Inland Seas Angler

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Fishing generated over $200 billion in sales and rebuilt two fish stocks

U.S. commercial and recreational fishing generated $208 billion in sales, contributed $97 billion to the gross domestic product, and supported 1.6 million full and part-time jobs in 2015—above the five year average, according to NOAA's Fisheries Economics of the United States recently released report.

Also out now, the Annual Report to Congress on the Status of U.S. Fisheries shows that the number of domestic fish stocks listed as overfished or subject to overfishing remain near all-time lows, with two new stocks rebuilt in 2016. The reports highlight the collaborative role of NOAA Fisheries and many partners in making continued progress towards ending overfishing, rebuilding stocks, and realizing significant benefits to the U.S. economy.

"U.S. fisheries are big business," said Samuel Rauch, acting assistant administrator for NOAA Fisheries. "Sustainable management of our nation's fisheries, supported by sound science, opens up economic opportunities to Americans along the supply chain—from buying bait at a local marina to enjoying a seafood dinner."

The U.S commercial fishing and seafood industry (including imports) generated $144 billion in sales in 2015, a 6% decline from the previous year, and supported 1.2 million jobs, a 15% decline from 2014, although this is still above the 5 year average. Factors such as the "warm blob," marine toxins, and El Nino affected the Pacific marine environment in 2015, and West Coast fishermen saw lower landings and revenue for several key commercial species.

Market forces affected fisheries in other regions, such as in the Gulf of Mexico, where revenue for shrimp landings decreased due to high inventories, dampening prices for both domestic harvest and imports. Seafood imports were also lower in 2015—$1.4 billion less than in 2014.

Saltwater angling generated $63 billion in sales across the economy in 2015, up 5% from 2014. Job impacts

Fishing generated over $200 billion

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Utah wildlife director to help lead USFWS

Will bring a successful track record to Washington, D.C.

SALT LAKE CITY – Greg Sheehan, director of the Utah Division of Wildlife Resources (DWR), has provided exemplary leadership on wildlife issues in Utah and will soon serve as the new deputy director of the USFWS.

Sheehan is passionate about wildlife and working with the public on wildlife issues. He has built coalitions of regional and national peers, conservation organizations, local stakeholders and other partners to deliver groundbreaking results. He is an avid hunter, fisherman and wildlife photographer who has served as DWR's director since 2012.

Sheehan earned his undergraduate degree at Utah State University and later received an MBA. His passion for wildlife – and his years of wildlife agency leadership – has given him a deep understanding of the issues and complexities involved in wildlife management.

Over the course of his 25-year career in natural resources, Sheehan has played a pivotal role in many remarkable accomplishments:

- Restoring many of Utah's fish and wildlife species to levels not seen in more than 125 years
- Increasing Utah's mule deer population by more than 100,000 animals within the past four years
- Improving and restoring more than 1.3 million acres of wildlife habitat as part of Utah's Watershed Restoration Initiative
- Working to conserve greater sage grouse, so a listing under the Endan-

Utah wildlife director

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in the marine recreational fishing industry remained steady from 2014 at 439,000 jobs. Mississippi, Connecticut, South Carolina, Washington, and Alaska had the greatest recreational fishing sector job growth in 2015.

In 2016, U.S. fisheries continued to rebuild, with the number of stocks on the overfishing and overfished lists remaining near all-time lows. Four stocks came off the overfishing list, while six stocks were added to the overfishing list. There were no changes to the list of overfished stocks in 2016. Two additional stocks – barndoor skate in Georges Bank/Southern New England and albacore in the North Atlantic – were rebuilt in 2016, bringing the total stocks rebuilt since 2000 to 41.

A stock is on the overfishing list when the catch rate is too high. A stock is on the overfished list when the population size of a stock is too low, whether because of fishing or other causes, such as environmental changes.

View the 2015 Fisheries Economics of the United States and 2016 Status of U.S. Fisheries reports. ✧

Utah wildlife director

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gered Species Act was unnecessary

- Launching a new migration initiative that uses cutting-edge technology to better understand and manage wildlife populations
- Creating the Utah Cutthroat Slam, a program to generate conservation funding for Utah's four native trout species
- Cultivating the public's passion for wildlife and conservation through expanded youth hunting and fishing days, annual pheasant releases and other hands-on wildlife events
- Serving in leadership positions in multiple national wildlife organizations

DWR Deputy Director Mike Fowlks will serve as interim director until a permanent hiring decision is made. ✧

Changes made to lake trout regs on lakes Huron and Michigan

Michigan has approved fishing regulation changes regarding lake trout and splake in lakes Michigan and Huron and Type F drowned river mouth lakes. These regs went into effect, **June 9**.

The changes will result in expanded angling opportunities, including:

- In the Lake Michigan lake trout management units of MM 1 through MM 4, lake trout and splake will be managed under a new minimum size limit of 15 inches (the maximum size limit regulation has been removed).
- In the Lake Michigan lake trout management units of MM 6 through MM 8, the lake trout and splake possession season has been changed to open all year.
- In the Lake Huron lake trout management units of MH 3 through MH 6, the lake trout and splake possession season has been changed to open all year.
- In Type F drowned river mouth lakes, the lake trout and splake possession season has been changed to open all year. ✧

The online version of the 2016-2017 Michigan Fishing Guide (available at michigan.gov/dnrdigests) will be updated to reflect these changes. Information also will be updated on the DNR's fishing regs hotline at 888-367-7060. ✧

Gander Mountain to keep some stores open

Gander Mountain is now part of the Camping World & Good Sam family following Camping World's successful bid for certain Gander Mountain assets in a bankruptcy auction. At Camping World & Good Sam, plans are to keep as many as 70 or more Gander Mountain stores open following the bankruptcy liquidation process. Following the liquidation process, you'll also see a fresh release of www.GanderMountain.com. ✧

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Sterilized Male Sea Lampreys released in the Pigeon, Sturgeon, and Maple Rivers

Scientists released sterilized, spawning-phase male sea lampreys in Michigan's Inland Waterway this May in hopes of employing another tool to combat the invasive menace. The waterway—a nearly 40-mile chain of rivers and lakes in the Northern Lower Peninsula—comprises the Pigeon, Sturgeon, and Maple rivers; rivers that contain a landlocked sea lamprey population. This research, funded by the Great Lakes Fishery Commission and Michigan Invasive Species Grant Program, will determine whether sterilized male sea lampreys will compete with fertile males to spawn with female lampreys, resulting in eggs that do not survive. The ultimate goal is to use this "sterile-male-release-technique" as a method to reduce or possibly eliminate sea lamprey reproduction—and thereby damage to fish caused by this invasive species—in the Inland Waterway and Lake Huron.

This spring, adult males were captured at the Cheboygan Dam and sterilized at the USGS Hammond Bay Biological Station in Millersburg, Michigan. Starting in May 2017, the USGS, USFWS, and Fisheries and Oceans Canada released 4,000 sterilized male sea lampreys, which no longer feed on fish, into the Pigeon, Sturgeon and Maple Rivers. The research team released sterile males in a 40:1 ratio of sterile to fertile males, meaning a female has a 1 in 40 chance of spawning with a fertile male. The objective is to put enough sterile males into the system to outcompete the fertile males for mates. If successful, the next scheduled lampricide treatment during 2020 will not be needed.

Also, if successful, the technique would be the first time that a control measure other than a dam has eliminated the need for lampricide treatments in a Great Lake tributary. ✧

DEC changes to 2017 Recreational Summer Flounder Fishing Regs

The New York State DEC announced that new recreational fishing regulations are now effective for summer flounder (fluke). These regulations are required to meet the more restrictive rules put in place by the National Marine Fisheries Service, and include changes to the minimum size and possession limits. The State led efforts to successfully challenge National Marine Fisheries Service's data in order to minimize reductions and ensure a viable fishery for New York and other East Coast states. New York's 2017 regulations should result in an approximate 30 percent reduction in harvest to meet the federal requirements.

