GULF & SOUTH ATLANTIC REGIONAL PANEL ON AQUATIC INVASIVE SPECIES & MID-ATLANTIC PANEL ON AQUATIC INVASIVE SPECIES
MINUTES
Tuesday, November 14, 2023 and Wednesday, November 15, 2023

Tuesday, November 14, 2023

On Tuesday, November 14, 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:

GSARP Members

Charlie Robertson, GSMFC, Ocean Springs, MS
Julie Holling, SC DNR, West Columbia, SC
Peter Kingsley-Smith, SC DNR, Charleston, SC
Rob Emens, NC DEQ, Raleigh, NC
Jessica Marchant, AL DCNR, Dauphin Island, AL
Jim Page, GA DNR, Waycross, GA
Michael Pursley, MS DMR, Biloxi, MS
Matt Phillips, FL FWCC, Tallahassee, FL
Tim Ellis, NC DEQ, Raleigh, NC
Kelly Gestring, FWC, Sunrise, FL
Cayla Morningstar, USGS, Gainesville, FL
Robert McMahon, UT Arlington, Arlington, TX (via GoTo Meeting)
Robert Bourgeois, LDWF, Baton Rouge, LA (via GoTo Meeting)
Jon Lane, USACE, Jacksonville, FL (via GoTo Meeting)
Michael Kendrick, SC DNR MRRI, Charleston, SC (via GoTo Meeting)
Monica McGarrity, TPWD, Austin, TX (via GoTo Meeting)
Don MacLean, USFWS, Arlington, VA (via GoTo Meeting)

MAPAIS Members

Steven Pearson, NY DEC, Albany, NY
Sarah Whitney, PA Sea Grant, Harrisburg, PA
Tara Whitsel, USACE, Hesston, PA
Katlyn Fuentes, Chesapeake Research Consortium, Annapolis, MD
Rob Emens, NC DEQ, Raleigh, NC
Sara Mirabilio, NC Sea Grant, Manteo, NC
Ian Pfingsten, USGS, Gainesville, FL
Sean Hartzell, PA FBC (via GoTo Meeting)
Michael Steiger, DNREC (via GoTo Meeting)
Jay Kilian, MD ISC, Annapolis, MD (via GoTo Meeting)
Chris Smith, NJ DEP, Robbinsville, NJ (via GoTo Meeting)
Heather Desko, NJ WSA, Clinton, NJ (via GoTo Meeting)
Kris Abell, PA Dept. of Agriculture, Harrisburg, PA (via GoTo Meeting)
Matt Shank, PA DEP, Harrisburg, PA (via GoTo Meeting)
Katie Zipfel, Western DNR, Parkersburg, WV (via GoTo Meeting)
Julie Lockwood, Rutgers University, New Brunswick, NJ (via GoTo Meeting)
Steve Minkkinen, USFWS, Annapolis, MD (via GoTo Meeting)
Mark Lewandowski, Regional Chesapeake Bay Program (via GoTo Meeting)

Christine Densmore, USGS, Kearneysville, WV (via GoTo Meeting)

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

Others
Rachael Hoch, NC WRC, Raleigh, NC
Dede Lawal, Chesapeake Research Consortium, Annapolis, MD
Rich Harrington, SC DNR, MRRI, Charleston, SC
Fred Scharf, UNCW, Wilmington, NC
Jarred Driscoll, NC AGR, Raleigh, NC
Chris Wood, NC WRC, Marion, NC
Kerry Mapes, Geo Owl, Wilmington, NC
Austin Matthews, NC DEQ, Raleigh, NC
Bronwyn Williams, NC Museum of Natural Sciences, Raleigh, NC
Nicole Hernandez, USGS, Collins, CO
Chelsea Bohaty, USACE, Jacksonville, FL (via GoTo Meeting)
John Galvez, USFWS, Atlanta, GA (via GoTo Meeting)
Kristen Sommers, USFWS (via GoTo Meeting)
Robert Corbett, NC DMF (via GoTo Meeting)
Bailey Robertory, Chesapeake Bay Program (via GoTo Meeting)
Tanya Darden, SC DNR (via GoTo Meeting)
John Galvez, USFWS (via GoTo Meeting)
Michele Tremblay, Naturesource Communications (via GoTo Meeting)
Aaron Henning, Susquehanna River Basin Com., Hummelstown, PA (via GoTo Meeting)

Adoption of Agenda
Rob Emens made a Motion to adopt the agenda. Julie Holling seconded the Motion. The Motion passed.

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

State Updates

New York
Steven Pearson gave an update on the New York Department of Environmental Conservation's AIS Program. The AIS Program's staff consists of an AIS Coordinator, a Research Scientist, and three Regional AIS Coordinators in regions with high-priority projects. ANS funds provide a part-time coordinator. Invasive Species Management has eight PRISM's exists, six with dedicated AIS staff. There are 16 state-funded Watercraft Inspection Steward Programs, with over 200 boat launches covered. The Adirondack region has well-positioned decontamination stations. Planned program growth includes a Watercraft Inspection Steward Program Coordinator, beginning this pay period, additional regional AIS coordinators, and nine DEC regions that will potentially have coordinators in all regions.

The Watercraft Inspection Steward Program performed over 218,735 inspections in 2023, with 11,637 detections of AIS. Once again, Eurasian watermilfoil, curly leaf pondweed, and zebra mussels were the most frequently found species.

Regional programs include the Great Lakes Landing Blitz held from June 30th to July 9th, and the Northeast AIS Landing Blitz held from June 30th to July 9th. Participation is also done at fairs, boating shows and fishing tournaments

Three hydrilla plants (*Hydrilla verticillata*) were found (two from tubers and one from a fragment in the Croton River, post-treatment. A new native mudwort was also discovered. Hydrilla was found in two new locations in Cayuga Lake. A 100 square foot was found near the mouth of the Owego Creek (Upper Susquehanna River), and was removed by hand. Follow-up treatment will occur next season. The Niagara River is also being treated. Other invasive plants include: European frogbit is spreading to new locations; Brittle naiad is spreading to new locations; Variable leaf milfoil is spreading to new locations (Adirondack Park); Water chestnut was found in the Great Chazy River and Dead Creek (Plattsburgh), a tributary to Lake Champlain along the western shore (Adirondack Park); Eurasian watermilfoil has been found in the Saranac River at Caddyville and two wetlands near Lake Flower (Adirondack Park); Curly leaf pondweed was found in Patterson Reservoir (Adirondack Park).

Northern snakehead has been found in the Delaware River Watershed. Additional fish were captured on the main stem of the Delaware River. eDNA monitoring is being done along the Delaware and Hudson Canal. Northern snakehead do not appear to have crossed between watersheds. Round goby has been found in the Hudson River. Operation changes along Champlain Canal appear to be preventing upstream movement. eDNA and electrofishing surveys are being done along the Champlain Canal. Saddle crayfish have been found in West Chester County. Red swamp crayfish have been found in West Chester County.

Hydrilla control projects are being continued in Tioga County at Spencer Pond, Little Nanticoke Creek, and Kuhlman Pond, Niagara River, Erie Canal/Tonawanda Creek in Erie/Niagara Counties, and at multiple locations in Cayuga Lake in Cayuga, Seneca, and Tompkins Counties. The first management season on Lake Sebago in Rockland County will be completed by the end of October with considerable success. The second treatment of water primrose and European frogbit in the Peconic River (Suffolk County) using a combination of florpyrauxifen-benzyl and imazamox occurred on July 11, 2023. The Team also conducted pre- and post-treatment macroinvertebrate surveys and aquatic plants surveys, as well as installed loggers at a select patch of Ludwigia to track dissolved oxygen prior to, during, and after treatment. Water chestnut control is occurring statewide. Fish Barrier installation along the Delaware and Hudson Canal is nearly completed to prevent inter-basin dispersal of northern snakehead.

Pilot efforts to restore *Vallisneria americana* in the Erie Canal and mouth of Croton River met with mixed results, but provided a lot of information for next season. Restoration (planting of riparian and emergent plants) of multiple sites with common reed and yellow iris in the St. Lawrence-Eastern Lake Ontario PRISM continues. Work is underway to develop larger restoration programs that would follow management actions

Texas

Monica McGarrity provided a Texas Parks and Wildlife Department Aquatic Invasive Species overview. The cost of effective AIS management in Texas is up to ~$45M / year. The TPWD total annual AIS budget is historically ~$1.4M (mostly federal boater access funds). Legislature allocated ~$3.2 M / year and 10 FTEs to TPWD Inland Fisheries since fiscal year 2016. Federal boater access funds and partner funds augment state-funded efforts. There is a working group approach to AIS prevention and management.

Public Awareness Campaigns include the Clean, Drain, Dry - Protect the Lakes You Love; Never Dump Your Tank; and multifaceted outreach campaigns.

Zebra Mussels are in 36 lakes, and seven river basins. Quagga Mussels are in Lake Amistad on the Rio Grande. Partners are monitoring nearly 50 lakes for early detection.

TPWD has an integrated pest management approach. Early detection and rapid response continues. Giant salvinia is the most problematic species, and is present in 26 reservoirs and seven river systems. Herbicide treatments using a variety of herbicides were also used to control Giant Salvinia on 34 water bodies, with approximately 15,000 acres treated in fiscal year 2023.

Giant reed control is ongoing to reduce impacts and improve river and stream habitat across the Pedernales, Blanco, Guadalupe, Edina, Nueces, and Llano River watersheds and San Felipe Creek. In the Brazos River, saltcedar control is underway. To date, approximately 20,000 acres have been treated across 150 primarily private properties. Elephant ear control on the Llano River continues, with over 50 river miles in monitoring or active management status. Each summer, at least one survey and treatment event is conducted. There are over 800 landowner partners assisting with 100s of river miles.

Pennsylvania

Sean Hartzell spoke on aquatic invasive species activities and updates of the Pennsylvania Fish and Boat Commission.

Installation of AIS Composting Stations was done at select boat launches through and AIS MP Grant.

Control Plans were developed for select aquatic invasive species.

Signage for AIS were posted at critical locations.

Agency website updates were done, and video clips were uploaded for the Agency Communications and Outreach Plan.

Surveys of select Commonwealth public lakes statewide are being conducted for AIS through GLRI funding.
Monitoring is being done for round goby, Northern snakehead, and New Zealand mudsnail.

Invasive Flathead Catfish research in Susquehanna River continues.

The 58 Pa. Code, Chapter 71a update will be effective Jan. 1st, 2024. This includes updated live bait regulations, "drainplug" law, and notice of stocking.

There were some notable new AIS records. New Zealand mudsnails are in the Ohio River basin. Northern snakehead reproduction is happening in Conowingo Pool. Blue catfish and freshwater drum range expansion is observed in the Delaware River basin. Virile crayfish and hydrilla are in Northcentral Pennsylvania.

