

The West Michigan

Angler's News

A periodical publication serving Michigan Sea Grant's Southwest District

Fall 2010

Volume 4, No. 2



What Will Happen if Asian Carp Invade?

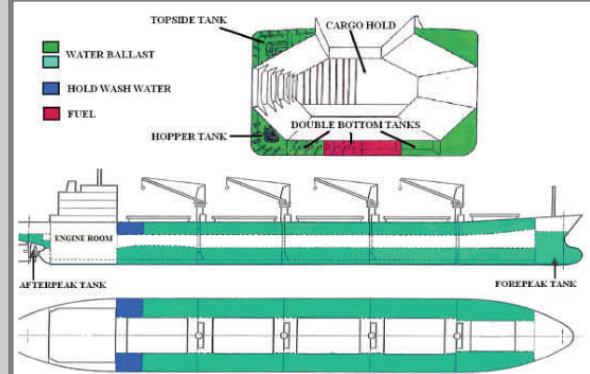
The first step in fighting any invasive species is prevention, but what happens when prevention fails? Time and time again we have seen this scenario play out in the Great Lakes. A new menace shows up in a limited number of locations and decisions are made. Should we react with an all-out assault before it spreads out and establishes populations around the Great Lakes? If so, are we sure that collateral damage to the ecosystem is justified by the possibility of successful eradication? Sometimes we know that there is no realistic chance of success once an invader arrives. Some of the worst, including round goby, never gave us an outside chance at success. Others, like the Eurasian ruffe, provoked intense debate over how to best respond.

In the very near future we may face an even more divisive debate over how to react if (when?) bighead and silver carp are documented in Michigan waters. This fall, eDNA sampling began in Michigan waters that included rivers considered suitable for carp spawning. What would happen if some samples were to test positive? There would be immense political pressure to react quickly, so it is important to consider the appropriate course of action before being forced into crisis mode.

The Michigan DNRE Proposed Plan for the Prevention, Detection, Assessment, and Management of Asian Carps in Michigan Waters was released in October 2010. It lists six goals supported by 22 strategic actions. Goal number one is prevention, which includes working to ensure that Asian carp are not transported accidentally with baitfish. Other goals include sharing information through development of educational materials, increased surveillance by scientists and anglers, and additional monitoring if Asian carp are detected in a given water body. The final goal is to eradicate, contain, or manage populations if they become established in Michigan. Plans specific to each river and lake are not given, but a variety of options are discussed. These include use of fish poisons if carp establish self-sustaining populations, among other possibilities such as increasing native predators. The entire plan can be found at the URL below.

http://www.michigan.gov/documents/dnr/AsianCarpManagementPlan_334348_7.pdf

GREAT LAKES LESSONS



Data on invasive species in ballast tanks are included among other topics.

Connect your Classroom with Real World Science!

New to the Michigan Sea Grant education lineup, teaching with Great Lakes Data offers educators a smart selection of Great Lakes data sets, teaching methods, tools, and lessons and activities that are easily incorporated into any curriculum.

Lessons include Great Lakes dead zones, seiches, and steelhead behavior in Lake Michigan. All are aligned with content expectations and national standards.

www.greatlakeslessons.com

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Great Lakes Science Shorts

Why Don't Muskegon River Walleye Reproduce Successfully?

The Muskegon River supports an impressive run of adult walleye each spring, but walleye reproduction is not successful despite the abundance of spawning habitat from Croton Dam to Newaygo. Researchers used two types of devices for incubating walleye eggs in the Muskegon River to determine the effects of egg predation. Only 2% of eggs exposed to predation survived, which is much lower than the 23% average egg survival in western Lake Erie. Muskegon River walleye eggs that were protected from predation had much higher survival than unprotected eggs, ranging from 24-50%. Low spring water temperature due to slow warming of water above Croton Dam was also important. Fish eggs develop more slowly at cold temperatures, and are therefore exposed to predation and the effects of abrasion from debris in the river's current for a longer time than eggs incubated at warmer temperatures. Although the study did not determine which species preyed most heavily upon walleye eggs, many potential egg predators live in the Muskegon. These include Johnny darter, rainbow trout, white sucker, and crayfish. Devices that protected eggs from predation also protected them from abrasion, so it is possible that abrasion of exposed eggs was a more important source of mortality than predation.

