

Kim Bogenschutz  
Aquatic Invasive Species Program Coordinator  
Iowa Department of Natural Resources  
1436 255<sup>th</sup> Street  
Boone, Iowa 50036  
Kim.Bogenschutz@dnr.iowa.gov  
515-290-0540

The Aquatic Invasive Species Program (DNR–AIS) staff in 2019 consisted of 1 full-time Coordinator/Natural Resources Biologist, 1 full-time Natural Resources Technician, and 19 seasonal Natural Resources Aides (14 watercraft inspectors, 5 survey crew). Iowa Lakeside Laboratory students assisted with watercraft inspections in Dickinson County in 2019.

Accomplishments in 2019 included the following:

- Employed 19 Seasonal Natural Resources Aides
- Conducted 8,059 watercraft inspections reaching almost 22,533 people
- Conducted 88 angler interviews on 20 trout streams
- Supported 23 partnerships and cooperative projects
- Gave 19 presentations at conferences and outdoor events
- Appeared 2 times on live local morning television program
- Leased 4 billboards with AIS prevention messages on interstate and state highways
- Ran 125,000 video ads targeting water recreation user groups
- Used geo-fencing to target 654,930 ads to visitors at high use boat ramps
- Ran 59 television ads about AIS and the Iowa AIS Law
- Targeted water recreationists with AIS prevention messages using boat ramp signs, print media, radio interviews, websites, social media, displays, and presentations
- Chemically treated invasive aquatic plants in 20 waterbodies
- Completed 111 full-lake vegetation surveys
- Surveyed vegetation at 87 access points on 26 lakes
- Surveyed adult zebra mussels in Crystal Lake, Lake Cornelia, and Storm Lake
- Placed zebra mussel veliger settlement samplers in lakes and reservoirs across the state
- Collected and analyzed 72 water samples from 36 lakes and rivers for zebra mussel veligers
- Surveyed Asian carp and/or bigmouth buffalo populations 10 times in interior rivers
- Purchased supplies for DNR Fisheries management stations and hatcheries to prevent the spread of AIS during operations

Nine new infestations of invasive aquatic plants were discovered in Iowa in 2019: Eurasian watermilfoil (3), brittle naiad (2), flowering rush (1), water lettuce (2), water hyacinth (1). Eurasian watermilfoil has been identified in 57 waterbodies, including private ponds, in Iowa since 1993, and brittle naiad has been identified in 65 waterbodies since 2003. 2019 was the first year that flowering rush, water lettuce, and water hyacinth were found in public waterbodies in Iowa outside of the Mississippi River.

The following lakes in Iowa have known infestations of zebra mussels: Bluebill Lake (2012), Blue Pit Lake (2016), Center Lake (2018), Clear Lake (2005), Crystal Lake (2019,) Lake Cornelia (2014), Lost Island Lake (2018), the Spirit/Okoboji chain of lakes (2012), and Storm Lake (2018). The new infestation at Crystal Lake was discovered from settlement sampler monitoring in 2019.

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. Extensive flooding in the Upper Mississippi River Basin during spring and summer of 2019 led to two new location records for Silver Carp in Iowa: Wapsipinicon River (Jones County), Maquoketa River (Jackson County). DNR-AIS staff surveyed Bighead Carp, Silver Carp, and Grass Carp in the Des Moines, Cedar, and Iowa Rivers to monitor reproduction and the upstream advance of their populations. 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.

DNR-AIS staff worked with staff from Story County Conservation Board, Iowa State University, and the Iowa Wildlife Center to coordinate a project in conjunction with Rummage RAMPage in Ames where individuals could turn in unwanted pets and plants as they were dropping off unwanted household items for the rummage sale. A geofencing and targeted internet video outreach campaign targeting aquarium and water garden owners was piloted in central Iowa in October and November, 2019.

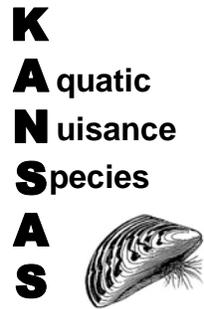
## **Indiana Spring Update 2020**

The Indiana Department of Natural Resources continues its efforts to prevent the spread of AIS species throughout the state of Indiana but especially across the Watershed divide between the Mississippi River Basin watershed and the Great Lakes watershed.

Indiana Department of Natural Resources has continued to utilize state and Great Lakes Restoration Initiative funding to provide for the implementation of the state AIS management plan implementation but also over the last couple years to combat two high priority Aquatic Invasive Plants. In August 2006, DNR biologists discovered hydrilla during routine sampling at Lake Manitou, an 809 acre lake located in northern Indiana. In response to this first discovery of hydrilla in the Midwest, IDNR implemented a rapid response plan that included initial quarantine of the lake to prevent its spread and an eradication program utilizing season-long herbicide application strategies. Along with an aggressive control effort in with the goal of eradication, IDNR implemented an adaptive surveillance program that included tuber sampling, aquatic vegetation sampling, and scuba diver visual surveys. Over a 12 year history that involved 10 years of season long herbicide applications and the last 6 consecutive years without hydrilla detection within the lake we were able to declare this project a successful eradication. The total cost for the project was \$2,950,000. While that number seems large it is a small price to pay to keep one of the worst invasive aquatic plants out of Indiana waters.

We also continue to fight the spread of EWM and the growth of Starry Stonewort in northeast Indiana. This macro algae especially has proven very difficult to control but we continue to try different chemical prescriptions and are coordinating with universities and plant control companies with hopes of finding better tools that are effective at limiting the growth and success of this invasive aquatic plant. The aggressive and large scale control and eradication efforts have slowed the spread of this aggressive macro alga but have yet to provide the answers to the best path forward.

Along with many other representatives of the AIS programs in the Midwest we continue to be engaged and participating in the following groups: Great Lakes Panel, Mississippi River Basin Panel, the Invasive Mussel Collaborative, Interstate ANS planning group, Indiana Invasive Species Council, regional hydrilla coordination and Asian Carp Regional Coordinating Committee .



# Kansas ANS Management Program

*Report to the Mississippi River Basin Panel on ANS management*

Submitted February 19, 2020

by: Chris Steffen, ANS Coordinator

## 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.

- On September 4<sup>th</sup>, the Kansas Department of Wildlife, Parks, and Tourism hosted a stop featuring Asian Carp for Senator Moran's 2019 Conservation Tour. The event was held at Kaw Point Park at the confluence of the Kansas and Missouri Rivers. Participants of the tour, including Senator Moran, were first provided an overview of ANS and Asian Carp and then loaded into electrofishing boats to experience the Asian Carp on the river first-hand. The educational event and electrofishing activities were well received by participants and the event was covered by local news stations.





- A KDWPT funded project looking at demographics, distribution, and natal origin of Asian Carp in the Kansas River continues to make progress. UNL Master's student Jake Werner has finished his second (and final) field season. The objectives of the project are to:
  1. 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
  2. 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
  3. Identify presence and upstream extent of black carp
  4. Determine flows required for successful upstream passage of Bowersock Dam
  5. Compare body condition and abundance and of native fishes (e.g., bigmouth buffalo, gizzard shad) above and below Bowersock Dam (This objective has been dropped due to very low catch rates of gizzard shad and bigmouth buffalo).

Sampling was conducted in the summers of 2018 and 2019 on three sections of the Kansas River: segment one is between the confluence with the Missouri River and the WaterOne Coffey Dam, segment two is between the WaterOne Coffey Dam and Bowersock Dam, and segment three is between the Bowersock Dam and the Topeka Weir.

- Otoliths were extracted from both Bighead and Silver Carp over the course of the project.

