

## **2017 Joint ASMFC & GSMFC Artificial Reef Committees Meeting Minutes**

*Tuesday, February 7 – Wednesday, February 8, 2017*

*Crowne Plaza Airport Hotel*

*Jacksonville, Florida*

Chairman Mark Rousseau called the meeting to order at 9:00 am. The meeting began with introductions of the members and guests. Members in attendance:

### **ASMFC Members and Staff**

Peter Clarke, NJ DWF, Port Republic, NJ  
Christopher Deacutis, RIDEM, Jamestown, RI  
Brad Ennis, FL FWC, Tallahassee, FL  
Lisa Havel, ASMFC, Arlington, VA  
Christopher LaPorta, NYS DEC, East Setauket, NY  
Bob Martore, SC DNR, Charleston, SC  
January Murray, GA DNR, Brunswick, GA  
Alicia Nelson, VMRC, Newport News, VA  
Jason Peters (with Amy Comer-Flowers), NC DMF, Morehead City, NC  
Mark Rousseau, MA DMR, Gloucester, MA  
Mike Malpezzi, MD DNR, Annapolis, MD  
Jeff Tinsman, DE DFW, Dover, DE

### **GSMFC Members and Staff**

James Ballard, GSMFC, Ocean Springs, MS  
Mike McDonough, LA DWF, Baton Rouge, LA  
Keith Mille (with Christine Kittle), FL FWC, Tallahassee, FL  
Craig Newton, AL DCNR, Dauphin Island, AL  
Douglas Peter, BSEE, New Orleans, LA (via conference call)  
Jimmy Sanders, MS DMR, Biloxi, MS  
Dale Shively, TPWD, Austin, TX  
Ali Ryan, GSMFC, Ocean Springs, MS

### **Others**

George Frankel, Eternal Reefs, Sarasota, FL  
Tim Mullane, Coleen Marine, Inc., Virginia Beach, VA  
Tsukasa Takahashi, Okabe, Tokyo, Japan  
Jeff Stephens, Water Gremlin Company/Okabe, White Bear Lake, MN  
Kenta Suda, Okabe, Tokyo, Japan  
Lesli Haynes, Lee County DNR, Fort Myers, FL (via conference call)  
Bill Seaman, University of Florida, Gainesville, FL (retired, now in NC, via conference call)  
Russell Brodie, FL FWC, Jacksonville, FL  
Tom Hilton, Atlantis Marine Habitats  
Larry Beggs, Reef Innovations/Reef Ball Foundation, St. Cloud, FL

Amy Comer, NC DMF, Morehead City, NC  
Christine Kittle, FL FWC, Tallahassee, FL

### *Adoption of Agenda*

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

### *Approval of Minutes*

The minutes from the meeting held March 14-15, 2016 were presented for approval. The minutes were approved.

### *HAPCs, Permitting, and Artificial Reef Deployment Discussion*

January Murray hosted a discussion regarding Habitat Areas of Particular Concern, permitting, and artificial reef deployment issues. Permits come up every five years, and Georgia is having issues that they didn't foresee. They submitted the paperwork in the beginning of January 2016 and 13 months later they still don't have their permits. The North Atlantic right whale critical habitat runs from FL to NC and off the coast of Maine – and it was expanded in 2015. GA was told they can be issued a permit as long as they don't deploy during calving season (Nov – April). The problem is that they receive donations throughout the year, and they have to accept and deploy them within a given timeframe. Murray just wanted to make sure that the states were aware of this issue because they might run into similar problems in the future. Their permit expired July 2016 so they don't currently have a permit.

Jason Peters said they have an oyster sanctuary site they're looking to develop this year. They submitted the permit application in Oct/Nov 2016 and were notified that it would take up to 2 years. The legislature provided \$2 million for the reef and NGOs leveraged \$500,000. They received the permit when the risk of losing federal funding was at stake. There are two avenues that protective resources can take – one is an expedited pilot project. NC has 13 permits in the works and they're requesting that each one goes through the pilot project process. Peter Clarke said that NJ submitted their paperwork in July and their permit expired Dec 2016. They were granted an extension from the Army Corps of Engineers (USACE). Murray said that GA asked for options in advance but they weren't provided with any.

Craig Newton said that AL been going through the same thing – for two and half years. Jeff Tinsman said that depending on your regional USACE office, you might not be able to get a 10 year permit.

