

Mississippi River Basin Panel Member Updates

July 2018

State Agency Member Updates

Alabama – Submitted by Steve Rider, Alabama Department of Conservation and Natural Resources

The USFWS completed their annual Asian Carp eDNA survey in the Alabama portion of the Tennessee River in April. A total of 195 water samples were collected below Wilson Dam, Wheeler Dam, Wheeler NWR, Elk River, and Guntersville Dam combined. None of the water samples yielded a positive detection for Bighead Carp or Silver Carp. However, we continue to receive unconfirmed reports of Silver Carp in Wheeler Reservoir. As time permits, we continue to sample in Wheeler and Guntersville reservoirs to target Bighead and Silver carp. In mid-June, we were able to place 2 and 3 VEMCO acoustic receivers below and above Guntersville Lock and Dam, respectively, to track passage of tagged Silver Carp. These Silver Carp were caught and tagged by Tennessee Technological University in November 2017 from Pickwick Reservoir.

The first documented Alewife in Alabama was collected by ADCNR biologists in May 2018, below H. Neely Henry Dam on the Coosa River (Logan Martin Reservoir).

Bighead Carp continue to be collected in low numbers in the Tombigbee and Alabama rivers during targeted sampling for other species.

A new infestation of Island Apple Snails was discovered on June 25, 2018 in Hog Bayou off of Chickasaw Creek, which drains into the Mobile River near Mobile, Alabama.

Zebra mussel densities in the Tennessee River appear to be a less than last year but not much. Most are medium to large in size with this year's cohort just large enough to be seen. More than likely, this year will be just as bad as last year.

Arkansas - Prepared by Jimmy Barnett, ANS Coordinator, Arkansas Game & Fish Commission

Zebra Mussel monitoring continued on the Arkansas River which is ZM positive. The three year intense monitoring on the White River is in its third and final year. The White River had one ZM reported in 1994, which was a single individual encountered near a barge facility at Clarendon, AR. Substrate samplers have been placed at twenty-five mile intervals from the mouth at the Mississippi River to the first low water dam at Batesville, AR this is approximately 275 miles. The White River has not been dredged for commercial navigation since the early 2000's and barge traffic ceased in 2009. Monitoring has shown no ZM above the MKARNS canal at the lower end of the White River. Our plans are to change to early detection monitoring on the White River in 2019.

Zebra Mussel monitoring on the lower Ouachita River in Arkansas began in 2017. To date, there have been no zebra mussels detected in the River. The river supports minimal commercial barges

from Camden (the most upstream point maintained for navigation) downstream (~130 RM) but has also supported house boat movement in recent years.

Early detection sampling is being conducted in eight large COE reservoirs in the State. Of those, only Bull Shoals is positive for zebra mussels and were likely transported by a house boat that had been moored on the Arkansas River near Little Rock in 2006. Due to the presence of ZM, the Arkansas Game and Fish closed a caged fish grow-out facility in Bull Shoals, reducing production of catchable sized catfish and trout for fishing derby programs. Zebra Mussel monitoring has been established below Bull Shoals Dam in our World Class trout fishery for ZM establishment from the reservoir.

Giant Salvinia was detected in a 200 acre county park lake in Miller County in November 2017. Survey teams surveyed surrounding waterbodies and have found no other locations to date. An attempt to eradicate the lake resulted in draining the lake to the lowest level possible and applying herbicide to the remaining open water. The plan is to keep the lake drained for 2018 to promote desiccation of any remaining GS. The area will be monitored to detect additional occurrences. Public awareness for GS has been increased by placing signage at all access areas in South Arkansas that asks for the public to report any GS occurrences to our hot line.

Water Hyacinth has become a larger problem on the lower end of the McClellan-Kerr Arkansas River Navigation System. The lower two locks are having to be cycled several times just for Water Hyacinth passage before a barge could be locked through, which increased lock time from two hours to as much as ten hours for each barge tow. The USACOE and other partners have developed a plan that will use biological control (weevils) in plant nursery areas, chemical control when mats appear, and an educational component to help prevent the spread by recreational and commercial users of the system. Weevils are to be released in 2018 and chemical controls as needed in 2019.

Lake Grampus, a 308 acre oxbow lake in Ashley County, became inaccessible in the summer of 2017 due to Water Hyacinth. A contract was established to chemically treat the lake in late 2017 and spring of 2018. The lake is now open and access has been restored.

Asian Carp monitoring continues to determine the leading edge of invasion. Reports for Silver Carp are lacking for most of the larger tributaries to rivers that are known to harbor Asian Carps. It will require at least two years, and likely more, to complete this monitoring. Commercial fishers continue to encounter Black carp in the Mississippi River in Chicot County. A graduate student working on Silver Carp in the lower White River also captured a black carp in a White River Oxbow lake approximately 50 miles upstream from the Mississippi River. A Bighead Carp was captured by a bow fisherman on June 9, 2018 in Bull Shoals Lake. The fish weighed 45 pounds. We are working with Missouri Department of Conservation on this report. We feel that this was from a bait bucket transfer and believe it is an isolated occurrence.

Northern Snakehead continue to expand their range. They have now been detected in the Mississippi river near the mouth of the White River. Intense sampling in the Arkansas River has

resulted in no detections. An AGFC Fisheries Biologist is working on his Master of Science Degree where his primary focus is the NSH. His project includes telemetry on dispersal patterns and diet competition between NSH, Large Mouth Bass, and Bowfin. He conducted a large effort sampling event in May 2018 involving about 30 people that captured 55 individuals for diet studies. Secondary sampling in 2018 has resulted in the capture approximately 60 other specimens.

The Arkansas ANS Task Force had its second meeting in December 2017. The task force is beginning to take shape and most of the committees are in place. The committee chairs will serve as the steering committee to get an operational guidance document developed for the Task Force to use in overseeing the implementation of the Arkansas State ANS Management Plan. The next meeting is planned for the winter of 2018.

We are in the development stage of a GIS mapping system that will allow people to create current distribution maps of an ANS from their computer with just a few strokes of a mouse. We hope that this can be used by our biologists and others to increase management efforts and awareness of ANS issues. This application will be housed on our ANS webpage that is being designed.

A new regulation that will prohibit interbasin transfer of wild-caught bait was passed in September 2017 and will go into effect October 1, 2018. The intent of this regulation is to prevent the spread of Asian carps, ANS vegetation, pathogens and Zebra Mussels.

Additional education efforts are being conducted to educate boaters to use the Clean, Drain, and Dry methods. We hope to prevent ANS transfers by getting people to follow these steps.

Colorado – Submitted by Elizabeth Brown, Colorado Division of Parks and Wildlife

CPW continues their mandatory Watercraft Inspection and Decontamination (WID) system at 72 locations statewide. CPW is operating a containment WID program at Green Mountain Reservoir, which is SUSPECT for quagga mussels (QM) per the Western Regional Panel (WRP) on ANS's Building Consensus Committee Listing Standards following an August 2017 detection of QM veligers by the Bureau of Reclamation (BOR). Subsequent bi-weekly sampling has revealed no further detection or confirmation of quagga mussels and there has been no evidence of adults in the samples. BOR provided funding to U.S. Forest Service (USFS), the recreational manager, for infrastructure improvements to the WID station in order to implement WRP containment protocols this year. CPW contracts the WID services to a private industry vendor. No adult zebra or quagga mussels have ever been found in the state of Colorado.

So far in the 2018 boating season inspectors have intercepted 22 boats with confirmed zebra or quagga mussels. Yet again, we anticipate having even more boats intercepted this year than in previous years. In addition, inspection and decontamination numbers are up statewide. CPW continues to manage the Regional WID Data Collection System utilizing a Quagga Zebra Action Plan (QZAP) grant from USFWS, which was granted again for 2018. The workflow is based on

Uniform Minimum Protocols and Standards (UMPS) and the Watercraft Inspection Training (WIT) Procedures. It is truly a collaborative product from Western Invasive Species Coordinating Effort (WISCE) discussions and collaboration among the WRP's Building Consensus Committee participants. CPW encourages all entities performing WID to explore adoption of this system in the next year. Agencies using the Regional WID Data Collection System in 2018 include CO, NM, UT, AZ, NV, MT, WY, Lake Tahoe, the National Park Service, numerous private industry locations, and various local waters in California.

CPW has been working with the State Legislature and a broad stakeholder team to establish a secure source of funding for the ANS Program to operate in the future. The Colorado General Assembly recently passed the Mussel Free Colorado Act (HB18-1008) which created a long term stable source of funding for the ANS Program through the creation of an ANS Stamp for resident (\$25) and non-resident (\$50) motorboats and sailboats to fund a portion (50%) of the ANS Program long term. This bill also allows CPW to recoup costs expended performing decontamination of infested vessels and increases the fines for violations. The bill is expected to provide approximately \$2.4M. The General Assembly also provided general fund dollars to CPW for the 2018 and 2019 boating seasons through separate legislation to help the program until the new fee is collected. CPW continues to work with federal agencies and the Congressional delegation to match state dollars and complete the financial need to continue implementing the ANS program at current levels.

Illinois – No update provided.

Indiana – No update provided.

Iowa – Submitted by Kim Bogenschutz, Aquatic Invasive Species Program Coordinator, Iowa Department of Natural Resources

The Aquatic Invasive Species Program (DNR–AIS) staff in 2017 consisted of 1 full-time Coordinator/Natural Resources Biologist, 1 full-time Natural Resources Technician, and 15 seasonal Natural Resources Aides (12 watercraft inspectors, 3 survey crew). This was a reduction of 5 seasonal staff due to budget restrictions. Iowa Lakeside Laboratory interns assisted with watercraft inspections in Dickinson County in 2017.