- Ablation of otoliths for microchemistry analysis is complete, but data has not yet been analyzed.
  - Water microchemistry samples for Sr, Ba, Mg, and Ca composition in the Kansas River and the Missouri River above and below the confluence with the Kansas River were collected during 3 events and have been analyzed. This information will be used in conjunction with otolith microchemistry to address objective 1.
  - eDNA samples have been collected, but results are not yet available. Results will be used to address objective 3.
  - For population demographic sampling, electrofishing (traditional and dozer trawl) and mini-fyke nets were used. No Asian Carp have been collected in segment three (above the Bowersock dam). Both Bighead and Silver Carp adults were captured in segment one and two. No juvenile Bighead Carp have been captured; juvenile Silver Carp were captured in both segments one and two, but were far more abundant in segment one.
  - Field work for the project is complete. Analysis of data and completion of Master's Thesis is expected by end of 2020. Publications will follow.
- Increased capacity (personnel) of ANS program – added 1 new FTE (60% of time devoted to ANS duties) to establish and manage watercraft inspection and decontamination (WID) program. Position will also address aquatic vegetation concerns and have education and outreach duties.
  - Regulatory changes
    - Added Marbled Crayfish to Prohibited Species list.
    - Prohibited the movement of live crayfish, leeches, amphibians and mussels. They may only be used within the common drainage where caught and cannot be transported above any upstream dam or barrier. This rule now aligns the regulations for all aquatic bait with our rules for the movement of fish.
    - Updated and clarified ANS designated waters. Asian Carp section previously noted “tributaries of the MO River,” which was not specific enough for law enforcement needs. Now all individual streams are named.
  - Zebra mussels were detected in Lyon State Fishing Lake in June of 2019.
    - 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, Tuttle Creek Reservoir, and Geary State Fishing Lake in 2017.
    - The 110 other waterbodies sampled for zebra mussel veligers were negative.

- Red Swamp Crayfish were documented in the wild for the first time in Kansas. The crayfish were first detected during a routine bait shop inspection. An investigation in conjunction with law enforcement determined that the crayfish were sourced from a pond in Butler County. Unfortunately, the population has been established for 5+ years and has spread into a nearby creek; eradication will not be attempted. Inspections were conducted at 90 other bait shops across the state with no further incidents. ANS literature was 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. For 2019, Geo-targeting was used to increase the likelihood that users at (or near) a lake would see ANS ads when they opened their Facebook account. As part of a larger goal to improve the efficiency of our education and outreach efforts, we compared targeting ANS Facebook ads at zebra mussel infested lakes vs. non-infested lakes. Users at infested lakes had significantly higher click rates than those at uninfested lakes. Our interpretation is that ANS education at outreach efforts should be continued (or possibly increased) even after a lake becomes infested with zebra mussels.
- Kansas continues to participate in the *Don't Let it Loose* campaign. The program has been well received and very popular with pet shop owners. We are supplying additional bags as pet shops request them. We plan to continue purchasing bags in the future and revisiting the locations.
- KDWPT continues to contribute 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.
- 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 significant disease. In addition, hatchery staff were trained to conduct health sampling should a disease outbreak require immediate collection of samples.
- ANS literature and outreach materials were distributed to all KDWPT offices, state parks, nature centers, baitshops, marinas and at educational events.
- ANS signage was maintained at ANS infested waters and prevention awareness signs were placed at uninfested lakes.

Kentucky – Submitted by Jessica Morris, Andrew Stump, and Ron Brooks (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 ANS Program Coordinator (Ron Brooks), 5 full time biologists (Christopher Hickey, Andrew Stump, Jessica Morris, Joshua Tompkins, and Matthew Combs), and 4 full time technicians. Other fisheries staff in KDFWR contribute their time to ANS projects on an as needed/available basis.

Accomplishments and findings to date in 2019 include the following:

#### KDFWR Aquatic Nuisance Species Plan:

The KDFWR Aquatic Nuisance Species Plan has not been updated since its introduction in 2008. Currently, the document is receiving updates to several sections. The aquatic nuisance species list has been updated using records and spatial queries for invasive species up to 50 miles outside of the Kentucky border. Plan objectives have been revised and the document is in the process of being rewritten to reflect the changes. Previously, KDFWR employees had planned on updating and reestablishing contact with Kentucky ANS Task Force members in 2019, but are attempting to finish a first draft of the revised document before attempting to contact task force members for input. In addition, we are currently working on a state early detection and rapid response (EDRR) workflow using geographical information systems (GIS). A new database has been established and all previous state records have been added, along with an annual query from the USGS NAS database. Future work in 2020 is focused on completing the plan revision, reestablishing the KY task force, and assigning priority rankings to guide future management efforts.

#### Middle Ohio River Basin Projects:

Asian carp population control measures and project evaluation are on-going collaborations with basin-state partners. In 2019, Kentucky participated in the removal of over 20,000 lbs of invasive carps from the Cannelton, McAlpine, Markland, Meldahl, Greenup, and RC Byrd pools. This marks more than 123,000 lbs of carp removed since the projects began in 2015. In addition, monitoring of the carp populations in this section of river has given us the resolution needed to make recommendations on population control measures and management actions. In 2019 we established a contract angler program for the Cannelton and McAlpine pools of the Ohio River. This has increased harvest pressure in order to lower density-dependent progression of Silver and Bighead carp upriver. The program currently has 13 anglers on contract and has facilitated the removal of approximately 60,000 lbs of invasive carps over 80 days of effort in the Cannelton pool alone.

The KDFWR also participated in telemetry and juvenile Asian carp projects, aimed at understanding movement, habitat selection, and recruitment of fish along the ORB in the pools mentioned above. The KDFWR conducted larval tows and aided in receiver downloads and data analysis. This has led to a better understanding of Asian carp establishment and spawning extent in the Ohio River in addition to allowing removal crews to pinpoint locations and effective removal strategies for furthering population control. This information has also helped to fill in knowledge for the ORB contingency planning and has set most of the boundaries for the establishment zone when considering Silver Carp populations.

#### West Kentucky Projects:

*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. Since the program began in 2013, the Asian Carp Harvest Program has facilitated the harvest of 11.7 million pounds of Asian carp from Kentucky’s waters. In 2019, 25 commercial fishers participated in the ACHP in 2019 on 2,188 fishing trips. On those trips commercial fishers reported harvest of 49,698 lbs of bighead carp and 5,767,836 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 48 ride alongs with 19 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 to be paid to commercial fishers at 5 cents per pound above what was paid by the processor. In 2019, KDFWR modified the subsidy so that \$0.05 / pound is paid for Asian carp greater than 7 pounds, and \$0.10 / pound is paid for Asian carp weighing less than 7 pounds. This is to account for the difference in price for this size of fish at most markets and to incentivize harvest of smaller fish. In 2019, KDFWR paid out \$207,421.00 in subsidy funds for Asian carp harvested from Kentucky and Barkley lakes.

#### *Western Kentucky Silver Carp Demographics*

In 2019, KDFWR continued to collect data from silver carp harvested from both Kentucky and Barkley Lakes. Results indicated that silver carp in Lake Barkley continue to be larger on average than silver carp in Kentucky Lake and also have a higher growth rate. Ages of silver carp ranged from 2-9 years old, with age 4 being the dominant year class represented in both lakes.

#### *Estimating Relative Abundance of Asian Carp*

In 2018 KDFWR began a three-pronged approach to estimate the relative abundance of Asian carp in Kentucky and Barkley lakes. The three prongs are standardized sampling with gill nets, a mark-recapture study, and in depth analysis of commercial harvest data. Standardized sampling in 2019 occurred in April, July, and October in both Kentucky and Barkley lakes. Sampling effort in Kentucky Lake resulted in the capture of 251 Asian carp with silver carp ranging in size from 515 mm – 964 mm. In Lake Barkley, 186 Asian carp were captured and silver carp ranged in size from 563 mm – 935 mm. The 600mm size class of silver carp dominated catches in both lakes. This sampling will be continued in subsequent years in the months of April, July, and October. The mark-recapture portion of this study is in coordination with Tennessee Wildlife Resources Agency and began in September 2018. Tagging efforts extended for one week in each lake and resulted in 1292 silver carp being tagged in both lakes combined. To date, 20 tagged fish have been recaptured and reported through the commercial fishery. Data collected through the commercial fishery continues to be analyzed yearly and fully captured in KDFWR’s annual report.

