GULF & SOUTH ATLANTIC REGIONAL PANEL
ON AQUATIC INVASIVE SPECIES
MINUTES
Tuesday, June 28, 2022 – Wednesday, June 29, 2022

On Tuesday, June 28, 2022, 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 (via GoTo Meeting)
Dave Armstrong, AL DWF, Tanner, AL (via GoTo Meeting)
James Ballard, GSMFC, Ocean Springs, MS
Wesley Daniel, USGS, Gainesville, FL
Pam Fuller, At-Large Member, High Springs, FL
Julie Holling, SC DNR, West Columbia, SC
Michael Kendrick, SC DNR MRRI, Charleston, SC
Peter Kingsley-Smith, SC DNR, Charleston, SC
Jon Lane, USACE, Jacksonville, FL
Jessica Marchant, AL DCNR, Dauphin Island, AL
Monica McGarrity, TPWD, Austin, TX
Robert McMahon, UT Arlington, Arlington, TX (via GoTo Meeting)
Jim Page, GA DNR, Waycross, GA
Michael Pursley, MS DMR, Biloxi, MS
Matt Phillips, FL FWC, Tallahassee, FL
Dennis Riecke, MDWFP, Jackson, MS
Cindy Williams, USFWS, Atlanta, GA (via GoTo Meeting)

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

Others
Kelly Gestring, FWC, Davie, FL
Ian Pfingsten, USGS, Gainesville, FL
Cayla Morningstar, USGS, Gainesville, FL
Jim Williams, Florida Museum of Natural History, Gainesville, FL
Lori Tolley-Jordan, Jacksonville State University, Jacksonville, AL
Joshua Bauer, USACE, Jacksonville, FL
Genevieve Bazer, USFWS, New Orleans, LA
Chelsea Bohaty, USACE, Jacksonville, FL
Susan Pasko, USFWS, Falls Church, VA (Via GoTo Meeting)
James Reinhardt, NOAA Restoration Center, Silverspring, MD (Via GoTo Meeting)
Heidi Himes, USFWS, Buffalo, NY (Via GoTo Meeting)

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

Adoption of Agenda

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

Approval of Minutes

The minutes of the December 1-2, 2021 GoTo Meeting were presented for approval.

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

Overview of Alabama's Freshwater ANS Program

Dave Armstrong gave a PowerPoint presentation entitled "Overview of Alabama's Freshwater ANS Program". For the freshwater ANS Program, their current funding is for invasive carp. The four target carp species are bighead, silver, black, and amur that are found in four Alabama and Tennessee River reservoirs. (Black carp are not found in Alabama).

Approval of the Alabama ANS plan and a subsequent proposal for funds should be approved by late summer 2022. New ANS funding will allow program expansion to begin implementation of ANS plan objectives and also address issues with extensive fauna (e.g., plants, snails, etc.)

The objectives for the invasive carp project include: monitoring invasive carp demographics and distribution; removal of individual invasive carp (post-data collection); and propagule sampling at invasion front barriers.

Field work for invasive carp include: monitoring invasive carp demographics and distribution; examining distribution and relative abundance using gill nets and boat electrofisher; data on individual carp; and collecting abiotic data.

Non-targeted species are also documented. Data is collected (frequency, TL, Wt) on ecologically sensitive species, and the fish are then released. Prior documented effects of invasive carps on native sport and forage fish (gizzard shad, zooplankton, paddlefish) are compared.

GPS-fixed site sampling is done randomly in spring, summer, and fall at 8-12 gillnet sites/reservoirs. There are 35 boat EF transects/reservoirs, with 3-4 habitat types.

Five sampled habitats include: main channel border; backwater creeks; large embayments; some overbank and island/secondary channels; habitat designations. The sites were selected using Google Earth, random generator x RM or grids. The approach is to develop long-term EF/GN sites for detection and occupancy of invasive carp, and ecologically significant or rare species in large rivers. The goal is to improve sampling with paired gear types, and multiple passes annually. Tennessee River reservoirs in Alabama total 202 river miles, and 193K acres.

Aging techniques were performed on carp using both pectoral fins and otoliths. Completion of 2020 fish saw some great techniques, and 2021-22 data is being studied. Age analyses are not complete, though given discussions with other state/federal labs, captured SVC appear to be getting larger and older, with no reproduction observed in Alabama. Age analysis across systems in the Tennessee River will help delineate demographics of size x age.

The Alabama Nuisance Species Plan was approved during fall 2021. Approval has allowed the state of Alabama to pursue annual federal match grants for statewide funding. A proposal was

developed and submitted in spring 2022. Funding grant is pending summer 2022. The grant should be approximately $125,000. New funding is expected in summer 2022. Implementation of a portion among ALANS plan objectives will begin within the proposal of work during 2022-2023.

The program objectives for the ALANS Plan are: 1.) Coordinate local, state, regional, federal, and international activities, and programs pertaining to ANS; 2.) Prevent, control, and manage introduction/reintroduction and spread of new/existing ANS through education about species pathways, targeting the general public, industries, user groups, government agencies, and NGOs; 3.) Eliminate, control, and manage ANS through monitoring, early detection, and rapid response; 4.) Prevention of ANS through legislation, regulation, and enforcement.

For 2022-2023, actions for Objective 1 will be to establish a permanent Alabama ANS Council, and hire a permanent, full-time statewide Alabama ANS coordinator. For Objective 2, actions will be to expand existing educational programs, develop educational materials for the general public, and develop a statewide ANS educational and informational website. For Objective 3, actions will be to monitor bighead and silver carp, and study impacts on native fishes, and to monitor zebra mussels. For objective 4, actions will be to develop non-native aquaculture, research, and aquarium species lists.

Discussion of the DWH Fish Strategic Plan Invasive Species Objectives

James Reinhardt spoke on the DWH Fish Strategic Plan invasive species objectives. He works with the NOAA's Deepwater Horizon Restoration Program, where his primary responsibility is to design, develop, and implement restoration projects that help restore fish and water column invertebrates that were injured because of the Deepwater Horizon oil spill.

James talked about the recently published/produced strategic plan that the Open Ocean trustees for the Deepwater Horizon oil spill published in March. It indicates the direction that NOAA intends to pursue as part of restoring fish and water column invertebrates from the Deepwater Horizon oil spill. There is also an objective related to helping to reduce risks from invasive species.

The injury from the Deepwater Horizon oil spill to larval fishes and other invertebrates that occupy the Gulf was immense. When BP settled with the trustees in 2015, the trustees released a programmatic damage assessment and restoration plan, which laid out general approaches to how NOAA would restore the eco system in the Gulf of Mexico in response to the spill. A multi-faceted restoration is happening. There will be habitat restoration for coastal habitat, salt marshes, oyster reefs, but also deeper areas such as coral reefs. A goal was set for reducing direct mortality for fishes and water column invertebrates. The commercial and recreational fishing communities were heavily involved in creating objectives.

NOAA worked with stakeholders to understand what they wanted in a transparent strategic planning process, and to define what the most important threats would be as part of the process. One of the threats identified were invasive species. A process was used to prioritize which invasive species to focus the restoration plan on over the next 5-7 years. This helped create objectives for the project. While going through the prioritization, information was collected that would help identify specific data gaps.

Last winter, a roundtable was held for academics and NGO partners. Public meetings were also hosted in cooperation with the Gulf States Marine Fisheries Commission and the Gulf Council. Numerous internal federal agency meetings were also held. Inputs were sought on what threats were most important for NOAA to address, what criteria they should be using to identify priority species, how to do a better job of communicating with stakeholders, and look for ways to continue to support collaboration for restoration.

The high priority restoration objectives are: Reducing negative impacts from bycatch; invasive species; IUU fishing; marine debris; post-release mortality; helping to develop tools and techniques to reduce uncertainty in restoration; helping establish and implement best practices for stakeholders and the fishing community.

James Ballard asked if there was a timeline of when NOAA will be looking for ideas for the invasive species side of the strategic plan. James stated that, unfortunately, there was no timeline at this point. A restoration planning process is begun by a Request for Project Ideas. James does not know when this will be, but possibly in the next year. Ballard asked James to keep him informed so he can also keep the GSARP informed so they can solicit ideas.

Update on ANS Passage Through the Tennessee-Tombigbee Waterway

Jim Williams gave a Power Point presentation entitled "Update on ANS Passage Through the Tennessee-Tombigbee Waterway". In June 2022, a USACE employee forwarded a report to a USFWS employee about a "jumping carp" in Aberdeen Lake. Aberdeen Lake is downstream of Bay Springs Lock on the Tenn-Tom waterway. There is a 50% probability that 20 silver or bighead carps could establish a permanent population. The nearest record for bighead carp is approximately 40 miles from Bay Springs Lock.

The 2022 Invasive Carp Action Plan is funded by a combination of agency funding, and Great Lakes Restoration Initiative funds. The plan includes research, deployment, and evaluation of a BAFF system at Kentucky and Barkley Locks on the Tennessee and Cumberland Rivers. Tagging and monitoring above and below Barkley and Kentucky Dams is currently ongoing. Preliminary results indicate that the most active movement upstream of the carps is between July and October.

In fall 2021, Mississippi DWFP and USFWS biologists developed an early detection monitoring protocol to detect movement of invasive carp on the Tenn-Tom Waterway downstream of Bay Springs Lock. MS DWFP has included the Tenn-Tom lakes on a rotating basis in their fisheries monitoring project. This sampling began in February 2022 on pools above Lock D and Lock E, with plans to continue downstream in the Tombigbee River. To date, no carp have been detected during this effort, but both agencies continue to monitor.

For the Silver Carp Detection Project, receivers were placed in the Yellow Creek Embayment. There were 16 silver carp detected by the Goat Island receiver. Four were tagged by MDWFP in 2019. Three of the four were tagged in Indian Creek, and one in Panther Creek.

All native species, whether endemic to the Tennessee basin, Tombigbee basin, or more widespread occurring on both sides of the drainage divide, are at risk. The two basins are inhabited by evolutionarily aquatic communities. Movement via the waterway of aquatic species across drainage divide has the potential to negatively impact native species and their environments. Possible outcomes include hybridization and ecological interactions. While threats

of natives crossing the divide may appear subtle, they have the potential to significantly impact biodiversity on both sides of the divide.

Recommended actions for the detection and prevention of invasive fishes moving via Tennessee-Tombigbee Waterway are: 1.) Corps of Engineers and U.S. Coast Guard should temporarily close Bay Springs Lock to all noncommercial traffic. Traffic analysis revealed 40% of the Bay Springs Lock traffic was recreational. This action would result in a 40% reduction in risk of aquatics moving across the divide and buy time until barriers are developed and installed; 2.) Begin eDNA survey for foreign invasive species at multiple sites on the waterway from Bay Springs to Gainesville Lock and Dam in Alabama. If this activity obtains a positive hit, then the shocking boats and net boats should be contacted; 3.) Organize and initiate assembly of a DNA library; 4.) Perform biological survey of fishes, mollusks, and crustaceans in Yellow Creek embayment drainage, as well as the upper Tombigbee River drainage above Columbus Lock and Dam; 5.) Establish an online clearinghouse for published and unpublished reports on biology and ecology of the Tenn-Tom Waterway, and assemble museum records for specimens cataloged in collections from the lower Tennessee River drainage from Kentucky Dam, upstream to Wilson Dam.