Accomplishments in 2017 included the following:

- Conducted 5,974 watercraft inspections reaching almost 17,000 people
- Conducted 380 angler interviews on 30 trout streams
- Leased 5 billboards with AIS prevention messages on interstate and state highways
- Ran 150,000 video ads targeting water recreation user groups
- Used geo-fencing to target 405,000 ads to visitors at high use boat ramps
- Ran 86 television ads about AIS and the Iowa AIS Law

- Displayed the “Clean, Drain, Dry” message during three weather page takeovers of a local television station website
- Targeted water recreationists with AIS prevention messages using boat ramp signs, print media, news releases, radio and television interviews, state fair displays, presentations, brochures, identifications cards, banners, posters, maps, and regulations booklets
- Chemically treated 23 waterbodies with Eurasian watermilfoil, brittle naiad, parrot feather, or Brazilian waterweed
- Completed 75 full-lake vegetation surveys
- Surveyed vegetation at 149 access points on 43 lakes
- Surveyed adult zebra mussels in Clear Lake, Bluebill Lake, Blue Pit, Lake Cornelia, and the Spirit/Okoboji chain of lakes
- Placed zebra mussel veliger settlement samplers in lakes and reservoirs across the state
- Collected 59 water samples from 24 lakes and rivers and analyzed them for zebra mussel veligers
- Surveyed Asian carp and/or bigmouth buffalo populations 22 times in interior and border rivers
- Hosted and participated in the Iowa Invasive Species Conference
- Supported 21 partnerships and cooperative projects Missouri River Asian Carp Control Strategy Framework
- Assisted with drafting a Missouri River Asian Carp Control Strategy Framework
- Purchased supplies for DNR Fisheries management stations and hatcheries to prevent the spread of AIS during operations

One new infestation of Eurasian watermilfoil was discovered in Iowa in 2017. Eurasian watermilfoil has been identified in 51 waterbodies, including private ponds, in Iowa since 1993. Brittle naiad has been identified in 58 waterbodies since 2003. Two species unknown in Iowa were identified in 2017: parrot feather, Brazilian waterweed. Treatment and monitoring at both locations continues in 2018.

The following lakes in Iowa have known infestations of zebra mussels: Bluebill Lake (2012), Blue Pit Lake (2016), Clear Lake (2005), Lake Cornelia (2014), and the Spirit/Okoboji chain of lakes (2012). The DNR-AIS is intensively monitoring three lakes to determine if they have established populations of zebra mussels after veligers were found in water samples: Brushy Creek Lake, Carter Lake, Rathbun Lake.

Bighead Carp and Silver Carp have been reported in increasing numbers throughout the Mississippi and Missouri Rivers and their tributaries in Iowa since the mid-2000s. DNR-AIS staff surveyed Bighead Carp, Silver Carp, and Grass Carp in the Des Moines, Skunk, Cedar, Iowa, and Maquoketa Rivers to monitor the upstream advance of their populations and to monitor for evidence of reproduction. Asian carp were found in all rivers except the Maquoketa River. DNR-AIS staff also continued to monitor the condition of bigmouth buffalo in areas of the Des Moines River with and

without Bighead and Silver Carp to determine the impacts of Asian carp on this native planktivore. An Asian carp research project at Iowa State University funded by DNR-AIS and the U.S. Fish and Wildlife Service began in 2013 and continues through 2018. The project is evaluating Asian carp population characteristics, dynamics, and reproduction in the Mississippi, Des Moines, Skunk, Iowa, Cedar, Rock, and Maquoketa Rivers. Eggs and/or larval Bighead, Silver, and Grass Carp were captured each year from 2014 through 2016 in the Cedar, Iowa, Skunk, Des Moines and Mississippi rivers. Asian Carp reproduction had not been documented in Iowa prior to the study.

Kansas – Submitted by Chris Steffen, ANS Coordinator, Kansas Department of Wildlife, Parks and Tourism

ANS Program Summary

The Kansas Aquatic Nuisance Species Management Plan was approved by the ANSTF in May 2005. The goals of the plan are to prevent new introductions of ANS to Kansas, prevent dispersal of established populations of ANS, eradicate or control to minimize the adverse ecological, economic, social, and public health effects of ANS, educate all aquatic users of ANS risks, and to support ANS research in Kansas. The coordinated efforts contained within the plan are designed to protect residents of Kansas and the state's aquatic resources from the multitude of potential losses associated with ANS plants and animals.

- Two new zebra mussel populations were detected in late 2017 (Tuttle Creek Reservoir in August and Geary State Fishing Lake in December), bringing the total number of established populations in Kansas to 30.
 - Previously, zebra mussels were discovered in El Dorado Reservoir in 2003; Winfield City Lake in December 2006; Cheney Reservoir, and Perry Reservoir in 2007; Marion Reservoir and Lake Afton in 2008; Milford and Wilson Reservoirs in 2009; Council Grove City Lake and John Redmond Reservoir in 2010; Council Grove, Melvern, and Kanopolis Reservoirs and Jeffery Energy Center Lakes (2) in 2011; Coffey County-Wolf Creek Lake and Chase County State Fishing Lake in 2012; lakes Shawnee and Wabaunsee and Clinton and Glen Elder (Waconda Lake) Reservoirs in 2013; Pomona Reservoir in 2014; Paola City Lake (Miola Lake) in 2015; Wellington City Lake in 2015; Hillsdale and Cedar Bluff Reservoirs in 2016; and Osage State Fishing Lake in May of 2017.
- In May, we started an Asian Carp research project with University of Nebraska – Lincoln. Jake Werner will be collecting information on Asian Carp in the Kansas River for his Masters degree. The proposed project is focused on obtaining pertinent information to document the presence and upstream extent of invasive carps in the lower Kansas River. We are specifically interested in determining the natal origin of invasive carps and to determine spawning occurrences within the Kansas River system. Invasive carps have the ability to compete with native fishes and an effort to compare condition of native species above and below a semi-barrier to carp expansion will provide information for future management. The specific objectives of this project are to:

- Determine the origin and large-scale movements of invasive carps (i.e., black carp, grass carp, bighead carp, and silver carp) found throughout the lower Kansas River as water and otolith chemistry allow
 - Attempt to identify invasive carp spawning aggregations, if and where they occur in the lower Kansas River, and relate potential recruitment events to climatic or hydrological variables
 - Identify presence and upstream extent of black carp
 - Determine flows required for successful upstream passage of Bowersock Dam
 - Compare body condition and abundance and of native fishes (e.g., bigmouth buffalo, gizzard shad) above and below Bowersock Dam
- Water chemistry information was collected from the Neosho River basin, main-stem Kansas River, and all Federal impoundments (25). The data was collected with the intention of using it for microchemistry projects (including the current Asian Carp project on the Kansas River). Microchemistry should answer some questions about the origin or movements of fish among major waterbodies in the state. In the near future, we plan to collect and catalogue water chemistry information for additional rivers, in particular the Arkansas and Marais Des Cygnes.
 - We filmed a segment on Aquatic Invaders for the Kansas PBS show *Sunflower Journeys*. Asian Carp and Zebra mussels were featured. The episode will air this fall, but a clip featuring fisheries technician Connor Ossowski getting hit by a flying Silver Carp has already attracted attention and can be viewed here:
<https://www.facebook.com/SunflowerJourneys/videos/10160627076625235/>.
 - A major effort to assess the status and impact of Largemouth Bass Virus in the state is underway. Samples (60 largemouth bass) were collected from 35 waterbodies across the state in fall of 2017 and spring of 2018. Lakes selected included locations that are part of a largemouth bass age/growth research study, lakes with a past positive test for LMBV, lakes where the largemouth bass population has unexplainably declined, and reference “good” population lakes. Otoliths were also collected from the fish that were sacrificed for LMBV testing. Part of our plan is to compare age and growth information between lakes and determine if LMBV is affecting long-term growth potential. Results from 30 of the 35 lakes have been received. LMBV has been detected in 9 new lakes due to this effort. That brings us to a total of 16 lakes that are positive for LMBV.
 - KDWPT contributed funding, hatchery space, and employee time to WAFWA’s YY Consortium. It is hoped that advancements in YY (Trojan male) technology will lead to opportunities for prevention, control or extermination of common carp, white perch and other invasive fishes. Idaho is having success using the technology on invasive Brook Trout.
 - ANS staff conducted vegetation surveys (identified species and mapped bio-volume) at 20 lakes. 30 more lakes will be completed this summer. KDWPT recently trained and certified 30 employees as drone pilots. I have a proposal in with our drone committee to use drones to map

emergent vegetation at lakes. Phragmites is an emerging issue in the state and is reducing the amount of shoreline access at some western KS lakes. Drone usage would allow us to quantify that issue and track its progress as well as estimate the costs to improve the situation.

- Kansas joined *Don't Let it Loose*. Pet shops were visited by Bob Wiltshire in May. Bob is in the process of adding our information to the website. We are supplying additional bags as pet shops request. We plan to continue purchasing bags in the future.
- Detection sampling for zebra mussel veligers was conducted at 106 Kansas waters in June. High risk waters will be sampled a second time in September.
- Fish disease sampling was conducted at all four state fish hatchery facilities and 3 private fish farm locations. None of the fish tested showed signs of disease. In addition, hatchery staff were trained to conduct health sampling should a disease outbreak require immediate collection of samples.
- Inspections were conducted at 90 bait shops across the state. No invasive species were found at any of the bait shops. ANS literature distributed to the bait shops during inspections.
- Outreach was continued through a campaign designed to utilize a variety of media outlets, including internet ads, radio ads, etc. Ads were redesigned, which led to a much more positive reception by the public.
- ANS literature was distributed to KDWPT offices, state parks, nature centers, baitshops, marinas and at educational events.
- "ANS Designated Water" signage was redesigned to replace the last run of signs which did not hold up well to sun/weather exposure. We also maintained ANS signage at infested waters and prevention awareness signs at uninfested lakes.
- In March, a deceased Ornate Bichir *Polypterus ornatipinnis* was found in a small urban pond in Kansas City. It most likely was an aquarium release. Bichirs are a tropical African fish which are unlikely to survive Kansas winters. Hopefully our inclusion in the Don't Let it Loose campaign will help prevent more of these releases in the future.
- Marbled Crayfish is the process of being added to our prohibited species list. Common Carp/koi are in the process of being removed from our list of species that can be sold for bait.
- We are continuing to experiment with the timing of Aquathol treatments for curly-leaf pondweed control. Treating immediately after ice-out in February was much more effective than past treatments in early April. This fall we will try treating in early December just prior to ice-on.
- White Perch were found in a series of HOA ponds in Dodge City, Kansas. Eradication efforts are in the planning stages. The current plan is to rotenone the ponds this fall.