Dale Shively said he's found every USACE district works a little differently. When personnel changes in a particular office there can be differences as well. In TX, deployments require

construction permits and then once they're deployed it's a different process. If an archaeological survey wasn't required at the time of deployment, but it is for subsequent permits, then you have to survey the site retroactively. Newton said they file for a nationwide permit for inshore reefs. It's much easier to get approval but it's strictly for maintenance activities. If you can demonstrate that the site needs maintaining (e.g. materials are at the end of their life), then you might be able to go that route.

Alicia Nelson said VA's permitting process has been smooth so far. Their state is currently not creating new reef locations, which has made it easier to renew permits. They haven't had to work with the National Marine Fisheries Service (NMFS) yet.

Christopher LaPorta said that NY had an issue with their new permits regarding Atlantic sturgeon habitat. NMFS was including monitoring stipulations on the permits that were difficult to meet. He recommends managers be vigilant, follow up, and be proactive. According to LaPorta the process has changed since he started in 2000 – endangered species listings are making it much more difficult to get permits. Rousseau acknowledged that there are serious consistency issues regarding permitting at the Federal level. In 2014 MA had the option of selecting a 5 or 10 year permit from the USACE – he just had to say which one he preferred. The whole process only took seven months from start to finish.

Keith Mille said that in FL, artificial reef permits are held by the coastal counties. The issues they face sound like a microcosm of what he's hearing around the table. Artificial reefs are a very small percentage of a USACE employee's workload – they are mainly focused on terrestrial projects. Artificial reefs probably deviate from their standard projects and for some reason they are not a priority. Many of FL's counties have been waiting years for permits. FL Fish and Wildlife Conservation Commission (FL FWC) always recommends that the counties ask for 10 year permits, otherwise the timeframe defaults to 5 years. Mille told Murray she might want to ask for a modification request if they do have to deploy during the winter months (this might result in a more extensive review or an observer on board). Murray said GA's not going to agree to not deploying in the winter. LaPorta said that eventually they will work with you, you just have to keep being proactive. We might want to invite some USACE representatives to this meeting so they have a better understand of what the states are facing.

Peters said NC's starting with a pilot project in the short term and following up with a large scale long term consultation for all of their reefs. That way the USACE is more comfortable providing approval. You don't need the actual permits or sites in place. Bob Martore said that consultation is supposed to be initiated by the USACE, so you have to push them for it. SC initiated a call with USACE, NOAA (right whale and endangered species representatives), etc. to get everyone on the same page. That allowed SC to continue building on the already permitted sites while specific sites were up for renewal. Mike McDonough agreed: LA always keeps everyone they need permission from in the loop (Coast Guard, NMFS, etc.) so they don't have to wait on them for approval – they get them on the same page as soon as possible.

*PCB-Free Military Vessels for Reefing (presentation 01)*

Mille gave a PowerPoint presentation to make everyone aware that the Maritime Administration (MARAD) and Naval Sea Systems Command (NAVSEA) might have some vessels available for reefing. He walked the committees through the NAVSEA website to show what is listed and the PCB tests that were run on each vessel.

Tinsman said that the year 1985 was somewhat arbitrary as a cutoff date (ASMFC-GSMFC Artificial Reef Committees wrote a letter in 2013 requesting MARAD reconsider its ship reefing policy of only allowing MARAD vessels newer than 1985 to be released for us as artificial reefs) since PCBs were banned in 1978. Use of PCBs began tapering off even before that. It was asked if there are different requirements for reefing ships built before 1980 and the response was that it depends on your region.

*Update on South Carolina's Deepwater Artificial Reef MPA (presentation 02)*

Martore provided a PowerPoint presentation on SC's Charleston Deep Reef, a Marine Protected Area (MPA) in the South Atlantic region. They worked with the South Atlantic Fishery Management Council (SAFMC) to develop a memorial reef 52 nm southeast of Charleston Harbor. The SAFMC asked SC to create an MPA with an artificial reef to be used in comparisons to natural reefs in other areas. They had trouble getting metal for the reef, so they worked with an offshore fishing group to raise \$400,000. The reef consists of 2-260' barges from a shipyard with shipping containers, cranes, etc. on top, and iron memorial places around it. It was sunk in May 2014 to a depth of 300-400'.

The MPAs are in place mainly to protect deep water groupers. NOAA was tasked to survey the site every year using side-scan sonar, multi-beam, and ROVs. Species of concern that have been identified on the reef since deployment include snowy, Warsaw, misty, yellowedge, and scamp grouper, as well as red snapper.

