GULF & SOUTH ATLANTIC REGIONAL PANEL
ON AQUATIC INVASIVE SPECIES
MINUTES
Thursday, September 18, 2014
Houston, TX

On Thursday, September 18, 2014 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
James Ballard, GSMFC, Ocean Springs, MS
Tim Bonvechio, GA DNR, Waycross, GA
Robert Bourgeois, LA Dept. of Wildlife & Fisheries, Baton Rouge, LA
David Britton, US FWS, Arlington, TX
Rick Burris, MS DMR, Biloxi, MS
Paul Carangelo, Port Authority, Corpus Christi, TX
Earl Chilton, TPWD, Austin, TX
Pam Fuller, USGS, Gainesville, FL
Lisa Gonzalez, HARC, The Woodlands, TX
Leslie Hartman, TPWD, Palacios, TX
David Knott, At-Large Member, Charleston, SC
Robert McMahon, UT Arlington, Arlington, TX
Steven J. Rider, AL DCNR, Montgomery, AL
Dennis Riecke, MS DWFP, Jackson, MS
Don Schmitz, FL FWC, Tallahassee, FL
Peter Kingsley-Smith, SC DNR, Charleston, SC
Kristen Sommers, FL FWC, Tallahassee, FL
Lindsey Staszak, NC DENR-DMF, Elizabeth City, NC
John Teem, FL DOA, Tallahassee, FL
Linda Walters, UCF, Orlando, FL

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

Others
Robert Adami, TPWD, Corpus Christi, TX
Thomas Decker, TPWD, Brookeland, TX
Jackson Gross, Smith-Root, Inc., Vancouver, WA
Jack Hill, Sam Houston State University, Huntsville, TX
Ya Sheng Juan, TPWD, Brownsville, TX
Craig Martin, USFWS, Falls Church, VA

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

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

Approval of Minutes
After a minor change, the minutes of the meeting of the April 8-9, 2014 meeting in Gulfport, MS were presented for approval.

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

Building a Consensus on Lionfish in the Western Gulf of Mexico
Read Porter, the Director of the Invasive Species Program at the Environmental Law Institute (EPI), gave a PowerPoint Presentation entitled 'Implementation of the National Lionfish Prevention and Management Plan in the Gulf of Mexico'. The Environmental Law Institute has been in existence for 40 years, and is headquartered in Washington, D.C. They are a non-profit, non-partisan, non-advocacy group. They are an environmental policy research and education group. Their focus is on implementation, and moving forward in terms of environmental outcomes.

The EPI's Invasive Species Program was launched in 2000 as an initiative of the Center for State, Local, and Regional Environmental Programs. They produce publications, and hold seminars and workshops. They are a founding member of the National Environmental Coalition on Invasive Species (NECIS). They are currently co-sponsoring a webinar series with the National Invasive Species Council. Their ongoing work across the state and federal policy landscape includes implementation of plant risk assessment, bioenergy state model law and federal policy, introduction and movement of shellfish, and other issues. They are a resource for policymakers.

In the Gulf of Mexico and Caribbean, their work involves fisheries management for enforcement and compliance studies, including in Gulf snapper and grouper fisheries through NSGLC. Their aquaculture work consists of improving policy and implementation for aquaculture in federal ocean waters. They are educating the public on how to engage on the Deepwater Horizon response for restoration. For ocean management, they are developing new laws in Antigua and Barbuda, and evaluating MPA enforcement laws across the Caribbean. They are working with BSEE to develop new tools to improve safety and environmental compliance for offshore oil and gas.

Porter spoke on the need for lionfish response. Lionfish are spreading, and impacts are increasing. There is a 79% reduction in reef fish populations, and the presence of lionfish on coral reefs undermines coral reef health. Management is needed to mitigate harm to fisheries,

and protect fragile reef ecosystems. With the GSARP-led National Lionfish Plan set to be adopted by ANSTF in November, there is a unique opportunity now to move from planning to action. A next step is a pilot project, with the concept to move from a national plan, to implementation at the state or regional level by creating action plans. This would involve holding a 1-2 day expert workshop to identify collaborators, determine resource availability, and identify gaps and additional resources. The Action Plan will enable collaborators to start implementing NLP in a cohesive manner that integrates science, management, and policy action; build links across expert networks; and seek resources to fill identified gaps. This would begin in Texas to develop the model, and expand on a state-by-state or regional basis. The estimated budget need is $25,000 for the initial workshop, and $15,000 for each subsequent workshop. Budget elements include: travel for participants, meeting costs, and labor to design the workshop/action plan/workshop report. Porter asked for feedback from the Panel on the project plan. If the Panel felt that the project was a good idea, he also requested a formal endorsement by way of a Letter of Support from GSARP. He also requested formal endorsements from member agencies, and ideas on funding sources.

Gonzalez asked if Porter had an idea of what a Texas workshop program would look like in terms of the key elements that would be discussed. He stated that there would be approximately 30 participants. Science, policy, and management would be covered. The workshop would consist of studying the lionfish plan in detail, to look at possible funds, contributors, and to build linkage across organizations and experts.

Knott asked Porter if he had any indication that people in the pet trade industry would be interested in participating. Porter stated that he has not reached out to them, but should.

Hartman suggested bringing in an oil and gas board member, and professional divers when this project develops. Porter plans on including the charter boat industry, and the fishing industry.

Porter stated that one of the values of this project is that it will be specific to each area.

Fuller asked the Panel if they would approve drafting a Letter of Support for the project. **Sommers made a Motion that GSARP would draft a Letter of Support for the project. It was seconded, and the Motion was approved**. **As an Action item, it was decided that the exact wording of the letter will be written at a later date.**

<u>Final Report – Reproductive Sterility for Control and Prevention of AIS</u>

Teem reported on reproductive sterility as a tool for the prevention and control of invasive aquatics. Apple snails are produced as an aquarium product in the aquarium trade. It would be a useful feature if those apple snails were sterile. If an aquarium dump occurred, those sterile apple snails could not become established in the environment.

The project started out with the goal of trying to make sterile apple snails with two species: *Pomacea brigesii* and *Asolene spixi*. The USDA currently allows only *P. brigesii* to be sold and shipped in the U.S. The USDA decided that all other species formally in the trade were potentially invasive, so those species were banned. There are some established populations

recorded in the USGS database. However, *A. spixi* was one of the banned species, and is no longer in trade.

One of the goals was a prevention goal to make a safer aquarium product that would not be able to reproduce in the environment. The other side of the project was to address apple snail infestations in the wild by introducing a sterile apple snail to an invasive population, and suppress the reproduction. Sterile release would be used as a form of control for an existing infestations of apple snails in the wild. Sterile *P. brigesii* could be sold without any requirement for USDA approval. Sterile *A. spixi* cannot be sold without USDA approval. There could be a potential market for both species.

