GULF & SOUTH ATLANTIC REGIONAL PANEL
ON AQUATIC INVASIVE SPECIES
MINUTES
Tuesday, April 10, 2018 – Wednesday, April 11, 2018
Jackson, MS

On Tuesday, April 10, 2018, Chairman **Kristen Sommers** called the meeting to order at 8:30 a.m. The meeting began with introductions of the members and guests. The following were in attendance:

Members & Proxies
James Ballard, GSMFC, Ocean Springs, MS
Tim Bonvechio, GA DNR, Waycross, GA
Rob Emens, NC DEQ, Raleigh, NC
Pam Fuller, USGS, Gainesville, FL
Lisa Gonzalez, HARC, The Woodlands, TX
Tom Jackson, NOAA, Miami, FL (via conference call)
Peter Kingsley-Smith, SC DNR, Charleston, SC
David Knott, At-Large Member, Charleston, SC
Jon Lane, USACE, Jacksonville, FL
Leigh McDougal, USDA Forest Service, Atlanta, GA
Monica McGarrity, TPWD, Austin, TX
Robert McMahon, UT Arlington, Arlington, TX
Michael Pursley, MS DMR, Biloxi, MS
Stephanie Otts, MS-AL Sea Grant, University, MS
Matt Phillips, FWC, Tallahassee, FL
Bobby Reed, LDWF, Lake Charles, LA (via conference call)
Dennis Riecke, MDWFP, Jackson, MS
Kristen Sommers, FL FWC, Tallahassee, FL
Cindy Williams, USFWS, Atlanta, GA

Staff
Ali Wilhelm, GSMFC, Ocean Springs, MS
Joe Ferrer, GSMFC, Ocean Springs, MS

Others
Nathan Aycock, USFWS, Jackson, MS
Mike Beiser, MDEQ, Petal, MS
Chelsea Bohaty, USACE, Jacksonville, FL
Michael Eggleton, UAPB, Pine Bluff, AR
Michael Flinn, Murray State University, Murray, KY
Jan Hoover, U.S. Army Engineer Research and Development Center, Vicksburg, MS
Trevor Knight, MDWFP, Jackson, MS
Gregory Moyer, Mansfield University, Mansfield, PA
Linda Nelson, USACE, Vicksburg, MS
Louise Nicholson, California University of PA, California, PA
Angelie Rodgers, USFWS, Jackson, MS

Gray Turnage, MSU, Starkville, MS

Public Comment

Chairman **Sommers** provided the opportunity for public comment. No public comments were received.

Adoption of Agenda

After a minor change to the agenda, **a motion to adopt the agenda was made, and passed unanimously.**

Approval of Minutes

The minutes of the May 11-12, 2017 GSARP meeting in Savannah, GA were presented for approval.

A motion was made to approve the minutes. The motion was seconded, and the motion passed.

Rotenone Sampling of Oxbow Lakes With and Without Asian Carp

Nathan Aycock gave a PowerPoint presentation entitled "Effects of Asian Carp on Sport Fish in Oxbow Lakes of the Lower Mississippi River". In 2016 and 2017, studies were done in three large Mississippi River oxbows to determine how silver carp and bighead carp affect game fish. The study sites were: Lake Whittington, a 3,000 acre oxbow of the MS River that is river connected, with Asian carp; Tunica Cutoff, a 3,800 acre oxbow of the MS River that is river connected, with Asian carp; Eagle Lake, a 4,700 acre oxbow of MS River that is not river connected, with no reproducing Asian carp. The current fish community composition by rotenone sampling was determined, compared to past samples from the 1980s and 1990s done in those locations, prior to silver and bighead carp introductions. The same methodology was done as the past sampling. In July and August, an 8-man crew set nets, applied rotenone, and picked fish up on the first day. On the second day, fish were picked up. The length and weight were collected on all fish.

In Lake Whittington, Asian carp made up 31% of the total weight of fish caught. In Tunica Lake, Asian carp made up 42% of the total fish weight. In Eagle Lake, Ictaluridae made up 29% of the total fish weight, with Clupeidae making up 21%. The average number of species in the 1990s from the three locations was 22-29. The average number of species currently is 23-30. There was no change in species richness.

It was concluded that when silver carp are present and reproducing, they dominate. There is a dramatic decline in shad and game fish numbers after silver carp are established. Rotenone sampling was highly variable. There is much work to be done to prevent Asian carp expansion into Mississippi reservoirs. There are still fisheries at Lake Whittington and Lake Tunica. Sampling will be replicated at Lake Whittington next summer.

Overview of the Aquatic Invasive Plant Research at Mississippi State University

Gray Turnage gave a PowerPoint presentation entitled "Overview of the Aquatic Invasive Plant Research Program at Mississippi State University". There are two classes of projects at MSU:

Laboratory/mesocosm, and Field. The focus areas of the Turnage Lab are: Aquatic/Wetland Plant Biology and Ecology; Aquatic/Wetland Nuisance (Invasive) Plant Control; UAS Operations (Plant detection and monitoring protocols). There are two facilities at MSU dedicated to aquatic/wetland plant research. Most projects of the MSU program have an extension or outreach component. There are technical reports, professional presentations, poster presentations, and workshops. A *Weed Control Guidelines for Mississippi* was published by MSU for 2017.

At the MSU Aquatic Plant Research Facility (APRF), multiple experiments are running at any given time. In 2017, there were 14 experiments, with some ongoing. The APRF and Greenhouse facilities allow staff to run small pilot projects prior to large field trials. Phenology negates the need to travel to the field as often. Control trials allows staff to screen multiple control options at one time, saving money. UAS operations allows staff to determine issues that arise with flight protocols/plans prior to field ops.

In 2017, 42 waterbodies were surveyed, with 105 aquatic plant species observed, and 15 nonnative plants. The survey was used to prioritize species for control efforts in Mississippi. It was the first statewide survey done.

Overview of the Coastal Mississippi Invasive Species Program

Mike Pursley gave a PowerPoint presentation entitled "Coastal Mississippi's Invasive Species Program". Giant salvinia is a state and federal noxious weed that is common in the Pascagoula and Pearl River. Its biomass doubles every 3-4 days. Weevils are used to help control it. Lionfish moved into Mississippi waters in 2015. They are predatory, with few natural enemies. Full control is not considered feasible. Asian tiger shrimp eat native shrimp and shellfish. They were first sighted in Mississippi in 2009, and appear to be reproducing in the Gulf. They have the possibility to introduce diseases. Sightings are often not reported. Hydrilla is an aquarium plant from Asia that is cold and salinity tolerant. Millions of dollars are spent on maintenance control in Florida. Silver carp outcompetes native fish for plankton. A silver carp was caught in Hancock County in 2014, and there have been recent sightings.

