GULF & SOUTH ATLANTIC REGIONAL PANEL
ON AQUATIC INVASIVE SPECIES
MINUTES
Tuesday, October 6, 2015 & Wednesday, October 7, 2015
Myrtle Beach, S.C.

On Tuesday, October 6, 2015, Chairman **Fuller** called the meeting to order at 8:30 a.m. The meeting began with introductions of the members and guests. The following were in attendance:

Members & Proxies
Lad Akins, REEF, Key Largo, FL
James Ballard, GSMFC, Ocean Springs, MS
Tim Bonvechio, GA DNR, Waycross, GA
David Britton, US FWS, Arlington, TX
Rick Burris, MS DMR, Biloxi, MS
Earl Chilton, TPWD, Austin, TX
Corrin Flora, NC DMF, Elizabeth City, NC
Pam Fuller, USGS, Gainesville, FL
Lisa Gonzalez, HARC, The Woodlands, TX
Leslie Hartman, TPWD, Palacios, TX
Chuck Jacoby, Indian River Lagoon National
David Knott, At-Large Member, Charleston, SC
Jon Lane, USACE, Jacksonville, FL
Robert McMahon, UT Arlington, Arlington, TX
Roberto Mendoza (via conference call), Univ. of Nuevo Leon, Nuevo Leon, Mexico
Chris Page, SCDNR, West Columbia, SC
Dennis Riecke, MS DWFP, Jackson, MS
Peter Kingsley-Smith (via conference call), SC DNR, Charleston, SC
Kristen Sommers (via conference call), FL FWC, Tallahassee, FL
Don Schmitz (via conference call), FL FWC, Tallahassee, FL
John Teem, FL DOA, Tallahassee, FL

Staff
Alyce Ryan, GSMFC, Ocean Springs, MS

Others
Stas Burgiel, National Invasive Specie4s Council, Washington, D.C.
Jackson Gross, Smith-Root, Vancouver, WA
Su Jewell, USFWS, Arlington, VA
Jianghong (John) Min, Harvard University, Boston, MA
Philippe Parola, Can't Beat 'Em, Eat 'Em, Baton Rouge, LA
Anna Toline, National Park Service, Washington, D.C.
Katie Walters, (via conference call), UF CAIP, Gainesville, FL

Matthew Waters, Valdosta State University, Valdosta, GA
Aaron Watson, SC DNR, Charleston, SC

Public Comment
Chairman **Fuller** provided the opportunity for public comment. No public comments were received.

Adoption of Agenda
After minor changes, a motion to adopt the agenda was made, and passed unanimously.

Approval of Minutes
The minutes of the May 5, 2015 meeting in Ft. Lauderdale were presented for approval.

After a minor change, a motion was made to approve the minutes. The motion was seconded, and the motion passed.

qPCR Tool for Detection of the Invasive Parasite of American Eels
Aaron Watson provided a PowerPoint presentation entitled "Update on the Invasive Parasite, *Anguillicoloides crassus*, of the American Eel, *Anguilla rostrata*". Irreversible damage is caused by *Anguillicoloides crassus* feeding on the eel's blood, and larvae migrating through the swimbladder wall. Consequences of swimbladder damage include: damages to gas gland and cell function; reduced O_2 content; problems with buoyancy control; compromised swimming efficiency and survival in migrating eels; mortality under stressful conditions.

A subcontract was awarded by Gulf States Marine Fisheries Commission: *Detection of an invasive parasite of American eels using qPCR*. The project goals are to test whether qPCR can detect *A. Crassus* collected from the wild, through the collection of planktonic and benthic crustaceans at the Goose Creek Reservoir, South Carolina; to generate standard curves and establish limits of detection for qPCR through laboratory cultures and infections of intermediate hosts (i.e., copepods); to use data from qPCR standard curves to quantify parasite abundance and densities in the field.

Quantitative PCR (q-PCR) is an excellent method for detection of rare DNA in environmental samples (endangered species, invasive species, parasites, etc.) It is also an excellent method for quantifying relative differences in gene expression between species, tissue types, treatments, etc.

Lab assay was successful for detection and quantification of *A. crassus* DNA from L2 stage. However, eggs, L2 and L3 stages are all in the environment or immediate hosts. There was potential inhibition of q-PCR in environmental samples. Further testing and validation of assay

needs to be done for successful use as a field tool, as well as increased specificity and reliability at low DNA concentrations.

Current progress includes sampling at the Goose Creek Reservoir site, where there was a high prevalence of infected eels during the summer sampling. In the fall sampling, there was a new cohort of young eel recruits to the area. Sampling of water, algal mat, sediment in the middle of the creek, and plankton were done. Adult eels were collected and checked for infection. Gravid *A. crassus* adults were dissected out from eel bladders and parasitic eggs were collected. Copepod cultures are being exposed to *A. crassus* eggs to establish supply of L3 stage parasites. There are plans to establish standard curve of L3 life stage similar to L2 curve already established.

Overview of South Carolina's Freshwater ANS Activities

Page gave a PowerPoint presentation entitled "Aquatic Invasive Species Program". The purpose of the program is to prevent and control the introduction, spread, and impact of aquatic invasive species in South Carolina's public waters, and to improve habitat and minimize the problematic impacts to water use caused by invasive species through management and prevention efforts.

The staff are members of the South Carolina Invasive Species Advisory Committee, a newly-formed committee that was established by statutory regulation, and is tasked with reviewing requests from state agencies, industry stakeholders, agricultural and environmental representatives, and concerned citizens to make recommendations for additions or deletions to the official list of regulated plant pests in the state, including both terrestrial and aquatics.