Kentucky – Submitted by Andrew Stump and Jessica Morris, Kentucky Department of Fish and Wildlife Resources

The Aquatic Invasive Species program in Kentucky is housed within the Critical Species Investigations branch (CSI). KDFWR-CSI includes staff members at two locations and includes a full time Fisheries Assistant Director, 5 full time fisheries biologists, 3 full time fisheries technicians, and 3 seasonal fisheries technicians. Other fisheries staff in KDFWR contribute their time to AIS projects on an as needed basis. Staff levels will remain similar in the foreseeable future.

Accomplishments to date in 2018 include the following:

Asian Carp and Scaled Rough Fish Harvest Program (ACHP)

- KDFWR-CSI administers a harvest program for Asian carp species (silver carp, bighead carp, grass carp and black carp) that allows commercial fishers access to closed waters for the purpose of harvesting invasive carps. Within the program commercial fishers must request permission to fish and are only allowed to harvest Asian carp and other scaled “rough fish” (buffalo, gar, drum, common carp, etc.). Their harvest ratio of Asian carp to other rough fish must be 65:35 on a monthly basis.
 - The Asian Carp Harvest Program has facilitated the harvest of 4.2 million pounds of Asian carp from Kentucky’s waters since the program began in 2013.
 - 16 commercial fishers participated in the ACHP from Jan. 1-July 3, 2018 on 178 fishing trips. On those trips commercial fishers reported harvest of 1,724 lbs of bighead carp and 216,535 lbs of silver carp.
 - KDFWR monitors the commercial catch in Kentucky by compiling daily reports from commercial anglers as well as conducting ride-alongs with commercial fishermen fishing within the ACHP. In 2018 KDFWR has conducted 12 ride alongs with 8 different commercial fishers to collect data on harvest and bycatch.

Asian Carp Subsidy

- KDFWR-CSI administers a subsidy for Asian carp (bighead, silver, grass, and black carp) harvested from Kentucky Lake (Tennessee River) and Lake Barkley (Cumberland River). The subsidy began in 2015 with a total budget of \$30,000 to be paid to commercial fishers at 5 cents per pound above what was paid by the processor. To date KDFWR has paid out \$14,979.85 in subsidy funds for 299,597 pounds of Asian carp harvested from Kentucky and Barkley lakes.

Western Kentucky Silver Carp Demographics

- KDFWR-CSI partnered with Murray State University in 2016 to collect demographics data from silver carp harvested from Kentucky Lake.
 - Analysis of this data revealed that silver carp in Kentucky Lake are larger than in other populations (Wabash, Illinois, Mississippi Rivers), have similar condition (L-W relationship) to other populations, grow very fast (triple in length between age-0 and

age-1), have variable recruitment (not all age classes represented) and exhibit lower mortality rates when compared to populations with more commercial harvest (Illinois River). The current level of commercial harvest of silver carp in Kentucky Lake is not providing a sufficient level of control.

- In 2017 KDFWR collected demographics data from silver carp harvested from Lake Barkley. Lake Barkley receives more pressure from commercial fishers which results in different population structure of silver carp in this system.
 - Analysis of data revealed that silver carp in Lake Barkley grow faster than silver carp in Kentucky Lake (length at age relationship), are above average condition when compared to other populations (relative weight), have a higher mortality rate than silver carp in Kentucky Lake, and gonadosomatic indices indicated that silver carp may have attempted to spawn in Lake Barkley in April of 2017. However, no young of year silver carp were observed in Lake Barkley in 2017.
- This study is being continued in 2018 with 6 trips being made to date for data collection.

Identifying Gear Types for Capturing Asian Carp

- KDFWR-CSI began a project in 2017 to identify and test new gear types for capturing Asian carp in Kentucky Lake, Lake Barkley and their associated river systems. KDFWR worked with Two River Fisheries to test a net system used to harvest Asian carp in China, however, this gear was unsuccessful in capturing Asian carp in Lake Barkley. KDFWR partnered with the USFWS for use of their Paupier Net system in Kentucky Lake and Lake Barkley on 3 occasions. The Paupier Net was successful in capturing 5,853 individual Asian carp throughout all sampling periods. KDFWR-CSI fished experimental gill nets in Kentucky and Barkley lakes capturing 191 Asian carp. Electrofishing in the tailwaters of Kentucky and Barkley lakes was used for Asian carp removal efforts resulting in the removal of 18,440 pounds of Asian carp.
- In 2018 KDFWR-CSI continues to test and utilize experimental gears for capturing Asian carp.
 - In June of 2018 KDFWR conducted its first bow fishing tournament for Asian carp only. Approximately 20,000 lbs of Asian carp were removed through this tournament.
 - 6,700 pounds of Asian carp have been removed from the Lake Barkley tailwaters through electrofishing.
 - 751 Asian carp have been removed from Kentucky and Barkley lakes through gill netting efforts by KDFWR-CSI.
 - The USFWS will return with the Paupier Net in September of 2018.
 - Two Rivers Fisheries has expressed interest in trying another net system in Lake Barkley
 - The USGS has contacted KDFWR-CSI in regards to testing an experimental net system in Kentucky and Barkley lakes.

Impacts of Asian Carp on Sport Fish in the Kentucky Lake and Lake Barkley Tailwaters

- KDFWR initiated a project in 2015 to assess the impacts of high densities of Asian carp on tailwater fish communities as well as sport fishing effort and success in tailwaters.
- KDFWR-CSI conducts electrofishing sampling in the tailwaters of Kentucky Lake and Lake Barkley on 3 occasions in the spring and fall. In 2018 spring sampling in the Kentucky Lake tailwaters produced 1,020 individual fish comprised of 37 species, with 15 Asian carp captured. Spring sampling in the Lake Barkley tailwaters produced 908 individual fish comprised of 29 species, with 85 Asian carp captured.
- In 2016 KDFWR-CSI conducted an access point creel survey in Kentucky Lake tailwaters and Lake Barkley tailwaters. Over 3,000 anglers were interviewed during the survey period. Most anglers were satisfied with the fisheries provided by the tailwaters. However, of those that were dissatisfied, anglers in Kentucky tailwaters cited Asian carp as the number one reason for their dissatisfaction; anglers in Barkley tailwaters cited Asian carp as the number two reason for their dissatisfaction. During the creel survey it was estimated that anglers caught over 25,000 Asian carp in Kentucky tailwaters and approximately 24,000 Asian carp in the Barkley tailwaters. This is a significant increase since the previous creel survey was conducted in both tailwaters.

Tracking Silver Carp Movement in Kentucky Lake

- Beginning in 2016, KDFWR-CSI has funded Murray State University to conduct a silver carp tracking study in Kentucky Lake.
 - 115 silver carp have been tagged in Kentucky Lake
 - 14 stationary receivers have been deployed in Kentucky Lake
 - KDFWR-CSI conducts manual tracking trips on Kentucky Lake and downloads stationary receivers monthly
- KDFWR-CSI is working closely with partner agencies (Murray State University, Tennessee Wildlife Resources Agency, Tennessee Technological University, Mississippi Department of Wildlife Fisheries and Parks, Alabama Department of Conservation and Natural Resources, United States Fish and Wildlife Service, United States Geological Survey, Tennessee Valley Authority, United States Army Corps of Engineers) to build an array of stationary telemetry receivers in the Tennessee and Cumberland Rivers to monitor upstream movement of silver carp, specifically passage through lock chambers.

Asian Carp Deterrent Testing at Lake Barkley Lock

- KDFWR is partnering with several agencies (U. S. Fish and Wildlife Service, U. S. Geological Survey, University of Minnesota, Fish Guidance Systems, and U. S. Army Corp of Engineers) to conduct field testing of a Bio-Acoustic Fish Fence at the downstream approach to the Lake Barkley Lock chamber. A research team has been established and is currently tasked with

determining specific research questions and the means necessary to answer those questions. In 2017, KDFWR deployed stationary receivers and began tagging silver carp with acoustic transmitters in the Lake Barkley tailwaters in an effort to quantify upstream movement of silver carp through the lock chamber prior to construction of the BAFF system. KDFWR will continue to tag silver carp, other Asian carp species and some native fish species to monitor movement through the lock chamber prior to and after installation of the BAFF.

Incidental Black Carp Detections and Monitoring Efforts

- In November of 2017 a commercial fisherman captured a black carp in Lake Barkley while targeting silver carp. This was the first reported capture of a black carp in the Cumberland River system, and the furthest upstream capture in the Ohio River Basin. In 2018 two more black carp have been captured in the Cumberland River system; one by a commercial fisher in Lake Barkley, and one by a bow fisher in the tailwaters of Barkley Dam. In addition, one black carp was captured by a commercial fisherman in Kentucky Lake, which was the first reported capture of a black carp in the Tennessee River system. In response to these captures, KDFWR partnered with the U. S. Fish and Wildlife Service to conduct targeted black carp sampling efforts. These efforts did not capture any additional black carp in the Tennessee or Cumberland River systems. All black carp reported captured to date in these river systems have been sexually mature, diploid adults.