Two unpublished research areas have been introduced since this reefing, and the SAFMC voted to make them special protected areas for spawning. Now SC has three artificial reef MPAs. Their current work is demonstrating that different reefs at different depths produce and attract different species.

*Break*

*Review of 2016 National Artificial Reef Workshop (presentation 03, briefing material 03)*

Lisa Havel presented a PowerPoint on behalf of Russ Dunn, NMFS and cohost of the 2016 National Artificial Reef Workshop. The workshop was held in Alexandria, VA June 9-10, 2016 to explore artificial reefs as a management tool to support and/or enhance sustainable fisheries. Nearly 80 participants from the around the nation – including state artificial reef program managers, scientists, recreational fishermen, and non-governmental organizations among other – shared lessons learned in reef application, opportunities and challenges in artificial reef science and management, and potential future directions of artificial reefs in U.S. waters.

Workshop objectives were to (1) provide an overview of current science and applied experience (lessons learned) regarding the application of artificial reefs as a tool to support or enhance sustainable fisheries; (2) identify and examine key considerations associated with artificial reefs as a potential management tool to support and/or enhance sustainable fisheries; (3) identify management challenges and associated research needs, knowledge gaps and limitations, and strategies for monitoring, using, and managing artificial reefs; and (4) discuss the potential roles of federal, state, and private sector partnerships in resolving artificial reef challenges and achieving objectives.

The workshop resulted in enhanced collective understanding of management challenges and associated research needs, knowledge gaps and limitations, and strategies for monitoring, using, and managing artificial reefs; and highlighted important factors to consider in understanding the potential role of artificial reefs to support and/or enhance sustainable fisheries in regions across the nation. Feedback suggested that participants found the workshop helpful in understanding the state of the science and the regional differences in using artificial reefs as a management tool. Participants also appreciated the issue being discussed publicly.

Participants suggested that the Federal role should focus on coordination, not regulation; expand information sharing; provide science support for the states; and permit streamlining. NOAA Fisheries is currently reviewing the summary and will be discussing next steps. The Joint ASMFC-GSMFC Artificial Reef Committees (Committees) suggested to Havel that we should let Dunn know that different agencies (intra- and inter-Federal agencies) aren't aware of what others are doing (e.g. right whales, Atlantic sturgeon, etc.), which makes it very difficult for the states. There might be a role for Dunn to get everyone on the same page regarding permitting within NOAA.

Other comments from the Committees included: certain aspects (such as older research) received more focus than others (there was less time to summarize current work); NOAA seemed to already have an idea of what the results of the workshop would be; and since the Committees meet every year, we may want to do a better job of inviting people, including NOAA, to this meeting. We could invite NOAA to be a committee member as well.

#### *Harwich Reef Update (presentation 04)*

Rousseau provided a PowerPoint presentation on the new Harwich artificial reef. Currently MA has five permitted sites. This low number is in part due to the fact that MA is not hard

structure/habitat limited in a lot of areas. Two Boston reefs are mitigation projects for large construction projects, including the Big Dig.

The Harwich artificial reef was funded through MA saltwater fishing licenses: 1/3 of the revenues go towards public access. In 2016, Fairhaven Pier funding went instead to Harwich Fishing Pier in Nantucket Sound. The site is located 2.2 nm south of Saquatucket Harbor on featureless bottom in 30' of water. The reef site is 9.9 acres and the reef is constructed of concrete rubble. MA wanted to maximize recreational fishing opportunity and limit the area from commercial fishing. There's a whelk fishery in the area after the southern New England lobster stock crashed. They ended up prohibiting commercial fishing on the reef site, as well as within a 100 m buffer zone on each side. MA Division of Marine Fisheries (DMF) partnered with the town since the reef is located in town waters.

The purpose of the reef was to add structure where habitat was limited, target recreationally important species, and provide additional recreational angling opportunities. All of the material was offloaded by March 23, 2016. Long term monitoring is being conducted with the help of VEMCO acoustic receivers, onset HOBO temperature monitors, and time zero benthic colonization/fouling baseline data. The reef was dedicated on August 4, 2016. So far, they've seen black sea bass, Atlantic sturgeon, striped bass, and great whites at the site.