Ivan, L.N., E.S. Rutherford, C. Riseng, J.A. Tyler. 2010. Density, production, and survival of walleye (Sander vitreus) eggs in the Muskegon River, Michigan. Journal of Great Lakes Research 36:328-337.

Chinook Salmon Migration Can Occur at Surprisingly Warm Temperatures

Anyone who fished salmon in Michigan last season was faced with abnormally warm water both in the big lake and in rivers that attract spawning fish in late summer. Optimal temperature for Chinook salmon migration is in the 57-61°F range. Surface temperatures in much of Lake Michigan stayed above 60°F well into October. River temperature was also high, with the Muskegon River below Croton Dam in the mid- to high 60s throughout September.

A recent study in the Klamath River basin of Oregon and California investigated the upper limits of temperature for migrating Chinook salmon. The author found that one salmon continued to migrate upstream at 78°F, a temperature previously thought to be lethal. Long term exposure to such high temperatures would be lethal for migrating salmon, and the daily average temperature used by each salmon early in the run ranged from 71-75°F. Average weekly temperatures were lower (70-73°F), presumably because fish moved quickly through the warmest downstream reaches of the river. The author noted that warm temperatures may lead to decreased spawning success because of the additional stress on salmon, but this was beyond the scope of the study.

Other factors commonly thought to be important in triggering runs include river discharge and precipitation, but these factors had no effect on the Klamath run. Instead, salmon keyed in on narrow windows of relatively low river temperature as predicted by cloud cover. Decreased light intensity was the only weather-related factor that could be used to time the beginning of the run.

Strange, J.S. 2010. Upper thermal limit to upstream migration of adult Chinook salmon: Evidence from the Klamath River Basin. Transactions of the American Fisheries Society 139:1091-1108.

Spiny Water Flea is More than Just a Nuisance

The most noticeable downside to the exotic spiny water flea is the tendency for fleas to collect on fishing line and clog guides, sometimes leading to broken lines and lost fish. Another downside to spiny water fleas is that they eat smaller zooplankton, playing the same role in the lake that forage fish do. To make matters worse, the spiny water flea is a sloppy eater. A new study notes that 38% of zooplankton caught by a spiny water flea is wasted because the flea shreds its prey while eating. Coupled with the high energetic demand of water fleas, this leads to an astoundingly high consumption rate. The study found that each spiny water flea kills its weight in smaller zooplankton every day at 64°F. Consumption rates increase or decrease with temperature, reaching as high as 135% per day at 75°F.

Yurista, P.M., H.A. Vanderploeg, J.R. Liebig, and J.F. Cavalletto. 2010. Lake Michigan Bythotrephes prey consumption estimates for 1994-2003 using temperature and size corrected bioenergetic model. Journal of Great Lakes Research 36:74-82.



The exotic spiny water flea is a significant predator on native zooplankton.

Species Profile

Chinook Salmon *Oncorhynchus tshawytscha*



The Chinook salmon is also known as the king salmon for a good reason. It is the largest Pacific salmon and has long been esteemed as a premier food and sport fish.

Etymology:

Oncorhynchus is derived from Greek words meaning “hooked snout”; the species name *tshawytscha* is a common name for the fish in Kamchatka. The word Chinook was first the name of a Native American village north of the Columbia River, and was later applied to a group of tribes and languages spoken in that area. Later, the name Chinook was applied to the characteristic warm, moist wind that blows from the Pacific Ocean. The name Chinook was first applied to salmon in 1851. Most common names for fish are not capitalized. However, when a common name includes a proper noun, the proper noun is still capitalized (e.g., Atlantic salmon).

Life History:

Chinook salmon spawn in Great Lakes tributaries during fall months, and their eggs hatch after spending the winter buried in gravel nests called redds. Young Chinooks develop quickly through the parr stage and become smolts before their first summer. Smolts develop the characteristic silver color of lake-dwelling salmon and move out of their natal streams. The ability of young Chinooks to reach the smolt stage quickly is a major key to their success in Great Lakes environments. In contrast, coho salmon and steelhead must spend one summer in a river environment as parr. River temperatures in many Great Lakes tributaries are too warm for good survival during summer.