#### *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. To date, KDFWR has worked with Two River Fisheries to test several passive net systems used to harvest Asian carp in China. However, these gears have been unsuccessful in capturing Asian carp in numbers great enough to warrant continued use. KDFWR has partnered with the USFWS for use of their Paupier Net system in Kentucky Lake and

Lake Barkley on 5 occasions. The Paupier Net was successful in capturing Asian carp throughout all sampling periods (1,009 Asian carp in 2019). In October of 2019, the USFWS also conducted sampling with an electrified dozer trawl for Asian carp. This resulted in the capture of 135 silver carp from Kentucky Lake. In 2019, KDFWR-CSI fished experimental gill nets in Kentucky and Barkley lakes capturing 3,521 Asian carp (29,504 lbs). Electrofishing was used for Asian carp removal efforts in the lower Cumberland River resulting in the removal of 24,302 pounds of Asian carp.

#### *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. However, high water levels in the spring months prohibited sampling efforts. In 2019 fall sampling efforts produced 7,848 fish comprised of 44 species during 6.75 hours of effort. During sampling efforts, skipjack herring was the most abundant species captured in the Kentucky Tailwater, whereas, Gizzard shad were the most abundant species captured in the Barkley Tailwater. The most common sport fishes captured in both tailwaters were bluegill, largemouth bass, smallmouth bass and flathead catfish. KDFWR also conducted an access point creel survey in Kentucky Lake tailwaters and Lake Barkley tailwaters. Over 2,600 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 ranked Asian carp highly among the reasons for dissatisfaction. During the creel survey it was estimated that anglers caught over 10,000 Asian carp in Kentucky tailwaters and over 17,000 Asian carp in the Barkley tailwaters. This is a slight decrease since the previous creel survey was conducted in 2016. The creel survey will be conducted again in 2022.

#### *Tracking Silver Carp Movement in the Tennessee and Cumberland Rivers*

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. In 2019 KDFWR & partners surgically implanted 155 silver carp with transmitters in the Lake Barkley tailwaters and 11 silver carp in Kentucky Lake. To date, 29 stationary receivers have been deployed in Kentucky waters of the Tennessee and Cumberland rivers. KDFWR staff monitor these receivers and download data on a monthly or bi-monthly schedule depending on location. KDFWR also conduct manual tracking trips on Kentucky Lake and Lake Barkley to increase detections of tagged fish in those systems.

#### *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 has developed a study plan for research to be conducted to determine the efficiency of the BAFF for deterring Asian carp movement. 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 throughout the deployment and testing of the BAFF. The BAFF was installed in 2019 and commissioned on November 8th, 2019.

KDFWR will continue to provide support to the research team throughout testing of this system. KDFWR has also worked with neighboring state natural resource agencies to develop a strategic plan for Asian carp barriers in the Tennessee, Cumberland, and Ohio Rivers, for implementation once funding becomes available.

#### *Incidental Black Carp Detections and Monitoring Efforts*

In 2019 two black carp were captured by a commercial fisherman using trotlines baited with silver carp, used as cut bait, to attract catfish. Both black carp were caught by hooks in the mouth, indicating that they were actively feeding on the cut bait. Previously, all black carp captured in the lakes were caught by commercial fishermen using gill nets. KDFWR recovered 23 black carp caught in the Ohio River, and 3 in the Mississippi River by commercial fishers using gill nets. All black carp reported were collected by KDFWR staff, dissected, and sections were shipped on ice to the respective laboratories for analysis (Black Carp Processing Protocol, USGS). Of the black carp mentioned above, 22 were male and 5 were female, and one was unknown due to the fish being gutted prior to pick-up. Length ranged from 33.9 - 40.9 inches, and weight ranged from 16.2 – 57.6 lbs. Additional black carp were captured in Kentucky waters of the Ohio and Mississippi Rivers during 2019, that were reported or turned into staff at Southern Illinois University at Carbondale. A complete listing of black carp captures and reported locations is kept by the USGS on the Nuisance Aquatic Species data base (<https://nas.er.usgs.gov/>). In 2018 the first reported capture of a young of year black carp in Kentucky was found. This black carp was captured in Gar Creek, a tributary of the Ohio River in Ballard County, Kentucky. In 2019, KDFWR staff intended to sample the area for additional young of year black carp. However, water levels in the adjacent Ohio River prevented sampling for the majority of the year. KDFWR staff did make an attempt to sample Gar Creek in August of 2019, but no black carp were captured during this effort.



*LDWF Office of Fisheries*

## **Louisiana - Aquatic Invasive Species report to MRBP, Spring 2020**

### **General Summary**

To help the public contact LDWF with ANS reports, Louisiana Department of Wildlife and Fisheries (LDWF) added an email contact [aquaticinvasives@wlf.la.gov](mailto:aquaticinvasives@wlf.la.gov). This email along with our ANS Hotline has increased our ANS reports from the public to over 850 reports during 2019. The hotline allows the public to record a voice message which is then emailed to the ANS coordinator for remote access. Both the email and hotline allow additional biologists to respond as needed.

In 2019, the LDWF outreach section had approximately 37 events where ANS displays and literature was available to the public. Of note were 2 cub scout day camps with 150 cub scouts ranging from 1<sup>st</sup> to 5<sup>th</sup> grade where the LDWF ANS coordinator had a display and presentation about invasive species. Another scout event with over 500 people had an ANS outreach table. LDWF outreach and LDWF ANS Coordinator hope that the scouts and their families who are often in the outdoors report ANS sightings to LDWF. The potential parasite and toxins of apple snails was a main talking point at the scout events since the local area had many apple snails.

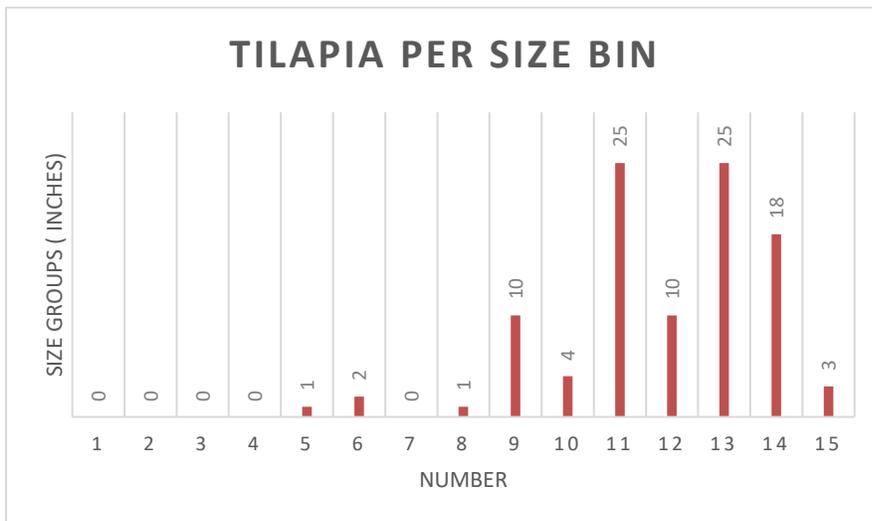
ANS coordinator Bobby Reed retired on April 1, 2019. Robert Bourgeois who had previously served in this role assumed those duties again.

### **New 2019 Invasions**

**Asian Swamp eels:** In late June 2019, LDWF was contacted with a report from a local university professor that they had caught Asian swamp eels in Bayou St John outside of New Orleans. They were identified as *Monopterus albus*. Sampling by LDWF and the local University professors have shown that the Swamp eels occur in about a 2 mile stretch of the bayou. LDWF has developed a management plan to try to contain the swamp eels to this local area. This plan includes periodic electro-fishing, juvenile eel trapping, habitat reduction through the spraying of invasive vegetation and stocking of known eel predators. LDWF biggest concern is that the eels will escape this area and impact the states crawfish and rice farms. There have been over 65 caught. The eels ranged in size from 43 mm TL to

815mm TL and represented many different size/age classes including juveniles which led us to believe we have a breeding population.

**Tilapia:** Nile tilapia (*Oreochromis niloticus*) were reported in a private pond near Shreveport, LA. After discussion with the land owner, it was determined that he caught the fish in Texas and stocked his own pond. LDWF sampled the downstream lake. No tilapia were detected in any areas outside of the initial reported pond. LDWF treated the pond with rotenone and killed 99 tilapia. The varied in size from 4 to 14 inches. With fish that was carrying eggs in its mouth. LDWF will likely do a follow up sampling in the spring to ensure the population was eradicated.