Early Detection and Evaluation of Removal of Asian Carp in the Ohio River

- This is a collaborative project with both state and federal partners involved in the Ohio River Asian Carp Control Strategy Framework.
- The 2017 Monitoring and Response plan built on the design and efforts initiated in 2015 and 2016 by both increasing the geographic range of monitoring efforts and focusing spring sampling efforts on targeted removal of Asian carps. This strategy increased the total number of carp harvested from these low-density waters by more than 200%. However, efforts in very low-density pools (Meldahl – R.C. Byrd) failed to detect the presence of Asian carps. With the knowledge that fish are present in these pools, this is likely an indication that more effort per pool is needed to increase the resolution of targeted approaches.
- Increased frequency of larger length-classes of Silver Carp in upriver pools, in addition to more narrow ranges of total lengths overall, suggests that fish captured upriver are more indicative of migrants, rather than successfully reproducing populations. This is further reinforced by relative abundances (CPUE) from monitoring efforts and reported data from additional sources such as the NAS database records. Tributaries in the Cannelton pool, where younger individuals were observed in 2017 are potentially important to spawning success (primarily Clover Creek/Tug Fork and Oil Creek, among others).
- Regressions for growth of both Silver Carp and Bighead Carp were comparable to other basins, suggesting that growth and condition of fish in the Ohio River is similar to that found elsewhere.

No significant changes in growth condition or relative abundances have indicated that removal efforts have had an impact of Silver Carp populations since 2016.

Control and Containment of Asian Carp in the Ohio River

- This is a collaborative project with both state and federal partners involved in the Ohio River Asian Carp Control Strategy Framework.
- The Control and Containment efforts of KDFWR-CSI on the Ohio River yielded approximately 18,250 lbs (8,280 kg) of invasive carps removed from waters along the invasion and establishment front. Additional captures during monitoring and juvenile sampling efforts brought the total weight just above 20,000 lbs (9,100 kg). This was comparable to previous years of removal efforts.
- With CPUE highly correlated with spawning activities in 2017, it is important to note that carp are likely more susceptible to the gears and techniques currently being used by project collaborators during the months of May – August. Utilizing this knowledge and a better understanding of carp responses to river conditions, KDFWR-CSI crews have already an estimated 15,000 lbs (6,800 kg) from the Cannelton and McAlpine pools alone.
- Catch rates have tended to decrease as water temperatures drop toward the fall season. However, recent collaboration between USFWS and KDFWR have successfully utilized hydroacoustics in the Cannelton pool during the cooler months to target large groups of riverine fishes where Asian carps appear to be congregating and have guided netting placement with side-scan and split-beam technologies.

Abundance and Distribution of Early Life Stages of Asian Carp in the Ohio River

- This is a collaborative project with both state and federal partners involved in the Ohio River Asian Carp Control Strategy Framework.
- KDFWR-CSI aided INDNR in conducting over 160 electrofishing transects totaling over 39 hours of effort in an attempt to document the extent of juvenile and young-of-year invasive carp species. Young-of-year fish were captured in both the Newburgh and J.T. Myers pools (currently below the collaborative monitoring program).
- Results of 2017 sampling largely support the extent of recruitment defined in 2016, with the majority of juvenile carp collected in the lower portion of J.T. Myers Pool. This pattern of recruitment in J.T. Myers Pool has been consistent annually and highlights the need for more-extensive larval sampling to identify timing and location(s) of spawning. The capture of one juvenile Silver Carp in Clover Creek (Cannelton Pool) potentially expands the extent of recruitment to above Cannelton Lock and Dam, further upstream than previously thought.
- This season, KDFWR-CSI has worked to collect over 60 larval tows in an effort to define the timing and extent of Asian Carp spawning range in the Ohio River.

Ohio River Asian Carp Contingency Planning

- In 2017 partners involved in the Ohio River Asian Carp response and planning efforts identified the need for a contingency plan to aid in decision making when considering the various responses to Asian Carp progression up the Ohio River.
- In 2017 KDFWR-CSI and collaborators in WVDNR created an outline and review of the Illinois River contingency plan in response to Asian Carp to identify key aspects of the plan that might be valuable to the Ohio River basin.
- In 2019, a workable plan is expected for review by basin partners that outlines appropriate actions, authorities, and responses to changes in Asian Carp statuses in the Ohio River.

Kentucky State Aquatic Nuisance Species (ANS) Plan Revision

- The KDFWR ANS plan was established in 2008 by a large number of collaborators. It outlined suggestions for the development of a more rigorous ANS program with a three-year timeline. Unfortunately those developments were not
- Currently, the plan is under examination and agency personnel are beginning to identify the extent of any updates and/or technical revisions that need to be made.
- Work is ongoing and no timeline is currently set for the completion of the plan revisions.

Louisiana – Submitted by Bobby Reed and Alex Perret, Louisiana Department of Wildlife and Fisheries

Apple Snail:

During 2017, the Louisiana Department of Wildlife and Fisheries (LDWF) received over 250 calls reporting apple snail infestations. Hurricane Harvey affected SW Louisiana during August 2017 and provided excellent expansion conditions for the populations in the Mermentau River basin. The winter of 2017/2018 was somewhat colder, and we are hoping they will not spread as much as occurred in 2016-2017. They have now been observed in 27 of the state's 64 parishes, and entire sections of freshwater marsh are now being reported as "eaten out" in some of the coastal parishes. Additionally, waterfowl hunters and fur trappers are reporting significant declines in ducks and fur bearers on their leased/owned lands where apple snail infestations are severe. Apple snails have now been reported in some rice fields of southwest Louisiana, as well as crawfish aquaculture farms. One crawfish farmer reported that they were interfering with harvest efforts by clogging up the crawfish trap entrances.

Inland Fisheries Section staff of LDWF, along with the USGS Wetland Research Center, Nicholl's State University and the Barataria-Terrebonne National Estuary Program, will continue to research and monitor for this species, and is currently conducting regular public educational outreach thru several media outlets. One such outlet is thru the LDWF Aquatic Invasive Species hotline.



Apple snail range in Louisiana, Spring 2018

Asian Carp:

Asian carp continue to be a problem in Louisiana's big rivers where populations of bighead, black, grass, and silver carps are now successfully reproducing in the Atchafalaya, Mississippi, Ouachita and Red rivers. They continue to slowly spread into smaller coastal river drainages at this time. Asian carp have the potential to cause extensive and irreversible changes to the aquatic environment, negatively impacting the long-term sustainability of native aquatic species, public use of natural resources, and the economic value of aquatic resources. Ongoing research includes impacts the carp may be having on native fishes of similar trophic level. In May and June of 2018, LDWF Inland Fisheries biologists are cooperating with the USGS out of Columbia, Missouri to collect black carp broodstock for the USGS culture center in order to complete life history studies for the injuriously listed fish. In 2017 and 2018, LDWF fisheries biologists updated the Louisiana *Senate Natural Resources Committee* and the *Coastal Management Program Managers* on Asian carp, other invasive species, and the Aquatic Invasive Species Program in general.

Tilapia:

LDWF Inland Fisheries crews continued to survey the drainage canals and ditches around Port Sulphur, Louisiana for the presence of invasive tilapia following massive eradication efforts in 2008-2009.

Following extensive rotenone applications, native predators were heavily stocked in the area in hopes of depleting any remaining tilapia. Approximately 30 tilapias were captured via electrofishing samples during the summer of 2017. It is not known how the extreme cold weather of 2018 may have affected tilapia populations in the area.

Zebra Mussels:

Lake Texhoma, a Red River impoundment in Oklahoma and Texas that has become infested with zebra mussels, and lies upstream of Louisiana, can now potentially infest the middle reaches of the Red River, including tributary impoundments. During 2017, LDWF fisheries biologists surveyed seven reservoirs for the presence of zebra mussel settlement. The lakes surveyed were back flooded by

the Red River during extreme high water events that occurred in spring of 2015 and 2016, and potentially introduced zebra mussel veligers. No zebra mussel settlement was detected in any of the reservoirs during 2017, however, surveys will again be conducted in the late summer of 2018.

Tiger Shrimp:

In 2017, LDWF received 13 reports of tiger shrimp from commercial and recreational angler catches along the Louisiana coastline from the Texas state line to the Mississippi River. Again, the sightings were in nearshore/bay areas during the months of August and September.



Lionfish:

Roving diver surveys is an accepted method of visually assessing fish assemblages associated with artificial reefs. LDWF's GI-FRL Dive Team geared up to begin roving diver surveys in offshore areas during summer months of 2017, but efforts were hampered by Hurricane Harvey. Surveys will be conducted in the spring and summer of 2018 at Louisiana's Artificial Reef (AR) Program structures off Louisiana's coastline. Dives will be limited to 120 feet deep (recreational dive limits). Lionfish presence/absence will be determined at each dive sight along with species richness. LDWF is proposing 20 AR Diver Surveys per year.

Aquatic Plant Control Program:

The program is housed within the LDWF's Inland Fisheries Section. Aquatic plant control plans were developed for 73 different waterbodies during 2017. Giant salvinia continues to be the most problematic AIS plant in Louisiana. Since 2008, LDWF has treated an average of 20,000 acres of giant salvinia per year with herbicides. LDWF uses an integrated approach to control aquatic plants, consisting of chemical, physical (drawdowns), and biological (insects and grass carp) methods in an

effort to achieve a greater combined benefit. LDWF has an annual Aquatic Plant Control Program budget of \$8,000,000 of which more than 50% of that is spent on giant salvinia alone for monitoring, treatment, and research.