Giant apple snails are a freshwater South American snail sometimes sold as "Mystery Snails". They are "perfect invaders", since they mature in 60-80 days, produce egg masses every two weeks (2,500 eggs/mass average), eggs hatch in 10-14 days, and they spread naturally and are transported by other species. They strip marshes of vegetation, and change plant communities to algal-based. They are carriers of rat lungworm parasite. Millions of dollars of damage to rice crops in Asia was caused by the snails. One Louisiana farmer lost 220 acres of crawfish production. Giant apple snails were discovered in Robinson Bayou in 2014. Since 2014, 11,945 egg masses have been destroyed, and 450 live snails captured. Recent flooding may have spread the infestation. There have been sightings in Louisiana, Alabama, and Mississippi. Control options are limited. In 2001, the MDAC BPI adopted an emergency apple snail regulation. Movement of live apple snails into and within the state is prohibited. In 2006, the USDA banned importation and interstate transport of most apple snails. However, young, immature snails sold in the aquarium trade are difficult or impossible to accurately identify. Taxonomic confirmation can be done on the two species. Mystery snails are *Pomacea bridgesii*, and in many cases not *Pomacea maculata*.

Control methods in coastal Mississippi consist of trapping, capture, and the elimination of egg masses. In Robinson Bayou, the approximate cost of weekly giant apple snail control missions total $624.00. The yearly cost total from 2014-2017 was over $63,000. In 2018, help was received from the Gulf Corps.

A free downloadable app, Workforce for ArcGIS, was created for field data collection. It is easily configurable for any type of project. Work area assignments can be set, data can be remotely uploaded, and the data downloaded in a variety of formats.

Overview of Riparian Plant Control Efforts in Texas

McGarrity gave a PowerPoint presentation entitled "Overview of Riparian Plant Control Efforts in Texas". The TPWD Healthy Creeks Initiative has specific goals: To reduce dominance and impacts of arundo on creeks; enhance habitat for fish and wildlife in important areas for conservation; engage private landowners in conservation efforts. Integrated arundo management consists of biological, cultural, mechanical, and chemical treatments. In 2018, management will expand to two new river basins – Medina and Guadalupe.

In 2016/2017, 6,700 acres along the Upper Brazos River were treated for saltcedar. The Brazos River is a critical habitat for smalleye and sharpnose shiners. Aerial surveys were done, as well as hydrological and biological monitoring. Saltcedar beetles are being used to help control saltcedar.

Don't Let Your Pets Become Pests

McGarrity gave a PowerPoint presentation entitled "Don't Let Your Pets Became Pests". The goals of this campaign are to prevent the introduction and spread of aquatic invasive species in order to help preserve native Texas marine ecosystems; create awareness of impacts of dumping aquarium fish, animals, and plants; inform aquarists of alternatives to dumping their tanks, via information provided on www.TexasInvasives.org/NeverDumpYourTank.

The primary target audience are aquarium owners from Texas coastal areas, between the ages of 18 to 60 years old. The secondary target audience are aquarium stores and pet superstores that are uniquely positioned to increase awareness, and might be able to offer to take back aquarium pets and plants. Marketing tactics include: website, print ad, direct mail, social media, vinyl banners, posters, digital advertising, billboards, and vehicle magnets. The online ad campaign delivered the message to over 225,000 people, with 11,310 clicks to the website, and 2,580,578 impressions in nine weeks.

Efforts in 2018 will include: messaging scuba divers; TPWD television episode and/or video news releases on invasive species; local television station visits with biologists catching lionfish, plecos, etc.; e-banners in TPWD e-newsletters and website; print ads in TPW Magazine and saltwater magazines; press releases to publicize the campaign; possible email campaign.

USACE-ERDC Research on Aquatic Invasive Plants

Linda Nelson gave a PowerPoint presentation entitled "USACE-ERDC Research on Aquatic Invasive Plants". The Aquatic Plant Control Research Program (APCRP) develops effective, economical, and environmentally compatible strategies for assessing and managing invasive

aquatic plant problems. The current focus areas are: biological control, chemical control, ecological assessment, management strategies and applications, and harmful algae.

Funded FY18 projects include: Biological Control of hydrilla and floating hearts in the U.S., and the development of insect biocontrols for *Phragmites* and flowering rush; Chemical Control with ProcellaCOR, evaluating grass-specific herbicides to enhance aquatic restoration, linking plant biology with management strategies to improve control of monoecious hydrilla, comparing generic aquatic herbicides with proprietary compounds, and management of water chestnut.

Ongoing research and development include overseas searches for new insect agents for monoecious hydrilla, phragmites, flowering rush, and crested and yellow floating heart. Momoecious hydrilla, a biotype believed to have originated from Korea, is expanding in the U.S. Leaf-mining *Hydrellia* flies are the only agents for hydrilla in the U.S., but are not effective against the monoecious biotype. Recent genetic characterization was done of hydrilla samples collected from China and Korea. Sites in both countries have been located which contain hydrilla matching the U.S. biotypes (monoecious and dioecious). Genetic characterization indicated the greatest genetic diversity of hydrilla occurs in China, and supports greater array of insect fauna and potential biological control agents. New insect agents identified include: Weevil (*Bagous rufipennis*), fly (ephydridae), midge (chironomidae), moth (cramdidae). The next steps will be to quarantine, establish rearing, and host specificity tests. Two moth species (*Archanara germinipuncta* and *Archanara neurica*) have been selected out of nine potential agents. They are a very low risk of negative impact to native *Phragmites* haplotypes. The next step will be to submit a petition to TAG for field release.

Research is being done to evaluate grass-specific herbicides to enhance aquatic restoration. The objective is to identify and develop grass-specific herbicides for aquatic plant management. Sequential treatments in the late spring worked well, and spot treatment concentrations are most promising for single applications.

USACE-ERDC Research on Invasive Fishes

Jan Hoover gave a PowerPoint presentation entitled "ERDC Research on Invasive Fishes". In the 1990s, research was done on grass carp for age and growth, movements, stocking densities, and innovative collecting techniques. Currently, on entrainment by and dispersal from Bonnet Carré.

Field studies are being done on suckermouth armored catfishes for shoreline erosion in natural and urban waterways, greenhouse demonstrations of reduced aquatic vegetation and periphyton, increased turbidity/phytoplankton, and literature review and workshop identifying multi-level impacts. Field studies are being done on sea lamprey for response to metals and swim performance. For Asian carp, empirically-based population models are being created that reflect extreme capabilities of the species, and management scenarios including barriers and harvest are being evaluated. Tournament-based harvest enables selective sub-sampling from 1000s of fish for jump parameters and population metrics. Observational studies were done on silver carp for spatial patterns and environmental influences. Videographic studies were done of their jump parameters.

External tags were attached to Asian carp entrained at Bonnet Carré. The populations were monitored in the Pearl River system, coincident with Gulf sturgeon studies. Paddlefish are less robust with prolonged exposure to Asian carp.

Developing technologies include chemical disinfection, and synthetic biology for engineered pathogens and engineered fishes with limited lifespans and daughterless strains. Developing industries include dog/cat treats and fish cake patties made from silver carp.