Blue tilapia (*Oreochromis aureus*) have been captured in the University Lakes of Baton Rouge. During a routine sampling event LDWF Inland Fisheries electrofished 1 tilapia. Within a week, another tilapia was reported via a Facebook group. After discussion with the person who posted, it was determined that the second fish was below the weir of the University Lake in an outfall canal. Investigations into how these fish got in the lakes are ongoing. Follow up surveys have resulted in 22 tilapia being captured with a concentration in one part of the lake system. To date all of the tilapia aged have resulted in ages of approximately 1 year old. The ovaries of the fish captured in January are starting to develop so we may have reproduction this Spring. LDWF will continue to survey the lakes and surrounding drainages. This drainage ultimately flows into Lake Maurepas and Lake Pontchartrain via Bayou Manchac and the Amite River.

**Pacu:** We had one report of a pacu in the Covington area. It was caught by a fisherman using bread for bait. This fish was released back into the pond and visits did not yield any sightings of the fish. We will check in the spring to see if the fish is caught or sighted again. We do not expect it to survive the winter or for populations to become established as we have had random large pacu sightings in many locations. The pond is in a recreational park so it's likely it was an aquarium release. The pacu was reported to be not afraid of people and swam up to take pieces of bread intended for ducks.

## **Current status of established ANS:**

**Tilapia:** There is an existing population of tilapia in the drainage canals and ditches around Port Sulphur, Louisiana 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. All of these fish were determined to be 1 or 2 years old via otolith aging and 6 of them were female. This area was not surveyed in 2018. It is not known how the extreme cold weather of 2018 may have affected tilapia populations in the area. In 2019 a survey of the area yielded 62 tilapia of varying sizes.

**Apple Snail:** During 2019, the Louisiana Department of Wildlife and Fisheries (LDWF) received approximately 750 reports of apple snail infestations. The wet spring and early summer had people reporting apple snail egg clusters on house siding and yard trees some distance from the waterways. A crawfish farmer reported that they were catching 5 gallon buckets full of apple snails in his daily trap hauls. He will report back to us on if his crawfish catch was reduced by the infestation. Apple snails have been reported in the rice growing region of LA. So far no one has reported any impacts to the rice fields.

**Asian Carp:** 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. LDWF inland Fisheries Districts collected ichthyoplankton samples during the months of May and June that will be used to determine the amount of Asian carp larval fish present in locations around the state. This study will be compared to previous samples to see if the distributions have changed. Some black carp were collected during sturgeon recovery operations in ponds in the Bonnet Carre spillway following the flooding from the Mississippi river.

**Zebra Mussels:** Zebra mussels were found in the waters of Blackhawk Scar lakes 2 to 3ft above the water. These mussels probably attached to the woody substrate during the Spring high water events. All mussels were dead.

**Tiger Shrimp:** In 2019, LDWF received 5 reports of tiger shrimp from commercial and recreational angler catches along the Louisiana coastline from the Texas state line to the Mississippi River. The sightings were in nearshore/bay areas during the months of September and October.

**Lionfish:** LDWF's GI-FRL Dive Team continues roving diver surveys in offshore areas during summer months of 2019. Lionfish presence/absence will be determined at each dive sight along with species richness. LDWF is working on a grant to analyze stomach contents via conventional visual methods as well as using genetic barcoding. This project will allow us to see what the lionfish are preying on as well as compare methods.

## **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 2019. Giant salvinia continues to be the most problematic AIS plant in Louisiana. Since 2010, LDWF has treated an average of 22,461 acres of giant salvinia per year with herbicides. LDWF uses an integrated approach to control aquatic plants, consisting of chemical, physical (AIS boom, 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 \$5,500,000 of which more than 50% of that is spent on giant salvinia alone for monitoring, treatment, and research.

**Mississippi's Freshwater ANS Report for the  
Mississippi River Basin Panel on Aquatic Nuisance Species  
March 2020 Meeting– Cedar Creek, Texas**

**By  
Dennis Riecke  
Mississippi Department of Wildlife, Fisheries, & Parks**

**New Activities from April 2019 – January 2020**

**Aquatic Plant Control Activities**

Giant Salvinia management in Ross Barnett Reservoir included:

- Containment with floating booms within Pelahatchie Bay
- Prescribed fire to burn vegetation which harbored Giant Salvinia
- Brush removal from slough area to make herbicide treatments applicable to remaining known infestation.
- Opening recreational access while maintaining barrier to the main lake.
- Maintaining drawdown through September 2019 to desiccate remaining plants.
- Filling the lake to pool in October 2020.
- Inspection of previously infested areas treated and burned were clear upon initial survey.
- Initial Fall 2019 survey discovered new colonies in new areas. These colonies were boomed off and treated with herbicide.
- Pieces of Giant Salvinia were found in Fall 2019 outside the containment area in water hyacinth mats requiring extensive monitoring and shoreline treatments.
- Surveys and plant treatments continuing.

MDWFP fisheries biologists chemically treated Water Hyacinth, Alligatorweed, Cuban bulrush, Hydrilla, and Giant Salvinia at Ross Barnett Reservoir

Contracted for aerial application of 2,4 D by helicopter to treat 200 acres of Water Hyacinth for \$16,000 at Horseshoe Lake ( September – October 2019).

Purchased 600 feet of floating boom (\$4,340) to contain Water Hyacinth at Horseshoe Lake.

MDWFP fisheries biologists chemically treated 5 acres of Water Hyacinth at Horseshoe Lake (October 2019) and Crystal Lake in Flowood, MS; Alligatorweed at Mayes Lake in Jackson; MS; Filamentous algae treated at Shadow Lake (Roosevelt State Park) in Morton MS and Hydrilla at JP Coleman State Park.

# MDWFP – Mississippi Freshwater Aquatic Nuisance Species Report

## March 2020 meeting of the Mississippi River Basin Panel on Aquatic Nuisance Species

---

### **Coordination Activities**

Attended meetings (June 2019, September 2019, December 2019) of the Mississippi Aquatic Invasive Species Council to guide implementation of the activities specified in the *Mississippi State Management Plan for Aquatic Invasive Species*. Updated federal ANS funding and project document.

Attended Gulf and South Atlantic Panel on Aquatic Invasive Species in November 2019 in Charleston, SC.

Reviewed the Lower Mississippi River Conservation Committee (LMRCC) Asian Carp Strategy document. Reviewed Asian Carp Project Templates. LMRCC Conference Call on Asian Carp projects

Met with Chef Philippe to discuss contract fishing on Pickwick Lake.

### **Information & Education Activities**

Gave oral presentations on Aquatic Nuisance Species at the Mississippi Museum of Natural Science, the Magnolia Fly Fishers Club and to state fisheries biologist working in Alabama and Tennessee.

Did a radio show presentation on Northern Snakeheads and Silver Carp.

Exhibited the Mississippi Aquatic Invasive Species Council display at the Reel Good Time event in July 2019.

Wrote Silver Carp life history article for *Mississippi Outdoors* magazine (November-December 2019 issue).

Composed *Asian Carp Status in Mississippi* document in response to information request from a venture capital firm.

Met with and provided information on harvesting Asian Carp and commercial fishing regulations to Moon River Foods personnel.

Completed Species Matrix for Lacey Act request from the Mississippi River Basin Regional Panel on Aquatic Nuisance Species.

Provided information and edited the Asian Carp Seafood Watch report compiled by the Monterey Bay Aquarium.

Submitted annual report for federal ANS grant.

Reviewed a Black Carp manuscript submitted for publication in the *N. American Journal of Fisheries Management*.

Edited the Gulf & South Atlantic Panel on Aquatic Invasive Species website (July 2019)

# MDWFP – Mississippi Freshwater Aquatic Nuisance Species Report

## March 2020 meeting of the Mississippi River Basin Panel on Aquatic Nuisance Species

---

Issued importation permit for Silvery Minnow to the Corps of Engineers, Environmental Research and Development Center.