Funding sources of approximately $600,000 per year consist of water recreational resource funds, federal AIS grants, and local sponsors.

The SC Aquatic Plant Management Plan development process is to develop a draft of the plan for APM Council yearly; solicit public comments on draft day for a 30-day period, and final approval of the Annual Plan at the March Aquatic Plant Management Council meeting.

The program promotes prevention through literature/plans, boat ramp signs, inspections, and billboards. Management includes herbicides, mechanical, drawdowns, and biological.

Control efforts year to date by SCDNR consisted of over 3,000 acres of control. Santee Cooper was over 2,900 acres of control.

The SCDNR Marine Division is taking the lead for island apple snails by surveying ponds, collecting snails and egg clutches, and preserving specimens from Beaufort and continuing up the SC coast to the North Carolina border.

There are a new AIS issues in SC. Whirling disease has been found, which is a disease of salmonid fish such as trout and salmon. The disease is caused by a microscopic parasite known as *Myxobolus cerebralis*. There is no known cure. AVM has been found on Lake Thurmond.

Overview of Smith-Root's Current AIS Efforts

Jackson Gross gave a PowerPoint presentation entitled "Research and Management of Invasive Species: On the Road to Ecological Recovery". There are many invasive aquatic species, but few management methods proven to be successful. Current methods primarily target adult fish.

Innovative conservation technology objectives include: specific life stages; lethal and non-lethal; critical periods of susceptibility; dose response. Methods: Suction/water jet technology; electricity (early embryonic stage most susceptible); electric barrier for fish control and passage. Studies were designed to evaluate fish physiology associated with common electric barrier settings to prevent fish passage. Testing was done on the ability to move and incapacitate bighead and silver carp. UV light and seismic technology tests were done as potential control strategies for Dreissenid mussels. A two-year study is being done in Lake Mead, Nevada to determine the dosage of UV to prevent settlement in a flow-through system, and at variable transmissibilities. Also, to determine minimum UV-C and UV-B dose to prevent larval settlement. Carbon dioxide / dCO2 tests were conducted, and revealed little effect of acute dCO2 exposure from fertilization to early hatch. Lethal and sublethal effects of electricity on Ranid larvae (American bullfrog) was done. Dose-dependent decrease in behavioral response in tadpole larvae was associated with increased voltage. The use of electricity to control African frogs is being tested. The use of seismic technology to divert or eradicate Asian carps is being tested. There was successful fish clearing in an electric barrier October 2011 and May 2012. The use of acoustic pulse pressure technology is being tested for fish deterrence. Laser transmission spectroscopy has a high sensitivity and the ability to detect differences between similar species.

Overview of the University of Florida's Education and Outreach Activities

Katie Walters provided a PowerPoint presentation entitled "Research and Outreach, the Foundation of Good Invasive Plant Management in Florida". The total for research and outreach from 1970-2015 is $28,207,386. Over 250 projects have been funded.

The University of Florida's Invasive Plant Education Initiative program allows students to understand and become aware of the ecological and economic problems that are caused by invasive species. A "3-day plant camp" for science teachers was held. There were activities, student lessons, and materials.

Field testing for using newly labeled aquatic herbicides will be a 3-5 year process. It will start out in small ponds, then small lakes, then small areas of large systems and shoreline strips, then fully-operational large-scale treatments.

A "Plant Management in Florida Waters" website has been created. It has an encyclopedic guide to plant management in Florida waterways, information about developing management plans, and covers over 400 topics.

FWC has issued a *Call for Research and Outreach Pre-Proposals Related to Invasive Plant Management in Florida for Fiscal Year 2015-2016*. The deadline for pre-proposal submission is March 23, 2016.

Overview of NAISIN Activities

Don Schmitz provided a PowerPoint presentation entitled "North American Invasive Species Network". NAISN's overall goal is to link existing invasive species regional efforts (centers, institutes, labs, networks) into an overall coordinated network. It is a consortium that uses a coordinated network to advance science-based understanding and enhance management of non-native invasive species.

NAISN is targeting certain areas to improve invasive species management in North America. They are working to become the lead coordinating entity for invasive species on PCLs. Ideally, invasive species expenditures would be tracked by each state on public conservation lands; invasive species ranges would be defined and what they actually threaten; economic impact studies in North America would be conducted, funded, tracked and coordinated. At the landscape level, invasive species management would be prioritized through risk and pathway analyses, identification, and assessment of new threats. Realistic management goals for each species would be developed, such as recommendations and protocols. Help with early detection and rapid response would be offered through emergency management coordination, technical assistance and other resources would be provided, funding would be coordinated, the public would be worked with, and easy web-based ID tools and pathways to identify new arrivals would be developed. There are over 25 smart phone apps. Local participation would involve helping to form and nurture partnerships or CISMAs within all the states. Help would be given to coordinate and disseminate research by tracking research in the U.S., encouraging research on IS pathways, developing exclusion technology, increasing and hosting more webinars aimed at dispersing current research, and developing IS Watch List for each state.

NAISN is working to establish a national public awareness campaign, along with education. They are working to expand this effort throughout North America's public schools, and include all invasive species and ecosystems. They are providing a forum for international policy and invasive species management efforts in North America. A North American Invasive Species Forum Conference will tentatively be held in February 2017 in south Florida. Topics will include international policy issues, jurisdictional issues, planning, prevention, etc. The conference will focus on invasive plants, but will also include invasive animal species.

