

**GULF & SOUTH ATLANTIC REGIONAL PANEL
ON AQUATIC INVASIVE SPECIES
MINUTES**

Tuesday, April 25, 2023 – Wednesday, April 26, 2023

On Tuesday, April 25, 2023, 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

Charlie Robertson, GSMFC, Ocean Springs, MS
Robert Bourgeois, LDWF, Baton Rouge, LA (via GoTo Meeting)
Wesley Daniel, USGS, Gainesville, FL
Pam Fuller, At-Large Member, High Springs, FL
Leslie Hartman, TPWD, Palacios, TX
Julie Holling, SC DNR, West Columbia, SC (via GoTo Meeting)
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
Rob Emens, NC DEQ, Raleigh, NC
Don MacLean, USFWS, Arlington, VA (via GoTo Meeting)
Monica McGarrity, TPWD, Austin, TX
Robert McMahon, UT Arlington, Arlington, TX
Jim Page, GA DNR, Waycross, GA
Michael Pursley, MS DMR, Biloxi, MS
Matt Phillips, FL FWC, Tallahassee, FL
Cindy Williams, USFWS, Atlanta, GA (via GoTo Meeting)
Sarah Funck, FL FWC, Tallahassee, FL
Tim Ellis, NC DEQ, Raleigh, NC

Staff

Dave Donaldson, GSMFC, Ocean Springs, MS
Ali Wilhelm, GSMFC, Ocean Springs, MS
Joe Ferrer, GSMFC, Ocean Springs, MS

Others

James Ballard, USFWS, Gautier, MS
Susan Pasko, USFWS, Ashburn, VA
Hunter Roop, GA DNR, Athens, Georgia
Cayla Morningstar, USGS, Gainesville, FL
Nicole Hernandez, USGS, Fort Collins, CO
Eamonn Leonard, GA DNR, Brunswick, GA
Wesley Gerrin, UGA Warnell, Athens, GA
Matthew Rowe, GA DNR, Social Circle, GA
Chelsea Bohaty, USACE, Jacksonville, FL
Robert Corbett, NC DNR, Raleigh, NC
Jim Williams, Florida Museum of Natural History, Gainesville, FL

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 November 30, 2022-December 1, 2022 meeting were presented for approval.

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

Overview of the ANS Program in Georgia

Jim Page gave a PowerPoint presentation entitled “Managing ANS in Georgia”. The goal of the ANS Program is to work with state, local, and federal agencies, along with members of the general public, to prevent, plan, and respond. Prevention efforts to prevent ANS include creating and updating laws and rules to prohibit species or require special permits to possess them, and education and outreach efforts to inform children and adults associated with ANS and how they can help prevent it. Since 2017, Georgia DCNR staff have spoken to over 15,000 school students and adults.

In August 2022, DCNR provided 24 pairs of ANS signs that Georgia Power put up at their boat ramps. The signs are also installed at various DNR ramps, and all PFAs.

In September 2022 in collaboration with Georgia AFS and other partners, a new ANS workbook for children was finalized.

ANS Outreach displays have been created for partners such as visitor centers, Georgia parks and aquarium, and the Charlie Elliott Education Center. There is a new ANS display at the GO FISH Education Center. New ANS rack cards will be distributed to all participants in their Boating Education classes across the state, which will provide information on how they can help with ANS prevention.

Efforts to address ANS include obtaining grant funding from the USFWS for use in conducting ANS efforts, following and updating the Statewide ANS Management Plan to identify and prioritize ANS, and developing Response Plans for some species. These provide a framework on legal backing, response options, and partner information.

GA DCNR hosted Watercraft Inspection Training in May 2022 at Red Top. It was led by PSMFC, and participants included several federal, state, and private groups. Also in May 2022 at Red Top, HACCP Training was led by USFWS, and attended by DNR biologists and technicians, along with other partners. An online training course for citizens is currently being developed.

In October 2019, a report was received of a Snakehead caught in a private pond near Norcross, GA. DNR responded, conducted electrofishing in the pond, and treated the pond. The presence of 34 Snakehead was confirmed. A large public announcement campaign was started to inform the

public about Snakeheads, how to identify them, and how to report them. An eDNA follow-up monitoring plan was initiated.

In 1973, Flathead Catfish were introduced into the Ocmulgee River. By late 1980s, they were all throughout Altamaha. In 1996, Flatheads were discovered in the Satilla River. In 2007, the fish were being removed full-time. In 2011, Blue Catfish were discovered in the Satilla River. Flatheads and Blues are currently being removed each year from May – October from the Satilla River.

In 2015, a report of Giant Salvinia in a private pond in Evans County was received. After a positive ID, the pond was treated many times with SONAR and Diquat until the Giant Salvinia was completely killed.

There were three recent scares of Zebra Mussels having the potential to be released in Georgia waters. In 2021, aquarium moss balls for sale at various PetCo/PetSmart stores were found to be infested with Zebra Mussels. Dozens of stores were visited, and the products were removed from the shelves. In Lake Lanier, a boat from Tennessee (2021) and a boat from Michigan (2022) were infested with Zebra Mussels.

UGA Warnell staff and students discovered WeatherLoach in McNutt Creek (Middle Oconee River) in 2020. Since then it has been discovered in several other creeks. UGA Warnell School is leading efforts on WeatherLoach work.

Snakehead Removal

Hunter Roop gave a PowerPoint presentation entitled “Northern Snakehead in Georgia: Discovery, Response, and Current Monitoring Strategies”. In October 2019, a local angler reported catching a snakehead out of a private pond in Gwinnett County. DNR staff surveyed the pond and adjacent waters with a boat and backpack electrofishing equipment, and two juvenile fish were captured.

The Rapid Response Plan objectives are to determine the extent of the population in the watershed, determine the presence/absence of T & E species, and develop an eradication/removal plan in light of incoming information. Staff surveyed 5.7 miles of stream and river, 91 acres of wetland, and two ponds. Sixteen Snakeheads were captured in a pond and adjacent wetlands. Data showed that the pond is the epicenter of an incipient population, and the likely location of the release. The low-density population was concentrated within and near the pond. No T & Es were detected. Piscicide practical was used to treat the pond and portion of wetlands where the Snakeheads were detected. A pond drawdown was done prior to a Rotenone treatment. Approximately three acres of pond and wetlands were treated. A total of 18 Snakeheads were discovered.

Recovery and mitigation short-term objectives are to restore functional use of the irrigation pond for the landowner, and restore the fish community/fishery. One objective is to leverage existing data to trace the origin of the captured snakehead using genetics and microchemistry.

The monitoring objective is to continue field surveys for remnant snakehead populations using electrofishing.

The objective for recovery and mitigation is to continue field surveys for remnant Snakehead populations by using eDNA. WRD has partnered with the USFWS Northeast Fishery Center to

analyze eDNA samples to target Northern Snakehead, and help guide electrofishing survey efforts. eDNA surveys were conducted in 2020, 2021, and 2022. There are plans to replicate sampling at eDNA survey sites in 2023. In total, 98 samples from over 40 independent sites have been processed. Only two sites tested positive for Northern Snakehead detection, both in 2021.

The population was likely established by a small number of mature fish, two of which have been removed from the area. There was a short window of opportunity for natural reproduction to occur in the pond prior to adult fish being removed. Opportunistic and standardized surveys have yet to produce any more Snakehead. eDNA samples have only resulted in 2% positive detections, indicating the population is not widespread throughout the watershed. The population appeared to concentrate within and near the pond, where foraging opportunities were greatest (based on observation).

Coastal Georgia Cisma

Eamonn Leonard gave a Power Point presentation entitled “Coastal Georgia Invasive Species Management Area”. In 2011, *Phragmites australis* management began. (~60 acres) in the Altamaha R. Delta. In 2012, Coastal GA Cisma was created. NFWF funding totals \$100K.

Focal species include *Phragmites*, Water Hyacinth, Sand Pine, Chinese Tallow, Salt Cedar, and Beach Vitex. Biocontrol is used for Air Potato, Water hyacinth, Alligator Weed.

Outreach events include Coast Fest and National Invasive Species Awareness week.

Invasive species managed include:

Common Reed (*Phragmites australis*), introduced from Eurasia and Africa in the 1700s via ballast material. This plant invades marsh communities, crowding out native plants, changing hydrology, altering wildlife habitat, and increasing fire hazard. Common Reed spreads by seed and root fragments. Management consists of cutting the stem and applying Imazapyr, Aerial, or Imazamox.

Water Hyacinth (*Eichhornia crassipes*), a free-floating plant with blue-purple flowers. Originates from South America. Introduced in 1884 at the Cotton States Exposition in New Orleans. It invades lakes, pond, rivers, and marshes. Forms dense floating mats that can double in size in two weeks. These mats restrict light, affecting submersed plants, aquatic invertebrates, and depletes oxygen levels. Management consists of Imazapyr, leaf hoppers, and physical removal.

Sand Pine (*Pinus clausa*), which is native to Florida. They were planted on sandhills in Georgia in replacing Longleaf Pine/scrub oak communities. Survive in poor, infertile soils. They shade out groundcover and alters habitat for native species like gopher tortoise, indigo snakes, etc. Management is done with Triclopyr or Imazapyr, and cutting them down below lowest branch.

Chinese Tallow (*Triadica sebifera*), native to China and introduced to South Carolina/Georgia in 1770s, then the Gulf Coast in the 1900s. They alter soil chemistry, and produce 100,000 seeds per year, which are then dispersed by birds and water. Management is done using Triclopyr or Imazapyr, and Imazamox via aerial.

Salt Cedar (*Tamarix ramosissima*), which is native to Eurasia and Africa. Was introduced in the 1800s as an ornamental in the West. It invades dredge spoil islands, marsh hammock edges, and

causeways. It can crowd out native riparian species, diminish early successional habitat, reduces water tables, and interferes with the hydrologic process. Management is done using Triclopyr or Imazapyr, and aerial Imazapyr.

Beach Vitex (*Vitex rotundifolia*), which can sprawl over 60 feet. It originated in the Pacific Rim, and was introduced in the 1980s (or earlier) for beach stabilization. It invades dune systems, and crowds out native species. It may inhibit sea turtle nesting, and trap hatchlings. It is the Kudzu of the beach. Management is done using Glyphosate with Imazapyr and Surfactant, or Triclopyr.

Other biocontrol methods used are Alligator Weed Flea Beetle and Air Potato Beetle.

An iPhone app called EDDMaps can be downloaded that finds, maps, and tracks invasive species.

Coastal Georgia Invasive Species Week was held February 28 – March 4, 2023.

Wild Animal Rule Changes in Georgia

Matthew Rowe gave a Power Point presentation entitled “Rules Pertaining to Wild Animals, Subject 391-4-8”. Title 27-1-2 (77) states that: “Wildlife” means any vertebrate or invertebrate animal life indigenous to this state...”. Title 27-1-2 (75) states that: “Wild Animal” means any animal which is not wildlife and is not normally a domestic species in the state. Title 27-5-1 states that: “The importation, transportation, sale, transfer, and possession of wild animals are privileges not to be granted unless it can be clearly demonstrated that such actions can be accomplished in a manner that does not pose unnecessary risk to Georgia’s wildlife and other natural resources or the citizens of and visitors to this state”

The Department of Natural Resources LED issues wild animal licenses and permits as described in 27-5-4. License: Wholesale or Retail Wild Animal Business (Not for Pet Owners). Permits: Scientific or Educational Purposes. Facilities are inspected every 2-3 years. There are currently ~ 100 organizations/individuals with licenses/permits.