Implications of the Lacey Act Ruling for States

Sommers gave a PowerPoint presentation entitled "Changes to Lacey Act Injurious Species Interpretation". The USFWS and state regulatory lists for injurious species do not always match up. The Lacey Act was established in 1900, with amendments. It prohibits importation into the U.S. Until 2017, interstate transport in the continental U.S. was prohibited. The April 2017 court ruling on the Lacey Act removed the interstate transport provision. Species that may pose a risk to each state, but are not currently regulated at the state level, may now enter from other states.

The direct impacts of injurious species are: direct predation, competition, disease risks, human and safety concerns, social and economic impacts, and secondary impacts. Do nearby states regulate or allow those species? Have they been reported in nearby states? What is the "risk" in each state? There are stakeholder interests for aquaculture, the pet industry, zoos/aquariums, and pet owners/hobbyists.

Possible options for states include: A case-by-case risk assessment for those injurious species not regulated in a state; a one-size-fits-all regulation in a state that places current injurious species into one of the state's regulatory categories; incorporating or referencing injurious wildlife into state regulations; a combination of approaches.

Region 4 USFWS/Small Grants Program/Regional Coordinators Meeting

Williams reported that they will have to now go through a rigorous request, review, and approval for federal expenditures of funding. A table was provided to the panel members showing review levels, and what was required. A spreadsheet must be filled out and sent in with all grants requesting funding. If the amount is over $50K, the request must be sent to the Senior Advisor. If under $50K, it must be sent to the FWS Director. Gulf States Marine Fisheries Commission is 501c(3). **Williams** submitted a request for $97K, followed by a second request for $40K to be added to the small grants program. It is a minimum of 6-8 weeks for the initial review. When approved, it must be sent to the FWS Director. This is the same process as the state grants. It is anticipated that final approval for issuing any grants will not be given until sometime in July. When approval for GSMFC project funding is given from the department, it will be posted on grants.gov for at least five days. **Ballard** will then post funding availability on the GSMFC website, and distribute through the panel members, and those who have applied for funding in the past. **Williams** and **Ballard** are working on how long the advertisement should be posted that project funds are available, to give people time to get their proposal together. **Ballard** will send out the RFP, contingent on the funding being approved, and then go through the ranking process with the review committee, and hopefully have the review completed by the time the funding becomes available.

Update on New Introductions

Fuller gave a PowerPoint presentation entitled "New Non-native Species Occurrences and Program Updates". A bullseye snakehead was found in a Miami-Dade golf course pond. In October 2017, zebra mussel veligers were found in a water sample from the North Fork San Gabriel River in Texas. Lake Georgetown of the San Gabriel River declared to be reproducing later that year. Also in October 2017, six adult zebra mussels were found in Richland Creek at the Richland Chambers Reservoir. An African jewelfish was found in Starke Lake in the Upper St. Johns Drainage in Ocoee, Florida. They appear to be established. Giant salvinia was found in Yellow Creek in the Pickwick Lake Drainage, near Burnsville, Mississippi. More plants were found upstream in Indian Creek, close to the confluence with the Tennessee River. Giant water sensitive plants were found in a pond near Oak Creek in the Peace Drainage in Florida. It is the fourth sighting in the state of Florida, and only the fifth in the country. Crested floating heart was found established in a pond near Beaver and Chocolate Creeks, in the Haw Drainage in North Carolina. Pagoda tiara were found in Lee County, Caloosahatchee, and Big Cypress Swamp Drainages in Florida. They appear to be established in these areas. These are native to Asia, and were an aquarium release. They were recently found in Florida in August 2017, and now on the west coast as of January 2018 and March 2018.

Alert Risk Mapper (NAS ARM) and Flood and Storm Tracking Maps (NAS FaST)

Fuller gave a PowerPoint presentation entitled "USGS Nonindigenous Aquatic Species Aquatic Risk Mapper (NAS ARM)". The NAS Alert System provides a framework for the rapid dissemination of new invasions, and notifies registered users of new sightings. It is part of a national early detection/rapid response system. The National Anthropogenic Barriers Dataset (NABD) includes over 56,000 dams. Barriers within the watershed can limit the spread of aquatic invasive species.

NAS FaST (Nonindigenous Aquatic Species Flood and Storm Tracker) is a new tool to track the possible spread of nonindigenous aquatic species from flood waters of Hurricane Maria. Flooding during storm and hurricane events has the potential to transport nonindigenous aquatic species. As part of the EDRR system the NAS program is interested in alerting managers of these possible new introductions. The program was created to help assess transportation of nonindigenous aquatic species between drainages due to storm surge and inland flooding, and to help natural resource managers determine potential new locations for individual species, or to develop a watch-list of potential new species within a watershed. NAS FaST has current flood maps of Hurricanes Harvey, Irma, Maria, and Nate. There are three stages for the maps after a flooding occurrence. Stage 1 (2-4 days) is the initial response and the creation of a map of potential flooded HUCs. Maps will include information about NAS that could spread. Stage 2 (6-8weeks) is a follow-up of assessment of drainages that had flooding conditions that could breach drainage divides from coastal storm surge or inland flooding. Stage 3 (12-18 months) is the final review of which drainages were connected from flooding and any records of potential NAS transport due to coastal storm surge or inland flooding.

Aquatic Nuisance Species Task Force Update

Williams reported that the last meeting of the Aquatic Nuisance Species Task Force was held on November 9-10, 2016. In April 2017, the department began a review of its advisory boards, which necessitated the postponement of committees, subject to the Federal Advisory Committee

Act, including the Gulf and South Atlantic Regional Panel. On January 10, 2018, a new Task Force charter was signed for operations to resume. The next Task Force meeting is scheduled for June 12-14, 2018. The Notice of Funding Opportunities was posted on March 30, 2018. It closes on April 30, 2018. GSARP funding will remain at $40,000.

Discussion about the Panel's Website Redesign

Joe Ferrer reported that he has been designing the website, but needs assistance with content. **McGarrity** suggested posting information about the most problematic species, what states are doing, products that have come out, and resources. **Pursley** suggested having an archive of past presentations as a reference. **Emens** suggested listing basic information as bullet points about aquatic invasive species, and to post upcoming GSARP meetings. **Kingsley-Smith** suggested a "frequently-asked questions" section, and an experts/agency database. **McMahon** suggested having a database for research reports/publications, and links to other panel websites. **Fuller** suggested having information for public education, with limits. **Bonvechio** suggested having state ANS management plans available. **Gonzalez** suggested providing links to various state's websites for invasive species lists. **Sommers** suggested also having information available just for the panel members, and not for the general public. **Ballard** agreed, and suggested that there be a priority list of the top 10 highest invasive species, with images that could be clicked on to take you to a facts page on that species. He would like the website to be two-fold – information and resources for the public, and for the panel only. **Williams** suggested that the top 10 list would be beneficial. **McDougal** suggested making the website easy to find for the public, and to organize the publications/reports by topics, etc. so they are easier to find on the website. **Riecke** suggested adding a section that explains about invasive species threats and why management and eradication are important, and having information for the general public, boat owners, exotic pet owners, etc. on how they can help stop the spread, report a species, or get assistance on identifying a species. Also, provide links to Habitattitude, Stop Aquatic Hitchhikers, etc. **Ott** suggested having the most relevant issues on the opening page to make it easier to navigate, especially for mobile phone users.