The Pennsylvania Sea Grant released the latest version of the Pennsylvania AIS field guide. This resource is an in-depth guide to identifying, reporting, and preventing the spread of AIS in Pennsylvania. The guide is available at no cost as a digital Adobe file, or as a spiral-bound water-resistant book. Pennsylvania Sea Grant released the Android version of the Guide Smart Phone app. It can be accessed by searching "PA AIS Field Guide" in either the Apple or Google Play stores.

In 2023, the Pennsylvania Governor's Invasive Species Council created an AIS Education and Outreach subcommittee. Their Goal is to meet quarterly to discuss AIS Education and Outreach initiatives. Membership consists of state and federal agencies, academic institutions, non-profit conservation organizations, etc.

Louisiana

Rob Bourgeois gave an update on the Louisiana Department of Wildlife & Fisheries Aquatic Invasive Species Program.

Some invasive species in Louisiana include apple snails, invasive carp, tiger shrimp, and aquarium releases.

A peacock bass was confirmed in September 2022 in Bayou St John. The site was sampled again in summer and fall 2023, but no additional peacock bass were found.

A Murray cod was captured in March 2022 in BREC Burbank pond.

A red bellied piranha was captured in LSU Lakes in May 2021.

Asian swamp eel was captured in Bayou St John in New Orleans in June 2019. Few have been captured over the last few years. Only one was captured in 2022, and it was by a fisherman. DWF staff and a local university professor continue to monitor and sample the population. The sampling by the university only resulted in three swamp eels being captured. So far, there have been no reports of swamp eels in 2023.

One species new to LA the Northern snakehead. There have not been any new sightings, but they are expected to spread. Louisiana's climate is believed to be possibly too hot for them. The climate match is only a 7 or 8 out of 10.

Invasive carps were first found in LA in 1976. Silver carp were found in 1985. Currently, other invasive carp species present are bighead, grass and black.

LA DWF staff collaborated with Louisiana State University since 2020 to tag 200 invasive carp, and set up a receiver array. The object of the project was to determine intrabasin movement to inform placement of potential deterrent technologies and removal efforts. Three fish so far have shown that the low salinity estuaries can be used by the carp to move. All three displayed an upstream direction on the migration in the spring.

New Jersey

Heather Desko provided an AIS update for the New Jersey Water Supply Authority.

There are 45 approved state ANS management plans – 42 state, and 3 interstate. In July 2022, MAPAIS funding was awarded for the New Jersey Aquatic Invasive Species Plan (AISMP). In Fall 2022, the SOW was developed, and solicitation was done to potential contractors. In Winter 2022-23, work begins. In Fall 2023, the Draft Plan was finalized. In Winter 2023-24, The Plan was sent to WG, and agency review/approvals were sought. The next steps will be the public comment period, and then ANSTF review and NJ request for funding in Spring 2024.

eDNA sampling for silty pond mussel was done in May 2023. There were no detections outside of the aquaculture ponds.

An unknown specimen, giant floater (*Pyganodon grandis*), was found downstream of Island Farm Weir (Raritan River).

Plans for 2024 molluscicide eradication include a new product approved by NJDEP in 2023 (used in Snake River, ID quagga mussel eradication). Funding is still being finalized.

The NJ Water Monitoring Council AIS Workshop was held October 4, 2023. There were 25 in-person participants, and over 20 virtual participants. Field portion included rake tosses to identify plants at Assunpink Wildlife Management area, and a hands-on demonstration of a waterless boat cleaning system utilizing one of Fish & Wildlife's boats. The NJWMC Decontamination Protocols are expected to be finalized and posted on the council's website by early 2024.

An Asian shore crab was found in Moorestown (Burlington County), in a resident's driveway, and identified by NJ Fish &Wildlife Marine Fisheries Administration. This appears to be the first record in the Delaware River drainage. Its origin is unknown.

Range expansion of Northern snakehead discovered further south to the Cohansey River (Cumberland County).

Warmouth was detected during an electrofishing survey in Prospertown Lake WMA (Ocean County) in 2023. This species is abundant throughout the lake, and was previously not present up to 2018 when the lake was last surveyed.

There have been several recent AIS detections/range expansions. Water pennywort (*Hydrocotyle* – sp. unconfirmed - some species are native in NJ) was observed for the first time in the Union Lake Wildlife Management Area (Cumberland County) and Salem Canal (F&W has a boat ramp at the location).

The Boat Steward Program has three locations and partners: The Manasquan Reservoir (Monmouth County Park Commission); The Spruce Run Recreation Area (State Park Service); and The Round Valley Reservoir (NJ Fish and Wildlife). There have been 2,910 surveys done across the three launches. Key interceptions include water chestnut at Manasquan, and a water lettuce dump at Spruce Run. New waterless cleaning stations have been installed at Manasquan and Spruce Run.

The Northeast Aquatic Plant Management Society Plant Camp 2024 will be held at the New Jersey School of Conservation in Sandyston, NJ from September 10-12, 2024. This will be a 3-day hands-on aquatic plant training camp for professionals.

Mississippi

Mike Pursley gave an update on the Mississippi Department of Marine Resources, and Mississippi Department of Wildlife, Fisheries and Parks.

A program of integrated pest management and spot herbicide application was used to control common salvinia, giant salvinia, alligator weed, torpedo grass, Eurasian watermilfoil, Brazilian elodea, phragmites and water hyacinth.

Mechanical control and trapping efforts continued on a giant applesnail population in the Pascagoula River.

There was a first sighting of Florida flagfish in the Tchoutacabouffa River.

Invasive species outreach and education events were held at Celebrate the Gulf Marine Education Festival at the Infinity Science Center (Earth Day), and Marine Science Day at the Mississippi Museum of Natural Science.

West Virginia

Katie Zipfel spoke on the West Virginia Division of Natural Resources AIS Program.

There are two major watersheds in West Virginia, mostly within the Ohio River Basin, which is MRBP membership. The Eastern Panhandle is the Potomac River Watershed.

The West Virginia AIS Program to date has no dedicated staff, and no approved AIS Plan. There is a Draft from 2014. Annual funding for invasive carp management is through the USFWS/MICRA.

Annual grant funding for invasive carp in the Ohio River is through the WRRDA. This includes monitoring, removal, telemetry, and egg and larval monitoring.

Monitoring for Northern snakeheads in the Potomac River will be expanded. There have been no reports of live specimens to date.

Hydrilla is widespread in the Ohio River and its tributaries. It is also widespread in many impoundments. WV DNR is coordinating with ORSANCO to monitor changes in the fish community in relation to hydrilla in the Ohio River. They are also working with some hydro companies for removal, and to increase public outreach.

Alabama

Jessica Marchant gave an ANS report on the Alabama Wildlife and Freshwater Fisheries and Marine Resources Divisions.

In 2023, ADWFF sampled during spring and fall, targeting invasive carps across 35 GPS-fixed sites in Pickwick, Wilson, and Wheeler Lakes. Only one each of Silver Carp (Pickwick) and Grass Carp (Wheeler Reservoir) were captured. Pickwick Reservoir is the leading edge of the invasion front for Silver Carp in Alabama waters of the Tennessee River system, and approximately 18K lbs. were captured by commercial fishers during February.

From 2022 to present, over a dozen invasive species reports for zebra mussels, crested floating heart, water lettuce, red-rim melania, oriental weatherfish, Chinese mystery snails, giant salvinia, Eurasian watermilfoil, apple snails, blue tilapia, Nile tilapia, grass carp, bighead carp, and silver carp were fielded from anglers, the general public, and biologists. In 2023, a Nile tilapia was captured in Fish River in Summerdale, AL.

The Alabama Spearfishing Association held two tournaments in 2023 that included a lionfish category. The Alabama Wildlife Federation donated $3,000 to each tournament to provide prize money for the lionfish category. The 18th Annual Red Neck Riviera Spearfishing Tournament was held in April/May. Over 1,460lbs of lionfish was harvested. The Orange Beach Spearfishing Tournament was held in September/October. Over 1,200lbs. of lionfish was harvested.

Delaware

Michael Steiger gave an update on the Delaware DNR Division of Fish & Wildlife.

A single flathead catfish that was caught in Lums Pond was recorded from a fishing tournament in 2019. DFW has conducted 14 days of electrofishing in 2022-2023, resulting in the removal of 42 fish ranging in size from 7” to 38”. The 38” fish weighed 30lbs, and would have been the state record if it had been caught by an angler. Preliminary stomach content analysis of the flatheads from Lums Pond have shown a diet consisting of yellow perch, white perch, bluegill, gizzard shad, and other catfish species.

The first confirmed catch of a blue catfish in the Delaware River watershed was in September 2013. The report of the 25” fish was called in by an angler. Only juveniles were captured in surveys done 2018-2021. In 2022-2023, four fish between 9”- 38” have been acoustically tagged. The usage of the C&D Canal to travel between Delaware and Maryland waters was confirmed. Seasonal movements and spawning locations will be documented in spring 2024. Oldmans Creek and Raccoon Creek in NJ seem to be the congregation spots.

On March 31, 2023, a draft of the Aquatic Invasive Species Management Plan for Delaware was sent to Don McLean and Sandra Keppner of the U.S. Fish and Wildlife Service for initial plan review by the Aquatic Nuisance Species Task Force. On May 15th, 2023, Delaware received edits and comments from the ANSTF. On October 12th, 2023, the Plan passed internal review. On October 17th, 2023, the Plan was posted for public comment. On November 15th, 2023, the public comment period will close. In Winter 2023/Spring 2024, the Plan should be signed and sent to ANSTF for final approval.

Florida

Kelly Gestring spoke on the Florida Fish and Wildlife Conservation Commission's Aquatic Nuisance Species priorities and goals.

The goal is to minimize adverse impacts from nonnative fish and wildlife to Florida's ecology, economy, and human health and safety. Strategies include preventing new introductions of high-risk species, responding rapidly to confirmed observations of priority aquatic nuisance species, assessing the risk of nonnative fish and wildlife not yet in Florida, and engaging the public in reporting and removal efforts.

ANS Activities for the Nonnative Fish and Wildlife Program include the creation of the Nonnative Fish and Wildlife Technical Assistance Group (TAG), and risk assessment of nonnative aquatic species.

The TAG was established in November 2021, and has since met nine times to discuss the current regulatory structure for nonnative fish and wildlife in Florida and how it might be improved. The TAG has reviewed and provided input to the FWC on a tier system for nonnative fish and wildlife, risk determination process, and additional items. Currently, FWC is taking time to reassess priorities as it relates to these efforts, and will reconvene with the TAG in 2024.

Assessing risk of nonnative fish and wildlife continues to be a high priority for FWC. They are contracting again with University of Florida to conduct risk screening using AS-ISK for several aquatic species.

Field projects are conducted for red swamp crayfish eradication, bullseye snakehead diet and telemetry research, and caecilian removal.

Matt Phillips reported that FWCC's Aquatic Plant Management Program includes sovereign submerged lands, public boat ramps, 465 lakes and rivers, 1.26 million acres, and 350 active management programs. Waters eligible for program dollars must be state owned with a public boat ramp or a designated FMA. There are currently about 1.26 million acres of water in the program.