Giant salvinia infestation on Lake Bistineau

Minnesota – Submitted by Heidi Wolf, Minnesota Department of Natural Resources

Prevention

- Workshop: With the support of Great Lakes Restoration Initiative funding and generous sponsorships from seven counties, the MN DNR hosted a two-day workshop in October 2017 for county partners and DNR personnel to learn how to promote behaviors and create positive social norms associated with aquatic invasive species prevention. The workshop was presented by Dr. Doug McKenzie-Mohr, author of "Fostering Sustainable Behavior," and attracted 77 participants representing 34 counties.
- County prevention metrics: The Minnesota Legislature provides \$10 million directly to Minnesota counties to help prevent the spread of aquatic invasive species. MN DNR's two Aquatic Invasive Species Prevention Planners created a template of metrics so that county programs can track their accomplishments and demonstrate that "AIS Prevention Aid" is making a difference in their communities.
- Permit training: The MN DNR launched a new online lake service provider permit training in 2017 to make it easier for providers to get their permits year-round. A total of 1,220 businesses were permitted lake service providers at the end of 2017.

Inspection and Enforcement

- Stopped zebra mussels: Watercraft inspectors found zebra mussels on 205 watercraft in 2017, and stopped watercraft from launching at 23 different water bodies where zebra mussels had never been found.
- Over 450,000 inspections: Between April-October 2017, 103 DNR watercraft inspectors inspected 84,824 watercraft/trailers at water accesses.
 - The DNR can also delegate watercraft inspection authorities to authorized inspectors working for tribal and local government units: in 2017, DNR trained a record 949 authorized inspectors working throughout the state, and those authorized inspectors inspected 365,986 watercraft/trailers at water accesses.
 - In 2017, DNR and authorized inspectors decontaminated 4,512 watercraft.
- High compliance rates: In 2017, about 97% of the watercraft inspected were complying with Minnesota's "drain plug law" when they arrived at the access. 98% of inspected watercraft arrived at an access without vegetation attached.
- Zebra mussel detection dogs: The MN DNR Enforcement Division's four zebra mussel detection canine officers assisted officers and inspectors during aquatic invasive species enforcement efforts. The dogs improve the efficiency of conservation officers, with faster and more thorough inspections of water-related equipment. The canine teams also provided educational demonstrations at the Minnesota State Fair, Aquatic Invader's Summit, Upper Midwest Invasive Species Conference and several other public events.

Management

- Plant grants: The MN DNR awarded over 90 grants to support management of invasive aquatic plants by partners, offering up to \$200,000 in reimbursements in 2017.
- Starry stonewort: In order to understand the efficacy of starry stonewort control methods the MN DNR requires monitoring the results of starry stonewort treatments; in 2017, the MN DNR made \$20,000 in grants available to help fund that monitoring.
- Zebra mussels: The MN DNR permitted two attempts to control newly discovered zebra mussel populations using pesticides in 2017: EarthTec QZ was used at Lake Minnewashta (Carver County) and Lake Marion (Dakota County), where MN DNR staff coordinated with U.S. Geological Survey research staff to conduct bioassays to determine treatment efficacy.

Detection and Response

- Carp: The 2017 Minnesota Legislature granted the MN DNR the authority to tag and re-release invasive carp for research purposes. The MN DNR tagged its first carp on July 28, 2017 in the St. Croix River. Fish biologists tracked its movement using active boat tracking and the passive receiver array present in the river system. In May 2018, while tracking the tagged carp, the MN DNR captured two other bighead carp on the St. Croix River: a 46-inch, 39-pound mature male, and the second was a 43-inch, 46-pound mature female.

- Starry stonewort: The MN DNR partnered with the Minnesota Aquatic Invasive Species Research Center (MAISRC), University of Minnesota Extension, and many counties and local partners on a statewide starry stonewort search effort: “Starry Trek.” During the event, volunteers searched 211 accesses on 178 lakes identified by MAISRC as high-priority search locations. Because of these efforts, we found starry stonewort at Grand Lake (Stearns County), and the MN DNR was able to complete a hand removal of the starry stonewort population there. The MN DNR will continue work on this ongoing project and monitor the efficacy of the hand removal.
- New mapping system: The MN DNR is using EDDMapS Midwest for reporting and mapping aquatic and terrestrial invasive species. See www.EDDMapS.org/midwest or download the “GLEDN” app to a mobile device. In fiscal year 2017, DNR staff and contractors made 12,606 reports of invasive species, mostly terrestrial invasive species.
- Response exercise: In 2018, the MN DNR hosted a meeting of Northeast Minnesota area partners to debrief on the *Hemimysis anomala* discovery in the Duluth-Superior harbor and to build capacity for future surveillance and detection work in western Lake Superior.

Legislative

- No surcharge increase: The legislature did not approve the Governor’s 2017 budget recommendation to increase the aquatic invasive species surcharge on watercraft registration fees from \$5 to \$12; watercraft registrations are valid for three years. Minnesota has had an aquatic invasive species surcharge on watercraft registrations since 1991, and the surcharge has been \$5 since 1993.
- Golden shiner import report: The MN DNR reported to the legislature on the potential risks of importing golden shiner minnows into Minnesota in 2018. Previous versions of the 2017 legislation that required the report would have allowed importation of golden shiner minnows from Arkansas.

Mississippi – Submitted by Dennis Riecke, Mississippi Department of Wildlife, Fisheries, & Parks

Aquatic Plant Control Activities

- Chemically treated about 391 acres of Cuban Bulrush (*Oxycaryum cubense*), Water Hyacinth (*Eichhornia crassipes*), Alligator weed (*Alternanthera philoxeroides*), and Water Lettuce (*Pistia stratiotes*) in Ross Barnett Reservoir. The main plant treated (80%) was Water Hyacinth. We also chemically treated (Harpoon + Diquat) 63 acres of Hydrilla (*Hydrilla verticillata*).
- Chemically treated (2, 4-D) 44 acres of Water Hyacinth, (*Eichhornia crassipes*), and Cuban Bulrush (*Oxycaryum cubense*) in Bogue Homa State Fishing Lake.
- Chemically treated (Rodeo + 2, 4-D) 10 acres of Giant Cutgrass (*Zizaniopsis miliacea*), Water Hyacinth, (*Eichhornia crassipes*), Alligator weed (*Alternanthera philoxeroides*), and Cuban Bulrush (*Oxycaryum cubense*) in Percy Quinn State Park Lake.

- Chemically treated (2, 4-D) 70 acres of Water Hyacinth (*Eichhornia crassipes*), in Crystal Lake, Flowood, MS.

Other Activities

- Attended fifth, sixth and seventh meetings (December 2017, March 2018, June 2018) of the Mississippi Aquatic Invasive Species Council to guide implementation of the activities specified in the *Mississippi State Management Plan for Aquatic Invasive Species*.
- MDEQ personnel posted 50 Northern Snakehead awareness and reporting signs along the Mississippi and Yazoo River boat ramps.
- Asian carp sampling in Pickwick Lake with Tennessee Tech U and USFWS. Tagged 10 Silver Carp with acoustic transmitters with TN Tech.
- Deployed Vemco receivers in Pickwick and Tennessee-Tombigbee Waterway (TTW) to track tagged Silver Carp.
- Electroshocked TTW Divide Cut to check for presence of Asian Carp
- Attended Bio Acoustic Fish Fence meeting at Kentucky and Barkley Lakes for Asian Carp
- Updated Asian Carp Buyer/Seller list.
- Completed Aquatic Invasive Species survey sent by Stephanie Green of Stanford University.
- Edited two crayfish fact sheets for the USGS Nuisance Aquatic Species office in Gainesville, FL.
- Completed survey sent by the Illinois-Indiana Sea Grant regarding agency rules on prohibited aquatic species. www.TakeAIM.org/regulations
- Revised Tier 1 and Tier 2 ANS Taxonomic Data base listing for the ANSTF.
- Wrote draft Southern Division, American Fisheries Society on urging fisheries personnel to contact their federal representatives to revise the Lacey Act shipment clause to give the USFWS the authority to regulate shipments of injurious wildlife between the 49 states in the continental United States. The SDAFS Executive Committee decided not to send this resolution to the membership for a vote.
- Completed survey sent by USGS, Lafayette, LA office on the transport and use of diploid and triploid grass carp.
- Edit USGS NAS Aquatic Mapper document and Mississippi Aquatic Invasive Species Council brochure.

New Detections

- Giant Salvinia (*Salvinia molesta*) found in TTW (Divide Cut, Lock A, Aberdeen), Pickwick Lake (Indian Creek) and at Ross Barnett Reservoir (July 2018).
- Silver Carp found at Bay Springs Lake (August 2017 and May 2018).

Ongoing Activities

- Asian Carp Telemetry Project on Pickwick and TTW.
- Continue to participate in the Mississippi Aquatic Invasive Species Council to guide implementation of the activities specified in the *Mississippi State Management Plan for Aquatic Invasive Species*.
- Continued distributing “Stop Aquatic Hitchhiker” cards along with all initial boat registrations and boat renewal registration cards that are mailed out.
- Continued printing The Stop Aquatic Hitchhiker logo and bullet list in the annual regulation guides --- *Mississippi Outdoor Digest*, (375,000 copies printed each year) and the *Digest of Mississippi Freshwater Commercial Fishing Laws and Regulations* (8,000 copies printed each year)..
- Links to the Mississippi River Basin Panel on Aquatic Nuisance Species and the Gulf and South Atlantic Panel on Aquatic Invasive Species, Stop Aquatic Hitchhiker and Habitattitude websites are on the department website.
- The Mississippi Museum of Natural Science has a permanent exhibit on exotic species.