For the Water Resources Development Act of 2022, Congressional authorization was received for the Committee to recommend $500,000 for the Corps, in partnership with other federal partners, to begin planning, design, initial engineering, and project management for construction of carp barriers in the Mississippi River basin and the Tennessee-Tombigbee Waterway. On June 8, 2022, the recommendation passed the House, and was forwarded to the Senate. Congressional appropriation is pending. **James Ballard** asked Jim to keep him informed of the timeline of developments.

Surveying Freshwater Invasive Snails for Detecting Helminth Pathogens

Lori Tolley-Jordan gave a Power Point presentation entitled "Surveying Freshwater Invasive Snails for Detecting Invasive Helminth Pathogens". Lori spoke on studies she conducted on detecting and identifying helminth worm pathogens in invasive trumpet snails (*M. tuberculata*) and invasive giant apple snails (*P. maculata*) in Florida.

These microscopic worms have complex life cycles, and live within their hosts. For parasitic trematodes, the eggs are ingested by the snail host. Free-swimming cercariae encyst in the skin of freshwater fish. Metacercariae in skin of freshwater fish are ingested by final hosts. For parasitic nematodes, the larvae mature, lay eggs, and first-stage larvae hatch in lungs. The first-stage larvae are passed in feces. The feces are consumed, allowing larvae to develop in mollusks. Vegetables can potentially be contaminated with third-stage larvae, as well as land crabs, frogs, freshwater shrimp, and lizards. The larvae enter the bloodstream of the hosts, in the intestine. The larvae then reaches the central nervous system, causing eosinophilic meningitis.

Prior to the study, *M. tuberculata* trematodes in the U.S. were found in native and migratory birds in the 1970s in Texas, Louisiana, and Arizona. Blindness in the birds was observed. The trematodes were found in native fishes in the 1990s in Texas. Respiratory stress, altered behavior, and mortality in the fish were observed. The trematodes were found in native fishes in the 2000s in Texas. Muscle deformities, altered behavior, and mortality were observed in the fish.

Locations for finding the snails for the study included streams, open water/lakes, canals/ditches, rivers, and retention ponds. For the parasite detection, live snails were collected from 13 sites. The snails were brought to the on-site labs live, in stream water. The snail shells were cracked, and the tissue removed. A tissue smear was observed under a compound microscope. Six sites had infected snails. Forty snails were infected. Snail tissue and parasites were preserved in Florida, and the samples were sent to Centre College in Kentucky. DNA extraction, amplification, and sequencing were all performed. Parasites were identified in the samples.

In summary, *Melanoides tuberculata* in Florida do have trematode parasites. More surveys will likely yield more species.

Horizon Scan of the Contamination of Commercial Nursery and Water Garden Trade Pathway in the Southeast to Identify Future Potential Aquatic Plant Invaders

Heidi Himes gave a Power Point presentation on the Horizon Scanning Tool, which allows the USFWS Nonnative Species Risk Assessment Program to identify species potentially coming next where prevention efforts might be most successful. Along with additional Horizon scans and invasion hotspot analysis that will be done by USGS, these scans identify species for the national and regional watch lists that will be used to help focus on early detection work, along with prevention efforts. The regional scans are designed to be repeated over time, and they vary in focus, depending on the regional priorities. The southeast scan was the fourth of the regional scans.

The objective of the Horizon scans is to identify species of freshwater and broadwater fish, micro-invertebrates, or plants at risk of arriving in target regions of the U.S., and establishing populations that are of yet unintentional movement.

To identify these potential invasive species risks, there is a three-phase process. The first phase is the scope definition, when state/regional priorities are gathered across the region to guide the determination of the boundaries of the Horizon Scan. Pathways of most concern are looked at, along with specific geographic boundaries that are most meaningful for the group, and which invasive species are of most concern. Information was purchased from three federal agencies, five state agencies, seven universities, and a regional partnership. Two virtual meetings were used, a questionnaire, and feedback on a draft document to gain input.

For the taxonomic scope, there were many species groups of concern expressed during the initial stages of the scoping discussion. As the discussion continued, it became apparent that of most concern were aquatic plants, due to the types and severity of impacts that they have produced. Participants expressed that they would be most concerned about species related to those that are already here causing problems. Species families and general species were focused on that were already impacting the southeast, with the idea that close related species may have similar impacts.

The pathway focus was on was commercial shipping, and the potential for species to hitchhike on contaminants of those shipments. Commercial shipping was the greatest effort concern expressed by the advisory group, and given the taxonomic focus on aquatic plants, it was decided to focus the pathway on commercial plant shipments.

The geographic scope during the discussion consensus was that natural boundaries like watersheds would be most meaningful to the group. The geographic scope was determined to be

watersheds in the southeast, with a direct connection to ports of entry attached to the pathway scope.

For the second phase, a list of species was developed that could be transported into the target region, which is the southeast, for introduction. Data was obtained on live plant imports from U.S. Census Bureau trade data and a USDA horticulture and nursery year book. These data sources provided information on imports by value and volume. The countries of origin were arranged by value and volume of imports, and then results were averaged to determine top potential donor countries. The consensus was that more shipments coming in is a higher likelihood for a hitchhiker or a contaminant on the shipments to be introduced.

The next step in the phase was to look at common similarity between the highly ranked species donor regions and the southeast. If the climate is extremely different in a donor region, there is less likelihood that the species from that region could become established in the southeast. The analysis was completed using a service developed tool for climate matching called the Risk Assessment Mapping Program (RAMP). RAMP is a mapping tool that uses the current geographic range of a species to predict the climate suitability of other geographic areas or future time periods. It was developed by the U.S. Fish and Wildlife Service primarily to assist with risk assessment of nonnative aquatic wildlife and plants.

The final step in the phase was to use a global species occurrence database to identify aquatic plant species in the taxonomic scope present in those high-ranking climate match donor regions. It was found that there are potential sources on almost every continent. This provides an opportunity for a high diversity of potential species introductions.

The climate match categories for each of the potential donor countries matched to the southeast are: High, Medium, and Low. Countries with climate matches in the Medium and High categories were selected to use in the next step of species list generation. The countries with High climate matches were Brazil and China. Italy had a Medium climate match. A global occurrence species database was used to gather a list of all species in the target taxonomic groups that were then present in those three countries.

The species in the High or Medium class jurisdictions are screened for the potential to be high risk to the southeast. The initial list included 208 valid species from within those focal taxonomic groups of aquatic plants that are present in the High or Medium climate match jurisdictions (Brazil, China, Italy). The focus was on species that are not already present in the southeast. Excluding those, the list was shortened to 154 species. Of those 154, 18 were already in the risk screening database, so those results could be applied to the southeast. Removing those, 136 species were left. The capacity to complete a full risk screen for all of the groups was not possible, but more information was previously gathered from the regional advisory group.

Two factors were expressed as most important: 1.) If the species had a past history of introduction; 2.) If the species was in the trade industry. There were 10 species that had full capacity of past introduction, and were also in trade themselves. A second factor expressed by the advisory group for prioritizing species was if they were not present in the wild in the U.S. After the 10 species were removed, species not present in the U.S. were looked at, and there were 79. Eight of those 79 species were in trade, but not present in the U.S. Two species had a history of introduction but were not present in the U.S. New risk screenings were used for the 20 species identified using the prioritization factors.

The services tool for rapid risk screening is the Ecological Risk Screening Summary (ERSS). ERSS provides information on a specie's history of invasiveness elsewhere in the world, and on its biology and ecology, potential or known effects of introduction, global and domestic distribution, and climate associations, and provides conclusions on potential risk of invasiveness. These evaluations give USFWS, as well as their natural resource stakeholders and the public, a quick way to determine which species are most likely (High Risk) and least likely (Low Risk) to cause damage if they spread outside of their natural range, and which ones have insufficient information to make such a determination (Uncertain Risk). The USFWS has an existing library of ERSS Risk Summaries of approximately 2,000 species, which can be accessed from their website, and are publicly available to governments, industry, and other stakeholders to assist in making informed decisions about creating watch lists, and trading, transporting, or possessing a particular species.

Four species were identified as High Risk. The remaining species had a classification as Uncertain Risk. Within the Uncertain Risk group, 13 species had a history of invasiveness of data deficient, which means the species does have a history of becoming established outside of its native range, but there was no impact information for that species, or the existing impact information was not credible enough for the species to be classified as a High Risk. The remainder of the species in the Uncertain Risk group had a history of invasiveness classified as no known native population, which means no records were found of established nonnative populations for that species. The four species identified as High Risk were: European Frogbit, African Elodea, South American Spongeplant, and Yellow Velvetleaf. All four species are directly traded, either in the U.S. or internationally, in addition to having the potential to hitchhike on other shipments, which was the pathway of concern, and have been known to escape cultivations of established populations.

The ERSS Risk Summaries could be added to Watch Lists for early detection work and providing identification resources to staff, conducting early detection, or for plant surveys. The summaries could also be used to provide identification resources to existing boat ramp stewards, expanding inspection programs to waterbodies that could be at a higher risk for severe impacts from those species that would take further risk analysis, development of outreach and education materials, science programs, industry partners, and the public in general to help with prevention and early detection.

Regional Invasive Species and Climate Change (RISCC) Network

Wes Daniel gave a Power Point presentation entitled "Southeast Regional Invasive Species & Climate Change Management Network". The goal of Southeast RISCC Management Network is to improve invasive species management in the face of climate change. To achieve this goal, they must identify information needs for invasive species management, and develop a strategy to address these needs via information sharing and research.

Wes stated that they are asking for feedback to assess invasive species management priorities. They are collecting the data to steer activities within the Southeast RISCC Network. There is a managers survey at: https://ufl.qualtrics.com/jfe/form/SV_ab0WehwlT4WLKDk, and a research study at: https://ufl.qualtrics.com/jfe/form/SV_bkevYQYV2UOXIlo.
A SE RISCC webinar series will be held on the third Thursday at 1:00 pm (EST) in August, September, October, November 2022, and January 2023.

A Southeast Climate Adaptation Science Center 2022 Regional Science Symposium will be held September 19-21, 2022 in Gulf Shores, AL.

The SE RISCC workshop will be held in fall/winter 2022.