Title 27-5-2. (b) states: “The board is specifically authorized to supplement the list of wild animals set forth in this chapter... The board also has the authority to prohibit wild animals.

The entire Wild Animal Chapter (O.C.G.A. 27-5) can be viewed on the General Assembly website. There are 104 groups of species listed. The list has not been updated since 1994. The Scientific name changes are creating confusion. Many invasive species groups not covered on the Wild Animal List are being introduced and established in Georgia. Proposed rules supplement the current list of wild animals and lists them all in single subject under authority of the DNR Board. Observations in Georgia, scientific publications and risk assessments, invasive species issues and regulations in nearby states, and recognition as an injurious species under federal law (Lacey Act) were developed by species and law enforcement experts from Georgia DNR.

Changes to the Wild Animal List include:

Mammals Prohibited: Mongoose. Inherently Dangerous: All non-domestic cat species.

Birds Prohibited: Monk parakeet and Purple Swamphen.

Reptiles Inherently Dangerous: Mole Vipers.

License: Two python, two lizard, and two turtle species.

Fishes Prohibited: Five groups of large invasive predatory fishes.

Inherently Dangerous: Three groups of invasive or electric fishes.

License: Four groups of predatory and/or invasive fishes.

Invertebrates Prohibited: Zebra Mussels and Marbled Crayfish.

Inherently Dangerous: Five groups of scorpions.

License: Crayfishes, snails, penaeid shrimps, freshwater mussels and other invertebrates not held in aquaria or tanks.

Adopted Rules for reptiles states that Indian Rock Python, Burmese Python, Argentine Black-and-White Tegu, Nile Monitor, African Helmeted Turtle, Softshell Turtles, and Chinese Softshell Turtle shall only be licensed for scientific, educational, or public exhibition purposes consistent with O.C.G.A. Sec. 27-5-4; provided, however, that such species possessed on or before the effective date of this rule may be held as a pet without a license or permit provided that the owner tags and registers all individuals with the Georgia Law Enforcement Division within 12 months following the effective date of this rule.

Amphibians—No Changes.

Fishes Prohibited: Three Carp species; African Tiger Fish; Wels Catfish; all species of Snakeheads; Nile Perch and Barramundi.

Inherently Dangerous: Added Stonefishes, Weever Fishes and Electric Eels.

License: Arapaima; Trahiras; Goonch Catfishes; Swamp Eels.

Invertebrates Prohibited: Dreissenidae (Zebra Mussels and relatives); Marbled Crayfish.

Inherently Dangerous: Five groups of Scorpions (Fattail, Bark, Thicktailed, Deathstalker, and Yellow-legged Creeping Scorpion).

License: All families of Crayfishes (except 3 species in food/aquarium trade); Apple, Assassin, and Asian Mystery Snails; Penaeid Shrimps (exception for human consumption); Four families and two genera of freshwater Mussels; all other freshwater and marine invertebrates not held in aquaria or tanks.

The following measures remain in place to prevent the need to listing all potential species and make the implementation of the rule less onerous. The following wild animals are subject to licensing requirements pursuant to O.C.G.A. Sec. 27-5-4:

All freshwater and marine fish and invertebrate wild animals which are not held in aquaria or tanks.

Species listed... and held in aquaria or tanks in Georgia before the effective date of this rule may be possessed, sold, transported or transferred for a 12- month period following the effective date of this rule; and

The species listed... shall only be licensed for scientific purposes consistent with O.C.G.A. Sec. 27-5-4.

Marbled Crayfish (Prohibited).
Argentine Black-and-White Tegu (License).
Dreissenid Mussels (Prohibited).

The Process:

1. Suggested regulation changes and species were developed between biologists from the GA DNR Conservation Section and DNR Law Enforcement.
2. Recommendations assembled and reported to the DNR Board.
3. Public Comment Period.
4. Presentations to the Board.
5. Passed by the Board.
6. Approved by the Secretary of State.
7. Rule in full effect Dec 2023 after 12-month grace period.

The Public Input Process:

On August 23, 2022, the Georgia DNR held a Board Briefing on Proposed Rules. On August 26, 2022, the Proposed Rules were publicly noticed on the website. On September 13, 2022, a virtual public meeting was held. The deadline for submitting comments on the proposed rules was September 30, 2022. On October 25, 2022, public comments and rules were presented to the Board for action. In December 2022, the Rule passed and went into effect.

Weather Loach in Georgia

Wesley Gerrin gave a Power Point presentation entitled “Georgia Weather Loach Update: Tools for Rapid Response to ANS Issues. Weather Loach (*Misgurnus anguillicaudatus*) is native to eastern Asia - Siberia to southeast Asia, and includes Japan. Its current distribution is worldwide, with multiple U.S. introduction pathways such as food, aquarium, and bait.

Weather Loach was first discovered in Georgia in McNutt Creek in Athens in November 2020; Sells Mill in Indian Creek in August 2021; Five sites in Middle Oconee in Summer 2022; Sweetwater Creek in Duluth in August 2022; Apalachee River in Social Circle in April 2023. At Club Drive Tributary, 25 loaches were found in two days.

Genetic analysis was done to determine where Weather Loach was introduced. Loaches sold as *Misgurnus anguillicaudatus* from two Athens, GA aquarium stores were analyzed. Genetic sequencing revealed these fish were *Paramisgurnus dabryanus*. No source of loaches available to the public have matched wild Georgia loaches.

Reproduction vs. recruitment studies were done. Lengths ranged from 43-190 mm. The age range was from 2-8 years. The mean length at age 2 was 123.3 mm. Length frequency for age 0-1 was below 120 mm.

Otolith microchemistry showed a mismatch between fully wild and aquarium captive loaches.

Diet and stable isotope studies were done. Middle Oconee population sources revealed a single introduction, and outward dispersal. Data support Indian Creek as ground zero. There were no habitat limitations, and stopped only by substantial barriers. Genetic results are forthcoming for Apalachee fish. There is not enough data for Yellow River fish.

There is reproduction and recruitment occurring in Georgia. Dispersal is occurring long distances from source populations. Individuals are consuming large amounts of micro and macroinvertebrates, some eggs, and appear to be scavenging dead fishes. Collecting information through eDNA, stable isotopes, genetics, otolith microchemistry will continue. Population reduction efforts will also continue. Public outreach will include the ArcGIS Story Map, Warnell Log alumni magazine, and Warnell social media.

Non-native Catfish Removal in the Satilla River

Jim Page gave a Power Point presentation entitled “Satilla River Non-Native Catfish Removal: Strategies and Results”. The Satilla River is a blackwater system flowing unimpeded for approx. 225 miles. Historically, the river has been home to one of the best Redbreast Sunfish (*Lepomis auritus*) fisheries in the southeastern U.S.

In 1996, Flathead Catfish were discovered in the Satilla River. In 1996, part-time removal efforts began, with the objective being to reduce the Flathead population, and protect the natives. In 2011, Blue Catfish were discovered in the Satilla River, so they were removed as well. The second objective was to reduce Blue Catfish to protect natives.

Flathead Catfish are native to the Gulf Coast drainages (e.g. Coosa River in GA). They are an apex predator that can live over 20 years. As full-grown adults, they can exceed 100 pounds. They are primarily piscivorous as adults, and their diet includes anything that will fit in their mouth, including endangered species like juvenile Sturgeon. A Flathead Catfish removed during electrofishing efforts regurgitated a fresh Atlantic Sturgeon, thus raising questions about the impact of protected species by non-native catfish. In recent years, GA DNR staff have seen gravid females less than 10” in length (including a 7.5” fish in 2017), suggesting potential compensatory mechanisms may be at play to overcome high removal mortality.

Blue Catfish are native to the Mississippi River drainages. They are the largest catfish species in North America (150lbs). They are an apex predator that can live 20 years in coastal and inland waters. They prefer freshwater, but can tolerate moderate salinities. They are an opportunistic predator that eats lots of fish and invertebrates, including Blue Crabs and Asian Clam. 2022 shattered records – 2.5x as many Blue Catfish were seen as the previous high year.

Catfish removal is done using two boats. One of the boats is the shock boat; the other is the “pick-up” boat. Electrofishing is done via modified backpack shockers, two 12-volt batteries, and a single copper cable that is towed off the stern of the vessel. Several species of Catfish are stunned, and staff selectively dip-net Flatheads, leaving native fish. Harvested Flatheads and Blues are put into coolers, brought back to office, and data is collected. For each fish, length and weight are recorded. Sex of fish is collected from a subsample of the catch, and otoliths may be removed from selected individuals for aging.

Along with the South Georgia heat (100F+), other challenges faced included low water, which causes dragging boats; high water, causing the fish to go everywhere; downed trees, which continually causes the use of chainsaws.

From 1996 – 2006, 12,020 fish were removed. From 2007 – 2022, 87,948 fish were removed. Since 2007, an average of 5,706 fish were removed per year. GA DNR's goal is to make as many passes each year through the Hwy 121 – Woodbine stretch, typically targeting 200 hours of effort for the season. In 2022, effort was strong through middle summer until water levels flooded, then slowed drastically. CPUE was down in 2022 (13 fish/hour). The average size rose in 2022, as not as many small fish were seen.

In 2022, efforts were often hampered by high water levels. Public support remains extremely high for these removal efforts, and there's no doubt such efforts have been beneficial to native populations. The capture of the new world record Redbreast in 2022 in the Satilla River has been a welcome site, and several anglers have expressed that they feel removal efforts have aided in such opportunities.

Discussion About Updating the GSARP Guidance Document

Charlie Robertson reported that the last time the document had been updated was in 2019. James Ballard, former Aquatic Invasive Species Program Coordinator at Gulf States Marine Fisheries Commission, and Coordinator of the Gulf and South Atlantic Regional Panel of Aquatic Nuisance Species, stated that the Guidance Document (which was once the GSARP Strategic Plan) was created with the goal to follow it if there were available funds to support it. Since then, the Aquatic Nuisance Species Task Force has created their own Strategic Plan that most activities are linked back to. If the GSARP no longer sees any useful benefit to the GSARP Guidance Document, it could go under the Aquatic Nuisance Species Task Force Strategic Plan, which does stay updated on a regular basis, and action is taking place with all of the subcommittees. Any activities that are decided on can be targeted to one of the objectives outlined in the Aquatic Nuisance Species Task Force Strategic Plan. When the GSARP reports to the Aquatic Nuisance Species Task Force, it can easily be tied to their Strategic Plan.

Peter Kingsley-Smith asked the Panel members if anyone had used the document in a meaningful way in the last three years. **Cindy** replied that the only thing she has used the document for was to put it into the USFWS FIS database, and has used it for a plan they have been implementing as part of the work she does. Other than that, she has not used it. The ANS Task Force Strategic Plan is also in the FIS database. She sees no reason to have two. **Peter** then asked the Panel members if there was any information about the GSARP itself that is included in the document that is not available on the website since the website overhaul. **Pam Fuller** stated that she did not see any.