Update on Lacey Act/Injurious Animals: Snakes Lawsuit; Bsal Chytrid in Salamanders; 1002 of FWS Risk Assessments; and More

Peter Jenkins gave a PowerPoint presentation entitled "New Court Ruling Undermines Federal Injurious Animal Regulation – and Other Related Topics". In May, an injunction was granted for a lawsuit by the United States Association of Reptile Keepers, Inc. A judge ruled that because the court has concluded that the meaning of the Lacey Act's relevant language was clear at the time of its enactment in 1960, Congress cannot be deemed to have adopted an alternative construction of the statute through ratification, particularly where it did not amend, or even discuss, the relevant language. The injunction is pending resolution by the Court of Appeals.

New authority to prevent high and medium risk imports is needed, and clear authority over interstate commerce. Species should be proactively assessed for invasiveness and disease risk using modern tools. There should be a clear emergency authority, especially for diseases like Bsal. One solution is HR 996/S.1153 – 113th Congress; Invasive Fish and Wildlife Prevention Act. It has not been reintroduced in this Congress yet.

A newly described pathogen poses a major threat to salamanders via trade. Bsal Chytrid is an emerging wildlife disease in salamanders. Southeastern U.S. is most at risk. To avert this North American biodiversity crisis, a moratorium/clean trade regulation is urgently needed. There is strong support, including from importers. There is proposed legislation: *America's Wildlife Health Protection Act of 2015*.

USFWS Risk Assessments: Over 1,900 species screened. There have been 714 RAs written up; 179 RAs finalized; only 18 RAs are on the FWS webpage. There are 535 "draft" RAs not produced.

The Center for Invasive Species Prevention (CISP) is a new non-profit organization that advances policy and non-governmental approaches to prevent the introduction and spread of invasive species. Two areas are being focused on at present: Cleaning up the invasion pathways that spread tree-killing insects and diseases, and limiting the introductions of invasive animals and pathogens and parasites that may introduce harmful diseases. CISP can help on a spectrum of invasives prevention projects through analysis, advice, public education, and advocacy.

Overview of Recent Federal Activities

Stas Burgiel gave a PowerPoint presentation entitled "NISC Update". Jamie Reaser has been named Executive Director of NISC. The Invasive Species Advisory Committee will meet on October in Maryland. An NISC Management Plan has been developed for prevention, early detection/rapid response, control, eradication and restoration, and coordination and collaboration.

National Invasive Species Awareness Week will be in February 2016. DC events include a kickoff event, award ceremony, NISAW fair, congressional briefing and reception, and a kid's day. Other events include webinars and state and local events.

Within 12 months, the Secretary of the Interior, working with other members of NISC, including NOAA, EPA, and USDA, will work with states and tribes to develop a framework for a national EDRR program, and develop a plan for creating an emergency response fund to increase the capacity of interagency and interjurisdictional teams. The EDRR framework objectives are to connect and build upon existing initiatives and EDRR networks; identify gaps in coverage and needs; increase the overall effectiveness of efforts to protect priority landscapes and aquatic areas; and scope a funding mechanism to support preparedness and response activities.

The EDRR report process will include a federal work group, ISAC work group, tribal consultation, and OMB/CEQ and agency review, and will be delivered by the Secretary of the Interior to the Council on Climate Preparedness and Resilience.

The EDRR report content will include a national EDRR framework with purpose and guiding principles, stages of the EDRR process, coordination, roles and responsibilities. Funding mechanisms and recommendations will also be included.

Burgiel spoke on their Options Paper for the Movement of Aquatic Invasive Species onto and off of Federal Lands. It includes an introduction of background and need, an overview of current federal authorities, policy options, and appendices with federal agency roles and responsibilities, summary tables, and federal agency laws and regulations. Recommendations are also listed.

Alternative Solution: Can't Beat 'Em, Eat'Em

Chef Philippe Parola gave a PowerPoint presentation entitled "Can't Beat 'Em, Eat 'Em - An Alternative Solution". Parola stated that the main priority of his solution is to tackle the Asian carp crisis. All signs point toward increasing numbers of Asian carp and worsening impacts.

Parola's plan is to sustainably harvest and transform Asian carp into Silverfin™ value-added food products for human consumption in domestic markets. The current business model is that 100% of Asian carp is used for by-products such as fish fertilizers, fish meal, pet food, surimi, and others. The cost to properly process Asian carp for export is more than the purchase price foreign importers will pay for the delivered product, and what processing plants can pay fishermen for their catch. The Silverfin™ business model for processing and selling Asian carp products will maximize fish value, such as 30% filet for value-added products such as fish cakes, and 70% for fish fertilizers, fish meal, pet food, and others. The Silverfin™ Group will pay fishermen more.

An eco-friendly food processing plant will be built. It will specialize in producing Silverfin™ value-added food products, develop recipes in a kitchen lab, and deploy sustainable practices and green technology to minimize environmental footprint.

The Mississippi River Basin will be served with the Silverfin™ flagship and satellite plants. There will be an FDA-approved processing plant, a cold storage facility to hold the raw product, and a satellite raw fish processing plant that can process up to 30k of whole fish per best day of fishing.

The Silverfin™ value-added products include croquettes, boulettes, and fish cakes. Sysco, the largest food distributor in the U.S., will be promoting and selling Silverfin™ products.

A "Can't Beat 'Em, Eat 'Em" documentary will be produced, uniting fishery and wildlife leaders, policy makers, scientists, fishermen, hunters, chefs, and home cooks in the common goal to sustainably harvest and transform invasive species into food sources.

Update on AVM Research in the Southeast

Susan Wilde gave a PowerPoint presentation entitled "New Locations and Species at Risk from Avian Vacuolar Myelinopathy". Avian Vacuolar Myelinopathy (AVM) is the most significant unknown cause of eagle mortality in the history of the U.S. From 1994-1996, there were large

die-offs of bald eagles in Arkansas. It was confirmed that they had AVM. It was also confirmed in American coots. In 1997, eagles began dying on Lake J. Strom Thurmond. From 1998-2015, there were 83 bald eagle deaths.