Floating plants that continue to be a problem in Florida include hydrilla, water hyacinth, water lettuce, *vallisneria spiralis*, and giant salvinia. **Matt** was asked to explain the visual identification differences between the Eurasian species and the native species. **Matt** stated that their research institute is attempting to produce a field guide for their characteristics, and what to look for. For the *spiralis*, the leaves are much more serrated in the younger plants, although that is not a consistent characteristic.

Maryland

Jay Killian with the MD Department of Natural Resources reported that Northern snakehead are a high priority invasive species in Maryland. DNR has recently completed a cooperative project with USFWS that studied harvest levels of Maryland's bow fishing community, and the levels of harvest exploitation in the upper Chesapeake tributaries where snakehead are now established in the Potomac and Blackwater Rivers. Snakehead were at one time confined to the Potomac River, but they have spread through most of the major Chesapeake Bay tributaries at this point in time.

In addition to that project, DNR has been working with the MD Department of Environment on an ongoing examination of PCB and mercury tissue contamination in Northern snakehead throughout the bay system. No results are available at this time.

Blue catfish are another high priority invasive species. DNR has been working with Salisbury University on ongoing research of predator/prey relationships in the Nanticoke River. No results are available at this time. As with the snakehead, DNR has been working with the MD Department of Environment on an ongoing examination of PCB and mercury contamination in blue catfish throughout the bay system.

DNR has hired an Invasive Fishes Program Manager. This is the first staff position that is dedicated entirely to invasive aquatic species in the DNR. A marketing specialist was also hired. These two staff members will be working to improve commercial harvest of blue catfish throughout the bay, trying to establish an economically sustainable fishery with MD's watermen to harvest blue catfish to reduce their numbers. Eradication is not possible, but this could reduce the impact of blue catfish on many different native species.

DNR has been experimenting with eDNA for the detection of AIS for several years. They are working with the USFWS and USGS on utilizing eDNA technology for the detection of Northern snakehead, blue catfish, flathead catfish, hydrilla, and Alabama bass.

DNR receives funding for management of MD state lakes for protection and restoration projects. Some of the funding is for AIS, but mostly aquatic plant management. This management is being done in four lakes - Rocky Gap State Park, Tuckahoe State Park, Blairs Valley Lake, and Deep Creek Lake. DNR has a Deep Creek Lake Launch Stewards Program that is held from Memorial Day through Labor Day. The Stewards conduct voluntary boat inspections, and educate the public about aquatic invasive species. If a vessel is found with invasive species, it must be decontaminated before launching. Over 5,000 vessels were inspected this year. Of those, 104 vessels had not been properly cleaned, drained, and dried. The vessels were found with organic materials on them. Of those, 15 had zebra mussels attached, and eight had hydrilla. None of the 104 vessels were allowed to launch due to their potential for invasive species introductions into water bodies.

There are two species of invasive water chestnut established in MD. In 2023, over 2,000 pounds of water chestnut (*Trapa natans*) was collected in the Sassafras River watershed. A new infestation was discovered on private property near Churn Creek. A farmer who owned the pond alerted the riverkeeper to the infestation and a large volunteer removal effort was initiated. More than 2,000 pounds of water chestnut was removed from the pond, with continued clean-up efforts planned for 2024. Nearly 500 pounds of water chestnut were removed from the Bird River, mostly from the creeks adjacent to Days Cove. DNR biologists visited the area in July and found considerable expansion in locations where water chestnut persists.

A related species of water chestnut, *Trapa bispinosa*, was recently observed in three ponds in Montgomery County. *Trapa bispinosa* looks very similar to *Trapa natans*, with subtle differences in the flowers and seed pods. In 2023, DNR partnered with several organizations to conduct a three-day removal effort in Beaverdam Pond, located on the Beltsville Agricultural Research Center (BARC) property. The removal effort was not successful, so DNR and the BARC staff are exploring the possibility of draining the pond to eradicate the plants.

Maryland is working on the AIS Management Plan. DNR is updating the Plan to reflect recent accomplishments, set new priorities, and add additional species of concern.

Jay was asked if there was any interest in using herbicides to control *Trapa bispinosa*. **Mark Lewandowski** from the Regional Chesapeake Bay Program replied that right now, there is one large infestation that is so big that the pond where it is located is being drained. They do not want to use herbicides because the pond is a beaver dam pond. They are currently attempting to get a permit to place a hole through the dam, insert a pipe, and drain the pond. Hopefully, the freezing winter temperatures will knock back the biomass. The pond will remain drained for several years until the *Trapa bispinosa* is gone.

Georgia

Jim Page spoke about the Georgia Department of Natural Resources Aquatic Nuisance Species Wildlife Resources Division's prevention and management in Georgia.

Structurally, WRD Fisheries Section has designated an ANS Coordinator to oversee and assist in coordinating ANS efforts performed around the state. With only a single person assigned to ANS oversight, this requires a team effort.

DNR partners with several DNR divisions (WRD, CRD, LED, etc.); Federal/Regional partners (USFWS; GSARP; USGS; etc.); and several local entities (cities and counties).

The Program Goal is to work with local, state, and federal agencies, along with members of the general public, to prevent, plan, and respond.

Efforts to prevent ANS include creating and updating laws/rules to prohibit species, or require special permits to possess them. In 2022, GA DNR ANS laws (Title 27-5-5) were updated. Training opportunities are provided to teach partners and members of the general public about ANS. Two recent in-person trainings (W.I.T and HACCP) were available, along with DNR's new online ANS training. Boat ramp signage was installed at boat ramps throughout GA to inform boaters about CLEAN, DRAIN, DRY efforts, and to teach angler and aquarium owners about not introducing nonnative species.

Education and Outreach efforts are done to inform children and adults on the problems associated with ANS, and the need to prevent introductions. Since 2017, over 20,000 children and adults have been spoken to.

Plans for addressing ANS include: obtaining grant funding from 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 certain species. These provide a framework on legal backing, response options, and partner info.

In 2020-2023, DNR partnered with UGA for WeatherLoach removals in the Oconee River tributaries.

In 2021 and 2022, DNR responded to a report of zebra mussels found in PetCo and other pet stores. Efforts are ongoing for nonnative catfish (flathead and blues) removal. Both species are native to NW Georgia. This large fish was introduced in other parts of Georgia. Staff are currently removing

both species from the Satilla River. This removal effort entails a full-time crew of five people conducting electrofishing efforts for six months each year from May – October. Also, flatheads were recently in the Ogeechee River after their establishment in adjacent Savannah River.

Virginia

Different management strategies are being looked at for *Trapa bispinosa*, including mechanical harvesting and chemical treatment. It did not respond as well to mechanical harvesting because the stems tend to grow back more so than *Trapa natans*

South Carolina

Peter Kingsley-Smith gave a presentation about the South Carolina Department of Natural Resources Marine Resources Research Institute's organization and focus areas for aquatic nuisance species in South Carolina.

The organizational structure of the SC DNR serves as the primary steward for the natural resources of the state. Besides the Executive Office and support services, there are four main divisions within the main body of the agency, all of which have a role to play when it comes to addressing the threats to Georgia's natural resources posed by aquatic nuisance species.

The Land and Water Conservation Division is where the state ANS Program is currently located. Most of the ANS work in that division is supported by state-appropriated funds, and addresses aquatic plant management needs for both native and nonnative plants.

The MRRI within the Marine Resources Division works not only on marine and estuarine species, but also on freshwater species that occur on South Carolina's coastal plain, such that research and monitoring efforts are coordinated with staff in the Wildlife and Freshwater Fisheries Division. Some recent examples of this are research efforts on coastal plain crayfish, island apple snails, and blue catfish.

The focus areas of research and monitoring related to ANS can be divided into aquatic plant management, funded through the state ANS Program, and research across the coastal plain to address specific threats using USFWS funding through the State and Interstate Aquatic Nuisance Species Management Plan Program.

Research in the coastal plain can be divided into three lines of inquiry: Improving DNR's understanding of species distributions; investigating native vs. nonnative species interactions; and developing genetic detection tools for emerging species of concern.

Aquatic plant management efforts by the state ANS Program, led by Julie Holling, center around the chemical treatment of nuisance aquatic plants (both native and nonnative) within the following areas: Coastal plain rivers and their tributaries, including the Combahee, Ashepoo, Cooper, Black, Pee Dee and Waccamaw Rivers; reservoirs and lakes, including Goose Creek and Back River and small waterbodies on DNR Wildlife Management Areas and in state parks. It is uncommon to encounter new nonnative aquatic plant species. In addition, in collaboration with the Freshwater Fisheries section, this program continues to stock certified triploid grass carp in various lakes across the state to primarily control hydrilla.

Regarding aquatic plant management (State ANS Program), South Carolina Legislature passed a reorganization bill in 2023, which primarily splits up the SC Department of Health and Environmental Control (DHEC). In part, this will serve to move both the SCDNR ANS Program and the SCDNR Hydrology Program to a new agency, the Department of Environmental Services. The move takes effect on July 1, 2024. This should have no effect on how the State ANS Program works.

The success of efforts to implement early detection and rapid response rely upon a contemporary understanding of the distribution of recently introduced species. Some of the species that DNR has focused on in this regard in recent years are the tiger shrimp, the island apple snail, nonnative portunid crabs such as *Callinectes bocourti* and *Charybdis helleri*; the blue land crab, and the invasive red swamp crayfish.

The red swamp crayfish is a species for which DNR has directed significant efforts towards understanding the spatial and temporal dynamics of its invasion, given its notoriety for successful spread into nonnative regions on a global scale. This species has spread extensively in the region from the 1900s to the 2000s across multiple watersheds. This spread is of particular concern in the southeastern U.S., which represents a geographic hotspot for crayfish diversity, given the apparent propensity of red swamp crayfish to displace endemic native crayfishes. There are some locations where native crayfish species were previously recorded, but where now only red swamp crayfish are found.

The second focus area is on native-nonnative species interactions. Some examples of this include investigations of direct and indirect transmission pathways for white spot syndrome virus among coastal crustacean species, genetic hybridization among crayfish species in the genus *Procambarus* and invasive blue catfish predation on native blue crabs.

Much of the ANS research at the MRRI centers around the development of genetic detection tools for emerging species of concern. Three species for which either tools have been developed or are in development in the lab include the rat lungworm, for which island applesnails were screened that had been collected along the coast, and published this tool in 2019. Although this parasite was not detected in the samples, it remains of concern in the region due to its ability to cause eosinophilic meningitis in humans, and to utilize a range of molluscan species as its intermediate host.

There are also concerns about northern snakehead in SC, particularly in light of observations of this species in the wild in neighboring states of Georgia in 2019, and North Carolina in 2021.