Ballard stated that panel members are needed to work on the website to help review the content and update it. **Pam Fuller**, **Lisa Gonzalez**, and **Dennis Riecke** volunteered to help with the website.

The Chairman again provided the opportunity for public comment. No comments were received.

Wednesday, April 11, 2018

The meeting reconvened at 8:30 a.m. The Chairman again provided the opportunity for public comment. No comments were received.

Tracking of Asian Carp in the Tenn-Tom Waterway

Trevor Knight gave a PowerPoint presentation entitled "Tracking Asian Carp in the Tennessee River and Tenn-Tom Waterway with Acoustic Telemetry". The objectives of the project are to evaluate movements of Asian carp in the TN and Tenn-Tom Waterway, evaluate Asian carp movement through locks and dams, and to continue to update leading edge of Asian carp invasion. From April 2015 through November 2017, staff with the MS Department of Wildlife,

Fisheries and Parks sampled rivers and lakes for Asian carp. Ten adult silver carp were implanted with acoustic tags and external floy tags. The transmitter transmits every 60 seconds, and has a battery life of approximately four years. Data is downloaded via Bluetooth.

Eight of ten tagged carp have been detected at Indian Creek. Nine of ten tagged carp have been detected at the mouth of Yellow Creek. The carp appear to over-winter in Indian Creek. Pulses in the current appeared to trigger movement between Indian and Yellow Creeks. The shortest time between detection of a carp at Indian and Yellow Creeks was eight hours and 49 minutes.

Receiver data will continue to be downloaded and analyzed. Fish will continue to be tagged during cool water. Their movement and passage through locks and dams will continue to be tracked. More receiver sites will possibly be added.

Asian Carp Effects on Age-0 Fish Dynamics in the Lower White River

Michael Eggleton gave a PowerPoint presentation entitled "Silver Carp Establishment in the Lower White River, Arkansas: Effects on Native Fishes". Bighead carp and silver carp population ranges have grown tremendously during the past 10-15 years. In 1975, they were found in the White River drainage. From 2005-2015, they were recorded along the borders of 23 states, with self-sustaining populations in the Mississippi, Missouri, Ohio, and Tennessee Rivers. The fish compete directly with adults of some native species, and juveniles of many species. They can consume up to 20% of their weight per day, most of which is plankton. They mature one year sooner than in China, and their mean sizes exceed those in China by 26%.

The Lower White River is a unique habitat, and has high fish diversity of over 150 fish species, with 11 endemics. It is less altered than most river-floodplain ecosystems, and the nearby Cache-White River confluence is listed as RAMSAR "Wetlands of International Significance". Bighead and grass carps are present, but at low densities. Silver carp have been established within the last decade, but are now highly abundant in many areas. Black carp are still rare, but becoming more common in nearby drainages.

A study was done at the Dale Bumpers White River National Refuge in 15 lakes to compare present-day (2017 post-carp invasion) oxbow lake fish assemblage attributes with historical datasets collected during 2002-2005 (pre-carp invasion), and to examine the relationship between present-day oxbow lake fish assemblage attributes and silver carp densities in oxbow lakes. Results of the study found that in 2017, 12 species were not found, compared to historical (2002) datasets, but 13 new species were collected. Shifts in fish assemblage structure was likely, with some sport fishes affected. It cannot be stated unequivocally, however, that assemblage shifts are due to carps, as periodic or constant assemblage shifts could be normal for these types of systems. More analyses will be done.

Another study was done to quantify juvenile (age-0) fish characteristics (abundance, growth, condition) of selected fish species in lower White River oxbow lakes, and examine the relationships between juvenile fish characteristics and carp densities in these same lakes. Nine "target species" were examined – four piscivores, two planktivores, two omnivores, and one common cyprinid. Results of the study have found that the mean length, weight, and CPUE were all inversely related to carp abundance. Samples are currently being processed that will be used

to estimate total fat content from composite samples of each target species and lake. One total fat estimate will be generated per species and lake, with fat estimates modeled vs. carp rank abundance. The general condition and fitness after first growing season and entering first winter will be reflected, which is critical to future year-class strength for many species. Additional juvenile measures vs. carp rank abundances will be modeled. Research will allow for the development of further hypotheses on carp effects, and will possibly be the basis for future experimental work. More analyses will be done in spring and summer 2018.

Diet Overlap Between Asian Carp and Gizzard Shad in Kentucky Lake

Michael Flinn gave a PowerPoint presentation entitled "Differential Niche Overlap of Invasive Silver Carp and Native Planktivores at Various Life Stages in Kentucky Lake". Kentucky Lake is the largest flood storage reservoir east of the Mississippi River. It has a large commercial fishery, and is a popular destination for bass and crappie fishing.

Silver carp were first officially reported in Kentucky Lake in 2004. They likely invaded the lake through the lock and dam. There was evidence of silver carp reproduction in 2015. There is evidence of competition, as the body condition of native bigmouth buffalo and gizzard shad was reduced, and bigmouth buffalo populations decreased.

Research was done to determine if competition between silver carp and other planktivores could be quantified; determine how ontogeny influences the potential for competition; seasonal (spring/summer) influence on the potential for competition; spatial differences in resource utilization and niche overlap in Kentucky Lake, Lower Tennessee River, Ohio River, Clarks River, and the Illinois River. Fish were collected via gill net and boat electrofishing. The length and weight were measured, and aging structures and tissue samples were extracted. The tissue samples were analyzed at Southern Illinois University in Carbondale. Isotopic niche is tightly correlated with trophic niche, which allows for estimate of shared resource use. Trophic niche equals resource use (food and habitat). Seasonal results showed that in the spring, the niche overlap does not equate to gut content overlap. Adult silver carp and juvenile threadfin shad do not share resources. Adult silver carp and adult gizzard shad share resources. Juvenile silver carp and juvenile gizzard shad share resources. Adult silver carp and juvenile gizzard shad share resources. In summer, there was no overlap between adult silver carp and juvenile threadfin shad. Trophic positions are similar. There was no overlap between adult silver carp and juvenile threadfin shad. Trophic positions are similar. Adult silver carp share resources with adult gizzard shad. Seasonal shifts showed that path direction indicates what is contributing to their diet. Adult silver carp and phytoplankton have similar path directions. Phytoplankton is the primary diet item. Adult gizzard shad and zooplankton have similar path directions. Zooplankton is the primary diet item. Juvenile threadfin shad do not follow path directions of end members. Juvenile threadfin shad switch feeding mechanisms. Groups become more enriched in nitrogen during the summer, with the exception of juvenile threadfin shad. Spatial differences in resource utilization and niche overlap results showed that there is spatial variation in niche overlap. Silver carp appear to consume more pelagic prey items than gizzard shad. Silver carp and gizzard shad share resources in Kentucky Lake, but threadfin shad do not. Juvenile silver carp and gizzard shad share more resources than adults. Competition is also occurring in the Illinois River. Core isotopic niche overlap varies by system. There is no resource overlap in the Ohio and Clarks Rivers. Competition depends on food and space availability. If competition ensues, there could

be declines in zooplankton and phytoplankton populations, body condition of planktivores, and abundance of plantivores.