Issued 6 Special Permits for the harvest of Asian Carp at Moon Lake. (September 2019).

Draft aquatic plant control sheets were developed by MSU for Hydrilla, Giant Salvinia, Water Hyacinth, Alligatorweed and Torpedograss (October 2019).

Completed survey on aquatic plant control funding and activities sent out by the Aquatic Ecosystem Restoration Foundation (October 2019).

### **Monitoring & Reporting Activities**

Collected Northern Snakeheads from 3 more locations (Lake Beulah- April 2019, Desoto Lake- June & July 2019, Horseshoe Lake- July 2019) Reported these occurrences to the USGS NAS database. Spawning confirmed.

### **Research Activities**

Helped a student from UAPB collect silver carp otoliths for some micro chemistry research.

Project activities performed by Mississippi State University personnel/students in September 2019 for the research project:

“Development of management strategy for surveillance and containment of invading Asian carp in waters connected to the Tennessee River”

- Hired graduate student to work on the research
- Ordered gill nets as per standards set by the cooperators
- Attended organizational meeting at Wheeler Lake
- Requested from TVA historical fish collection data on nine mainstem reservoirs
- Coordinated deployment of Vemco receivers with TN Tech cooperators
- Conducted a site visit of the study area (Bay Springs Reservoir, Pickwick Lake) and coordinated storage of field equipment with Bay Springs Reservoir office of the USACE

### **New Detections**

No new species. New locations for Silver Carp – Pearl River and Eagle Lake.

### **Ongoing Activities**

Coordinated and administered federal ANS grant. Submitted amendment in July 2019 for coordination, information and education activities and for research on “Development of management strategy for surveillance and containment of invading Asian carp in waters connected to the Tennessee River”. Amendment approved in September 2019

Continued Asian Carp Telemetry Project on Pickwick and Tenn -Tom Waterway.

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*.

# MDWFP – Mississippi Freshwater Aquatic Nuisance Species Report

## March 2020 meeting of the Mississippi River Basin Panel on Aquatic Nuisance 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**

Continue surveying state lakes for aquatic invasive plants.

Develop management and control fact sheets on invasive aquatic plants

Continue chemical treatments of Giant Salvinia at Ross Barnett Reservoir and survey reservoir for new occurrences.

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, the Divide Cut, and Bay Springs.

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.

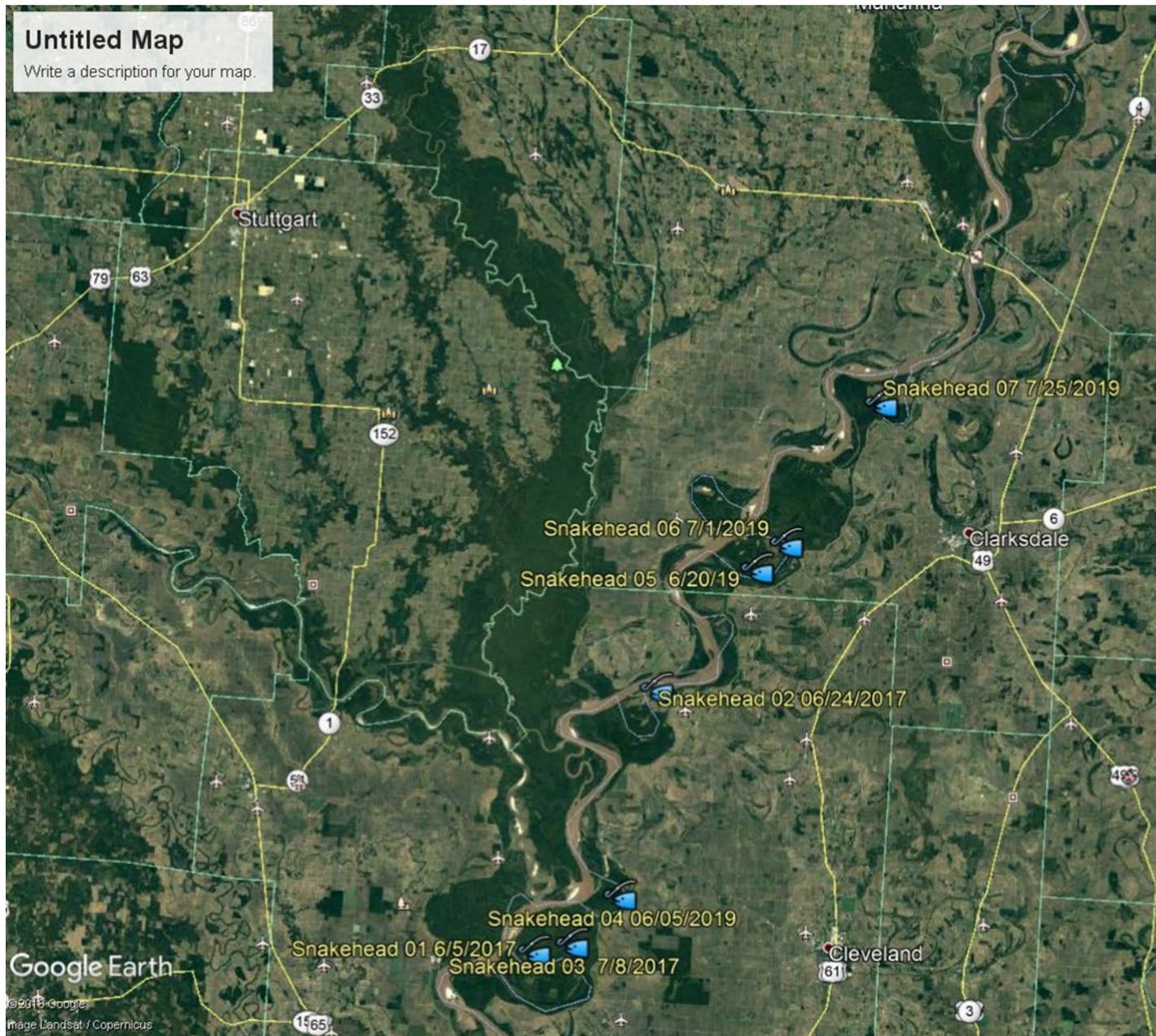
Establish an EDRR monitoring program comprised of state and federal personnel who sample aquatic species in Mississippi public waterways on a routine basis.

Submit backlog of reported nonnative species occurrences to ANS database.

Work on revisions to the *Mississippi State Management Plan for Aquatic Invasive Species*

MDWFP – Mississippi Freshwater Aquatic Nuisance Species Report  
March 2020 meeting of the  
Mississippi River Basin Panel on Aquatic Nuisance Species

---



Northern Snakehead Distribution in Mississippi 2017-2019  
5 locations, 7 fish collected, Adults with fry at two locations in June-July 2019

### Ohio MRBP Report (3/3/20)

- Continued control efforts of *Hydrilla* in the Ohio River basins.
- Continued to monitor for Bighead Carp and Silver Carp in the Ohio and Muskingum Rivers using eDNA, routine sampling activities, and telemetry.
- Closed to Ohio Erie Canal GLMRIS connection in Akron, Ohio and continue to work on closing the GLMRIS connections at Little Killbuck Creek and Grand Lake St Marys.
- 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". Continue to distribute the *Ohio Aquatic Invasive Species* guide (second printing; third planned).
- Participated in the following groups: Great Lakes Panel, Mississippi River Basin Panel, Ohio Aquatic Invasive Species Committee, and Asian Carp Regional Coordinating Committee.
- Added New Zealand Mudsnail and Marbled Crayfish as Injurious species in Ohio.
- Working with the Ohio Department of Agriculture to add 18 aquatic invasive species to their prohibited list.
- Ohio Aquatic Invasive Species Committee (an informal stakeholder advisory) has continued to meet twice each year).