Irradiation of chromosomes produces translocations that pair abnormally during meiosis. Fertility is reduced in irradiated snails in two ways: egg production is decreased, and fertility of eggs is reduced. Viability of irradiated P. brigesii adults decreases at doses of radiation above 130 Gy. Unfortunately, 95% of the snails are killed to get the remaining 5%, which are sterile. This was unacceptable for the purposes that **Teem** had in mind for the snails. Alternative methods were sought that did not involve radiation, and did not affect the viability of the snails.

Mortality is high when snails are irradiated to produce translocation chromosomes. Directed recombination is being investigated as an alternative to irradiation treatment to produce chromosomal translocations. Techniques for getting DNA integrated into snail genomic DNA and expressed are being investigated.

The development of triploid snails would provide a means to generate sterile snails without the high mortality associated with irradiation. Recombination between chromosomes can produce translocations that pair abnormally during meiosis. Getting DNA components into snails is done by transfecting DNA into snail tissue, mating the transfected snail, and collecting eggs for DNA to detect gene expression and DNA by PCR. This was unsuccessful for a long time. **Teem** then used a retrovirus to transfect the DNA into male snail genome, who passed on the genes to the female, who then laid eggs that hatch into hatchlings. DNA was made from the hatchlings, and PCR was done on them.

Mating of the snails will take place this winter. **Teem** will attempt to produce sterile apple snails for sterile release using that system. He received funding from Jeff Herrod at USFWS for that purpose. Sterile-release may provide a means to control apple snail populations if the population is relatively well-controlled and eggs can be collected from the site efficiently.

Teem next discussed another plan for an aquarium trade product. The aquarium trade and farmers have no interest in a sterile apple snail. However, a product might be created that the aquaculture industry would be interested in. One example is a sterile snail that would fluoresce. Male snails are transfected with Green Fluorescent Protein (GFP) plasmid DNA to see if they could be easily identified by green fluorescence. Males transfected with DNA are viable and fertilize females to produce eggs. GFP-transfected snail hatchlings can be viewed under UV light to look for green fluorescence. No green fluorescent hatchlings have been detected yet. PCR analysis of GFP-transfected snails detected no GFP-positive hatchlings yet.

The Invasiveness of *Chaetomorpha* Alga Used in the Aquarium Trade

Walters gave a PowerPoint presentation entitled 'The Next "Killer" Algae? Risk Assessment and Mitigation for Aquarium Strains of the Marine Macroalgal Genus *Chaetomorpha*'.
Caulerpa taxifolia is an invasive species associated with aquarium dumping. Aquarium macroalgae is used as biological filter, and is hardy and easy to obtain. Factors promoting its invasion success include: fast uptake/growth; hardiness; vegetative reproduction.

A study was done on fragment generation, survival, and growth to determine what the minimum viable fragment size would be; if smaller fragments were less likely to survive; if fragments survive under different thermal conditions; and how many viable fragments are generated by hobbyists. Ten aquarium strains of *Chaetomorpha* were purchased. Three species were received: *C. linum*, *C. spiralis*, and *C. crassa*. Fragments generated in transport were counted and measured. They were then cut to lengths 0.5 – 10 mm, and exposed to 5, 22, and 30˚C. The survival and growth of the fragments were monitored over two weeks. There were no significant differences in fragment generation, and no effect of distance shipped/transported.

The study found that the minimum viable fragment size was 0.5 mm. Smaller fragments were not less likely to survive. Fragments can survive under different thermal conditions. Thousands of viable fragments are generated per purchase. Hitchhikers may also be introduced with *Chaetomorpha* purchases. This includes known invasives and their congeners.

Five aquarist disposal techniques were tested on five fragments and one clump of *Chaetomorpha* to determine the minimum exposure times for safe disposal: boiling, microwave; freezing; desiccation, and freezing. Also in question was if the minimum duration increased with the amount of algal tissue. After testing was completed, disposal technique and application recommendations include: boiling purchase water containing algae or tank water after water change for 1 minute; or microwaving for 15 seconds; or freezing for 24 hours in plastic bags; or desiccation with lid for 24+ hours; or desiccation with closed lid for 6+ days and dispose via garbage can destined for a landfill; or freshwater with no light for 6 days and disposal via plumbed sinks or drains (not storm-water drains).

It is important to assess the effectiveness of chemical algicides for the removal of potential invasions of *Chaetomorpha*, but to also limit the detriment to non-target species by minimizing the quantity of chemical use. Three populations of *Chaetomorpha* were tested, using five different eradication methods: chlorine bleach, rock salt, copper sulfate, acetic acid, and sonar. Survival and growth were examined after being exposed to the chemical, rinsed, and re-submerged for four weeks. Chlorine bleach, rock salt, copper sulfate, and sonar were not effective at the tested concentrations. Acetic acid was 4% for one minute and 2% for four minutes. *Chaetomorpha* is harder to eradicate than *Caulerpa*.

For risk mitigation, a two-barrier approach is needed. To prepare for potential invasions, rapid response enabled by prescreened chemicals for eradication and/or management of invasion. To prevent aquarium-release introductions, outreach to aquarists with science-based recommendations.

Two other invasives are *Mytella charruana* in St. Augustine, FL, and Ascidians (Sea Squirts) in Mosquito Lagoon.

Update on the Invasive Parasite (*A.crassus*) of the American Eel

Kingsley-Smith gave a PowerPoint presentation entitled '*Update on the Invasive Parasite, Anguillicoloides crassus, of the American Eel, Anguilla rostrata*.' The native range of the American eel is the Atlantic Coast, Greenland to South America.

Eel vulnerability and decline is due to their high age at maturity, only spawning once, and long life span; they are harvested both commercially and recreationally throughout their range; harvest peaked in 1979, and has been declining for the past 30+ years. Other potential threats are: barriers to their migration, turbine mortality, environmental changes, and *Anguillicoloides crassus*. There has been a decline in eel populations since 2001. Petitions filed with the USFWS and NMMS in 2004 and 2011 to list the American eel as an endangered species are still under review.

Anguillicoloides crassus is a nematode parasite that infects the swim bladder of anguillid eels. They are endemic to East Asia, and infect Japanese eels without causing serious pathology. However, they are extremely pathogenic to non-native eel species such as the American eel and European eel. In 1982, *A. crassus* infections in the European eel caused severe declines in eel numbers, and has rapidly infected eel species in Europe, North Africa, South Africa, and North America.

The first report of *A. crassus* in wild populations of *A. rostrata* was in 1995 in Winyah Bay in South Carolina.

Understanding of the life cycle of *A. crassus* is based largely on European studies. Little research on the life cycle has been done in North America. In April 2014, a meeting of the Southeastern Society of Parasitologists was held in Statesboro, Georgia. The experimental infection of a potential cyclopoid vector of *Anguillicoloides crassus* was discussed at the meeting. European studies have shown that cyclopoid copepods act as intermediate vectors for *A. crassus* infections. Equivalent studies have not previously been conducted in North America. Zooplankton were collected for q-PCR work from Goose Creek Reservoir in South Carolina. Copepods, ostracods, and other invertebrates were exposed to *A. crassus* larvae. Cyclopoid copepod of the genus *Acanthocyclops* selected for experimental infection readily ingested larva, and the larva moved into the hemocoel. *Acanthocyclops* is a potential vector for larvae of *A. crassus*. More research is needed on distribution and seasonality.