AVM causes lesions in the white matter of the central nervous system, specifically an intramyelinic edema. Animals become neurologically impaired, including "drunken" gait and inverted swimming. Also affected are mallards, ring-necked ducks, buffleheads, American wigeon, Canada geese, great horned owls, and killdeer.

Aquatic systems, including freshwater wetlands, ponds, and lakes are prone to invasion.

Aetokthonos hydrillicola is a previously undescribed cyanobacterium. It grows as an epiphyte on hydrilla and other invasive exotic aquatic plants in all AVM sites. It produces a neurotoxin. Coots eat the hydrilla and accumulate cyanobacterium neurotoxins in their tissue. An eagle feeding on a dead coot might consume the neurotoxins and develop a deadly neurological disease. A study was done to see if it might be possible for the AVM toxin to effect other herbivores and be transferred to their predators. As part of intensive surveys and monitoring that began in 2001, dense aquatic macrophytes were associated with sites. Three most abundant species were all nonnative. The most abundant plant at all of the sites was nonnative *Hydrilla verticillata*. It was heavily colonized by epiphytic algae. In 2014, thirty sites had hydrilla and *Aetokthonos hydrillicola*. There were 166 eagles confirmed with AVM. Twenty sites had AVM+, hydrilla, and *A. hydrillicola*.

Taxa affected by ingesting *Aetokthonos* positive *Hydrilla* include: Fish, salamanders, frogs, caecilians, mammals, turtles, crocodiles, alligators, caimans, birds, tuataras, lizards, and snakes.

Experimental feeding of h*ydrilla verticillata* colonized by stigonematales cyanobacteria on painted turtles maintained at the Whitehall Herpetology Laboratory induced vacuolar myelinopathy in the turtles. Between days 80 and 90, all turtles fed *Aetokthonos* positive *hydrilla* exhibited associated clinical signs of VM, which included weakness, lethargy, anorexia, floating abnormality, and ataxia.

Solar powered PTT/GPS 70g units were mounted on juvenile eagles, and programmed for the winter risk period of November to January.

Field trials were conducted on triploid Chinese grass carp to see if fish are susceptible to AVM. They are susceptible, as vacuolar lesions were found in grass carp feeding on hydrilla.

In fall 2012, sentinel birds with access to hydrilla were found to be AVM positive. Without hydrilla, they were AVM negative.

A pilot study will be done in fall of 2015. Grass carp will be stocked in J. Strom Thurmond Reservoir. Twenty-four grass carp will be fitted with body implant radio transmitters to assess

movement. A small subset of stocked grass carp will be collected for health assessments and laboratory feeding trials to test for risk of AVM toxin transmission.

Impacts and Interactions of Dominant AIS in Lake Seminole

Matthew Waters gave a PowerPoint presentation entitled "Impacts and Interactions of Dominant Aquatic Invasive Species in Lake Seminole, GA". Hydrilla is up to 50% coverage on Lake Seminole. It is managed with carp and herbicides, and dam release. Also found in the lake are *Corbicula fluminea, Pomacea maculata*, and *Pomacea paludosa*. Mapping of the lake for these species was done from 2012-2015. Sediment transport was done in 2014 and 2015.

Objectives are to continue density and distribution maps of the three invasive species in Lake Seminole, and begin to look at the impacts of invasive species on sediment transport and lake ecology. Hydrilla and other SAV appear to be linked to precipitation, and the coverage percentages fluctuate from year to year.

Pomacea are largely concentrated on the Flint and Spring Creek arms. Very few sites contained both species. Impacts on hydrilla coverage are unknown.

Future control include drones, eDNA, and c dynamics.

Wednesday, October 7, 2015

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

Overview of CRISPR and its Applications in ANS Management

Jianghong Min gave a PowerPoint presentation entitled "CRISPR Technology and Echo-Restoration". CRISPR (clustered regularly inter-spaced short palindromic repeats)/Cas9 is a gene-editing technique that scientists can reprogram with artificial guide RNAs to cleave sequences within genomes and enable the surgical insertion of new fragments of genetic information into cells. An organism carrying one copy of an altered gene normally passes it on to 50% of the offspring. A gene drive can ensure that nearly all of the offspring inherit the altered gene, which would cause it to rapidly spread through the population and eliminate the species.

One possible application is to genetically modify mosquitoes so they cannot transmit diseases such as malaria. The wild-type mosquitos would be replaced with genetically modified ones, and malaria would be eradicated.

The Non-Native Seagrass *Halophila stipulacea*, Introduction and Threats

Anna Toline provided a PowerPoint presentation entitled "SERO NPS Oceans Program – Managing the Non-Native Seagrass *Halophila stipulacea*". This nonnative seagrass is rhyzomatous and monocotyledonous. It is highly salt and light tolerant, and is diocecious (males and females). It is native to the Western Indian Ocean – Red Sea and Persian Gulf, as well as

coastal islands of Eastern Africa and the southeast coast of Indian subcontinent. In the 1800s, it invaded the Eastern Mediterranean Sea via the Suez Canal. It invades native seagrass beds via water column transport through storms and disturbances.

In five years, there has been an increase of 19 to 669 ha. It has rapid growth, and invades occupied seagrass beds and bare sand. It has a lower species abundance and diversity than native seagrass, and is not an equivalent substitute for native fish. It overlaps with sea clover, manatee grass, shoal grass, and turtle grass. It has the potential for overlap with Johnson's seagrass and ESA-listed endangered species.