Coast-wide recreational harvest of summer flounder was originally expected to be cut by 41 percent, and under state-by-state recreational allocations, New York was facing a 70 percent reduction.

The open season for fluke has not changed. The new regulations include a three-fish possession limit, a 19-inch size limit, and an open season from May 17 through September 21.

This regulatory change reflects the coast wide decline in the number of summer flounder documented in the most recent surveys. Consistent below-average reproductive success for the last five years may be one cause for the decline. The catch limits set by the National Marine Fisheries Service for both the recreational and commercial fisheries in 2017 are the lowest in the history of the fishery management plan, which began in 1993.

For current marine recreational fishing regulations for all species: http://www.dec.ny.gov/outdoor/7894.html

Marine recreational anglers 16 years or older are reminded that they must register each year in New York's free Recreational Marine Fishing Registry on DEC's website: http://www.dec.ny.gov/permits/54950.html ✧

Lake Trout natural recruitment evident in Lake Michigan

When do we stop stocking?

Lake trout without a fin clip are being caught more frequently in Illinois waters and constituted 27-49% of fish caught out of northern ports during summer, 2014-2016. All lake trout stocked in lakes Michigan and Huron receive a fin clip and coded-wire tag to designate them as hatchery-origin fish. The largest proportion of Lake Michigan's unmarked spawning lake trout in fall are found in Illinois waters (~50% of lake trout in LMP fall gill net surveys). Smaller percentages of unclipped fish are being sampled as you move north through the lake (~25% Midlake Refuge; 4% Northern Refuge).

This appears to indicate that sustained natural reproduction is occurring in Lake Michigan and it is likely happening in Illinois waters. What is less clear is whether the increase in unclipped fish is due to spawning success by natural fish, stocked fish or a combination of both. Researchers from the INHS have been using a remotely operated vehicle (ROV) and egg traps to document spawning at Julian's Reef. They collected one lake trout fry and observed another during spring 2016.

For 2017, Wisconsin and Indiana will be raising their bag limits for lake trout. A change to the bag limit for lake trout is under consideration in Illinois and any adopted changes to the Lake Michigan sport fishing regulations would be implemented in 2018. Concurrent with an internal review of lake trout bag limits for Illinois, a sub-group of the Lake Trout Working Group of the Lake Michigan Technical Committee is proposing criteria by which stocking will be ceased on a reef by reef (or regional) basis when natural reproduction is considered sustainable. Illinois fishery managers and anglers will need to consider the consequences of a bag limit increase in light of potential cessation of stocking at Julian's Reef in the near future ✧

Sea lamprey management program proving successful, says DFO

Adult sea lamprey reach suppression targets for first time

SAULT STE. MARIE – The Department of Fisheries and Oceans Canada are reporting that due to the long standing sea lamprey management program on the Great Lakes, the population of adult sea lamprey has now reached suppression targets for the first time in the history of the program.

"We've now reached defined targets for the suppression of adult sea lamprey for the first time in 30 years, the first time in the history of the program," stated DFO's Paul Sullivan, "and marking targets for lake trout have gone down very significantly. The target set is five marks of lake trout having been targeted by lamprey."

Sullivan explained, "The program has provided benefits. We have seen an excellent sign over the years in the increase in natural reproduction of lake trout and their reaching maturity. There has been great success in Lake Huron.

Application of selective lampricides to streams and lentic areas harboring larval sea lampreys continues to be the primary method of control. In streams and rivers, licensed crews apply TFM alone or in combination with Bayluscide, while in estuaries, lakes and interconnecting channels (collectively referred to as "lentic areas"), a bottom-release granular formulation of Bayluscide is applied. Treatments are normally conducted every three to five years and are very effective in reducing the number of larval sea lampreys before they migrate to the lake and kill fish important to the Great Lakes recreational, commercial, and aboriginal fisheries.

Portions of the following tributaries and lentic areas to Lakes Superior, Huron, Erie and Ontario are scheduled for lampricide treatment in 2017 for Lake Superior, Lake Huron, Lake Erie, Lake Ontario—both on Canada and US sides.

For Lake Huron, Manitoulin Island tributaries included for the treatment this year include Silver Creek and Mindemoya River. Treatments will be conducted during April to November 2017.

Lampricides are lethal to lampreys but impart little harm to other fish species at concentrations used in treatments. Individual fish may be affected if weakened through spawning activities, environmental stress, disease, injury or pollution. As well, some aquatic species or life stages may exhibit sensitivity, including members of the catfish family and mudpuppies.

Bait fish or other aquatic organisms that are confined artificially may be susceptible to the lampricide due to stress caused by crowding and handling.

Barriers designed and constructed to prevent migrating adult sea lampreys from accessing spawning areas also play an important role in controlling sea lampreys and reduce the need for application of lampricides. Thirty-one barriers have been constructed in Canadian tributaries to the Great Lakes, many of which incorporate traps to capture and assess populations of adult sea lampreys during their spring spawning migration. Some barriers are designed with adjustable crests to facilitate fish passage while others are constructed with fish passage capabilities.

Great Lakes tributaries are systematically surveyed to detect and evaluate larval sea lamprey population. Stream surveys using portable electrofishing gear or applications of Bayluscide will be conducted on approximately 88 Lake Superior, 67 Lake Huron, 25 Lake Erie and 70 Lake Ontario tributaries and/or their associated bays in 2017 to identify and evaluate new or re-established populations of sea lamprey. ✧

U.S. sales of fishing licenses up

Two new reports show positive trends for fishing, with data revealing increases in Hispanic, youth and female participation. Fishing is again the No. 2 most popular adult outdoor activity, but is closing in on the No. 1 activity—jogging. The Recreational Boating & Fishing Foundation said the increase is being reported by the USFWS and the Outdoor Foundation.

The latest fishing license sales data from the USFWS shows a 1.79 percent increase in fishing license sales. It was enough to bring the 10-year change in license sales to 4.26 percent. Even more encouraging is that it marks the third consecutive year of increases in license sales after a long period of stagnant sales.

Additionally, the Outdoor Foundation released its 2017 Outdoor Recreation Participation Topline Report, which includes plenty of positive news for the sport of fishing.

Saltwater fishing participation increased 4% during the last three years. Fly fishing increased 6% in 2016 and 9.8% during the last three years, and kayak fishing increased 4.6% in 2016 and 31.8% during the last three years. Youth participation was 15.6 million, with 19.5% of people ages 6 to 24 participating in fishing, up from 14.8 million in 2015.

Adult participation was also up, with 31.5 million people over age 25 fishing, which is 14.6 percent of the adult population.

"We are very encouraged by the positive news coming from both the USFWS and the Outdoor Foundation," RBFF president and CEO Frank Peterson said in a statement. "It's great to see the sport of fishing getting the appreciation we all know it deserves, and with fishing being the No. 1 activity done from a boat, this is news our entire industry should celebrate. These trends give us plenty of momentum as we continue on our path to 60 in 60."

The RBFF's 2017 Special Report on Fishing will be released in full in July.

✧

Minnesota's largest invasive carp captured near Redwood Falls

Bighead carp captured by bow angler and reported to DNR

A bow angler fishing in a private gravel pit near Redwood Falls caught the largest invasive carp recorded in Minnesota. The bighead carp measured 47½" and weighed 61.7 lbs.

Invasive fish coordinator Nick Frohnauer said the angler immediately reported the capture to the Minnesota DNR and was helpful getting the specimen delivered to the area fisheries office. "The news of this capture is somewhat alarming, given the size and location," Frohnauer said. "This bighead carp was captured about 80 miles upstream from the only other bighead carp captured in the Minnesota River."

