prey balance
- Will collect information for 2021
- Lake MI committee stocking policy
- Recall that we were at a record low stocking in 2017 and will stock 2.5 million Chinook lakewide in 2021- up a million



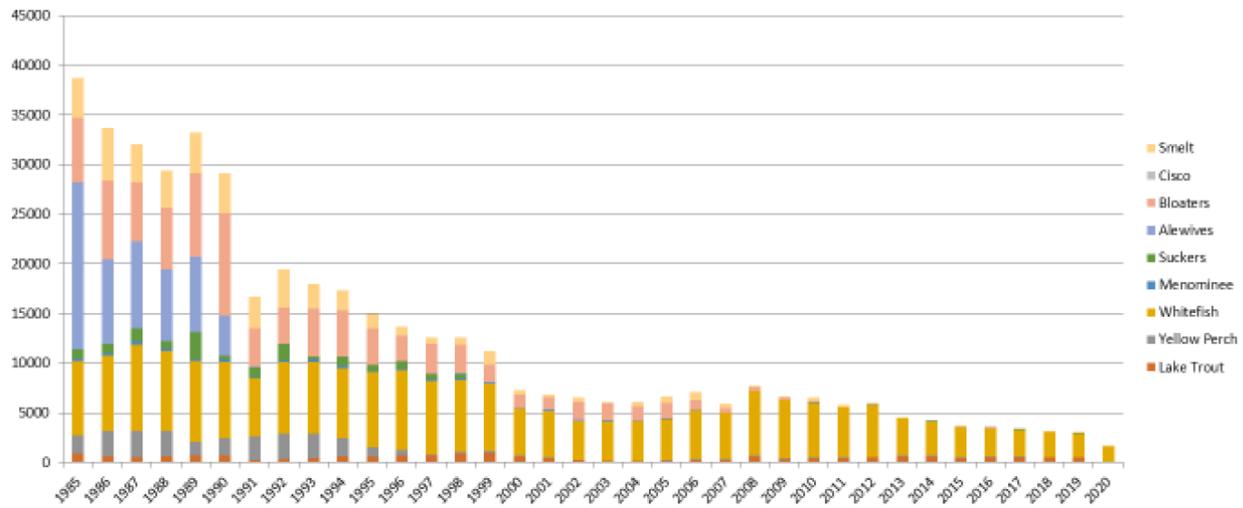
Lake Michigan Management Updates

- Lake-wide harvest with all states combined continues to be lower recreational and commercial harvest as the productivity of the lake continues to decline.

Lake-Wide Harvest - Recreation



Lake-Wide Harvest - Commercial



- Round goby research is using video images of the bottom of the lake to estimate goby densities by bottom type (sand, clay, rock). A test area at Good Harbor Reef estimated 7 million gobies in the reef area. It would be a great step forward with understanding total prey abundance to have good estimates of round goby.
- USGS only completed three bottom trawls and found low levels of alewife. They plan to use new technologies like upward pointing acoustics and sail drones to see if alewife are avoiding the research vessel.
- An extra 225,000 Chinook salmon (total 879,306) will be stocked in 2021 to make up for no steelhead. Also, 296,000 brown trout, 1.5 million coho salmon, and 2.1 million lake trout will be stocked in Michigan waters. Some lake trout will be stocked nearshore due to travel restrictions by USFWS.

Here is the plan for Chinook salmon stocking:

Site	2013 - 2016 Stocking Level	Current Odd Years	Current Even Years	2021 Outside 1836
Escanaba	12,000	0	0	
Manistique*	34,000	0	130,000	
Medusa*	72,000	92,000	0	92,000
Boardman*	60,000	0	71,306	
Manistee River*	22,000	0	0	
Little Manistee River*	150,000	228,000	228,000	228,000
Big Sable River*	38,000	0	0	
Muskegon River*	18,000	75,000	0	75,000
Grand Haven	59,000	129,306	0	241,806
Holland	15,000	0	50,000	
Black River	15,000	0	75,000	
Saugatuck	16,000	0	100,000	
St. Joseph	48,000	130,000	0	242,500
Total	559,000	654,306	654,306	879,306

Lake Michigan Stocking Plans for 2022

- A subcommittee will be formed to make recommendations on 2022 stocking levels.
- The Lake Michigan Committee has been notified that Michigan is interested in discussing stocking increases.
- Great Lakes Salmon Initiative and Ludington Charter Boat Association have already shared ideas for stocking numbers and locations.
- It will be important to develop criteria for numbers and locations. We need to stock enough (100,000 or greater) to

increase survival and consider locations that contribute the most to the lake-wide fishery.

o Habitat Improvements: The Pucker Street Dam on the Dowagiac River is almost completely removed opening 150 miles of coldwater habitat. Removing quagga mussels from areas of Good Harbor Reef shows promising signs that the mussels will not recolonize with enough goby predation.

