GULF & SOUTH ATLANTIC REGIONAL PANEL
ON AQUATIC INVASIVE SPECIES
MINUTES
Thursday, December 17, 2020 (Via GoTo Meeting)

On Thursday, December 17, 2020, Chairman **Peter Kingsley-Smith** 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
Kristina Alexander, MS-AL SGC, Oxford, MS
James Ballard, GSMFC, Ocean Springs, MS
Rob Bourgeois, LDWF, Baton Rouge, LA
Wesley Daniel, USGS, Gainesville, FL
Rob Emens, NC DEQ, Raleigh, NC
Pam Fuller, At-Large Member, High Springs, FL
Lisa Gonzalez, HARC, The Woodlands, TX
Leslie Hartman, TPWD, Palacios, TX
Chuck Jacoby, Indian River Lagoon NEP, Palatka, FL
Michael Kendrick, SC DNR, Charleston, SC
Peter Kingsley-Smith, SC DNR, Charleston, SC
David Knott, At-Large Member, Charleston, SC
Monica McGarrity, TPWD, Austin, TX
Robert McMahon, UT Arlington, Arlington, TX
Matt Neilson, USGS, Gainesville, FL
Craig Newton, AL DCNR, Dauphin Island, AL
Jim Page, GA DNR, Waycross, GA
Michael Pursley, MS DMR, Biloxi, MS
Matt Phillips, FWC, Tallahassee, FL
Dennis Riecke, MDWFP, Jackson, MS
Kristen Sommers, FWC, Tallahassee, FL
Craig van der Heiden, Miccosukee Tribe of Indians, Miami, FL
Cindy Williams, USFWS, Atlanta, GA

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

Others
Joshua Bauer, USACE, Jacksonville, FL
Chelsea Bohaty, USACE, Jacksonville, FL
Jonathan Freedman, USGS, Gainesville, FL
Andrew Grosse, SC DNR, Charleston, SC
Dale McPherson, NPS, Atlanta, GA
Cayla Morningstar, USGS, Gainesville, FL
Ian Pfingsten, USGS, Gainesville, FL

Public Comment

Chairman **Kingsley-Smith** provided the opportunity for public comment. No public comments were received.

Peter explained to the panel members that it is challenging to participate in large audio calls on virtual platforms, and provided some rules that would be followed for this meeting. The order of business will be that when a call is made for a motion, a motion or question will be made from the floor. That person will then get a second half opportunity for discussion. Then when it goes to the vote, "Opposed" will be done first. The panel members will be asked if anyone is opposed to the motion. If someone is opposed, then that person can unmute and say, "Nay", or post in the chat that they are opposed to the motion. If no opposition to the motion is heard, then it will be taken as a unanimous acceptance of the motion.

Adoption of Agenda

A motion to adopt the agenda was made, and passed unanimously.

Approval of Minutes

After minor changes, the minutes of the April 22, 2020 GoTo Meeting were presented for approval.

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

Non-native Reptiles and Amphibians in South Carolina

Andrew Grosse gave a PowerPoint presentation entitled "Protecting South Carolina's Native Reptiles and Amphibians". There are 143 species of reptile and amphibians in South Carolina. South Carolina is in the top 10 states for reptile and amphibian diversity.

Conservation challenges include: loss of habitat, disease, collection by the pet trade, food markets, venom trade, collection in large numbers, and inadequate protection and penalties. There is unsustainable and unregulated harvest. Less restrictive laws puts collection pressure on local species, and provides a path to launder illegally-collected wildlife from other states. There is domestic and international demand. United States box turtles are in very high demand. Recent trade show prices averaged $500 – 1,000. Exceptional specimens were priced at $500+. The black market wildlife trade, a multi-billion dollar industry worldwide, is an issue in South Carolina because some of the state's laws aren't strong enough to keep illegal wildlife traders from doing business there.

On September 28, 2020, a new law, Act 177, was passed by the South Carolina legislature and signed by the Governor, which will provide significant protections for South Carolina's native turtle populations, and other native reptiles and amphibians. It establishes possession limits, and allows those who exceed possession limits to register their collection for a temporary exemption. It also allows SC DNR to manage native reptiles and amphibians through regulation, as well as making it illegal to release or let escape non-native wildlife, and provides increased penalties for violations. The bill also gives SC DNR the authority to regulate potentially damaging or invasive species.

Argentine black and white tegus are now a problem in South Carolina. Despite being known as highly invasive, they are one of the most popular species in the pet trade. Over the last 20 years,

over 126,000 live tegus have been imported into the United States. Other common species are red tegus and gold tegus. All three species have been reported in Florida. Argentine black and white tegus are in Florida, Georgia, Alabama, South Carolina, Texas, North Carolina, and Virginia. Their method if invasion is through release or escapement. They are predacious omnivores that eat alligator, turtle, and bird eggs (turkey, quail), mussels, insects, spiders, and plants. They rapidly mature in 2-3 years, and have a high reproductive output of 25-30 eggs. They grow to four feet long, and live 15-20 years. They can also tolerate cold temperatures. The first confirmed sighting in South Carolina was on August 13, 2020. The SC DNR confirmed eight additional sightings in September. A Black and White Tegu Lizard Sighting Form was created by SC DNR for citizens to report sightings. Over 200 sighting reports have been received, with 41 of interest and 11 confirmed. Seven tegus have been removed. South Carolina Act 177 makes release of non-natives illegal, and gives authority to prohibit/restrict non-native species that may become established, invasive, pose a threat to native wildlife and/or human health.

Overview of Florida's Current ANS Rule Making

Kristen gave a PowerPoint presentation entitled "Florida's Rule Making". Minimizing adverse impacts from invasive species is a high priority for the Florida Fish and Wildlife Conservation Commission. The impacts of invasive species are competition with native species, direct depredation, habitat alteration, disease, economic impacts, and human health and safety. Establishment factors are climate and habitat suitability, biology of the non-native species, the rate of introduction, and the numbers introduced locally and statewide.

Very high-risk non-native reptiles proposed for prohibited status include: Nile monitor, northern African python, reticulated python, Burmese python, green anaconda, and all species of tegus. High risk non-native reptiles proposed for prohibited status include: Green iguana, southern African python, scrub python, and amethystine python.

State legislature passed Senate Bill 1414 during the 2020 legislative session, and the Governor signed it in June. The bill changed possession allowances for many high-risk reptiles that are in use. Florida Fish and Wildlife Conservation Commission's Executive Order 20-19 was effective July 1st to provide clarity to the regulated public. This order mirrored much, but not all of the language in the statute changed. The commissioners approved Draft Rule Changes consistent with Executive Order 20-19 in the July Commission meeting. The goal was to eliminate commercial breeding and pet ownership of high-risk reptiles to protect Florida's environment and economy by adding 16 non-native reptile species to the Prohibited list, address reporting requirements, biosecurity requirements to limit escapes, provide limited exceptions, add definitions as appropriate, and clarify provisions of the exotic pet amnesty rule. The Florida Chapter of the United States Association of Reptile Keepers initiated a lawsuit - FL vs FWC, with the premise of whether the legislature has the authority to pass regulations on wildlife. On August 27th, 2020, a summary judgement hearing occurred. The Circuit Court found that the changes on the statute unconstitutional and unenforceable. The signed judgement was filed on September 24, 2020. As of September 24th, FWC is no longer implementing or enforcing the statutory changes pertaining to invasive reptiles or Executive Order 20-19. Per the direction of the Commissioners in July, staff continue to move forward with rule making to address these high-risk invasive reptiles. Stakeholder engagements included: Promoted participation from stakeholders; high participation from a range of perspectives, such as over 1,400 written comments through online comment box and email, over 5,500 completed surveys from September to October, over 200 workshop participants in 10 virtual public workshops in

September and October, and three external focus groups in October and November. Polarized stakeholder feedback revealed that the majority of Florida residents supported the changes (69%), but the reptile industry and hobbyists strongly opposed (21%). FWC staff are pulling together revisions to rule language based on this feedback. The next steps will be to continue collecting comments, take revised rules to the February 2021 Commission meeting for consideration, and continue risk screening work on high-risk species to consider for regulation.

The Florida Fish and Wildlife Conservation Commission is currently in rule making for high-risk reptiles. Many aquatic species are under consideration for upcoming rule packages in 2021.