Following a moss ball scare in 2021 when zebra mussels were found imbedded in them in numerous pet stores, DNR was prompted to begin developing genetic detection capabilities for zebra mussels, a concern that seems validated following the confirmation of zebra mussels from North Carolina in the fall of 2023.

North Carolina

Rob Emens with the NC Department of Environmental Quality stated that a blue land crab sighting was reported to the Wildlife Research Commission in July, who then contacted the Division of Marine Fisheries. In August, a meeting was held involving the Wildlife Research Commission, SC DNR (since the sighting was so close to SC), NC Museum of Natural Science,

and Division of Marine Fisheries. In August, there was a press release about the blue land crab sighting. Following the press release, more reports of blue land crab sightings were received.

A new position was recently created with the North Carolina State Parks. This Invasive Species Coordinator position entails organizing and coordinating the invasive species management the parks are doing. The position has been filled, and Tim and Rob have met with the new Coordinator.

At Lake Waccamaw State Park, two new waterless boat cleaning stations have been installed. The cleaning stations have the ability to track usage and also which cleaning tools housed on the unit are used.

Lake Waccamaw, one of the few natural lakes in NC, was previously successfully eradicated of hydrilla using herbicides. Grass carp were not used because of the sensitive species that are in the lake.

Zebra mussels were confirmed in September in a private quarry. eDNA sampling was also done, which confirmed the presence of the zebra mussels.

In September, apple snails were confirmed in the Lumber Rive, which flows into the Waccamaw River Basin.

In October, an AIS reporting tool was launched by the Wildlife Research Commission.

The Aquatic Weed Program puts together a Work Plan yearly that earmarks funds towards specific aquatic weed projects. Two current projects are the giant salvinia project and the Eno River project. The Eno River project is the first time that the state has used an herbicide injection system to treat a flowing body of water. The river was treated from 2015-2019. Treatment was halted for a few years to evaluate the treatment, and continue eradication efforts on a hydrilla infestation upstream from the treatment in the upper reaches of the watershed. There are numerous farm ponds in the Eno River shed, and they are being examined. Some are positive for hydrilla. Treatment has begun again in the Eno River with the injection system.

The Aquatic Weed Program provided a grant to NC State University to evaluate the efficacy of florpyrauxifen-benzyl on North Carolina noxious weeds. This research project was a 2-year project that ended in May. Findings from the $120,000 project are forthcoming.

Rob was asked if the DEQ saw impacts on native species from the Eno River project using the herbicide injection system. **Rob** explained that there was a tremendous effort to look at the site before they began the project to treat there. River weed, a native plant, is present in the Eno River and is not a common plant, so there was concern. Also, pebble snails, a rare species, live in the river weed. Toxicology research was done to evaluate fluoridone and endothall to see which one would be a better choice in regards to the pebble snails. Fluoridone was found to be the better choice. There was some impact to water willow during the first year of treatment, but it has recovered.

Rob and **Tim Ellis** are co-chairing a steering committee for the development of a NC ANS Management Plan. An ANS Management Plan was developed in 2016, but it was never sent to the

ANS Task Force for approval. DEQ received a grant from MAPAIS to assist with the development of the plan.

North Carolina-Specific Projects/Updates

NCDOT Adaptive Management Planning and Treatment of Phragmites at Bodie Island Lighthouse

Wes Cartner with the North Carolina Department of Transportation gave a presentation on the Environmental Analysis Unit- Mitigation & Modelling, which is an unmanned aircraft system (UAS)-based approach for Bodie Island Lighthouse Mitigation Site for phragmites modeling, wetland predictive modeling, bald eagle nest validation surveys, bat emergence and count assistance, RCW habitat modeling, and stewardship and monitoring improvements.

NCDOT will monitor wetland mitigation by photographs and determinations of aerial percent vegetation cover of phragmites stands. Vegetation success criteria are: total aerial coverage of dense phragmites stand will decrease from mapped acreage after the first-year treatment; the trend of decreased aerial coverage of mapped phragmites will continue each treatment year; and total aerial coverage of dense phragmites stands will be 10 acres or less, with stems less than three feet tall at the end of the final monitoring year.

Phragmites coverage at the site decreased by approximately 34 acres between 2019 and 2022. Areas that appeared to contain phragmites were sprayed using the UAS between September 19-21, 2022. This area totaled approximately 58.94 acres. The quantified results of 2019-2021 herbicide applications were assessed in August and September 2022 via aerial imagery and 5 Phragmites modeling. Modeling results showed approximately 19.4 acres of phragmites, occurring mostly at low densities, throughout the site. Vegetation monitoring plots showed approximately 35% average aerial coverage of phragmites across the site. Phragmites regrowth will continue to be evaluated.

Future plans include the U.S. Forest Service bringing 'Dragon Eggs' for controlled burning; herbicide application followed by burning, which has shown to be relatively effective and may stimulate the native plant community recovery; Finding of No Significant Impact (FONSI) was received in 2002 to allow the seashore to use prescribed burning to manage hazardous fuel loads.

The UAS approach uses RTK/GPS shapefiles for plot monitoring and flight planning. Consistent mapping and detection of changes on site provide adaptive management through project perpetuity. Seven acres sprayed an hour for ~60 acres with a team of three to four staff. There is reduced on-site time from weeks to days. It is also safer.

Adaptive Modeling Approaches to Mapping Phragmites using UAV Imagery

Kerry Mapes with Geo Owl spoke on using adaptive modeling approaches to map phragmites at the Bodie Island Lighthouse, using UAV imagery.

Remote sensing & UAS services include: end-to-end UAS Services for planning, collection, processing, analysis, and reporting; inspection and monitoring for sites, assets, vegetation; 2D/3D mapping for static maps, dynamic web apps; light detection and ranging (LiDAR) for precise 3D modeling; large-area Orthoimagery to derive planimetrics, detect objects, monitor change; thermal

video, imaging, and mapping for emergency response and monitoring; multispectral imagery for vegetation health, change detection, and management.

The project will assist NC DOT in quantifying and monitoring aerial percent vegetation cover of phragmites stands. Vegetation success criteria objectives are:

Objective 1: Total aerial coverage of dense Phragmites stands will decrease from mapped acreage after the first year of treatment. Monitoring will include an initial and follow-up quantification of phragmites by acreage.

Objective 2: The trend of decreased aerial coverage of mapped phragmites will continue each treatment year. A model improvement like vegetation plots allow staff to better assess the accuracy of their classification, and create training data more confidently.

Objective 3: Total aerial coverage of dense phragmites stands will be 10 acres or less with stems less than three feet tall at the end of the final monitoring year. Results from 2023 indicate there are 9.9 acres of phragmites remaining, but some stems are still over three feet tall.

Model adaptations will be done for 2024. Instead of using one model to classify phragmites (i.e. SVM), a suite of machine learning/AI models will be tested. Some models may do a better job at classifying sparse phragmites, which gives higher accuracy and more confidence in the quantification.

Carolina Beach State Park Wetland Restoration

Bree Charron with the North Carolina Coastal Federation provided a presentation on the wetland restoration project for Carolina Beach State Park.

The North Carolina Coastal Federation aims to protect, create, enhance, and restore benthic and related estuarine habitats in the lower Cape Fear River to compensate for lost public trust resources and services.

This project is being done to address environmental damages caused by 40 years of operations by the Kerr-McGee Chemical Corps. Located in Navassa in Brunswick County, the former Kerr-McGee facility treated wood products with creosote, leaving sediments and water on site laden with polycyclic aromatic hydrocarbons (PAH). PAH levels present in the site sediments were sufficient to cause harm to the organisms living within, upon, or closely associated with those sediments, or otherwise adversely affect the ecological services provided by the habitat.

Restoration alternatives are in the Lower Cape Fear River Watershed and around Navassa, North Carolina. The goal is to address the resource injury through restoration of similar habitats in the Lower Cape Fear River region. The project aims to restore and enhance tidal marsh habitat between the Sugarloaf and Swamp Trails, an area which has been highly disturbed. Although the site was once an area of healthy tidal marsh, it became dominated by invasive phragmites. The park and their partners have worked to remove the phragmites through burning, pesticide treatment, and cutting.

The restoration projects reflect alternatives that meet NRDA regulatory project eligibility requirements. The lower Cape Fear River Project area consists of 13.5 acres of a wetland

restoration area. In 2015, a Living Shoreline of 600 feet was permitted, and 200 feet have been completed. Future plans include a walking bridge and educational area.

Location(s) of the potential NC Coastal Federation Living Shoreline Project(s) are sills, breakwaters, and saltmarsh restoration in 2022-23.

Location of the NCDMF AR-491 Fishing Reef & Oyster Sanctuary are five acres, of which 1.0 acre of reef construction was completed in 2017.

Location of the potential NC Coastal Federation shallow subtidal patch oyster reef creation and enhancement sites are 4.0 acres in 2022-23, with an additional 11 acres in the near future, located down river.

The project will be implemented in phases. First will be the removal of invasive species. Next will be the creation of a slough (a shallow swale of varying depths) through the removal of fill material and grading. Next will be native vegetation planting, followed by monitoring.

The timeline to completion will begin in late August 2023, with an herbicide treatment of remaining phragmites. Planting will be done in May/June 2024. Patchy herbicide treatments will also be done. Supplemental plantings will be done in 2025.

Eradicating Yellow Floating Heart Through the Regulatory Process

Jarred Driscoll with the North Carolina Department of Agriculture and Consumer Services Plant Industry Division, Plant Protection Section gave a talk on eradication efforts of yellow floating heart through the regulatory process.

There are 128 regulated plant species. Yellow floating heart is a class A state noxious weed in North Carolina. Several counties are affected by yellow floating heart, including Yadkin, Transylvania, Macon, Cleveland, Orange, Johnston, Lee, Moore, Cumberland, and Craven.

There is a strategy for eradicating a regulated plant such as yellow floating heart. Survey work is done. Outreach is conducted. Herbicide treatments are done. Regulations are developed that stop plants from entering trade/open environment through nurseries, online sales, and plant swaps. It is known that EDRR works and needs implementation. When an invasive plant is detected, prevention or eradication is simple or feasible. Unfortunately, public awareness typically begins when eradication is unlikely, and an intense effort is required.

Aquatic nursery inspections are regularly performed. The Aquatic Dealer List shows those nurseries that sell aquatic plants. These nurseries are categorized as a Registered or Certified Nursery. There is also a "Non-Licensed" category. Non-Licensed can be inspected any time of the year annually. Registered or Certified nurseries are inspected during the growing season (April-September). In addition, passive survey is accomplished during the growing season through other formal surveys NC DACS conducts. The non-licensed category can be thought of as pet stores, and are not required to be licensed with NC DACS, but are inspected as a supplement to their field staff within plant protection to catch additional locations that sell aquatics.

Removing Giant Salvinia from Gapway Swamp (Columbus County, NC)

Rob Emens with the North Carolina Department of Environmental Quality reported on their Gapway Swamp giant salvinia eradication project they are doing in partnership between the NCDEQ, Columbus County, and the US Army Corps of Engineers.