▪ Field units will be holding conversation and coffee meeting to discuss various regulation proposals.

▪ Underwater Spear Fishing Proposal would allow for the take of lake trout, walleye, and northern pike while snorkeling in the Great Lakes.

▪ Some are talking about an extra trolling license to allow for an extra three rods requiring a change in statute.

▪ Guides and some anglers are concerned about the lower runs of steelhead and would like to see lower bag limits.

o New Cormorant Rule/permit system effective Feb 12, 2021

▪ Draft permit application nearly complete to allow for harassment and take of cormorants

- Region of 24 states 78,000 birds will be up for the taking

- Quota could be around 10,000 birds for Michigan

- Great Lakes Colony – reduce conflict (shooting/egg oiling) include: Beaver Island, Little Bay and Big bays de Noc, Ludington Pumped Storage Facility

- Non-lethal methods would be allowed to harass birds at fish stocking sites. ✧

Egg collection on the Little Manistee River

Have you ever wondered where those salmon and trout the Michigan Department of Natural Resources stocks in the Great Lakes and tributaries come from? Before they hatch into fry (very young fish), before they grow to stocking size and before they leave the stocking truck, the eggs of these fish must be collected by DNR Fisheries Division personnel.

The Little Manistee River Weir and Egg Collection Facility, located on the beautiful Little Manistee River just outside of Manistee in Manistee County, is the place where this story originates.



For over 50 years, workers at the Little Manistee facility have collected eggs from Chinook salmon and

steelhead, two very important and popular gamefish species.

The egg-take facility was constructed in 1967 and began operations in 1968 to meet the growing interest in fishing for salmon and steelhead—two non-native species introduced previously to the Great Lakes. This site on the Little Manistee River was chosen based on its proximity to Lake Michigan and its ideal spawning habitat that already supported natural reproduction of steelhead (lake or ocean-going rainbow trout).

In the late 60s and early 70s, the introduction of coho and Chinook salmon revitalized Great Lakes fisheries that were depleted by invasive sea lamprey and alewife, commercial fishing and habitat degradation that had occurred over time.

Beginning in 1968 and continuing through today, the Little Manistee egg-take facility has operated as the primary source for Chinook salmon eggs, and the sole source for steelhead eggs, for these two fish-stocking programs.

The facility operates from about mid-March to



May to collect eggs from steelhead that spawn in the river each spring. Mid-September through October, the facility staff collects eggs from Chinook salmon that spawn in the fall.

In 2019, the facility got much-needed upgrades, including replacing most of its mechanical and concrete infrastructure and adding efficiencies such as LED lighting and pump improvements.

Over the last 50 years, there has been only one time the facility and staff were unable to fulfill the egg quota for the steelhead program. In the spring of 2020, the COVID-19 pandemic was still in its early stages, and the many unknowns at the time resulted in the painful decision to suspend spring egg-take operations out of an abundance of caution.

For the fall Chinook salmon operations, return-to-work protocols were in place, facility workstations were modified to create distancing, plastic barriers were added, and the work crew size was reduced to only local unit staff.

These same protocols were in place for the 2021 spring steelhead operation, allowing staff to meet the needs of this important program while safely working together.

Process

The Little Manistee Weir and Egg Collection Facility and grounds includes several important components that provide a way to capture and hold fish and allow staff to collect and fertilize eggs and to release or harvest fish.



The process begins with the weir structure itself. The weir is basically

a temporary dam that blocks fish from migrating upstream but does not impound water in the way a traditional dam would.

The other major component of the facility is a fish ladder leading to a raceway that connects to several ponds. The ponds, raceway and fish ladder are all flooded using large pumps that pump water from the river channel that circulates throughout the facility and down the fish ladder.

[Watch fish enter the facility.](#)

The flow of water through the facility attracts fish congregated below the weir up the fish ladder and into holding ponds. Chinook salmon and steelhead on their spawning run instinctively move upstream to seek out spawning habitat. This instinct leads them into the facility. Once a significant number of fish have been collected in ponds, egg-take operations can begin.

A typical day of egg take begins with a significant amount of planning and preparation.

Egg Collection

continued on page 9

Egg Collection

continued from page 8

First, the quota of eggs to meet the stocking requests of the program, including enough surplus stock to allow for changes in stocking numbers and losses during the rearing process, must be determined. This gives staffers an idea of how many days the operation will take and the staffing level necessary to complete the work.

There is also a detailed protocol created and revised annually that describes the process required to fertilize, disinfect and prepare the eggs for the trip from the weir to the hatchery.

Once these steps are determined, it is time to bring in the fish. Fish are moved from the large holding ponds by opening the pond doors and using a machine called a crowder to slowly push them into the main raceway.