Research was done for fish use of native vs nonnative seagrass habitats. Results showed that it yields larger fish, but half as many juveniles. It supports lower fish species richness. Research on growth rates at seagrass edge and tank-planted/floating seagrass showed lateral growth up to >6cm/day, and up to 50% increase in biomass in seven days. Research on herbivory by native fish, invertebrate analysis, and nutrient analysis showed fish and invertebrates preferentially grazed on native seagrasses, and harbored fewer organisms.

Education and outreach is being done through mapping, monitoring, and a web page for reporting. NPS is working with parks and partners to control the seagrass. Currently, NEPA coordinators have been contacted. Funds are being sought, and permits and a budget are needed.

Aquatic Nuisance Species Task Force Update

Su Jewell reported that an Executive Secretary will be hired soon, and they are currently interviewing for the position.

The fall Task Force meeting, hosted by NOAA, will be held on November 4-5, 2015 in Silver Spring, MD.

For the State and Interstate Aquatic Nuisance Species Management Plan Grant Program, FAC received one million dollars in 2015. The first stage of the grant process, which was the review of the pre-proposals, is complete. The FWS regional coordinators are now working with their regional grant staff to complete the grant process.

For fiscal year 2016, the language from the House report includes an additional $1 million for the State and Interstate Aquatic Nuisance Species Management Plan Grant Program.

The aquatic hitchhiker campaign will be upgraded and revitalized.

Habitattitude will be redesigned, updated, and expanded. They are looking to engage partners to participate on an advisory committee. The updated website will hopefully be completed by November.

The Government Accountability Office (GAO) conducted a review of all aquatic invasive species, and the costs for all federal agencies for aquatic invasive species. Key questions

included: identification of current federal spending and projected future costs of operation and maintenance related to mitigating the impacts of aquatic invasive species on federally owned or operated facilities; identification of current federal spending on aquatic invasive prevention; analysis of whether current federal spending is adequate for the maintenance and protection of services provided by federal facilities; miscellaneous items deemed appropriate. The GAO compiled the responses from the federal agencies into a report. The draft report was received on October 1. The comments were compiled, and the GAO report is being finalized.

Invasive Species Traveling Trunk Update and Discussion

Ballard gave a PowerPoint presentation entitled "Traveling Trunk Update". Over 30 organizations and schools have used the traveling trunk. Some of the positive comments received were that it is a "great real-world learning experience", "the kit was amazingly simple to use", "it brought our curriculum to life", and "the python skin really hit home with the students".

Suggestions were made for the traveling trunk. These include to consider including a few hands-on activities, such as a game, to use in K-12 classrooms to illustrate the effect of invasives. Also, to include a banner in the trunk that can be used at public events to draw attention to the display.

Update on New Introductions

Fuller gave a PowerPoint presentation entitled "New Species Occurrences". In the past six months, 84 nonindigenous aquatic species have been confirmed. Three are new to the U.S.; eight are new to the state; 52 are new to drainage; 21 are new to the county. The groups include: 31 fish, 29 mollusks, and 11 reptiles. Some of these NAS include: brown hoplo; giant applesnail; red-bellied pacu; Cuban treefrog; lowland cichlid; giant cichlid; silver carp; redtail catfish; zebra mussel; quagga mussel; Chinese mysterysnail; Japanese mysterysnail.

REEF's Lionfish Control Programs

Akins gave a PowerPoint presentation entitled "Lionfish Collecting and Handling Workshops in the Southeast United States". Headquarters for REEF are located in Key Largo, with an office at Scripps, San Diego. There are 60,000 members. Over 197,000 fish surveys have been done.

Projects include: grouper, fish survey, and artificial reefs. There are education and trip programs. Exotic and invasive species involve regional management, research, control, and outreach.

A "Field Guide to the Nonindigenous Marine Fishes of Florida" was created through collaboration by USGS, NOAA, and REEF.

There has been a 95% reduction in fish biomass on Bahamian reefs between 2007-2010. Lionfish impacts can be minimized by population suppression. Local control can be effective through training, focused effort, regular visitation, prioritizing sites, removal targets, and resource allocation.

In 2013, a lionfish derby was held in Green Turtle Cay, Bahamas. After the derby, there was a 75% decline in a 180sq km area.

In October 2013, an Invasive Lionfish Collecting and Handling Workshop was held in Cape Canaveral, FL.

In 2015, lionfish workshops were held at many locations in the southeast. The workshops focused on lionfish background, biology/ecology, impacts, control and techniques, and hands-on training. In May 2015, the Reef Environmental Education Foundation and Audubon Nature Institute held an Invasive Lionfish Collecting and Handling Workshop in New Orleans, LA. A lionfish workshop was held at the Gulf Coast Research Laboratory in Ocean Springs, MS in May, 2015.

"The Lionfish Cookbook – The Caribbean's New Delicacy" has been published by REEF.
Lionfish capture and removal has been allowed in the Florida Keys National Marine Sanctuary. Permits are issued to capture lionfish in the 18 sanctuary preservation areas only. Training is provided, and participants must attend a workshop and complete a Lionfish Response Review. The permit must be carried at all times while on the water in the sanctuary.

Update on the 2015 USFWS Region 4 AIS Small Grants Program

Ballard gave a PowerPoint presentation entitled "Update on the Selected Projects for 2015". In April, all proposals were sent to the review committee for individual ranking. In May, a meeting was held with GSARP the review committee to discuss averaged proposal rankings, and the final ranking was sent to FWS for review. Notifications indicating funding status were sent to all PIs. Eight projects were funded, and sub awards were sent out. Total funding provided was over $185,000.