# Oklahoma ANS Management Program

Final Report to the U.S. Fish and Wildlife Service for  
January 1 2019 – December 31, 2019

Prepared by Curtis Tackett  
Aquatic Nuisance Species Program Coordinator  
Oklahoma Department of Wildlife Conservation

## Summary

The Oklahoma Department of Wildlife Conservation's (ODWC) Aquatic Nuisance Species (ANS) Program includes outreach, education, research, monitoring, and coordination on an interstate and basin level. ODWC has been closely involved with the Oklahoma Invasive Plant Council (OKIPC), the Mississippi River Basin Panel (MRBP), and the ANS Task Force to discuss new invasive species threats to southern waters, research opportunities for emerging ANS issues, and strategies for outreach to user groups. The ANS coordinator serves on the Outreach and Education committee for the MRBP and attended the annual coordination meeting and Asian carp sampling workshop that were held in Cadiz, KY during April . The ANS coordinator also serves as an active board member for the OKIPC and has renewed his board member term for 2020-2022.

The ANS coordinator attended the ODWC Fisheries Division annual meeting during June 2019 and provided a statewide ANS update to all fisheries staff and administration that were in attendance. This included updates updates on zebra mussel early detection sampling and Asian carp distributions throughout the state.

The ANS coordinator is continuing a partnership with Oklahoma State University (OSU) and Lake Carl Blackwell staff in regards to the treatment and management of Yellow Floating Heart (*Nymphoides peltata*) in Lake Carl Blackwell in Payne County. ODWC has purchased herbicide and application surfactant for OSU and contractors to apply to the plant in various coves during 2017 and 2018. Due to undesired success with the glyphosate treatments OSU and contractors decided to try a new herbicide product in 2019 called ProcellaCor. During July of 2019 ODWC provided an airboat and operator to apply the new herbicide to the affected areas throughout the lake. Upon follow up assessments of the application it is determined that the new herbicide product provided a substantial reduction in the overall plant density and it is believed that future spot treatments is all that will be required to potentially eradicate the plant from the lake.

As an early detection effort, ODWC in coordination with the Tishomingo USFWS Office continues to sample a list of Oklahoma Lakes where zebra mussels have not been detected for early detection purposes. The ANS coordinator sampled a total of 20 lakes during June which are listed here: Arcadia, Bell Cow, Stanley Draper, Atoka, Broken Bow, Hugo, Pine Creek,

Sardis, Birch, Copan, Hulah, Ellsworth, Fuqua, Lawtonka, Dripping Springs, Holdenville, Shawnee Twins, Wes Watkins, Greenleaf, and Tenkiller. Samples were sent to the BOR lab in Denver for analysis and we are still awaiting results. All sample analysis records are kept in an online database housed by the BOR for multiple states. Discussions with the BOR revealed that they have discontinued their veliger sampling for BOR lakes in OK. Therefore ODWC and the USFWS Tishomingo FWCO may consider adding some BOR lakes to our sampling routine.

ODWC's fisheries division also maintains a Hazard Analysis and Critical Control Points (HACCP) program to ensure that all watercraft and sampling gear are decontaminated. Each fisheries regional office has a heated pressure washer and approved chemicals to treat their equipment before entering a new body of water. This program has been broadened to other divisions within the wildlife department as well as other state and federal agencies and universities.

## **Major Accomplishments**

The ANS coordinator brings together other state and federal agencies within Oklahoma and also on an interstate level to coordinate meetings with stakeholders, user groups and the general public. The ANS program relies solely on securing federal funds for the existence of the program and for committing a coordinator role to implement the ANS Management Plan.

ODWC is actively involved in the MRBP, MICRA, and ANSTF for data sharing and coordination of ANS related activities on a regional level. The coordinator also stays up to date on the Western Regional Panel and what ANS issues the western states are facing. The coordinator has also been actively involved with the Asian carp partnership groups through the FWS and the LMRCC regarding the WRRDA funding. The ANS coordinator also serves on the Outreach and Education committee for the MRBP and worked with the committee chair to run the committee meeting and address agenda items and new ideas at the annual meeting in Cadiz, KY. The coordinator also works with Wildlife Diversity program staff to develop invasive species needs as they relate to species of greatest conservation need (SGCN) and assists in reviewing proposals for the State Wildlife Grant (SWG) program. An ANS priority was developed and included in the fall 2019 Request for Proposals for the State Wildlife Grant program as well as the Sportfish Restoration program. Proposals are currently being reviewed internally for Asian carp population assessment projects in the lower Red River.

The ODWC fisheries division staff and the ANS coordinator are providing technical assistance to Oklahoma State University and Lake Staff at Lake Carl Blackwell for the herbicide treatment of Yellow Floating Heart that has been established in the lake for 3 years now. Fisheries division staff provided an airboat and operator for the herbicide application of the chemical ProcettaCor during the summer of 2019. Post-treatment monitoring has shown great success of the application and a significant reduction in the density of the plant throughout the lake. The ANS coordinator is also continuing oversight of the Invasive Aquatic Plant SWG project that is scheduled to be completed in 2020. Results of this project will include an updated distribution map of aquatic invasive plant species throughout OK as well as a website page with

plant distribution and information about each species. The draft page can be found at <https://biosurvey.ou.edu/developing-the-aquatic-invasive-plants-of-oklahoma/>.

The coordinator has been working with the USFWS and the Lower Mississippi River Conservation Commission (LMRCC) on the completion of the Asian Carp Control Strategy Framework for the Arkansas River and Red River sub-basins. The ANS coordinator has attended multiple conference calls to discuss the increase in Asian carp funding and has been working both internally and with our research partners to develop proposals for submission.

ODWC's ANS program relies on federal funds from the USFWS to support the ANS coordinator and most of the operations of the program. ODWC has viewed the ANS program as successful and has dedicated state funds to supplement the program. The ANS coordinator submitted the grant proposal for the USFWS funding for the implementation of the state ANS management plans and will continue to submit these proposals and necessary reports on an annual basis as long as funding is available to states for the implementation of the ANS Management Plans. We are eager to see the funding increase for the state ANS Plans so that states can have more resources to better address the increasing threats of aquatic invasive species.

The ANS boater survey was completed in 2009 and a final report with additional data was submitted in 2010. The ANS plan was updated in 2010 and is probably due for an official update and approval by the ANS Task Force at some point in the near future. ANS awareness has increased across the state due to the outreach efforts of ODWC and other stakeholders and agencies however the results of the 2019 angler survey described below reveals that we definitely need to increase our outreach efforts even more for 2020 and beyond. Year 2020 will likely be focused on Asian carp assessment planning work as well as continued zebra mussel veliger early detection sampling. We will continue outreach efforts of ANS throughout the state and new outreach ideas and efforts will be pursued with our I&E staff. The ANS coordinator will continue to work with our university research partners on aquatic invasive species issues.

In 2019 ODWC launched a newly updated angler survey to get feedback from our constituents about their fishing experiences in Oklahoma. The ANS coordinator worked with our Human Dimensions specialist to develop questions in the survey about Aquatic Nuisance Species in OK. This was a unique way to receive feedback from the public about invasive species in our state. The questions were pulled from the ANS boater mail out survey that ODWC completed in 2009 and modified to fit the information need for now 10 years later. The brief ANS results of this survey are attached at the end of this report.

A distribution list of ANS in Oklahoma as well as a detailed map has been generated by the ANS coordinator and displayed in several publications and presentations and this will be updated with the most current Asian carp data, zebra mussel detections (pending results) and invasive plant data from SWG project. The ANS coordinator keeps a master database of all ANS occurrences in OK as well as a separate Asian carp database that includes all known captures of bighead and silver carp to date. The Asian carp database includes location data of capture as well as biological data such as length, weight, and age data. Both the master ANS database and the Asian carp database are shared with various other agencies and researchers as

needed. Currently the biggest threat to Oklahoma's fisheries and aquatic resources are bighead and silver carp, aquatic invasive plants, and zebra mussels. As mentioned before, the University of Oklahoma is conducting an aquatic invasive plant project through our State Wildlife Grants program and one of the end results will be a detailed map of updated distributions of non-native invasive aquatic plant species. The ANS coordinator was successful in the addition of an ANS priority on the Request for Proposals (RFP) for both the State Wildlife Grants Program and the Sportfish Restoration Program. proposals. The ODWC is currently funding 2 invasive crayfish projects through Sportfish Restoration and will also be pursuing an Asian carp project in the lower Red River and tributaries through the increased USFWS Asian carp funding.