Future research will be done on management strategies for mass removal of silver carp. A telemetry project to determine movement patterns through the systems is ongoing. Silver carp abundance, body condition of native planktivores, and phytoplankton and zooplankton abundance and community dynamics will continue to be monitored.

Developing eDNA Protocols for the Early Detection of Rusty Crayfish

Louise Nicholson gave a PowerPoint presentation entitled "Environmental DNA (eDNA) Protocols for Early Detection of Rusty Crayfish in Lotic Systems". Rusty crayfish are invasive in 20 states. They are native to the Ohio River basin. They were introduced through bait buckets, educational use, and intentional release. Rusty crayfish impact native species through: Increased interspecific competition and displacement of native crayfishes; increased rates of predation by fishes; hybridization with native crayfishes. They impact other species through destruction of aquatic plant beds and trophic shifts in predator-prey/grazer-vegetation relationships, and shifts in macroinvertebrate/fish assemblages.

The potential advantage of environmental DNA (eDNA) detection of invasive species is that it provides a highly sensitive method for detecting invasive species at low densities without the need for invasive sampling, but it has had varying degrees of success. In question are what factors affect eDNA detection rates for rusty crayfish, and if eDNA sampling is an effective method for detecting rusty crayfish in lotic systems. Water samples were collected under varying laboratory conditions, and preserved by filtration and ethanol and 3M sodium acetate. A field test protocol was done. Crayfish were collected from Blacklog Creek and maintained in aquaria. A laboratory model stream was used, and the crayfish were introduced to the stream in tethered cages. Tissue samples were used for initial protocol testing. PCR primers amplified cytochrome c oxidase subunit 1 (COI) gene. Results showed that eDNA detection is affected by crayfish density, but not by crayfish size. The sex ratio affects detection strength. In lotic conditions, eDNA detection is more variable. Detection reliability increased when appendages/moulted exoskeletons were present. Sites will be re-sampled in spring/summer, when crayfish are likely to be moulting. The detection method will be modified. Water quality parameters that influence detection rates will be identified.

Monitoring for *Didymosphenia geminat*:An Environmental DNA Approach

Gregory Moyer gave a PowerPoint presentation entitled "Applications of eDNA Methods for Inventory and Monitoring of Aquatic Species". The goal of the project was to monitor for *Didymosphenia geminate* using eDNA. Didymo, also known as "snot rock", is an extracellular polysaccharide stalk.

A total of 31 Tennessee streams were surveyed for snot rock. Stream water was filtered using a drift net, 240 mm in diameter. After a two minute soak, 5ml of water was taken for microscope analysis. It was concentrated to 50ml and then frozen. Samples were duplicated. Methods used were microscope analysis and eDNA analysis. An assay was developed, with negative and positive controls, and an internal positive control. Results from eDNA showed all positive rxns

worked. There was no contamination in negatives, and no PCR inhibition. Standard microscope evaluation was fast, and can be used with limited training.

Detection of quagga mussels using eDNA will be done to confirm their presence in a quarry linked to the Susquehanna River.

A Motion was made to move the Vice Chairman (Gonzalez) into the Chairman position. It was seconded, and the Motion passed.

State Reports/ Members Forum

Florida

Sommers spoke on FWC's development of innovative control methods to increase the number of lionfish removed from shallow water reefs by incentivizing divers and dive boat operators, and to fund research to develop methodologies to remove lionfish from waters beyond the reach of recreational divers. The FWC is asking for assistance from Florida's divers and dive organizations to increase lionfish harvesting efforts, and the FWC created the Lionfish Harvest Reimbursement Program, which began in January 2018. Dive boat captains will conduct a lionfish harvest trip, and be eligible for reimbursement if the total lionfish harvest from the day's trip is equal to six lionfish multiplied by the total number of divers. The qualifying total harvest is achievable for divers removing lionfish from areas of the state that vary in population density. This system also allows for experienced harvesters to compensate for less experienced individuals, since the eligibility is based on the total number of lionfish removed during the trip, and not on the number of lionfish harvested per diver.

The FWC will launch their new Tagged-Lionfish Program in May 2018. This program uses dart-tagged lionfish to incentivize divers to continue removing lionfish from Florida waters. The tagged lionfish will be released on public artificial reef sites, and those divers who harvest the tagged lionfish will be rewarded either monetarily or in product form. Four to six lionfish will be tagged at each of 50 randomly-selected public artificial reef sites statewide between the depths of 80-120 feet. Additionally, the program can provide valuable data on the movement of lionfish based on the location of the fish when tagged, and when harvested.

In 2017, the FWC announced a funding opportunity for stakeholders to research, test, and develop equipment and methodologies for harvesting lionfish recreational dive limits that are greater than 130 feet. The request for proposals was announced in September 2017, and eleven proposals were submitted. Five vendors were awarded contracts in December 2017. Contracts with vendors have been compiled, and are under review by both parties prior to execution. The FWC's Wildlife Impact Management Section contracted with the University of Florida's Tropical Aquaculture Laboratory staff to generate biological synopses of other members of the scorpionfish family, and to test, evaluate, and apply the Aquatic Species Invasiveness Screening Kit (AS-ISK) to the lionfish genera *Dendrochirus*, *Parapterois*, and *Pterois*. The biological synopses for 13 species of lionfish have been completed. To date, one UF assessor has evaluated all 13 species using the AS-ISK tool, and other independent evaluations are in progress. *Pterois volitans* and *P. miles* were assigned risk scores of 34 and 35, which are higher that any other

species of lionfish. The completed assessments will provide an estimate of risk category for each species (low, medium, or high) and an estimate of relative risk of all the species.

Fishbrain is one of the largest fish reporting apps available to anglers around the world. The FWC and Fishbrain have partnered to use these reports as a tool to help determine the distribution of selected nonnative fish species. To date, 2,169 usable nonnative fish reports have been reviewed by the FWC. A total of nineteen freshwater, and one marine nonnative fish species were confirmed in these submitted reports.

A two-day “Fish Slam” event was held on November 7-8, 2017 in which 31 fishery biologists from 11 agencies used a variety of sampling methods to collect nonnative fishes. The objectives of Fish Slams are to sample waterbodies not normally sampled by biologists, and to determine if nonnative fish populations are established or spreading. A total of 20 nonnative fish species were collected from 35 sites in Broward and Miami-Dade counties. No new nonnative species were collected.