Irreversible damage is caused by the parasites feeding on the eel's blood, and by larvae migrating through the swimbladder wall.

Since 2011, research has continued on yellow eels. The objectives are to quantify abundance, prevalence, and intensity of *A. crassus* infections in *A. rostrata*; to determine the factors most closely associated with *A. crassus* infections in *A. rostrata*; and to compare findings with previous studies of *A. crassus* infections in South Carolina *A. rostrata* populations. The

prevalence of all parasite stages was highest at the North Inlet and Cooper River, and lowest at ACE Basin and Little Pee Dee River. There were no significant seasonal differences.

SCDNR electrofishing surveys of swim bladder damage in yellow/silver eels was 89% (64% moderate, 25% severe), which is higher than the prevalence of the parasite.

Since 2012, gravid female *A. crassus* have been observed year-round, such that the life cycle may be maintained all year. For more Northern populations, the occurrence is seasonal.

Little is known about the effects of *A. crassus* on glass eels and elvers, and how susceptible these early stages are to infection. Long-term monitoring of glass eels by the SCDNR Diadromous Finfish Research Section provides access to glass eels. At the Goose Creek Reservoir dam, eel passages were installed in 2012. The project objectives were to determine whether wild-caught glass eels and elvers were infected; to identify the earliest eel life stage infected; and to determine the factors influencing infection. Subsamples of eels were collected between March and December 2013. Eel length, eel pigment stage, and the numbers of *A. crassus* larvae (L3 and L4) and adults in dissected swimbladders were recorded. Late stage glass eels and elvers were infected. Glass eels (n=278): 8% infected. Elvers (n=200): 63% infected. Infection occurs within months of eel recruitment, and *A. crassus* eggs were observed in elver swimbladders. Recent eel recruits to the stuary may not be feeding on intermediate parasite hosts which are unknown in North America, but likely include various species of copepod.

From March to July, the percentage of infections increases with age – likely with pigment stage. After July, the percentage of infection decreases significantly. Possible reasons for the decline include the seasonal loss of intermediate hosts; the upstream migration of infected eels; clearance of parasite from the host; and the mortality of infected eels.

The Gulf States Marine Fisheries Commission awarded a subcontract entitled 'Detection of an Invasive Parasite of American Eels Using qPCR'. The project goals will be 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 in South Carolina; to generate standard curves and establish limits of detection for qPCR through laboratory cultures and infections of intermediate hosts such as copepods; and to use data from qPCR standard curves to quantify parasite abundance and densities in the field.

Update on New Introductions

Fuller gave a PowerPoint presentation entitled 'GSARP Species Updates'. A silver carp was collected on the Mississippi Gulf Coast in St. Louis Bay off the Washington Street pier in April 2014. A bowfin was confirmed in a new drainage in the Oostanaula River in Georgia. A blue Catfish was confirmed in a new drainage in the Satilla River between Blackshear and Hoboken in Georgia in May 2014. A sailfin catfish was confirmed in the Chattahoochee River near Atlanta, Georgia. A marbled pim was collected in Fuchs Park Miami during a fish round-up event in May 2014. A bagre de Rio (*Rhamdia sp.*) was collected in a canal near the intersection of Kendall Drive and Krome Avenue in Florida in May 2014. Also in 2013 and 2014 at this same location. In 1995, a *Rhamdia quelans* was collected from this area. An African clawed frog was collected at a private residence in Riverview in Florida in December 2013. This was the

first in the county/HUC since 1996. In August 2014, another African clawed frog was collected at a private residence in Homestead. This was the first in the county/HUC since 1964. Cuban treefrogs were confirmed in Chapel Hill, NC; at a residence in Crestville, FL; at Eglin Air Force Base, FL; and a nursery in New Orleans, LA. Giant apple snails were found in Lake Seminole in Florida in May 2013; a retention pond in Savannah, Georgia in July 2014; a shallow canal in Robinson Bayou in Mississippi in July 2014. Chinese mystery snail was collected in a pond off Old Alabama Road and Hwy 141 in Georgia in August 2013.

Other invasive findings include: Round goby is moving towards the Mississippi River, and has also moved outside of the Great Lakes basin, and into the Ohio basin. Also, a pimelodid hybrid catfish was collected in the Mississippi River near Ste. Genevieve, MO in July 2014, which is the first occurrence in the nation.

Update on the USFWS Region 4 AIS Small Grants Program

Ballard gave an overview on the program. **Jeff Herod**, who has transitioned out of the coordinator position, had requested at the last GSARP meeting that the Panel take over the Region 4 AIS Small Grants Program. The Panel accepted the request. All proposals were sent by **Ballard** to the GSARP Review Committee on May 6, 2014 for individual ranking. Seventeen proposals were submitted. A meeting was held with the Review Committee on May 29, 2014 to discuss averaged proposal rankings. The final GSARP ranking was sent to FWS for review. Notifications indicating funding status were sent out on June 25, 2014 to all PIs. On August 26, 2014, sub awards were sent out. Eleven projects were funded. Total funding provided was $205,503.

Preparations for next year include: working with FWS to expedite the process in order to make the funding available before the peak sampling season; revising the RFP to request more details on methodologies, expected outcomes, etc.; assessing the proposal review and ranking process and make changes if necessary; revising the "Required Information to Establish a GSMFC Sub Award" information request form to streamline sub award development, which **Ballard** has modified.

Discussion of the 2015-2019 GSARP Guidance Document

Ballard reported that he used comments from the workgroups at the last meeting on how to revise the Strategic Plan, and developed the Guidance Document, which is the updated version of the Strategic Plan. **Ballard** stated that he wanted the Guidance Document approved by the 2015 spring meeting, and requested that the Panel review this latest revision, and let him know of any updates, corrections, etc.

Ballard asked **Hartman** about the status of the Rapid Response Plan, and reminded the Panel that at the last meeting, it was decided that a decision would be made on whether an up-or-down vote would be done. **Hartman** stated that the current Plan should be provided to the Panel for review, and decide if an up-or-down vote would be done. **Ballard** stated that he will send out the document to the Panel as it is, and it will be discussed at the next meeting on whether to be voted up or down, or go back for further review.

Aquatic Nuisance Species Task Force Update

Craig Martin provided an update on the part of the agency budget that supports a large part of the Task Force activities. There is a great deal of uncertainty for FY2015. Currently, it is thought that there will be a continuing resolution through December 11, 2014, with a .06 rescission. This will be at the FY2014 level. If this were to happen for the full FY, they would expect to continue the $1 million for state plan support.