Update on New Introductions

Wes gave a PowerPoint presentation on the USGS Nonindigenous Aquatic Species Database. Data is received from museum collections, state and federal agencies, scientific literature, researchers, other databases, and public sighting reports. Over 1,300 species and subspecies are tracked, and over 700,00 data points across the United States, Alaska, Hawaii, and U.S. territories. The data ranges from the 1800s to present.

NAS alerts from January 1, 2010 – 12/16/2020 include 84 NAS alerts, and 38 species. There are 1,035 registered users for the NAS alert database. The top states are North Carolina, Florida, Texas, and South Carolina. New nonindigenous species to the U.S. are the eyetail cichlid, and gar characin. New to a state are the Indo-Pacific swimming crab, yellow floating heart, and Cuban bulrush. A new species to Georgia is the oriental weatherfish, which was found in a creek by the University of Georgia staff on a field trip. Also found in several states is marsh dewflower, Australian spotted jellyfish, and oriental river prawn.

Actionable tools on the NAS include Alert Risk Maps (ARM), Flood and Storm Tracker (FaST), Screen and Evaluate Invasive and Non-native Data (SEINeD), and Impact Tables. The SEINeD tool will allow stakeholders to upload a biological dataset collected anywhere in the U.S., Alaska, Hawaii, or U.S. Territory that can be screened for invasive or non-native aquatic species occurrences.

Three products being developed for eDNA in the NAS database include community standards, a communication plan, and displaying eDNA on the NAS database. Seven webinars were held in the spring, with 164 participants.

A national framework for early detection and rapid response is in development by the US Fish and Wildlife Conservation Commission. The University of Florida (invertebrates, vertebrates, plants) and Texas Parks and Wildlife (marine invertebrates, fish, and parasites) have nearly completed theirs. Early aquatic invertebrate contenders include zebra mussels and red swamp crayfish. Early marine contenders include colonial tunicate, bryozoa, and Asian date mussel. Early vertebrate contenders include crab-eating macaque, Japanese fire belly newt, and African clawed frog.

A National Horizon Scan is being done on organisms in trade. USGS is the lead. The area of interest is the U.S. and island territories. The method being used is the Helen Roy Rapid Screening Tool. Freshwater and terrestrial vertebrates are being investigated. The source of the species list is LEMIS and Industry List, and future expert opinion. The time to complete is October 2021. Proposed products include a global list of highest-risk traded species that have the potential to become invasive in the U.S.; regional watchlists of OIT species of high risk; a public

interface on the NAS webpage providing easy access to the watch lists and species profiles highlighting the high-risk species; creation of ArcGIS Server web service layers of any maps for use by stakeholders; publish any automation tools developed on code.usgs.gov; a publication of the results of this project.

A hotspot analysis of invasion threats is being done, lead by Wesley Daniel of USGS, with support by Michigan State University. The areas of interest are the U.S., Alaska, and Hawaii. The method being used is hot spot analysis with multiple landscape variables. The species being investigated are freshwater vertebrates. The source of the species lists is watch lists from numerous horizon scans. Time of completion is July 2022. The goal of this project is to identity regional hotspots at the highest risk of invasion from watch list freshwater species. This information will be provided to stakeholders through online interactive maps housed on the NAS database.

Upcoming projects include: The expansion of the impact table with U.S. ACoE priority plant species; a new national flood risk model looking for frequently connected drainages; Aqua-DePTH Database aquatic disease and pathogen; GIS server web feature services.

Cindy stated that if there was anyone who wanted to get involved with the Horizon Scan calls, there will be a second call in early January, and they should send her an email so she can provide all the information. The purpose of the call is to narrow down the genera, as they have limited funding and will only be looking at approximately 20 species.

State Reports/ Members Forum

Alabama

Craig reported that several invasive species have been documented in Alabama coastal waters. The bocourt swimming crab (*Callinectes bocourti*), tessellated blenny (*Hypsoblennius invemar*), Australian spotted jellyfish (*Phyllorhiza punctata*), Asian green mussel (*Perna viridis*), Asian tiger shrimp (*Penaeus monodon*), and red lionfish (*Pterois volitans/miles*) have been documented, although non-validated or undocumented reports of additional invasive species likely exist. Unfortunately, the ecological effects of these invasive species are poorly understood in Alabama's estuaries and Gulf of Mexico waters; however, interactions between indigenous species and invasive species typically results in negative impacts to the native species. Prey of Australian spotted jellyfish include early life history stages of many commercially and recreationally important finfish, and the temporal/spatial distribution of Australian spotted jellyfish could drastically increase finfish larvae/egg mortality rates if spawning events coincide with swarm activities. Similarly, the bocourt swimming crab could compete for resources of the native blue crab. The current status of the Australian spotted jellyfish and the bocourt swimming crab, however, does not indicate that these two invasive species pose an immanent concern. Similarly, tessellated blenny and Asian green mussel do not appear to pose an immediate threat, but their distribution and abundance should be monitored to ensure early detection of proliferation. The Asian tiger shrimp, *Penaeus monodon,* and red lionfish, *Pterois volitans/miles* continue to be invasives of heightened concern, and their broadened distribution, increased abundance, and/or documented negative effects on native species warrants concern.

The latest invasive species observed in Alabama's marine waters was an Amazon Red Tail Catfish in July 2016. The specimen was collected in a recreational crab trap at a private dock on the Bon Secour River. Additionally, a single bocourt swimming crab was collected in a

commercial crab trap during a November 2016 AL DCNR MRD onboard fisheries observation trip. The exact location where the 101mm carapace width, male bcourt swimming crab was caught is unknown, but the general location of capture is south of Lillian Bridge and north of Ross Point in Perdido Bay. No observations of the bocourt swimming crab have been made since the first observation in 2007 until the 2016 observation.

The Asian tiger shrimp has been a species of concern since 2006 when it was first observed in Alabama's inshore waters (Mississippi Sound). After the first individual was documented, captures of Asian tiger shrimp have incrementally increased. A confirmed report of a single specimen caught near Middle Bay Light occurred in 2008, followed by five confirmed reports in 2009. From 2006 to 2009, the distribution of tiger shrimp was primarily restricted to Alabama's southern inshore waters; however, its distribution extended to northern Mobile Bay and into Perdido and Wolf Bays in 2011. The forty-three confirmed reports during 2011 indicate the Asian tiger shrimp occurs within all of Alabama's primary estuary basins. However, the concern for Asian tiger shrimp has decreased within the commercial shrimping community, which has resulted in fewer validated reports. Alabama Marine Resources Division received fewer validated reports in recent years than in previous years, but personnel communications between AMRD and commercial shrimpers indicate a significant abundance of Asian tiger shrimp occur within Alabama waters, despite the reduction in validated reports. Based upon the temporal and spatial abundance of Asian tiger shrimp encounters and reported sightings (despite lower perceived importance of Asian tiger shrimp since 2013), evidence suggests the Asian tiger shrimp has become established in Alabama's waters.

Red lionfish have successfully colonized the Gulf of Mexico waters offshore of Alabama. The first report, which was unvalidated, was from a 2009 observation made by a recreational SCUBA diver at an area of natural hard-bottom about 20 nautical miles south-southeast of Orange Beach named Trysler Grounds. The first confirmed report was documented in June 2011 by a spear fisherman who collected an individual from an oil/gas platform approximately 43 miles south of Dauphin Island. Numerous unconfirmed reports of lionfish have been made to various government agencies that indicate lionfish were rather abundant on the Trysler Grounds in 2011. SCUBA divers reported observing up to 30 individuals during single dives in this area during the 2011 dive season. However, unconfirmed reports from SCUBA divers from 2012-2013 indicate lionfish abundance had increased from previous levels. A recreational diver reported observing upwards of 60 individual lionfish during a dive at Trysler during the 2012 dive season, although the observer did not know when he made the observation, or even an approximate location within the Trysler Grounds reef complex. Similarly, a SCUBA diver reported observing up to 100 individual lionfish during a dive at an artificial pyramid reef during June 2012. Unfortunately, the diver would not disclose any information indicating a more precise location where the observation was made, other than it was "offshore of Alabama". Additionally, 26 lionfish were donated to AMRD after a lionfish rodeo in June and July 2012 by a local dive shop, but the rodeo coordinator did not attempt to obtain collection information about the lionfish.