Richardson Pond and Buffkin Pond are both found to be heavily infested. Richardson Pond is approximately 210 acres, and Buffkin Pond is approximately 40 acres. Interviews with local residents suggest salvinia has been present since 2013. Richardson Pond is dominated by cypress, with significant areas occupied by tussocks in the upper end. Buffkin Pond is dominated by tussocks near the dam. The upper reach is hardwoods.

The site is over one mile from the NC/SC line. The ponds are approximately 250 acres combined. Gapway swamp watershed generally flows SW into Buffkin Pond, then turns NW into Richardson Pond, then flows along the state boundary line, and ultimately into the Lumber River in SC.
An initial site visit by NCDEQ Aquatic Weeds staff was done on July 29, 2020. This was in response to a report that came from a pond management company.

The goals of the project are to bring public awareness to the problem, connect with landowners, delineate the infestation, pursue grant money, and project planning. Aerial surveys with drones (NCDEQ & NCSU) are being planned, and ponds and waterways will be identified and inspected.

The first meeting was held by NCDEQ and NCDA in Columbus County on November 2, 2023. A giant salvinia fact sheet was developed. A public meeting will be held on November 30, 2023 at the Cooperative Extension Office. Grant money was pursued from DEMLR, FEMA, and the Office of Recovery & Resiliency.

The main goal of this project is to halt the downstream spread of giant salvinia by treating the lower reach of the infestation with herbicide. Herbicide was applied to the lower end of Richardson Pond. The target area was approximately 50 acres. Salvinia weevils will be introduced to the site. All activities are carried out by NCDEQ Aquatic Weeds and USACE staff. Funding and timing are not sufficient to coordinate and initiate a site-wide management program. In-water treatment was done with four applications of fluridone, plus foliar spraying with flumioxazin.

In 2022, the goal was to begin site-wide eradication while continuing to mitigate the risk of downstream spread. Approximately 115 acres were treated for Giant Salvinia. Foliar herbicide applications were done to Richardson and Buffkin ponds for the purpose of removing alligatorweed, and to create paths through tussocks. The NCDEQ contracted with SePRO in May 2022. Most of the herbicide applications and clearing services were carried out by a contractor. Additional salvinia weevils were released.

In 2023, the goal was to continue to mitigate the risk of downstream spread, push further into un-treated areas of Richardson Pond, and treat Buffkin Pond (the upper reach of the infestation). Approximately 150 acres were treated for Giant Salvinia. Foliar herbicide applications were done to Buffkin pond for the purpose of removing alligatorweed, and to create paths through tussocks. The upper reach of Buffkin pond (Salvinia expansion) and drainage ditches in headwaters were surveyed.

In 2021, access to Buffkin Pond was a major challenge there. There is no boat ramp, and the dam is breached and in disrepair. A path was cleared by using herbicide applications. Tussocks are difficult to remove using herbicides. Multiple applications are needed. Also, tussocks are slow to decompose.

Salvinia weevil releases were done in August 25, 2021 (17,400 insects), and July 27, 2022 (50,000 insects). Weevils will reduce the density of giant salvinia if their population is successfully established. Weevils will not eradicate giant salvinia. Monitoring of the Salvinia weevils began in November 2021, and occur approximately every six weeks.

Impacts and Management Challenges of the Invasive Alabama Bass *Micropterus henshalli* on North Carolina's Reservoirs and Rivers

Chris Wood with the North Carolina Wildlife Resources Division spoke on the impacts and management challenges of the invasive Alabama bass in reservoirs and rivers.

There are four *Micropterus spp.* (black bass) that are native to North Carolina – largemouth bass, smallmouth bass, spotted bass, and Bartram's bass.

Alabama bass were originally thought to be a subspecies of spotted bass. They are native to Mobile Bay drainages.

The impacts of Alabama bass introductions include the displacement of native largemouth bass with a shift in the dominant species, and introgressive hybridization with other black bass congeners. They harm or eliminate native species by interbreeding with them or outcompeting them for resources.

There are impacts of largemouth bass displacement. The mechanisms are unclear, but it is safe to assume there will be a combination of habitat and trophic competition. They are primarily in large reservoirs, but riverine systems appear less prone. The timeframe is 6-10 years for a species shift. There will be large economic impacts as well.

Alabama bass numbers have risen in Lake Norman in the Catawba Basin, Moss Lake in the Broad Basin, and Lake Gaston in the Roanoke Basin.

Introgressive hybridization of smallmouth and other black bass such as smallmouth bass, shoal bass, Bartram's bass, and spotted bass. Hybrids are usually caught first, followed by a full genetic take-over of Alabama bass. This is happening in mountain reservoirs and some larger rivers.

Following genetic studies using fin clippings from fish species from Lake James, it was found that 1/3rd of the small mouth bass captured were hybrids. Lake James is the upper most reservoir in the Catawba chain, and arguably the most popular reservoir.

It has been confirmed that eight of the 17 basins have Alabama bass, from the far west in Hiwassee Lake, to the far east in the Roanoke Basin.

Signs have been posted at lakes, reservoirs, etc. with information about Alabama bass and their threat to native bass.

North Carolina Wildlife Resources Division is also working directly with BASS and BASSMASTER magazine to get the word out. The AFS Black Bass Conservation Committee puts out a "What's That Bass Wednesday", where biologists from around the region try to test their knowledge by posting pics of funny-looking bass from around the southeast. After the guesses are received, genetic testing is done on the fish, and the answers are revealed about the hybrids found throughout the region. This approach gets the word out to the scientific community.

To date, Alabama Bass have been documented in 21 waterbodies across North Carolina, with impacts in eight of 17 river basins. Education efforts to stop the spread of Alabama Bass have not been effective. Attention must be focused on what North Carolina's fisheries landscape will be with Alabama Bass present.

The most serious threats are to existing black bass species. It is understood that Alabama bass hybridize with other black bass species, but it is not completely understood what their habitat use is, or how they directly outcompete largemouth bass. The obvious tool is stocking, but its impacts are limited. Habitat manipulation might be an effective tool.

Population Dynamics and Trophic Ecology of Nonnative Flathead Catfish in the lower Cape Fear River Ecosystem

Fred Scharf with the University of North Carolina at Wilmington gave a presentation on the trophic ecology and demography of non-native catfishes in the lower Cape Fear River.

A broad study was done, with the objectives of examining trophic ecology through the analysis of both stomach contents and stable isotopes, with species-specific patterns, and to quantify the extent of anadromous fish predation; performing population demography (age/size structure, abundance) with spatial variation (tributary-scale); migratory dynamics and habitat use, and contingent behavior and site fidelity.

Sampling was done in the Cape Fear, Black, and Northeast Cape Fear Rivers in May 2017 - August 2021. Low-frequency electrofishing was performed. All flathead and blue catfish were processed for size/age, diet, and tissue analysis. Electronic tagging was also done.

The flathead catfish diet consists mostly of crayfish, fish, and prawns. They also feed on insects, clams, and crabs. Fish prey and large crustaceans occurred with the highest frequency. Prawns are more common in the mainstem Cape Fear River. Cape Fear is unique in its lack of crayfish prey.

The blue catfish diet consists of mostly fish, insects, and clams. They also feed on prawns, crayfish, and crabs. Asian clams are dominant in all of the tributaries. Fish occurred at low frequencies. The Northeast Cape Fear has greater prey diversity.

Occurrence of fish in the diet increased with body size for both species. Flathead catfish are piscivorous, even at small body sizes. Blue catfish have a more abrupt shift at larger body sizes.

Prey fish eaten by flathead catfish include: largemouth bass, sunfish, blue catfish, flathead catfish, bullhead, American shad, gizzard shad, and hogchokers. Prey fish eaten by blue catfish include: sunfish, blue catfish, gizzard shad, and American eel.

Flathead catfish feed at a higher trophic level. Flathead catfish trophic position = 4.26. Blue catfish trophic position = 2.96.

Flathead catfish have a high trophic position, engage in a consistent use of fish prey throughout ontogeny, macroinvertebrates (crayfish and prawns) are an important prey resource, and have an increased use of anadromous/marine prey resources with size.

Blue catfish have an intermediate trophic position, are heavily dependent on Asian clams, are less omnivory than Chesapeake tributaries, and have a late ontogenetic shift to piscivory.

Flathead catfish can live up to 25 years old. Blue catfish can live up to 17 years old. There is some tributary-level variation in growth rates.

There was a 40% drop in abundance in the NE Cape Fear post-hurricane Florence.

Knowledge of seasonal movements and habitat use is lacking for many introduced populations, and would benefit the evaluation of potential spatial management strategies. Objectives of a study done were to identify timing, spatial extent, and size dependence of seasonal migrations; demonstrate repeat behavior/straying; and evaluate site fidelity during migratory and non-migratory periods. Flathead catfish were fitted with acoustic tags in each major tributary. The passive listening array (25-40 receivers) extended 50-100+ km in each tributary. There was supplemental active tracking. The fish were at large for over 2 years from October 2019 – Dec 2021. Just over half of the fish displayed extensive upriver migration during spring 2020. All fish that were still available to migrate repeated the behavior in 2021. Migration propensity was size dependent. Non-migratory fish displayed only limited movement. There was no spatial straying (across major tributaries). Both upriver/downriver migration events were rapid, with a max velocity that equaled 20-60+ km/day. There was strong site fidelity. Introduced flathead catfish exhibit repeat migratory behaviors and high site fidelity within the Cape Fear River. Identification of specific spawning locations and areas with high site fidelity could inform management strategies to increase harvest and/or targeted removal.

There are several management options. Passive removal could be done, with no regulations that restrict removals, and communication with stakeholders that support trophy fisheries. Incentivized removal could be done, with the release of high reward tags. There could be active targeted removal with large-scale efforts by agency staff. Examples of this are in Georgia and South Carolina (can be river-specific).

The North Carolina Catfish Management Plan 2019 uses different management strategies across regions. Coastal tributaries are part of the "Invasive catfish reduction unit". There is currently passive removal in coastal NC (no incentives, but also no restrictions).

The Conundrum of Red Swamp Crayfish in the Carolinas: Knowledge Gains and Gaps of a Spreading Issue

Bronwyn Williams of the North Carolina Museum of Natural Sciences spoke on the challenges of having red swamp crayfish in the Carolinas, and the knowledge gains and gaps of this spreading issue.

The Red Swamp Crayfish, *Procambarus clarkii*, is native to areas of the Gulf Coast and lower Mississippi basin. One of the primary means of their wide spread has been through aquaculture, wherein the goal is to provide a food source. The challenge is that many of these aquaculture facilities don't account for the fact that crayfishes are not truly restricted to water bodies. Overland travel is common, particularly when it rains or in times of high humidity. Furthermore, crayfishes are escape artists.