Peter told the Panel members that since there did not appear to be any interest in updating the document, the document could be archived, but kept as a resource on the GSARP website so that it could be referenced to in the future, but not direct any efforts in updating it. **Wes Daniel made a Motion to archive the document, the Motion was seconded, and the Motion passed.**

Discussion About Establishing a New Fiscal Agent for the GSARP Grant

Dave Donaldson, Executive Director of the Gulf States Marine Fisheries Commission (GSMFC), stated that the Commission has been coordinating the Gulf and South Atlantic Regional Panel

(GSARP) on Aquatic Invasive Species Grant for over 10 years. The amount of the grant is \$50,000 annually. For the last several years, the work involved with coordinating the grant has cost the Commission significantly more than \$50,000. The current grant runs out on December 31, 2023. James Ballard is no longer employed at the Commission, and **Charlie Robertson** has taken over his position, along with other responsibilities at the Commission, which are all time-consuming. The GSMFC IT Administrator who attends all GSARP meetings to set up the recording, audio, and computer system for the meetings takes time away from his duties at the Commission to attend these meetings. Due to these reasons, the Commission will no longer be coordinating the GSARP grant. **Charlie** will still serve on the GSARP and Aquatic Nuisance Species Task Force as a representative of the GSMFC.

Peter Kingsley-Smith stated that one scenario discussed was that members of the GSARP could use other funding to support their travel to GSARP meetings, which would free up the \$50,000 for administration of the panel meetings. **Pam Fuller** asked Dave if the Commission would consider continuing to coordinate the grant if this could be done. Dave replied that due to current and future time constraints for **Charlie** and the Commission's IT Administrator, it would be too demanding to continue coordinating the grant.

Ron Lukens suggested asking other panels about how they handle funding, and also consider a contractor to handle the coordination. Ron also suggested talking to the Aquatic Nuisance Species Task Force about the possibility of other resources.

Susan Pasko stated that two panels have a contractor (Northeast Regional Panel and Western Regional Panel) who handles all coordination responsibilities. Most of the members cover their own travel to meetings. Each panel receives \$50,000 funding. This has been the level for several years, which is the fully authorized amount from legislation. Opportunities for increased panel funding can be sought, but Susan does not see anything on the horizon.

Robert McMahon said that he was on the Western Regional Panel for many years, and the panel experienced funding issues. As a solution, panel members paid their own travel, and they met once per year. A contractor was used for coordination. He suggested the possibility of the GSARP meeting only once per year. **Peter** stated that he wants to continue meeting twice yearly.

Wes Daniel stated that the Mid-Atlantic Regional Panel had needed a fiscal agent for their grant. They chose Michelle Tremblay, the contractor for the Northeast Regional Panel, to be their fiscal agent, but not their coordinator. The panel has a grant program that they utilize their \$50,000 for, so they are able to keep their fiscal agent, and to keep a portion of that grant program going. An option would be to find someone to coordinate the GSARP.

Monica McGarrity suggested contacting Elizabeth Brown, who was the former Chairman of the Western-Regional Panel. She is now a private consultant and is the coordinator of the Mississippi River Basin Panel.

Several panel members asked what the requirements are to be the fiscal agent/coordinator for the GSARP. **Susan** stated that she has searched through the legislation for the answer, but found no restrictions or limitations. The only exception is that because there is a grant program, it must be someone who is able to set up an account with Grant Solutions, and serve as the Grant Administrator.

Rob Emens suggested that the person should be familiar with the Federal Grant process.

Charlie pointed out that there are other responsibilities for coordinating the GSARP in addition to the meetings, such as the GSARP website and the Traveling Trunk.

Pam suggested having a detailed list of what is involved in coordinating the GSARP, such as how much of each person's time is spent on each responsibility, and the duties involved. Also, to find out from the states if they would be willing to fund their travel for meetings. A cost-saving idea would be to meet in state or federal buildings instead of up-scale hotels.

Wes suggested forming a work group that could provide a cost, time, and budget analysis for coordination of the GSARP.

Susan stated that since the funding will lapse on December 31, 2023, they already have the direct announcement on Grant Solutions to ask for new packages. The process will take approximately 6-8 weeks. A new fiscal agent will need to be in place by late October – early November to avoid a lapse in funding.

Don MacLean pointed out that many of the state plans have a segment in their proposals and grants for coordination, which pays the salary of their coordinator, and also funding for travel. This is acceptable, and can be added to the paperwork sent to **Cindy**.

Peter asked for volunteers to head a Working Group to assemble information about how other panels are supported and coordinated. **Peter Kingsley-Smith made a Motion to establish an open ad-hoc group to assemble information related to the coordination of other Regional Panels to develop scenarios and budget scenarios as to how GSARP moving forward may continue to exist without Gulf States Marine Fisheries Commission being their fiscal agent. The Motion was seconded, and the Motion passed. Wes Daniel, Pam Fuller, and Leslie Hartman** were appointed as Chairmen.

A fiscal agent will need to be in place 60-90 days from October in order to establish themselves and to get everything in place, so June-July 2023 would be the target date to name a fiscal agent.

Wes suggested conducting a survey of the states to see what they feel the GSARP priorities are, such as how many meetings to hold per year, the travel funds issue, the Traveling Trunk, etc.

Charlie stated that the GSMFC will continue to maintain and ship the GSARP Traveling Trunk. A reservation system for the Traveling Trunk was developed in-house at the GSMFC by their IT Administrator. Joe Ferrer, GSMFC IT Administrator, pointed out that the GSARP Traveling Trunk is an integral component of the GSMFC website. **Leslie** asked if it was a possibility for GSMFC to continue hosting the website. Joe stated that hosting it was minimal on his part unless it were to be redesigned. Dave Donaldson replied that the GSMFC could possibly continue hosting the website.

Charlie brought up the idea of each state hosting yearly GSARP meetings. State buildings would be used, and their equipment would be utilized to cut down on costs. Each home state would coordinate their own meeting. Several panel members agreed to the idea.

Peter Kingsley-Smith made a Motion to establish an Ad-Hoc and Open (in terms of membership) Working Group to focus on the future coordination of GSARP meetings, and the activities and duties associated with panel activities. The Motion was seconded, and the Motion passed.

Peter Kingsley-Smith made a Motion to appoint initial Co-Chairmen of Pam Fuller, Wes Daniel, and Leslie Hartman. The Motion was seconded, and the Motion passed.

Discussion About Purchasing High Priority Outreach Materials for the Region

Cindy spoke on purchasing outreach materials for GSARP meetings and other events that would showcase aquatic invasive species. There is approximately \$17,000 left over from a grant that could be used to purchase outreach materials for the states before December 31, 2023. **Cindy** asked the panel members what their thoughts were as to what outreach materials should be purchased. **Monica McGarrity** stated that they recently did a study with the Western Regional Panel looking at what messaging was most effective for boaters, and found that factual scientific information was one of the most effective. Social media was also very effective, and the most cost-effective. Ecological and economic loss were also effective messages.

Leslie asked if the money might be better used to purchase microphones or other equipment for future GSARP meetings that will no longer be supplied by the GSMFC. **Cindy** replied that if the equipment cost is less than \$5,000 for each item, then it is possible if it is presented in the manner that it is being purchased to facilitate GSARP meetings for education and outreach. If the cost is over \$10,000 per item, it is unlikely that it would be approved, due to the property tax issue. It would probably require a change of scope because there is no funding in the Equipment category. If the cost is under \$5,000, it is considered Supplies. If it is over \$5,000, it is considered Equipment. Typically, the GSARP small grants spread is in personnel and sub-contracts. **Cindy** does not anticipate a problem with making a purchase work out. Dave Donaldson pointed out that items such as microphones, mixing boards, etc. that would create a recording system are not purchased separately. The system is purchased as one whole unit with all of the components included, which would be over \$5,000. The problem would be that if GSMFC purchased the system, it would be considered equipment, and would become part of GSMFC's inventory. GSMFC would then have to track it, which would be fine if GSMFC were to continue as the coordinating body, but how would the equipment be transferred to someone else? **Cindy** replied that with buying equipment, there is a clause in the contract that states what is to be done with the equipment at the end of the grant. Initially, if GSMFC purchases the equipment, it is on GSMFC's inventory, but when the project is over, that equipment gets transferred back to the service, or GSMFC gets to keep the equipment. If it is transferred back to the service, it would be passed out to whoever the next sponsor is of the GSARP. **Charlie** stated that although those are good options, other possibilities should be looked at.

Julie Holling said there is a need for replacement signs such as Clean, Drain, Dry and Don't Move Aquatic Hitchhikers at boat ramps in South Carolina.

Mike Pursley stated that their boat ramp signs are 15 years old and need replacing.

Monica added that in their study, most people surveyed stated that they obtained their information from boat ramp signs.

Jessica Marchant stated that Alabama could definitely use outreach materials. They do not have any funds in their budget for them.

Jim Page said that boat ramp signs have been well-received, but he is not able to purchase a large amount of them, so having more signs to post at boat ramps would be beneficial. Also, informational materials on aquatic invasive species for school-age children would be beneficial.

Monica said that from the large roadside billboards about Clean, Drain, Dry and Aquatic Invasive Species that they had placed in several locations, their study found that most people obtained their information from state agency websites and boat ramp signs. Billboards ranked fairly low as a source of information. Boat ramp signs are also needed for saltwater locations. **Monica** said she has been working with a researcher who recently created a children's book on zebra mussels.

Rob asked if some of the funds should be used towards the Traveling Trunk, such as shipping costs or to create a new trunk. The Traveling Trunks are more in demand now. Alternative trunks could be created for each state, and include state-specific species. Also, some trunks could be geared towards grade-school children by including coloring books, pictures, lesson plans, etc.

One idea was to divide the funds between all of the states. Each state would receive approximately \$2,200. **Jim** asked the panel members about using that amount towards customizing the Traveling Trunks with each state's specific invasive species.

Rob suggested dividing the funds between having banners made and creating new Traveling Trunks.

Peter Kingsley-Smith made a Motion to use the \$17,000 to generate a start-up Traveling Trunk kit, one for each agency for them to use when in-state for their own outreach purposes. The Motion was seconded, and the Motion passed.

The funds would need to be used by December 31, 2024.

Discussion About Updating the Herb Kumpf Invasive Species Traveling Trunk

Charlie stated that the GSMFC will create eight new starter Traveling Trunks. He will contact each state Rep to see if they are interested in receiving one. The trunks will be customized with invasive species that are in their state, and other specific items. Panel members will provide some invasive species from their states that will be used in the trunk. The trunks will be housed at each state's agency. The three current trunks will continue to be managed by GSMFC at their office. James stated there is still a need to update those three trunks with current literature, maps, distribution data, etc.

Rob Bourgeois asked if there was a need to have brochures and materials that are in Spanish. Several panel members agreed that it would be beneficial. **Charlie** stated he will work on creating them. Invasive species brochures and materials printed in Spanish will also be ordered for the trunks.

Aquatic Nuisance Species Task Force Update

Susan Pasko gave an update on the Aquatic Nuisance Species Task Force. At the ANS Task Force January 2023 meeting, the establishment of an ad-hoc subcommittee to determine the financial

impacts from limitations on motorboat registration fees as presented by the U.S. Coast Guard guidance letter was approved.

Action Items:

1. USGS will provide information on the timing and intent of the Black Carp Community of Practice, NAS User Meetings, and NEDRRIS Network Meetings to share with the ANSTF member and regional panels.
2. Distribute the “Decontaminating Firefighting Equipment to Reduce the Spread of Aquatic Invasive Species” to ANSTF members and regional panels. The Prevention subcommittee will provide recommendations regarding adoption of the protocol at the next ANSTF meeting.
3. Distribute the “Model Process for a Rapid Response Fund” document to ANSTF members and regional panels for comments. The work group will address comments and present a final document of ANSTF approval consideration at the next meeting.
4. The Outreach Subcommittee will consider options develop a single online national resource similar to Protect the West for communicating watercraft inspection and decontamination requirements, procedures, and state program contacts. The Outreach Subcommittee will report their recommendations for developing this resource at the next ANSTF meeting.
5. Subcommittees will submit workplans to the Executive Secretary for distribution to ANSTF members and regional panels.