USFWS OLE Import Inspection Procedures and Authorities

Genevieve Bazer gave a Power Point presentation entitled "USFWS OLE Inspection Procedures and Authorities". The service law enforcement focuses on potentially devastating threats to wildlife resource, illegal trade, unlawful commercial exploitation, habitat destruction, and environmental contaminants. The Office of Law Enforcement (OLE) investigates wildlife crimes, regulates wildlife trade, helps people understand and obey wildlife protections laws, and works in partnership with international, federal, state, and tribal counterparts to conserve wildlife resources.

Wildlife inspectors are the nation's front-line defense against the illegal wildlife trade. The officers ensure that wildlife shipments comply with U.S. and international wildlife trade laws, treaties, and regulations. They are stationed at major airports, ocean ports, and border crossings, and monitor an annual trade worth over $4 billion.

The goals of the OLE are to: enforce U.S. and international laws and treaties that protect wildlife, including the Endangered Species Act (ESA), the Lacey Act, and the Convention on International Trade in Endangered Species (CITES); investigate the unlawful take and unlawful commercialization of foreign and native species; break up international and domestic smuggling rings that target imperiled animals; protect wildlife from environmental hazards and safeguard critical habitat for endangered species; and, inspect wildlife shipments to ensure compliance with laws and treaties, and detect illegal trade. Wildlife inspectors participate in blitzes, and respond to illegal shipments found at Fed Ex and DHL.

Approximately 2,270 species are listed as endangered or threatened under the Endangered Species Act. With limited exceptions, none may be imported, exported, commercialized either alive, as parts or products, or as hunting trophies without specific permits.

The Lacey Act helps foreign countries and our individual states enforce their wildlife conservation laws. Under the Lacey Act, it is a violation of Federal Law to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any fish or wildlife or plant, that were taken, transported, possessed, or sold in violation of any state or foreign law.

Under CITES (Convention on International Trade in Endangered Species), 184 nations are regulating international trade to prevent the decline of species threatened or potentially threatened with extinction. Trade is either virtually prohibited, or restricted. International shipments of these species and products requires an import or export permit, or both, issued in advance by the official management authorities of the countries involved.

Discussion of USACE ANS Work/Funding in the Southeast

Jon Lane gave a Power Point presentation entitled "USACE Jacksonville District Updates". Biologists caught an 18-foor long, 215-pound Burmese python in the Florida Everglades. The record-breaking snake was the heaviest python caught in the wild, and had the largest egg count.

Direct project funding was provided for invasive species for Everglades restoration for the first time.

It has been a difficult year for the Alligatorweed Biocontrol Program, due to FedEx complications and a lack of a robust insect population. So far this year, approximately 15,000 insects have been caught.

The U.S. Army Corps of Engineers' Aquatic Pest Control Cost Share Program supports work on invasive species management, including inspection stations, early detection rapid response, monitoring and control activities with non-Federal sponsors. Current activities directed by Congress include control of hydrilla and flowering rush, which are both highly invasive aquatic plants.

The Aquatic Plant Control Research Program (APCRP) is the nation's only Federally authorized research program providing the capabilities to manage invasive aquatic plant species. The objective of the APCRP is to develop cost-effective, environmentally compatible (or sustainable) aquatic plant management technologies, which address national needs and priorities in water resources management.

The USACE research team consists of a significant cadre of scientists and engineers with state-of-the-science knowledge in a variety of disciplines. Multidisciplinary research teams are tasked with the development of new herbicide technology, improved monitoring technology, and development of biocontrol agents to manage invasive species.

The APC Program, including the APCRP, is authorized at $130M, and has not been in the President's budget since 2010. Both programs remain active, but are limited to Congressionally directed activities.

Discussion of the National Experts Database Update

Wes Daniel gave a Power Point presentation on the National Experts Database. The ANS Task Force Experts Directory was designed to direct users to invasive species experts. It has been set up as a 2-tier system with the first tier accessible to the public. The public portion of the database will guide you to a state contact who acts as a filter for information and identifications. If they can't answer your question, these state contacts have the ability to log in to the second-tier experts. The current version is focused on aquatic invasive species and taxonomic expertise, and only searchable by state or province.

The Experts Database 2.0 will be more searchable by state/province, expertise, agency, university, NGO, and more. It will also have expanded expertise on taxonomics, AIS, research, eDNA, control, economics, social sciences, climate change, and more.

The ANSTF EDRR subcommittee will make an annual reoccurring work element to update the Experts Database. The EDRR chairman will ask for updated regional panel lists and interest by panel members in being part of the Experts Database. A listserv of all experts will be created, and an auto-generated email will be sent out annually in January for members to reply to continue to be in the database. A second courtesy email will be sent to members who do not reply. If an expert does not reply, they will be removed from the database.

New expert database members will be recruited via requests on listservs, professional societies, regional groups, etc. Also, by asking interested people to help.

The Experts Database will need to be promoted to be used. Links to it could be posted on the USGS NAS Database, USDA NISIC, and the new EDRR Information System.

Aquatic Nuisance Species Task Force Update

Susan Pasko gave an update on the Aquatic Nuisance Species Task Force. The Task Force is continuing to meet virtually, but hopes to meet in person in the fall. They held a virtual meeting in May 2020. A variety of presentations were given, as well as standing updates, and subcommittee updates. Each regional panel provided an update on what they have prioritized in the last year. A recording of the presentations is available, and Susan told the panel members to contact her, and she will share the recording. Meeting minutes will be available soon.

There were several Action items from the meeting. The first Action item was for the Fish and Wildlife Service, the U.S. Geological Survey, and the Department of the Interior to consider recording a webinar presentation on the National Early Detection Rapid Response Framework that can be shared with the regional panels and other interested audiences. This will soon be available after the recording has been edited. Susan will inform panel members when it is available for those interested. The second Action item was for Susan to distribute the framework for determining the need for Aquatic Invasive Species Control and Management Plan for Task Force members and the Regional Panels. This work is being produced by the Control Subcommittee, which is basically a framework to determine what species need a more detailed, controlled action plan. Susan will provide the framework to those interested in viewing, or to provide comments by July 15th. Approval will be received hopefully by their next fall meeting. The third Action item is for Susan to work with appropriate agencies to provide an update on activities related to stony coral tissue loss disease. Speakers are being selected for the next fall meeting, and there will be a session dedicated to stony coral tissue loss disease. The fourth Action item is for the Prevention Subcommittee to facilitate a discussion with appropriate agencies and the National Invasive Species Council to encourage the use and adoption of the guidelines to prevent AAS transport by wild and fire operations. This is in response to a recommendation from the Western Regional Panel. The fifth Action item, also from a recommendation from the Western Regional Panel, is that a discussion will be held with the Regional Panels and watercraft industry representatives to discuss the evolution of boat design, and determine if a boating adhoc committee should be re-established in order to update the design standards from the 2013 technical information report and improve interactions between the waterfront industry and managing partner entities.

The Prevention Subcommittee is continuing to work with the U.S. Fish and Wildlife Service to explore opportunities to make importation data electronically available and searchable for organisms that are imported into the U.S.

Funding has been secured for a gap analysis for invasive species pathways to determine what prevention measures may be lacking. With that funding, the USGS is leading a gap analysis to look at incidences where species were introduced in a unique way to identify where there was a particular mitigation measure that could have been in place, but wasn't, with the hopes of offering recommendations on how to strengthen pathway management for the future.

A cooperative agreement has been awarded to Purdue University, which will complete Phase 1 of a seaplane risk analysis project that was led by the Prevention Subcommittee. Phase 2 has been posted on Grants.gov, and will close on August 3, 2022. It is hoped that with these two studies, there will be a better understanding on how seaplanes are moving, and how they are carrying essential invasive species with them. Also to be studied will be what different types of mitigation measures could be used on buying seaplanes in order to stop that pathway.

An Organisms in Trade Hitchhikers Work Group has recently been formed. This is response to continuous reports received of contamination with supply chains that are going to suppliers and retailers. Mossballs found infested with zebra mussels are one example. Working with the supply companies, producers, retail stores, etc. to identify the problem will hopefully lead to decreased spread of the hitchhikers.

The Early Detection Rapid Response Subcommittee is continuing to assist the US Geological Survey with the Nonindigenous Aquatic Species (NAS) database, but will address stakeholder needs throughout the development of new detection and assessment goals. They also continue to work with the USGS on Horizon Scanning and Watch List, and coordinate with the National Invasive Species Council to help develop an inventory of Horizon scans.

A survey was recently distributed by the subcommittee on training needs in regards to rapid response. Responses showed that there is a high need for this type of training/guidance when it comes to rapid response. A rapid response template is being developed, which may include things such as a checklist, or guidelines on how to conduct exercises.

A Task Team was recently established under the Early Detection/Rapid Response Subcommittee that will be focused on developing a model of a rapid response funding process. A draft will hopefully be ready by the fall meeting for Task Force consideration.

The Aquatic Nuisance Species Task Force Experts Database is in need of updating, and will be modernized in the near future.

The Control Subcommittee continues to work on plan revisions. There are 10 species goal plans that have been approved through the Task Force throughout the years. The Control Team has evaluated those and found several that need updated. They are also working on a decision-making process to develop new species plans, should that need ever arise.

The Control Subcommittee continues to work closely with the Research Subcommittee to address gaps for control measures where lacking, for either a specific species, or a particular location.

The Research Committee developed a National Invasive Species Research Priorities List that has been approved. To ensure it gets communicated in an effective manner, they are also working on a Communications Plan to help promote it and get it into the right hands of those performing the work. A tracking mechanism is being developed to keep track of what progress is being made on the individual priorities. This list will stay up to date as needed, and visited on an annual basis.

The Outreach Subcommittee is working on the assessment for outdoor recreational campaigns. A Request for Proposals was put out last year to conduct that assessment that would focus on evaluating the Stop Aquatic Hitchhikers campaign, the Clean, Drain, Dry Initiative, etc. This

was awarded, and underway. Susan received an update from the contractor who is conducting the assessment that they are wrapping things up, and the final report should be received in the next few weeks.

The Outreach Subcommittee is working on updating and expanding the Stop Aquatic Hitchhiker website.

The Outreach Subcommittee has initiated a National Aquatic Invasive Species Outreach Community of Practice. This provides a forum for research professionals to share ideas and to network.

The Aquatic Nuisance Species Task Force continues to put out their weekly newsletter. They also have a new logo.

Cindy Williams asked Susan what the source was for funding the panels. Susan stated funding is through the FAC Program. There is a General Fund that goes to the Regional Panels and for other administration costs of the Task Force. The Panels do not have a dedicated funding line. Cindy asked if NOAA provides any financial assistance to the Task Force. Susan stated that NOAA only provides funding for staff support, and nothing financial.

Update on New Introductions

Cayla Morningstar gave a Power Point presentation entitled "USGS Nonindigenous Aquatic Species (NAS) Spring Update: New Species Occurrences in the Gulf States". The new species alerts are for December 1, 2021 – June 22, 2022.