Alabama Marine Resources Division received a grant from Gulf States Marine Fisheries Commission (GSMFC) in December 2012 to monitor reef communities in the Gulf of Mexico, dispatch red lionfish when encountered during SCUBA surveys, increase public awareness of the lionfish invasion, and streamline the general coordination between State agencies, Federal agencies, and the public. Eighteen dive surveys were completed by AMRD personnel during 2013, and t-shirts were distributed to members of the SCUBA community who were active in

submitting reports, samples, and increasing public awareness. Additional funding was secured from GSMFC to continue the monitoring in 2014, and continue increasing public awareness. AMRD personnel conducted SCUBA surveys at 18 reef sites in 2014, and created an Adopt-a-Reef program that emphasized the reporting and capturing of lionfish. The Adopt-a-Reef program featured a web-based application that allows for the submission and viewing of reports collected by Adopt-a-Reef participants; however, the developer of the website removed the site from public access, which effectively ended the Adopt-a-Reef program.

Fishery-independent monitoring of reefs offshore of Alabama report a similar pattern in the lionfish invasion. Remotely Operated Vehicle (ROV) surveys within the Alabama Offshore General Permit Reef Zone from 2011 through 2015 indicate a widespread distribution of lionfish between 10 nm and 50 nm offshore of Alabama. No red lionfish were observed during 2011 ROV surveys, but frequency of occurrence was 100% during 2015 ROV surveys; however, lionfish were more abundant on reef sites that were a greater distance from Mobile Bay. Beginning in 2016, spearfishing tournaments were held to specifically target red lionfish. A weekend long tournament, "Lions on the Line", was held at FloraBama during 2016, when 1,662 lionfish were harvested. A summer-long tournament, Alabama Lionfish Challenge, was held from May 26, 2018 through September 3, 2018, when the recreational division of the Alabama Lionfish Challenge harvested 540 lionfish, and the commercial division harvested 278 lbs of lionfish. Tournaments were also held in April 2019 and September 2019, when a total 2,140.9 lbs and 1,296.4 lbs, respectively, were harvested during the tournaments.

The spatial distribution of red lionfish has not changed after becoming established; however, the rate of population growth has changed over time. During the first several years of the invasion, population growth of red lionfish increased substantially from year to year; however, the rate of population growth during the previous few years has reduced such that it seems the population has plateaued to a stable state.

General awareness of invasive species and their potential for negative impacts has increased in Alabama citizens over the past few years. Alabama Administrative Code 220-2-.26 was amended in August 2020 and limits the possession, selling, offering to sell, import, release, or causing to be brought or imported additional nonnatives into the state of Alabama. The administrative code pertains to any species of venomous reptile that has never naturally existed in the wild in Alabama; any species of bird, mammal, reptile, or amphibian listed as injurious wildlife by the U.S. Fish and Wildlife Service under the federal Lacey Act; and any species of Tegu (*Salvator* sp.).

A concern exists due to the COVID-19 pandemic that limited outreach activities to increase awareness of invasive species. In addition to limited outreach due to COVID-19, spearfishing tournaments that include red lionfish as categories were cancelled due to the pandemic, which limited the control of population increase and distribution of lionfish. Future monitoring will be of higher importance if resource managers desire to evaluate control efforts on the lionfish invasion. On the other hand, Alabama resource managers made a significant stride in covering regulatory gaps observed in the Lacy Act.

David Armstrong has officially replaced **Steven Rider** as an Alabama representative on the GSARP panel.

Florida

Kristen reported on the Bullseye Snakehead Study in Lake Ida. Bullseye snakehead have recently expanded their range into Lake Ida, one of the most natural in the metro West Palm Beach-Miami area. This offers a unique opportunity to study this fish in a more natural aquatic system. The findings of the project will better inform managers of potential impacts that bullseye snakehead might have in the hundreds of lakes that are within their predicted range. Biologists from the Fish and Wildlife Conservation Commission (FWC) and NOAA are collaborating on a multi-pronged project to compare movement, diet overlap, and habitat utilization of bullseye snakehead, butterfly peacock bass, and largemouth bass. Collection of stomach content data from the three species began in July 2020, and will continue monthly for at least one year. In the fall, radio telemetry will be used to track movement of these species, and PIT tags will be used to determine species-specific preferences for temperature and depth, as well as estimating population size and catchability of each species. Some fish will be externally tagged with a reward tag to promote angler participation to assess harvest rates, and collect preference data.

In response to an angler's report, FWC staff conducted electrofishing in the Cooper City/Davie area south of I-595, and documented bullseye snakehead in the main South New River Canal, and in two lateral canals that drain into this main canal. Water in the South New River Canal can be pumped westward into canals flowing south through Everglades habitat. This finding provides some insight of why positive eDNA hits for bullseye snakehead were detected in Everglades canals 25 miles southwest, without managers able to conform the physical presence of these fish. FWC and partners will continue to monitor for bullseye snakehead in this area.

In June 2020, a USGS fisheries biologist confirmed an angler's report of bullseye snakehead in one of a series of retention ponds in Bradenton, FL, south of Tampa. Several size classes were collected by USGS, including young-of-year, indicating reproduction had occurred. Follow-up electrofishing by FWC fisheries biologists collected bullseye snakehead from one five-acre pond. Additional electroshocking of a nearby creek will be necessary to determine potential presence of additional bullseye snakehead in nearby waterbodies, since the infested pond can flow into the creek, and ultimately into the brackish water section of the Braden River during a high-water event. This extreme range expansion is most likely the result of an illegal introduction by an angler.

The Lionfish Removal and Awareness Day was canceled this year due to COVID-19. It has been rescheduled for May 15-16, 2021. The Lionfish Challenge 2020 kicked off on May 22, 2020, and has been extended through November 1, 2020. The goal of the Lionfish Challenge is to encourage and reward recreational and commercial divers to remove lionfish from Florida waters. To date, 641 people have registered for the Lionfish Challenge, and 157 divers have submitted lionfish. A total of 12,580 lionfish have been submitted. The recreational diver who brings in the most lionfish will be crowned the Lionfish King or Queen, and the commercial diver with the most weight of lionfish will earn the title of Commercial Champion.

During April-September 2020, two reports of Asian tiger prawns were received – one from Volusia County, and one from Brevard County.

The FWC has recently received four reports of Arapaima from the west coast of Florida. These are unusual reports, as arapaima are on FWC's Conditional Species List, and it is illegal to have them as pets. The canal systems where anglers caught these fish connect to the Myakka River,

one of Florida's Wild and Scenic Rivers. Follow-up electrofishing by FWC in the canals did not yield any additional specimens.

FWC's Nonnative Fish and Wildlife Program staff are working with other FWC biologists to conduct electrofishing surveys, and remove nonnative fish (primarily tilapia and sailfin catfish) from springs associated with the St. Johns River in central Florida that support large populations of these fish. Many of these springs serve as important winter habitat for manatees, providing both thermal refuge and forage of eelgrass. Blue tilapia spawn in these springs, and there is concern that their nesting activities will uproot the eelgrass, and reduce the amount of available manatee forage. Sailfin catfish burrow up to one meter into the banks to lay their eggs, which may destabilize the banks and cause shoreline erosion. Sailfin catfish have been observed "grazing" on manatees utilizing the springs during winter, which may stress the manatees and put them at risk of cold-related health issues. FWC biologists used experimental gillnets to remove tilapia from several springs in central Florida. The nets did not catch any tilapia, but created an interim "fence" that corralled them, making them susceptible to electrofishing.

AS-ISK risk screenings were completed for 11 species of pomacentrids (damselfishes), one of the most important groups of marine ornamental fish, including the top nine fish species imported into the US. It appears that despite high volume in the aquarium trade, most pomacentrids represent relatively little or moderate risk of invasiveness in Florida. Only one species, regal demoiselle, exceeded the calibrated medium-high threshold score for global marine fish invaders. This species scored as high as it did in large part to its invasion history, a major component of the AS-ISK scoring. Regal demoiselle are already established in the western Gulf of Mexico, and are spreading eastward towards Florida. Despite this, little evidence suggests they are having adverse impacts where they are established.

FWC contracted with University of Florida to generate bio-profiles and complete AS-ISK risk screens for African clawed frog, western clawed frog, blue-ringed octopus, clown knifefish, four species of sailfin catfish, cane toad, and spectacled caiman. The completed assessments will provide a relative risk estimate for each species (low, medium, or high). FWC will use this information to inform future management recommendations for these species.