One introduction pathway is the deliberate release of these crayfishes into waterbodies and/or waterways. Often these releases are well-intentioned: teachers and/or students releasing crayfish obtained for classroom learning back to where they came from; leftover live crayfish for a crawfish boil that are released into a nearby stream; by someone who hears that crayfish can help control aquatic vegetation in their private pond; someone who longs for their own supply of Louisiana red swamp crayfish; or those who want to enhance forage for fish or birds.

Another way the red swamp crayfish has been spread is through the pet trade. Breeders have created the most incredible color patterns within the red swamp crayfish. These specialty crayfishes are expensive. A pink sakura *P. clarkii*, apparently bred in Florida, costs $99.99.

The red swamp crayfish has been introduced widely across the U.S. The most substantial spread has been in the southeastern and mid-Atlantic regions, an area that harbors a high diversity of native crayfish. In fact, the southeastern U.S. is the global center for crayfish diversity. It is not yet understood just what that diversity truly is.

It is not known exactly when red swamp crayfish were introduced into these areas, but museum records are available that include agency records from both states. Records of red swamp crayfish in the Carolinas prior to 2000 (not all confirmed), are limited. The earliest record of red swamp crayfish in North Carolina is from 1985 – a specimen purchased live from a seafood market in Raleigh. Around 2000, there is an inflection point.

An SWG project was done that focused on portions of the lower Pee Dee basin - the Little Pee Dee, Waccamaw, and Winyah systems. Prior to 2000, there was only a small cluster of red swamp crayfish near Georgetown. Currently, red swamp crayfish have mostly taken over these systems, and records of native crayfishes are rare.

Impacts of red swamp crayfish on invaded ecosystems are varied, and frequently severe. They have a direct impact on native crayfish communities through competition. They also impact other components of aquatic ecosystems, through predation and displacement. Red swamp crayfish are aggressive, and their carapace is particularly thick and strong. Time to sexual maturity is quick - only a handful of months. A single female can produce hundreds of eggs at a single time. They achieve highly dense populations very quickly. As secondary burrowers, they are tolerant to low dissolved oxygen – thus elevated temperatures, and are also tolerant to a range of salinities.

Much of Bronwyn's work has focused on the native crayfish species that are being impacted by, or are in the potential pathway of, red swamp crayfish. Three examples of crayfish endemic to one or both of the Carolinas are Waccamaw crayfish, coastal plain crayfish, and Pamlico crayfish. A not insignificant impediment faced in determining the impacts of red swamp crayfish on native biodiversity is understanding what that diversity is in the first place.

A paper was published in 2006 by The American Microscopical Society on the first report of the association of crayfish worms on blue crabs in Chesapeake Bay, Maryland. The source of this unusual association was the release and establishment of red swamp crayfish in swamps in Chesapeake Bay. Red swamp crayfish are amazing vectors for their ectosymbionts.

Procambarus virginalis, the marbled crayfish, is a species literally spawned in the pet trade. Similar, but different, to the red swamp crayfish, the ecological characteristics of this species that make it desirable in the pet trade make it a huge threat to native ecosystems. This crayfish is parthenogenic, and with the release of a single individual there will rapidly be exponential population growth.

Red swamp crayfish cannot be eradicated from most invaded areas. So, the focus needs to be on limiting further spread.

Other Business

The **Chairmen** provided the opportunity for public comment. No public comments were received.

Day 1 Adjourned

Rob Emens made a Motion to adjourn the meeting. **Jim Page** seconded the Motion, and the meeting was adjourned at 4:30pm.

Wednesday, November 15, 2023

On Wednesday, November 15, 2023, Chairman **Peter Kingsley-Smith** called the meeting to order at 1:00 p.m.

Current Applications of Genetic Tools to Aquatic Nuisance and Invasive Species in South Carolina

Tanya Darden from the South Carolina Department of Natural Resources gave a talk on the current applications of genetic tools they are using on aquatic nuisance and invasive species.

Population genetics is a powerful tool. Every living thing has DNA. Access to challenging individual and population information is possible. There are a great deal of applications, and multi-disciplinary teams.

eDNA can be used for invader detection. It is a passive field detection of rare species, and q/ddPCR allows for increased sensitivity. It can be used for pathogen detection, and juvenile identification.

Stock structure and genetic health includes gene exchange and adaptive potential, tool metrics, and contributions. Gene structure and adaptive potential can identify the number introductions, the source(s) of introduction, the sizes of introduction, and population interactions. Tool metrics can identify genetic differentiation (F_{ST}), genetic diversity (H_e), inbreeding (F_{IS}), and effective population size (N_e). Contributions can identify action areas, and build critical foundations.

Hybridization/Introgression limits introgression into native populations, and conserves native species boundaries.

There are endless opportunities with genetic tools, such as multi-disciplinary projects for population genetics, and early detection/rapid response. Also, comprehensive population

evaluations, and responsible stewardship of resources that strengthens the foundation for science-based decisions.

Revisiting the Non-Native Range of the Blue Land Crab, *Cardisoma guanhumi*, in the Southeast United States

Daniel Sasson with the South Carolina Department of Natural Resources, and Bronwyn Williams of the North Carolina Museum of Natural Sciences spoke on revisiting the non-native range of the blue land crab in the Southeast U.S.

The blue land crab is a semi-terrestrial crab that is one of four species in the genus *Cardisoma* Their distribution is confined by water temperature and salinity requirements of larvae. They are found along the Atlantic coast, from Brazil to South Florida, and throughout the Caribbean, Bahamas, and the Gulf of Mexico. Adults reach six inches across the carapace. Adult males are usually blue-gray. Females can be blue-gray or white/ash-gray. Juveniles are dark brown, orange or purple. Both sexes have one larger claw. Males are typically larger than females. Their sexes can be differentiated based on the shape and size of the abdominal apron.

Blue land crab habitats are near estuaries and riverbanks in urban areas. They dig extensive burrows 3-5" wide, and six feet deep in firm, muddy areas. They can tolerate both freshwater and saltwater. They seal their burrows with leaf litter during molting.

Historical reports from iDigBio of museum specimens show that they have been found in several states in the Southeast. In 1919, in Key West, FL. In 1921, in Miami, FL. In 1936, in Silver Springs, FL. In 1944, Fort Pierce, FL. In 1963, Brownsville, TX.

Reports from iNaturalist show other locations in the Southeast where blue land crabs have been found, as well. In 2006, Corpus Christi, TX. In 2008, Marineland, FL. In 2017, Elmer's Island, LA. In 2019, Brandenton, FL. In 2021, Galveston, TX. In 2021, PerdidoKey, FL. In 2021, Fernandina Beach, FL.

There have been sporadic historical reports from 1997 to 2020. Recent specimens have been found dating back even further. There was an influx of reports in summer 2022. There were five unsolicited reports in August alone.

There have been 196 total reports of confirmed blue land crabs in South Carolina. There have been 92 confirmed sightings in South Carolina, from Port Royal to Myrtle Beach. They are concentrated in the Charleston area. Locations include estuaries, on roads, in forests, at the beach, in lawns, and indoors.

The town of Emerald Isle, North Carolina published a video on YouTube about blue land crabs being in their town. The North Carolina Environmental Quality has also posted a report on their website for citizens to be on the lookout and to report sightings. Citizens have posted sighting information and photos.

Blue land crabs are widely distributed and established in South Carolina in a variety of habitats. It is not known for sure how they arrived in South Carolina, but it was possibly via human mediated introduction or range expansion. Population genetic studies are needed, and a better understanding of distribution and history of sightings in the United States.

Potential impacts from blue land crabs include shoreline destabilization, their affect native species, and habitat overlap with species of conservation concern.

The Southeastern Regional Taxonomic Center developed a Specimen Accession Form for crab identification and collection information.

Discovering what blue land crab physiological tolerances are, such as salinity and temperature tolerance, multiple life stages—larvae, megalope, juveniles, adults, and regional differences in tolerances can help predict their potential future expansion.

New Invaders Need New Tools: Zebra Mussel and Apple Snail Detections in North Carolina and the Need for a NCWRC ANS Reporting Tool

Rachael Hoch with the North Carolina Wildlife Resources Commission discussed the need for a North Carolina Wildlife Resources Commission ANS reporting tool for zebra mussel and snail detections in North Carolina.

The only detections of zebra mussels in North Carolina were in moss balls in 2022. They were first detected in a North Carolina waterbody in 2023.

On September 14, 2023, NCWRC and Duke Energy received a report of zebra mussels in a recreational dive private quarry in Iredell County. On September 18th, Duke Energy, NCSU, USFWS, and NCWRC met to discuss the situation and what the next steps would be. On September 21st, NCWRC and USFWS SE Dive Team investigated the report. Zebra mussels, *Dreissena polymorpha*, were detected and verified. Water was collected for eDNA. The quarry was closed to members and public access. On September 22nd, NCWRC issued a press release about the zebra mussels. On September 26th, the zebra mussels were taken to the NC Museum of Natural Sciences to confirm their identification and aging. On October 17-18th, USFWS and NCWRC surveyed two other recreational quarries under the same ownership. Both of the quarries were negative for zebra mussels. eDNA confirmed the zebra mussels in Iredell quarry. On October 19th, Duke Energy and NCWRC visually surveyed Lake Norman, and collected eDNA and water quality samples. On October 23rd, the NCWRC ANS team met to discuss an eradication plan. On November 2nd, eDNA results were negative for the two recreational quarries in NC and Lake Norman. It is now known that zebra mussels are contained to a private water body in Iredell County, NC. There have been no detections in other NC recreational quarries and in nearby Lake Norman.

The future goal for zebra mussels is eradication by developing a plan for the quarry, and evaluating treatment options. On November 20th, a coordination call was done with other resource partners. Funding will be identified, public outreach and education will be done, and long-term monitoring and early detection will be a priority. A flyer was created for snorkelers and SCUBA divers to clean, drain, and dry to protect NC water bodies.

There is one record from 1992 from the upper Dan River of channeled apple snail, but they did not become established. Mystery snails are widely established in NC.

On September 7th, 2023, a WRC District Fisheries Biologist received a report from a member of the public of pink egg masses on the Lumber River near Lumberton, Robeson Co. On September

8th, egg clusters were detected in additional locations. On September 11th, the eggs were taken to Art Bogan at NC Museum of Natural Sciences. The eggs were confirmed to be *Pomacea sp.* On September 27th, additional surveys were conducted by NCWRC staff, and live individuals were confirmed. Fivemile Branch and Saddletree Swamp watershed appears to be the source of the introduction. Staff knocked off all of the egg masses. The finding was reported to the USGS NAS database. On October 2nd, NCWRC issued a press release, and human health concerns and highlights new reporting tool. On November 6th, NCWRC confirms *Pomacea maculata* (Giant Apple snail). Apple snails are established in the Lumber River in NC.

In early spring, the spread of apple snails will be revaluated. A management strategy will be developed, and public outreach will be increased.