In June 2021, a quagga mussel was collected from the International Amistad Reservoir in Texas.

In August 2021, three specimens of Mesoamerican cane toad were identified in Polk County, Florida.

In Florida, two "tire track eels", a potential new species, were identified. These eels are popular in aquariums. Taxonomic confirmation is forthcoming. No more specimens were recovered.

In March 2022, a Southeast Fish Slam Bioblitz was held at various sites in Florida. This is a great way to uncover new species before there is a large population establishment, foster collaboration with other biological agency partners and share information, spread awareness, and ensure important specimens enter museums. These events often include "Fish Chat", a small, conference-like forum to share research, management efforts, and ask questions. Other nonnative species, such as plants and invertebrates can be recorded. The events help managers sample areas they might not have time or manpower to sample. The next Fish Slam Chat will be in Southeast Florida in December 2022.

USGS NAS staff are preparing to map the NAS Flood and Storm Tracker (FaST) Maps for the coming storm season. Hurricane season will start June 1st instead of June 15th for 2022. Existing impact tables continue to grow as new publications and news articles come out. NAS staff continue to complete impact tables for new species.

Update on USGS ANS Projects

Wes Daniel reported that there is Congressional and Administration interest for a coordinated EDRR Framework in the United States. The President's budget request for FY23 includes a $2.6M Pilot Rapid Response Fund. This recognizes that early detection and rapid response frameworks are a priority, and provide a cost-effective approach to invasive species management. It will establish a pilot Aquatic Invasive Species Rapid Response Fund that is coordinated through the Aquatic Nuisance Species Task Force. It will have interjurisdictional response teams.

Bipartisan Infrastructure Law funding for FY22-FY26 has $100M for invasive species prevention, detection, and eradication, along with opportunities for development and implementation of a National EDRR Framework. DOI invasive species priorities include "3 in 3 for the WIN: Wildfire, Islands, and a National EDRR Framework". DOI's Executive Leadership affirmed their support for "3 in 3 for the WIN", an effort to advance three signature invasive species initiatives in three years.

Projects to develop the Institutional Architecture for a National EDRR Framework in FY22 include: Horizon scans to develop Watch Lists to consider potentially invasive species not yet found in the U.S., and determine the extent of potential habitat in the U.S.; hot spot analyses; molecular detection tools at points of entry; genetic material repository and network; natural resource manager's eDNA toolbox; READI-Net – eDNA surveillance network; invasive species habitat tool (INHABIT) – terrestrial plant forecasting to predict species abundance, not just suitability of invasive species, and include watchlist species that are not yet known to occur in the U.S.; a Rapid eDNA Assessment & Deployment Initiative Network; and a national EDRR information system with jurisdictional based data-sharing, EDRR network users and customized alerts, training and outreach, and automated reports.

The next steps will be to support FY23 President's Budget Request for the Rapid Response Fund, socialize the National EDRR Framework internally and externally, prioritize strategic investments in the National EDRR Framework for Bipartisan Infrastructure Law FY@#, and build support for using and/or increasing base appropriations to sustain the National EDRR Framework implementation in FY23 and beyond.

Public Comment

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

The meeting recessed at 4:45 p.m.

Wednesday, June 29, 2022

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

Discussion of ANSTF Recommendations

Two Motions were made to present to the Aquatic Nuisance Species Task Force.

Motion #1: Since invasive carp have now been found in the Tombigbee River basin, the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species recommends that the

Aquatic Nuisance Species Task Force urges the USFWS and/or MICRA to take the necessary steps needed in terms of legislation and national plans to allow the use of invasive carp funding in the Tombigbee and Mobile River Basins. The Motion passed unanimously.

Motion #2: The Gulf and South Atlantic Regional Panel on Aquatic Invasive Species hereby recommends that the Aquatic Nuisance Species Task Force urges Congress to amend NMANPCA so that Puerto Rico, the U.S. Virgin Islands, and all U.S. territories and possessions are eligible to receive aquatic invasive species management plan funding. The Motion passed unanimously.

Discussion of GSARP Outreach Material

Dennis Riecke spoke on the idea of a Power Point presentation as one of the GSARP's outreach materials. Panel members have a need to periodically give a public presentation, either to Commissioners, staff members, at an agency lecture series, etc. A Power Point presentation would be beneficial, and could also be designed for use by teachers, the general public, etc. Dennis suggested developing a standard Power Point template that all the members could use, which could also be personally customized at the end of the presentation. It could also be posted on numerous websites. There is also a brochure template that could be designed to be state-specific. Dennis has the template for the brochure.

Dennis asked for volunteers to help develop the Power Point presentation and brochure. Several panel members expressed interest in participating. Dennis will put together outlines, and then send to **James Ballard** to circulate among the panel members for input.

Region 4 USFWS/Small Grants Program

Cindy Williams reported that invasive carp have become the forefront of what the region is receiving funding for to deal with this problem. The total amount of funding received by the USGS for the Arkansas Red and White Rivers, Lower Mississippi River Basin, Missouri River Basin, Ohio River, Tennessee River, Cumberland River, and Upper Mississippi River is $14M. The Southeast region is receiving a little over half of that amount. Regions 2, 3, 4, 5, and 6 are receiving funding in the amount of $7.29M. All of this funding is coordinated and distributed by Region 3 (the Great Lakes region).

State Plans are currently being developed. Alabama has had their State Invasive Species Management Plan approved. This is the first year for Alabama to receive funding for both their State Plan and invasive carp. States not receiving funding in Region 4 for their State Management Plans are Florida (funding not requested) and North Carolina (did not submit a proposal). Some small grants funding has been provided to Puerto Rico for several projects.

There has been staff expansion in two Fish & Wildlife Conservation offices that do habitat restoration and population monitoring. These offices are located in Panama City, Florida, and Baton Rouge, Louisiana. Historically, there have been one staff member at most offices. Several other offices will have additional staff added.

There is a lot of momentum from the headquarters aquatic invasive species branch to have the USFWS have a nationally coordinated early detection rapid response. The USFWS is working with the USGS and the National Parks Service to make that happen. Cindy explained that an early detection rapid response cannot be done without assistance from all of the USFWS

partners. Supposedly, funding will be forthcoming in the future, and dedicated teams throughout the USFWS will lead the efforts.

The annual Prevention funding amount totals approximately $400,000. Some of these funds were provided to Horizon Scan, and will include additional Horizon scans around the country in the future.

There has been an expansion of the Hazard Analysis Critical Control Point (HACCP) training, which has been gaining a lot of momentum. A training session was held in May in Georgia. A virtual HACCP training session will be done in July for Pennsylvania.

Northern snakehead were discovered several years ago in Gwinnett County in Atlanta, GA. Efforts have been done to keep them contained. USFWS recently received a report that samples collected from that location for eDNA analysis showed no detection of northern snakehead DNA.

Grant Solutions has continued to evolve. There are several new requirements that are now part of Grant Solutions, so additional information may be required when requesting grants.

James Ballard reported that over the last seven years, 43 projects have been funded, totaling over $1,000,000. The program has resulted in increased collaboration and communication between the Fish and Wildlife Service, Gulf States Marine Fisheries Commission, Gulf and South Atlantic Regional Panel on Aquatic Invasive Species, and the academic community.

Projects selected for funding for FY2021 include: 1.) Integrating Chemical and Biological Controls for the Aquatic Weed *Alternanthera philoxeroides* (Alligatorweed) – Mississippi State University; 2.) Invasive Armored Catfish (*Pterygoplicthys* spp.) and Midas Cichlid (*Amphilophus* spp.) in Puerto Rico Rivers: Evaluations of Invasion Extent and Efficacy of a Physical Control Method – University of Tennessee and North Carolina State University; 3) A Horizon Scan to Collaboratively Identify Invasive Species Threats to the Islands of Puerto Rico and the U.S. Virgin Islands – University of Florida; 4.) Leveraging Habitat Suitability Modeling to Inform Management of Nonnative Fishes in a Changing Climate – US Geological Survey.

The ANSTF Prevention Subcommittee FY22 Work Plan includes: Making organisms in trade data electronically available, doing a pathway risk assessment evaluation, determining gaps in prevention, forming an ad-hoc committee on VIDA, and expanding non-regulatory prevention measures to help identify steps needed to conduct a traffic assessment to inform the strategic placement of roadside inspection stations in new areas, and establish the Fish Production and Retail Hitchhiker Mitigation Workgroup.

The Aquatic Nuisance Species Task Force's (ANSTF) fall 2021 meeting was held virtually on November 16-18, 2021. The spring 2022 ANSTF meeting was held virtually on May 24-26, 2022.

Due to the pandemic, the Jimmy Sanders Memorial Lionfish Challenge was a virtual tournament utilizing Fishing Chaos. Thirty-one lionfish were collected in 2021, and all prizes were distributed in December. Sponsors were Engel Coolers, Neritic Diving, ZooKeeper, Fishing Chaos, and USFWS.

Discussion of Herb Kumpf Invasive Species Traveling Trunk

James Ballard asked the panel members for input on updating the traveling trunk, and if any new species needed to be added. Due to the COVID pandemic, usage of the trunk dropped considerably, but requests for reserving it are beginning to pick back up. James will also be updating the USGS maps. **Jim Page** said that he has recently added lionfish spines, zebra mussel shells, and Asian clam shells to the traveling trunk that he keeps at his office for events. **Jon Lane** said that he has seen a traveling trunk that had actual drain pipes embedded with zebra mussels, and a license plate recovered from the water that was encrusted with zebra mussels, which really helped people understand the negative impacts from zebra mussels. James said that he would like to update the traveling trunk reservation page on the website by adding a checklist for specific materials and species that people want to highlight at their events so that the trunk can be customized for that particular event. In addition, he would like to create a poster that teachers can keep in their classrooms after using the traveling trunk.

After the discussion, it was decided that information on northern snakeheads will be added to the traveling trunk.

State Reports/ Members Forum

Alabama

Dave Armstrong reported that after final review by the National Aquatic Nuisance Species Task Force, the Alabama Aquatic Nuisance Species Plan was approved during November 2021. This plan approval has initiated a proposal by Alabama Division of Wildlife and Freshwater Fisheries (ADWFF) to receive grants funds which should allow securement of funds in summer 2022.

ADWFF hired an Aide to assist the new ANS program office in Athens, AL during November 2021. They also want to hire an ANS Biologist II in July-August 2022, and Dave told the members if they knew of a good candidate, or were interested themselves, to contact him.

Since January 2022, twenty-nine silver carp have been captured by ADWFF staff in Pickwick Reservoir, using electrofishing and gillnets in fixed and targeted sites. To date, 105 silver carp have been captured in this system since fall 2020.