There was a $10,000 reduction in regional Panels that had to be done. It is likely that this would continue at $40,000 per Panel.

The Task Force Executive Secretary, Susan Mangin, retired in March. The position will not be filled at this time.

David Hoskins is the new Co-Chairman of the Task Force.

The National Lionfish Prevention Management Plan is up for approval.

The Task Force is working with the American Boating/Yacht Council, which develops standards for the boating industry. They have proposed a summit that would bring together boat engineers, manufacturers, and marina owners, with aquatic invasive species experts. The intent is to identify boat decontamination challenges, clean/drain/dry challenges, etc. Are there engineering or boat design solutions to those?

Public Comment

Fuller provided the opportunity for public comment. No comments were received.

The meeting recessed at 5:00 p.m.

Thursday, September 18, 2014

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

State Reports/ Members Forum

Alabama

Several invasive species have been documented in Alabama coastal waters: red lionfish, Asian tiger shrimp, Asian green mussel, Australian spotted jellyfish, tessellated blenny, and Bocourt swimming crab. Prey of Australian spotted jellyfish include many commercially and recreationally important finfish. The temporal/spatial distribution of Australian spotted jellyfish could drastically increase finfish larvae/egg mortality rates if spawning events coincide with swarm activities. Similarly, the Bocourt swimming crab could compete for resources of the native blue crab. The current status of the Australian spotted jellyfish, Bocourt swimming crab, tessellated blenny, and Asian green mussel does not indicate that these invasive species pose an

immanent concern. However, the Asian tiger shrimp and red lionfish continue to be invasives of heightened concern.

The Asian tiger shrimp (*Penaeus monodon*) has been a concern since it was first observed in Alabama's inshore waters in 2006. Captures of the tiger shrimp have incrementally increased. In 2011, its distribution extended to northern Mobile Bay and into Perdido and Wolf Bays, which indicates the Asian tiger shrimp occurs within all of Alabama's primary estuary basins. Within the commercial shrimping community, the concern for tiger shrimp has decreased, which has resulted in fewer validated reports. Commercial shrimpers indicate encounters with tiger shrimp, but they no longer record collection information, preserve the specimen, or report encounters to AMRD in a timely manner. There have been no reports of Asian tiger shrimp in 2014. However, evidence suggests that they have become established in Alabama's waters. AMRD continues to focus on documenting occurrence, characterizing the population structure and processing samples for genetic investigation. Efforts are also being made by local academic institutions to acquire live specimens and conduct research regarding behavior and interactions of Asian tiger shrimp with native fauna.

The first confirmed report of lionfish was documented in June 2011 by a spear fisherman who collected one from an oil/gas platform 43 miles south of Dauphin Island. Unconfirmed reports from scuba divers from 2012-2013 indicated lionfish abundance had increased dramatically. A scuba diver reported observing up to 100 lionfish during a dive at an artificial pyramid reef in June 2012. Unconfirmed reports by scuba divers indicate that lionfish are widespread throughout Alabama's artificial reef permit zone.

In December 2012, Alabama Marine Resources Division received a grant from Gulf States Marine Fisheries Commission to monitor reef communities in the Gulf of Mexico, dispatch red lionfish when encountered during scuba surveys, increase public awareness of the lionfish invasion, and streamline the general coordination between state agencies, Federal agencies, and the public. Additional funding was secured from GSMFC to continue the monitoring in 2014 and continue increasing public awareness. In 2014, AMRD personnel have conducted scuba surveys at 13 reef sites; is in the process of developing an Adopt-a-Reef Program; and utilizing local lionfish derbies as a platform for outreach and promotion of the Adopt-a Reef Program. AMRD is coordinating with a software development company to create a web-based application that will allow for the submission and viewing of reports submitted by Adopt-a-Reef participants. One of the responsibilities of Adopt-a-Reef participants is to remove lionfish from their adopted reef.

In an effort to capture additional harvest information for the red lionfish and Asian tiger shrimp, AMRD has incorporated *Pterois sp*. and *Penaeus monodon* into the state's trip ticket program.

AMRD participation in lionfish derbies and the promotion of the Adopt-a-Reef Program is expected to result in routine extermination efforts at important reefs. A page within the Alabama Marine Information Calendar dedicated to educating the public about lionfish and the Adopt-a-Reef Program has been distributed to a variety of establishments, where it becomes readily available to DCNR/MRD constituents.

Rider provided the freshwater invasive species report. The first report of a bighead carp occurring in the Pea/Choctawhatchee River drainage was received this summer. A dead 40lb specimen was found in a private pond adjacent to the river. The carp were never stocked in the pond, and it is believed the fish may have entered the pond during flood conditions.

Commercial paddlefish harvesters on the Alabama River during the 2014 season continued to catch large bighead carp. Paddlefish sampling by ADWFF biologists on the Tombigbee River continued to yield large specimens of bighead carp.

In the Tennessee River, zebra mussel densities remain low. Only six zebra mussels were collected over a six-mile reach of the river last summer.

In the last two years, multiple reports have been received of tilapia catches from the Tombigbee River.

Recreational anglers have caught several oscars in Parker Lake, an oxbow of the Tombigbee River.

Control and eradication efforts continue for island apple snails found in Langan Park and Three Mile Creek in Mobile. The previous treatment area has been expanded an additional 2.2 miles. Two NATRIX treatments done in 2013 were relatively unsuccessful. The 2014 treatment rate increased from 0.3 to 0.5 ppm, based on 72-hour fate tests done (and funded) by SePRO.

In May, a *Pterygoplichthys pardalis x disjunctivus* was caught in a turtle trap from the Dog River in Mobile County.

Blueback herring, a prohibited species in Alabama, have recently been collected from Lake Martin, approximately 30 miles NE of Montgomery.

An unconfirmed report was received of hydrilla in the Yates Reservoir in the Tallapoosa River drainage.

In 2013, water hyacinth was found in 13 locations in the Coosa River, on Neely-Henry Reservoir. The plants were frost damaged, so the decision was made to wait until 2014 to reassess. All sites have been re-surveyed, and only one location still had hyacinths. The site was successfully treated with herbicides.

In 2013, 69 acres of water hyacinth and water lettuce were treated on the Lay, Mitchell, and Jordan Reservoirs. Treatments for 2014 are scheduled to begin within the next two weeks.

Eurasian water milfoil was treated on Lay Lake in 2013. In 2014, 27 surface acres have been treated. No Eurasian water milfoil has been identified on the Coosa or Tallapoosa Rivers in 2014.

Hydrilla was been treated on Lay Lake and Lake Jordan in 2013. No hydrilla has been identified on the Coosa River in 2014.

Since 2006, treatments on lyngbya have been ongoing in Mitchell, Lay, and Jordan Lakes. In some of the treatment areas, there has been success. Treatment acreages for the 2014 season have been decreased. It is anticipated that 2015 will be the same, but lyngbya is still a major concern on those reservoirs.