Since 2010, several regulation changes were proposed and approved. ODWC has changed import/export requirements for all loads of aquatic wildlife crossing Oklahoma's borders. Each transporter must receive an approved import/export permit for each load of aquatic wildlife prior to entering or leaving the state. It is now illegal to launch any watercraft into public waters with attached zebra mussels and or aquatic vegetation. Oklahoma has also prohibited the sale of diploid grass carp for stocking in private waters. Only triploids may be stocked in private waters. Shad may not be transported from "Asian carp infested waters". This list of waters is set by the fisheries division and is subject to change on an annual basis through the Oklahoma Fishing Guide. Rusty crayfish and Australian red claw crayfish have also been added to the restricted species list of aquatic wildlife. One new regulation that was passed during 2017 was to prohibit the stocking of any aquatic organism into public waters without ODWC's Director's approval including fish, plants, mussels, crayfish etc. This regulation went into effect January 1, 2018. No new regulation proposals pertaining to ANS were drafted during 2019 but there are internal discussions to review and possibly propose changes to the "restricted aquatic species" list in state Title 800.

The ANS coordinator continues to serve on the board of directors for the Oklahoma Invasive Plant Council and was voted in to serve another term on the board. The OKIPC is a non-profit organization that serves as a clearinghouse for invasive plant information. Board member involvement includes attending quarterly board meetings/conference calls, assisting in making decisions for steering the council's outreach efforts, and helping with organizing and development of the annual meeting. The OKIPC held a business meeting during February 2019 at the Oklahoma Natural Resources Conference (OKNRC) in Tulsa, OK and the ANS coordinator attended and provided an ANS update to the Board. The ANS coordinator attended various conference calls with the board throughout this reporting period and worked on various outreach efforts through the Council including fact sheets for the website and preparing materials for the upcoming National Invasive Species Awareness Week in 2019. The ANS coordinator will also be attending the OKNRC in Tulsa, OK during February 2020 to attend the OKIPC board meeting and assist with the invasive species presentation session and educational booth. The OKIPC has a citizen science program that reaches out to other volunteer groups for the reporting of invasive plants throughout OK. Outreach efforts have been accomplished in various ODWC publications for the purpose of the public reporting ANS especially Asian Carp and Zebra Mussels. The coordinator along with I&E staff developed an online citizen science page on the ODWC website that allows for the

reporting of invasive species as well as provides links to the OKinvasives.org website and the OKIPC website and these sites are maintained annually.

The ODWC is currently funding a project through the State Wildlife Grants program involving the establishment of Aquatic Invasive Plants in Oklahoma. This project includes surveying public lakes statewide for seven target species: Hydrilla, Brazilian Waterweed, Parrot Feather Watermilfoil, Eurasian Milfoil, Australian Water Clover, Yellow Iris, and Purple Loosestrife. After data is collected, a distribution map will be generated for these aquatic invasive plant species throughout Oklahoma. Monthly reports from the principal investigator already show some new occurrences for some invasive aquatic plant species. The project summary will be provided when the project is completed in 2020.

The coordinator continues the zebra mussel veliger early detection program and the coordinator was able to increase veliger sampling during 2019 to a total of 20 waterbodies throughout OK. ODWC conducts this early detection sampling in coordination with the Tishomingo USFWS Lakes that were sampled during this time reporting period were Arcadia, Bell Cow, Stanley Draper, Atoka, Broken Bow, Hugo, Pine Creek, Sardis, Birch, Copan, Hulah, Ellsworth, Fuqua, Lawtonka, Dripping Springs, Holdenville, Shawnee Twins, Wes Watkins, Greenleaf, and Tenkiller.

If ODWC is successful in securing federal funds for Asian carp work in OK then we will be able to develop a long-term Asian carp monitoring program in the lower Red River by gathering baseline population demographic data as well as documenting the spatial extent of both species throughout this system including its major tributaries such as the Kiamichi River, Blue River, and the Muddy Boggy.

The Hazard Analysis and Critical Control Points (HACCP) program is implemented each year. It is crucial that ODWC must enforce a decontamination program within the agency and the ANS coordinator has reached out to other agencies to enforce the same policy for watercraft and sampling equipment. All fisheries staff including reservoir staff, streams staff, and hatchery staff conduct HACCP procedures on all sampling equipment and boats before moving from one waterbody to another or one basin to another. These are documented within the that particular fisheries region and plans are constantly being updated to address new issues.

The ANS coordinator has been meeting and coordinating with staff at Lake Carl Blackwell regarding the treatment and potential eradication of Yellow Floating Heart within the lake. This is the first known widespread establishment of this species in Oklahoma and ODWC will continue to coordinate with the lake staff and Oklahoma State University regarding treatment options and monitoring. The first round of herbicide treatments were completed during the summer of 2018 with some positive results in certain coves of the lake and benthic matting was applied near the water intake structure with some positive results. This combination of treatments had limited success. During 2019 ODWC fisheries staff assisted with the application of a new herbicide called ProcellaCor and this application yielded very promising results with a documented 90% reduction in the overall plant density. We are hopeful that future spot treatments in 2020 and beyond could possibly eradicate the plant from the lake or keep it at such a low level that it is a minimal threat.

The ODWC maintains a number of publications and media to promote awareness about ANS. These include our fishing guide regulations, the Lakes of Oklahoma publication, the ODWC website, the Outdoor Oklahoma TV show and magazine, Zap the Zebra and Don't Free Lily brochures, various watch cards, and a number of other pamphlets and stickers.

The coordinator operated the Aquatic Nuisance Species educational booth at ODWC's annual Wildlife EXPO during the fall of 2019 with the help of other wildlife diversity program staff. The total attendance for the 3-day event was estimated at over 46,000 attendees. The event provided various ANS educational materials to the public in the form of display posters, brochures, and various informational games that the public could play to learn about invasive species such as Asian carp and zebra mussels. Various educational handouts generated by the OKIPC were distributed at this event including an invasive plant coloring book, fact sheets, pens, stickers, bags, and water bottles.

The ODWC continued partnership with the OG&E staff to disseminate various zebra mussel outreach materials including fact sheets, signage, and a public press release through the OG&E educational division. The OG&E also assisted with zebra mussel veliger sampling at Konowa Lake.

The ANS coordinator gave various educational programs and presentations including: Oklahoma State University Environmental Science Graduate Program, Northeastern State University Fisheries Management Class, MRBP Asian Carp Workshop, 2019 Oklahoma Bio Blitz, and the Broken Arrow High School Annual Science Expo.

The ANS coordinator regularly meets with ODWC staff as well as other state agencies to discuss updates on the distribution of ANS and management efforts. The coordinator regularly gives ANS updates at the quarterly wildlife diversity meetings, the OKIPC board meetings, the Conservation Exchange Group meeting, Fisheries Division meeting, and various other partner meetings.

The coordinator also moderated the invasive species session at the OK Natural Resources Conference in February which brought together a wide variety of natural resource professionals involved in invasive species work across the state and will be performing the same duties at the 2020 OKNRC in Norman.

The ANS coordinator continues to review and issue all aquatic import permits for Oklahoma and educates the bait industry about invasive species and particularly the regulations pertaining to grass carp ploidy in OK. The ANS coordinator also reviews applications for commercial minnow dealers, commercial turtle harvesters, scientific collections, and ploidy certifications for triploid grass carp and works with those groups on invasive species issues. The ANS coordinator regularly fields inquiries from the public fish hobbyist groups about restricted species in Oklahoma and educates them about why certain species are prohibited.

The Geographic Distribution and Ecological Impact of Aquatic Invasive Plants in OK project is still ongoing with targeted completion in 2020. This project is funded through the State Wildlife Grants program and includes field surveys statewide at public water bodies for

invasive aquatic plants and creating a distribution map of the findings for seven or more target species. The ANS coordinator was successful in the addition of an ANS priority on the Request for Proposals (RFP) for both the State Wildlife Grants Program and the Sportfish Restoration Program. Proposals. ODWC is currently funding two research projects that have an invasive crayfish component. One research project focuses on the Ouachita mountain streams of Southeast OK and the other project focuses its efforts in the NE part of the state in Ozark streams. The ANS coordinator along with fisheries staff and administration will be seeking a research project focused on the population assessment of both bighead and silver carp in the lower Red River and its tributaries through either the new Asian carp funding for the lower Mississippi River sub-basins or through Sportfish Restoration funding.