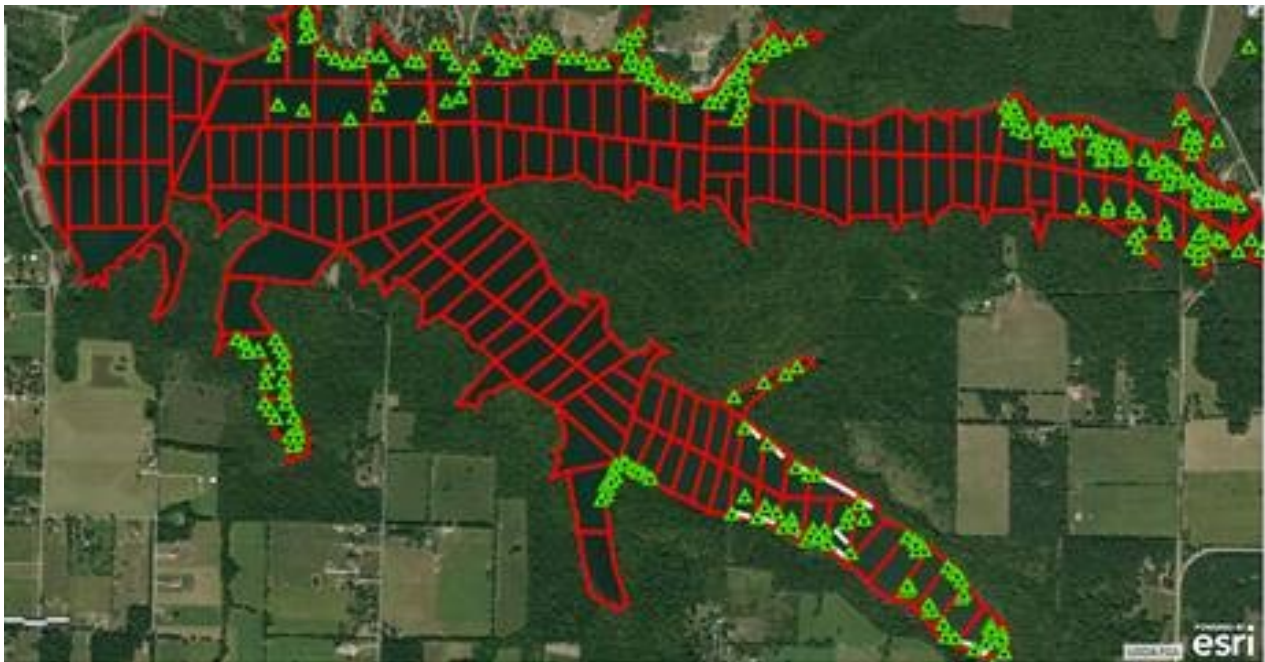
Future Activities

- Revise and reprint the Stop Aquatic Hitchhiker brochure to include more species that are present in Mississippi.
- Purchase aquatic herbicides and hire contractors to treat public and private waters infested by invasive plants.
- Continue telemetry project for Asian Carp in TN River and TTW. Continue to sample for Asian Carp in Pickwick.
- Continue to monitor Giant Salvinia in Pickwick and the TTW. Treat as needed in Pickwick
- Compose freshwater fishing bait regulations to specify what bait can be legally, sold, possessed, transported and used in Mississippi.
- Seek approval of legislation required to initiate licensing of retail bait outlets selling live freshwater fishing bait.
- Adopt a list of approved, restricted and prohibited species under the authority specified in MS Code 49-7-80 and as specified in the *Mississippi State Management Plan for Aquatic Invasive Species* Amend list of approved, restricted and prohibited species as specified in the public notice that regulates aquaculture activities in Mississippi.
- Establish an EDRR monitoring program comprised of state and federal personnel who sample aquatic species in Mississippi public waterways on a routine basis.

- Submit backlog of reported nonnative species occurrences to ANS database.
- Adopt a list of approved, restricted and prohibited species under the authority specified in MS Code 49-7-80 and as specified in the *Mississippi State Management Plan for Aquatic Invasive Species* Amend list of approved, restricted and prohibited species as specified in the public notice that regulates aquaculture activities in Mississippi.
- Establish an EDRR monitoring program comprised of state and federal personnel who sample aquatic species in Mississippi public waterways on a routine basis.
- Submit backlog of reported nonnative species occurrences to ANS database.

Missouri – Submitted by Kenda Flores, Missouri Department of Conservation

The Missouri Department of Conservation coordinated a scuba dive search of Fellows Lake (785 acres) in June. Hydrilla had been found in Fellows Lake in December 2016. It was treated with fluridone in 2017 and 2018. No tubers have ever been found. It was decided that the ultimate search would be to scuba dive the area where the hydrilla was found and snorkeling and rake tosses would be used to search the remainder of the lake. In two days with the hydrilla search efforts at Fellows Lake we had 17 individuals on the water in Zone 5 (upper end of the north arm) on the first day and 27 individuals on the main portion of the lake the second day. Most of the lake was covered in those two days. We found **zero** new strands of the plant.



There was a good media event at Fellows Lake prior to waterfowl hunting season. Springfield television and radio representatives were at the lake to film and record information about how to CLEAN, DRAIN, DRY your boat and equipment to prevent aquatic invasive species from infesting Fellows Lake.

I presented a live “No MO Invasives Wild Web Cast.” The topics were announced through electronic media. The date and time was announced and citizens could see a presentation and hear the speakers when they clicked on the link to the site. The topics were Hydrilla, Zebra mussels and Asian carp.

A Hydrilla app was designed for data collection when we search the state for hydrilla. This year an entire article in the Missouri *Conservationist*, our statewide magazine featured our efforts with hydrilla. We also have a Hydrilla e-mail address for citizens to send us notifications if they think they have hydrilla in their ponds or lakes. We got a great response after the information in the *Conservationist* article from citizens checking their ponds and e-mailing us pictures of their problem vegetation.

There is a newly formed Department-wide Invasive Species Coordinating Team. Radio ads have been written to play for public awareness of invasive species. The first ads address information about Bush Honeysuckle, Callery Pear and Asian Carp.

Fisheries formed a new Asian Carp Committee. There has only been one meeting and we are trying to gather information to identify current state/agency ecological issues such as native fish abundance with Asian carp, recreational use and Fisheries’ goals, angling opportunities, the agency Sport fish restoration funding impacts: fewer boaters... anglers....licenses...funds. We discussed topics such as where we need/want to go with Asian carp and where we should focus our efforts.

There was an Asian Carp removal project at Creve Coeur Park Lake by MDC, the U.S. Geological Survey, the U.S. Fish and Wildlife Service and the St. Louis County Parks. Bighead and Silver carp entered the park lake when the Missouri River flooded prior to 2009. Carp reduced the number of natives and severely impacted crappie populations. The carp have been the source of several nuisance fish kills and caused problems for lake users with their leaping. The Team used the Unified Method to push all the Asian carp to end of the lake where they were able to harvest 47,000 pounds of them. The Team spent three weeks clearing and blocking the lake, cell by cell as they gradually herded the fish to a final collection point.

Since the Asian carp round-up in Creve Coeur Park Lake we have been working on new Carp Utilization Permits to allow commercial anglers to participate in the removal of Asian carp and to utilize the fish in a department approved method.

Montana – No update provided.

Nebraska – Submitted by Allison Zach, Nebraska Invasive Species Program Coordinator, University of Nebraska-Lincoln

There are 7 seasonal technicians conducting watercraft inspections and boater surveys at high risk waterbodies throughout the state this year. Boater surveys collect information on watercraft movements, clean, drain and dry behaviors and bait usage information. Technicians attend fishing tournaments and outreach events during the season. Waterbodies are sampled throughout the state for zebra and quagga mussels and water samples are sent to the Montana lab for analysis. There are 4 zebra mussel positive waterbodies in Nebraska (the entire length of the Missouri River in Nebraska, Lewis & Clark Lake (near Yankton, NE), Lake Yankton and Offutt Air Force Base Lake (Bellevue, NE). There are 2 suspect waterbodies in Nebraska including Carter Lake (on the Omaha/Iowa border) and Lake Zorinsky (in Omaha, NE which was drained in 2010/2011 to kill zebra mussels). A single water sample at each of these waterbodies were found to have zebra mussel larvae in 2017 and 2016 respectively. Quagga mussels have not been found in Nebraska.

North Carolina – No update provided.

North Dakota – Submitted by Jessica Howell, ANS Coordinator, North Dakota Game and Fish

Major Accomplishments and on-going works:

1. **Multi-media outreach campaign** – We signed and began implementation of a contract with a private company to fund a statewide, multi-media ANS I/E effort; completed multiple internal webcast, video, press releases, and website updates; assisted with design of a new ANS sign, brochure updates, and state fair display; and met with various user groups to present information about ANS.
2. **Seasonal boater surveys and voluntary inspections** – We contracted work of four seasonal employees to conduct voluntary boater surveys and inspections at high-use locations in ND.
3. **Industry ANS inspections** – ANS inspections were completed on high-risk commercial construction equipment and ANS facility inspections were completed at non-resident bait suppliers that sell live aquatic bait to ND bait vendors.
4. **ANS sampling** – We conducted regular monitoring of the Red River for zebra mussels; conducted early detection sampling on a number of non-infested waters for zebra mussels and other ANS; and conducted regular monitoring on the James River for silver carp.
5. **Coordination** – We hosted a ND AIS Committee meeting (held every spring and fall); met with various ND user groups and water advisory boards; and attended regional coordination meetings; in the process of updating the ND ANS management plan.