The fish likely entered the gravel pit during a period of high water. The pit is within the Minnesota River floodplain and periodically becomes connected during flood flows.

"The gravel pit where the carp was captured provides a unique opportunity to determine if the fish was an isolated capture or part of a group," Frohnauer said. "The pit is off the main channel, so fish are confined to a smaller area rather than having many miles of river."

The DNR is concerned about the potential impacts of invasive carp in the Minnesota River and other waters. The agency is working with other state and federal agencies, conservation groups, university researchers and commercial businesses to prevent the spread of invasive carp.

- The DNR has contracted with the Water Resources Center at Minnesota State University – Mankato to provide information to guide DNR management decisions for the Minnesota River.
- The Minnesota Aquatic Invasive Species Research Center at the University of Minnesota has funding through the DNR to evaluate potential deterrents for Mississippi River Locks and Dams. Through the Environment and Natural Resources Trust Fund (ENTRF), they have installed acoustic speakers at Lock 8 in southeastern Minnesota and modeled flows through the gates at Dams 2, near Hastings, and 8.
- The DNR is in the process of awarding a contract to explore the feasibility of installing an acoustic deterrent system at Lock and Dam 5 in southeastern Minnesota. A deterrent system at this location would help prevent fish from moving into both the Minnesota and St. Croix rivers.

While no breeding populations have been detected in Minnesota waters, individual fish have been caught in the Mississippi near the Twin Cities, the St. Croix River and the Minnesota River.

Invasive carp captures must be reported to the DNR immediately. Call 651-587-2781 or email invasivecarp.dnr@state.mn.us. Take a photo and transport the carp to the nearest fisheries office or make arrangements for it to be picked up by a DNR official. ✧

Black carp bounty leads to discovery in Illinois River

A black carp captured this April in the Illinois River by a commercial fisher highlights a unique partnership between fishers, the Illinois DNR, and Southern Illinois U. For surrendering this black carp, the commercial fisher received a $100 bounty, and in turn, helped resource agencies learn a little more about the range of black carp in the Illinois River. The black carp was found south of Peoria, Illinois near Copperas Creek Lock and extends the upstream detection of the species by 110 miles.

Scientists from federal agencies including the USFWS and USGS provide valuable analysis of the surrendered black carps. The most recent black carp reported near Peoria, Illinois was 28 inches in length and weighed eight pounds. Analysis by the FWS indicates that this fish was fertile, referred to as diploid, which is consistent with most fish recently captured in the bounty program. Since the establishment of the bounty program in 2015, 37 black carps have been collected. Of these, 26 were collected in 2016 alone. Four have been found in the Illinois River.

Commercial fishers are valuable in the cooperative effort to better understand black carp because they are skilled in fishing large rivers throughout the region. Beyond the Illinois River, the bounty program also accounts for the majority of adult black carp reported in the rest of the country. In addition to commercial fishers, anglers and bowfishers should be aware of these invasive fish and what to do if one is harvested. In appearance, black carp closely resemble the more common grass carp, another Asian carp which is also found in large rivers of the central United States. Proper identification of black carps is an essential component of the bounty program.

The black carp is one of four species of Asian carp that threaten waterways in the central United States. As molluscivores, black carps consume native freshwater mussels and snails that live in our large rivers. 26 freshwater mussel species native to Illinois are state-threatened or endangered, twelve of which are federally listed..

More information on black carp distribution in the United States:

U.S. Geological Survey Animated Map

U.S. Geological Survey Black Carp Fact Sheet

Identification of Black Carp and Grass Carp

To report a black carp captured from the Mississippi, Illinois, Ohio or Wabash rivers, call

Illinois DNR: 217-557-0719 OR

618-462-0362 ✧

DEC asks anglers to avoid spawning lake sturgeon

New York is asking anglers to avoid spawning lake sturgeon in New York's Great Lakes waters, Great Lakes connecting channels, and tributaries of the Great Lakes, St. Lawrence River, Finger Lakes, and Oneida Lake. Typically during this time of year, DEC receives multiple reports of lake sturgeon caught by anglers fishing for walleye and other species. Sturgeon spawn in New York State in May and June when water temperatures reach 55 to 64°F. Anglers should not intentionally target these protected fish. If an angler catches a sturgeon, they should fish another area or change fishing gear to avoid catching another.

Follow these practices to ensure the fish are returned to the water unharmed:

- Avoid bringing the fish into the boat if possible;
- Use pliers to remove the hook. Sturgeon are almost always hooked in the mouth;
- Always support the fish horizontally. Do not hold sturgeon in a vertical position by their head, gills, or tails;
- Never touch their eyes or gills; and
- Minimize their time out of the water and return the fish to the water immediately ✧

Research vessels to expand knowledge of Great Lakes

The Michigan DNR announced all four of its fisheries research vessels are back on the water, beginning their annual surveys of Great Lakes fish populations. Surveys conducted by these vessels examine and collect information on all aspects of Lakes Huron, Michigan, Superior and St. Clair fish communities and their habitats. This information is essential in supporting the DNR's mission and evaluation work that started in the 1960s. For more info: michigan.gov/fishresearch or Fact sheet about research vessels. ✧

Launch improvements completed at Victoria Dam in Ontonagon County

The Michigan DNR announced improved access to good fishing opportunities at the Victoria Dam via a boat launch facility improved recently by the Upper Peninsula Power Co. The improved boat launch site now includes parking for both cars and trucks with trailers, four spots each. Additionally, the upgrades have provided added space for launching boats, with an improved grade for pulling in and out of the boat launch.

The Victoria reservoir provides a very attractive fishery for walleye, bluegill, largemouth bass and black crappie. Pond-reared walleye are stocked here on a periodic basis, but natural reproduction from resident walleye spawning in the gravel upstream reaches of the impoundment helps maintain an annual supply of legal-size fish (15").

"This reservoir is an excellent body of water for catching walleye by means of trolling the mid-water drop offs, or by jig fishing in the opening pocket-points to the bays. ✧

Wingshooting Clinics

Wingshooting clinics will be conducted this summer and fall in Illinois at IDNR sites, cooperating gun clubs and hunting preserves. Most clinics are conducted on weekends. Wingshooting clinics for youth (age 10-15) and women provide instruction on safely firing a shotgun at a moving target with reasonable reliability. Hunter wingshooting clinics are hands-on, and include extensive live fire at a variety of clay target presentations on sporting clays courses specifically designed for teaching typical hunting situations. For wingshooting clinic schedule and more information: Recreation wingshooting clinics. ✧

Need help identifying a fish? DNR can help

With more than 200 fish species in Indiana waters, anglers sometimes catch fish they can't identify. A new DNR online tool can help. The Fish ID Form allows the public to submit photos and information for free directly to biologists for help with identification. The form is at wildlife.IN.gov/9448.htm.

Information collected from the forms will help biologists track rare species and identify locations of invasive species. "After several years of getting photos through email or social media, I thought it would be best to have a place where people could submit them directly to a biologist," said Brant Fisher, DNR nongame aquatic biologist.

When submitting photos, include a picture of the entire fish with something in it to reference size (ruler, coin, hand), and close-ups of unique features of the fish.

Email photos to fishid@dnr.IN.gov in medium-size .jpeg file format. Videos should be .mp4, .wmv or .mov and less than 10 MB in size. Information collected on the Fish Identification Form includes length, weight, distinguishing characteristics, location and date of catch, and observer information. ✧

Citizens Fishery Advisory Committee Meetings minutes:

Lake Huron

To view the 17 page April minutes of Michigan's Lake Huron Citizens Fishery Advisory Committee Meeting, click on the link here: Lake Huron Citizens Fishery Advisory Committee Meeting.