The rapid smolting of Chinooks also makes them less expensive to raise in a hatchery setting. Hatchery-reared Great Lakes Chinooks develop from egg to smolt in 6 months, while coho salmon require 18 months. Hatchery production is still important, but the percentage of naturally spawned Chinooks in Lake Michigan rose from 23% in 1979 to 54% for the 2006 year-class. Sampling in 2009 showed a drop to 43% naturally-spawned fish in the 2008 year-class.

After smolting, Chinook salmon spend from 1½ to 4½ years in Lake Michigan. Age 5 fish were a small component (0-3%) of returning spawners in the late 1980s, and when mortality increased due to bacterial kidney disease (BKD) in the early 1990s the Age 5 fish virtually disappeared from runs. A similar trend occurred in returning Age 4 fish, which accounted for 31-71% of runs in the late 1980s and only 3-7% from 1993-1995.

After returning to a gravelly section of river, a mature female salmon excavates a redd by turning onto her side and thrashing her tail on the substrate. Female salmon are easy to see because they usually remain on their shallow redds and develop a white coloration on their tail as the skin is worn away by abrasion on the gravel. Anglers often target resident trout and migratory steelhead that feed on salmon eggs behind active redds.

Male salmon fight for spawning rights and the largest male typically claims a spot near a receptive female between battles with smaller males. Ironically, the smallest males are often successful at sneaking into spawning position without drawing the wrath of the dominant male. For this reason, early-maturing males (jacks) are found in rivers along with older mature fish.

All salmon that enter a river to spawn go through radical physiological changes before ultimately dying. Jacks have been known to live up to five months after spawning, but even the jacks will not survive to feed again in Lake Michigan. The reason for this iteroparity is that Chinook salmon in their native habitat typically enter nutrient-poor streams to spawn. The death and decomposition of adult salmon is necessary to stimulate the growth of stream insects that will feed the next generation of salmon. Fisheries biologists have even begun the practice of stocking salmon carcasses to aid attempts at restoring runs in some western rivers.

Diet:

In the Great Lakes, Chinook salmon are diet specialists that are less adaptable than other predatory species like lake trout and steelhead. This makes them ideal for controlling populations of their preferred prey, the alewife. Chinook and coho salmon were stocked to create a world-class sport fishery in Lake Michigan at a time when the exotic alewife had overrun the lakes and native lake trout populations were virtually wiped out by sea lamprey. Fisheries researchers now annually assess the balance between salmon and alewife to guide managers in their attempts to maintain a productive and relatively stable fishery.

Lake Huron provides an example of what might happen if Chinook salmon become too abundant for the prey base available. In Lake Huron, alewife virtually disappeared in 2004. Chinook salmon populations crashed in response. Their diet has shifted to include rainbow smelt and, surprisingly, the exotic spiny water flea.

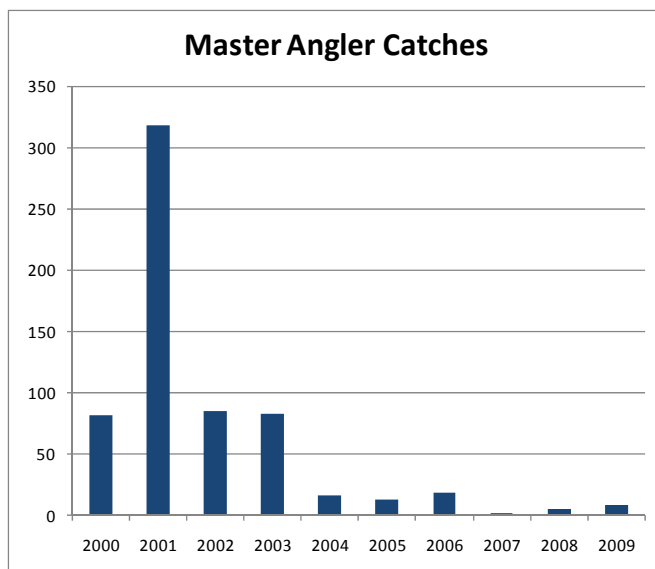
Size & Master Angler Entries:

The largest Chinook salmon on record was an Alaskan fish that weighed 126 pounds and measured 58 inches long. Great Lakes anglers drool at the thought of such a fish, but the Michigan State Record stands at 46 pounds, 1 ounce.

Different strains of Chinook salmon vary in their life history. Chinooks in Alaska's Kenai River often reach 50 pounds, and top out close to 100 pounds. A study of factors explaining variation in adult Chinook salmon size found that latitude and distance of migration did not explain differences among strains. Instead, local characteristics of the freshwater environment played an important role in determining the life history and average size of salmon.