ADWFF staff continue field monitoring for invasive carps, and CY 2022 collections targeted three species (bighead, silver, and grass carps), using gillnets and boat electrofishers. Collections and surveys were made in three reservoir pools of the Tennessee River (Pickwick, Wilson, and Wheeler) over 33 sample dates at 142 fixed and targeted sites. Silver carp were captured only within Pickwick Reservoir. Plans for second half of 2022 include continued sampling and development of an occupancy sampling strategy for the three lower reservoirs.

In June 2022, a single silver carp was found dead in the Montgomery pool of the Tombigbee River, downstream from Bay Springs Lake located in Itawamba-Prentiss County, Mississippi. This sighting and prior findings of bigheads and grass carp in Alabama waters of the Tombigbee River lend credence to recent discussions by multiple agencies on the need for installing fish barriers at Bay Springs. This location is a man-made navigation reservoir at the head of the Tenn-Tom system, ultimately draining into Mobile Bay. Invasion of carps could have devastating impacts on native fauna in the Mobile-Tensaw Delta, and all connected inland/coastal waters therein.

The infestation and control of island apple snails in Threemile Creek in Mobile continues to have management oversight by the Mobile Bay National Estuary Program. Other known populations persiwst at Hog Bayou industrial ponds near Chickasaw Creek in Mobile County, a pond in Orange Beach in Baldwin County, and two private ponds in Pike Road Alabama in Montgomery County.

Mobile Area Water and Sewer (MAWSS) Board recently re-opened Big Creek Lake to anglers and boaters on a limited basis due to ongoing issues with salvinia, which has been treated by MAWSS since 2021. Big Creek Lake serves as the primary water source for the city of Mobile.

Since spring 2021, two silver carp have been captured and positively identified within Wilson Reservoir. Additionally, two bighead carp (male and female) were captured in one commercial fisherman's gillnet in Guntersville Lake off Brown Creek. These are the only two recent reports of invasive carp outside Pickwick Reservoir in the Tennessee River.

Since 2021, small numbers of smallmouth bass have been found in Smith Lake, a large reservoir in the Sipsey River system. Though native to the Tennessee River, these popular sport fish are invasives in this system.

Jessica Marchant reported that several invasive species have been documented in Alabama coastal waters. The bocourt swimming crab, tessellated blenny, Australian spotted jellyfish, Asian green mussel, Asian tiger shrimp, and red lionfish have all been documented. The current status of the Australian spotted jellyfish and the bocourt swimming crab does not indicate that they pose an immanent concern. Tessellated blenny and Asian green mussels do not appear to pose an imminent threat, but their distribution and abundance should be monitored to ensure early detection of proliferation. The Asian tiger shrimp and red lionfish, however, 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 nonnative species observed in the marine waters of Alabama was a single crescent grunter. The specimen was collected in February 2020, but was not reported until March 2021. The specimen was collected at the Dauphin Island Airport, and was maintained in an aquarium at Five Rivers Delta Resource Center. The ADCRN/MRD was notified once the Five Rivers staff realized the fish was not native to Alabama. The fish is currently in quarantine at the Dauphin Island Estuarium, and will be displayed for outreach purposes to educate the public on the problems associated with invasive species.

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 limits 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.

Florida

Matt Phillips reported that the Lionfish Awareness and Removal Day was held in May 2022 in Destin, Florida. This event was held in conjunction with the state's largest lionfish removal event, the Emerald Coast Open Lionfish Derby. The six days leading up to the removal day is

called Restaurant Week. Participating restaurants created and sold lionfish dishes. It is hoped that public demand for lionfish meat will increase. There were 145 tournament participants, who removed 13,835 lionfish.

The Florida Fish and Wildlife Conservation Commission is holding the 2022 Lionfish Challenge. The event began in May 2022, and will continue through Labor Day. The Challenge is a statewide event open to recreational and commercial divers, and is a rewarding way to help reduce the number of lionfish on Florida's reefs. Participants in the Challenge have historically removed a large number of lionfish. In 2020, 21,569 lionfish were harvested. In 2021, 21,146 lionfish were harvested.

The FWC has developed a variety of programs designed to increase lionfish removals by sponsoring tournaments and offering incentives to recreational and commercial divers. FWC will provide funding to qualified "hosts" to organize and hold lionfish tournaments. Since July 2020, FWC has sponsored 19 lionfish tournaments whose participants have removed over 22,000 lionfish.

The Recreational Lionfish Harvest Program aims to incentivize dive charter boat operators to conduct recreational lionfish-specific harvesting trips to increase the number of lionfish removed from Florida waters. Charters will be eligible for reimbursement if the total lionfish harvest is equal to eight lionfish, multiplied by the total number of divers. Charters will be reimbursed for $50/diver. These trips have resulted in nearly 10,000 lionfish being removed from Florida waters.

The Commercial Lionfish Harvest Program provides incentive for commercial divers to harvest lionfish and sell their fish to licensed wholesale dealers. In addition to their lionfish sales, FWC will reimburse commercial participants with $3.00 per pound of lionfish with the submission of their trip ticket.

In October 2020, green mussels were reported from Little Lake Worth Lagoon, on the north end of Lake Worth Lagoon, where they had not been reported before. FWC and other partners are currently undertaking major restoration projects in the Lake Worth Lagoon, including creating nesting islands surrounded by rip rap intended for native oyster habitat. Green mussels are a bio-fouling organism, and there are concerns that they could displace native oysters and cause substantial economic fouling issues for ships and structures, such as floating docks, channel markers, pilings, and intake pipes. Since February 2021, there have been no new green mussel reports from the Lake Worth Lagoon or other Intercoastal Waterway sites. However, a flier has been developed and disseminated to Lake Worth Lagoon stakeholders to aid in the identification and reporting of green mussels.

The first in-person Fish Slam since the onset of COVID-19 was held in March 2022 in southwest Florida. The primary objectives of this event were to resample sites reported to have arapaima, document the distribution of butterfly peacock, and clown knifefish found in a June 2021 survey, and assess the species composition and abundance of nonnative fish in previously unsampled waterbodies. Forty-four fish biologists from seven organizations sampled 30 sites from Naples to Englewood, Florida. Fifteen species of nonnative fishes were collected or observed. Mayan cichlids, blue and Nile tilapia, and sailfin catfish were the most widespread and abundant species collected. A total of 13 adult clown knifefish were collected from three interconnected

homeowner association lakes in Venice, FL. In June 2021, fifteen adult clown knifefish were removed from these lakes. This was the 12th event since the program began in 2013.

A new nonnative species, tentatively identified as Tire Track Eel or Zig Zag Eel was collected from a single site in Cape Coral, FL during the 2022 Fish Slam. Two individuals were collected, and additional follow-up sampling is planned. Tissue samples are being collected by USGS for eDNA, and the eels will be returned to the Florida Museum of Natural History to be added to their collection.

A range extension for spotfin spiny eels was documented by FWC part of the 2022 Fish Slam. Four of these eels were collected from the Miami Canal where it flows under Alligator Alley. This site is approximately 26 miles north of their last known location.

The FWC and Southwest Cooperative Invasive Species Management Area (SWCISMA) partners held their 2nd Invasive Fish RoundUp on April 29 - May 1, 2022. Over 100 youth and adult anglers on 33 teams registered for the event, and 75 anglers from 29 teams brought in 3,424 fish. Anglers brought a total of 12 different nonnative fish species into the weigh-in site in Ft. Myers, FL. The primary species brought in by number were Mayan cichlids, blue and Nile tilapia, oscars, and sailfin catfish. There were no new species collected this year, but there were some uncommon ones, including pike killifish, black acara, and brown hoplo. Anglers competed for prizes donated by local sponsors, and many of the partners set up outreach booths to promote prevention of nonnative species release. This event is a valuable tool that assists FWC in assessing nonnative fish distributions and abundance.

Bullseye snakehead have recently moved into the Lake Ida-Osborne chain-of-lakes system in southeastern Palm Beach County. An FWC multi-divisional internal grant proposal was funded to examine how these top-level predatory species use the 'natural' habitats, and to compare stomach contents to snakeheads, bass, and peacocks collected in manmade urban canals. By better understanding how these species utilize resources in the Lake Ida system, insights can be developed into how they may interact in natural everglades habitats further to the west. Bullseye snakehead have not been documented in the everglades to date. Stomach content collection of the three species began in July 2020, and will continue through June 2022 to examine seasonal and ontological differences in diet and diet overlap among species. Preliminary results indicate a high degree of overlap in diet between the three species, with fish the principal prey group by weight. Bullseye snakeheads have the most diverse diet, and consume a variety of turtles. This invasive fish also consumed prey items in large numbers, including over 800 cane toad tadpoles.

In March 2021, radio transmitters were surgically implanted into 25 each of the three target species. Tracking began in April 2021. Fish movements are being monitored by three shore-based remote receivers and by handheld receivers on boats. The fish were also tagged with reward tags to evaluate catch rates of these popular sportfish by anglers. Tracking has shown a wide variety of movements within the lake, as well as into the interconnected canal systems. Researchers have documented some mortality of radio-tagged fish, and plan to recover the tags and implant them again this fall to monitor movements over another winter to see how these species respond to cold water conditions. A database is under construction to allow FWC to enter and analyze the fish movement from active and emote tracking collections.

The FWC’s standardized electrofishing program monitors native and nonnative fish populations in southeast Florida urban canals. The FWC’s Nonnative Fish and Wildlife Program (NFWP)

coordinated with FWC freshwater fish management 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's NFWP has used since 1997. Three to five randomly chosen daytime transects were added to this protocol. In October 2021, the NFWP sampled six core canals using these modified protocols. A total of 2,011fish were collected from six core canals. Native fish (24 species) comprised 72% of the total catch, and nonnative fish (17 species) comprised the remainder. Native sportfish, primarily redear sunfish, bluegill, and largemouth bass comprised 85% of the native fish catch, and 61% of all fish collected. Spotted tilapia, butterfly peacock, and Mayan cichlid were the principal nonnative fish species collected, making up 60% of the nonnative fish collected, and 17% of the total number. No new nonnative species were collected.

The U.S. Fish and Wildlife Service (USFWS) received funding for an Early Detection Rapid Response project to support ongoing FWC efforts to prevent the establishment of arapaima and other potentially detrimental invasive fish species in Florida. The funding allowed for the purchase of large-mesh gillnets, a snagging rod, and a bowfishing kit that can be used by FWC in the event an arapaima is observed. The funding also paid for USGS and USFWS travel expenses to sample waterbodies with reports of arapaima. In November 2021, a new report of an arapaima in a brackish water canal in Cape Coral, Florida was received by FWC. Several shoreline surveys and one electrofishing survey were conducted by FWC, but no arapaima were observed or collected. No additional reports have been received from this location. The fish was likely a large snook or tarpon. FWC has developed outreach materials to inform the public on the potential environmental consequences of releasing this fish, and to encourage anglers to report observations or catches to FWC's "I've Got 1" hotline.