Lake Michigan

To view the 23 page April minutes of Michigan's Lake Michigan Citizens Fishery Advisory Committee Meeting, click on the link here: Lake Michigan Citizens Fishery Advisory Committee Meeting minutes ✧

June is 'Ohio Goes Boating Month'

DNR provides boating and educational opportunities all month long

COLUMBUS, OH – The Ohio DNR is offering boating and boating education opportunities to help celebrate the designation of June as 'Ohio Goes Boating Month' by the 132nd Ohio General Assembly. The House Bill 84 designation highlights Ohio's thriving boating and tourism industry.

In an effort to bring attention to the many boating opportunities the state's lakes and beaches offer, legislators in both the House and Senate passed House Bill 84 on April 26, highlighting the importance of the Ohio's boating industry, which creates $3.6 billion in economic benefits. According to committee testimony, the western basin of Lake Erie has the third largest concentration of boats in the United States. The bill also strives to increase awareness for ensuring that Lake Erie, and all of Ohio's waterways, remain clean, protected and healthy.

House Bill 84 promotes the variety of activities for Ohioans on the water at state parks, marinas and yacht clubs. Boating activities, such as kayaking, canoeing, sailing, stand-up paddleboarding and power boating, also encourages Ohioans to vacation in the state, which boosts local economies along Ohio's shoreline and throughout the state.

- Kayak Birding Trip – **June 17**, 8 a.m.–12 p.m., East Fork State Park. To register, call 513-734-4323.
- Ohio Boating Education Course – **June 17**, 8 a.m.–5 p.m., Buck Creek State Park, Springfield, Clark County. To register, call Buck Creek State Park at 937-323-1582.
- U.S. Coast Guard Auxiliary Flotilla 082-06-08 About Boating Safely Course – **June 17**, 8 a.m.–4:30 p.m., U.S. Coast Guard Auxiliary, Moundwood Station, 7490 Edgewater Ave., Huntsville, Logan County. To register, contact Anita Daniel at 937-726-6572 or uscgx.sois@gmail.com.
- Paddle Palooza – **June 18**, 1-5 p.m., Cowan Lake State Park. For more information, call 614-306-4913.
- Ohio Boating Education Course – **June 24**, from 8 a.m.–5 p.m., Rocky Fork State Park. Call the East Fork State Park office to register at 513-734-2730.
- Intro to Canoeing – **June 24**, 9 a.m.–5 p.m., Alum Creek State Park – meet at the Cheshire boat ramp. To register, call 614-265-6652 or email valerie.cox@dnr.state.oh.us.
- Paddle Palooza – **June 24**, 12-4 p.m., Portage Lakes State Park – at the beach. For more information, contact Richelle Slomer at 330-402-6919 or richelle.slomer@dnr.state.oh.us.
- Ohio Boating Education Course – **June 24**, 8 a.m.–5 p.m., Alum Creek State Park classroom. To register, contact Alum Creek State Park at 740-548-5490 or alumcreek.watercraft@dnr.state.oh.us.
- Ohio Boating Education Course – **June 24**, 8 a.m.–5 p.m., Rocky Fork State Park Activity Center (turn at North Shore launch ramp), Hillsboro, Clermont County. To register, contact East Fork State Park at 513-734-2730 or cincinnati.watercraft@dnr.state.oh.us. ✧

VHS linked to Cayuga Lake fish kill

Viral Hemorrhagic Septicemia (VHS) has been connected to a fish kill involving thousands of round gobies in Cayuga Lake, the NY DEC announced. VHS can cause hemorrhaging of fish tissue, including internal organs, and can cause the death of infected fish. It does not pose any threat to human health.

Cornell University confirmed VHS was present in fish samples collected by DEC on May 12. VHS is a deadly and persistent virus of fresh and saltwater fish that has been causing disease issues in the Great Lakes and connected waters since 2003. It was first documented in New York in 2006. VHS has not been linked to a fish kill in the Finger Lakes in almost a decade and this is the first discovery of the presence of this virus in Cayuga Lake.

VHS is currently responsible for an ongoing fish kill in Lake St. Claire in Michigan and western Lake Erie.

Water temperatures have been optimal for the virus this spring as it replicates prominently in water temperatures between 50˚ and 58˚ F. Mortalities usually continue until the water warms above that range. VHS can be spread through a variety of means, including the moving of potentially infected fish from one waterbody to another. This can be done by stocking or the use of bait fish.

DEC Commissioner Basil Seggos said, "Anglers play a key role in preventing the spread of VHS. We encourage anglers to vigilantly follow the regulations prohibiting the movement of baitfish and other fish between waters to protect New York's high quality fishing."

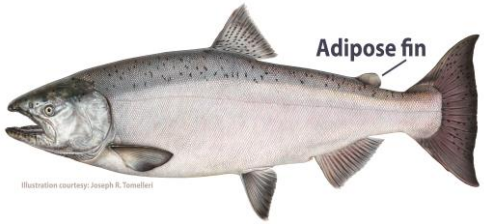
To help prevent the spread of VHS, anglers and boaters should:

- Follow baitfish regulations developed to prevent the spread of harmful fish diseases;
- Only release baitfish into the waterbody it was taken from;
- Not discard unused bait purchased commercially into any body of water;
- Not move fish from one water body to another;
- Not dispose of fish carcasses or by-products in any body of water; and
- Inspect, Drain and Dry and Disinfect boats and gear before moving to another water.

DEC routinely collects and tests fish from approximately 30 waters annually to screen for VHS and other harmful diseases. People can help DEC monitor the health of New York's fish populations by reporting any large number of dead or dying fish (usually 100 or more) to the nearest DEC regional office (ask for the Bureau of Fisheries) or the Rome Fish Disease Control Unit at (315) 337-0910. ✧

Anglers asked to watch for tagged fish; provides DNR with critical information

The Michigan DNR again is encouraging Great Lakes anglers who catch marked and tagged fish to report them. The DNR has used the coded-wire tag program to mass mark various fish species in Michigan since the 1980s. Mass marking provides critical data as fisheries biologists look to determine the value of naturally reproduced fish versus stocked fish, and lakewide movement of fish.



The program involves implanting a small, coded-wire tag, which is invisible to the naked eye, into the snout of a fish. A fish containing a coded-wire tag can be identified because its adipose fin (the small, fleshy fin between the dorsal and tail fins) has been removed. Anglers who catch a tagged fish then can record needed information about the fish, remove and freeze the fish's snout, and drop it off at a designated location. For a statewide list of dropoff locations.

For years the DNR primarily tagged Chinook salmon and lake trout as part of its mass marking effort in Lake Huron. Tagging these fish has helped biologists understand more about lakewide natural reproduction and how many wild fish are available in the Great Lakes. It also has helped determine if the percentage of wild fish varies from year to year and how fish stocking locations contribute to lake and river fisheries. Additionally, it provides insight into fish movement and where fish are stocked compared to where they are caught.

Because of the value of the information the mass marking effort brings, the DNR, in conjunction with the U.S. Fish and Wildlife Service, has continued to coded-wire tag all lake trout, Chinook and Atlantic salmon stocked into lakes Huron and Michigan, as well as a subsample of rainbow trout (steelhead) from the Au Sable River.

"We rely heavily on Michigan's anglers to return tagged fish and are appreciative of their cooperation," said Randy Claramunt, the DNR's Lake Huron Basin coordinator. "Participating in the DNR's mass marking effort allows us to learn more about the state's fish species so we may manage them more effectively in the future."

Because of the vast number of fish marked by this method (millions annually), there are no longer rewards given to anglers for returning tagged fish. Any angler returning a coded-wire tagged fish to the DNR now will receive a letter describing the history of the fish caught (such as stocking location and age).

To learn more about the DNR's mass marking efforts, visit michigan.gov/taggedfish.