A WRC ANS reporting tool (ArcGIS Survey 123) was developed by NCWRC to report ANS species within WRC jurisdiction. The goals of the tool are to increase early detection reporting, increase WRC rapid response and coordination, and educate the public. Reports have been received: 16 in NC, three in FL, and one in Ohio. All were snails.

Future directions for the ANS reporting tool include: A buildout verification step in the tool, expanding coordination with other partners, integrating into NC rapid response procedures, and streamline reporting to the USGS NAS database.

Chesapeake Bay Wide Coordination to Address the Spread and Impacts of Blue and Flathead catfish

Bailey Robertson with NOAA's Chesapeake Bay Program gave a talk on the spread and impacts of blue and flathead catfish, and Chesapeake Bay's coordination to address the problem.

The Chesapeake Bay Program is a regional partnership tasked with conservation and restoration of the Chesapeake Bay Watershed, with a goal of environmental and economical stability. Goal Implementation Teams include: Sustainable Fisheries, Habitat, Water Quality, Maintain Healthy Watersheds, Fostering Chesapeake Stewardship, and Enhance Partnering, Leadership and Management.

The Invasive Catfish Workgroup (ICW) is a group of varied stakeholders tasked with planning the management of invasive catfish throughout the Chesapeake Bay Watershed. The group includes state managers, government, scientists, recreational watermen, commercial watermen, and more. The group met in 2020 to develop a management strategy. The Stated Outcome of the 2020 Invasive Catfish Management Strategy is to "Reduce the abundance and mitigate the spread and ecological impacts of invasive catfishes in Chesapeake Bay through increased public education and awareness and development of fishery management strategies that ensure ecosystem health and productivity".

The 2023 Invasive Catfish Workgroup held a virtual meeting on July 19, 2023. A decision was made to reconvene ICW and assess the future of the group. Results from the meeting determined that there was an overwhelming agreement that the ICW should continue. There was a desire by members to hold an in-person meeting soon (Winter 2023/24). There should be more funding/advertisement for various aspects. There was confusion by some on why blue catfish are not more readily available to consumers. There was a desire to re-assess/find a common goal/plan that all can agree on. There is still the issue of conflicting opinions.

One of the ICW members spoke at a Farm Bill hearing to express frustration with USDA requirements. Collaboration with congressional leaders is being done to get catfish language removed from bills. There is hope that more funding can be received for research and processors. Views on the Farm Bill are more varied than originally thought. The USGS is looking for high priority science needs (possibly catfish needs as identified by the group). ICW met with members of the USGS to develop a list of science needs questions around blue catfish.

An ICW member is attempting to get blue catfish on the menu in public schools in Maryland, and also trying to get a USDA Child Nutrition label on blue catfish cakes. This could serve as a model for getting blue catfish on the market.

Research is being done for several projects such as the blue catfish's diet and tropic ecology through long-term studies on how the tropic ecology will shift as blue catfish become more established; development of a new more cost-effective method for aging blue catfish; a project on the growth and reproductive rates of blue catfish; engaging in public outreach on aquatic invasive species; assessing blue catfish defense changes over ontogeny/growth; a joint project with the MD DNR to assess the efficacy of targeted removal by electrofishing of the largest catfish in the Nanticoke River at reducing the average size in the population, abundance, and reproductive output.

More research is being investigated for blue catfish population studies. The Blue Catfish Movement Project is an acoustic telemetry project leveraging passive and active tracking methods to investigate baseline seasonal movement and environmental covariates, identify aggregation areas, and assess behavioral response to low-frequency electrofishing. Results will better quantify blue catfish impacts to native species, increase operational efficiency of commercial fishing efforts, and contextualize research to further management efforts. Preliminary results identify that the population structure is likely tied to preferred prey distribution, limited downstream movement, and high site fidelity.

Invasive catfish fishing tournaments are being held to raise awareness. In November, a "Madness on the Marshyhope" Invasive Catfish Tournament was held at Marina Park in Federalsburg. There were vendors, food trucks, filet demonstrations, and also river education, music, and a weigh-in party.

The ICW will hold a meeting on January 10, 2024 at the VCU Rice Rivers Center. The agenda has not been finalized yet, but topics will include revisiting the outcome statement, deciding on common goals that all stakeholders can agree on, coming up with actions to move forward, and member updates.

Federal Updates

Kristin Sommers with the U.S. Fish & Wildlife Service gave an update on the ANS Task Force.

At the July 2023 ANS Task Force meeting, there were updates from the USGS NAS database, National Invasive Species Council, and the AIS Commission. Updates were given for the Prevention, EDRR, Control, and Outreach Subcommittees. There were talks by invited speakers that discussed using invasive species for luxury fashion; InvaCost, a database of the economic costs of biological invasions worldwide; and storytelling about invasive species through Podcasts.

The Task Force approved the formation of the 'Legislative Report' workgroup. This is in response to the Don Young Coast Guard Authorization Act of 2022. This Act directs the Task Force to submit a report to Congress recommending legislative, programmatic, or regulatory changes to eliminate remaining gaps in authorities between members of the Task Force to effectively manage and control the movement of aquatic nuisance species. The Action Item for this will be for the Executive Secretary to send out a request for volunteers for this workgroup, and then report the progress at the next Task Force meeting.

The Task Force approved the 'Management Plan for the European Green Crab' to be posted in the Federal Registry for public comment.

The Task Force adopted the "Decontaminating Firefighting Equipment to Reduce the Spread of Aquatic Invasive Species".

This year, as part of the Bipartisan Infrastructure Law authorization for ecosystem restoration, the Department invested $1 million to establish a pilot Rapid Response Fund for Aquatic Invasive Species with an additional $1 million envisioned each year 2024 through 2026 as part of advancing a National EDRR Framework.

As a result of this approval, the ANSTF moved forward with posting the first RFP on August 17th. The first round was closed. Thirteen proposals were received, which are currently in review, with a decision expected in late November. The RFP will reopen later this month, and will continue to open quarterly until the RR funds have been depleted.

The ANS Task Force Strategic Plan serves as a blueprint to guide the actions of the ANS Task Force. The Plan for 2020 – 2025 establishes six goals: Coordination, Prevention, Early Detection and Rapid Response, Control and Restoration, Research, and Outreach and Education. Under each Goal, there are three objectives that provide detail about how to accomplish that goal. A subcommittee has been formed for each goal, and is tasked with drafting an annual workplan that outlines specific activities the subcommittee will implement to advance that goal.

For the ANSTF Prevention Subcommittee, funding was secured to conduct a Gap Analysis for invasive species pathways to determine where prevention measures may be lacking. USGS is leading this gap analysis and developing case studies.

This year, an award was made to conduct a seaplane risk analysis project and identify recommendations to mitigate this pathway. An award was made to Creative Resource Strategies, and the project will begin this Fall.

The Subcommittee has recently formed an Organism in Trade Hitchhikers Workgroup in response to recent reports of contaminated domestic shipment to retailers (for example, shipments of feeder goldfish contaminated with potentially invasive crayfish). This workgroup is working with states and industry to identify measures to help mitigate risks within supply chains at the producer, supplier, and retail levels. Priority work is focusing on outreach for retail stores, and developing handling practices for producers.

Upcoming work elements include discussion on the potential of increased AIS movement with wildland fire operations. At the ANS Task Force meeting, this document was adopted, and work still needs to be done regarding how to disseminate the information.

The ANSTF EDRR Subcommittee will continue to assist the U.S. Geological Survey in conducting Horizon scans, and develop a watch list in connection with the EDRR Framework. Several Horizon scans have already been completed, with more in progress.

The Subcommittee is also taking steps to modernize and enhance the ANSTF Experts Database. The revised database will help facilitate communication among the AIS community by adding more search terms (area of management, specialty, location, taxonomic expertise). This new tool will be incorporated into the EDRR Information System, and will be expanding to include terrestrial experts.

The Rapid Response Template Team is close to completing a Rapid Response Plan Template, which will include a checklist and guidance on how to develop a Rapid Response Plan. This is meant for entities that do not have a Plan.

Since its establishment, the ANS Task Force has approved 10 species-specific Management Plans. These include the Quagga Zebra Action Plan for Western Waters, and the National Invasive Carp Plan, which serve as a foundation to inform Congressional appropriations to help manage these species. The ANSTF Control Subcommittee has conducted an audit to determine the status and activity of the Plans, and identified plans that need updated. Work groups have been established to update the Green Crab and New Zealand Mudsnail Plans. The Green Crab Plan was approved for posting to the Federal Register for public comment. The Subcommittee is also developing a Decision-making Process that will be used to determine when a new species Plan should be developed.

For the ANSTF Outreach Subcommittee, the ANS Task Force works alongside its partners to implement two national ANS campaigns: Stop Aquatic Hitchhikers! and Habitattitude. The Stop Aquatic Hitchhikers! campaign is used to empower recreational water users to take action to prevent the spread of ANS, whereas the Habitattitude campaign is used to educate people to be responsible pet owners by not releasing pet or aquarium contents into the environment.

Earlier this year, an assessment was completed that looked at the effectiveness of outreach efforts that target outdoor recreational users, with particular focus on the Stop Aquatic Hitchhikers, Clean Drain Dry Initiative, and Play Clean Go. The Subcommittee is currently reviewing the finding, and plans to develop an action plan with short- and long-term priorities for outreach, along with a media toolkit.

The Subcommittee continues to expand the Stop Aquatic Hitchhiker website to serve as a clearinghouse for outreach materials. Wisconsin Sea Grant now has access to the Stop Aquatic Hitchhiker website, which will allow for another person to manage and update the website.

The Subcommittee has started a National AIS Outreach Community of Practice, a forum for outreach professionals to connect and share ideas. Topics thus far have included geofence marketing and webpage design. The subcommittee is now beginning work to evaluate the first year of the ANS Outreach Community of Practice (AISCoP).

The National AIS Priority Research List developed by the ANSTF Research Subcommittee was approved by the ANSTF in November 2021. A tracking mechanism to evaluate the progress of the priorities is being developed. A survey has been developed, and will be sent out with the survey to populate the experts database. The survey will also be used to update the priorities list by developing criteria to determine when a priority has progressed enough that it can be removed, and to identify emerging or new issues that should be added.

The next ANS Task Force meeting will be January 24-25, 2024 at the USGS Headquarters in Reston, VA. Following that meeting, the Northeast Panel will be hosting the ANSTF the first week of May 2024, with the location to be determined soon.

GSARP and MAPAIS Priority Introductions and NAS Program Updates

Cayla Morningstar and **Ian Pfingsten** with the U.S. Geological Survey gave updates on GSARP and MAPAIS priority nonindigenous species introductions, and the Nonindigenous Aquatic Species Program.

Since February 2023, there have been 20 NAS Alerts in the GSARP region for six fishes, five mollusks, one crustacean, four plants, three herps, and one scyphozoan. The reports were received via NAS Sighting reports (13), personal emails (4), and news reports (3).