From there, the fish are slowly pushed into the spawning building and lifted by a basket into a tank where fish are anesthetized for handling. The fish are then taken out of the basket and put onto a sorting table where ripeness can be checked, and males and females are separated.

The ripe males are gently squeezed so milt, or sperm, can be collected in a small receptacle. Eggs are removed from ripe females by adding compressed air into the body cavity with a small needle.

In the steelhead egg collection process, spawned fish are moved to a recovery tank outside the building before being released upstream. Steelhead do not necessarily die after spawning and can spawn more than once in their life cycle.

In contrast, Chinook salmon only spawn once during their life cycle and then die, so fish that have been spawned are then harvested and sold by a state contractor.

During both egg collection operations, males and females are put in individual buckets for fertilization. Eggs are then combined in large egg buckets to finish preparation for transport.

When the buckets of fertilized eggs leave the Little Manistee River Weir facility, they go to a DNR fish hatchery, where they are counted and placed in incubators. This begins the fish's journey through the hatching and early rearing process.



The fish are kept in the hatcheries until they begin the visible smolting process, when physiological changes occur as these migratory fish begin homing in on their surroundings, which will determine where they return to spawn.

The clearly visible part of the smolting process is the shedding of the camouflaged (with parr marks) scales that help conceal the fish while in rivers and streams. These scales are replaced with bright silvery scales as they migrate down rivers to the Great Lakes.

This occurs after only six months for Chinook salmon, while steelhead are in the hatchery for about one year. Stocking fish during the smolting process assists biologists in predicting where the fish may return to spawn.

Public outreach

The Little Manistee River Weir facility and grounds is also a great place to visit. Egg-take operations are usually open to the public (apart from recent COVID-19 restrictions) and allow visitors to see these amazing fish and the process of harvesting their eggs up close.

Weir tours, combined with education and outreach efforts, bring hundreds of students to the Little Manistee Weir every year to learn about the life cycle of fish, invasive species, the history of salmon in the Great Lakes and the DNR programs that manage and sustain these prized fisheries.

In 2012, the DNR partnered with the Manistee Explore the Shores Program to add universally accessible amenities at the site, including paved pathways around the grounds that offer a self-guided tour with informational signage, a large observation deck below the weir structure, handicap parking spaces and Americans with Disabilities Act-compliant pit toilets. This work was made possible by a grant from the Michigan Natural Resources Trust Fund.

If you would like to visit the weir, check out [dates of operation and more](#) at Michigan.gov/Hatcheries.

For more information on DNR fish stocking, fishing for steelhead and salmon, and many other fish-related subjects, visit Michigan.gov/Fishing.

Check out previous Showcasing the DNR stories in our archive at Michigan.gov/DNRStories. To subscribe to upcoming Showcasing articles, sign up for free email delivery at Michigan.gov/DNR. ✧

General Fishing Season opened May 1

MADISON, Wis. – The Wisconsin DNR reminds anglers that the 2021-2022 fishing season opened May 1, without any changes to season dates. All regulations and license requirements still apply.

“I hope everyone is as excited as I am for the 2021 fishing season,” said Justine Hasz, DNR Fisheries Management Bureau Director. “I have my rods ready and can’t wait to hit the water this coming Saturday. 2020 was a great year for anglers, and I expect 2021 to be even better.”

Many new and experienced anglers took part in the general fishing season opener last year amidst the pandemic. Boat launches will likely be crowded again this year and the DNR encourages anglers to maintain social distancing and wear a face covering when within 6-feet of other anglers.

As anglers head out to their favorite fishing [locations](#), please remember:

- Always wear life jackets
- Practice safe and sober boat operations
- Release fish responsibly
- Minimize the spread of [aquatic invasive species](#) by removing

Stream trout fishing opens statewide on April 17

Minnesota’s popular warm weather stream trout season opened Saturday, April 17, with quality fishing opportunities in every region of the state. Brook trout and splake fishing also opened April 17 on Lake Superior and its tributary streams. Minnesota has some excellent trout fishing, and anglers help pay for trout habitat and access improvements with their fishing licenses and trout stamps. Anglers fishing on designated trout waters must have a trout stamp validation in addition to an angling license.

More: [DNR fishing page](#) ✧

plants and animals from your boat before and after launching, draining all water from compartments, and never move live fish away from any waterbody.

Over the past year, DNR staff have worked hard to manage Wisconsin’s amazing fishery resources responsibly. Their efforts include maintaining and enhancing critical fish habitat, conducting fish population surveys, adding over 120 miles of classified trout waters and stocking over 5.5 million fish into inland lakes and streams and both Great Lakes.

Based on early harvest reports, the DNR predicts anglers will have a successful opening weekend.