Anglers who catch a fish missing its adipose fin (as diagrammed here) are encouraged to report it to the Michigan DNR. ✧

IDNR releases management plan for reintroduction of alligator gar

The Illinois IDNR has published its ***Fish Species Management Plan for Alligator Gar in Illinois***, which details IDNR's effort to reintroduce alligator gar to Illinois waters.

A fish native to Illinois, the gar was determined to be extirpated, or extinct from Illinois waters. The last known catch of the fish, prior to the start of the reintroduction effort, was in the Cache River basin in southern Illinois in 1966.

"The plan details our efforts and activities as we attempt to reestablish and manage alligator gar populations in Illinois," said IDNR Fish Chief Dan Stephenson. "They are a large, unique species that we would like to see thriving in Illinois waters again. There has been a lot of interest in our reintroduction efforts already, and we encourage anyone interested in sport fishing and this project to look at the plan."

The alligator gar is the largest of the gar species and second largest freshwater fish in North America, next to the white sturgeon. The current all-tackle record alligator gar, caught in 1953 in Texas, weighed 302 lbs. and measured 7 ft., 6 in. Researchers determined that prior to extirpation, Illinois produced some individual gar measured at more than eight feet in length, with the heaviest weighing 176 lbs.

IDNR personnel last fall stocked 1,600 alligator gar as part of the reintroduction program at Powerton Lake State Fish and Wildlife Area (Tazewell Co.), Sanganois State Fish and Wildlife Area (Cass Co.), Horseshoe Lake State Park (Madison Co.), and Kaskaskia River State Fish and Wildlife Area (St. Clair Co.). Tiny electronic tracking tags were attached to those fish for biologists to monitor their progress.

"The hope is to create "a sustainable alligator gar population in southern Illinois," with a side benefit to anglers and bow hunters. "We know it's a long-term project," said Stephenson, pointing to the fact that female alligator gar aren't sexually mature until they're about 11 years old. Alligator gars, which have enamel-like ganoid scales, can typically live 50 to 60 years.

The success of the plan will be documented through annual progress reports for each management objective, and the plan will be updated as needed. The ***Fish Species Management Plan for Alligator Gar in Illinois*** is posted online at: Alligator Gar.pdf ✧

DNR encourages bass derby directors to register events online

As temperatures continue to warm, many anglers are looking forward to fishing the open water season. With this in mind, the Michigan DNR reminds anglers coordinating bass fishing tournaments in 2017 to register those tournaments online via the Michigan Fishing Tournament Information System.

The system was initiated in January 2016 after the Michigan Natural Resources Commission issued Fisheries Order 215.15A in 2015, requiring all bass fishing tournaments to be registered online. “This is the second year of Michigan’s requirement to register and report all bass fishing tournaments,” said Tom Goniea, DNR biologist and tournament fishing liaison. “The results we received in 2016 were very encouraging, with just under 2,100 tournaments registered on 271 lakes and rivers in the state.

The data collected via the Michigan Fishing Tournament Information System is used to understand the impact bass tournaments have on the local economy. The information also will inform future management discussions regarding seasons and angling opportunities. In 2018, this registration requirement will be expanded to all fishing tournaments regardless of species.

“If they haven’t already done so, bass fishing tournament directors should get online and register their 2017 tournaments,” Goniea said. “So far in 2017, more than 1,650 tournaments have already been registered and more are coming in every day.” To register, tournament directors must go to the DNR’s Michigan Fishing Tournament Information System, which can be found online at mcgi.state.mi.us/fishingtournaments or michigan.gov/fishing. Instructions on how to access the system, add tournaments and report catch data also are available online. ✧

Biologists to update status of Lake Erie and Niagara River Fisheries

An upcoming meeting to update the public about the status of the Lake Erie and Upper Niagara River Fisheries is scheduled during June, New York State (DEC) announced.

"DEC is committed to sound management of Lake Erie and Upper Niagara River fisheries to maintain high-quality angling opportunities and associated economic benefits," DEC Regional Director Abby Snyder said. "This event provides an excellent opportunity for anglers to hear directly from the biologists who study and manage Great Lakes fisheries."

The free seminar will take place at Woodlawn Beach State Park's Lodge on Tuesday, **June 27** from 6:30 to 9:30 p.m., and will begin with an informal discussion and poster exhibits. This will be followed by a series of presentations on Lake Erie and the Upper Niagara River fisheries topics, including an opportunity for angler input on a variety fisheries management activities such as a newly released steelhead management plan. The meeting will conclude with questions and an open discussion.

Key members of Lake Erie and Niagara River's fisheries management and research community will present on Lake Erie fisheries management and assessment activities for steelhead, walleye, and muskellunge, and discuss research initiatives and habitat improvement projects. This seminar is sponsored by DEC's Lake Erie Fisheries Unit and Region 9 Fisheries offices. Anyone interested is welcome to attend this free event and registration is not required.

The Lake Erie and the upper Niagara River rank among New York State's top fishing destinations, especially for walleye, smallmouth bass and steelhead. The 2007 statewide angler survey estimated more than 800,000 angler days spent on these waters and the estimated value of these fisheries exceeded $22 million to the local New York economy. ✧

Tagged muskies to be stocked in Lake Webster

For the second year in a row, DNR fisheries biologists released 1,500 one-year old muskies into Lake Webster to boost the lake’s sagging muskie population. The stocking happened last month. The fish normally would have been stocked last fall but were held over winter in a pond and fed live minnows at the Fawn River State Hatchery in the hope of increasing their chance for survival.

Studies in other states show that year-old muskies stocked in spring survive at higher rates than fingerling muskies stocked in fall, presumably because they can avoid predators more easily and have more food and cover in fall. Muskies stocked averaged 12.5" long, about 2 inches larger than a batch of 1,325 fingerlings stocked in the 774-acre Kosciusko County lake last fall.

Before stocking, each muskie was tagged with a transponder that enables biologists to track the long-term growth of each fish and compare its survival with muskies stocked in the fall. Muskies have been stocked into Lake Webster for more than 35 years. The population peaked in 2005 and then declined. The cause of the decline is unknown.

Lake Webster is one of 13 Indiana waters stocked with a combined 20,000 muskies each year by the DNR. Six are natural lakes in northern Indiana (Barbee, Bruce, Everett, Skinner, Tippecanoe and Webster). Five are pits in southern Indiana (Bass, Bluegrass, Duck, Loon and Plover). Two reservoirs, Eagle Creek in Indianapolis and Brookville Lake in southeast Indiana, are also stocked.

Two other lakes in Noble County (Loon and Upper Long) are stocked with muskies by local anglers with a permit from the DNR.

Biologists say if the larger, older muskies eventually survive better at Lake Webster, similar stockings could be done at other Indiana waters. ✧

DNR tests for fish virus at Lake Webster

Michigan's decision to cancel its muskie-stocking program this year due to a virus outbreak in adult fish they capture for muskie eggs has prompted Indiana DNR officials to say a similar situation could develop in the Hoosier state. VHSv, which is responsible for a number of dead fish in Lake St. Clair and the Detroit River, could potentially show up in Lake Webster, Indiana's only source for muskie eggs.

"If VHSv does show up in Lake Webster, we wouldn't want to bring infected eggs into our hatchery system where they could contaminate the water and spread to other fish," said Dave Meuninck, manager at the Bodine State Fish Hatchery and DNR fish disease coordinator.

To reduce the risk, the DNR processes dozens of fish collected each spring from Lake Webster for testing during Indiana's muskie egg-taking operation.

No VHSv has been detected at Lake Webster, or anywhere else in Indiana, to date.

"If we find it, we'll have to make major adjustments to our muskie program," said Meuninck. "That could mean trying to establish another brood fish population, getting eggs from out of state sources, or holding virus-free adult muskies in a pond all year. Either way it complicates the situation," he said.