On the Tallapoosa River, variable leaf milfoil poses a threat to recreation and hydropower generation, even though it is a native species. Approximately 60 acres were identified on Yates Lake in Fall 2013. In August 2014, 26 acres were treated, with little success. During 2013, it reached problematic levels in Thurlow Reservoir. A drawdown 10 feet below normal full pool elevation was done in February 2014 to expose the vegetation to freezing temperatures. Recent surveys show little to no growth. Sterile grass carp were also stocked in the reservoir in 2010 to help control it.

Hydrilla was identified in 2010 in multiple locations along a 15-mile stretch of the unregulated portions of the Tallapoosa River in Cleburne County. Herbicide treatments were done in October 2010, which were minimally successful. Recent surveys in 2014 showed no hydrilla, but this is possibly due to winter/spring rains scouring much of the existing vegetation, and it has not re-established itself.

Florida

Sommers gave an update on lionfish. On August 1, 2014 FWC rules to prohibit the importation of lionfish earlier in 2014 became effective. These new rules prohibit the importation into Florida of all live lionfish belonging to the genus *Pterois*, including devil firefish (*Pterois miles*) and red lionfish (*Pterois volitans*). Only Florida wild-caught lionfish can be sold by wholesale or retail dealers. Rule changes will allow the use of re-breathers while scuba diving to harvest lionfish. A permitting system has also been developed to allow spearfishing for lionfish and other non-native species during approved tournaments and other organized events in areas where spearfishing is not allowed. Additional rule changes to address the ban of breeding lionfish are going to the Commission for acceptance in September 2014.

An outreach and control program is being developed by FWC. The purpose is to: engage the dive community, non-profit organizations, corporations, private citizens, and other groups in statewide control; further educate the public about the lionfish invasion; encourage the participation of those not currently participating in lionfish control efforts; and organize and coordinate control efforts to improve efficiency and identify areas to target. FWC is attending lionfish derbies and other events, and will holding statewide workshops demonstrating safe lionfish cleaning and handling practices. A large statewide outreach event is being planned for the Spring/Summer of 2015.

Lionfish sightings and captures can now be reported via FWC's website. On May 28th, a new lionfish reporting application ("Report Florida Lionfish") for use on smart devices, was developed and released to the public. Over 2,500 people have downloaded the app. The FWC will use the data to help identify sites where targeted lionfish removal might be most beneficial. The data will be available to the public and shared with other groups and agencies that collect this kind of information.

On May 17th, FWC staff assisted in the coordination and implementation of the 5th Annual ECISMA Non-native Fish Round-Up. The goals of this annual tournament are to increase public awareness about the potential negative impacts of releasing non-native fish into Florida's waters, and to promote the consumptive use of these unwanted but available resources. A total of 55 anglers registered for the event, and caught 18 different species of fish. Almost 600 pounds of exotic fish were removed from south Florida waters as a result of the roundup. This year, two new species of non-native fish were collected in Miami-Dade County. Two silver catfish were caught from a roadside dish, and a Marbled Pim was caught from a small, city park pond. FWC conducted two follow-up surveys to assess the status of these new discoveries. Two additional specimens of silver catfish were collected, but no other Marbled Pim were found.

FWC staff conducted a one-day electrofishing survey of the L-30 Canal in Miami-Dade County, as part of a joint effort with the Everglades Cooperative Invasive Species Management Area (ECISMA) to assess fish communities in southeast Florida canals that have not been routinely sampled. African jewelfish, Asian swamp eel, brown hoplo, and blue tilapia were additional exotic fish species collected. FWC last sampled the canal in 1998. These new exotic fish species are widespread and abundant in southeast Florida canals.

The results of a study done on bullseye snakehead and bowfin were summarized, and will be presented at the October Southeastern Association of Fish and Wildlife Agencies Conference in Destin, Florida. These morphologically similar fish co-occur in several southeast Florida urban canals. In September 2013, a 12-month study was completed that demonstrated there was a high dietary similarity between bullseye snakehead and bowfin, with biologically significant overlap indices at all sizes of fish examined. A difference in spawning seasonality may reduce potential negative feeding associations between young-of-year of these species. In standardized electrofishing, there were no significant negative correlations in catch rates. These data suggest that despite their ecomorphological similarities, bullseye snakehead do not appear to be having a measureable negative impact on bowfin.

Schmitz reported on new developments with aquatic herbicides, herbicide resistance strategies, and biological controls targeting invasive aquatic plants in Florida. From 1980 – 2013, over $346 million has been spent on controlling aquatic invasive plants on 1,436,001 acres in Florida.

Since the mid-1980s, Fluridone was the tool relied on to manage large hydrilla infestations in big central Florida lakes. In 2009, out of 205 samples of hydrilla collected across Florida, there were at least 127 unique genotypes. In 2001, there were only six herbicide compounds registered for use in natural area aquatic systems. Two plans: Plan A. - Register new herbicides. To obtain U.S. EPA registration for herbicide use in water, there are more than 140 health and environmental tests. It takes 8-10 years for full EPA registration, and $40-60 million to register for aquatic site use. Plan B. – Contracted research into finding registered herbicides for use in natural aquatic areas. The cost: $729,767. In 2014, there are 14 herbicides, and 27 formulations available. Field testing stages for using newly labeled aquatic herbicides: Start out in small ponds; small lakes; small areas of large systems, shoreline strips; fully operational, large scale treatments. This is a 3-5 year process. Endothall provides almost complete control of hydrilla. For water hyacinth control, the problem is that treating mixed communities of invasive and non-target species results

in short-term injury or death to bulrush, spikerush, sagittaria, etc. With 2, 4-D and diquat use, there is strong visual injury symptoms or control of non-target natives.

All seven herbicides registered for aquatic use since 2003 are single site enzyme inhibitors, classes of compounds in which resistance has been documented in terrestrial applications. Herbicide resistance management strategies employed in Florida aquatic sites are to eliminate pioneer invasive plant populations; manage at low levels to avoid large scale herbicide applications; apply only when success is most likely; rotate active ingredients where feasible; combine active ingredients if cost-effective; apply follow-up applications with different methods; integrate chemical, physical, and bio-controls; and control plants before they produce seeds and tubers. Limitations to herbicide resistance management strategies include being unable to use maximum rates because of cost and/or selectivity reasons; reduced non-target selectivity by certain herbicides; water flow and exchange impacting optimum rates; regulatory constraints; stakeholder objection; and long-term field testing required to justify use in sensitive areas.

The search for insects for biocontrol began in 1981, and 85 spp. were evaluated. Insect biocontrols released for hydrilla include two weevils and two flies. From 1972-2010, $1.65 million was spent on biological control research on hydrilla. FWC research funding ended in 2010. *Megamelus scutellaris* was released in 2010 and is specific to water hyacinth.