Priority Work Elements for the ANSTF Prevention Subcommittee in 2022/23:

Assess new ANS introductions to determine where prevention measures may have been lacking or ineffective, or resulted from gaps in authority.

Evaluate seaplanes as a potential pathway for ANS, and identify mitigation measures.

Established the Organisms in Trade (OIT) Hitchhikers Workgroup.

Upcoming Work Elements:

Determine if the Boating Ad-Hoc Committee should be reestablished to the Boating Partnership Subcommittee in response to evolution of boat designs and their ability to transfer AIS.

Facilitate a discussion to encourage the use and adoption of the guidelines to prevent AIS transport by wildland fire operations.

Priority Work Elements in 2022/23:

Facilitate monitoring efforts to detect and report new sightings of ANS.

Develop a plan for capacity-building in NAS to meet stakeholder needs.

Develop ANS horizon scanning and watch lists.

Facilitate the development of capacities to respond rapidly to new invasions.

Modernize and enhance the ANSTF Experts Database.

Develop a Rapid Response Template.

Develop a model RR funding process.

Coordinate the development and implementation of ANS Management and Control Plans.

Plan revisions: European Green Crab and New Zealand Mudsnaill.

Decision-making Process for Approval to Develop new Species Control and Management Plans.

Identify gaps in available control and restoration measures and encourage innovation.

Communicate the gap and measures that are needed to address gaps in control measures.

Establish ANS Task Force research priorities and identify prospective partners.

National AIS Priority Research List approved in November 2021.

Facilitate activities that support priority ANS research needs.

Promote the annual priority research list – agency letters, social media, white paper.

Track and disseminate study results to incorporate into ANS management decisions and activities.

Survey AIS community for current /planned AIS research that aligned with priorities.

Develop process to update the National AIS Priority Research List.

Evaluate ANS communication, education, and outreach efforts to ensure they are consistent and effective.

Conduct an assessment of national campaigns that target outdoor recreational users.

Develop processes to share information and consistently implement ANS outreach strategies.

Populate the Stop Aquatic Hitchhikers portal to serve as a national clearinghouse for education, outreach, and marketing materials.

Establish an ANS Outreach Community of Practice.

The next National Task Force meeting will be held July 18-19, 2023, which will be virtual.

Update on New Introductions

Wes Daniel gave a Power Point presentation entitled “New occurrences of AIS in the Gulf and South Atlantic Region”. In the Gulf and South Atlantic Region, there have been 50 NAS Alerts since December 2022: 32 plants; nine fishes; four frogs; two crabs; two gastropods; one jellyfish. There are 1,392 Tracked Species, 692,499 Records, and 1,117 Alert System Users.

Two new species to the U.S. include the Demasoni Cichlid (*Pseudotropheus demasoni*) found in the Miccosukee Country Club Pond- Miami, FL, and the Pirapatinga (*Piaractus orinoquensis*) found in a neighborhood retention pond in Denton, TX.

Chinese Mitten Crab (*Eriocheir sinensis*) was found near Empire, LA. This is the first time the species has been seen in the state since 1987.

In January 2023, Large-flower Primrose-willow (*Ludwigia grandiflora*) was found in Llano, TX in the Llano River below the dam.

Pond Loach (*Misgurnus anguillicaudatus*) was found in January 2023 in Jefferson County, AL in Cahaba River drainage.

Yellowbelly Cichlid (*Cichlasoma salvini*) was found in the Lateral J. Canal in Indian River County, FL in March 2023.

The neurotoxic cyanobacteria *Aetokthonos hydrillicola*, which causes Vacuolar Myelinopathy (VM), grows on Hydrilla and additional dense submerged aquatic plants. It produces a deadly, persistent neurotoxin, Aetokthonotoxin (AETX), which is ingested directly by herbivorous aquatic species (such as Coots, waterfowls, snails, tadpoles, Grass Carp, and Sunfish). The food chain transfer is via consumption of toxic prey by predators (such as eagles, owls, hawks, salamanders, water snakes, and bass). Many of the risks surrounding VM, including its risk to humans, still remain unknown. The goal is to develop an efficient detection protocol for determining where *A. hydrillicola* is found within freshwater resources, and use this protocol to track expansion of both the cyanobacteria and toxin. It is not currently known if this newly described cyanobacteria is native to the southeast, and just became abundant when the invasive plants provided a perfect host. For those interested in knowing what is growing on state submerged aquatic vegetation, USGS can provide supplies for shipping and postage of plant samples. Contact Ian Pfingsten (ipfingsten@usgs.gov) to request shipping supplies and protocols. Contact Susan Wilde for more information on the project.

New enhancements are proposed for the USGS website. These include a modern website design, a new dashboard interface, additional data associated with species profiles (added information on management control options; expansion of the number of photos; addition of “watch list” species not established in the U.S.), new data sources, more landscape to map, new data delivery options, better interoperability between databases, and communication plans.

Beginning in April 2023, state and tribal AIS managers will be contacted about their priority species. These species will be flagged, and the state will be contacted about sighting/eDNA detections.

Emails were sent with an invite for a May 26th Invasion Hotspot Analysis meeting.

Update on USGS ANS Projects

Cayla Morningstar reported that USGS received BIL funding, so it is bipartisan infrastructure legislation funding. Goals for USGS are to put a large amount of work into early detection and rapid response efforts. They are creating a large EDRR framework, and essentially looking at the invasion process. Early detection is important for removing a large invasive species population out of an area before they become well established and spread.

Cayla is working on the Invertebrate Horizon Scan project. Large literature reviews are being done, as well as large reviews of importations of species that are spreading around the world and moving in the trade, but that are not in the United States yet. A large list of species is being created (so far, there are 8,000 species), and a climate match will be used to see which species could become established in the U.S. if they were to enter. This will be pared down by scoring for things like invasiveness of impacts, how much the species spreads, and other variables to score species. The final product will be a Watch List. A Plant Horizon Scan is also being created. **Cayla** stated

that if any panel member or their colleagues are interested in helping with the projects, they can contact her.

INHABIT (Invasive Species Habitat Tool) is used to predict species abundance, not just suitability of invasive species. It includes watchlist species that are not yet known to occur in the U.S.

Environmental DNA (eDNA) will be integrated into the USGS database.

The BIL funding will extend to other projects that will involve eDNA. One of the goals is to use molecular detection tools, and develop assays that can test the water that invasive species are found in at ports.

REDI-Net (Rapid eDNA Assessment and Deployment Initiative and Network) is another project underway that is an eDNA surveillance network.

A Manager's eDNA Toolbox will be designed that allows managers to assess the available approaches, markers, validation techniques and communication strategies for molecular tools in resource management.

A National EDRR Information System is being designed for invasive species information, planning, technology, and training. It will be for aquatic and terrestrial species. Stakeholders will include policy-makers and lawmakers; regulatory agencies; land and resource managers; private industry; protected-area managers; private land owners; and other USG partners. There will be a data hub that is a platform for finding, querying, and sharing big data, and flexible data analysis and visualization tools. Information needs include: a National Policy; spatial prioritization for targeted action; EDRR network users and customized alerts; jurisdictional-based data sharing; training and outreach; and automated reports. One of the goals of this project is to highlight current work being done by agencies, and to bring awareness to it. USGS would like input from agency managers. There are four Focus Groups (Plan, Detect, Respond, Report) open for enrollment and participation. Enrollment can be done by visiting the National EDRR Information System website.

Aquatic Barrier System for the Tennessee-Tombigbee Waterway in Alabama and Mississippi

Jim Williams with the Florida Museum of Natural History in Gainesville, Florida gave an update on the system.

The Water Resources Development Act 2022 included authorization for resources for feasibility studies for Tennessee-Tombigbee river basins, Tennessee. The project was to place a barrier system to deter, impede, or restrict the dispersal of aquatic nuisance species in the Tennessee-Tombigbee Basins.

Nonindigenous fishes in the Tennessee-Tombigbee Waterway include Silver Carp, Round Goby, Bighead Carp, Black Carp, and Northern Snakehead.

Any native aquatic species occurring in either Tennessee River basin or Tombigbee River basin, but not both sides of the drainage divide, have the potential to negatively impact native species and/or their environments. Possible outcomes include hybridization, competitive displacement, alteration of predator-prey relationships. Extinction from hybridization is a real threat. While

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

The lead agency for the feasibility study for a barrier on Tenn-Tom Waterway is the Nashville District, US Army Corps of Engineers. The “Decision Analysis Team” was assembled. Team members include state and federal agency partners. At present, they are looking only at a barrier at the Bay Springs Dam/Lock site. Currently, options are being considered for the type and placement of the barrier structure. A single deterrent barrier (e.g., acoustic, bubble system, or electric) is being examined, but a multi-deterrent barrier (e.g., BAFF system) is also being examined. Jim stated that for the Tenn-Tom Waterway, they not only want a barrier designed that will prevent fish from moving downstream into the Mobile River, they also want the barrier to prevent fish from moving upstream from the Alabama River into the Tenn-Tom Waterway. Jim’s solution would be to place an electric barrier above and also below the Tenn-Tom Waterway Bay Springs Reservoir. However, those barriers are very expensive to maintain.

Bay Springs Lock is very large. It is an 84-foot lift lock, with a water volume of 5.5 million cubic feet (41.4 million gallons) every time it opens and closes. The Sonny-Montgomery Lock only has a 30-foot lift with 14.8 million gallons of water volume, which would be much easier to place a barrier at. One possible treatment there would be the usage of CO2 to narcotize the fish in the system.

A report is due in July 2023.

Public Comment

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

The meeting recessed at 5:00 p.m.

Wednesday, April 26, 2023

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

Peter Kingsley-Smith presented the Distinguished Achievement Award to James Ballard, the former Gulf States Marine Fisheries Commission Aquatic Invasive Species Program Coordinator, and Coordinator (March 2008 – February 2023) of the Gulf and South Atlantic Regional Panel of the Aquatic Nuisance Species Task Force for his outstanding contributions to the field of aquatic invasive species in the Gulf and South Atlantic region. James told the panel members that working with them has been very rewarding, and hopes that his new job position will allow him to continue to participate in invasive species efforts.

Accidental Host Video

Peter Kingsley-Smith provided a documentary entitled "Accidental Host - The Story of Rat Lungworm Disease". The story is about a silently-spreading foodborne parasite that thrives in tropical areas of five continents, including Hawaii and the southeastern U.S. The film features

patient stories and expert interviews. The disease can cause life-long neurologic damage, and even death.

Rat lung worms not only enter rats and snails, but innocent bystanders. Most of the time, the parasite cycles between rats and snails, its natural hosts. In rats, the adult worms live in pulmonary arteries where the parasites mate. After offspring hatch, rats eventually pass droppings that can harbor thousands of invisible larvae. Snails and slugs eat those larvae-laden droppings. Other rats become infected by eating those snails and slugs. Humans become infected when they, too eat larvae living in mollusks or other contaminated foods. In the 1960s, Lawrence Ash, an American parasitologist, began collecting snails from market gardens in Hawaii and French Polynesia. He discovered that sometimes the parasite contaminated fresh leafy produce. Until then, dishes containing undercooked freshwater shrimp or land snails were seen as likelier sources of infection. Humans can become infected by possibly eating a salad, smoothie, etc. containing a small snail or slug that contains rat lung worm larvae that had been on green produce used to make the food item. In their juvenile phase, semi-slugs are fairly translucent and are hard to see among leafy vegetables and other produce.