VHSv is contagious and can spread from lake to lake within a watershed. Anglers can also spread it by not adequately cleaning their fishing gear, boats and trailers. The virus can infect dozens of susceptible fish species. Some species, including muskies, are very susceptible while others, such as walleyes, are somewhat resistant.

VHSv kills fish by causing blood vessels to leak. Infected fish often develop bloody patches on the skin. It doesn't affect humans. There is no known way to eliminate the virus once it appears but not all fish succumb to it. Survivors can become carriers however. ✧

DNR's Stream Fish Population Trend Viewer updated

The Michigan DNR announced the annual update to its web application designed to inform the public on local and regional trends in abundance, growth and survival of important fish populations in selected streams across Michigan is complete.

The application was developed and launched by the DNR in 2014 and summarizes data collected from a network of fish population survey sites, with data for some sites going back to 1947.

"The Stream Fish Population Trend Viewer features more than 40 streams that represent a range of conditions in terms of stream size, temperature and Great Lakes access," said DNR biologist Troy Zorn.

Since trends in stream fish populations largely are influenced by regional climate and flow conditions, repeatedly going back to the same locations annually provides a clear understanding of trends in a stream. Users will be able to see what the population trends are in different areas of the state by comparing trends for key sites in each region. For fishery managers, understanding regional trends is critical to determine the best course of management on these streams, as well as interpreting survey data on streams that are surveyed less frequently. Understanding these trends is equally important to anglers, watershed or conservation groups, and the public.

Anglers, fisheries professionals and the public can look up a river and see what the most recent trends are in terms of abundance, growth and annual survival of selected fish species. Information can be viewed in map, graph or table formats. Approximately half of the sites are sampled each year, with new data added to the Trend Viewer each spring.

The Stream Fish Population Trend Viewer app can be found at http://www.mcgi.state.mi.us/fishpop/# ✧

NY Becoming an Outdoors-Woman programs

Here are some upcoming fun and informative programs offered in the Adirondacks by Becoming an Outdoors-Woman (BOW) instructors Sheila and Sonny Young. For more information or to register, contact:

Adirondack Foothills Guide Service, LLC
SHEILA & SONNY YOUNG,
Licensed NYS Outdoor Guides
518-359-8194,
www.adkfoothills.com,
adkfoothillsgs@gmail.com

Become Skilled with Map & Compass
Saturday, **June 24, 2017** - $50*
Saturday, October 21, 2017 - $50*

The Complete Hiker – Fun and Safety in the Wildlands
Saturday, July 15, 2017 - $50*

Adirondack Byway: A Raquette River Paddle
Saturday, August 19, 2017 - $65* (plus option of canoe/kayak rental)

Wilderness First Aid, 9-hour certification program
Sunday, September 17, 2017 - $120*

High Peak Jaunt: Views from the Summit
Friday, September 29, 2017 - $50*

Registration fee does not include meals or lodging

Also, the LL Bean store in Colonie (Albany), in conjunction with the Becoming an Outdoors-Woman (BOW) program, is offering a number of Women's-Only stand up paddleboard, fly fishing and kayaking courses this summer. These classes all take place in the Albany area. Click here to see all the details: LLBean+2017.pdf. To register go to Register-albany and click on Event Calendar.

Kelly Stang, NYSDEC, 518-402-8862 - Kelly.stang@dec.ny.gov For more info: DEC Becoming an outdoor Woman ✧

Fishery Commission redesigns website

The Great Lakes Fishery Commission has launched a newly revamped website at www.glfc.org and www.sealamprey.org. The new website has been constructed to provide visitors with improved navigation and functionality, allowing visitors to easily access information about the Great Lakes fishery, sea lamprey and the control program, cutting-edge research, and cooperative fishery management in the basin.

The new website also boasts more multimedia content throughout to enhance users' understanding of particular issues and improve the learning experience.

Exciting new features include the Pulse on Science page and the Program Spotlight. The Pulse on Science page will highlight groundbreaking research on a routine basis—the first edition allows visitors to learn about (and listen to!) lake trout reproduction. The Program Spotlight will be featured on the home page to alert visitors to noteworthy happenings at the Commission.

The website will continue to serve as a central resource for publications, photos, and videos related to the Great Lakes fishery. The photo and video databases contain hundreds of files, each including a title, description, and credit information. Publications, photos, and videos are available for free download, most in high definition format.

The Commission's website is fully searchable and the new site includes an upgraded publication and media search function with multiple parameters (year, author, source, type, and keyword) to improve visitors' ability to find and retrieve information as quickly and easily as possible. We encourage you to explore the website and join the Commission's mailing list! ✧

High water in ditches causes concern about fish

Recent heavy rains that flooded northeast Indiana ditches could create problems for anglers. DNR fisheries biologists say flooding can create better conditions for non-native common carp to move into lakes, rivers and wetlands.

Introduced in Indiana in the 1880s, common carp have spread throughout the state and caused widespread damage to water quality, fish habitat and fishing. Carp roil the muck and silt on lakebeds and riverbeds, muddy the water, uproot aquatic plants and destroy nests of other fish.

In the 1980s, the DNR managed a project to eradicate carp from Sylvan Lake and many of its headwater lakes and streams. Carp became so abundant at the lake that few anglers fished there, and residents were unhappy with the muddy water.

After the renovation, water quality improved, fishing boomed, and lakefront property values increased.

Carp also have caused problems at Bixler Lake in Kendallville. Located upstream from Sylvan, it was renovated in the 1970s and developed into an outstanding fishery.

DNR officials installed a barrier in the outlet to block carp from returning to the lake from Henderson Ditch, but DNR later removed it due to maintenance issues. Carp numbers increased after removal, but not enough to warrant another renovation.

In general, biologists do not like fish barriers because they also block the movement of popular species. Pearson suspects Bixler Lake gets an influx of walleyes during high water from stockings downstream at Sylvan Lake. He caught four walleyes at Bixler during a fish survey there last summer.

But local conditions and can override this concern. "Carp are the biggest problem at Bixler," Pearson said. "If a barrier is installed, walleyes could always be stocked later directly into the lake." ✧

DNR seeks to understand more about muskie through online public survey

The Michigan DNR is investigating the muskie fisheries of the state again by distributing an online angler survey.

The 2017 Survey will gather information about muskellunge angler demographics and catch data. Muskie have been surveyed since 2014, but only online since 2016. Traditional methods, including creel and postcards, have not been as successful as collecting information through electronic means. To find the survey: michigan.gov/muskie.

The information collected via the 2017 Muskie Angler Survey plays a key role in proper fisheries management. Anglers may fill out one survey per person per trip and they may complete a survey for each angling trip they make. Anglers must obtain a muskie harvest tag when deciding to harvest a fish. These tags are obtained when purchasing a Michigan fishing license or any date thereafter, as long as the angler has a fishing license and a valid driver's license. ✧

Minn. Governor signs bill protecting traditional ammo

Minnesota Gov. Mark Dayton has signed legislation that will prevent the state's DNR from banning the use of lead shot for hunting in the farmland zone. NSSF has worked for the past two years to secure legislative language that would curtail the state DNR's lead shot ban proposal ✧

Fall Turkey Applications

Resident Illinois hunters can apply online for permits for the 2017 Illinois Fall Shotgun Turkey season (Oct. 21-29). The first lottery application deadline is **July 3**. For more turkey hunting info: Illinois Fall Turkey Hunting. ✧

How much do lake trout and Chinook salmon really eat?

Chinook salmon have been the most important predator in Lake Michigan for decades. With baitfish on the decline, some anglers believe that lake trout are now eating more than salmon.