ANS information is disseminated through a multitude of avenues including the OK fishing guide, outdoor OK magazine and television show, you tube and social media, the department's website, the Lakes of Oklahoma publication, press releases, brochures, watch cards and posters at various events and various commercial permit applications. The new ANS signs have been distributed to all regional fisheries offices and are currently being installed at access points statewide for boaters and anglers. The coordinator with the assistance of I&E staff performed an educational campaign on social media focused on ANS in conjunction with the 2019 National Invasive Species Awareness Week and this will be continued in February 2020.

## BOATING

Over half of all licensed anglers in Oklahoma used a boat for some portion of their fishing in the past 12 months (Fig 16). This includes all active anglers.

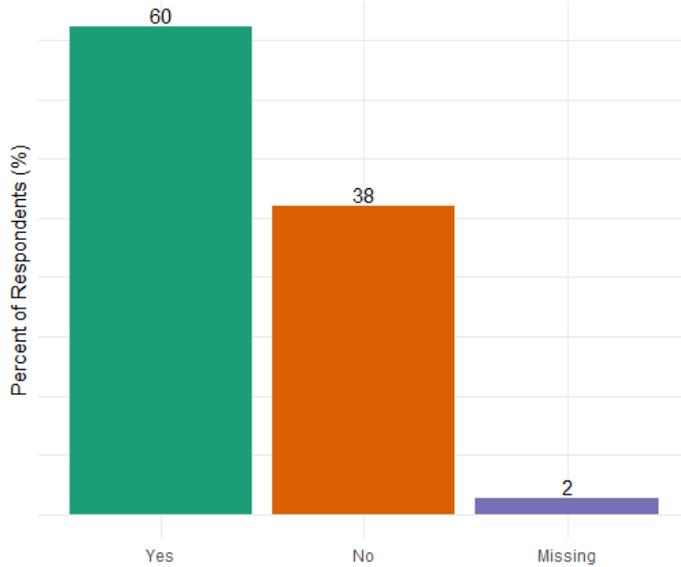


FIGURE 16: RESPONSE OF ANGLERS TO IF THEY USED A BOAT FOR FISHING IN THE LAST 12 MONTHS N=1,370

If anglers said they used a boat to fish, we asked about their actions related to aquatic nuisance species (ANS) prevention. We listed seven actions both positive and negative and asked how often they complete the activities (Table 5). Boaters were generally taking actions to prevent the spread of ANS.

TABLE 5: RESPONSE TO ANS RELATED ACTIONS AND THE FREQUENCY OF ACCOMPLISHING THEM FOR ANGLERS THAT USED A BOAT FOR FISHING IN THE LAST 12 MONTHS

<u>Positive Precautions</u>	Never	Rarely	Sometimes	Always
Conduct visual inspection	8%	10%	25%	56%
Remove aquatic plants and animals	22%	10%	13%	55%
Flush cooling system with tap water	45%	18%	22%	15%
Rinse boat with high pressure or hot water	25%	16%	40%	19%
<u>Negative Actions</u>	Never	Rarely	Sometimes	Always
Move boat to another waterbody without drying	78%	14%	4%	3%
Leave water in boats	77%	11%	8%	4%
Release unwanted live bait into water	56%	11%	18%	15%

We also asked all active anglers (whether they used a boat or not), from what sources they had heard about ANS. Anglers had most commonly heard of aquatic nuisance species through the OK fishing regulations guide (43%). Second most common was boat ramp signs (39%) followed in third by the selection of, “I have not heard of ANS before now” (33%).

## RECOMMENDATIONS

1. Thirty-three percent of anglers had never heard of ANS before this survey. This illuminates the fact that anglers need further education on this threat to aquatic ecosystems in Oklahoma.

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

- **Coordination** – Hosted watercraft inspector and decontaminator (WIT II) training for 40 South Dakota and neighboring states staff. Met with regional fisheries, parks, communications, and law enforcement staff to direct AIS work. Provided training for 12 seasonal AIS interns and all new park ranger/ conservation officer hires. Attended regional coordination meetings, worked with SD Department of Transportation to include conveyance/equipment inspection and decontamination requirements into work contracts.
- **Monitoring** – Deployed 160 Hester-Dendy samplers statewide. Collected 213 veliger samples and processed about half in house with the other half processed by the MT lab. Reproducing populations of zebra mussels were found in Lakes Sharpe and Francis Case. New Zealand mudsnails were discovered in a private hatchery (Trout Haven/Eden Valley) connected to Beaver Creek near Buffalo Gap, Custer Co., SD. Vegetation surveys at almost 500 sites statewide revealed a new infestation of curly pondweed at Pickerel Lake.
- **Watercraft Inspection** – Inspected 2,048 boats statewide, 13 standing water decontaminations performed.
- **Enforcement** – Conducted multiple compliance checks to educate boaters and enforce boat plug rules. Issued 166 tickets and 82 warnings in 2018. Nearly every violation was due to not pulling boat plugs. Provided a local boat registry to help boaters in the zebra mussel containment zone to use their boats without requiring decontamination every trip. As long as the LBR sticker is displayed, they have their boat log/ paperwork, and they don't take their watercraft outside of the transportation zone, the boater is free to use as normal.
- **Outreach** –2019 marketing efforts generated over 4.9 million impressions. Targeted emails and press releases were sent to a distribution group of over 135,000 resident and nonresident fishing license holders. Held a wakeboard package giveaway to survey rec boaters and to get their contact info

for targeted email list. Generated more than 3,000 new contacts with the promotion. Utilized memes, web banner ads, Spotify radio, and social media to educate boaters and drive them to the <http://sdleastwanted.com/> website. There was a 26% increase in overall use of the website from 2018. Used geofencing to send targeted messages to boaters at ramps in our zebra mussel containment zones, generating over 347,000 impressions. Used takeover marketing, wrapping gas pump toppers and ice box wraps with placement gas pump toppers and ice box wraps with placement in key areas statewide.

**Tennessee** – submitted by Cole Harty, ANS Coordinator, Tennessee Wildlife Resources Agency

- Tennessee hired an ANS Coordinator in December 2019.
- High School Fishing Team ANS program and watercraft inspection training informed students about ANS. Program topics were general and state specific. Students were also taught and tested on the importance of preventative measures and watercraft inspection.
- Bass Pro Tour Tournament angler, Michael Neal, partnered with TWRA to promote ANS awareness. Michael displays Agency ANS logo on his boat, truck, and jersey. Michael has made appearances at High School Fishing Team ANS programs and taped several ANS videos for Agency distribution.
- Several ANS education and awareness booths were set up at fishing and boating events across the state. Staff also participated in webinar/podcasts about ANS.
- Hired interns from University of Tennessee at Knoxville to do ANS outreach.
- Initiated research on the use of freshwater prawns as a control for red swamp crayfish.
- Hired interns from University of Tennessee at Martin to assist with Asian carp study evaluating reproductive success, establishing leading edges and abundance of age-0 carp in Kentucky and Barkley Lakes using larval light traps, larval tows, and mini-fyke nets.
- Purchased gill nets for Asian carp sampling on the Tennessee and Cumberland rivers.
- Assessing spatial variation in relative abundance of Asian carp in Kentucky, Pickwick, Barkley, and Cheatham reservoirs.
- Implanted and monitored Asian carp movement and lock and dam passage in the Tennessee and Cumberland rivers.
- Angler reported Silver Carp from Chickamauga Lake – Agency personnel and partners increased surveillance and outreach for Asian carp in response.
- TWRA Asian Carp Harvest Incentive Program (ACHIP) supports commercial fishers and wholesale buyers with monetary incentives applied to harvested Asian carp and by providing gill net webbing material.
- Agency staff served Asian carp at the Bassmaster Classic to promote angler harvest and utilization.
- Participated with the Modified-Unified Method effort on Kentucky Lake.