Next year, the RFP for the 2016 funding opportunity will be reviewed, and any necessary changes will be made. In order to make the funding available before the peak sampling season, the process will be expedited as much as possible. The proposal review and ranking process will be assessed, and changes made if necessary.

State Reports/ Members Forum

Alabama

Rider reported that two fishing guides from north Alabama were recently charged with illegal importation, possession, and selling of blueback herring, which is considered an invasive species in Alabama. The herring were used as bait for striped bass fishing charters. Alabama law prohibits the importation of invasive species that pose a threat to native wildlife and public safety. Blueback herring have become established in Lewis Smith Lake, and threaten to disrupt the lake's gamefish composition and feeding habits. Based on information from local anglers, state biologists think these fish were purposely introduced to augment the lake's baitfish population. A study has been funded through Auburn University to examine the potential impacts of blueback herring on the fishery in Lewis Smith Lake.

A young-of-the year flathead catfish was collected in Lake Eufala in May.

An Oscar was recently caught in Lake Martin.

During April and May, USFWS and AL DWFF biologists collected eDNA samples from the Alabama portion of the Tennessee River to try and identify the invasion front of Silver Carp. There was one eDNA-positive detection identified in Wilson Dam tailwaters in Pickwick Reservoir. There were four positive detections for Bighead Carp, and two positive detections for Silver Carp in the Guntersville Dam tailwaters in Wheeler Reservoir. A silver carp was caught by a recreational angler below Wilson Dam in April. Over 40 sightings were reported to the NAS website.

Florida

Sommers reported that over 2,000 lionfish were removed from Florida waters during the Lionfish Removal and Awareness Day held on May 16-17, 2015. Twelve events were held around the state. In Pensacola, more than 3,000 people attended the festival. Six local celebrity chefs prepared lionfish tastings to demonstrate how easy it is for the general public to be involved in lionfish removal efforts. Guy Harvey and the Mayor of Pensacola attended the event. It was covered by over 50 media outlets.

A small number of tiger shrimp reports continue to be received by FWC from around the state.

In May, the 6th Annual Everglades Cooperative Invasive Species Management Area Nonnative Fish Roundup was held. The primary objectives of this event are to promote consumptive use of nonnative fishes and increase public awareness of nonnative fish issues. Over 1,000 fish comprised of 15 different species were brought in during the one-day event. No new species of nonnative fish were caught.

Swamp eels were collected from four interconnected locations in Hardee County.

Bullseye snakehead have expanded their range into more of southern Palm Beach County, most likely due to illegal releases.

The Bullseye Snakehead Roundup 2015 tournament season ended in September. Six catch, keep, and kill tournaments were held. The total number of bullseye caught was 827. Anglers are being recruited from the tournaments to assist in determining the distribution of nonnative fish, especially in waterbodies that cannot be sampled by standard methods.

FWC is assisting the USGS in an eDNA study that will help define the range of bullseye snakehead in south Florida.

In July, a 12-month study on blackbelt cichlid in the West Palm Beach Canal was initiated to determine life history attributes, including stomach contents, fecundity,band spawning seasonality.

At the Everglades Cooperative Invasive Species Management Area Summit in July, FWC hosted a nonnative fish breakout session. Upcoming events were discussed with interested partners, such as the Nonnative Fish Catch; Click and Submit Contest; a Fish Chat; and the 7th Annual Nonnative Fish Roundup.

The majority of permits issued during June-September 2015 were for removal and transport of conditional reptiles – primarily Burmese pythons. The FWC python removal program continues to be a popular citizen-based effort program. The number of persons permitted through the program continues to grow yearly.

Schmitz gave a PowerPoint presentation entitled "Research and Outreach: The Foundation of Good Invasive Plant management in Florida". Their budget was increased this year by $5 million. Since 1970, over $28 million has been spent for research and outreach. The majority of research funds were spent on hydrilla, and the majority of funds spent by category was for biocontrol. When successful, biocontrol provides long-term, sustainable suppression of weed populations.

Schmitz will be retiring at the end of January.

Georgia

Bonvechio provided an update on the Satilla River Flathead Catfish Removal Project. During the 2015 sampling season, 8,428 flathead catfish were removed. Since 2007, over 55,000 flathead catfish have been removed. Suppression of the flathead catfish population in the Satilla River has been demonstrated through measured changes in biomass, size, and age-structure.

Anglers reported a few large redbreast sunfish, including 10 inch "Roosters" that were caught in the heart of the flathead catfish removal area.

The river record largemouth bass of 12 pounds was caught on March 27th.

In October, a 140mm TL shoal bass was caught and released on the Altamaha River by DNR personnel conducting electrofishing. The shoal bass is a very popular riverine sportfish in Georgia and Florida, and is native to the Flint and Appalachicola Rivers and its drainages.

Four small patches of water hyacinth were removed from the canal in the Okefenokee Swamp leading to Stephen C. Foster State Park to Billy's Lake.

After draining a pond at the Georgia DNR Bowens Mill Fish Hatchery in January, a large 6 inch White River crayfish and two smaller individuals were obtained. The crayfish were most likely brought in from Arkansas on a truck with a load of fathead minnows last spring.

In January 2015, giant salvinia was discovered in a pond in Evans County. The contamination originated from an upstream pond, which discharges into the lower pond. The upstream pond had

100% coverage coverage of giant salvinia, and the downstream pond had approximately 50-60% coverage. Control of the salvinia was achieved through the use of a combination of liquid and granular fluridone herbicides. The infested areas will be monitored and retreated as necessary throughout the season.