In the Kenai River, young Chinooks spend one to two years in the stream before smolting. Year-old smolts entered the ocean averaging a foot in length. Most Great Lakes Chinooks are 3-4 inches long when they smolt. The head start in growth gives "stream-type" strains of fish an advantage in size for their first one to two years at sea, but this size advantage does not hold through until fish reach their maximum age. Another strain of Chinooks from the Wannock River also reaches very large sizes, but is considered an "ocean-type" fish that smolts during its first year of life. This shows that long river residence of parr isn't necessary to achieve large adult size.

One characteristic that Kenai River salmon do share with other large-bodied strains of salmon is the high percentage of fish returning after 4 or 5 years in the ocean. In the Kenai, 67% of male and 88% of female salmon return at age 4 or 5. Two strains of Chinook salmon were initially used for Great Lakes stockings in the late 1960s. One was the Tule strain from the Columbia



The number of Chinook salmon entered in Michigan's Master Angler Award program has declined in recent years while catch rates have been high. Managers are hoping to see a decrease in salmon numbers along with an increase in size over the next few years.

River basin, and the other was from Green River Hatchery in Washington. Of 267 Green River Hatchery salmon included in a recent study, none had spent 5 years in the ocean before returning to spawn. Furthermore, only females returned after 4 years while males spent three years or less in the ocean.

Food availability and growth characteristics of a strain can also be important in determining ultimate size. Kenai River females returning after 4 years were 20% longer than Green River Hatchery females that had spent an equal time at sea.

Great Lakes Chinook salmon have been getting smaller in recent years. Quagga mussels have led to unprecedented declines in the productivity of open waters, leading to lower energy density of alewife. Chinook salmon must now consume 22% more Lake Michigan alewife to reach 17 pounds in four years. The number of large alewife is also low relative to historic averages, which may be related to high salmon numbers as much as lower food web changes. Annual sport harvest of Chinook salmon from Lake Michigan averaged 8.2 million pounds from 2004-2007. That is higher than any harvest in recent history; 1987 was the last year in which over 8 million pounds of Chinook was harvested.

All of this is reflected in MDNRE's Master Angler Award program. The minimum entry size for kept Chinook salmon is 27 pounds, and the minimum length for catch-and-release entries is 41 inches. Since 2004, fewer than 20 fish have been entered annually. Although entries are still being accepted for 2010, only one fish had been entered online for the 2010 season as of November 11.



Regional Fishery Workshop

Saturday, January 8, 2011

Ramada Inn & Convention Center

4079 West U.S. 10

Ludington, MI 49431

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|-------|---|-------|--|
| 8:30 | Coffee and Registration | 11:45 | Environmental and Social Dimensions of Offshore Wind Development
Erik Nordman – <i>Asst. Professor, GVSU</i>
Jon VanderMolen – <i>Technical Call-In, GVSU Annis Water Resources Institute</i> |
| 9:00 | Welcome
Dan O'Keefe – <i>SW District Educator, MI Sea Grant</i> | 12:00 | Lunch and LACA Tackle Raffle |
| 9:05 | Chinook Salmon and Forage Base Update
Dave Clapp – <i>Charlevoix Res. Station Manager, MDNRE</i> | 1:00 | How Should We React if Asian Carp are Found in Michigan Waters?
Turning Point Feedback and Facilitated Discussion
Dan O'Keefe – <i>SW District Educator, MI Sea Grant</i> |
| 9:45 | Fisheries Management Update
Jim Dexter – <i>Lake Michigan Basin Coordinator, MDNRE</i> | 1:30 | MDNRE Fisheries Q & A
Dave Clapp – <i>Charlevoix Res. Station Manager, MDNRE</i>
Jim Dexter – <i>Lake Michigan Basin Coordinator, MDNRE</i> |
| 10:05 | Great Lakes Water Levels
Mark Breederland – <i>NW District Educator, MI Sea Grant</i> | 2:00 | Break |
| 10:20 | Break | 2:15 | Charter & Tournament Fishing Economic Impacts
Dan O'Keefe – <i>SW District Educator, MI Sea Grant</i> |
| 10:40 | Spatial Distribution of Salmon and 3-D Thermal Mapping of Lake Michigan
Ed Rutherford – <i>Res. Fisheries Biologist, NOAA GLERL</i> | 2:30 | MCBA Random Drug and Alcohol Program
Capt. Dean Hobbs – <i>Lake Michigan Car Ferry</i>
ENS Selena Warnke – <i>Drug & Alcohol Program Inspector, USCG 9th District</i> |
| 11:05 | What's Next? Invaders that Don't Get All the Press
Ed Rutherford – <i>Res. Fisheries Biologist, NOAA GLERL</i> | 3:30 | Adjourn |
| 11:20 | Offshore Wind Legislation and GLOW Council Report
Capt. Denny Grinold – <i>MCBA State Affairs Officer & GLOW Council Member</i> | | |