A population of bay snook was discovered in 2014 in a series of interconnected waterbodies in Pinecrest Gardens in Miami-Dade County. These waters also held a variety of other nonnative fish species, including koi, pacu, redtail catfish, ripsaw catfish, and blue mbuna. Using rotenone to eradicate these fishes was not practical, due to the property owner's desire to protect the koi. When Hurricane Irma struck in September 2017, most of the large-bodied nonnative fish, including the koi, perished due to low dissolved oxygen levels caused by a power outage, or by stranding after flood waters within the property receded. However, the bay snook and blue mbuna survived. Rotenone was then applied to the pond by FWC personnel. Eight species of nonnative fish were collected, including 158 bay snook, and 145 blue mbuna. Follow-up sampling have not yielded any additional bay snook or blue mbuna. The pond is being restocked with native freshwater fish, with the goal of establishing a native fish community.

The FWC's standardized electrofishing program monitors native and nonnative fish populations in southeast Florida urban canals. To increase the power of this approach, the FWC's WIM Section coordinated with FWC FFM staff to develop a modified sampling protocol based on their long-term monitoring program. The new protocol keeps three fixed-starting point transects that the FWC NFWP has used since 1997. Additionally, 3-5 randomly-chosen daytime transects were added to this protocol. The addition of new transects increased the mean number of nonnative fish species collected per canal by 14%, and the number of native species collected increased by 32%. No new nonnative species were collected.

The winter of 2017/2018 was the coldest in Florida since 2010. Nonnative fish species' intolerance to cold-weather temperature is the primary environmental limiting factor that determines their distribution in Florida. The FWC received 49 cold-water related fish-kill reports through the Fish Kill Hotline. Reports from anglers of dead nonnative fish were also received. The winter fish-kill of 2018 had relatively minor impacts to populations of nonnative fish species, with no expected long-term detrimental effects on them.

In Riverview, FL a population of African clawed frogs was discovered in a small retention pond in 2016. Several ponds were renovated with hydrated lime, but were soon repopulated with

frogs. Traps were placed on the bottom of the pond, but native and African clawed frogs were both killed. Traps set on the surface of the pond were ineffective. A "B" shaped minnow trap proved to be successful, as it kept frogs alive and native species could be released unharmed. A total of 117 waterbodies were sampled, with 12 supporting African clawed frog populations. A total of 20,441 frogs and tadpoles were removed over a four-month period.

The WIM Section will contract with two universities to conduct genetic and disease analysis on African clawed frogs. These frogs are potential vectors of chytrid fungus, a disease linked to global declines in amphibians. The objectives of the study are to determine the adaptive genetic variation in these frogs, and to determine if pathogens may be facilitating or hindering the invasion front of the frogs. The WIM Section will also contract with UF to better understand the spatial extent, invasion potential, and potential management of the frogs by doing a study to determine the spatial extent of the frogs using comprehensive surveys, perform thermal tolerance trials to set geographic limits on the potential distribution of the frogs in Florida, and to assess efficacy of removal methods. Both projects will begin in July 2018.

Python Removal Permits comprised most permits issued during September 2017 – February 2018. A total of 50 permits were issued, including 38 issued for the removal of conditional reptiles from FWC Wildlife Management Areas.

The 8th Annual Everglades Cooperative Invasive Species Management Area Nonnative Fish Round-Up is scheduled for April 27-28, 2018. This tournament increases awareness of nonnative fish issues in Florida, and encourages consumptive use of nonnative fish.

The FWC/USGS co-host a "Fish Chat" approximately every two years in southeast Florida. Fisheries professionals from a variety of universities, state, and federal agencies provide updates on ongoing or completed projects. The next Fish Chat will be held in May 2018.

The first Snakehead Round-Up of the 2018 season will be held in April, and will continue through September. The FWC will act as the weigh-master and provide outreach materials to participants and spectators. These tournaments provide valuable data on effort and harvest of bullseye snakehead and catch rates of co-occuring largemouth bass.

The FWC will host the 2018 Lionfish Removal and Awareness Day on May 19-20, 2018, with a 2-day festival in Pensacola. Additional events at locations around the state will take place on the same weekend.

The FWC has begun planning for a 2018 Lionfish Summit scheduled for early October. The agenda will include invited speakers, breakout sessions, poster presentations, and more.

Georgia

Bonvechio reported that during the 2017 sampling season, 3,713 flathead catfish were removed. The average size fish captured declined in 2017 to two pounds. For the past two years, the average length has declined from 365 mm TL in 2016, to 310 mm TL in 2017. Biomass per effort also has been declining from a high of 77.5/kg/hr, but was down to 15.7 kg/hr in 2017. Since 2007, over 79,700 flathead catfish have been removed.

In the Satilla River, seven blue catfish were found in 2011 in sampling. In 2016, 225 blue catfish were harvested. In 2017, 379 were caught. Continued monitoring and removal will occur, as the obvious increase concerns resource managers.
A pacu was caught by a Fulton County angler in July 2017 in a subdivision pond. The fish was identified via photo. Unfortunately, the fish was released back into the pond.

The GA DNR Fisheries Management Section is instituting a protocol to collect and test grass carp in an effort to monitor grass carp ploidy, and to minimize the potential establishment of wild grass carp populations in state-managed waters. Fifteen wild grass carp were captured and submitted for triploid testing. All 15 of the fish tested positive as triploids, including several from the Coosawattee and Etowah Rivers.

The Traveling Trunk was displayed at the Blackshear Elementary 4H Day on November 16, 2017. The python skin was a big hit. Approximately 250 students and 20 adults were reached.

Louisiana
Reed reported that they are monitoring the Red River for the presence of zebra mussels.

The apple snail invasion is still a major issue. During 2017, they had over 250 reports of apple snail infestations. Hurricane Harvey in August 2017 caused excellent spreading conditions in the southwest corner of the state. There were populations discovered along the Mermentau River basin during the fall of 2015, and there are now zebra mussel populations reported in 27 of the state's 64 parishes. In the fall of 2017 and spring of 2018, apple snails have been reported in rice fields, as well as some crawfish aquaculture farms. This has caused problems with harvesting due to the snails clogging up trap entrances.

The spread of Asian carp in large rivers is being monitored. Black carp brood stock are being collected for life history studies.

Following massive eradication efforts of tilapia in 2008 and 2009 in Port Sulphur, monitoring is still ongoing. Following the Rotenone applications, native predators have been stocked in hopes that they would deplete any remaining tilapia. Staff collected 30 tilapia during electrofishing sampling to see how the cold weather might have affected the population. Sampling will be done again this summer.

Lionfish monitoring was being done at offshore platforms that are part of the artificial reef program, but Hurricane Harvey interfered with that. Monitoring will begin again this spring and summer.