Angiostrongylus cantonensis live in pulmonary arteries, and are then discharged into the blood stream, and then lodge as emboli in the smaller vessels. They were first found in rats in China in the 1930s, but it was not until the 1950s that Australian researchers reported something novel. Not only did certain *Angiostrongylus* species live in and near rat lungs, they also invaded rat brains. This is the same journey later found in humans as well. From time to time, rat lung worms appeared in patient's eyes in Asia, suggesting possible invasion of the brain. But Meningitis, an inflammation of the covering of the brain, was a far more common clinical syndrome, both in Asia, and several Pacific islands. The final piece of the puzzle fell into place in Honolulu in the 1960s. That's when an autopsy revealed rat lung worm deep in the brain of a man from a mental hospital who died of severe Meningitis. It was not known how he became infected. It was known about the life cycle of the parasite in slugs and snails, so studies began on slugs and snails in Hawaii.

A species of semi-slugs, identified as *Parmarion martensi*, an invasive polyphagous semi-slug, was discovered in the Hawaiian Islands in 1996. On the Big Island of Hawaii, they were discovered in 2004, and over 75% of semi-slugs that were collected were found to be infected by the parasite.

Coinciding with the arrival of these semi-slugs, it appeared that there was an increase of the number of cases of meningitis, and an increase of the severity. Some cases were severe enough to end up in hospital intensive care units, which was unheard of prior. Some of the cases were so severe that the patients needed to be put on a ventilator, a feeding tube, and required very intensive medical support. A lot of people who have been infected can no longer work again due to neurological and physical damage from the disease. It is not only mentally and physically devastating, but also financially. Some people went through the whole disease process without any medical attention. They experienced months of being delirious, nearly comatose, not eating, and experiencing severe headaches. Unfortunately, it is common for people to go to Urgent Care or a hospital ER department several times before they are taken seriously enough that a spinal tap will be done, which confirms the diagnosis of the disease.

Before reaching the nervous system where they typically die, rat lung worm parasites often cause many baffling complaints such as fatigue, nausea, coughing, itching, low-grade fever, skin rash, and diarrhea. It is a difficult disease to diagnose. When the parasites enter the brain, symptoms of involvement of the central nervous system become apparent, such as headache, weakness,

sensitivity to light, bladder dysfunction, and even coma. *Angiostrongylus Eosinophilic Meningitis* is confirmed when spinal tap fluid contains *Angiostrongylus cantonensis*

Treatment of the disease using high-dose steroids that suppresses inflammation had long-term been the traditional mainstay. Nonetheless, newer guidelines published in the *Journal of Parasitology* recommend that patients also receive de-worming drugs like Albendazole, with one caveat. When a patient is suspected of having the disease, they should immediately begin taking the drug. The young larvae are killed by these drugs. Once the larvae get older, the drugs do not work as well. This was learned through veterinarians. Dogs can also get rat lung worm disease, and are treated with de-worming drugs. There is also evidence of the value of corticosteroids being used. There is debate by experts whether or not preventive treatment should be given to people.

Rat lung worm can infect many different species of animals worldwide. In a teaching zoo in Gainesville, Florida, rat lung worm disease was found in primates. *Angiostrongylus* have also been found in rats and snails in a scientific survey that was conducted in Florida.

Making people aware of rat lung worm disease is being done in Hawaii in various ways. A program was created by a woman whose son had the disease and suffers from debilitating neurological and physical repercussions from the disease. School children are being taught about the slugs and snails that can carry rat lung worms. The children then educate family and friends about the dangers of handling the snails and slugs. Educating the local population to not only warn them of the disease and what the symptoms are like, but also what they can do to prevent themselves from becoming infected is a main priority. Farmers markets have been a great arena to spread the word on the importance of washing produce, fruit and vegetables before eating them. Stricter regulations for small farmers who sell their produce to restaurants is needed to ensure that their produce has been safely processed. Restaurants need to establish stringent washing protocols for their produce, fruit and vegetables before serving them to the public. Plant-based smoothies and juices can also harbor *Angiostrongylus*. Educating tourists about rat lung worm disease and how they could become infected is another way to prevent it.

Diagnosing hosts of *Angiostrongylus cantonensis* and *Angiostrongylus Eosinophilic Meningitis* will continue to be an uphill battle until doctors are better informed, and testing improves. Doctors without previous experience or education with *Angiostrongylus cantonensis* and *Angiostrongylus Eosinophilic Meningitis* would not consider testing a patient for them. There also needs to be education for healthcare providers so that they can know what symptoms to look for, and how to make the diagnosis. For a better outcome for the patient, the disease needs to be diagnosed at the earliest stage. Hopefully, one testing method in the future would be a blood test that can be used as a rapid diagnostic test in hospital emergency rooms so that a patient would not have to endure a painful spinal tap.

Discussion of ANSTF Recommendations

There were no ANSTF recommendations.

State Reports/ Members Forum

Alabama

Jessica Marchant reported that several invasive species have been documented in Alabama coastal waters. The Bocourt Swimming Crab (*Callinectes bocourti*), Tessellated Blenny

(*Hypsoblennius invemar*), Australian Spotted Jellyfish (*Phyllorhiza punctata*), Asian Green Mussel (*Perna viridis*), Asian Tiger Shrimp (*Penaeus monodon*), and Red Lionfish (*Pterois volitans/miles*) have been documented although non-validated or undocumented reports of additional invasive species likely exist. Unfortunately, the ecological effects of these invasive species are poorly understood in Alabama's estuaries and Gulf of Mexico waters. However, interactions between indigenous species and invasive species typically results in negative impacts to the native species. Prey of Australian Spotted Jellyfish include early life history stages of many commercially and recreationally important finfish, and the temporal/spatial distribution of Australian Spotted Jellyfish could drastically increase finfish larvae/egg mortality rates if spawning events coincide with swarm activities. Similarly, the Bocourt Swimming Crab could compete for resources of the native Blue Crab. The current status of the Australian Spotted Jellyfish and the Bocourt Swimming Crab, however, does not indicate that these two invasive species pose an imminent concern. Similarly, *H. invemar* and *P. viridis* do not appear to pose an immediate threat, but their distribution and abundance should be monitored to ensure early detection of proliferation. However, the Asian Tiger Shrimp, *Penaeus monodon*, and Red Lionfish, *Pterois volitans/miles* continue to be invasives of heightened concern, and their broadened distribution, increased abundance, and/or documented negative effects on native species warrants concern.

The latest non-native observed in the marine waters of Alabama was a single Crescent Grunter, *Terapon jarbua*. The specimen was collected on February 28, 2020, but was not reported to the appropriate officials until March 29, 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 Fiver 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. The Amazon Red Tail Catfish was observed in Alabama's marine waters in July 2016. The specimen was collected in a recreational crab trap at a private dock on the Bon Secour River.

Additionally, a single Bocourt Swimming Crab was collected in a commercial crab trap during a November 2016 ADCNR/MRD onboard fisheries observation trip. The exact location where the 101mm carapace width, male Bocourt Swimming Crab was caught is unknown, but the general location of capture is south of Lillian Bridge and north of Ross Point in Perdido Bay. No observations of the Bocourt Swimming Crab have been made since the first observation in 2007 until the 2016 observation.

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

in validated reports. Based upon the temporal and spatial abundance of *P. monodon* encounters and reported sightings (despite lower perceived importance of Asian Tiger Shrimp since 2013), evidence suggests the Asian Tiger Shrimp has become established in Alabama's waters.

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

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

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

Beginning in 2016, spearfishing tournaments were held to specifically target Red Lionfish. A weekend long tournament, "Lions on the Line", was held at FloraBama during 2016 when 1,662 lionfish were harvested. A summer-long tournament, Alabama Lionfish Challenge, was held from May 26, 2018 through September 3, 2018 when the recreational division of the Alabama Lionfish Challenge harvested 540 lionfish and the commercial division harvested 278 lbs. of lionfish. Tournaments were also held in April 2019 and September 2019 when a total 2,140.9 lbs. and 1,296.4 lbs., respectively, were harvested during the tournaments.

On September 7, 2022, Alabama Marine Resources Division caught a juvenile Red Lionfish while trawling in Perdido Bay with a 16' otter trawl. The capture of this juvenile Red Lionfish is notable, as few individuals have been reported in the Perdido System. A derelict crab trap was incidentally

caught in the trawl net at a depth of roughly 3 meters in Terry Cove, near the northern tip of Robinson Island. AMRD removed the derelict crab trap from the trawl net and began working the catch down to the tail bag when the Red Lionfish was first observed. It is not certain if the Red Lionfish was in the crab trap when first caught, or if it was simply near the trap when caught in the net. The juvenile Red Lionfish was an estimated 60 millimeters in total length and was placed in a live well on the vessel. The fish was taken back to the lab and kept alive for educational purposes at outreach events, such as the Mobile Boat Show.

The Mobile Boat Show is a large, three-day event that is held at the Mobile Convention Center in downtown Mobile, Alabama. The 71st annual Mobile Boat Show took place from March 3, 2023, through March 5, 2023, and drew many attendees. With numerous new boats on display and over 100 vendor booths, it was a great opportunity for Alabama Marine Resources Division to interact with the public. This year, AMRD staff educated the public about our Division's purpose, goals and functions, as well as about the native and non-native marine species that are currently found in Alabama's coastal waters. The juvenile Red Lionfish that was captured in the Perdido System by AMRD in the fall of 2022, was featured at the most recent Mobile Boat Show. The live Red Lionfish was displayed in a fish tank at the event, along with an informational bulletin about this aquatic invasive species. This Red Lionfish drew a lot of interest from the public, so it is our hope that attendees left this event with a better understanding of the issues associated with the Red Lionfish invasion on the Gulf of Mexico. Overall, the spatial distribution of Red Lionfish has not changed after becoming established. However, the rate of population growth has changed over time. During the first several years of the invasion, population growth of Red Lionfish increased substantially from year to year. However, the rate of population growth during the previous few years has reduced such that it seems the population has plateaued to a stable state.

Florida

Sarah Funck reported that the 2023 Lionfish Awareness and Removal Day (LRAD) will be held May 15, 2023, in Destin, FL. Visitors will have the opportunity to taste lionfish, watch fillet demonstrations, participate in family-friendly games and much more. This event is held in conjunction with the state's largest lionfish removal event, the Emerald Coast Open Lionfish Derby on May 13 and 14, with a final weigh-in on the 15th, 2023. The six days leading up to LRAD is called Restaurant Week. Each day, one of six participating restaurants create and sell a lionfish dish that highlights the great taste and versatility of this unique seafood. It is hoped that the more people who taste lionfish, the higher the public demand will be. The 2022 LRAD event was very successful, with 145 participants removing 13,835 lionfish. The First Place Team for Most Lionfish removed 1,623 fish. Prizes were also awarded for the largest lionfish (436 mm) and smallest lionfish (39 mm).

The Florida Fish and Wildlife Conservation Commission (FWC) is also planning to hold the 2023 Lionfish Challenge. The goal of the Challenge is to encourage and reward recreational and commercial divers for removing lionfish from Florida waters. The Lionfish Challenge is scheduled to begin May 20th, and run through Labor Day, September 4th, 2023. The Challenge is a statewide event open to recreational and commercial divers. Checkpoints will be set up around the state for recreational divers to submit their catch, and commercial divers will provide copies of trip tickets to document the weight of lionfish they harvested. At the end of the Challenge, the recreational diver with the most lionfish and the commercial diver with the most weight of lionfish will be crowned the Lionfish King or Queen for their category. To keep divers interested, there will be a tiered prize system based on the number or weight of lionfish submitted to encourage continued

harvest. There will also be bi-weekly raffles for all participants that have submitted a qualified entry. This Challenge is a fun and potentially rewarding way to help reduce the number of lionfish on Florida's reefs. Additional information on the 2022 Lionfish Challenge can be found at <http://fwcreefrangers.com/lionfish-challenge>.