Ludington Area Charter Boat Association Meeting to Follow

Registration Form

Regional Fishery Workshop Ludington, MI—January 8, 2011

(Registration Due by December 31, 2010)

Name(s): _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ E-mail: _____

Number of persons attending: _____ Amount Enclosed \$ _____

Registration Fee: \$20.00 (Includes Lunch)

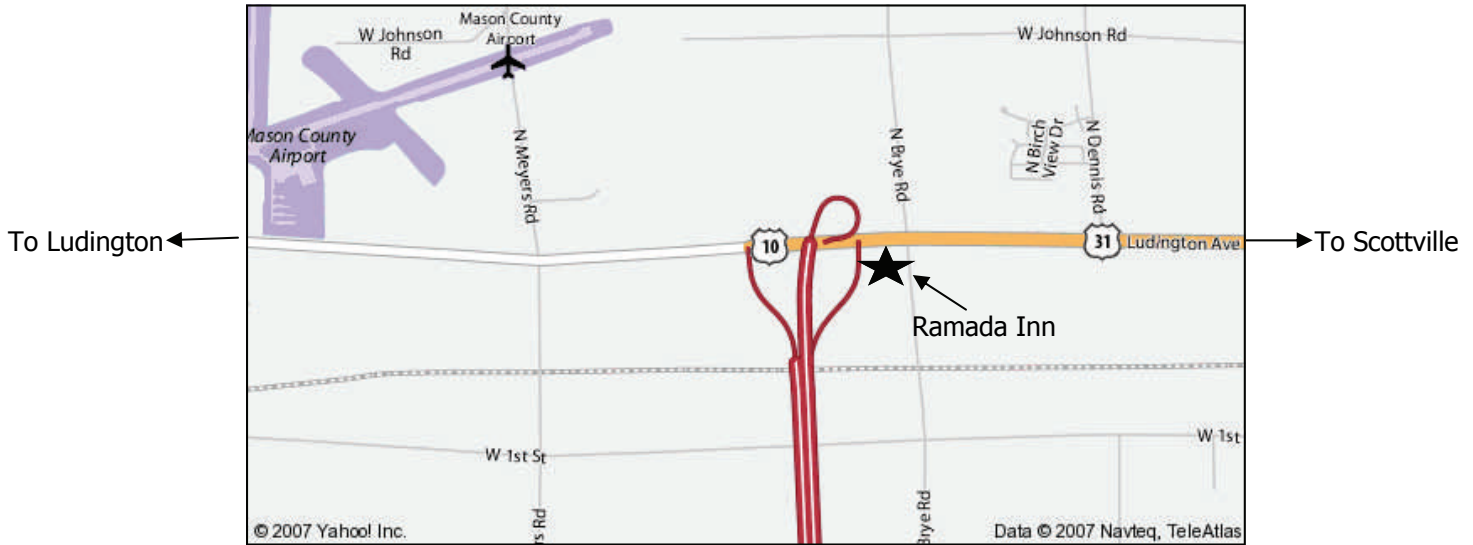
**Make Checks payable to:
Ottawa County MSU Extension**

**Mail to: Ottawa County MSU Extension
ATTN: Regional Fishery Conference
12220 Fillmore Street STE 122
West Olive, MI 49460**



Michigan Sea Grant invites you to attend the annual Ludington Regional Fishery Workshop to be held on Saturday, January 8, 2011. Topics presented will cover current research on issues that affect Lake Michigan fisheries. A hot lunch buffet will be included in the conference registration fee of \$20. Advanced registration is requested to assure an accurate count for food service. Please use the cut-off registration form at the bottom of this sheet and mail it with your check made out to Ottawa County MSU Extension. The mailing address is listed on the registration form. If you should have questions, please call (616) 994-4580.