*Lunch: 12:00*

#### *SMZ Designations in the EEZ off New Jersey (presentations 05 and 06)*

Tinsman and Clarke provided PowerPoint presentations on the process of receiving Special Management Zone (SMZ) status off DE and NJ, respectively. Tinsman presented on the goals of the DE reef program and reef site selection criteria. 75% of their program funding comes from Wallop-Breaux (U.S. Fish and Wildlife Service) Sportfish Restoration Program Funds. No taxpayer funds (state) go towards reef development. Three sites (9, 10, and 11) are located in the DE EEZ. Of the 2,323 nm<sup>2</sup> of the EEZ of DE's coast, only <0.2% of the bottom is designated SMZ (4.6 nm<sup>2</sup>).

In 2007, DE and NJ made two presentations to the Mid-Atlantic Fishery Management Council (MAFMC) regarding gear conflicts and the possibility of a future SMZ request, as provided for in the black sea bass plan. The meeting was information. In July 2008 DE and NJ were made aware that commercial gear was in conflict with the intended recreational goals for Wallop-Breaux funded projects by the Sportfish Restoration Office, and in April 2010 NJ's Sportfish Restoration funds were suspended.

DE signed a bill to give the Division of Fish and Wildlife authority to manage gear types, which went into effect in the fall of 2011. DE initiated the process of SMZ designation with the

MAFMC in June of 2011. This would eliminate gear conflicts, improve tautog stock, and allow DE to continue to manage reefs for both commercial and recreational activities. It was a gear limitation request, not a restriction on commercial fishing. The MAFMC voted 11-3 to support the SMZ request. NOAA published the final rule on June 9, 2015: 1,511 days after the original request.

For NJ, the process was quicker. In December 2015 NJ requested SMZ regulations for all NJ permitted reefs in Federal waters (13). The MAFMC placed NJ's request on the 2016 Implementation Plan, and the Monitoring Team evaluated the request. In October 2016 the MAFMC recommended SMZ status, and it went out for public comment. In November the MAFMC voted to recommend to NMFS that all NJ reefs in Federal waters receive SMZ status, and they are currently reviewing that recommendation.

On June 1, 2016 NJ's Sportfish Restoration Funding was restored.

#### *ROI with Relation to Large Artificial Reef Systems in Japan (presentation 07)*

Kenta Suda from Okabe Co., Ltd. provided a follow-up PowerPoint presentation to last year's talk on Japan's fishery environment improvement project. The project creates suitable ecosystems benefitting the life cycle of aquatic creatures. The government and prefectures develop a master plan for each individual area of the sea and records the benefits of the project with monitoring techniques. Most artificial reef projects in Japan are funded by the government and handled as fishery improvement projects.

Suda provided a project example in Aomori prefecture using goldeye rockfish and seaweed beds, nursery artificial reefs, and steel artificial reefs. The return on investment (ROI) for this project is calculated using three main factors: effect of maintenance and increase of fisheries resources, effect of industry other than fisheries, and the effect of maintenance and restoration of the aquatic environment. He then walked us through the calculations for ROI, and demonstrated that the total benefit for the project was \$19.2 million, and the total cost was \$14.6 million. The cost-benefit analysis was 1.31.

Break

#### *Overview and Implementation of Northeast Florida's Offshore Reef Fisheries-Independent Monitoring Program (presentation 08)*

Russ Brodie from the FL FWC provided a PowerPoint on their monitoring program. In 2010 there was an emergency rule for full closure of Atlantic red snapper harvest, and in 2016 SEDAR indicated that red snapper continues to be overfished and that overfishing is occurring. SEDAR

has called for more fisheries-independent surveys because of this. Multiple fishery-independent monitoring studies have been (and continue to be) conducted.

The hooked-gear study uses passive vertical and horizontal longlines, as well as active electric reels on traditional fishing rods. 364 stations were sampled, catching 1,294 red snapper. The active repetitive timed drop had a greater CPUE than the longlines. The study showed a bimodal distribution in length, average ~575 mm. 1,307 red snapper were aged, with a mean age of 4.39 years. Distribution was also bimodal at 2-3 years and 5-6 years. Younger fish were surprisingly caught in the southern zone (there was not a longitudinal effect). Hooked gear studies allow for the ability to track age classes through time, and allow for a lot of fish to be collected. Results show similar length frequencies to stereo cameras.

Historical juvenile red snapper records have been very limited in the South Atlantic (97 individuals caught from 1982-2013). Through MARFIN they received a grant to target juveniles with trawls and Z-traps for two sampling seasons. They were able to collect 111 red snapper in the traps and 83 in the trawls in 2015. They had similar success according to their 2016 preliminary data. These data fill in much-needed length-frequency information.

FL FWC has applied for submitted three follow-up proposals to expand upon these studies.