Giant salvinia continues to be a big threat in Louisiana. Since 2008, LDWF has treated 20,000 acres of giant salvinia per year with herbicides. Control efforts for all aquatic invasive plants include chemical, physical (drawdowns and booms), and biological (salvinia weevil and grass carp). Their annual budget for aquatic invasive plant control is $8 million, of which 50% of the budget is spent on giant salvinia management alone.

Mississippi

Freshwater report:

Riecke reported that invasive plant species were chemically treated in the Ross Barnett Reservoir, Bogue Homa State Fishing Lake, Percy Quinn State Park Lake, and Crystal Lake.
MDEQ personnel posted 50 northern snakehead awareness and reporting signs along the Mississippi and Yazoo River boat ramps.

Asian carp were sampled in Pickwick Lake, and 10 silver carp were tagged with acoustic transmitters. Vemco receivers were deployed to track silver carp.

New detections of giant salvinia were found in TTW (Divide Cut, Lock A, Aberdeen) and Pickwick Lake (Indian Creek).

Distribution of "Stop Aquatic Hitchhikers" cards along with all boat registrations and renewals continues. Printing of the "Stop Aquatic Hitchhikers" logo and bullet list in annual regulation guides continues. The "Stop Aquatic Hitchhikers" brochures will be revised to include more invasive species that are present in Mississippi.

Aquatic herbicides will be purchased, and contractors hired to treat public and private waters infested by invasive plants.

An EDRR monitoring program will be established comprised of state and federal personnel who sample aquatic species in Mississippi public waterways on a routine basis.

Saltwater report:
A program of integrated pest management using salvinia weevils and spot herbicide application was used to treat existing populations of common salvinia, giant salvinia, and water hyacinth.

During monitoring of existing infestations, and early detection of AIS, two aerial surveys totaling 405 miles, and 21 boat surveys totaling 205 miles were conducted.

In an ongoing effort to control and contain an infestation first discovered in 2014, 610 giant apple snail egg masses were destroyed, and 12 live snails were removed from Robinson Bayou in the Pascagoula River. The bayou flooded during Hurricane Nate, drowning some egg masses, but possibly distributing snails to new locations on the river.

Training, equipment, and coordination was provided to Gulf Corps crew members who are helping MS DMR this spring to control and map the giant apple snail infestation.

North Carolina

Emens reported that crested floating heart has been found for the first time in NC. It is in a small, isolated site. There is a new hydrilla infestation in a NC bay. Hydrilla management in Lake Waccamaw has been successful using only herbicides. Very few tubers are being found. Management plans are being decided on for White Lake due to hydrilla being found in 85% of sample points that were surveyed across the lake.

The Wildlife Resource Commission is funding UNC Wilmington to do a non-native carp study in the lower Cape Fear. Feeding habits of the fish will be studied.

No tiger shrimp reports have been received in the last year.
In the Eno River, there has a project under way to treat hydrilla in a flowing system with fluridone. The project has been going well. Monitoring of invertebrates and fish is being done for impacts from the treatments. The treatment area will be expanded further upstream in the future.

South Carolina

Kingsley-Smith reported that the College of Charleston graduate student who has been doing research on the population genetic structure, salinity tolerance, and parasite prevalence for the island apple snail successfully defended her thesis on March 8, 2018, and was hired by the SC DNR to lead a new research avenue on comparative ecology of native and non-native coastal crayfish species.

Since 2017, the SC DNR Crustacean Research and Monitoring Section has been conducting research for a project on the impacts and spread of the invasive red swamp crayfish (*Procambras clarkii)* in the undeveloped ACE Basin watershed of South Carolina. This species has been shown to alter structural and functional components of freshwater ecosystems where it is introduced, and at times, fundamentally alter the nature of the ecosystem that it invades. The objectives of the research project include investigating the potential for resource competition between the invasive red swamp crayfish and two native species of crayfish (eastern red swamp crayfish and hummock crayfish); investigate the effects of sea level rise on these crayfish. Laboratory experimental trials are being conducted to determine the salinity tolerances of these crayfish. Results have shown the crayfish have the ability to tolerate high salinity waters, suggesting potential resilience to increases in salinity due to storm surge or sea-level rise in short term. However, the two salinity trials conducted using hummock crayfish suggest that prolonged exposure to oligohaline and mesohaline is physiologically stressful, and reduces the ability of this species to survive short-term exposures to polyhaline water.

The levels of reporting and concern over Asian tiger shrimp continue to decline since their peak in 2011. No reports have been reported to SC DNR or the USGS Non-Indigenous Aquatic Species database in 2018. The total number reported to date from South Carolina is 440 specimens.

The redeye bass (Bartram's Bass) in the Savannah Basin is one of three priority species listed as a species of highest concern in SC DNR's State Wildlife Action Plan (SWAP). This listing is primarily due to the effects of hybridization with the Alabama bass, which was introduced into the reservoir systems in the Savannah River Basin in the 1980s. The hybridization between the two species in the reservoirs has been documented in the field and confirmed by genetic analysis. A current study by the SC DNR Marine Resources Research Institute's Population Genetics Research Section is being done to fill knowledge gaps, and inform management decisions aimed at securing self-sustaining pure populations of redeye bass. In spring/summer 2017, egg samples were collected in eight tributaries to the upper Savannah for quantitative PCR genetic analysis to confirm species identity and the extent of hybridization of redeye bass with closely-related shoal bass species throughout the range in the Upper Savannah River Basin.

During electrofishing sampling in the Cooper River in December 2017, a tilapia was collected and identified as a hybrid between blue and Nile tilapia, based primarily on caudal fin colorations. In January 2018, a member of the public reported 12 dead tilapia in a storm water retention pond in Mount Pleasant, SC, most likely due to unusually low water temperatures associated with snowfall in coastal SC. All reports of non-native tilapia are submitted to the USGS Non-Indigenous Aquatic Species database.

Texas

McGarrity reported that currently, there are 14 lakes in Texas fully infested with zebra mussels. Five lakes and downstream rivers are designated as positive. TPWD and partners continue to intensively monitor approximately 60 lakes designated as at-risk for zebra mussel infestations. Recently, zebra mussel infestations were detected in Lake Austin Lake and Lady Bird Lake in the Colorado River Basin, downstream of infested Lake Travis.

Efforts to manage giant salvinia and water hyacinth for recreational boating access continues. Currently, 20 lakes in Texas have significant infestations of giant salvinia, four lakes have new infestations. Giant salvinia is believed to be eradicated from five lakes. In 2016/2017, 36,383 acres of giant salvinia were treated in Texas. Detection and rapid response efforts continue. TPWD also continues to work to establish salvinia weevils in lakes. In 2016/2017, over 880,000 adult weevils were released in Texas lakes. In some areas, self-sustaining weevil populations are now present. A severe cold weather event in January greatly reduced the acreage of salvinia on many lakes.