Biologists with the FWC's Fish and Wildlife Research Institute (FWRI) are exploring different methodologies to try and remove tilapia from Silver Glen Spring, without causing undue stress to the manatees that overwinter in that spring. Tilapia's bedding activities may uproot native aquatic plants and decrease the forage available to the manatees. Electrofishing is not an option, due to the likelihood of accidentally shocking a manatee. Bowfishing and spearfishing cannot remove large numbers of tilapia at one time, and can only be used when manatees are not present. Heavy mats of algae were on the bottom of the spring, so seining was not an option, so FWRI tried gillnets to harvest the tilapia. Many fish escaped, but over 300 pounds of tilapia were removed. New gillnets constructed with stronger monofilament line, a single mesh size, and a heavier leadline will be purchased soon.

The FWC has contracted researchers with the university of Florida to use the native Eastern mosquitofish as a biocontrol species on tropical clawed frogs found in small retention ponds in the Riverview area near Tampa. These fish prey heavily on the eggs and tadpoles of the frogs. Researchers are currently sampling ponds for presence/absence data on adult tropical clawed frogs to identify their range, and to determine relative abundance. Upon detection of vulnerable life stages of the frogs, the ponds will be stocked with Eastern mosquitofish, and frog populations will be monitored to assess depredation impact. The goal of this project is to make both permanent and ephemeral ponds inhospitable to tropical clawed frog reproduction and recruitment and ultimately, to eradicate this species from Florida. This work will continue through June 2023.

Freshwater report:
Kelly Gestring reported that invasive nonnative plants were reported in 96.8% of Florida's 462 surveyed public lakes and rivers that comprise 1.27 million acres of fresh water. Managers spent approximately $4.12 million during FY2020-2021.

Floating water hyacinth and water lettuce were present in 279 public lakes and rivers in 2021, covering approximately 5,048 acres.

Hydrilla was reported in 176 public waters in 2021, and was managed to target goals in all of Florida's public lakes and rivers; however, tubers infest about 60,112 acres, and represent the potential for immediate growth. In 2021, 72.2% of the hydrilla populations reported covered 10 acres or less, and 36.6% of the hydrilla reported in 2021 occurred in the four lakes of the Kissimmee Chain of Lakes, among Florida's largest and most important multi-purpose waterways. Managers spent $8.03 million controlling 28,533 acres of hydrilla in Florida public lakes and rivers during FY2020-2021.

The Florida Exotic Pest Plant Council lists 12 Category 1 invasive plants capable of disrupting aquatic ecosystems and causing harm in Florida public waters. Ten Category 1 plant species, in addition to hydrilla and water hyacinth, were detected covering approximately 13,547 acres in 94% of Florida's public waters in 2021. During FY2020-2021, $1.96 million was spent managing approximately 5,168 acres of aquatic plants other than hydrilla and floating plants. The majority was spent for control of plants like bur head sedge, exotic ludwigia, frog's bot, and tropical American water grass in Florida's waters to conserve fish and wildlife habitat, and navigation in extensive marsh systems of these waters.

Georgia

Jim Page reported that in 1996, the WRD - Fisheries Management Section began removing flathead catfish from the Satilla River. In 2006, the Flathead Catfish Removal Project was instituted to control the population. In May 2021, staff initiated removal efforts, and removal efforts were consistent and effective. However, persistent rains in July, August, and September resulted in river levels being above normal, which minimized the effectiveness of gear, and negatively impacted removal efforts. Staff spent over 155 hours of shocking time, and 3,372 flatheads were removed.

GA DNR staff continue to remove blue catfish from the Satilla River. During the 2021 removal season, 80 blue catfish were removed.

A mystery snail was captured in Lake Oconee-Sugar Creek in Putnam County in April 2022.

A blue catfish was captured in Lake Lanier in Hall County. It was reported by a GA DNR biologist. The fish was kept.

An Asian swamp eel was captured in Olley Creek in Cobb County. The report was provided by a private citizen. The eel was kept, and placed in a personal aquarium.

Gill lice was observed in the mouth of a gulf striper fish in the Flint River. It was positively identified by GA DNR staff.

Water hyacinth continues to be observed in several waterbodies within the state.

Commercial fishermen continue to periodically report catches of Asian tiger shrimp in Georgia waters. Reports of tiger shrimp continue to be provided through the new reporting tool on the GA DNR-WRD website. Reports of a single tiger shrimp captured in bait trawls were received in September 2021 and October 2021. Both instances occured in Maiden Creek (St. Andrews estuary). Staff may potentially intercept tiger shrimp during fishery-independent standardized sampling conducted monthly at over 36 sites coastwide for penaeid shrimp and blue crabs. Results of these surveys suggest that abundance of tiger shrimp in Georgia's sampled waters are low.

Staff continue to make additional updates to the GA DNR Aquatic Nuisance Species web page on the website.

Staff have developed and begun installing two new ANS signs at boat ramps and public access sites around Georgia to inform the public about how they can help prevent ANS introduction.

Staff with the US FWS, Pacific States Marine Fisheries Commission, and other groups joined the GA DNR to host two ANS trainings. The first was a Watercraft Insprction/Decontamination Training held at Red Top Mountain Park in May. Participants learned how to identify non-native species, and inspect/decontaminate vessels. Participants included marina owners, federal and state employees, and private citizens. A second training conducted at RTMSP in May was a Hazard Analysis and Critical Control Point (HACCP) training. Cindy Williams with USFWS joined National Park Service staff and other leaders to teach participants, comprised mostly of researchers, about how to develop plans to minimize the potential of introducing invasive species during research activities.

Conducting visits to schools and other educational outlets continues to be an utmost priority. Over 4,700 students and adults were spoken to across 18 school/civic groups. Sixteen of these visits included talks utilizing the Traveling Trunk, which continues to be a valuable tool provided by GSARP.

Louisiana

In March 2022, LDWF received a call and picture of a fish from a citizen. The caller stated that the fish was caught by a friend, and then released back into a pond. LDWF staff and other experts identified the fish in the picture as a Murray Cod. LDWF biologists visited the location and surveyed the small pond and canals in the area, but did not find any Murray Cod or other nonnative fish. LDWF caller the angler to get more information, and the angler directed them to a nearby pond, which was not electrofished previously. The angler also admitted that the fish in the picture was not his, but one that “Google suggested”. LDWF returned to the pond to sample, but did not find any nonnative fish. There are a few Murray Cod in LA, so the report cannot be confirmed as false. They will sample the area in fall 2022.

In May 2021, the LDWF ANS coordinator received a report from the public of a Pacu caught in University Lake in Baton Rouge. Upon receiving the fish, it was determined to be a red Piranha. LDWF has sampled the lakes monthly, and has not recovered any more piranha. It is considered to be a single introduction.

Blue tilapia were found during routine sampling in October 2019 by LDWF in University Lake. Repeated sampling in 2020 has shown a reproducing population. The February 2021 freeze kept the Baton Rouge area under 40 degrees for 137 hours, and below freezing for 94 hours. Since

that time, LDWF has sampled the area several times, and has not found any live tilapia. It is believed that the tilapia did not survive the cold spell.

Public reports of apple snails slowed from the normal pace in previous years. With the drought conditions experienced, the snails are mainly in canals and bayous, and not in drainage ditches. The Louisiana crawfish industry is reporting large catches in their fields, and this has generated more public interest. Limpkin populations have been increasing in LA. These birds eat apple snails, and many piles of empty shells have been reported in areas with limpkins. LDWF is hopeful that these birds may help reduce the apple snail numbers in some areas.

In fiscal year 2020, LDWF began two projects funded through USFWS's Lower Mississippi River Invasive Carp Partnership and the Atchafalaya, Red, and White Rivers Invasive Carp Partnership. These two projects should assist LDWF in locating breeding areas, and identifying potential locations for carp barriers. LDWF has tagged 107 invasive carp to help understand the movement of the carp in south Louisiana. Of the 107 invasive carp tagged, 57 have been detected. This will assist in determining their seasonal migration patterns. Through this project, a grass carp tagged in Iowa was detected in the lower Atchafalaya River. During plankton tows in June, LDWF biologists captured silver carp ranging from one to two inches. Both of these projects will conclude in December 2022.

In fiscal year 2021, LDWF began four partnership funded projects to investigate the developing markets for invasive carp, investigate obstacles inhibiting commercial fishermen from harvesting invasive carp, and to study the impacts of invasive carp on native commercially important fish. The projects are still in progress, and there are no results available yet.

For fiscal year 2021, LDWF has proposed additional studies to expand the telemetry project, develop commercial markets for carp, help define the exact breeding periods of the carp, continue studying impacts on native fisheries, and investigate the effectiveness of commercial gill nets in off-channel habitats. These projects will begin in January 2023.

An Asian swamp eel was found in Bayou St. John in New Orleans in June 2019. LDWF and a local college professor continue to monitor and sample the population. Two small eels were found in samples collected in September 2020. No eels were found from September 2020 to May 2022. Only one specimen has been reported thus far in 2022, and was caught by an angler, and confirmed via photograph. This eel was caught at the original site where the swamp eels were first detected. LDWF will sample in summer 2022.

LDWF continued control of invasive vegetation species through their Aquatic Plant Control Program. Aquatic plant control plans were developed for 74 different water bodies during this reporting period. Giant Salvinia continues to be the most problematic invasive plant in Louisiana. Since 2010, LDWF has treated an average of 21,404 acres of giant Salvinia per year with herbicides. The program has an annual budget of $3,200,000, of which over 50% is spent on giant Salvinia alone for monitoring, treatment, and research.

A project was initiated where observations from members of the public are filtered on iNaturalist to produce a list of all invasive species reported. This list of species and locations is screened by the LDWF ANS coordinator to look for new invasive species, as well as any range expansions. Any observations of interest may generate a site visit to determine if the report is accurate. Thus far, no data has yielded any confirmed new invasive species.

Mississippi
Freshwater report:

Dennis Riecke reported that the MS Department of Environmental Quality submitted their plan to the Task Force.
Funds have been used for plant surveys, chemical testing on plants, and various projects.

Funds for Asian carp have mainly been used for research projects.

Two studies are being done on oxbow lake invasions. One study is in Moon Lake. Homeowners on the lake wanted a barrier installed for a shoot that goes into the lake. Conditions under which the lake becomes connected, hydrological conditions, and movement of fish are being looked at. At Eagle Lake, there are two water control structures. How they will influence the exchange of fish is being studied.

Two other oxbow lake studies are also being done. A typology study is being done on the susceptibility of an invasion by Asian carp. Another study will look at where the Asian carp are present in those oxbow lakes, and where they might go next. Sampling will also be done.

The presence of Asian carp in Pickwick Lake was very low.

MDWFP has a contract with the Pearl River Valley Water Supply District to chemically treat invasive plants in the Ross Barnett Reservoir. Giant Salvinia was found in a cove there. Removal efforts and chemical treatments were done, along with booms and restriction of boat traffic have proven effective, and it appears to have been eradicated.