Outreach efforts include industry and research summits, management workshops, industry updates, and operation reviews. Tech exchanges have also been done in the form of industry tech exchange workshops, FWC workshops and research reviews, and a UF-IFAS short course/FAPMS.

Georgia

Bonvechio reported on the Satilla River Flathead Catfish Removal Project. Flathead catfish were illegally introduced and first observed in the Satilla River in 1996. The Satilla River is one of the premier sunfish fisheries in the state of Georgia, with redbreast sunfish being one of the most sought-after species. During the mid-2000s, standardized sampling and creel surveys revealed declines in abundances of redbreast sunfish and bullhead catfishes, coincided with significant increases in the abundance of flathead catfish.

The Georgia Wildlife Resources Division (WRD) Fisheries Management Section (FM) began removing flathead catfish from the Satilla River in an effort to reverse the impacts of flathead catfish on native fish populations. Despite these efforts, the number and size of flathead catfish continue to increase.

Since 2007, more than 44,471 flathead catfish have been removed. During the 2014 May – October sampling season, 13,655 flathead catfish were removed. Numbers from this year's sampling effort show an increase in several flathead catfish population indices, including average weight and length, CPUE, and biomass per hour removed. This is due to the high water on the Satilla River for 18 months leading up to this year's sampling. The size structure of the population has declined, with the average-size fish removed progressively dropping from 5.8 pounds in 2007, to 0.8 pounds in 2013. In 2014, the size increased some to 1.2 pounds.

There appears to be a compensatory shift in sexual maturity due to increased exploitation. Gravid, turning Age-2 females have been found in multiple sampling years, ranging in size from 200 to 251 mm TL.

Suppression of flathead catfish population in the Satilla River has been demonstrated through measured changes in biomass, size, and age-structure. However, higher recruitment and earlier maturation is being witnessed. Intensive harvest will be required to prevent the flathead population from rebuilding. Successive high water from fall 2012 to spring 2014 appears to have helped the flathead population rebound.
Impressive stringers of large redbreast sunfish are being reported by anglers. In the heart of the flathead catfish removal area, 10-inch "Roosters" are being caught. The redbreast sunfish increase may be due in part to the reduction of large catfish in the Satilla River, but other contributing factors also played a part, such as the water level and fishing effort.

On West Point Lake, a 10-12" smallmouth bass was caught and released in March 2014. An electrofishing survey was done in the Turkey Creek area around the angler's dock. A total of 68 largemouth bass and nine spotted bass were caught, but the released smallmouth bass was not recovered.

The WRD flathead catfish removal crew documented the non-indigenous range expansion of the Blue Catfish in the Satilla River during sampling in 2011. Seven blue catfish were recovered in 2011. Ages ranged from 3-5 years old. Blue catfish were not collected during 2012-2013 sampling. Two juv3enile blue catfish were obtained from an angler in May 2014 on the Satilla River out of the FFA camp boat ramp. The fish were caught at the confluence of the Alabama and Satilla rivers. This is about 100 river miles further upstream than the first documentation in 2011.

A pleco was found lethargically swimming near a boat ramp on the Chattahoochee River in July 2014, and was most likely an aquarium release. The fish was released by the fishing guide who encountered it.

Channeled apple snails were found by a WRD non-game biologist at the Towne Lake Subdivision near Savannah in July 2014. Pink egg masses and live apple snails were found.

Brazilian Pepper was found in the Turtle Creek drainage on the Jekyll Island Causeway in July 2014. WRD treated the site, and it is believed that the kill is complete. If necessary, it will be re-treated in the fall.

The Fisheries Management Section of the Georgia Department of Natural Resources is instituting a protocol to collect and test grass carp ploidy. This is a proactive effort to monitor grass carp ploidy, and to minimize the potential establishment of wild grass carp populations in state managed waters. This protocol should be put into action by October 2014.

Louisiana

Bourgeois reported that, as of fall 2014, approximately 28,000 acres of aquatic nuisance weeds have been treated by LDWF spray crews and private spray crews.

Areas previously controlled by the U.S. Army Corps of Engineers (USACE) remain a priority in 2014 - especially large areas of the Terrebonne marsh and Henderson Lake. Approximately 6,500 acres in these areas have been treated so far in 2014 by LDWF spray crews and private applicators. The majority of this effort was directed toward water hyacinth control, but giant salvinia was also treated. The USACE Removal of Aquatic Growth Program has resumed on a limited basis. They have treated a significant water hyacinth infestation in Bayou Petit Caillou in Terrabonne Parish. They will also aid LDWF by providing water hyacinth control efforts in Henderson Lake and Bayou Lafourche, Bayou Terrebonne, Bayou Grand Caillou, and Bayou Pointe au Chien, if necessary.

Since 2005, giant salvinia has been a major focus of aquatic plant control efforts in Louisiana. The combination of herbicide appplications, water level fluctuation, and biological control is being used to keep giant salvinia coverage at a level that allows for recreational use of waterbodies.

The unusually cold temperatures associated with the past winter significantly reduced the amount of giant salvinia present this spring. However, salvinia coverage in most waterbodies returned to near normal levels by mid-July. To keep salvinia infestations at manageable levels, regular herbicide applications and drawdowns are currently being used. A large-scale fluridone treatment will be done in Saline Lake as part of a drawdown there in an attempt to reduce giant salvinia growth in the heavily timbered areas of the lake. In 2009, a similar treatment with penoxsulam herbicide was done on Saline Lake, which resulted in three years of residual control.

Monitoring and giant salvinia weevil stocking efforts have continued in 2014. Weevils have been released throughout the state, including on relatively new infestations in Henderson Lake and the St. Bernard marsh. Herbicide applications are necessary to maintain access in some areas, but the weevils seem to be slowing the growth rate of the plant significantly.

The LDWF and LSU Agricultural Center have entered into an agreement to research and potentially develop a population of cold-tolerant weevils for use in north Louisiana. Weevils that survived last winter in north Louisiana lakes will be the foundation of this population. After many generations and several cold exposures, it is expected that a cold-tolerant weevil population will be created that can be mass produced for stocking across north Louisiana. The LSU AgCenter will also be researching factors that may contribute to winter survival, such as flight ability and habitat type.

There were no reports of tiger shrimp from November 2013 to August 2014. There have been approximately 20 reports of tiger shrimp as of September 2014.

Through contacts within the commercial diving industry, several reports of lionfish have been received. LDWF was contacted by one company that has made recording lionfish a part of their company policy, and provides LDWF with periodic spreadsheets of sightings.

Due to the increase of apple snail interest, an apple snail conference was held. The conference was attended by researchers who are studying some aspect of apple snails. Also present were state, parish, and Federal agencies. This group will meet again in early 2015.

A LDWF 2013 ANS grant to survey selected public urban ponds in Baton Rouge and Lafayette for the presence of ANS is complete, with the exception of some analysis. The only exotic species found so far in the samples were plants.

The 2014 ANS grant will be used to stud the trophic effects of Asian carp on some LA oxbows.