The FWC is currently considering new rule changes for certain high-risk nonnative reptiles, including Burmese pythons, Nile monitors, tegus, and green iguanas. The proposed rules would add these species to the state's Prohibited list, thereby limiting their possession to qualifying, permitted educational exhibitors and researchers; create new caging and biosecurity requirements; limit breeding and import of these high-risk species in the state; and provide some limited exceptions to people in possession of these animals for exhibition, commercial sale, or personal use prior to their listing as Prohibited. Staff provided a first draft of rule proposals at the FWC's July 2020 Commission meeting, where Commissioners approved staff to move forward with publishing those drafts and seek public comment. FWC staff have since held 10 public workshops, collected over 1,000 comments, and had over 5,500 respondents to two surveys on this topic. Staff recently completed a set of three focus groups to refine further the proposed rules based on the public comment received. Final proposed rule drafts will be brought to a future FWC Commission meeting for final Commissioner approval.

The FWC has received both final reports from two separate two-year long research contracts on a western clawed frog population conducted by UF and the University of Central Florida (UCF). These contracts were developed after several attempts to eradicate western clawed frogs from

retention ponds in the Riverview area were unsuccessful. The clawed frogs were misidentified for several years as African clawed frogs until researchers confirmed using genetic analyses (qPCR) that they are the closely related western clawed frog.

UF worked to identify the spatial extent of clawed frogs in Riverview, dispersal patterns and environmental associations with occupied water bodies, and modeled potential for spread throughout Florida. The results of the study indicated that the clawed frogs are likely continuing to spread, and clawed frogs presence was positively associated with occupied ponds within 400 m and the amount of submerged vegetation at a site, but was negatively associated with the presence of fish and mean dissolved oxygen content. Modeling efforts demonstrated that the clawed frogs could likely survive through much of south Florida, but were limited by seasonal temperature and precipitation ranges in northern Florida.

UCF used disease ecology, population genetics, and eDNA to understand potential impacts from the clawed frog population in the Tampa Bay area. The conclusions of the project determined little evidence exists to suggest clawed frogs in Riverview, FL are impacting amphibian disease ecology (i.e., ranavirus, chytrid, and perkinsea) in the area. Based on analysis between sampling areas, the study showed that clawed frogs were not differentiating genetically in Riverview over time/space, likely due to the recent nature of the release. The animals were likely introduced via the pet or aquaculture trade.

During April – September 2020, 73 Conditional Species Permits (CSPs) were issued - nine research permits were issued that covered a range of species, mainly nonnative reptiles; twenty-two permits were issued for possession for personal use of Prohibited species; three permits were issued for commercial use, all for Conditional aquatic species; fourteen CSPs were issued for importation and possession for public exhibition; one CSP was issued for the importation of African tortoises; nineteen CSPs were issued for the importation of Conditional reptiles; five CSPs were issued for red-eared sliders possessed as personal pets.

Matt reported that FWC has a new communication piece associated with everything they do management-wise on freshwater systems. It is for the general public to inform them of the latest information on the FWC website. He will provide the link in the chat, and asked the panel members to review it, and provide FWC with suggestions, etc. for their data presentation to the public.

Georgia

Jim reported that during the 2020 sampling season (May – October), 3,355 flathead catfish were removed from the Satilla River. Since 2007, over 82,000 flathead have been removed. The size structure has declined from 5.8 pounds in 2007 to 2.1 pounds in 2020. The biomass per effort has declined from 77.5 kg/hr in 2005 to 20.4 kg/hr in 2020. Suppression of the flathead catfish population in the Satilla River has been demonstrated through these measured changes. Ongoing intensive harvest will be required to control the flathead population.

GA DNR staff continue to remove blue catfish from the Satilla River. In 2017, 397 were removed. In 2018, 58 were removed. High water levels that year likely contributed to such few numbers. In 2019, 663 were removed. In 2020, 187 were removed. Continued monitoring and removal of this species will occur.

An Asian swamp eel was captured in September 2020 in Olley Creek in Cobb County during electrofishing sampling. The fish was euthanized.

An Oscar was caught by an angler in August 2020 in Lake Allatoona in Bartow County. The fish was euthanized.

A flathead catfish was caught by an angler in the Savannah River in Effingham County in September 2020. The fish was euthanized.

A paddlefish was caught by an angler in a private pond near Roswell in January 2020. The fish was found dead in March. Follow-up sampling by DNR found no other specimens.

A longear sunfish was caught by DNR during a sampling event in the Flint River in October 2020. The fish was euthanized.

A brown hoplo was caught by an angler in the St. Mary's River in Charlton County in October 2020. The fish was euthanized.

Several oriental weatherfish were caught by UGA students conducting field work in McNutt Creek in Clarke County in November 2020. This appears to be the first of this species in Georgia. All fish were euthanized.

Commercial fishermen continue to periodically report catches of Asian tiger shrimp in Georgia waters, though such incidences remain low. Two reports were provided in October 2020 through the new reporting tool on the GA DNR-WRD website. One report indicated a single tiger shrimp was captured during one day of fishing, while a second report listed 40 tiger shrimp as being caught during 14 days of fishing. GA DNR will continue to monitor tiger shrimp occurrence. Results of monthly ecological monitoring trawl surveys suggest abundance of tiger shrimp in Georgia's sampled waters are low.

Staff have continued to make additional updates to the GA DNR Aquatic Nuisance Species (ANS) web page on their website. This updated site provides much more detailed information on species found in or near Georgia, educates readers on how they can help prevent ANS releases, and allow members of the public to report certain ANS species online.

Conducting visits to schools and other educational outlets continues to be a major priority. Due to COVID-19, education events were impacted. Visits to schools and educational events have been held outdoors in a safe manner instead. Animals were shown to the students from a safe distance, often in an elevated position in the back of DNR trucks. This approach has allowed allows education efforts to continue. GA DNR spoke with over 1,200 students during events that were held from April – December, 2020.

Louisiana

Rob reported that during 2020, the Louisiana Department of Wildlife and Fisheries (LDWF) received approximately 1,250 reports of apple snail infestations. Reports of invasive species from the public were logged, and the public was contacted to get additional information as needed. Most calls were apple snail reports, with no new parishes or watersheds reported to be infested. The LDWF Aquatic Nuisance Species (ANS) Coordinator has started to receive detailed reports from a bridge inspection crew, which has added to our apple snail ranges.

LDWF ANS Coordinator and Inland Fisheries personnel developed two projects that were funded by the United States Fish and Wildlife Service (FWS). One of the projects will sample ichthyoplankton in the major river basins in LA. The second will be a telemetry project. Carp will be tagged in the Intercoastal Waterway to see if they are migrating between river basins. These 2 projects should assist LDWF in locating breeding areas and identifying locations for carp barriers.

Asian swamp eels, *Monopterus cuchia*, were found in Bayou St John, New Orleans in June 2019. LDWF and a local college professor continued monitoring and sampling the population. Small eels were found in samples collected in September 2020. LDWF plans to monitor the area and sample in the spring and summer of 2021. The species has not expanded its range from 2019. LDWF has started an eel removal control program via electrofishing and removal of nonnative aquatic plants that the eels inhabit. In 2020, the number of removal trips has been reduced by COVID-19 restrictions.

LDWF's planned sampling for lionfish during the reporting period was canceled due to COVID-19 restrictions on research cruises.

The existing populations of tilapia in Plaquemine parish was not sampled at the time of the report due to COVID-19 impacts to field sampling.

Blue tilapia, *Oreochromis aureus*, were found in routine sampling by LDWF in University Lake located in Baton Rouge in October 2019. Thirteen tilapia were found in samples collected in December 2019. Sampling efforts in February 2020 and March 2020 did not result in any tilapia being collected. Three tilapia were collected in April 2020, including one brooding eggs in its mouth. Sixteen tilapia were collected in August 2020. These were similar sized as the initial capture fish from October 2019 and December 2019, so we believe this is a reproducing population. LDWF will continue to remove tilapia from this location as manpower allows. The vicinity to residential areas makes eradication using rotenone very difficult. LDWF has a long-term dataset on the lakes, which will allow us to track impacts to native fish. The LDWF ANS Coordinator received a call from a nuisance alligator trapper that he had seen tilapia in a private pond. LDWF Enforcement investigated the tip to our LA ANS hotline, and the owner admitted the stocking of tilapia. Inland Fisheries personnel treated the pond with rotenone to remove all of the tilapia present. In the Spring/Summer of 2021, Inland Fisheries personnel will sample the pond to verify the eradication.

In 2020, LDWF received two reports of Tiger Shrimp from commercial and recreational angler catches. LDWF Marine Fisheries collected a small Tiger Shrimp (75mm) while electrofishing in Bay Adams. A few more unconfirmed reports were received.