Green Mussels (*Perna viridis*) were first discovered in Tampa Bay in the late 1990s, and rapidly increased in abundance. They soon spread south along the Gulf coast, into the Keys, and then up the Atlantic coast to several locations north of but not within Lake Worth Lagoon (LWL). However, in October 2020 Green Mussels were reported from Little Lake Worth Lagoon on the north end of LWL. FWC and other partners are currently undertaking major restoration projects in the LWL 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.

There have been no new Green Mussel reports from the LWL or other Intracoastal Waterway sites since February 2021. However, a flier has been developed and disseminated to LWL stakeholders to aid in the identification and reporting of Green Mussels to the FWC.

In February 2023, a new unconfirmed report of an Arapaima (*Arapaima gigas*) in a brackish water canal in Cape Coral, FL was received by the FWC. The location is less than two miles from a previous but unverified arapaima report. Due to a lack of credible information, FWC did not investigate this latest report. This site is near the Caloosahatchee River. It is likely the fish was a large Snook or Tarpon; species that frequent these canals.

In March 2023, FWC Law Enforcement investigators seized an illegal shipment of juvenile (approx. four inches long) Arapaima. Arapaima are regulated by the FWC as a Conditional species. Permits to possess live Arapaima are only issued to qualifying entities for research, commercial import/export, and public exhibition. Aquaculture facilities with a valid Aquaculture Certificate with Restricted Species Authorization issued by the Florida Department of Agriculture and Consumer Services are allowed to raise Arapaima only for food. 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 IveGot1 hotline.

In August 2022, an EDDMapS report of Red Swamp Crayfish (RSC) (*Procambarus clarkii*) was received from a location in northeast Florida near Jacksonville. FWC staff positively identified them as RSC. RSC are native to the Escambia River basin in western peninsular Florida, but this site is more than three hundred miles from their native range. RSC are considered highly invasive, and the site is near habitats occupied by the State Threatened Black Creek crayfish, a species already under stress from a native crayfish species that has been transplanted into the Black Creek drainage basin. The site has a series of drain lines connected to a retention pond. The RSC were first spotted in one of the access wells of the drainage system and were also trapped from the retention pond. Small numbers of RSC were also trapped from a shallow pothole in an almost completely dry drainage ditch just north of the site. The source of these RSC at this site is unclear at this time. Trapping and surveying of waterbodies near the site were rapidly initiated to define the geographic range of the RSC and a team was developed to formulate an Early Detection Rapid Response plan to address this novel Florida invasion. Two applications of copper sulfate were

applied to the retention pond, drain lines, and pothole. The treatments were unsuccessful in eradicating the RSC from any of the sites.

Researchers in Michigan are using pyrethrin, a commonly used insecticide, as an effective means of removing RSC. However, it is not currently labeled for use in aquatic systems. Exemptions were obtained from the EPA and NPDES and a treatment was conducted in December 2022. At the time of this treatment, juvenile RSC were observed in the pond and in the pothole. Sections of the drain lines were partially plugged and pyrethrin was applied to the pond, pipe sections, and pothole at a concentration of 2 ppm. The pond, pipe sections, and pothole were monitored for three days by visual inspection and trapping. No live RSC were recovered. Additional trapping was conducted in waterbodies outside the treated areas and no additional RSC were recovered.

Trapping continued in early 2023 to monitor the pyrethrin treatment water collected in a second low spot in the ditch, a spot that had been dry in December 2022. Dip netting yielded an adult and several juvenile RSC in this location. This pothole was treated with pyrethrin and no live RSC were recovered. Due to the burrowing ability of RSC and the high-water table in the area, it appears that RSC were able to survive and even reproduce during the dry season and occupy a shallow pothole after a rain event. FWC plans to return to the area at the beginning of the rainy season to monitor all the sites and treat any remaining RSC.

A canal in western Broward County that is divided into two similarly sized sections by water control structures was identified as a site to examine potential impacts of Bullseye Snakehead (*Channa marulius*) on native fish species with emphasis on Largemouth Bass. The sections are divided into transects, and quarterly fish community electrofishing was initiated in November 2022. In the south section, all Bullseye Snakehead collected have been removed. Monthly removals from the south section are being conducted to expedite any potential changes in the native fish communities. Changes in relative abundance of native and nonnative species based on electrofishing catch rates and changes in size structure of native sportfish will be looked for. This is a 2-year research project that will provide insights on Bullseye Snakehead impacts in a relatively closed system. As a side project, FWC will monitor the canal sections annually to determine how long Bullseye Snakehead in the removal section repopulate the area.

Upcoming Events:

Fish Slam: A multi-agency fish Slam is tentatively scheduled for May 2023 in the Tampa Bay-Sarasota area.

Southwest Cisma Invasive Fish RoundUp: The Southwest Cooperative Invasive Species Management Area is hosting a nonnative fish removal contest May 5-7, 2023. Anglers of all ages will target nonnative fish in hopes of winning a prize for the most species, most fish, and heaviest aggregate weight.

2023 Lionfish Challenge: The 2023 Lionfish Challenge is scheduled to run from May 20 through Labor Day. The goal of the Challenge is to encourage and reward recreational and commercial divers for removing lionfish from Florida waters.

Matt Phillips reported on activities conducted under the Cooperative Aquatic Plant Control Program in Florida public waters.

Invasive non-native plants were reported in 97.2% of Florida's 462 surveyed public lakes and rivers that comprise 1.27 million acres of fresh water.

Eradicating established invasive aquatic plant populations has proven nearly impossible; therefore, routine maintenance is needed to suppress invasive plants at low levels to sustain attributes like navigation, flood control, and recreation while conserving native plant habitat.

Floating water hyacinth and water lettuce, two of the world's fastest growing plants, covered as much as 125,000 acres of Florida public waters as recently as 1959 and therefore are the FWC's highest management priorities.

These plants were present in 278 public lakes and rivers in 2022 covering about 3,400 acres. 87.4% of the floating plant populations reported in 2022 covered 10 acres or less.

Managers spent approximately \$3.28 million controlling 3,400 acres of floating invasive plants in Florida public lakes and rivers during FY 2021 - 2022.

Submersed hydrilla, imported during the 1950s as an aquarium plant, is capable of growing several inches per day filling the water column and covering the surface of water bodies that are not frequently and routinely managed.

Insufficient funding allowed hydrilla to evolve into statewide water and habitat management crises by the middle 1990s infesting about 100,000 acres in 365 (80%) of Florida's public lakes and rivers. Sufficient, recurring funding and improved technology aided by FWC-funded research enabled managers to reduce hydrilla to about 45,675 acres in 2022.

Hydrilla was reported in 177 public waters in 2022 and was managed to target goals in all of Florida's public lakes and rivers; however, tubers infest about 72,887 acres and represent the potential for immediate regrowth.

70.6 % of the hydrilla populations reported in 2022 covered 10 acres or less. 43.1 % of the hydrilla reported in 2022 occurred in the four lakes of the Kissimmee Chain of Lakes, among Florida's largest and most important multi-purpose waterways.

Managers spent \$13 million controlling 24,053 acres of hydrilla in Florida public lakes and rivers during FY 2021 - 2022 to conserve the multiple uses of these resources.

The Florida Exotic Pest Plant Council lists twelve Category I invasive plants, capable of disrupting aquatic ecosystems and causing harm in Florida public waters. 10 Category I plant species in addition to hydrilla and water hyacinth were detected, covering about 16,668 acres in 94% of Florida's public waters in 2022.

\$1.96 million were spent managing about 4,097 acres of aquatic plants other than hydrilla and floating plants during FY 2021 - 2022, most for the control of tussock-forming plants like bur head sedge, exotic ludwigia, frog's bit and tropical American water grass in Florida's waters to conserve fish and wildlife habitat and navigation in the extensive marsh systems of these waters.

Don MacLean pointed out that clarification is needed for the native species becoming a nuisance species issue. Caution must be taken with the native species issue in some arenas when they become a nuisance with what is being done. For state aquatic nuisance species management plans, the term “nuisance” must still be used because it is in the authorizing legislation. State planned funding cannot be used on native species, no matter how much of a problem they become. The term ANS, for the purposes of the state management plan, is for aquatic invasive species. ANS funds should not be used for control if it is not an invasive species.

Georgia

Jim Page reported that since the introduction of flathead catfish into the Satilla River in the mid-1990s, the impact on redbreast sunfish has been significant. In an effort to reduce their impact on redbreast sunfish and other native fish, the Georgia Department of Natural Resources staff initiated efforts to remove flathead catfish on a part-time basis in 1996, and full-time beginning in 2007 to control their population. Staff completed 2022 removal efforts, and will again resume removal efforts in Spring 2023.

Georgia DNR staff also continue to remove blue catfish from the Satilla River. Removal of this second non-native species occurs simultaneously during flathead catfish removals. After removing a record number of blue catfish in 2022, staff will resume removal efforts in spring 2023.

While thorough eradication efforts were done in October 2019 to prevent the spread of Northern snakehead found in Gwinnett County, GA DNR staff took a proactive approach to continue monitoring this site and subsequent nearby downstream waters to ensure these invasives were eradicated. Since 2020, GA DNR staff have teamed with USFWS staff to conduct eDNA sampling in waters adjacent to the discovery site. Sampling efforts in 2021 indicated two positive hits for snakehead eDNA, though follow-up sampling in 2022 found no positive hits. Assuming no detections are found in 2023, staff will suspend sampling in 2023.

Triploid grass carp continue to be purchased and used by GA DNR particularly for control of weeds at ponds located on GA DNR fish hatcheries. Grass carp are used for long-term pond maintenance at ponds located on GA DNR state park lakes and federal properties. GA DNR continues to assist the USFWS with stocking Banks Lake National Wildlife Refuge to aid in the control of *Cabomba* spp. And other vegetation, stocking 1,215 carp during this reporting period. An apple snail was captured in Black Lake in Bulloch County. The report was provided by a private citizen in November 2022. It was positively identified by GA DNR staff.

Oriental weatherloach were captured at several locations in the Ocmulgee and Oconee River drainages. Reports were received from UGA Warnell School students. The fish were positively identified by UGA/GA DNR staff. Fish continue to be observed during school sampling events. During this reporting period, no reports of zebra mussels were made. GA DNR staff continue to remain vigilant for voluntary reports of zebra mussels attached to boats.

No reports of giant salvinia were received during this reporting period.

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

Commercial fishermen continue to periodically report catches of Asian tiger shrimp in Georgia waters, though these reports remain low. Reports continue to be provided through the new reporting tool on the GA DNR-WRD website.

GA DNR staff may potentially intercept tiger shrimp during fishery-independent standardized sampling conducted monthly at over 35 sites coastwide by the GA DNR Coastal Resources Division. Results of these surveys also suggest abundance of tiger shrimp in Georgia's sampled waters are low.

Lionfish continue to be found in deep waters along most of the eastern U.S. coast, including off the Georgia coast. GA DNR has a reporting tool on their ANS website for anglers to report lionfish.