#### *Status of Historical Resource Survey Requirements*

Mille said FL has been working with an historical resources officer to meet historical resource survey requirements. If they're mandated to do a cultural resource survey and the survey comes back clear, he would like to not have to go back and resurvey in the future. He's trying to get a training certification for artificial reef projects in place so that it's easier to keep the permitting process moving. They currently have a training program for terrestrial sites, but the offshore archaeological dataset is much thinner.

Tinsman said they went through all this in 1995 when they were applying for their original permits. They hired a contractor to side-scan sonar the area, which is then analyzed by an archaeologist. This cost \$32,000 for 11 sites in the mid-1990s.

Newton said that AL is required to have a certified marine archaeologist on board for every step of the project. They have to side-scan the sub-bottom and take magnetometer readings. He's worried that the definition of coastal resources could change over time, requiring more surveys. It could include not just shipwrecks but paleo-levees 10 m under the seabed. AL has some older inshore reefs where surveys haven't been conducted. So far they haven't had to retroactively survey when maintenance to the reefs is required.

Tinsman said that DE hasn't had any requirement to redo their original analyses. They did have to maintain a 250' buffer around a shipwreck, though. Shively said that the process in TX is similar to AL. Every project requires an archaeologist survey. If the project is in state waters you



have to work with the state historic preservation office (SHPO). You need a permit to perform the survey, which includes the magnetometer settings, sub-bottom profiling, spacing, etc. If a magnetic anomaly shows up, they don't identify it, they just give it a buffer.

States that have already gone through the process don't have to repeat the surveys as of now, but AL is nervous that the definition of coastal resource might change.

### *Public Comment*

Tom Hilton introduced himself as a recreational fisherman from TX and said that he appreciates what we do. He's glad that managers understand the importance of placing habitat. He also said that he owns a mapping company that started out creating paper charts in books, as well as a marine habitat company (Atlantis Marine Habitats). AL was putting so much habitat in the water it caught his eye. All of the stakeholders there worked like a well-oiled machine. Tackle shops, etc. are putting money towards reefs. They've been trying to fight the intrusion of catch shares on the recreational fishing community. With the new administration they might be able to affect change. He's fighting for the transfer of management to the states. To him it seems like a lot of problems are associated with the Federal government's lack of interest. Another issue that the states are facing seems to be funding. He's working to present a plan to harvest some of the commercial catch, and any harvester of public trust resources must pay a fee which would be funneled back to the states and put it into fisheries management. His marine habitat company manufactures reef pyramids by shooting concrete with fibers to create reef. They have a 115' landing craft and eight acres in Freeport. Tinsman said to be careful what you wish for when it comes to royalties on commercial harvest. It's similar to requesting SMZ status. If you're taking money from commercial fishermen, you might find yourself having to help commercial fishermen as well. For example, foresters have to pay royalties and replant trees. They currently don't have to do anything like that in the Gulf. Hilton said that if management of these resources was placed in state fisheries commissions, they would be able to determine the harvest coming off their coasts. He doesn't think red snapper should be managed as one stock in the Gulf. Each state can make better than Federal fisheries managers can. Tinsman said that every fisheries manager on a commission is a political appointee that won't want to make a decision on recreational vs. commercial catch. Instead, they might want to generate funds for reefs through naming rights.

Bill Seaman is a retired University of Florida faculty member and wanted to make an announcement about the 11<sup>th</sup> International Conference on Artificial Reef and Related Aquatic Habitats in mid-September in Terengganu, Malaysia. The meeting is focused on contributions to science, policy, and livelihood. He said he will send a link to Lisa and Keith for every to see (<http://mycarah.umt.edu.my/>). Still active scientifically and can review plans and proposals as an FYI.

*Meeting Adjourn 4:30*

*Day 2: Start 8:30 am*

Rousseau called the meeting to order and Newton asked for a motion to present the state updates first, and the members were fine with this suggestion.

#### *State Updates*

GSMFC: James Ballard said that the Artificial Reef Materials document is underway. He would like the group to provide underwater photos and help with the section on how reefs function. He asks that the photos include a caption so readers know who to contact. Ballard is also working on a proposal to the RESTORE program that would use standardized materials and monitoring methods one year before deployment and 10 years after: both onsite and adjacent to reefs in order to study the impact on the surrounding environment. Using red snapper as a model should appeal to both state and Federal agencies.