The Georgia Department of Natural Resources Fisheries Management Section is instituting a protocol to collect and test grass carp, in a proactive effort to monitor grass carp ploidy and to minimize the potential establishment of wild grass carp populations in state-managed waters. From November 2014-April 2015, 10 wild grass carp were captured and submitted for triploid testing. All 10 of the fish tested positive as triploids.

Mississippi

Burris reported that 50 field surveys, and two aerial surveys were conducted for early detection of AIS. New infestations of kudzu were discovered in the Jourdan River and manually removed.

Beach vitex was discovered on Deer Island by a Mississippi Habitat Steward during a bird survey. The single plant infestation was manually removed by DMR Invasive Species Program personnel.

In Robinson Bayou in the Pascagoula River, 406 giant apple snail egg masses were destroyed during weekly apple snail control missions. Seven live snails were captured and checked for rat lung worm parasite. All snails tested negative.

Eleven Asian tiger shrimp captured in Mississippi were confirmed and reported to the NAS database.

A small population of common salvinia was manually removed from the Wolf River.

Burris reported on coordination and outreach activities. Specimens from the GSARP Traveling Trunk of Invasive Species were displayed at the Celebrate the Gulf Marine Education Festival in Pass Christian.

Lionfish catch and seafood surveys were conducted at the Gulf South Fishing Rodeo, and online through the MDMR website.

A downloadable/printable 18” x 24” invasive species educational poster that is distributed via the MDMR website was produced.

Riecke provided the freshwater report. The Aquatic Nuisance Species 2014 Report to Congress was reviewed and revised.

Two meetings were held with groups trying to establish an Asian Carp processing facility in Mississippi. Special harvest permits were issued to Moon River Foods to use stabilized seines

and fixed barrier nets to harvest Asian carp in lakes and rivers. Commercial fishermen are being recruited to harvest the carp. Two containers of gutted, frozen carp have been shipped to China.

The "Stop Aquatic Hitchhikers" logo and message has been placed in the Commercial Fishing Laws and Regulations brochure, and 8,000 copies were printed.

The "Stop Aquatic Hitchhikers" cards continue to be reprinted and distributed along with all boat registrations or renewals that are mailed out.

Links to the Mississippi River Basin Panel on Aquatic Nuisance Species, Gulf and South Atlantic Regional Panel on Aquatic Invasive Species, "Stop Aquatic Hitchhikers", and Habitattitude websites are on the department website.

The Mississippi Museum of Natural Science has a permanent exhibit on exotic species.

The Mississippi Aquatic Invasive Species Council will be formed to guide implementation of the activities specified in the *Mississippi State Management Plan for Aquatic Invasive Species*.

Freshwater fishing bait regulations will be composed to specify what bait can be legally sold, possessed, transported, and used in Mississippi.

A list of approved, restricted, and prohibited species as specified in the Mississippi State Management Plan for Aquatic Invasive Species will be adopted.

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

Mississippi contacts listed in the Expert Taxonomic Database will be updated and expanded.

North Carolina

Flora reported that there were 23 tiger shrimp reports in 2014. Fourteen were confirmed. Gear types included cast nets, trawls, channel nets, and a crab pot. So far in 2015, there have only been two reports, with one being confirmed. Tiger shrimp have now been added to trip tickets.

The Chinese mystery snail is found from the Catawba basin, Yadkin/Pee Dee basin, Cape Fear basin, and the Roanoke Basin. Inland Fisheries Division staff will continue to monitor for the snails, and is in the process of producing educational materials for the public.

Gill lice have been found on brook trout and rainbow trout populations, with each species of trout being infected by a different species of gill lice. Although it has only been documented on rainbow trout, this copepod has the potential to affect the state's only kokanee salmon population within the Nantahala Reservoir.

The current funding mechanism for the Aquatic Weed Control Program is the Shallow Draft Navigation Channel Dredging and Lake Maintenance Fund. This is the first time state funds have been allocated to invasive aquatic plant management on a recurring basis in NC.

Albemarle-Pamlico National Estuary Partnership (APNEP), along with several government organizations and a citizen science monitoring network, have begun a baseline survey of Hydrilla spread in the Albemarle Sound. The APNEP is currently forming a small Hydrilla Technical Advisory Group. The group will draft an action plan on how to monitor and manage hydrilla. Signs are also being posted at boat ramps to educate boaters and other users on stopping the spread of aquatic vegetation.

The NC Aquatic Nuisance Species Management Plan has been finalized by the working group and is currently being sent for the Governor's signature. It will be submitted to the Task Force for approval at the next meeting.

South Carolina

Kingsley-Smith reported that FY2015 funding under the state and interstate ANS Management Plan Program was secured to improve understanding of the recent invasion of the South Atlantic Bight and Gulf of Mexico by the Asian tiger shrimp. A temporary biologist has been hired to work on both tiger shrimp and island apple snails.

The first 2015 report of tiger shrimp from South Carolina waters was made on July 13th. Since then, five other specimens collected have been donated to the SCDNR. The preservation and archiving of pleopod tissue samples for genetic analyses that commenced in 2008 continues as specimens become available. These samples are being held in a tissue repository in Beaufort, NC.

Collections of island apple snail shells were reported in 2010 and 2011 from a location in Mount Pleasant, SC. It was believed that this population had been eradicated following chemical treatment and cold winters; however, a site visit in August 2014 revealed the presence of empty shells and egg masses deposited during the previous season. In August 2015, apple snails and egg clutches were observed in the pond and also several surrounding ponds, suggesting that the population may be spreading.