The Aquatic Plant Control Program is housed within the LDWF's Inland Fisheries Section. LDWF continued with our control of invasive vegetation species using a variety of techniques. Aquatic plant control plans were developed for 72 different waterbodies during the reporting period. Giant Salvinia continues to be the most problematic invasive plant in Louisiana. Since 2010, LDWF has treated an average of 21,373 acres of Giant Salvinia per year with herbicides. LDWF uses an integrated approach to control aquatic plants, consisting of chemical, physical (booms and 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

$3,100,000, of which more than 50% of that is spent on Giant Salvinia alone for monitoring, treatment, and research.

COVID-19 has reduced the number of events where LDWF typically distributes ANS outreach to the public. LDWF published social media posts during the year on apple snails, snakeheads, and invasive vegetation. COVID-19 restrictions impacted our regular sampling, as well as our outreach programs. The benefit of the restrictions was that many people were outdoors and reported more apple snail locations, and also took on the duty of scraping eggs during their time at home.

Mississippi

Freshwater report:

Dennis reported that Mississippi Department of Wildlife, Fisheries, and Parks fisheries biologists chemically treated water hyacinth, alligator weed, Cuban bulrush, hydrilla, and giant salvinia at Ross Barnett Reservoir. Giant salvinia management included: containment with floating booms within Pelahatchie Bay; prescribed fire to burn vegetation which harbored giant salvinia; new colonies chemically treated; drawdown to expose remaining plants to cold temperatures over winter; recreational access opened from main lake into Pelahatchie Bay and closed are reduced to inside the containment booms.

From May to August 2020, biologists sprayed over 7,000 gallons of chemical herbicide on 200 acres of water hyacinth in Horseshoe Lake.

From July to August 2020, biologists sprayed approximately 900 gallons of chemical herbicide on 50 acres of water hyacinth in Little Round Lake.

Two acres of alligator weed was treated at Lake Monroe.

At Wall Doxy State Park Lake (Spring Lake), the expansion of parrotfeather was surveyed and photographed in March 2020. Critical areas around piers and boat ramp were treated with herbicide and monitored effects. In June 2020, the lake was stocked with 1,000 additional triploid grass carp. Winter drawdowns are performed as per fisheries management plan.

Three special permits were issued for the harvest of Asian carp at Moon Lake for 2020/2021 season. Grant application documents to secure a new Asian carp contract fishing project for their removal in the Mississippi River and Yazoo River Basin were submitted.

A federal ANS grant to implement activities specified in the *Mississippi State Management Plan for Aquatic Invasive Species* was administered.

An ANS federal grant for research project on "Development of management strategy for surveillance and containment of invading Asian carp in waters connected to the Tennessee River" was administered. Data has been obtained on movement of approximately 300 bighead carp in the TN River system. These detections will be used to test whether bighead carp movements differ among seasons, when the water level is raised, and when the water level is drawn down.

A letter of support was submitted to the Mississippi Bureau of Plant Industry for obtaining a special local needs 24c designation for an aquatic labelled Metsulfuron Methyl herbicide to be used on giant salvinia in the state of Mississippi.

The Stop Aquatic Hitchhiker cards continue to be distributed with boat registrations and boat renewal registration cards that are mailed out.

Mississippi State University conducted a third aquatic and riparian plant survey of 11 lakes and 33 rivers. They found 40 new plant species in lakes - six that were all riparian. They found 119 aquatic/riparian plant species in streams with 18 nonnative species.

Online sellers such as Amazon, eBay, Craigs List, and Etsy were all notified that sales and shipment of water hyacinths, alligator weed, and *Trapa natans* are illegal under federal law.

Northern snakehead were collected in Steele Bayou and Perry Martin Lake, which are new locations.

Saltwater report:

Mike reported that 542 giant applesnail egg masses were destroyed, and 31 live snails were removed from the Pascagoula River. Control mission frequency was reduced due to COVID-19 protocol and reduced staff availability. Since this infestation was first detected in 2014, 30,368 eggs masses have been destroyed, and 1.132 live snails have been removed from the river.

A program of integrated pest management and spot herbicide application was used to control populations of common salvinia, giant salvinia, alligator weed, torpedo grass, beach vitex, and water hyacinth.

One new sighting of a large Asian tiger shrimp caught in a commercial shrimp trawl, and one new sighting of giant applesnail in the Pearl River was reported to the NAS database.

Due to COVID-19, quarterly aerial surveys and outreach activities at events have been temporarily suspended.

North Carolina

Rob reported that **Corrin Flora** will no longer be a member of the GSARP. She is still with the NC DMF, and will continue to be the contact person there.

The ANS Management Plan does not have a management policy yet. COVID-19 played a part in delaying the process.

Rob talked about a recent report of giant salvinia infestation. In talking to locals there, he was informed that giant salvinia had been there for years. He provided two links – one that had photos from the infestation site, and the other link was a Cooperative Extension website with some giant salvinia information as a public outreach. The NC DEQ hasn't been dealing with giant salvinia for ten years now. The last time there was giant salvinia in NC was 2000-2001 when it came in as a contaminant on some nursery water garden stock. By 2008-2009, all of the sites infested by giant salvinia had been identified, and the giant salvinia eradicated from them. Unfortunately, the new infestation site is much larger than any other they dealt with before. The

former infested site was 15-20 acres in a hardwood swamp. The new infestation site that they are now dealing with is over 200 acres, and very difficult to access. This drainage basin is near the border of South Carolina, and basically drains into South Carolina, and then into the Lumber River. This is the only current giant salvinia infestation site that they know of in NC. A NC DEQ technical group recently had a meeting to develop a treatment plan for spring-summer 2021.

South Carolina

Peter reported on monitoring the distribution of the island apple snail, *Pomacea maculata* and its potential to invade the estuarine habitats of the Ashley River. Recent research conducted at the South Carolina Department of Natural Resources MRRI to investigate the salinity tolerance of newly hatched *P. maculata* demonstrated their ability to tolerate salinities as high as 8 psu, representative of upstream estuarine habitats in South Carolina. There is a well-established population of *P. maculata* in a suburban neighborhood in West Ashley (specifically within the stormwater retention ponds at the Village Green residential development), located less than 3 km from the Ashley River. SC DNR researchers continue to survey these populations on an annual basis. Since the initial survey in 2018, the survey has been expanded to include 30 additional retention ponds outside of the Village Green neighborhood, as well as more natural areas, to monitor the spread of *P. maculata*. Island apple snails have been observed in five additional ponds in Village Green (for a total of 26 ponds with island apple snails), eight newly surveyed ponds in the Shadowmoss Plantation neighborhood nearby, and along Church Creek, which connects the two West Ashley neighborhoods, and ultimately leads into the Ashley River. During this reporting period, 58 retention ponds and their surrounding wetlands and creeks were surveyed, of which 55 ponds were sampled in summer and fall 2020. The three additional ponds were added to the fall survey following a new observation of island apple snails in a retention pond on the southeastern edge of the survey area. Island apple snails were observed in two of the three newly surveyed retention ponds, in addition to a drainage ditch, and further down Church Creek. These results suggest *P. maculata* has additional dispersal capabilities within this area of West Ashley.

South Carolina Department of Natural Resources (DNR) biologists surveyed stream and wetland habitats in the southern and middle Atlantic coastal plains and southeastern plains ecoregions in both the PeeDee basin, and in the Charleston area to better understand the distribution of the invasive red swamp crayfish, *Procambarus clarkii*, and predict potential impacts to native species. Since April 2020, SC DNR biologists have surveyed 55 locations, collecting *P. clarkii* at 32 of these locations. During this time period, nine species of native crayfish were collected; however, 88% of all collected specimens were identified as *P. clarkii*.

Researchers at the SC DNR MRRI are developing molecular tools that will allow testing of the hypothesis that hybridization is occurring within wild populations of the *Scapulicambarus* subgenus of crayfish. The genus *Procambarus* is a diverse genus with at least 177 species. The red swamp crayfish, *P. clarkii*, is nested within the subgenus *Scapulicambarus*, which it shares with only four other species. Within this subgenus, the eastern red swamp crayfish, *Procambarus troglodytes*, was shown by Busack (1989) to be the species most closely related to *P. clarkii*. The eastern red swamp crayfish, *P. troglodytes*, is the most abundant native crayfish species in South Carolina, where much of its range overlaps with known locations of invasive *P. clarkii*, including some locations near Charleston, SC. Hybridization is common among crayfish species; however, the majority of the research to assess the role of non-native crayfish hybridizing with native species has focused on the genus *Faxonius*, with little evidence currently available for wild hybridization within the genus *Procambarus*.