ASMFC: Havel provided an update on the black sea bass habitat project that they funded last year. They awarded the funding to Dr. Brad Stevens at the University of Maryland Eastern Shore for a project titled: Hab in the Mab: Characterizing Black Sea Bass Habitat in the Mid-Atlantic Bight. Their objective is to improve our understanding of the relationship between black sea bass abundance and habitat characteristics in the Mid-Atlantic region. Specifically, they are determining the preference of black sea bass for particular habitats by assessing their abundance, size structure, and feeding ecology within natural and artificial reefs; improving the understanding and other habitat characteristics of natural and artificial reefs; and determining if reduced fragmentation and increased connectivity of habitats increases fish recruitment, by experimentally manipulating corridors between isolated patches. So far Dr. Stevens has conducted field work for one season, and is working on analyzing the data.

Havel is also in charge of working with the southern Atlantic states to create the Artificial Reef as EFH policy for the SAFMC. They have had one conference call and will be meeting immediately after this meeting in person to continue working on the document. It will be completed by mid-April.

Federal Agencies: Douglas Peter said that policy hasn't changed over the last year, but companies that aren't financially solvent are creating some issues for the states regarding platforms. Oil prices are down and structures are being decommissioned but sometimes the owners are bankrupt. There has been some discussions on changing height levels of the conductor wells in the Rigs to Reefs policy. They used to cut the height of the jacket, but now they're not to cut higher than 15' above the flood line. A series of projects have been approved but have not started yet. There's been a slight uptick in Rigs to Reefs Gulf-wide, but the number of applications for structural removals has gone down to ~100/year. It peaked ~300 a few years

back. There are currently 2100 structures still left in the Gulf of Mexico. 40% are single piles that probably won't become reefs.

Georgia (briefing material 04): Murray said that The Georgia's Department of Natural Resources (GADNR), Coastal Resources Division (CRD), Habitat Restoration and Enhancement Unit (HREU) continues to focus on providing suitable and accessible quality habitats for coastal recreational anglers through enhancement of Georgia's 30 marine and 15 estuarine artificial reefs. These reefs play an important role in Georgia's marine and estuarine ecosystems and coastal economies along with providing recreational opportunities as popular fishing and diving destinations. Reef project partnerships include local sport fishing clubs, private businesses, and other interested organizations as well as the acceptance of financial and material donations in order to further develop Georgia's Artificial Reef System.

### *Offshore Artificial Reefs*

The Offshore Artificial Reef (OAR) Project covers ~116 square miles consisting of 30 artificial reef sites: 20 offshore reefs, two beach reefs, and eight Department of Defense (DOD) TACTS Towers. GADNR is currently consulting with the DOD on deployment plans to fully submerge the eight decommissioned TACTS Towers. Once deployed to the seafloor, the ownership of the Towers will be transferred to GADNR to allow the structures to continue to serve as habitat for marine life while providing recreational opportunities. Project SCUBA divers conducted material and compliance inspections during summer of 2016 where six reefs were visited and 46 dives were conducted.

During 2016, GADNR conducted one OAR enhancement through deployment of donated materials of opportunity. On June 30<sup>th</sup>, 2016 approximately 68 metal poultry transport cages (PTCs), 26 culvert sections, and six truckloads of concrete culvert/boxes were deployed at SAV Reef site (31°54.705'N / 80°47.195'W). This deployment would not have been possible without partnerships from the East Coast Terminal Company who staged materials landward in Savannah; Industrial Marine Services, Inc. who donated labor and equipment to load materials onto a contracted barge; Fieldale Farms Corporation who donated PTCs; TW3 Transportation who provided transportation of PTCs at a discounted rate; Astra Group, Inc. who donated 26 concrete culvert sections; and Consolidated Pipe and Supply Company who donated six truckloads of concrete culvert/boxes.

All of GADNR's OARs, 30 existing and one proposed, are permitted under the USACE Regional Permit No. 36 (RP 36), (SAS-2008-00584). In 2016, GADNR requested a new beach reef site, BSF, be considered for addition to RP 36. This 400 yard diameter site, approximately 4 nm southeast of Little Tybee Island (center of reef 31°54.089'N / -80°50.073'W), was identified in partnership with the Savannah Sport Fishing Club. RP 36 authorizes the deployment and maintenance of materials at Georgia's OAR sites located in the Atlantic Ocean and remained valid until July 27,

2016. RP 36 renewal documents were submitted to USACE on January 11, 2016. In September 2016, USACE determined that the proposed project may affect, but is not likely to adversely affect the following species: North Atlantic right whale (*Eubalaena glacialis*), and the loggerhead (*Caretta caretta*) and Kemp's ridley (*Lepidochelys kempii*) sea turtles. In addition, USACE determined that the proposed reissuance may effect, but is not likely to adversely affect listed critical habitat for the North Atlantic right whale. In October 2016, USACE generated an effects determination/request for concurrence letter. NMFS Section 7 consultation was initiated in November 2016 and GADNR responded to a list of questions in December 2016.