GA DNR staff continue to make additional updates to the GA DNR Aquatic Nuisance Species web page on their website. The reporting tool on the website is used by the public as a way of informing staff of new discoveries.

Two new ANS signs are being installed by GA DNR staff at boat ramps and public access sites around Georgia to inform the public about how they can help prevent ANS introductions. Georgia Power recently installed several signs at their boat ramps as well.

GA DNR staff continue to set up ANS display tables at various locations to help educate members of the public about ANS in Georgia, and how they can help. These displays have proven very successful, and staff continue to seek new locations to set up displays.

Fisheries staff with GA DNR have provided ANS rack cards that GA DNR Law Enforcement will distribute to all participants taking Boater Education classes across the state. This will allow important ANS information to be provided to boaters to educate them on how they can help prevent transporting ANS.

Conducting visits to schools and other educational outlets is a high priority for GA DNR. Staff spoke to over 2,500 students and adults at 12 schools/civic groups during this reporting period. Nine of these talks utilized the Traveling Trunk.

GA DNR staff continue to utilize the ANS education trailer at various outreach events. This educational tool has been a great addition to DNR's efforts to teach children about ANS.

Louisiana

Rob Bourgeois reported that zebra mussels have been found to survive over the summer in areas where they were previously thought not to survive. The populations were found on telemetry receivers after being deployed under water for two years. The mussels were detected on the Atchafalaya River near Morgan City, and in the Wax Lake Outlet near Vermilion Bay. These areas will be monitored as the telemetry receivers are serviced.

A Chinese mitten crab was reported near the mouth of the Mississippi River. This was the first reported mitten crab since the 1990s. It was caught by a commercial crab fisherman. The Louisiana Department of Wildlife and Fisheries will monitor commercial crab catches for any additional occurrences.

A peacock bass was confirmed in the summer of 2022. LDWF staff electro-fished the area but did not find the fish. This area is near a long-term sampling site, so LDWF staff will sample this area in early summer and fall 2023.

Public reports of apple snails have slowed. The GA DNR ANS coordinator visited three local areas where populations were previously present, but found no snails. The disappearance of snail populations may be due to a severe early freeze in November 2022 and/or a late freeze in March 2023. LDWF staff will continue to monitor the three locations to see if the snails return.

Since fiscal year 2020, LDWF has had projects funded through USFWS's Lower Mississippi River (LMR) Invasive Carp Partnership and the Atchafalaya, Red, and White Rivers Invasive Carp Partnership. LDWF collaborated with Nicholls State University to investigate the presence of invasive carp larvae on rivers in the LMR. The objective of the study was to determine the extent of invasive carp spawning activity in the Mississippi River, Atchafalaya River, Ouachita River, Red River, and Tensas River Basin sites sampled in LA. Reproduction is occurring on the Red, Mississippi, Atchafalaya, and Ouachita Rivers. Invasive carp spawned in all three of the months sampled, with a peak occurring in May. No larvae were collected west of the Atchafalaya River in 2022, despite large numbers of adults present in some of the areas collected.

Since 2020, LDWF has collaborated with LSU to tag 200 invasive carp, and set up a receiver array. The object of the project was to determine intrabasin and interbasin movement to inform placement of potential deterrent technologies and removal efforts. In 2022, there were nearly 158,000 detections from 79 unique carp across the array of 40 receivers. The maximum distance traveled and recorded by receivers was 572 km, and the mean distance traveled and recorded by receivers was 31 km.

A silver carp tagged in a backwater of the lower Atchafalaya River south of Morgan City has been detected in the Atchafalaya River Basin for over one year since its initial capture and release in 2021. Over the course of the year, the fish has swum over 500 river km, being detected on nine different receivers, utilizing the intercoastal waterways several times to transmit between Wax Lake Outlet and the Atchafalaya River, both north and south of Morgan City.

Another silver carp was tagged in 2021 in the North Prong of Schooner Bayou. This fish quickly transitioned into Vermilion Bay. The fish was detected there continuously (-18,000 detections) and was next detected after a week of silence on another bay receiver – this time at the mouth of Avery Canal. Total residence time in the bay for this fish was around three months. The next appearance occurred in the Lower Atchafalaya River, followed by a rapid transit north of Morgan City.

Other transmitters detected on the receiver array in southern Louisiana include grass carp from the northern Mississippi River basin, a bull shark, American eels, and red drum. Additional orphan tags were detected, but have not yet been identified.

LDWF collaborated with LA Universities Marine Consortium to perform feeding trials on catfish of food pellets made from invasive carp. The project will be completed during the first quarter of 2023. Louisiana-sourced invasive carp are bigger than invasive carp from Illinois invasive carp.

Asian swamp eels were found in Bayou St. Johns in New Orleans in June 2019. LDWF and a local university professor continue to monitor and sample the population. LDWF electrofishing did not detect any swamp eels. The sampling by the university only resulted in three swamp eels being captured. All three were captured in one of the 82 samples taken in 2022. It is believed that this is a small population.

LDEF continued with their control of invasive aquatic weeds, using a variety of techniques. Aquatic plant control plans were developed for approximately 70 waterbodies during this reporting period. A total of 34,763 acres of nuisance vegetation were treated in 2022. Giant salvinia continues to be the most problematic invasive plant in Louisiana. Herbicides are being applied to over 20,200 acres during that time. Additionally, 9,993 acres of water hyacinth were treated across the state during this reporting period. LDWF uses an integrated approach to control aquatic plants consisting of chemical, physical, and biological methods in an effort to achieve a greater combined benefit. In 2022, LDWF had an Aquatic Plant Control Program budget of \$6,500,000, of which a large portion was spent on the monitoring, treatment, and research of giant salvinia.

Mississippi

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, Brazilian elodea, and water hyacinth.

An aerial photo survey of 193 miles was conducted for early detection of AIS in difficult-to-access areas, and to help monitor treatment efforts.

Pomacea maculata trapping and egg mass destruction continued in the Pascagoula River. Limpkins continue to be sighted in the apple snail infested areas.

The Mississippi Department of Marine Resources continues to serve on the Mississippi Aquatic Invasive Species Council, the Mississippi Cooperative Weed Management Area, and the Pascagoula River Alliance.

Invasive species outreach and education events were held at the Mississippi Aquarium on February 17, 2023, the Biloxi Boat Show on February 4-54, 2023, and at the Mississippi Aquarium for National Invasive Species Awareness Week on February 25, 2023. Display items from the Traveling Trunk of Invasive Species were utilized to facilitate interaction with the public.

North Carolina

Rob Emens gave a Power Point presentation on their Gapway Swamp Giant Salvinia Eradication Project. The project focused on two ponds in Columbus County - Richardson Pond and Buffkin Pond. In July 2020, the NC DEQ Aquatic Weeds staff did an initial site visit in response to a report received from a pond management company.

The goals for 2020 included:

Public awareness; Connect with landowners; Delineate the infestation; Pursue grant money; Project planning. Activities included:

- Aerial surveys with drones (NCDEQ & NCSU.)

- Identify and inspect ponds and waterways.
- 1st meeting - NCDEQ, NCDA, Columbus County (November 2, 2022).
- Developed a Giant Salvinia fact sheet.
- Public meeting at Cooperative Extension Office (November 30, 2022).
- Pursued grant money (DEMLR, FEMA, Office of Recovery & Resiliency).

The goal for 2021 was to:

Halt the downstream spread of Giant Salvinia by treating the lower reach of the infestation with herbicide. Management activities included:

- Herbicide applied to the lower end of Richardson Pond.
- Target area was ~50 acres.
- Introduce Salvinia Weevils to the site.
- All activities carried out by NCDEQ Aquatic Weeds and USACE staff.

The goal for 2022 was to:

Begin site-wide eradication while continuing to mitigate risk of downstream spread. Management activities included:

- Herbicide applied to Richardson and Buffkin ponds.
- Target area was ~115 acres.
- Most of the herbicide applications and clearing services were carried out by a contractor.
- Release additional Salvinia Weevils.

Gapway Swamp – Salvinia Weevils were used as a biological control method.

Release events of Salvinia weevil (*Cyrtobagous salviniae*):

- 17,400 insects - August 25, 2021
- 50,000 insects - July 27, 2022
- Weevils will reduce the density of Giant Salvinia if their population is successfully established.
- Weevils will NOT eradicate Giant Salvinia.

Gapway Swamp -Giant Salvinia eradication project:

Year	Budget (MOA)	Actual total	Actual (NCDEQ share)	Actual (Columbus County share)	USACE (estimated in-kind)
2020	-	\$ 5,000	\$ 5,000	-	-
2021	\$ 120,000	\$ 71,824	\$ 35,912	\$ 35,912	\$ 12,000
2022	\$ 150,000	\$ 129,650	\$ 64,825	\$ 64,825	\$ 20,000

Year	Proposed Budget (MOA)		NCDEQ share	Columbus County share	USACE (estimated in-kind)
2023	\$ 124,000	-	\$ 62,000	\$ 62,000	\$ 10,000
2024	\$ 50,000	-	\$ 25,000	\$ 25,000	?

South Carolina

Julie Holling reported that since the last meeting, they have been primarily working in the office. They drafted their annual Aquatic Plant Management Plan. The plan was presented to the Aquatic Plant Management Council for review in January after hearing reports on the vegetation treatment, vegetation surveys, water quality, and sterile grass carp health in the Santee Cooper lakes. These lakes are the most contentious portion of the plan, due to the large size of the lake, shallow depth, and the large numbers of grass carp that have been put in the system several times since 1989. There are roughly 34,500 carp currently in the system, and the plan proposed stocking 12,000 additional fish, which was slightly above the mortality rate. The plan was put out for a 30-day public comment period before the Council met in March. The number of carp to be stocked in the lakes was reduced to the true mortality rate of 11,025, and the plan was approved.

SC DNR is in the process of ordering sterile grass carp for various water bodies across the state, excluding the Santee Cooper lakes, which are purchased by that organization, and expect them to be stocked in mid-May. It is also hoped that alligatorweed flea beetles can be obtained from the Army Corps of Engineers in Florida.

SC DNR conducted community outreach at the Southeastern Wildlife Expo in February in Charleston, and at the Palmetto Sportsmen's Classic in May in Columbia.

Peter Kingsley-Smith reported on investigating hybridization between the invasive Red Swamp Crayfish (*Procambarus clarkii*) and its sister species the Eastern Red Swamp Crayfish (*Procambarus troglodytes*). The Red Swamp Crayfish, *Procambarus clarkii*, which is 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 Busack (1989) showed to be the species most closely related to *P. clarkii*. The Eastern Red Swamp Crayfish, *P. troglodytes* is the most abundant native crayfish species in South Carolina, where much of its range overlaps with known locations of invasive *P. clarkii*. Hybridization is common among crayfish species; however, the majority of the research to assess hybridization of non-native crayfish with native species has focused on the genus *Faxonius* (Perry *et al.*, 2001; Arcella *et al.*, 2014), with little data currently available for hybridization within the genus *Procambarus*.

Researchers at the SCDNR MRRI have been applying molecular tools to test whether hybridization is occurring within wild populations of the *Scapulicambarus* subgenus of crayfish. 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 amplify and bin reliably in *P. troglodytes* (Table 1). A total of 259 samples, 127 *P. clarkii* and 132 *P. troglodytes*, are included in the final STRUCTURE analysis estimating shared ancestry between the two species (Figure 1). Our results show that no individuals included in these analyses were hybrids and 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 indicators for hybridization as the 2 or 3 alleles that occur in *P. troglodytes* are ubiquitous in *P. troglodytes* and completely absent in *P. clarkii*. If hybridization were occurring, we would expect to see introgression of alleles between species at these loci.