During the current reporting period, SC DNR biologists sampled 14 aquatic habitats in the Charleston area, a subset of which are being used to assess potential hybridization. Baited minnow traps and dip netting were the primary techniques used to locate *P. clarkii* and *P. troglodytes*. Microsatellite markers that are being developed for *P. clarkii* will be used to genotype both *P. clarkii*, *P. troglodytes*, and any potential hybrids collected in the field. The resulting genotypes will be subjected to the model-based Bayesian clustering methods implemented in STRUCTURE in order to estimate and visualize potential shared ancestry that would be expected if hybridization is occurring between these two species. So far, 17 microsatellite markers have been optimized for amplification in *P. clarkii*, and the optimization of the multiplex panel is nearing completion. Screening of samples from *P. troglodytes* for reliable amplification will begin shortly. Markers that amplify in both species will be used for the final hybridization analyses.

White spot syndrome virus (WSSV) infects many crustacean species, is highly pathogenic, and was recently associated with both wild and farmed red swamp crayfish in Louisiana. Since Louisiana exports a considerable number of live red swamp crayfish to SC, the potential presence of WSSV in these specimens raises concerns that this virus could infect native crustacean species in SC, such as the commercially- and recreationally-important white shrimp and blue crab that inhabit brackish waters, and that are known to be susceptible to the effects of WSSV.

To determine if *P. clarkii* is a vector for the WSSV, this species will be tested using molecular qPCR assays recently modified and optimized from Blaylock *et al.* (2019) by colleagues in the SC DNR Population Genetics Research Section. These qPCR methods will be used to screen samples of several tissue types, including gill, muscle, and pleopods obtained from *P. clarkii*. The sampling for this project will mirror the sampling conducted for the hybridization project discussed above, with both *P. clarkii* and *P. troglodytes* collected from locations across the Charleston area. The results for this study will be in presence/absence form for all individuals that are screened. Since WSSV can also have significant impacts on estuarine crustaceans, sampling locations will focus on brackish water habitats and habitats near brackish water where white shrimp and blue crab would have a higher likelihood of being exposed if the virus is present. Progress on this project has been impacted by restrictions on fieldwork and laboratory access due to the pandemic.

The redeye bass in the Savannah River Basin is one of three priority species included in the National Fish and Wildlife Foundation's Native Black Bass Initiative, and is a species of highest concern in SC DNR's State Wildlife Action Plan. 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. Since then, hybridization between the two species in the reservoirs has been documented in the field and confirmed by genetic analysis.

Researchers at the SC DNR have developed a microsatellite-based genetic tool to investigate hybridization in black bass populations in the Savannah River basin. Their variability make microsatellites an effective tool to investigate genetic structure and hybridization among populations. In addition to 10 polymorphic microsatellites developed for redeye bass, microsatellites originally developed for largemouth bass have been used for other black bass species to assess hybridization impacting endemic shoal bass in the Chipola River. Hierarchical STRUCTURE analysis suggests that black bass genotyped at 17 loci with sets of reference

samples of regional congeneric species can be assigned to clusters with high confidence. Individuals are assigned as "pure" species if over 98% genetic ancestry results from a single species, "near-pure" species if 90-98% genetic ancestry occurs from a single species, and "hybrid" if less than 90% genetic ancestry occurred from a single species. Project results to date include: 1) evidence of widespread invasion by Alabama bass and active hybridization throughout the redeye bass range; 2) documentation of 25 tributary sites where pure/near-pure redeye bass are located without incident of hybridization; and 3) documentation for the first time of hybridization occurring on nests in running waters (nearly 60% of sampled streams contained hybrids). The SC DNR Population Genetics Research Section is continuing to process unknown field samples to increase sample sizes for informative analyses of gene flow patterns within species, as well as hybridization rate patterns across the landscape.

The bullseye snakehead has been documented to occur in southern Florida where it is known to compete with a variety of bass species, and to consume native reptiles, amphibians, and smaller fishes. Northern snakehead are more prevalent across the Atlantic coast than the bullseye snakehead, posing a more probable threat to native species. Freshwater ecosystems on the Atlantic coast are extremely rich in biodiversity, and have a high number of native species that would be at risk to an invasion of snakehead species. Although not currently documented in South Carolina, both bullseye snakehead and northern snakehead are found – to varying degrees – in Florida, Georgia, and North Carolina. Typically, when first documented in a new area, however, invasive snakehead have often already established a persistent population. Since northern snakehead are found in states and watersheds closely surrounding South Carolina, it is important to be able to rapidly assess waters once a detection of any snakehead species occurs.

Environmental DNA (eDNA) is a useful tool in identifying organismal presence within an area without sampling the organism directly, providing a substantial benefit for rare species, for those that occur in low densities, or for those that are logistically difficult to detect. Tools utilizing eDNA have become increasingly popular for monitoring threatened, endangered, or invasive aquatic species. The use of eDNA can be useful in both identifying potential pathways of invasion, and identifying invasive snakehead species while at low densities before they establish a population.

The SC DNR Population Genetics Research Section has begun the development of a panel of species-specific markers for snakehead species. An optimized and functional panel will support the rapid evaluation of the distributional extent of an invasion, once detected. This research team is using existing genetic sequence data and published eDNA tools to design and optimize a suite of eDNA tools for detection of both bullseye snakehead and northern snakehead. The SC DNR Population Genetics Research Section will conduct benchtop tests with all identified tools with DNA from bullseye snakehead and northern snakehead, from its sister family Osphronemidae (Gouramis), and from a diversity of freshwater fishes available in the SC DNR Genetics Tissue Collection. An understanding of distribution is extremely beneficial in identifying potential pathways of movement for snakehead into freshwater ecosystems. Once potential pathways are identified, biologists can make more informed management decisions on how to maximize containment of a snakehead invasion and design possible eradication strategies. Providing timely and accurate data is the most effective way to inform management to reduce the risk of invasive snakehead species across the region.

Researchers with the SC DNR MRRI's Shellfish Research Section remain interested in understanding the invasion of the South Atlantic Bight and Gulf of Mexico by the Asian tiger

shrimp, *Penaeus monodon*. The total number of tiger shrimp reported in SC is currently 475, with a size range of 58 to 330 mm TL. Although reports have declined in recent years, it is likely that a high proportion of the tiger shrimp collected are being kept for consumption instead.

In July 2020, researchers at the SC DNR MRRI began receiving reports of the cloudy periwinkle, *Littoraria nebulosi*, in SC from Chris Marsh, Executive Director of the Spring Island Trust/Lowcountry Institute. Prior to this report, the geographic range for this species was generally thought to be restricted to Florida. After communicating with Susan Hewitt at the American Museum of Natural History, SC DNR staff learned that new records for this species were documented for Georgia and South Carolina, demonstrating a substantial expansion in the known range for this species. New records in 2020 on the website iNaturalist.org lists records for this species near Jacksonville, FL, Jekyll Island, GA, and Sapelo Island, GA. SC DNR staff conducted multiple surveys for the presence of this species in SC, and documented locations for this species throughout much of the state, including new locations (listed from south to north, and indicating dates of surveys) at Hunting Island, SC, (August 27th), Botany Bay (October 15th), Folly Beach, SC (August 2nd), Capers Island (September 3rd), and Cedar Island (September 25th). The Cedar Island record at the mouth of the Santee River represents the most northern recorded location for this species.

SC DNR received a call about an individual who had observed a blue land crab, *Cardisoma guanhumi*, on his property on Bohicket, SC. The reporting individual is known to be familiar with native crustaceans, such that his report was deemed trustworthy. SC DNR staff investigated the observation, but were unable to provide confirmation that this species was present at the location. SC DNR staff will continue to follow up on this report in the hopes of observing the specimen.

SC DNR staff helped to identify a crab that was collected by a commercial shrimper off Brunswick Island, GA as the Indo-Pacific swimming crab, *Charybdis hellerii*; superfamily Portunoidea. With a broad Indo-Pacific native geographic range, Indo-Pacific swimming crab was introduced to the eastern Mediterranean Sea, beginning in Israel in the 1920s. In the western Atlantic, it was first reported in Folly Creek, near Charleston, SC in 1986 in association with a SC DNR clam farm. This specimen remains housed within SC DNR's Southeast Regional Taxonomic Center (SERTC) collection. This specimen pre-dates the first published report for this species on the east coast. Since then, Indo-Pacific swimming crab has been reported across 62˚ of latitude, and now ranges from south of Cape Hatteras, North Carolina, to Florianopolis, Brazil.