The food supply in Lake Michigan is not what it used to be. Invasive species like quagga mussels, nutrient reductions in open waters, and high numbers of predatory fish to feed all play a role in "squeezing" baitfish like alewife. The result can be an imbalance of predators and prey. In other words: too many mouths to feed for the amount of food available in open water.

Of course, this is a simplistic way of looking at things. Different species of fish are not the same in terms of the energy they consume and use. They grow at different rates, prefer different water temperatures, and utilize food more or less efficiently.

These factors become important when considering the total number (or biomass) of baitfish being consumed by predatory salmon and trout in Lake Michigan. Many anglers are particularly concerned about the impact of native lake trout versus introduced Chinook salmon. Both species are currently stocked in Lake Michigan, but both species also reproduce naturally.

Chinook salmon are prized gamefish with a very high growth rate and a short lifespan—they typically spawn and die at age 2.5 or 3.5 with a very few surviving to age 4. Lake trout are also a good gamefish, but they do not draw anglers to the lake in the same way that the spectacular fighting ability of the Chinook salmon does. Mid-sized trout are excellent table fare, but large, old lake trout tend to accumulate more contaminants than salmon. Lake trout can also live much longer than salmon (over 20 years), but they grow much more slowly.

Since there is a limited number of baitfish in the lake, there is a limited amount of energy (calories) available to trout and salmon. How does this all play out in terms of the amount and types of prey fish being eaten by lake trout and Chinook salmon? To find out, I relayed some questions on the topic to two people who have been studying Lake Michigan fish for a combined total of over sixty years: Chuck Madenjian (USGS) and Jory Jonas (MDNR).

How would a lake trout and Chinook salmon compare in terms of the energy they consume each year?

C.M.: For the period of time from age 1 through age 12, annual food consumption by a lake trout in Lake Michigan averages 13 lbs. This estimate is based on the assumption that the annual food consumption for age-10 and age-11 lake trout is similar to that for lake trout of ages 7-9. For the period of time from age 0 through age 3.5, annual food consumption by a Chinook salmon in Lake Michigan averages 42.5 lbs. Thus, Chinook salmon in Lake Michigan are feeding at a rate more than three times higher than that of lake trout.

J.J.: I agree with Chuck's summary above, but would also add that Chinook salmon grow faster, inhabit warmer waters than lake trout on average, and are much more active. All of these factors lead to increased demand for energy (food) relative to lake trout.

So, on an annual basis a Chinook salmon eats more than a lake trout of the same size. We know that lake trout live longer than Chinook salmon, though. How much does an average lake trout eat over its entire lifetime as opposed to an average Chinook salmon?

C.M.: The answer to this question partly depends on the definition of an entire lifetime for a lake trout. Based on the bioenergetics modeling by Don Stewart and others, an average lake trout consumes 143.3 lbs. of food between the time of stocking as a yearling into Lake Michigan and age 12. A Chinook salmon consumes 147.7 lbs. of food between the time of stocking as an age-0 fingerling into Lake Michigan and age 3.5, when a Chinook salmon is ready to spawn.

J.J.: Chuck did a nice job of summarizing lifetime consumption of the two species above. When asking a question like this, it is important to consider why it is being asked. Total lifetime consumption of prey does not equate to information valuable in determining sustainability of the system. New year-classes of fish are always being produced and individual species have different life-spans and life-histories. Several generations of alewife and Chinook salmon will have cycled during the life-span of a lake trout. For example, during the lifespan of a lake trout age 12 which consumed 143.3 lbs. of prey there will have been four generations of Chinook salmon each consuming 147.7 lbs. of prey (590.8 total lbs.). Because of fluctuations in births and deaths and the lack of life-span synchrony among species, we typically summarize population levels of predators and prey on an annual basis in order to monitor for changes over time.

Fish are cold-blooded animals, so water temperature must affect how often they eat and how quickly they digest food. Do temperature preferences play a big role when comparing bioenergetics of lake trout and Chinook salmon?

C.M.: Temperature does play a role when comparing bioenergetics of lake trout and Chinook salmon. However, the main driver of the difference in consumption rates between lake trout and Chinook salmon is the difference in growth rates between the two species. In other words, the main reason for the much higher rate of food consumption by Chinook salmon compared with that by lake trout is that Chinook salmon grow substantially faster than lake trout. Average summer temperatures experienced by lake trout in Lake Michigan range from 46.4 to 50°F, whereas average summer temperature experienced by Chinook salmon in Lake Michigan ranges between 53.6 and 55.4°F. Metabolic costs typically

increase with increasing temperature, and so Chinook salmon would be expected to have higher metabolic rates than lake trout. Nonetheless, the primary reason for the higher food consumption rate for Chinook salmon compared with that for lake trout is the higher growth rate by Chinook salmon compared with that for lake trout.

J.J.: Chinook salmon are also more active than lake trout, travelling large distances and generally moving around more. Combine higher activity levels with the factors mentioned by Chuck above, including higher temperature occupancy, and you have a higher demand for calories to support Chinook salmon.

Fish need energy to maintain basic body functions, chase down prey, and reproduce. Additional energy can be used for growth. How do lake trout and Chinook salmon compare in terms of their ability to use food energy for growth?

C.M.: Gross growth efficiency (GGE) is equal to growth (increase in weight) divided by the amount of food consumed to attain that growth. Thus, GGE is a measure of the efficiency with which a fish converts food consumption into its growth. According to the bioenergetics modeling by Don Stewart and others, the GGE for a 3.5-year-old Chinook salmon is 13.3%. That is, the 3.5-year-old Chinook salmon converted its food into its growth with a 13.3% efficiency. The GGE for a 12-year-old lake trout is estimated to be 8.0%. Thus, a Chinook salmon is considerably more efficient at converting food into growth than a lake trout in Lake Michigan.

Large, old lake trout are a common catch in central and southern Lake Michigan. These fish might weigh over 20 pounds and be 20 years old or older. Computer models that calculate how many baitfish are being eaten in Lake Michigan treat a 20-year-old lake trout the same as a six-year-old. Does a 20-year-old lake trout really eat only as much as a six-year-old?

C.M.: To answer this question, a growth trajectory for lake trout from ages 1 through 20 would be needed. Stewart et al. (1983) estimated mean weight at age for ages 1 through 10 only, so information on mean weight at age for ages 11 through 20 would be needed to answer this question. According to Stewart et al. (1983), annual consumption of food by an average lake trout in Lake Michigan remained relatively constant at a value of about 17.6 lbs. between the ages of 6 and 10. In other words, annual feeding rate of lake trout did not increase as lake trout age increased from 6 to 10. Mean weight at age 6 was 6.6 lbs., and mean weight at age 10 was 10.6 lbs. Thus, even though the weight of an average lake trout increased by 4 lbs. between ages 6 and 10, annual rate of food consumption by lake trout did not increase between ages 6 and 10 (Stewart et al. 1983). Note that annual weight gain by lake trout decreased between ages 6 and 10. If the annual weight gain (annual growth) continued to decrease between ages 10 and 20, a large increase in annual consumption over ages 10-20 would not be expected.

J.J.: It is true that larger fish on average require more energy than smaller fish, all else being equal. As lake trout age, the annual growth rate is much less, reducing energy demands, as mentioned by Chuck above. In more recent catch-at-age modelling efforts in eastern Lake Michigan, the mean weight of a lake trout at age 6 was 5.7 lbs., at age 10 was 9.7 lbs. (a change of 4 lbs. in 4 years) and was 11.2 lbs. at age 15 (an increase of 1.5 lbs in 5 years). By age 7 most lake trout are spawning so fish age 7-15 should be experiencing similar energy demands for spawning. Despite this, growth rate (body weight added per year) continues to decline as the fish ages.