Northern Pike and Walleye Forecast

Recent creel reports show anglers have successfully fished inshore for species such as [northern pike](#) and [walleye](#).

In the central, western and northern parts of the state, walleye will be done spawning and have moved into shallower bays to feed. Anglers should expect to find them in slow

currents or drop-offs and should fish for them using a jig and a minnow.

On the Winnebago System, walleye and northern pike will be in their pre-summer patterns in a little deeper water and prominent lake locations, but not as much as during the heat of summer.

Anglers should expect walleye to be next to shore structures in the vicinity of the major rivers. Inland waters on the eastern side of the state will be a little cooler, and the walleye and northern pike will likely be hanging around the shoreline-oriented habitat.

In southern Wisconsin, walleye and pike are finished spawning, but the southern lakes haven’t warmed up much past 55 degrees.

Cool water temperatures in Lake Superior have prolonged walleye spawning. The temperature should provide excellent walleye fishing along the Ashland County side of Chequamegon Bay, off the coal dock in Washburn County and in the St. Louis River. If you are fishing the southern portion of Lake Michigan, try fishing tributary rivers. ✧

Bring on the bass

Indiana Anglers can target bass near their spawning beds in shallow areas as water temperatures near 65 degrees. Use soft plastic worms (with or without a bullet-shaped weight) and soft plastic stick baits to entice these fighting fish. Cast a spinner bait if bass are active near the surface. Here are three public water suggestions for bass (and panfish):

- North: [Worster Lake](#) (St. Joseph County)
- Central: [Summit Lake](#) (Henry County)
- South: [Blue Grass Fish & Wildlife Area](#) (Warrick County)

For more places to fish, explore our [Where to Fish map](#). ✧

Fishing for sunfish? Check for new sunfish regulations

Remember to closely check the 2021 Minnesota Fishing Regulations booklet and signs at water accesses for new sunfish limits that are in effect on 94 waters. The new regulations went into effect March 1. Lower limits on specific waters are part of an initiative to protect and increase sunfish sizes. These changes are in response to angler-driven concerns over the declining sizes of sunfish in Minnesota.

More details: [DNR sunfish management page](#) ✧

Root River Report

The following information is the latest fishing information for the Root River in Racine. We will post new information to this site every **TUESDAY or WEDNESDAY** at 4:00 pm from September through December, and from March through May. We will also update the number of fish processed at the [Root River Steelhead Facility](#) to give you the exact number of fish passed upstream. Depending on water conditions and the number of fish in the weir, fish are usually processed on Mondays and Thursdays.

In addition, you can check out our [Lake Michigan Outdoor Report](#) for the latest fishing information on Lake Michigan and Green Bay.

Root River Steelhead Facility

Lake Michigan trout and salmon don't successfully reproduce in Wisconsin streams, so the DNR gives Mother Nature a hand. Watch fisheries crews collect eggs and milt from spawning fish to create the next generation of steelhead to challenge anglers.

- [Steelhead Spawning at Root River Steelhead Facility](#)

Root River Fishing Report for April 9, 2021

The Root River experienced a decrease in fishing activity this week. Anglers are still targeting steelhead both down and up river of the weir. Most anglers have been seen using the usual fly-fishing tackle to try and catch steelhead. Anglers have been catching lots of suckers and only a small handful of steelhead. A combination of flies, spawn and beads were successful in catching steelhead. Last week's rain

increased water levels on the river. The increase in water levels also increased the flow and decreased water visibility.

Root River Steelhead Facility Report

Our third processing day, and second spawning day at the Root River Steelhead Facility for Spring 2021 was Monday, April 12. Flows in the river rose over the weekend after a few days of rain, and the river level is currently 358 cfs. The water temperature in the facility was 54.3 degrees. Our next spawning/processing day is scheduled for Monday, April 19.

TOTALS as of April 12, 2021				
	Rainbow Trout	Chinook Salmon	Coho Salmon	Brown Trout
Total Captured	542			
Passed Upstream	411			
Taken to Hatchery				
Spawnd at Facility	198			
Egg Take	390,000			

✧

Freshwater Fishing Regulations Guides now available

The 2021 Freshwater Fishing Regulations Guides are now available wherever you purchase your fishing license. Pick up your copy today, or visit DEC's website for a downloadable [PDF version](#). You can email feedback on the new format of the guide to: fwfish@dec.ny.gov ✧

Best times to cast a line

In early May, especially in northern Indiana or if the weather has been cool, wait until late afternoon or evening to go fishing. This allows the daytime heat to warm the waters and get sluggish fish more active and willing to bite. Later in May, after a stretch of warm sunny days, the best times to fish are early morning, late afternoon, and even nighttime ([especially for bass](#)). ✧