In 2016 the HREU drafted an Artificial Reef Strategic Plan (ARSP) to establish strategies for promoting reef habitat enhancement along the Georgia coast. The ARSP is intended to serve as a blueprint for HREU statewide operational activities, serve as a guide for future activities, and to provide a coordinated approach to habitat enhancement projects. GADNR also maintained a You Tube Channel that houses OAR videos (<https://www.youtube.com/channel/UChrnTJ6fzvAF8BoltzN9-Nw>) which are linked to the Georgia Outdoor Map website (<http://georgiaoutdoormap.com>). The Georgia Outdoor Map is an interactive map that identifies GADNR managed lands and outdoor recreational opportunities, including offshore and inshore artificial reefs, by using any device with a web browser.

### *Inshore Artificial Reefs*

The Inshore Artificial Reef (IAR) Project consists of 15 total sites located within seven of Georgia's estuaries, covering all six coastal counties. Thirteen of the reefs were established within the intertidal zone, zero to three feet deep at mean low water (MLW). These reefs provide small vessel anglers additional fishing opportunities since they were designed to replicate oyster beds and other naturally occurring structures. Two reef sites, Little River and Jekyll Island Pier, were established as subtidal reefs which are accessible by land. These reefs were positioned in waters eight to twelve and five to six feet deep MLW respectively.

During April 2016, GADNR conducted two IAR enhancements at estuarine reef sites identified for development within existing permitted areas while working with coastal sport fishing organizations, anglers, and donors. The Troupe Creek reef (31°13.772'N / 81°26.501'W) is located northeast of the Troupe Creek Marina, St. Simons Sound, Glynn County whereas the Joe's Cut reef (31°55.910'N / 80°59.297'W) is located at the mouth of Romerly Marsh Creek, Wassaw Sound, Chatham County. Both of these habitat enhancement sites used fabricated Fish Aggregating Device (FAD) units: a FAD consisting of a three foot square, four inch thick concrete base with 1.5 inch diameter PVC protruding from the surface of the base combined with a donated steel frame. FAD units constructed by Department personnel provided each IAR site structurally complex fish and oyster habitat. On April 8<sup>th</sup> and 11<sup>th</sup> a total of 50 FAD units were

deployed by GADNR staff at Troupe Creek reef in partnership with Rayonier Inc., Jesup Plant (donation of frames); Boykin Steel and Crane (donation of transportation); and a private property owner Dr. Neal Boswell (donation of use of property to stage materials). On April 26<sup>th</sup> a total of 48 FAD units were deployed by GADNR staff at Joe's Cut reef in partnership with Rayonier Inc., Jesup Plant (donation of frames); the Savannah Sport Fishing Club (donation of funding); Boykin Steel and Crane (donation of transportation); and TW3 Transportation (discounted transportation).

### *Oyster Reefs*

Georgia's estuaries contain a high density of natural oyster spat. However, there is a lack of suitable "natural cultch" materials available for oyster settlement; therefore shell and other materials must be reintroduced into the environment to promote growth and expansion of new oyster reefs. In order to have shell available for projects GADNR manages seven Shell Recycling Centers along the coast where community members from restaurants, oyster roasts and other events voluntarily donate oyster shells to be used in future projects. Shell is also bagged through volunteer outreach events and placed at designated restoration sites each spring. After shells are planted, oyster spat attach and grow creating a new oyster reef. Forty-four volunteers participated in a total of four "bagging events" where approximately 1,117 bags (8.4 tons) of recycled oyster shells were created thus donating a total of 88 hours to project activities. GADNR's Oyster Shell Recycling Project provided 37.9 tons of cured (three to six months) shells for use in 2016 projects but only 3.6 tons of shells were required in two oyster reef maintenance projects in Chatham and Glynn counties, creating a 34.3-ton reserve.