In the future, MDWP will be hiring contractors, and purchasing a boat and fishing nets to catch Asian carp. The fish will be gutted, the air bladder punctured, and then put back into the water.

Saltwater report:

Mike Pursley reported that a program of integrated pest management and spot herbicide application was used to control populations of common Salvinia, giant Salvinia, alligator weed, torpedo grass, Eurasian watermilfoil, and water hyacinth.

Two aerial photo surveys totaling 173 miles were conducted for early detection of AIS in difficult to access areas, and help monitor treatment efforts.

One report of an invasive silver carp in the Jourdan River was received and reported to the NAS database.

Crews continue control efforts against the Pascagoula River giant applesnail infestation. ArcGIS Quickcapture is used to record field capture data and survey tracks. Approximately 51,700 egg masses have been destroyed, and over 4,700 live snails have been removed from the river since this infestation was first detected in 2014. A modified crawfish trap baited with crawfish bait has been the most successful so far, trapping as many as 20 snails per deployment.

A public outreach event as part of National Invasive Species Awareness Week was held at the Mississippi. Larger items from the GSARP Traveling Trunk of Invasive Species were incorporated into the display to help communicate invasive species information to visitors.

A mobile phone invasive species reporting tool has been maintained and promoted on MS DMR's website and social media outlets.

South Carolina

Michael Kendrick reported that researchers at the SC DNR Marine Resource Research Institute (MRRI) have developed molecular tools to test whether hybridization is occurring within wild populations of the *Scapulicambarus* subgenus of crayfish. The red swamp crayfish, *Procambarus clarkii* (invasive to South Carolina), is nested within the subgenus *Scapulicambarus*, which it shares with only four other species, including the native eastern red swamp crayfish, *Procambarus troglodytes*, which is the species most closely related to *P. clarkii*. The eastern red swamp crayfish is the most abundant native crayfish species in South Carolina, where much of its range overlaps with known locations of invasive *P. clarkii*. Hybridization is common among crayfish species; however, the majority of the research to assess hybridization of nonnative crayfish with native species has focused on the genus *Faxonius*, with little data currently available for hybridization within the genus *Procambarus*.

Baited minnow traps and dip netting were the primary techniques used to locate *P. clarkii* and *P. troglodytes*. Microsatellite markers were used to genotype *P. clarkii, P. troglodytes* and any potential hybrids collected in the field. The resulting genotypes were subjected to the model-based Bayesian clustering methods implemented in STRUCTURE to estimate and visualize potential shared ancestry that would be expected if hybridization is occurring between these two species. Of the 17 loci that consistently amplify in *P. clarkii*, 6 also amplified and binned reliably in *P. troglodytes*.

A total of 259 samples, 127 *P. clarkii* and 132 *P. troglodytes*, were included in the final STRUCTURE analysis estimating shared ancestry between the two species. No individuals included in these analyses were identified as hybrids and as such there is no indication of recent or rampant hybridization between *P. clarkii* and *P. troglodytes* at any of the sampling locations. Loci Pcl-12 and Pcl-64 were particularly informative as hybridization indicators as the 2 to 3 alleles that occur in *P. troglodytes* are ubiquitous in *P. troglodytes* and completely absent in 2 *P. clarkii*. If hybridization were occurring, introgression of alleles at these loci between these species would be expected.

White spot syndrome virus (WSSV) is highly pathogenic, infects many crustacean species, and was recently associated with both wild and farmed red swamp crayfish, *Procambarus clarkii* in Louisiana. Since Louisiana exports live *P. clarkii* to South Carolina, the potential presence of WSSV in these specimens raises concerns over WSSV threats to commercially- and recreationally-important native crustacean species in SC, such as the white shrimp and blue crab that are known to be susceptible to WSSV. As such, sampling locations for this study focused on brackish water habitats where white shrimp and blue crab are known to occur. Specimens were tested using molecular qPCR assays modified and optimized from Blaylock et al. (2019) by the SCDNR Population Genetics Research Laboratory. Screening of 60 wild-caught specimens of white shrimp, brown shrimp, and blue crab resulted in no wild-caught estuarine specimens testing positive for WSSV. These methods were also used to screen several tissue types obtained from *P. clarkii*, including gill, muscle, and pleopods for the presence/absence of the virus. Based

on sampling of 14 locations in the Charleston area, no wild-caught crayfish have tested positive for WSSV. In 2022, to investigate an additional pathway of potential WSSV transmission, store-bought specimens of *P. clarkii* (n = 75) and *P. troglodytes* (n = 30) were also screened using the optimized qPCR assay, along with positive control samples, negative control samples, and no DNA template controls. All specimens of *P. troglodytes* tested negative for WSSV; however, nearly half of the store-bought *P. clarkii* specimens tested positive for WSSV. In addition, store-bought specimens of white shrimp (n = 90) and Pacific whiteleg shrimp were screened for WSSV. The virus was not detected in any of the store-bought white shrimp, but WSSV was detected in 17 of the 30 store-bought Pacific whiteleg shrimp specimens.

Researchers are preparing for experimental trials to investigate the mechanisms of WSSV transmission from *P. clarkii* to estuarine crustaceans. These trials will focus on the relationships between environmental conditions and WSSV transmission dynamics, including the rate of initial transmission, infection intensity, and mortality rate. Trials will utilize a combination of 3 environmentally relevant salinities and temperatures to assess transmission from experimentally inoculated *P. clarkii* to uninfected *P. setiferus*. These trials are scheduled for August-September 2022. Staff recently presented results from qPCR screening alongside the experimental design of future trials in the form of a poster at a recent research symposium hosted by the South Carolina Sea Grant Consortium in Charleston, SC in May, 2022.

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 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 already established a persistent population.

The SCDNR Population Genetics Research Laboratory has begun the development of a panel of species-specific markers for snakehead species to support the rapid evaluation of the distributional extent of an invasion once detected. Data sources from Serrao et al. (2014), Simmons et al. (2016), Roy et al. (2018), and Hunter et al. (2019) are being used to optimize an efficient suite of eDNA tools. Benchtop tests were conducted 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 SCDNR 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.

Three pairs of previously designed and tested primer/probe combinations specific to bullseye snakehead and Northern snakehead were ordered for optimization in the SCDNR Population Genetics Research Laboratory. Positive control tissue for these snakehead species and other snakehead species for non-specific amplification testing was requested from the Florida Museum of Natural History, the Georgia 4 Department of Natural Resources, and the North Carolina

Museum of Natural Sciences. Each primer and probe combination was amplified by qPCR following published protocols, testing both target and non-target snakehead species. All three combinations successfully amplified the target species and did not amplify the other snakehead species. Further testing was performed to ensure that there is not amplification in non-target species, such as four species of gourami that have been obtained from local pet stores and other native freshwater species for which the Population Genetics team already have tissues archived. All three primer and probe combinations failed to amplify any of the non-target species.

Given the overlapping invasive range of zebra and quagga mussels, and the potential negative ecological and economic impacts posed by both species, the SCDNR Population Genetics Research Laboratory is working to optimize and evaluate existing eDNA tools for the detection of both species in the southeastern U. S. The optimization and testing of a panel of species-specific markers for zebra and quagga mussels for use in the highly diverse aquatic landscape of the southeastern U. S. will support proactive aquatic surveys for these invasive species, as well as the rapid evaluation of the distributional extent of an invasion once detected. As a complement to eDNA tools, an SOP for field implementation that provides a Decision Tree to allow for the establishment of criteria and actions that can quickly be put into place in the event of a positive detection is also being developed. Initial steps for the project have included identifying native mollusc species that will be tested with the zebra mussel and quagga mussel probes to ensure that no non-target amplification occurs with native species. Although local native mollusc species are not closely related to these possible invasive species, it is an important step to ensure that any field-collected sample results are properly interpretated. Tissue samples or extracted DNA from several native species will be procured to test against these eDNA probes.

Once tool development is complete, an archived series of eDNA extractions from 60 sites in blackwater systems across South Carolina and Georgia that were previously collected as part of an eDNA study for blackbanded sunfish will be screened for the presence of invasive snakehead and zebra mussels to provide a baseline dataset for these species across the region. All contamination controls and protocols will be implemented, and samples will be evaluated with multiple technical replicates and positive/negative DNA controls.

Researchers with the SCDNR 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. The SCDNR received no reports of tiger shrimp in the current reporting period. 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 addition, researchers at the MRRI have continued their collaboration with researchers at Auburn University to explore the viral diseases present in tiger shrimp. SCDNR staff provided whole specimen and/or gill tissue samples and collection information for four additional archived tiger shrimp specimens for this effort.

SCDNR and USGS continue to receive reports of island apple snails from the public. The majority of these recent observations have been in areas where island apple snails were previously documented by SCDNR MRRI's Shellfish Research Section staff; however, the SCDNR received one observation of island apple snails near the Santee Cooper resort on Lake Marion, SC, which would represent a new location for these snails. Staff plan to conduct surveys in this area to verify these observations. SCDNR staff have also been in contact with, and provided information to, US Fish and Wildlife staff conducting research on the link between gastropods (including the non-native island apple snail) and limpkins in South Carolina.

Commercial and recreational crabbers have increasingly reported the occurrence of invasive portunid crabs in South Carolina. This includes the Indo-Pacific swimming crab and the bocourt swimming crab. To manage any potential ecological and fisheries impacts, researchers with the SCDNR MRRI's Shellfish Research Section are interested in understanding the distribution and occurrence of these invasive portunid species. Staff collected one adult male bocourt swimming crab from a commercial crabber in Beaufort County during the current reporting period. A tissue sample was collected from the specimen and sent off for genetic analysis. Staff will continue to accept specimens from commercial and recreational crabbers. Portunid crabs are often difficult to identify at the juvenile stage leading to a lack of life history information for many portunid species in this age class. Therefore, researchers at the MRRI are using a combination of morphological and genetic approaches to facilitate greater taxonomic resolution for juvenile portunid species. Specimens were collected and retained from the SCDNR Estuarine Trawl Survey, which includes 26 statewide sampling locations. Sampling for this project has been completed, resulting in the collection of over 700 juvenile portunids from the *Callinectes*, *Arenaeus*, and *Achelous* genera. Genetic samples have been sent for analysis and the genetically verified identifications will be used to develop a guide to increase the accuracy of native and non-native portunid identifications in the field.

Julie Holling reported that Chris Page retired at the beginning of 2022. They are currently working with a two-person staff, and hoping to hire a technician soon.

In 2022, 168 acres of water hyacinth on the Combahee River were treated, as well as several lakes on state parks across the state. In May, triploid grass carp were stocked in Lake Greenwood, Lake Murray, Goose Creek Reservoir, Spartanburg Water's Lake Bowen and Reservoir #1, and a small pond on Crackerneck Wildlife Management Area. More treatments are forthcoming for the next fiscal year starting in July.