LDWF received a USFWS grant to extend and expand the 2012 ANS grant for drift net sampling for Asian carp. The first summer of sampling ichthyoplankton is finished, and the samples are currently being analyzed to determine the presence, relative abundance, and distribution of Asian carp. This baseline information from 2012 will be used to model distributions, understand recruitment and metapopulation dynamics, assess impacts, and inform management of these aquatic invasive species. The 2013-2014 grant will be used to expand sample site coverage and help further our understanding of these species.

A large effort is being made by the LDWF Extension section for better public outreach/education of ANS via public festivals, fishing tournaments, outdoor exhibitions, boat shows, etc.

LDWF is posting brochures, links, and articles about ANS species/concerns on their Facebook page. To date, information on tiger shrimp, Rio Grande cichlids, lionfish, and northern snakehead have been shared.

The state wildlife action plan is under revision, and the Introduced and Exotic Species section will be expanded in this version, which will hopefully result in an increase in State Wildlife Grants that will provide needed research on ANS species. One ANS-related grant has been submitted for funding so far.

Mississippi

Burris reported on invasive species activities that took place between April and August 2014. New infestations of silver carp, giant apple snail, and Eurasian watermilfoil were discovered during that period, and reported to either the NAS database or EDD Maps.

Twenty-three field surveys for early detection of AIS were conducted, totaling 330 miles.

A low-altitude aerial photo survey of 163 miles was conducted to aid in the early detection of AIS, and to help monitor on-going control efforts.

Three confirmed sightings of invasive Asian tiger shrimp were reported to the NAS database. Two of the shrimp were captured live and made available for use in a study at Dauphin Island Sea Lab.

On Coastal Preserve lands, 268 feral hogs were eliminated by USDA Wildlife Service's biologists using helicopter hunting techniques.

Since being discovered in July, 277 giant apple snail egg masses were destroyed, and two live snails were trapped from Robinson Bayou in the Pascagoula River.

Herbicide was applied to manage populations of alligator weed, Brazilian elodea, and water hyacinth.

At the "Celebrate the Gulf Marine Education Festival" in Pass Christian, an invasive species educational booth was set up. The GSARP Traveling Trunk of Aquatic Invasive Species was displayed to help increase invasive species awareness, and to facilitate discussions about AIS with the public.

During the Mississippi Deep Sea Fishing Rodeo, a $100 lionfish bounty was offered to the person bringing in the most lionfish. No lionfish were turned in, but the promotion served to increase awareness of the lionfish invasion.

Invasive species personnel attended a Harrison County cogon grass coordination and control meeting, and a meeting of the Mississippi Cooperative Weed Management Area.

Reports of Eurasian watermilfoil and alligator weed were investigated and confirmed.

A DMR Marine Patrol agent reported a silver carp in Bay St. Louis. This is the first confirmed sighting in the area.

Riecke provided the freshwater report. Ongoing activities include: continued printing of the "Stop Aquatic Hitchhikers" logo and bullet list in the annual *Mississippi Outdoor Digest* and *Guide to Mississippi Saltwater Fishing*; continued distribution of "Stop Aquatic Hitchhikers" cards with all mailed boat registrations and renewals; continued posting "Stop Aquatic Hitchhikers" signs at new boat ramp sites; placed links to the Mississippi River Basin Panel on Aquatic Nuisance Species, and the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species on the MS FWS website; permanent exhibit on exotic species at the Mississippi Museum of Natural Science.

New activities include: sending a silver carp from a fish kill in Lake Chotard off for disease diagnosis; attending the Mississippi River Basin Regional Panel on Aquatic Nuisance Species Meeting in July in Athens, TX; and working with Wildlife Forever on an ANS sticker that will be posted to boat ramp signs. A Chinese company has purchased an abandoned catfish processing facility to process and ship Asian carp carcasses to China. They hope to be shipping surimi blocks by the end of the year.

Future activities include: implementing the activities specified in the Mississippi State Management Plan for Aquatic Invasive Species; composing freshwater fishing bait regulations to specify which bait can be legally sold, possessed, transported, and used in Mississippi; prohibiting wild-caught bait from being used on any water body except where collected; seeking approval of legislation required to initiate licensing of retail bait outlets selling live freshwater fishing bait; seeking approval of legislation required to initiate licensing of retail bait outlets selling live freshwater fishing bait; adopting a list of approved, restricted, and prohibited species under the authority specified in MS Code 49-7-80, and as specified in the *Mississippi State Management Plan for Aquatic Invasive Species*; amending the list of approved, restricted, and prohibited species as specified in the public notice that regulates aquaculture activities in

Mississippi; establishing an EDRR monitoring program comprised of state and federal personnel who sample aquatic species in Mississippi public waterways on a routine basis; updating and expanding information for Mississippi contacts listed in the Expert Taxonomic Database.

South Carolina

Kingsley-Smith reported on the invasive castrating barnacle (*Loxothylacus panopaei*). In January 2014, SCDNR hired Dr. Amy Fowler to manage the Crustacean Research Section of the Marine Resources Research Institute. Dr. Fowler has conducted studies on the infection of small mud crabs by the invasive castrating barnacle. This parasite was introduced to the US Atlantic coast from the Gulf of Mexico, most likely in the 1960s as part of the oyster aquaculture trade in the Chesapeake Bay. Dr. Fowler and her collaborators found the most northern extent of the introduced barnacle in Long Island Sound, NY in 2012. She is monitoring population prevalence and impacts on the crab communities with researchers in New York. This fall, Dr. Fowler and her collaborators will be examining the possible adaptations that the mud crabs have undergone in response to parasitism across a wide range of historical interactions, recent interactions, and recent escape. Dr. Fowler also led a group that assessed the diversity and abundance of aquatic invasive species hitchhikers in the live bait trade out of Maine. They experimented with various ways to reduce the organisms that are transported this way. Currently Dr. Fowler is working on quantifying the community composition of crab populations in South Carolina intertidal oyster reefs, with a focus on the invasive anomuran *Petrolisthes armatus*, which may have been negatively impacted by the cold winter temperatures this past winter.

Kingsley-Smith reported that he and Dr. Fowler secured funding to improve understanding of the recent invasion of Asian tiger shrimp (*Penaeus monodon*) in the South Atlantic Bight and Gulf of Mexico. This funding will support the hiring of a new, temporary grant Wildlife Biologist I position at the SC Marine Resources Research Institute. The focus will be on the collection of tiger shrimp across a range of habitats, from shallow coastal juvenile nursery habitats in estuaries and tidal creeks, to sandy or muddy-sand offshore habitats of mature adults. Potential effects of the establishment of tiger shrimp on native shrimp, crab, and bivalve populations will be examined through an investigation that will look for ontogenetic shifts in feeding preferences using stable isotope analyses. There are concerns that the introduced species may compete for food resources with native species, and consume them. Results of the study should address these concerns.