There are currently 58 lakes in Texas that have significant infestations of water hyacinth. However, it is believed that it has been eradicated from 11 lakes. In 2016/2017, 8,989 acres of water hyacinth were treated in Texas. Cold weather greatly impacted infestations statewide.
Efforts continue on riparian invasive plant management, with a focus on improving habitat in Texas' Native Fish Conservation Areas. In 2016/2017, 6,700 acres along 178 miles of the Double Mountain Forks of the Brazos River watershed were treated with herbicides in large-scale efforts to manage saltcedar there. Saltcedar beetles, a biological control agent, are present, but population numbers remain low in the treatment area.

In the Nueces River basin, arundo control has been a model for successful management through building partnerships with riverside landowners along the rivers in priority areas to treat over 300 acres of arundo along 90 river miles over the past seven years. In 2018, efforts ar continuing and expanding to the Upper Medina and Upper Guadalupe river basins.

Supported by funding from Texas Parks and Wildlife Department and the ANS Task Force state grant, invasive species research continues to evaluate downstream dispersal and population dynamics of zebra mussels, which are a significant concern in the river-lake ecosystems of Texas. Additional zebra mussel research will be supported in 2018.

To support efforts to prevent new giant salvinia and zebra mussel infestations, outreach/public awareness campaigns continue to be a priority, with increased focus on outreach to marinas to prevent the movement of zebra mussel-infested boats. The “Protect the Lakes You Love” campaign for 2018 will begin in May. The campaign includes billboards, digital, radio, social

media, and print ads that will focus on infested and high-risk areas during the summer boater season.

A new "Arundo Control Man – Prevention Program for Texas" outreach campaign was launched in March 2018 to target construction, roadside maintenance, and fill-dirt and aggregate suppliers to prevent new introductions of arundo into waterways of Texas.

The "Never Dump Your Tank" campaign continues to target invasive species prevention messaging to aquarium owners along the Texas coast, and spotlight the lionfish problem in the Gulf.

University/Research

McMahon reported that he recently finished a 2016/2017 study of the population dynamics of the three major longest existing zebra mussel populations in Lakes Texoma, Ray Roberts, and Belton. Monthly collections of zebra mussels were done at each lake. In mid-summer, there is no settlement, so there are two distinct generations of zebra mussels. Larvae do not develop to the petty veliger stage at high temperatures, which stops the development of larvae until settlement. Random sampling of 100 veligers was done monthly, and lengths were measured. While larvae may be present, the petty veligers that can actually settle appear for much shorter periods.

Lake Ray Roberts had a very dense population of zebra mussels. In October 2016, the pH in the lake fell below 7, and stayed at that level until August 2017. This prohibited settlement of veligers to juveniles. The adult population has disappeared from the lake. It is not known why the pH fell so low.

In Lake Belton, surface water oxygen tensions dropped to 15% of total air saturation in September 2016. Zebra mussels cannot tolerate anything below 30%, and the adults died off in the lake.

In 2015, massive rain fall in the spring caused the water levels in Texas lakes to rise dramatically. The water temperatures rose, and drove the existing zebra mussels below the thermal climate, which made it too hypoxic for the adults to survive. That fall, water levels dropped, and the populations are rebounding from the die-off.

SEA GRANT

Otts reported that they have been looking at the Lacey Act. She is tracking notices through some of the legal databases when states have taken action to do what Texas and Florida are considering doing, which is to add additional species to the prohibited species list. She is compiling the actions in progress information into a Microsoft Word document.

Also at issue is the live bait trade and their regulations. The Minnesota legislature has been looking at possibly allowing the import of Golden Shiners, but only from Arkansas, and if restrictions could be placed on importing one species, but not others.

HARC

Gonzalez reported that they have an invasive species field guide for the upper Texas coast and Galveston Bay area, and have distributed 10,000 copies. The field guide was recently updated again. She will send some field guides to James for the Traveling Trunk, and bring some to the next GSARP meeting.

In the Houston/Galveston area, HARC has an invasive species working group that meets regularly under the auspices of the local estuary program. One of the issues is that several of the organizations on the working group are non-profits, land trusts, and land conservation organizations, and a down-side of their success is that they are struggling with management of invasive species on lands, and how to fund control efforts. It was discussed as to how they could come together in a more coordinated way, and obtain funding through collaborative grants, and leverage resources. A CISMA (Cooperative Invasive Species Management Area) was created for the Houston/Galveston region that will cover invasive plants and animals, and a range of habitats to include riparian areas. They will be working over the next few months on prioritizing activities, and getting organizations to sign on. The next step will be to reach out to the public agencies.

US FWS Region 4 AIS Small Grants Program

Williams stated that there is $2 million available for aquatic invasive species - $1 million of it is for prevention, and the other $1 million is for control. There is a component in each approved state management plan that addresses control and prevention. The amount of money that comes to each region in the FWS is dependent upon the number of interstate-approved management plans that the ANS Task Force has approved.

Ballard reported that he was contacted by a Commissioner from Florida to try and expand their efforts with the Lionfish Challenge. **Ballard** has been working with the other Gulf states to see if a season-long removal effort is possible for each state. He is working with an app developer on creating an app to take a photo of the lionfish caught, along with a record of location, water depth, weight, length, etc. He envisions a more "image-based tournament", where a photo of the lionfish tail would serve as verification that the lionfish was actually killed, instead of having to bring in the actual lionfish. A concern is how to incentivize a lionfish category in a tournament, since there is no funding for that. He is working with **Cindy Williams** to obtain funding to incentivize it. He is working with vendors from Florida to get incentives to motivate divers to remove lionfish for the tournaments.

ANSTF

Ballard reported that the ANSTF has been in a "holding pattern" for a year, and unable to meet. They will be having a meeting in June 2018 to plan on how the Task Force will move forward, and what its new direction will be.

Discussion of ANSTF Recommendations

Recommendations:

1.) To request that the ANSTF work closely with AFWA (Association of Fish & Wildlife Agencies), as AFWA considers the implications of the recent court ruling on the Lacey Act.

2.) To facilitate cross-regional summaries that will identify state gaps in regulating these species, and identifying road blocks to states protecting themselves from injurious wildlife by gaps that have been identified by that.

There were not enough panel members present to make motions for recommendations to the ANSTF.

Election of Officers

Lisa Gonzalez was nominated Chairman. It was seconded, and with no other nominations, **Gonzalez** was elected Chairman.

Peter Kingsley-Smith was nominated Vice Chairman. It was seconded, and with no other nominations, **Kingsley-Smith** was elected Vice Chairman.

A Motion was made to close nominations. The Motion was seconded, and passed unanimously.

Other Business

Next Meeting Time and Place

The possible location of the next meeting in Texas will be San Antonio.

The date will be sometime in October. **Ballard** will inform the panel members of the final details for the meeting.

Public Comment

Kristen Sommers provided the opportunity for public comment. There was none.

A Motion was made to adjourn the meeting, and the Motion was approved. There being no further business, the meeting adjourned at 5:00 p.m.