Records of non-native *Callinectes* collected in commercial crab pots include the bocourt swimming crab, *Callinectes bocourti*, collected in Battery Creek on September 2nd and Archers Creek on September 25th, both in Beaufort County, SC in the Port Royal Sound area, and the rugose swimming crab, *Callinectes exaperatus*, collected in Archers Creek on September 30th.

The SC DNR MRRI recently received two reports of non-native flatworms in South Carolina. The first, reported from Summerville, was identified by Dr. Leigh Winsor, Adjunct Senior Research Fellow at James Cook University in Australia as *Caenoplana* sp. This species was likely introduced from Papua New Guinea, and has been reported in the United States from Texas and Florida. Three individual specimens were collected and preserved in the SC DNR Southeast Regional Taxonomic Center's Taxonomic Collection at the MRRI.

A new terrestrial hammerhead flatworm was reported from Santee State Park to Chris Page, SC DNR ANS Program Manager. The beige flatworm was identified as the land planarian, *Bipalium kewense*, based on the description of the flatworm; however, no photos were taken. It was estimated to be approximately 6 inches long, and was found on the railing of a boat. The reporting individual, who was visiting from Georgia, was familiar with these flatworms after seeing fliers in Georgia calling for reports of this invasive species. *Bipalium kewense* is native to the Indo-China region, and has been reported in the wild from southern California, Louisiana, Florida, Georgia, North Carolina, South Carolina, and Texas. This species is commonly found in greenhouses across the United States, and is likely spreading to new areas through the distribution of potted plants.

On September 10, 2020, the SC DNR received a call from a local aquaculturist that he had collected an unusual specimen of a freshwater prawn in the genus *Macrobrachium* from one of his land-based ponds adjacent to Toogoodoo Creek, South Carolina. He believed the specimen to be *M. rosenbergii*, but requested that someone collect the specimen and identify it. Upon receipt of the specimen, several SC DNR researchers independently examined the specimen, and were unable to determine its identity, either as a native South Carolina species of *Macrobrachium*, or *M. rosenbergii*, or any of the other species in this genus that have previously been reported from the southern part of the U.S. east coast. To determine the identity of this specimen, the SC DNR Population Genetics Research Section extracted and amplified DNA from a tissue sample (pleopod) of the specimen, sent the DNA out for sequencing, and then blasted the sequences against records in GenBank. These efforts were led by SC DNR Assistant Marine Scientist, Dr. Larry Bowman. Results from the sequencing revealed the following:

Amplification of COI fragments:

1) LCO-HCO (generic invertebrate primer): *Macrobrachium nipponese* (Oriental River Prawn) 87% coverage; 98.84% identity; e-value 0.0
2) Crust1-HCO (prawn specific primer 1): *Macrobrachium nipponese* (Oriental River Prawn) 93% coverage; 98.60% identity; e-value 0.0
3) Crust2-HCO (prawn specific primer 2): *Macrobrachium nipponese* (Oriental River Prawn) 87% coverage; 98.00% identity; e-value 0.0

[Coverage is how much of the COI fragment is covered; these values are high for such generic primers; 0% identity is how much of a sequence perfectly matches a sequence in the database; e-values are similar to significance measures or p-values; e-values all at 0.0 means any mismatches in the sequences were not "mismatched" bases, but rather holes or inconclusively called bases ("N" as opposed to ATCG).]

Upon the determination of the specimen collected from South Carolina as *M. nipponese*, further literature and database searches yielded no established records of this species in the U.S. The species is commonly cultivated in China, and is known to be invasive in Iraq, the Ukraine, and Russia, but no confirmed reports exist for this species in the U.S. An internet search for this species, however, yielded a 'hit' on the website ncfishes.com (The Fishes of North Carolina). Dr. Kingsley-Smith contacted this website to learn more about why *M. nipponese* is included maong its gallery of aquatic invertebrates. In the response to this inquiry, Dr. Kingsley-Smith was informed that members of this group first collected *M. nipponese* in North Carolina in 2014, and have been working to establish its distribution. According to a respondent from the ncfishes.com group *"they appear to be very common in estuarine waters and coastal rivers from North*

Carolina to Florida… and we believe the vector for introduction is ballast water, as all of our collections have all ben made near shipping ports, and we have been unable to locate any aquaculture in the US working with this species. To give you an idea of how widespread they are. I've made roughly 60 collections in NC from Morehead City to Wilmington, and every last one has been nipponense." **Peter** stated that, had SC DNR Marine Resources Division been given this information previously, they would have been able to identify that species without having to go down the route of outsourcing, genetic sequencing, and paying senior staff to perform DNA extraction, etc. His research group invested a significant amount of time, energy, and resources trying to identify a species, and ultimately discovered that it was a species that other people knew had been in South Carolina for some time. **Peter** said that this incident opens up a board of discussion for the GSARP about what kind of mechanisms or approaches they may want to put in place to prevent this sort of thing from happening again. He suggested discussing this under Other Business at this meeting. Several panel members suggested discussing the issue.

Texas

Monica reported that since their initial introduction into the state in 2009, zebra mussels have invaded 30 lakes across five watersheds in Texas. Texas Parks and Wildlife Department and partners continue to monitor 43 lakes for early detections, 21 for population monitoring, and one post-treatment. After a very localized introduction was detected at Lake Waco in 2014, weighted black plastic sheeting was used to cover the substrate in the area for four months in an attempt to eradicate the mussels. Although a few mussels were found live after the plastic was removed, subsequent sampling for five years has resulted in no evidence of an infestation. If there are no detections in fall 2020 samples, the lake will be delisted from 'positive' to 'undetected/negative' status. This would possibly be the first successful case study of the use of this method for zebra mussel eradication.

On November 10, 2020, the Texas Parks and Wildlife Commission voted to adopt proposed exotic species rule changes that will go into effect on January 11. This will address changing needs of the regulated community, as well as current, new, and potential threats. Proactively, four Lacey Act-listed injurious fishes were added to the controlled exotic species list – European perch, stone moroko, amur sleeper, and wels catfish. Also added were golden mussel, mudsnails, crested floating heart, and yellow floating heart.

Currently, Mozambique tilapia may be stocked in private ponds in Texas without a permit, many of which are creek impoundments where escape could occur unchecked. Under the new rules, landowners in a designated 'conservation zone' will be required to obtain approval from the department prior to stocking, which will enable the department to prevent stocking in ponds where escape is likely. Due to the inability to distinguish confidently among hybridized tilapias in aquaculture for enforcement purposes, and the burden of proof placed on aquaculturists by a stocking allowance for Mozambique tilapia only, the new rules will allow stocking of the four species currently in aquaculture.

In July 2020, Lake O.H. Ivie near San Angelo was upgraded to fully infested with zebra mussels. Zebra mussels were first discovered there in March 2019 when four adult zebra mussels were found by the Colorado River Municipal Water District in an above-ground storage tank near San Angelo that is part of the lake's water transmission system.

Lake Grapevine was also upgraded to fully infested with zebra mussels in July 2020. In May 2018, the United States Geological Survey (USGS) found a zebra mussel larva in plankton

samples collected on the southern end of Grapevine Lake. Additional sampling indicates that zebra mussels are established, and a population is developing in the lake.

In October 2020, Richland Chambers Reservoir was upgraded to fully infested status. Zebra mussels were first discovered in 2017 when the Tarrant Regional Water District (TRWD) located several adults on multiple occasions in a single cover near the dam. The resulted in a zebra mussel 'positive' designation for the reservoir at the time. A localized treatment was conducted in the cove, using a novel low-dose copper compound in an effort to eradicate the mussels. Samploing efforts did not detect any zebra mussels in 2018 or 2019, but in 2020, TRWD staff found zebra mussels at two locations near the cove where they were found in 2017, and also at the Kingswood boat ramp two miles upstream. Multiple size classes were found, which indicates a reproducing population in the reservoir.

Since 2016 when the Texas Legislature first allocated approximately $3.2M annually to TPWD for aquatic invasive species management, aquatic plant control efforts have increased approximately five-fold. Currently, infestations are being managed on 54 water bodies around the state, primarily in east Texas, Due to increased funding and staff, efforts to rapidly respond to new infestations have increased. As a result, water hyacinth was eradicated from Dickinson Bayou in 2017, and giant salvinia was eradicated from Lake Fork and Lake Athens. However, giant salvinia reinvaded Lake Athens, and was also newly detected on Lone Star Lake, Lake Gilmer, and Bringle Lake. Common salvinia was found on Lake Fork.