The preservation and archiving of pleopod tissue samples for genetic analyses began in 2008, and continues as specimens become available. The samples are being held in a tissue repository in Beaufort, NC. USGS researchers will try to identify the geographic origins of tiger shrimp living along the Gulf and Atlantic coasts of the US, in the hope of answering questions regarding the status of their establishment, the number of releases, and the population structure of this shrimp in its introduced range. It would also be informative to obtain tissue samples from invaded regions of the current geographic range of tiger shrimp, such as Columbia and Bolivia.

Reports of tiger shrimp in US waters appears to be down considerably for 2014 compared to previous years. This is probably due to reporting apathy rather than a reflection of a change in abundance. There have been no reports from commercial shrimpers trawling offshore in 2014, who in past years provided the majority of reports. In June 2014, the smallest tiger shrimp ever

collected in US waters since the reappearance of this invasive species in 2006, was collected in a recreational minnow trap in Horlbeck Creek, SC and measured 61mm. Prior to 2014, the smallest tiger shrimp reported from US waters since the reappearance of this invasive species in 2006, was 102mm. Collections of smaller shrimp earlier in the year support the belief that this species is now established and reproducing in US waters. **Kingsley-Smith** and Dr. Fowler are in the process of hiring a Wildlife Biologist I position to help with their tiger shrimp research efforts.

The invasive parasitic nematode, *Anguillicoloides crassus*, infects the swimbladder of the American eel (*Anguilla rostrata*), and was first detected in wild American eels in 1995 in eels collected from Winyah Bay, South Carolina. Since then, the parasite has spread to other areas along the North American coastline. This is of concern, because the American eel has declined in recent decades. The parasite is believed to originate from Asia, where it infects the Japanese eel (*Anguilla japonica*). *A. crassus* has been unintentionally spread around the world, and now infects numerous other anguillid eel host species. The US stock of American eels is considered 'depleted', and a proposal to have the species listed under the Endangered Species Act is currently under review. Recent studies in South Carolina found that at least 58% of eels were infected and that juvenile eel stages became heavily infected soon after their coastal incursion from the Atlantic. The SCDNR was awarded a subcontract award in 2014 from the Gulf States Marine Fisheries Commission entitled "Detection of an Invasive Parasite of American Eels Using qPCR". The main goals of this project are to undertake a pilot study testing the use of quantitative PCR to detect *A. crassus* in intermediate hosts, such as small planktonic and benthic crustaceans. The successful method will provide a useful tool for rapidly screening different habitats for the presence of the parasite. It will also facilitate further research aimed at understanding the parasite's life cycle, and its use of different intermediate and paratenic host species. Investigators are also in discussion with researchers in Canada who have previously developed a protocol for qPCR detection for *A. crassus* in order to testthis protocol for larval stages of *A. crassus* removed from American adult eels collected in South Carolina.

Faunal identification of invertebrates scraped from settlement blocks deployed from April 2013 – July 2013 at various locations throughout the ACE Basin National Estuarine Research Reserve has been completed. Results from the identifications present a faunal list of 62 invertebrate taxa. Four of those species are known to be invasive: *Amphibalanus Amphitrite* [barnacle]; *Paradella dianae* and *Synidotea laevidorsalis* [isopod crustaceans]; and *Petrolisthes armatus* [anomuran crustacean]. An additional species, the South American mussel (*Mytella charruana*), was collected from outside of the targeted sampling surface of one block. The ubiquitous nonindigenous barnacle *Balanus trigonus* had settled on blocks that were lost from tethers on pilings that were located in high salinity waters near ocean inlets at three sites.

Much of the initial work from studies done by Dr. Erik Sotka of the College of Charleston and colleagues on the impacts of a nonindigenous seaweed, *Gracilaria vermiculophylla*, on mudflat communities in South Carolina and Georgia has been published in Byers *et al*. (2012). The seaweed can now be found along the Pacific North American coast from Canada to Mexico, on the Atlantic seaboard from Maine to Georgia, and in the eastern North Atlantic from Morocco to the Baltic Sea. A thesis done by a College of Charleston Masters student documented the mutualism between the non-native seaweed and the decorator annelid *Diopatra cuprea*. The

worm actively attaches the seaweed to its tube domicile. The worm gains greater access to native amphipod prey that are attracted to the seaweed.

At a location in Mount Pleasant, South Carolina, island apple snail shells were observed and collected in 2010 and 2011. Following chemical treatment of the population, combined with consecutive cold winters, it was believed that the population had been eradicated. However, a recent visit in August 2014 revealed the presence of empty shells and egg masses that were laid this season. No live snails were observed, but it appears that the population has not been eradicated. It may be contained and under control though.

Texas

Britton stated that he assists with running the giant salvinia control team, which is largely made up of members from Texas and Louisiana. USFWS had been able to provide some funding to TPWD in the past for giant salvinia, but has not been able to in the last few years. **Britton** will attempt to obtain funding in the future.

Thomas Decker provided the freshwater report. The hard winter helped with giant salvinia control. Vegetation surveys will be done next week at Toledo Bend Reservoir, which is the largest reservoir, and has the largest invasion of giant salvinia.

Louisiana provided funding to help with giant salvinia control in Toledo Bend Reservoir. They contracted with an herbicide spraying company. Approximately 400 acres were treated. However, the giant salvinia has grown back. Currently, TPWD has treated over 2,200 acres of giant salvinia on Toledo Bend Reservoir. On Caddo Lake, over 1,500 acres have been treated. The plan is to do a combination of helicopter treatments, which can treat larger areas.

Bio-control efforts include the release of 60,000 weevils on Caddo Lake and Toledo Bend. From their new weevil growing facility, it is hoped that 60,000 to 100,000 weevils will be produced next year.

The Greater Caddo Lake Alliance recently built a new greenhouse for weevils. TPWD contributed approximately 7,500 weevils for start-up help. Weevils will be released onto Caddo Lake within a few weeks.

Next year, TPWD will raise alligator weed flea beetles in a limited, experimental capacity.

For the first time in almost a decade, water hyacinth has been reported on Lake Murvaul, a small lake west of Caddo Lake. It is hoped that this is an isolated incident, and can be successfully treated.

Discussion of ANSTF Recommendations

The Panel made two Motions for recommendations to the ANS Task Force. **Ballard made a motion to recommend to the Task Force that they ask GAO to update their economic study on the economic impacts of AIS. Hartman seconded. The Motion was approved.**

Kingsley-Smith made a Motion to recommend to the Task Force that they explore alternative funding methods similar to Sport Fish Restoration or industry consortium format to fully support the Panels and state Plans. Knott seconded. The Motion was approved.

Other Business

Ballard stated that the Letter of Support discussed earlier will be done, sent to the members, and Fuller will sign it. It will then be mailed.

Next Meeting Time and Place

It was decided that the GSARP will meet together with the ANS Task Force. The location of the next meeting will be decided after consulting with the Task Force.

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

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.