Studies on Great Lakes salmon and trout bioenergetics were conducted back in the 1980s. Do they still hold true today with so many invasive species in the food web and changes to the strains of lake trout being stocked?

C.M.: Bioenergetics models for Chinook salmon and lake trout are sufficiently flexible such that they can accommodate changes in the Lake Michigan food web and changes in lake trout strains being stocked. Inputs to the bioenergetics models include growth of the fish (predator), temperature regime experienced by the fish, diet schedule for the fish, energy density of the prey, and energy density of the fish (predator). All of these inputs can be adjusted to more accurately reflect changes in the food web or changes in lake trout strains stocked. Bioenergetics model estimates of food consumption by Chinook salmon and lake trout are especially sensitive to estimates of growth by Chinook salmon and lake trout, so changes in growth over time would need to be taken into account when estimating food consumption by these fishes over decades of time. In the laboratory, the lake trout bioenergetics model performed equally well for both Marquette and Seneca Lake strains of lake trout, so lake trout bioenergetics was very similar among strains of lake trout. The Seneca Lake strain does inhabit slightly cooler water than the Great Lakes strains of lake trout, but this slight difference in temperatures between strains had only a small effect on food consumption. Laboratory performances of both the Chinook salmon bioenergetics and the lake trout bioenergetics model are reasonably good. On average, the model estimates of food consumption are within 5% of observed consumption.

Now we know how much individual trout and salmon eat, but how many baitfish are eaten annually by all predators in Lake Michigan? How did estimated lake trout consumption compare to estimated Chinook salmon consumption on a lakewide basis in 2016?

J.J.: In 2016, lake trout consumed 13.7 kt. of prey and Chinook salmon consumed 38.4 kt. Even though numbers of Chinook salmon in 2016 were at all time low levels lake-wide, they consumed nearly 3 times as much forage as lake trout. In 2016, the biomass of Chinook salmon in Lake Michigan was estimated to be

5.0 kt. and lake trout 5.9 kt. Just four years' prior, in 2013, Chinook salmon biomass was substantially higher at 15.7 kt. and lake trout were 7.0 kt.

Until now we have only been discussing how many baitfish are being eaten, but we know that Chinook salmon depend almost entirely on alewife while lake trout can eat a variety of prey including round gobies. Have lake trout moved away from eating alewife in Lake Michigan?

J.J.: Lake trout tend to be opportunistic feeders and will take advantage of a variety of prey items, whereas Chinook salmon are more specialized preferring almost exclusively alewife as prey. Since about 2003, lake trout have been taking advantage of a relatively new prey source in Lake Michigan, the round goby. Because of increased public interest in understanding the role of lake trout as predators in Lake Michigan, a variety of new initiatives have begun to better understand this more complex predator. For the last few years, diet collections have been occurring outside of the standard spring assessments which conclude in mid-June, and on broader spatial scales. Preliminary comparisons indicate that there is a seasonal component to lake trout feeding whereby they consume larger numbers of round goby in the spring and increased dependence on alewife as the year progresses. Smelt and bloater have been abundant in the diets of lake trout in the past, but for the recent 5 years over 75% of lake trout diets have been comprised of alewife and round goby. We continue to explore new and more robust methods for keeping up with the changing trends in lake trout consumption. Some of these include evaluation of fatty acid or isotopic signatures which can represent a longer period of lake trout consumption (in the case of isotopes up to one-year). We are seeking funding to conduct broader data collection efforts to better understand changing patterns throughout the lake and in different seasons.

So, we don't yet know exactly what percentage of Lake Michigan lake trout diet is alewife, but what was the realistic range of possible alewife consumption by lake trout in 2016?

J.J.: It's still early, but most of us are comfortable with an average alewife diet proportion of around 50% for lake trout, which we currently use in consumption models. Preliminary investigations indicate that in the spring (April to mid-June) alewife comprise between 7% to 20% of the diet of lake trout, and from mid-June to August alewife can represent from 50% to 80% of the diet. We continue to pursue improvements to describe feeding patterns of this more complex predator in the Lake Michigan basin.

Thanks Jory and Chuck for providing detailed answers to these questions.

In summary, when anglers point out that lake trout need more food to reach a given weight they are correct. A lake trout needs about 125 pounds of food to reach a weight of ten pounds while a Chinook salmon needs around 75 pounds of food (based on differences in gross growth efficiency). However, the Chinook salmon consumes this amount of food over a very short period of time when compared to a lake trout.

In fact, a typical Chinook salmon consumes roughly three times as much food in a given year as a typical lake trout does. This is critically important because alewife (and other prey fish) reproduce and grow each year. The absolute amount of food consumed by a salmon or trout in its lifetime is therefore less important to maintaining a good predator-prey balance than its annual demand for prey.

Chinook salmon do burn through alewife much more quickly than lake trout, but that does not mean that lake trout consumption is completely insignificant. Science is always improving, and the upcoming study on predator diets is one example of an effort to better understand what lake trout are eating at different times and in different parts of Lake Michigan.

Despite the never-ending quest for better information, fishery managers must make decisions in real time based on the best available scientific information. We know that an individual Chinook salmon consumes more alewife than a lake trout does, but we also know that Chinook salmon are no longer the only important species to consider when looking at predator-prey balance in Lake Michigan. In the future, scientists will be taking a harder look at diet and consumption of other predators like lake trout, coho salmon, and steelhead. ✧

Other Breaking News Items:

(Click on title or URL to read full article)

$4.6 million earmarked for Outer Harbor project
The Outer Harbor in Buffalo New York will be getting some improvements. Congressman Brian Higgins announced that $4.6 million in federal funding has been approved for dredging and repairs to the breakwall.

Indiana court takes up Lake Michigan property rights case
The Indiana Supreme Court is taking up a long-running dispute that pits public access to Lake Michigan against the rights of lakeside property owners.

A Lake Michigan fish story: Return of the king
In the harbor towns along Lake Michigan, there haven't been a lot of good fish stories to tell the last couple years due to poor salmon fishing. However, this year salmon fishing strong according to the Michigan Department of Natural Resources.

New York acquires 6,000 acres around Salmon River
The State of New York is acquiring 6,000 acres of land along and around the Salmon River, which is a major economic and tourism asset for Oswego County, New York.

Asian carp would cluster along Lake Michigan shorelines, says study
If bighead and silver Asian carp reach Lake Michigan, a new U.S. Geological Survey study suggests the unwelcome invaders would congregate in protected waters like Grand Traverse Bay, Lake Macatawa and Green Bay.

Lake Erie plastic keeps volunteers busy
Garbage patches' the size of Texas have been discovered in the ocean, and now researchers have discovered our Great Lakes are filling up with plastic faster than previously thought

U Mich awarded $20m for Federally funded Great-lakes Research Institute
The U. of Michigan has been awarded a five-year, $20 million grant from the federal government to form a research institute focused on sustainable management of the Great Lakes. The Cooperative Institute for Great Lakes Research, which will be hosted

Lamprey control operations underway in Great Lakes
The Sea Lamprey Control Centre in Sault Ste. Marie, Ontario, has started this year's application of lampricide, with most Lake Superior and Lake Huron tributaries to be treated in May, June, and July.

Chicago boaters use offshore buoy for real-time Lake Michigan conditions
Chicago's boaters can make a better decision whether to hit the water each day thanks to a buoy that was launched early Tuesday morning in Lake Michigan four miles offshore.

Federal scientists prepare for Asian carp invasion in Hamilton area
Asian carp are big, voracious, and destructive. Government officials across the Great Lakes are doing what they can to stop the fish from gaining a foothold in the lakes.

$1.87 million in upgrades planned for Fort Sheridan preserve
Significant public access improvements scheduled to begin soon at the Fort Sheridan Forest Preserve bordering Lake Michigan in Illinois will nearly complete years of big-picture planning for the former Army base

End