Ohio – Submitted by John Navarro, Ohio Department of Natural Resources

- Continued control efforts of *Phragmites* and *Hydrilla* in the Lake Erie basin and Ohio River basins.
- Continued to monitor for Bighead Carp and Silver Carp in Lake Erie and the Ohio and Muskingum Rivers using eDNA, routine sampling activities, and telemetry.
- Hosted the second Grass Carp Planned Action from June 12 – 14, 2018 with 71 representatives from 14 organizations. A total of 31 Grass Carp were collected from the Sandusky and Maumee Rivers using electrofishing and trammel nets. Nine were implanted with transmitters for future tracking and 21 were removed.
- Developed the *Lake Erie Grass Carp Response Strategy* to provide a road map for the next five years.
- Continue to investigate closure options for the four GLMRIS connections in Ohio at Little Killbuck Creek, Ohio Erie Canal, Grand Lake St Marys, and Mosquito Creek Lake. The USACE has completed the final design for the closure of the Ohio Erie Canal connection; NTH has completed preliminary closure designs at Little Killbuck Creek; and we are implementing the final phase for closing the connection at Grand Lake St Marys. Mosquito Creek Lake is considered very low risk to AIS movement and no further action is required.
- Continue the surveillance of Ohio's bait and Grass Carp supply chain to determine if AIS, including Bighead and Silver Carp, are being transported through the bait trade.
- Continue an AIS outreach campaign through Wildlife Forever to target anglers moving bait. This outreach program includes billboards, print media, and items for distribution at events with the slogan "Trash Unused Bait".
- In partnership with Ohio Sea Grant, The Ohio State University, and ODNR Division of Wildlife, published the "*Ohio Field Guide to Aquatic Invasive Species*".
- Participated in the following groups: Great Lakes Panel, Mississippi River Basin Panel, Ohio Aquatic Invasive Species Committee, and Asian Carp Regional Coordinating Committee.
- Developed a risk assessment policy to screen potential new aquatic invasive species.

Oklahoma – No update provided.

Pennsylvania – No representative.

South Dakota – Submitted by Mike Greiner, Senior Biologist—AIS Coordinator, South Dakota Game, Fish and Parks

- Created a Local Boat Registry in zebra mussel containment waters to allow boaters to more easily transport and store boats locally, while restricting movement to other waterbodies unless decontaminated
- Mike Greiner replaced Mike Smith as coordinator
- Instituted boater compliance checks near zebra mussel containment waters
- Updated AIS website
- Starting using geofencing tech at containment water boat ramps to send targeted messaging about pulling boat plugs
- Began experiment to test water filtration systems used in spawning activities
- Utilized giveaway on website to gather data on boater demographics, knowledge of AIS risks, laws and sources of AIS info. Captured contact info for future targeted communications
- Utilized social media (Facebook, Twitter, Instagram) to connect with customers, educate with memes and messaging, and direct to SDleastwanted.com
- Utilized takeover marketing on gas pumps and ice boxes along Interstate highways, main entrances into state, and near high use areas for education/outreach

Tennessee – Submitted by David Roddy, Tennessee Wildlife Resources Agency

- High School Fishing team ANS program and watercraft inspection training. Provide classroom power point presentation on general ANS topics and specific species of concern to Tennessee waters. Preventative measures and the fundamentals of a water craft inspection are discussed. Within the program, students are involved in finding zebra mussels and other ANS on an Agency watercraft and are tested on how successful they were in finding them.
- Rented two billboards displayed in the city of Dayton, TN next to the Chickamauga Reservoir. One billboard was pertaining to “Stop Aquatic Hitchhikers”, the other was about removing aquatic vegetation from a boat and trailer.
- Professional Bass Angler partnering with TWRA to promote Aquatic Nuisance Species awareness. Michael Neal, FLW Tournament Angler, Displays Agency ANS logo on his boat, truck and jersey. Michael occasionally makes appearances at the High School Fishing Team ANS training. Michael has taped several ANS videos for Agency distribution.
- Asian Carp “Alert” boat ramp signage.
- Purchase Asian carp fillets for public taste testing. Tasting and ANS awareness booths set up at Bass Pro, Nashville Tennessee, State Legislatures Outdoor Caucus event, the Governor’s One

Shot Turkey event and the Tennessee Wildlife Foundation events. These events give the public opportunity to taste test and visually inspect Asian carp filets as a consumable item.

- Hired two interns from the University of Tennessee at Knoxville, to do ANS outreach in the east Tennessee area. Whirling disease, zebra mussels and non-native vegetation concerns and how to limit the spread by anglers and recreational boaters was done via educational booths and disinfecting gear videos.
- Several ANS education and awareness booths set up at several fishing and boating events across the state.
- Purchased Asian carp sampling gear. Gills nets purchased for sampling on Kentucky and Barkley Reservoirs.
- Purchased fish tag transmitters for an Asian carp movement study on Kentucky Reservoir.
- Evaluating reproductive success, establishing leading edges and abundance of age-0 in Kentucky and Barkley Reservoirs using larval light traps.
- Assessing spatial variation in relative abundance of Asian carp in Kentucky, Pickwick, Barkley and Cheatham reservoirs. Also, developing the indices of abundance in the dam tailwaters of these reservoirs which are proximal sources of further upstream invasions.
- Evaluating tailwater sampling efficiency and relating tailwater indices to catches in the main basin. Sampling additional tailwaters within the Tennessee and Cumberland River systems to determine the leading edge of Asian carp. Implanting and monitoring telemetry tagged Asian carp movement and lock and dam passage in the Tennessee River.

Texas – Submitted by Monica McGarrity, Aquatic Invasive Species Team Leader, Inland Fisheries Division, Habitat Conservation Branch, Texas Parks and Wildlife Department



Aquatic Invasive Species: A Problem for All Texans

It's estimated that the annual economic impact of aquatic invasive species in the U.S. has reached more than \$140 billion. Globally, impacts are estimated at more than \$4 trillion. In Texas, aquatic invasive species negatively affect water infrastructure, municipal and agricultural water supplies, waterfront property values, boating and other water-based recreation, fish and wildlife, and related fishing and hunting opportunities. The above graphic from TPWD's aquatic invasive species public outreach and prevention campaign is one component of a comprehensive statewide program being delivered by TPWD and partners to manage aquatic invasive species. This fact sheet profiles recent accomplishments of this statewide program.

The Need for Management of Aquatic Invasive Species

Texas freshwater boating and fishing opportunities are world renowned and generate billions of dollars for our state's economy. Top fishing lakes generate an annual economic impact of \$14-32 million annually. Bank, wade, and kayak fishing in rivers of the Texas Hill Country generates over \$74 million annually. As a whole, freshwater fishing in Texas has an estimated annual economic output of over \$1.7 billion, and is responsible for more than 13,000 jobs. Freshwater fishing, boating, and other forms of water-based recreation are clearly important to our state's economy. However, these quality of life benefits are diminished by the spread of aquatic invasive species.

The most problematic aquatic invasive species were introduced into Texas from Africa, Eurasia, Australia and South America. These include hydrilla, giant salvinia, and water hyacinth, which form dense floating mats that impede boating access, consume high amounts of water, and interfere with water conveyance for agricultural and municipal water supply. Other species such as saltcedar and Arundo form dense stands along streams and degrade habitats for fish and wildlife. Zebra mussels were introduced into Texas waterways in 2009, and have been shown to colonize and clog water intakes and other water infrastructure, resulting in costly and ongoing maintenance and repairs. Furthermore, studies of real estate and property values have identified linkages between infestations of aquatic invasive species and declines in waterfront property values of up to 19 percent.



TPWD biologists control floating mats of aquatic invasive plants that block boater and angler access



Before and after photos of a successful TPWD water hyacinth control project that restored boater and angler access

TPWD, landowners, and other partners cooperate to control Arundo along Hill Country rivers

TPWD and Partners Take Action to Manage Aquatic Invasive Species

During state fiscal years 2016-2019, the Texas Legislature allocated approximately \$3.2 million annually to TPWD for statewide management of aquatic invasive species. This unprecedented level of financial investment has greatly increased the scope and scale of aquatic invasive species management efforts in the state. To coordinate and ensure effective use of available resources, TPWD established an Aquatic Invasive Species Working Group. Formed in fall 2015, this Working Group has built and expanded existing partnerships with universities, river authorities, municipal water districts, non-profits, local, state and federal agencies, and other partners. Between fall 2015 and fall 2017, these partnerships planned and delivered more than 60 aquatic invasive species management projects statewide. Current funding will allow these projects to continue through fall 2019. For Texas to keep pace with the constant and growing problems associated with aquatic invasive species, it will be critically important that the state's investment of technical and financial resources be supported at adequate levels for the long-term.

Significant Accomplishments (FY16 — Present):

- ⇒ 880,011 giant salvinia weevils were produced and stocked in East Texas lakes to control giant salvinia
- ⇒ 6 rapid response events successfully contained introductions of giant salvinia at Lake Fork (n =2), Falcon Lake, Brandy Branch (n = 2), and Martin Creek reservoirs
- ⇒ 80 marinas were visited as part of an outreach program to promote invasive species prevention strategies
- ⇒ 6,700 acres of saltcedar were treated along 178 miles of the upper Brazos River to restore habitats for wildlife, including game birds and endangered fishes
- ⇒ 575,000 registered boaters are receiving "Clean, Drain and Dry" invasive species outreach and prevention materials
- ⇒ 25 miles of river were monitored and treated along the Llano River and tributaries to control invasive elephant ear
- ⇒ 380 landowners cooperated to manage Arundo along more than 128 miles of Hill Country rivers
- ⇒ 56 high-risk lakes were monitored to aid in early detection of zebra mussels
- ⇒ 58 rivers and lakes were managed to control infestations of aquatic invasive plants
- ⇒ 35,064 acres of giant salvinia were treated with herbicides on East Texas lakes including 7,491 acres at Toledo Bend Reservoir, 8,203 acres at Sam Rayburn Reservoir, and 13,555 acres at Caddo Lake
- ⇒ 1,960 boats were inspected at 57 boat ramps on lakes infested or at high-risk for zebra mussels
- ⇒ 313 million impressions were made through radio, online, print, and outdoor advertising as part of the giant salvinia and zebra mussel public awareness campaigns

Additional project descriptions and status reports are available at the following link:

<http://tpwd.texas.gov/landwater/water/aquatic-invasives/projects.phtml>.