The conference will be held at the Ramada Inn and Conference Center located at 4079 West U. S. 10, on the southeast corner of the US-31/US-10 intersection.



Please Note:

Accommodations for persons with disabilities may be requested by contacting Daniel O’Keefe at (616) 994-4580 by December 31, 2010 to make arrangements. Requests received after this date will be fulfilled when possible.

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The Sea Grant Ludington Regional Fishery Workshop is held in cooperation with:

**Michigan Charterboat Association — Ludington Charterboat Association —
Michigan Salmon & Steelheaders Association — MDNRE Fisheries Division —
United States Geological Survey — Great Lakes Fishery Commission —
NOAA Great Lakes Environmental Research Laboratory**

Michigan Sea Grant Happenings

Sturgeon Rearing Facility will be Located on Kalamazoo River

Lake sturgeon will soon get a helping hand. A stream-side rearing facility will be used to raise wild-spawned sturgeon eggs and larvae from the Kalamazoo River. The facility will be located in New Richmond for a 2-3 year experimental phase beginning in spring 2011.

Kalamazoo River Sturgeon for Tomorrow is a non-profit organization that works with Michigan Sea Grant on educational programs and volunteer activities. Last spring, those activities included a Sturgeon Guarding program. Volunteers guarded the area where the last few sturgeon spawn in the lower Kalamazoo River to protect them from poaching. Volunteers have also participated in sampling for sturgeon eggs and larvae, which will be especially important in coming years because wild fish are needed for rearing efforts. Habitat restoration, which benefits game fish as well as sturgeon, is also planned for the future. Contact Michigan Sea Grant or follow the link below to learn more.

<http://kazoosturgeon.org/>

Fish Photo Library Under Development

Have you ever come up empty when looking for a high-quality fish image? We at Michigan Sea Grant have, and we decided to do something about it. We are in the process of building an online library of images that are suitable for use in newsletters, presentations, educational signs, and teaching materials. For images of available species, follow the link below.

<http://www.miseagrant.umich.edu/photos/fish/index.html>

Offshore Wind Council Report Available

The Great Lakes Wind Council (GLOW) was appointed by Governor Granholm in January 2009 to make policy recommendations regarding offshore wind development in Michigan. Michigan Sea Grant was involved as a neutral party in collecting audience feedback at five community meetings held during spring and summer 2010. The final report of the council is now available online. It includes a synopsis of comments received by the council and an appendix detailing the audience feedback results from community meetings.

http://www.michiganlowcouncil.org/GLOWreportOct2010_with%20appendices.pdf

West Michigan Wind Assessment Issue Briefs Online

The West Michigan Wind Assessment is a research project funded by Michigan Sea Grant and led by Dr. Erik Nordman of Grand Valley State University. The assessment has produced two issue briefs to help people understand the benefits and costs of wind energy development from a variety of perspectives. A glossary of wind energy terms and an overview of wind energy status and trends are also available.

The first issue brief details factors driving wind energy development across the country and around the globe. The second issue brief synthesizes the state of the science around health concerns including flicker and noise, and analyzes how West Michigan communities are addressing these challenges. The issue brief also assesses how wind energy could improve air quality and human health outcomes in West Michigan and the region.

Visit <http://www.gvsu.edu/wind/> and click on "Project Documents and Reports" for completed products. Offshore wind development will be covered in upcoming briefs on social and environmental issues.

Upcoming Events

Fight 'em and Fillet 'em

November 30, 6:00-9:00 PM
San Chez Restaurant
38 Fulton St. West, Grand Rapids, MI

WMEAC is sponsoring this unique culinary event featuring Asian carp dishes and presentations by Carp Czar John Goss and Sea Grant's Dan O'Keefe. Donation of \$40 is appreciated; register at www.fightasiancarp.org

Asian Carp: Taking the Fight to Our Backyard

January 18, 6:00-8:00 PM
John Ball Zoo Administration Building
1300 W. Fulton St., Grand Rapids, MI

Following a presentation on carp biology and lessons learned from other Great Lakes invaders, attendees will have an opportunity to discuss what should be done if Asian carp are found in the Grand River. No charge.

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West Olive, MI 49460

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to Life*

The West Michigan
Angler's News

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