A site in West Ashley, SC was revisited where apple snails had previously been observed. An empty shell, a dead snail, and a live snail were observed. In April, the pond was revisited, and 65 live snails were collected. All snails and accessible egg clutches were collected and brought back to the laboratory for studies. Researchers have sampled the site every two weeks between May and September 2015. All snails observed were removed, and all accessible egg masses were destroyed. This study will continue until no newly laid egg masses are observed. To date, 485 live snails have been removed from this single pond, and 2,033 egg masses have been destroyed. In September 2015, all ponds nearby were sampled biweekly for the presence of snails or egg masses to determine the extent of the population. Of the 23 ponds surveyed, eight additional

ponds contained apple snails and egg masses. In addition, egg masses were observed in small creeks running from ponds into wooded areas.

In a residential pond on Hilton Head Island, an additional invasive snail species was discovered. All ages and sizes of *Melanoides tuberculata* were found. This is a freshwater gastropod native to Northern Africa. In addition, an established population of *Pyrgophorus spinosus* was found in a ditch at the same location on Hilton Head Island, which represents the first record of this species reported north of Florida.

In the spring of 2015, funding was secured from a State Wildlife Grant for a study to characterize invasive Indo-Pacific lionfish populations in the Atlantic off of the southeastern United States. The funding will support the analysis of data collected from an ongoing trap/video survey to provide estimates that have been requested by researchers and managers for some time, and will be important for monitoring and management purposes. In 2010, video cameras were included on all chevron traps deployed. Currently, SERFS deploys about 1,500 traps in the region annually. The videos are examined for individual fish counts of fish species that are important for fisheries management in South Carolina and across the region. In addition, bottom habitat characteristics were recorded and paired with environmental data, such as depth, temperature, and salinity collected at each location. Over 10% of all videos examined have contained lionfish. A final report is expected in December 2015.

In addition to that research, a College of Charleston graduate student is currently undertaking a comparative analysis of invasive lionfish population demographics among four areas of its invasive range.

Researchers at the SC Department of Natural Resources recently found that at least 45% of American eels are infected with the swimbladder parasite, *Angullicoloides crassus* in the estuaries of SC, and that the young glass eel stages become heavily infected within months of recruiting to coastal habitats from their oceanic spawning areas. South Carolina is one of two states in the U.S. where harvesting glass eels is still permitted. *Angullicoloides crassus* is a nematode of Asian origin that infects the swimbladder of its native host, the Japanese eel *Anguilla japonica*. It was unintentionally introduced to the U.S. in the 1990s, where it now infects the American eel *Anguilla rostrata*. It is one of several factors that may have caused a decline in American eel numbers. Using funding from the USFWS during 2014-2015, SCDNR staff successfully developed and optimized a species-specific qPCR assay for *A. crassus* with the ability to differentiate this invasive species from closely-related parasitic nematode species found in local ecosystems. Through a grant from USFWS in 2015-2016, the molecular detection tool will be applied in a field setting. Following field validation efforts, broader surveys using the qPCR approach will help to better characterize the current distribution and rate of spread of this invasive parasite of American eels.

Texas

Hartman reported that tiger shrimp are being found up and down the coast.

Lionfish are being caught by commercial shrimpers.

A Texas-only, invitation-only lionfish workshop will be held in Corpus Christi in February. Discussions will focus on priorities, current research, funding sources, outreach, and control methods.

Public outreach: Campaign being created to prevent aquarium dumping.

Additional monies awarded were $7 million, which are available for weed management and control, but also for habitat restoration, research, education, and outreach.

McMahon reported that zebra mussels have infested central and northeast Texas waters.

U.S. Army Corps of Engineers

Lane reported that crested floating heart is expanding quickly in numerous water bodies.

In the research realm, at the University of Florida, they are creating aquatic labeled grass herbicides. Field trials are currently being conducted.

USFWS

Strakosh reported on grants and funding. They are hoping to increase their funding towards GSARP this year.

HARC

Gonzalez reported that the Galveston Bay National Estuary Program, a forum for invasive species, was dormant for several years, but has started up again. A meeting was held in August.

Massive rain and flooding on Memorial Day have caused water hyacinth and other aquatic invasive species to become dislodged from upper regions and travel to other areas.

Discussion of ANSTF Recommendations

Provide increased financial support to the panels and identify alternative funding sources that the panels can utilize to support annual meetings, coordination, and panel activities. **McMahon made a Motion to accept the recommendation. The Motion was seconded, and passed.**

Encourage the Federal Lands Committee to explore options for federal agencies to clarify situational authorities, support full implementation of agency authorities, and harmonize policies across federal agencies for the movement of aquatic nuisance species onto and off federal lands and waters. **Page made a Motion to accept the recommendation. The Motion was seconded, and passed.**

Establish an ANSTF Ad-hoc committee specific to the boat industry. **Akins made a Motion to accept the recommendation. The Motion was seconded, and passed.**

Have a presentation on the potential use of CRISPR in the control and management of ANS at the next ANSTF meeting. **Riecke made a Motion to accept the recommendation. The Motion was seconded, and passed.**

Encourage ANSTF member agencies to continue to explore development of new barrier technologies that will address the problem of bio-directional inter-basin movement of ANS. **Fuller made a Motion to accept the recommendation. The Motion was seconded, and passed.**

Election of Officers

Kristen Sommers was elected Chairman.

Lisa Gonzalez was elected Vice Chairman

Other Business

Hartman made a motion to change the bylaws. The amended bylaws will be sent by Ballard, along with the original bylaws. The amendments will be voted on. McMahon seconded.

Next Meeting Time and Place

The location of the next meeting will be in Alabama.

The next meeting will take place the first week in April.

Public Comment

Fuller provided the opportunity for public comment. There was none.

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