In the MAPAIS region, there have been 32 NAS Alerts since April 2023 for 13 mollusks, seven crustaceans, six plants, four herps, and two fishes. The reports were received via NAS Sighting reports (26), personal e-mails (4), and news reports (2).

On July 15, 2022 in Hood County, Texas, a threespot cichlid hybrid (*Amphilophus trimaculatus* × *Amphilophus* sp.) was captured in Lake Granbury. This species is new to the U.S. and the Middle Brazos-Palo Pinto River. The fish was removed from the wild, and kept in an aquarium by the collector.

On June 4, 2023 in Concordia Parish, Louisiana, two Northern snakehead were caught in the Mississippi River, Old River near Minorica. This species is new to Louisiana and Lower Mississippi-Natchez drainage.

On June 12, 2023 in Horry County in South Carolina, two Oscars were observed in Gray Lake adjacent to the shoreline. One was captured. This was a catch-and-release pond, so after photographing it, the fish was released. This species is new to Horry County and Waccamaw River drainage.

On July 28, 2023 in Schenectady County, New York, two round goby were caught in Alplaus Kill, just downstream of the Glenridge Road Bridge. This species is new to Schenectady County.

On March 21, 2023 in Indian River County, Florida, mosquito fern were discovered in Fellsmere WMA (Headwaters Lake). IPM crews were dispatched the next day to attempt eradication of NW populations near a kayak launch area. This species is new to Indian River County.

On June 15, 2022 in Autauga County, Alabama, giant salvinia was found in a private pond. This species is new to Autauga County and Upper Alabama River drainage.

On July 20, 2023 in Carteret County, North Carolina, a report was made to SCDNR through a public survey about blue land crab observations in Emerald Isle. This species is new to North Carolina and the White Oak River drainage.

On September 21, 2023 in Iredell County, North Carolina, zebra mussels were found in a quarry on private property in an obscured location. This species is new to North Carolina.

On August 1, 2023 in Cumberland County, North Carolina, an applesnail was found in the Lumber River. Several individuals, including adults and juveniles, have been observed across multiple years. This species is new to Cumberland County and the Lumber River drainage. A previous report was received in 1992.

On May 9, 2023, zebra mussels were found in Hords Creek Lake in Coleman County, Texas. Multiple size classes were found. This waterbody is designated as infested. This species is new to Coleman County

On August 1, 2023 in Cumberland County, North Carolina, a Rio Grande chirping frog was found in the Upper Cape Fear River in Fayetteville. It was likely dispersed as a hitchhiker on plants or potting soil. Several individuals, including adults and juveniles, have been observed across multiple years. This species is new to North Carolina and the Upper Cape Fear River.

There are confirmed occurrences of vacuolar myelinopathy in several states. The cyanobacterium *Aetokthonos hydrillicola* grows on aquatic vegetation and produces a neurotoxin. Coots and other animals consume vegetation that is contaminated with the neurotoxin, and develop vacuolar myelinopathy. Eagles develop VM from preying on neurologically impaired coots who have ingested the toxins.

Dr. Susan Wilde and colleagues at the University of Georgia's Warnell School of Forestry and Natural Resources are working on a LAMP assay project. The study will focus on the application of LAMP (Loop-Mediated Isothermal Amplificaton) to in-field detection of the cyanobacteria, *Aetokthonos hydrillicola*, that produces Aetokthonotoxin (neurotoxin) that causes vacuolar myelinopathy. It will use previous primer development to produce a protocol that will allow for in-field genetic detection of the gene cluster within *Aetokthonos hydrillicola* that causes the production of Aetokthonotoxin (AETX). The protocol will be used to determine potential areas where the cyanobacteria could exist in the field (i.e. hydrilla leaves, tubers of the hydrilla, soil in the reservoirs, pine needles of the surrounding trees). The goal of this project is to develop a protocol that can be used and replicated by other researchers and management to easily identify areas of potential VM risk.

The USGS Southeast Regional Invasive Species and Climate Change (RISCC) Management Network will coordinate and disseminate information to guide management of native and invasive plants and animals across the Southeast U.S. They are working on developing a workshop focused on how research and management can be mutually beneficial in context to SE RISCC goals, and management challenges to address adaptive management needs. Standards for data collection and monitoring will be developed. Research summaries and webinar series will also be created.

The USGS Early Detection Rapid Response National Framework performs global invertebrate and plant horizon scanning, hotspot analyses, and uses Siren, a national EDRR information system.

The USGS Global Horizon Scan consists of a plant horizon scan and hitchhiker risk assessment, and an invertebrate global horizon scan. The scans are for all 50 states of the U.S. & territories, looking at terrestrial and aquatic species. They also examine hitchhikers on plants. The hotspot map results can be used to prioritize areas of surveillance, and assess the risk of new introductions. It will provide a series of searchable and scalable maps of invasion hotspots.

Siren is the USGS's National Early Detection and Rapid Response Information System. The National Early Detection Rapid Response (EDRR) Information System is an emerging online resource for invasive species information sharing and collaboration that serves as the information hub of the National EDRR Framework. This centralized network will improve access to existing and emerging information resources, and expand collaboration to facilitate early detection and rapid response to biological threats across the nation.

The USFWS Puerto Rico and U.S. Virgin Islands all taxa Horizon Scan was launched on August 31, 2023. On October 13, a check-in with team leads was done. On January 12, 2024, risk assessments were completed. On March 15, a peer review was completed, and ranked within the teams. On April 26, a final consensus was done. On October 1st, a manuscript was submitted.

eDNA is going live on NAS soon. The goals of integrating eDNA into the NAS database include: Establish, maintain, and update community data standards with the cutting edge of eDNA science; communicate with managers, scientists, and stakeholders to inform management decisions and responses while minimizing unnecessary responses; and provide a public interface with vetted data to display eDNA detections in conjunction with observed and reported specimens.

The USGS Flood and Storm Tracker (FaST) maps for the 2023 Hurricane Season are available on the website. After Hurricane Ian in 2022, the maps were updated.

USACE Update

Jon Lane and **Tara Whitsel** with the U.S. Army Corps of Engineers reported on USACE and its programs.

The USACE is involved with invasive species through Management (i.e., the Natural Resources Management Program). The USACE manages over 12 million acres of public land and water at Civil Works Projects; Control (i.e., Navigation mission); and Research (i.e., US Army Engineer Research Development Center (ERDC). The USACE Invasive Species Leadership Team is an 18-member team that consists of one representative from each division office, and a representative from one of the district offices within each division.

The Invasive Species Travelling Trunk is an educational outreach awareness trunk that contains specimens, a manual of talking points for the included Power Point presentation, species information, a python skin, a nutria pelt, and handouts. It is provided free of charge to partner agencies, conservation and environmental groups, and schools.

The USACE Invasive Policy was updated per Section 501 of WRDA. It was signed in February 2023.

The ISLT PgMP (Programmatic Management Plan) was signed by the Director of Civil Works, and distributed in April 2023.

The USACE Invasive Species Strategic Plan is in final draft. It is a requirement of the John Dingell Jr Conservation Act. It will be routed to Congress after signature.

The Noxious Weed Cooperative Agreement Delegation has been signed. It was distributed in August 2023. The Portland District is already working on a draft agreement for use.

The Aquatic Plant Control Program was created with an annual funding ceiling of $5,000,000, and incorporated the sharing of operational costs at 30% non-federal and 70% federal. Numerous public laws have increased the annual APC spending authority and changed the non-federal cost share of program operations to 50/50 with funding ceiling of $130M (although that has never been appropriated).

Congress appropriated $38M in FY23 final appropriations for the Aquatic Plant Control Program and specified: Activities related to Flowering Rush and Hydrilla ($2M); Inspection Stations, EDRR, and Monitoring ($16M); Aquatic Plant Control Research ($7M); Research and EDRR for Connecticut River Hydrilla ($6M); Invasive Carp Prevention ($1M). The FY24 PBUD Request includes $0M for APC per OMB Passback.

For watercraft inspection stations, Wyoming and Nevada were added to the agreement in FY22. In FY23, letter reports for the Upper Colorado River Basin, Upper Missouri River Basin, and South Platte River Basin were finally completed. The Russian River is still in progress. USACE is working on cost-share agreements with ND, SD, and CO, and also exploring letter report/planning/cost-share for the US/Canada border.

The WRDA 509 Report is routing through HQ for transmittal. Planning and coordination is being done to support the development and management of invasive carp prevention in the Cumberland and Tennessee River Basin related to Section 509, WRDA 2020, and in the Tombigbee River Basin. In FY23, planning will begin to include the Mobile Basin and tributaries of the Mississippi River. Initial funding is being utilized for initiation of both the PgMP and Programmatic NEPA Document. Anticipate end of Q4. Funding will also facilitate the creation of any necessary Cost-Share Agreement with Non-Federal Sponsors and other Federal agencies involved in the effort.

Specific work will be done in the CT River, Lake Seminole, Alum Creek, and Flowering Rush. In FY23, work will begin to include South Carolina and the Santee Cooper Authority in cost shared work to protect hydropower generation from negative impacts of invasive species. The plan is to have the agreement in place by treatment season FY24.

The Aquatic Nuisance Species Research Program (ANSRP) of the U.S. Army Engineer Research & Development Center (ERDC) was established to address all invasive aquatic animals, as well as, harmful algae species that are problematic to the nation's waterways, infrastructure, and associated resources. The ANSRP provides USACE managers and operational personnel with innovative technologies regarding risk assessment, prevention strategies, species history/ecological data, and cost-effective environmentally sound options for managing aquatic nuisance species.

The Aquatic Nuisance Research Program (ANRP) was appropriated $13M for HAB research and development in FY23. The program was also appropriated $5M for the HAB Demonstration Program, and $5M was appropriated for Next Generation Ecological Modeling. The ANCRP is

executing the HAB R&D Initiative in conjunction with strategic partners. Since FY19, the program has implemented over 36 research projects dedicated to preventing, detecting, and managing HABs in freshwater bodies nationwide, including work in the Great Lakes and Florida.

ERDC-Led HAB R&D Projects have several HAB research focus areas. Prevention involves research on reducing biomass and toxicity and/or demonstrate reduction in available nutrients feeding the bloom within an aquatic system. Management involves research on removing or inactivating HAB biomass and toxins through physical, chemical, and/or biological processes. Detection research involves developing rapid, reliable and cost-effective technologies and standardized approaches for improved HAB monitoring and detection.

HAB Interception, Transformation and Treatment System (HABITATS), was developed in 2020, and was the 2020 USACE Innovation of the Year Award Winner. HABITATS permanently removes HAB biomass and associated nutrients, is applicable to freshwater bodies across the nation, is scalable, and can treat millions of gallons of water/day, which produces clean water and biofuel.

Other Business

There was no other business.

Public Comment

The Chairman provided the opportunity for public comment. There was none.

Julie Holling made a Motion to adjourn the meeting. Matt Phillips seconded the Motion, and the Motion was approved. There being no further business, the meeting adjourned at 4:30 p.m.