Riparian plant management continues to be a focus, prioritizing treatment of giant reed and saltcedar on over 300 private properties in key native fish conservation areas.

The TPWD aquatic invasive species outreach campaign continues to be a focus, with state and partner funding supporting these efforts. The campaign employs diverse delivery methods, including billboards, gas station advertising, boat ramp signage, geofenced digital radio ads, pre-roll videos, other digital advertising, print ads and mailings, and in-house social media.

Four research projects are currently being funded by TPWD and partners, focusing on efforts of water chemistry on zebra mussel reproduction and early development, population dynamics and impacts of zebra mussels on native unionids, native plant competition methods for enhancing hydrilla control, and the bait fish pathway for introduction of gulf killifish and sheepshead minnows outside their native range within the state and hybridization impacts. Research projects have experienced some delays due to COVID-19, but all are on track to be completed by the end of 2021.

University/Research

Robert reported that they published a paper with several co-authors, entitled 'Settlement, density, survival and shell growth of zebra mussels in a recently invaded low latitude, warm water Texas reservoir'. This reservoir is Lake Belton in central Texas. It was shown that in that reservoir, zebra mussel growth rates were among the highest in the world, and their life spans among the shortest. High summer temperatures in Texas do not prevent the production of veligers, but they don't develop to settle, which means bi-model settlement periods – one in spring, and one in fall. **Robert** said the paper can be obtained by contacting him, or through the Aquatic Invasion's website.

Robert's final PhD student finished in June. She completed her dissertation research on her long-term study of the comparative population dynamics of zebra mussel infestations in three Texas reservoirs - Lake Texoma, Lake Ray Roberts, and Lake Belton. Her results indicated that mussel invasion densities tended to climb in all the reservoirs with time, so they are not nearly as dense as they have been after the initial invasions. They all had spring and fall settlement periods. Another discovery was that there were major mussel die-offs in Lake Belton, due to summer periods of surface water hypoxia, and in Lake Ray Roberts, where Ph fell below 7.4 required for zebra mussel veligers to develop to settlement. The mussels have almost completely disappeared from Lake Ray Roberts. Results suggest that mussel populations in Texas are going to fluctuate in densities through time. Zebra mussel dried tissue weight varies through time, and essentially, through the summer and early fall at high temperatures, the mussels lose tissue weight and starve. It is so severe in some cases that it causes the adults to die off because they are more prone to the weight loss. In Texas, zebra mussel populations, either spring or fall settled groups, actually disappear from samples taken in August and September. They live usually no more than a year, which is very unusual. Up north, they live 3-4 years. Another discovery was that the appearance of settlement confident petty veligers in the plankton samples correlates very closely with juvenile settlement. Another words, when they are first picked up, settlement occurs soon after, which can be used to more tightly predict when you should apply control measures. The dissertation can be obtained by contacting **Robert** directly.

There is a second ongoing study being completed, comparing population dynamics of zebra mussels in two closely-adjacent, similar lakes in central Texas – Lake Belton, invaded in 2013, and Lake Stillhouse Hollow Lake, invaded in 2019. The idea is to elucidate the long-term population dynamics of zebra mussels in warm water Texas waterbodies, comparing what happens in an early invasion, and in a later invasion. Data collections are almost finished, and the results are being written up.

Region 4 USFWS/Small Grants Program

Cindy reported that they issued approximately $7.5M worth of Asian carp grants to an expanded area in 2020, to the states of Alabama, Mississippi, Louisiana, Arkansas, Tennessee, and Kentucky. Their region issued more Asian carp grants than any other region. **Cindy** learned several months ago that someone in the Grants Solutions arena went into the system and did a block, changing all of the reporting dates to the end of the Federal fiscal year. So basically, grantees had a month's worth of activity on the new 2020 grant to submit a report. **Cindy** thinks she can go into the system and change those dates, but if the report can be submitted by the end of December, that would be good. If unable to, and if **Cindy** is not able to get the dates changed, she encouraged everyone to submit a letter on their letterhead, along with a financial 424 showing the money was received, that states that the grant was just awarded to them, there is now a new process, there was no activity, and due to COVID-19, the report will be submitted in the next reporting cycle.

As for state grants, states have been awarded funds for their Aquatic Invasive Species Management Plans. That program has really grown. When the program first began, grantees were awarded between $20,000-25,000. In 2016-2017, it increased to around $45,000. In 2020, it was increased to $90,000+. Hopefully a change in the administration will not change anything.

Cindy and Don McClain at USFWS worked with **Steve Rider** to get the Alabama Aquatic Invasive Species Management Plan resurrected and approved. Even though there were updates to the plan, the literature cited was still 10 years old, so it was rejected. The plan is being updated

again. Hopefully, it will be re-submitted in 2021. North Carolina will also be submitting their plan in the near future. Once those state plans have been submitted, almost every state in the southeast region will have an approved plan.

USACE

Joshua Bauer reported that they are working on two invasive animal projects for the Everglades Restoration Project in South Florida. One of the projects being worked on is at a site inundated with tegus, caymans, and other reptiles. The other project is working in water control structures in surrounding areas, where invasive fish populations will be studied for reducing impacts on native populations, as well as reducing the fish passage for invasive fish.

The invasive reptile work that will be brought into place next year will be following an EDRR effort to expand the program past tegus and caymans; however, for the first year's funding, they only have enough funds to supplement four known species.

Chelsea Bohaty reported that they finished their webinar series with their Engineering Research Development Center for 2020. She provided a link in the chat feature which included all of the archived presentations that were done for 2020. The next webinar series will begin next spring. She asked that if anyone was interested in being on the mailing list, they can email her.
The alligator weed flea beetle program will be starting up next spring. Surveys for flea beetles typically begin in February, with intent to collect in early spring. Chelsea told the panel members that if anyone is having any issues managing alligator weed infestations on their projects, they can email her. There have been complications due to COVID-19, but they were able to ship out approximately 32,000 beetles to nine different states. Some recipients were not able to get out into the field, since the beetles were shipped at the beginning of April, which was the beginning of the COVID-19 pandemic. If anyone would like flea beetles, they can contact Chelsea.

Region 4 USFWS/ Small Grants Program

James reported that due to COVID-19, a lot of things got pushed back, and many researchers being unable to work in their labs. Many no-cost extensions on current research were done. USFWS moved the funding for this year's small grants program back into the program, but it will go out into the RFP for next year. A Task Force meeting was held last week, which mainly focused on the new subcommittees from the Task Force and that are addressing the strategic plan. Over the coming months, there will be a lot of information coming out from those subcommittees asking for different requests. **James** asked the panel members to keep an eye out for them, coming from the Task Force directly, or forwarded to the panel members from **James**.

The Task Force is looking for a representative on the Outreach Committee, so if anyone from the panel has experience doing outreach who would like to serve on the committee, they are encouraged to apply.

Other Business

James will email the GSARP panel member list to everyone to make updates. The updated member list should be sent back to **James** in January. He will then update the GSARP website.

Panel Recommendations

James stated that the next Task Force meeting will possibly be in May. He asked the panel members if there were any recommendations they wanted to present to the Task Force. There were none.

Next Meeting Time and Place

The dates of the next meeting in the spring will be decided at a later date. Due to COVID-19 concerns, it will most likely be a virtual meeting again.

Public Comment

The Chairman 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 12:30 p.m.

Action Items

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Matt reported that FWC has a new communication piece associated with everything they do management-wise on freshwater systems. It is for the general public to inform them of the latest information on the FWC website. He will provide the link in the chat, and asked the panel members to review it, and provide FWC with suggestions, etc. for their data presentation to the public.

Page 23
James will email the GSARP panel member list to everyone to make updates. The updated member list should be sent back to **James** in January. He will then update the GSARP website.

Page 20
It was decided by the panel members that the *Macrobrachium nipponese* incident would be discussed by those wishing to participate after the meeting ended. **Peter** said that this incident opens up a board of discussion for the GSARP about what kind of mechanisms or approaches they may want to put in place to prevent this sort of thing from happening again.

Page 23
James stated that the Task Force is looking for a representative on the Outreach Committee, so if anyone from the panel has experience doing outreach who would like to serve on the committee, they are encouraged to apply.