An assessment is being done on potential transmission pathways for the transmission of white spot syndrome virus (WSSV) to native crustaceans. White spot syndrome virus (WSSV) is highly pathogenic (Escobedo-Bonilla *et al.*, 2008), 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 (SC), 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 (*Penaeus setiferus*) and blue crab (*Callinectes sapidus*) that are known to be susceptible to WSSV. Researchers are conducting experimental trials to investigate the potential pathways of WSSV transmission from *P. clarkii* to estuarine crustaceans.

One such trial was conducted between December 7 – December 16, 2022. The objective of this trial was to evaluate potential pathways of interspecific transmission from *P. clarkii* to *P. setiferus* via cohabitation with infected crayfish (no direct contact) and ingestion of previously infected crayfish tissue. The four experimental treatments (each with 7 replicates) were as follows: (1) ingestion of control (uninfected) tissue; (2) ingestion of infected (WSSV) tissue; (3) cohabitation with control (seawater) injected crayfish; and (4) (3) cohabitation with infected (WSSV) crayfish. This trial produced results that showed positive transmission of WSSV to shrimp through the ingestion of infected tissue but failed to display transmission via cohabitation. These results were presented at the 115th Annual Meeting of National Shellfisheries Association held in Baltimore, MD on March 26-30, 2023.

Work is being done to assess abundance trends for non-native portunid crabs (family Portunidae). Commercial and recreational crabbers have increasingly reported the occurrence of invasive portunid crabs in South Carolina. This includes the Indo-Pacific swimming crab, *Charybdis hellerii* and the bocourt swimming crab, *Callinectes bocourti*. To manage any potential ecological and fisheries impacts, researchers with SCDNR MRRI's Shellfish Research Section are interested in understanding the distribution and occurrence of these invasive portunid species. 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 178 samples have been sequenced at the COI mitochondrial gene. Data analyses are ongoing.

Texas

Monica McGarrity reported that TPWD is continuing to work with Oklahoma Department of Wildlife Conservation, Arkansas Game & Fish Commission, Auburn University, and Texas Tech University to assess the population status of invasive bigheaded carp in the Lower Red River Basin across the tri-state area. To date, over 350 bigheaded carp have been found in the Red River upstream to Denison Dam below Lake Texoma and in all monitored tributaries. To date, only one bighead carp has been detected in the Sulphur River, a major Red River tributary in Texas and Arkansas. Thus far, successful reproduction has not been documented. Telemetry work has begun in the Red River, with most acoustic receivers in place, and 29 bigheaded carp tagged to date. A

grant is in progress for funding lost/damaged receiver replacement during the second year of the project.

There have been no new detections of zebra or quagga mussels in Texas, or upgrades in lake infestation statuses since the last GSARP meeting.

The quagga mussel situation at Lake Amistad on the Rio Grande continues to be monitored by the NPS in collaboration with TPWD. Quagga mussel larvae have been detected in low numbers at two sites across multiple sampling dates in spring/summer 2021 and summer 2022. To date, settled mussels have not been found on settlement samplers or in shoreline searches, including searches with detection canines.

Dreissenid mussel eDNA has been detected for the first time at three water bodies. Results were delayed due to time for sample analysis. Zebra mussel eDNA was detected for the first time in summer 2022 USGS samples in Bois d'Arc Lake, which is not yet open to the public. Feces from a highly abundant waterfowl population is considered a possible source of eDNA. Quagga mussel eDNA was detected in Lakes Nasworthy and Waco (the latter where zebra mussels were eradicated approximately eight years ago). The TPWD considers eDNA as an 'inconclusive' result, and an indication that close monitoring is needed.

Giant salvinia continues to be the most problematic aquatic invasive plant in Texas, and is present in 25 reservoirs and seven river systems. Early detection and rapid response efforts continue, and a recent introduction at Lake Pinkston has been treated, and giant salvinia is now considered extirpated at Lake Pinkston. A reoccurrence found at Lake Gilmer was treated shortly after discovery, with no plants being observed in surveys conducted over the last several months. Biological control using giant salvinia weevils continues to show success, and the weevils are being used as part of their IPM strategy on 15 water bodies, with a total of 353, 638 weevils released in fiscal year 2022, and another 137,586 weevils released in the first half of fiscal year 2023. Self-sustaining weevil populations are now present at J.D. Murphree WMA lakes, Toledo Bend Reservoir, Sheldon Lake, Lake Naconiche, Lake Nacogdoches, and Lake Raven. Herbicide treatments using a variety of herbicides were also used to control giant salvinia on 36 water bodies, with nearly 15,000 acres treated in fiscal year 2022, and almost 8,000 acres treated in the first half of fiscal year 2023.

Water hyacinth continues to be problematic, and is present in 58 reservoirs and all major rivers across the state. In fiscal year 2022, nearly 3,500 acres of water hyacinth have been treated with herbicides on 30 water bodies, primarily using 2,4-D. Almost 500 acres of water hyacinth have been treated in the first half of fiscal year 2023.

Crested floating heart is currently found in three public water bodies, and yellow floating heart in two water bodies. Yellow floating heart is present on the Louisiana side of Toledo Bend Reservoir on the state border. Treatment using ProcellaCOR has been highly effective, and infestations have been significantly reduced on most water bodies.

Hydrilla in many cases provides much-needed fish habitat in aging reservoirs in Texas with minimal littoral zones, so treatments of hydrilla are limited to addressing access issues at swimming areas, campsites, along shorelines where it has become problematic for lakefront landowners for access, boat ramps, and boat lanes unless coverage exceeds 40%. Control strategies

include herbicides and triploid grass carp. In fiscal year 2022, 170 acres of hydrilla were treated across nine water bodies. No hydrilla has been treated so far in the first half of fiscal year 2023.

Giant reed is ongoing in central Texas across the Pedernales, Blanco, Guadalupe, Medina, Nueces, and Llano Rivers, and San Felipe Creek. Control is implemented

Leslie Hartman stated that they no longer receive reports of tiger shrimp. They are also not receiving any reports of lion fish.

USACE

Jon Lane reported that they have reached out to the division, which includes other states, to create an invasive species group. They are hoping to have better representation throughout the GSARP for future meetings.

USACE has a 50/50 cost share with Florida for the APC Program. The program included other states throughout the Southeast in the past. USACE is attempting to update their agreement with Florida. Currently, it is only for aquatic plants. The program has expanded to include all aquatic invasive species. This agreement will also include other states in the Southeast that will receive funding for projects, except for Texas and Louisiana. **Jon** will be looking for local partners as he works on the document.

Another part of the APC Program is the Demonstration Project. The demonstrations are currently only for hydrilla and flowering rush. Some of the treatment projects have begun in Florida. USACE is working with researchers and the state to determine needs and what demonstrative research projects can be done in the future.

Within the APC Program, there is funding available for Rapid Response. Crews, equipment, and boats are all available to help with this effort.

Jon recently attended the Greater Everglades Ecosystem Restoration (GEER) conference, which has been held for over 20 years. Invasive species were never highlighted at the conference, especially fish. This year, after a paper was written by Nathan Dorn and others from Florida International University on the threat of Asian swamp eels, interest and concern were sparked about the devastation they cause to native crayfish, small fish, and other species. **Jon** is creating an Asian swamp eel summit that will be comprised of scientists and others who are knowledgeable about the eels, and discuss information and investigate what control mechanisms can be implemented.

Jon is holding a meeting in May in Gainesville, FL for discussions on CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) to discuss forming a genetics fisheries team, and to investigate receiving funding for invasive species control at the genetics level. CRISPR is genetic biocontrol that can be defined as the release of organisms with genetic methods designed to disrupt the reproduction of invasive populations. Participants include staff from USACE, FWC, USFWS, USGS, and other entities.

USACE is doing a spray drone demonstration for an aquatic invasive species project being done. This method can hopefully be used for sensitive and difficult-to-reach areas.

Region 4 USFWS/Small Grants Program

Cindy Williams reminded the panel members about making sure their SAM and UEI are current and updated. **Cindy** is in the process of working on state plan applications as they are submitted. She sent an email to everyone about USFWS possibly having specific aquatic invasive plant funding. Five states responded. She will do a targeted announcement for aquatic vegetation control only to those five states. It will be added to the state plan grant.

University/Research

Robert McMahon reported that he and **Monica McGarrity** have been working on a risk assessment for zebra mussel invasions in lakes. This is not a region-wide risk assessment, but a lake-by-lake one using calcium concentration, pH, salinity, and temperature for 133 Texas lakes. With a few exceptions, most of the lakes are at high risk for zebra mussel infestations.

Robert has been working with a professor at Temple Junior College to look at population dynamics of zebra mussels in two closely-adjacent Texas lakes. Zebra mussels in Texas have unusual population dynamics. Typically, in most of the U.S. they have a lifespan of three to four years. In Texas, the lifespan is only one year. However, they grow incredibly fast in the high temperatures of Texas lakes. The question is: Why would zebra mussels born in the spring or fall of one year, become adults and reproduce the following year, and then die off in August and September? Research was done in Europe in the past that shows that zebra mussels, no matter how much plankton was in the water to feed on, they cannot filter and eat fast enough to support their metabolic rate once water temperatures reach above 25 degrees, so they starve. **Robert** found through his research that younger mussels do fine with high temperatures, but adult mussels starved after a year's life span once temperatures reached above 30 degrees.

Robert has begun a new long-term study on zebra mussels. Texas zebra mussels live in lakes with the highest temperatures anywhere in the world. It is believed that they are rapidly moving south to warmer bodies of water. It appears that they have evolved to tolerate higher water temperatures. The study will involve three Texas lakes to examine long-term temperature tolerances for zebra mussels to see if that is the case, which could put many Southern water bodies at risk for infestation. Fortunately for the Gulf coastal states, the waters are too soft to support zebra mussels.

Election of Officers: Vice-Chairman

Peter stated that due to **Dennis Riecke** stepping down, there is now a vacancy for a Vice Chairman. **Peter Kingsley-Smith made a Motion to elect Matt Phillips for Vice Chairman of the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species. Pam Fuller seconded the Motion, and the Motion passed. Matt Phillips** was elected Vice Chairman of the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species.

Other Business

Next Meeting, Time and Place

The location of the next meeting will be in North Carolina, probably in Wilmington.

The date will be sometime in November, 2023.

Public Comment

The Chairman provided the opportunity for public comment. There were 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 Items:

- 1. GSMFC will develop scope and cost documents outlining their management of GSARP to assist in the search for a new fiscal agent.**
- 2. A working group, led by Wes Daniels (USGS) and Leslie Hartman (TPWD) was established to discuss options for a new fiscal agent, and future management of GSARP. The fiscal agent will need to be in place by October/November 2023. This group has already met once, and will be sending out a poll to the Panel with options to consider.**
- 3. GSMFC will coordinate with GSARP member states to gauge interest, and assess needs for state-specific start-up kits for the Traveling Trunks.**
- 4. Documents for the traveling trunks will be translated into Spanish. Florida and Texas have existing materials that could easily be added to the Traveling Trunks to assist with the transition.**
- 5. Peter Kingsley-Smith, Rob Emens, and Tim Ellis will coordinate with GSMFC regarding the next GSARP meeting in North Carolina in Fall 2023, and assess the feasibility of meeting in conjunction with the Mid-Atlantic Panel on Aquatic Invasive Species.**