Virginia – No update provided.

West Virginia – No update provided.

Wisconsin – Submitted by Tim Campbell, University of Wisconsin Extension

- The 2nd Great Lakes Briefs on Invasive Organisms Symposium (GL BIOTIC) will be hosted as part of the Upper Midwest Invasive Species Conference (UMISC) in October. There will be 25 OIT-related speakers that cover topics including outreach, risk assessment, enforcement, industry perspectives, live bait, and responding to OIT invasions. Register for UMISC to take part in the GL BIOTIC Symposium.
- We are working with Dr. Bret Shaw at UW-Madison on two separate projects
 - The first is to develop acceptable alternatives to the religious and cultural release of live animals. This project will involve a survey of natural resource managers to determine what practices would be acceptable to them while also interviewing animal release practitioners to learn what alternative practices could be used that also meet the intent of the practice. The results will be reported into two fact sheets – one for natural resource managers and one for practitioners. A conversation guide will also be created to help natural resource managers talk about the issue. This should be completed by spring 2019.
 - The second is a social media experiment to test how different message frames used in invasive species communication affect stakeholder engagement. With the help of a graphic designer, we operationalized these message frames into illustrations that we have been using in standardized paid Facebook advertising. By the end of the experiment we should know which message frames are most engaging which should lead to more efficient communications. This project should be completed by fall 2018.
- We will be hosting our 5th Drain Campaign and our 10th annual 4th of July Landing Blitz. The Drain Campaign targets anglers and promotes better compliance with our water movement laws by providing anglers with ice packs to use to transport their catch home. The 4th of July Landing Blitz targets the infrequent boater while also thanking those that are taking AIS prevention actions with SAH! towels. We inspected more than 20,000 boats and contacted more than 35,000 people between the two efforts in 2017.
- UWEX will be administering our boater/angler survey in fall of 2018. We administer this survey every five years to measure awareness and compliance of AIS regulations. We can also use it to find knowledge gaps that we can then address with new outreach programs (e.g. the Drain Campaign). The report for this survey will likely be complete by spring 2019.
- With the help of GLRI funding, we are working with the Great Lakes Civilian Conservation Corps (GL CCC), based in Racine, WI, to implement watercraft inspections along the Great Lakes coast in southeast Wisconsin. They have submitted applications to other funding sources to expand

their program in WI. Other CCC programs, especially ones that use Americorps funding, may be a way to expand watercraft inspections in other states.

Wyoming – No update provided.

Federal Agency Member Updates

NOAA – No update provided.

NPS – No update provided.

USACE – Submitted by Mark Cornish, U.S. Army Corps of Engineers

Asian carp –



Aquatic nuisance species electrical dispersal barrier system, Romeoville, Illinois

Chicago Sanitary and Ship Canal:

All existing barriers [Barrier I (aka the Demonstration Barrier), Barrier IIA, and Barrier IIB] are currently fully operational. They are all operated simultaneously unless a barrier needs to be off line for maintenance.

A more permanent, upgraded Barrier I (often referred to as Permanent Barrier I or PB1) is currently under construction. PB1 will include the current Demonstration Barrier refreshed with new electrodes and an additional new system of higher-powered electrode arrays in a new control building. The underwater structures for the new arrays of PB1 have been completed and construction of the main control building and backup power systems will be complete this summer.

The last major contract for PB1 is to supply and install the specialized electrical pulse-generating equipment for the new arrays within the main building. This contract will be competitively

advertised in mid-June with the intent of awarding this fiscal year. Installation will be completed in FY 2020. PB1 will likely be activated in 2021 after completion of safety testing.

Engineer Research and Development Center (ERDC) developed electrical operating protocols to stop Asian Carp from passing through the existing barriers (IIA and IIB) under different environmental conditions. Chicago is using these recommendations on DC parameters – 2.3 v/inch, 34 Hz, 1.5 ms.

ERDC is still in the process of evaluating very small Bighead and Silver Carp during summer conditions. Research results will be used to parameterize the new Permanent Barrier 1 still under construction.

GLMRIS Study: Brandon Road Lock and Dam:

The Corps is working aggressively on the Brandon Road Study and is seeking opportunities to complete the Chief's Report sooner than August of 2019. A regional partnership is crucial to achieving an implementable and sustainable project. In essence the Corps wants to establish multiple defensive barriers at Brandon Road to prevent the movement of Asian Carp into the Des Plaines River and eventually the Chicago Sanitary and Ship Canal. Numerous management and control technologies are being examined for employment at this facility.

Great Lakes Restoration Initiative:

Evaluating AC electricity at ERDC this summer as a new type of barrier that may be easier and more economical to deploy compared to DC pulse.

Other:

Conducting salinity tolerance testing to evaluate movement of the Asian Carp invasive front into Gulf Coastal Tributaries. Tagged Asian Carp entrained through the Bonnet Carre Spillway to monitor potential movement from the Spillway, through Lake Pontchartrain, into the Pearl/Pascagoula Rivers.

Harmful Algal Blooms –

Harmful Algal Blooms are becoming a much more significant problem for Corps of Engineers Districts. We are facing problems in Florida, the Great Lakes, New England, Texas, the Pacific Northwest and many other areas. ERDC has begun three research projects to examine various mechanisms to identify, manage or control these blooms. Additionally, ERDC researchers are supporting various Districts that are attempting to minimize the negative impacts from harmful algal blooms. The USACE Invasive Species Leadership Team is developing a HAB module for their interpretive invasive species traveling trunk program.

Phragmites –



Phragmites in the Mississippi River delta, Louisiana.

The Corps continues to collaborate with Louisiana State University and USGS National Wetlands Research Center to monitor and evaluate the declining populations of Phragmites in southern Louisiana. The Corps has assisted with the:

- Inventory and pre-process moderate and high resolution satellite imagery
- Landsat-5 TM and Landsat-8 (2008-2017); 6 multispectral bands/30meter spatial resolution
- WorldView-2 and -3 (2012-2017); 8 multispectral bands/<2meter spatial resolution
- Radiometric and atmospheric processing of WV imagery

Reed Canarygrass –



Reed canarygrass field on USACE Mississippi River bottomlands near La Crescent, Minnesota

BMPs –

The St. Paul District, is partnering with the biology department at the University of Wisconsin, La Crosse, on a study to identify best management techniques to restore floodplain forest on Corps-owned lands invaded with reed canary grass. Corps natural resource managers from the environmental section in La Crescent are working with undergraduate researchers from the university to plant willow and cottonwood cuttings into established reed canary grass. The cuttings were collected during the fall or spring dormant, leaf-off seasons. Researchers will monitor growth and survival of the cuttings for several years and provide future management recommendations back to the St. Paul District. Randy Urich POC. <http://www.mvp.usace.army.mil/Media/News-Releases/Article/1101586/corps-working-with-university-of-wisconsin-students-to-save-local-wetlands/>

USCG – No representative

USDA APHIS – No representative

USDA Forest Service – No update provided.

USEPA – No update provided.

USFWS – Submitted by Emily Pherigo, Columbia Fish and Wildlife Conservation Office on behalf of the Asian carp technical committee of the Missouri River Natural Resources Committee

- State and federal agency partners concerned about the impacts of a growing Asian carp population in the Missouri River Basin formed the Asian carp technical committee within the Missouri River Natural Resources Committee(MRNRC).
- State partners wrote *The Missouri River Basin Asian carp control strategy framework* (Framework) to implement the *Management and Control Plan for Bighead, Black, Grass, and Silver Carps in the United States* (National Plan) at the sub-basin level.
- The Framework was approved by the Asian carp technical committee and the executive committee of the MRNRC in April 2018. The document was distributed to MICRA, the Asian Carp Advisory Committee, and was posted on asiancarp.us in May 2018.
- Partners are actively conducting management and research in the Missouri River Basin. Projects range from defining the spatial extent and demographics of the Missouri River Basin Asian carp populations to applying management actions in select waterbodies.
- Missouri River Basin partners are forming priorities for the next 3-5 years that will address goals of the Framework.

USGS – No update provided.

Canada Federal Member Update

Department of Fisheries and Oceans Canada – No update provided.

Regional Member Update

MICRA – No written update provided. Update provided at the coordination meeting.

University/Research Member Updates

National Sea Grant Program (Upper Basin) – No update provided.

National Sea Grant Program (Lower Basin) – Julie Lively Anderson, Louisiana Sea Grant

Louisiana Sea Grant (LSG) has been involved with outreach, public awareness, and research of ANS. Internally, presentations have been done to all the marine extension agents on Roseau Cane Scale and Giant salvinia. Roseau cane, *Phragmites australis* was detected in Plaquemines Parish in 2016. Significant regions of die-off were reported from the lower Mississippi River Delta, and LSG has helped with research, monitoring, and education. Giant salvinia continues to be a significant problem across of the Louisiana's waterways. This has caused problems for recreational fishermen, duck hunters, alligator hunters, and even shrimp boats trying to get out of dock. Agents with Louisiana Sea Grant have assisted with monitoring projects involving giant salvinia and various control measures including weevils. Asian carp reports are also still increasing in the locations and the density across Louisiana.

In Fall 2017, a new project began to characterize the freshwater commercial fishery in Louisiana. Conversations with management, fish buyers, and processors have included discussions about ANS. Commercial fishermen surveys will begin in July 2018 and include questions about which ANS have the largest impact on their activities.

During continual outreach events, ANS was an activity with 20 teachers at WETSHOP in July and an exhibit at Ocean Commotion with over 2,000 2nd-8th graders and 300+ teachers and chaperones.

University of Minnesota – No update provided.

At-Large Member Updates

No updates provided.