In 2021, various rivers, creeks, lakes, reservoirs, and wildlife management areas were treated for a variety of invasive plants.

Triploid grass carp were stocked in May at Lake Murray (1,500), Goose Creek Reservoir (800), Lake Greenwood (300), Lake Bowen (65), Spartanburg Reservoir #1 (25), Lake Wallace (140), Kendall Lake (120), and Second Millpond (200).

The U.S. Department of Agriculture provided SC DNR with approximately 3,000 alligatorweed flea beetles in May 2021, which were released on Goose Creek Reservoir.
Funding for SC DNR is from the Water Recreation Fund, which is a small portion of the state's gas tax, and varies from year to year. The money is used to cover all of the program expenses and treatments.

Most of the community outreach is done at the Southeastern Wildlife Expo in Charleston, and at the Palmetto Sportsmen's Classic in Columbia.

Texas

Monica McGarrity reported that zebra mussels have invaded 33 lakes across six watersheds in Texas since their initial introduction into the state in 2009. Since the last GSARP meeting, zebra mussels have invaded three additional lakes in Texas.

Quagga mussels were detected for the first time in Lake Amistad in the Rio Grande Basin on the Texas-Mexico border in 2021. Single quagga mussel veliger larvae were detected on four different dates across two sites in the lake, and confirmed by DNA testing. To date, no settled mussels have been detected, and no veligers were detected in samples collected in April 2022. The National Park Service and TPWD will continue to monitor the lake.

The TPWD and partners continue to monitor 44 lakes for early detection of invasive mussels, 28 lakes for population monitoring, and to support research on enhancing detection methods and better understanding of population dynamics.

A recently completed zebra mussel establishment risk assessment indicated that, with the exception of low-calcium east Texas lakes, power plants, and a few lakes with high salinity, all studied Texas lakes are at high risk of zebra mussel establishment, despite the state being at the southernmost extent of the range of this species. Prior to their invasion of
Texas, it was believed they would not be able to become established in the state due to high temperatures.

Numerous aquatic invasive plants are highly problematic in Texas, including giant and common salvinias, water hyacinth, hydrilla, and crested and yellow floating hearts. There have been no new invasions of giant Salvinia or other problematic aquatic invasive plants documented since the last GSARP meeting, and treatment efforts have been highly effective. Giant Salvinia coverage has been reduced to approximately 300 acres in Caddo Lake, and to approximately 75 acres in Toledo Bend. At Toledo Bend, staff have begun re-seeding American lotus in treated areas and across many lakes. Significant regrowth of native plants in treated areas has been observed. The current drought situation is allowing saltwater intrusion into estuarine habitats, which has eliminated giant Salvinia and water hyacinth infestations in many previously highly infested bayous. Salvinia weevil success has been very good, with weevils found in many new locations, and already providing significant control. Hydrilla treatment continues to be limited to small local lakes and state park sites to clear areas around fishing piers, boat ramps, and swimming areas.

Riparian invasive plant management continues to be a focus, prioritizing treatment of giant reed, saltcedar, and elephant ears. Partnership efforts begun in 2015 have accomplished treatment of these species on over 400 private properties, and several public properties across eight watersheds in key native fish conservation areas.

The TPWD, Oklahoma Department of Wildlife Conservation, and Arkansas Game and Fish Commission are partnering with Auburn University and Texas Tech University to study the distribution and population dynamics of bighead carp in the Lower Red River Basin across the tri-state area. Regulations preventing the transfer of live nongame fish from waters with invasive carp have been expanded to include all such tributaries, and will go into effect September 1, 2022. This project is nearing the end of its second year, and funding has been approved for continuation of the population assessment for a third year, along with expansion of the project to include acoustic telemetry to guide sampling, and inform future potential removal efforts. This project also includes collection of much-needed baseline data on native fish assemblages.

The TPWD aquatic invasive species outreach campaign continues to be a focus, with state and partner funding supporting these efforts. The 2022 campaign is currently underway, and will run through the majority of the peak boating season. Targeted emails to licensed anglers in areas

where invasive carp have been detected are also used to reach these anglers with a message regarding preventive bait regulations, and the risk of spreading these species through bait bucket transfers.

Four research projects are currently being funded by TPWD and partners through an aquatic invasive species small grants program: 1.) Near Real-time Detection and Monitoring of Invasive Mussel Species in Texas Waterways – Baylor University; 2.) Assessing the Population Dynamic and Body Condition of Zebra Mussels Within and Between Two Texas Water Bodies with Different Population Trajectories: Lakes Belton and Stillhouse Hollow – Temple College; 3.) Using Remote Sensing to Map *Arundo donax* Populations in Native Fish Conservation Areas Throughout Texas to Better Understand Causal Factors of Invasion and Set Management Priorities – Texas State University; 4.) Assessing Abundance, Sex Ratio, and Space Use by Suckermouth Armored Catfish to Enhance Control Efforts – Texas A&M University; Texas State University.

USACE

Jon Lane reported that the FY23 budget was recently received from Congress, and $16M was allocated for watercraft stations in the Western U.S.

A record-breaking 215-pound Burmese python was recently captured in the Picayune Strand State Forest in the Florida Everglades. The snake was 18-feet long, was the heaviest python caught in the wild, and had the largest egg count.

The USACE is in early stages of working with the FWC on doing survey work for Everglades restoration projects to see what invasive species are there before and after restoration efforts, and to determine if restorations were a success. Direct project funding was provided for invasive species for Everglades restoration for the first time.

It has been a difficult year for the Alligatorweed Biocontrol Program, due to FedEx complications and a lack of a robust insect population. So far this year, approximately 15,000 insects have been caught. Beetles can be obtained by contacting Chelsea Bohaty at USACE at (904) 232-2263.

The Aquatic Plant Control Program (APC) supports cost shared control of invasive species. It also includes research and development of cost-effective solutions to invasive species problems. The APC Program and the Aquatic Plant Control Research Program (APCRP) are authorized at $130M, and has not been in the President's budget since 2010. Both programs remain active, but are limited to Congressionally-directed activities.

The Aquatic Pest Control Share Program supports work on invasive species management, including inspection stations, early detection rapid response, monitoring, and control activities with non-federal sponsors. The APCRP is the nation's only federally-authorized research program providing the capabilities to manage invasive aquatic plant species. It averages approximately $5M per year. Research and demo projects include: Alligatorweed flea beetle collection/distribution; NAS database impact tables; and hydrilla chemical control technique demo at Lake Seminole. There is a 50/50 cost share between USACE and non-federal sponsors. The program supports work on invasive species management, including inspection stations, EDRR, monitoring, and control activities (biological, chemical, and mechanical). Involvement with the APC program can be done by Cost Share (long term, 50% and non-federal sponsor,

requires MOU with USACE) or Demo/Research Projects (short term or one-time demonstration, no matching fund required, no MOU required but requires USACE interest). For information on the program, Jeremy Crossland can be contacted at USACE at (202) 761-4259.

University/Research

Robert McMahon reported that he and Dr. Heather Artreburn will soon have an article published in the Biological Bulletin entitled "Population and Reproductive Dynamics of Zebra Mussels (*Dreissena polymorpha*) in Warm, Low Latitude North American Waters". The research was funded in part by the Texas Parks and Wildlife Department. It describes the long-term (3-6 years) population dynamics of zebra mussels in the first three invaded Texas water bodies – Lakes Texoma (2009), Ray Roberts (2012), and Belton (2013). The study revealed that zebra mussel populations in all three lakes had Boom-Bust population dynamics reaching peak densities 2-5 years after invasion followed by long-term density declines. The results have important implications for both management of zebra mussel invasions and control of mussel macrofouling in raw water-using facilities in Texas.

Robert is collaborating with Dr. Jason Locklin of Temple Junior College on a Texas Parks and Wildlife Department funded research project to compare the population dynamics and physiological conditions of zebra mussel populations in two closely adjacent and physio-chemically similar Texas lakes - Lake Belton (invaded in 2013), and Lake Stillhouse Hollow (invaded in 2016). The Lake Belton population has undergone a major post-invasion decline in density, while mussels in Stillhouse Hollow Lake are still in the boom stage with high densities. Differences in mussel shell growth rates and physiological condition between the two lakes are being examined in order to understand the basis for long-term zebra mussel boom-bust population dynamics in Texas water bodies. The field work portion of the study ends in September 2022, after which a research report will be submitted to the Texas Parks and Wildlife Department. A manuscript will then be created for publication.

Mississippi-Alabama Sea Grant

Kristina Alexander reported that the Mississippi-Alabama Sea Grant Legal Program (MASGLP) has been conducting a survey on Mississippi aquatic invasive species via a grant from the Mississippi Department of Environmental Quality and the U.S. Fish and Wildlife Service.

The goals of the survey are to learn what people in Mississippi know about invasive species, where they learned about them, and what they are willing to do about them. A list of registered boaters gave MASGLP names, and online software was used to find likely email addresses for approximately 1,200 registered boaters. Additionally, emails were sent to approximately 300 other people, indicating that completed surveys were eligible for randomly awarded Amazon gift cards.

A large percentage of the email addresses were incorrect, and very few people responded. Therefore, other measures are being taken to obtain more responses. Those more direct appeals have garnered more responses. To date, over 80 replies have been reported.

A report on the survey responses, as well as any recommendations for management, will be publicly available at the end of 2022.

A law student intern researched state enforcement actions for violations of invasive species laws in multiple states. His article, State Laws Versus Endangered Species, was published in *Water Log*, the quarterly web publication of MASGLP.

USGS

Wes Daniel stated that the EDRR Subcommittee is putting together a template for early detection and rapid response planning. Panel feedback is welcome. This template is important because there is currently a considerable amount of effort to begin rapid response funding. The funding would be available by request for a rapid response action. The requirements to obtain these funds are being decided on by the subcommittee. Wes will keep the panel updated on the progress.

Other Business

Next Meeting, Time and Place

The location of the next meeting will be in New Orleans, Louisiana.
The date will be in November 2022.

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 3:30 p.m.

Action Item:
Dennis Riecke asked for volunteers to help develop a GSARP outreach Power Point presentation and brochure. Several panel members expressed interest in participating. Dennis will put together outlines, and then send to James to circulate among the panel members for input.

Action Item:
James Ballard asked James Reinhardt to keep him informed of the timeline for NOAA to seek input for ideas for the invasive species side of the Strategic Plan for NOAA's Deepwater Horizon Restoration Program, so that he can keep the GSARP members informed so they can solicit ideas.

Action Item:
James Ballard asked Jim Williams to keep him informed of the timeline of developments for the future carp barriers in the Mississippi River basin and the Tennessee-Tombigbee Waterway that will be constructed.

Action Item:
James Ballard will add information on northern snakeheads to the GSARP traveling trunk.