Performance monitoring at both Overlook Park (Glynn) and Florida Passage (Chatham) sites indicated maintenance deployments were required to augment existing areas of oyster reef restoration sites that had been overtaken by sedimentation. On March 30<sup>th</sup>-31<sup>st</sup>, 2016 Overlook Park maintenance materials, 100 oyster balls placed on top of 25 wooden double pallets including 75 oyster shell bags, were deployed adjacent to prior restoration materials (2013-2015). This type of maintenance material was subsequently tested on site (2015) and found to be successful in combatting sedimentation as well as recruiting oysters quickly. On April 4<sup>th</sup>, 2016 400 oyster shell bags were deployed on top of the existing footprint covered by sedimentation at the Florida Passage site. While the perimeter of the previously deployed (2013) reef materials were sufficient to recruit and sustain large (2" - 3") oyster growth, the majority of the remaining footprint was buried by sediment. Both sites were monitored bi-annually according to methods established in the GADNR Oyster Reef Restoration Monitoring Plan (2015). Maintenance deployments were conducted under previously obtained state (CMPA No. 600) and federal (USACE Nationwide No. 27: SAS-2012-00898 and SAS-2012-00524) permits.

The “Georgia Oyster Reef Mapping Project” was conducted in partnership with The Nature Conservancy (TNC), Georgia Coastal Management Program, and NOAA Office for Coastal Management to create a Geographic Information System (GIS) dataset of existing natural and restored oyster reefs along the Georgia coast. This project mapped existing inventories of oyster reef locations using 2013 high resolution low tide aerial imagery. The data from this project were converted from a shapefile format to a polygon overlay in a .kml file that can be displayed in Google Earth™ for broader usability. This dataset can be used to search for favorable conditions of potential oyster reef restoration sites while not disturbing known oyster reefs. The dataset is available for public use and can be downloaded from NOAA’s Digital Coast data repository at: [https://coast.noaa.gov/dataregistry/search/dataset/info/benthiccover\\_or viewed via the GADNR Georgia Wetlands Restoration Access Portal \(G-WRAP\) at: http://gcmp.maps.arcgis.com/apps/webappviewer/index.html?id=7fcb79b84b9440f9b35b3a5e4efd6afc](https://coast.noaa.gov/dataregistry/search/dataset/info/benthiccover_or_viewed_via_the_GADNR_Georgia_Wetlands_Restoration_Access_Portal_(G-WRAP)_at_http://gcmp.maps.arcgis.com/apps/webappviewer/index.html?id=7fcb79b84b9440f9b35b3a5e4efd6afc)

South Carolina (briefing material 05): Martore said that it has been a very average year for the SC Marine Artificial Reef Program. Sixteen material deployments were made during the past calendar year, comprised of surplus concrete material, designed structures, and vessels. One new reef site was permitted.

A concerted effort is being made to construct and deploy new reef modules in-house. Three new designs of concrete and steel have been built which can be deployed from our own research vessels. Two of these designs have already been placed on three separate reef sites while the third, which is larger than the others, is currently under construction. These new structures will be monitored regularly to determine which warrant further construction and distribution.

Our request to the SAFMC to have our two unpublished experimental reefs declared Type II MPAs has been approved as part of the Council’s Amendment 36 to the Snapper Grouper Fishery Management Plan. These areas are now classified as Spawning SMZs.

The latest site visit to our deep-water artificial reef MPA, now 2-years old, revealed numerous grouper species including Warsaw, snowy, misty, yellowedge, and scamp, as well as red snapper. The original purpose for creating this reef was to provide spawning habitat precisely for these species so, although no spawning behavior was observed, their presence here is highly encouraging.

A fifth edition of the “Guide to South Carolina Marine Artificial Reefs” has been printed and is being distributed as requested. This guide is a comprehensive listing of all reef sites and materials, with GIS generated maps of all South Carolina artificial reefs.

North Carolina (briefing material 06): Peters said that during 2016, the NC Division of Marine Fisheries (NCDMF) reef programs have spent a considerable amount of time in preparation for increased enhancements and development in the coming years. This increase is largely attributed to substantially expanded budgets for estuarine restoration and public support for reef development.

*Reef Construction:*

In 2016, four projects were completed, resulting in one new 10 acre oyster sanctuary, two vessels sunk on a nearshore reef site, rock and reef unit enhancements to an existing inshore fishing reef, and eternal reef deployments at a nearshore fishing reef. The Oyster Sanctuary Program budget was increased substantially in 2016 and federal funds were leveraged by a local nonprofit to build a 40 acre oyster sanctuary site in southern Pamlico Sound, called Swan Island Oyster Sanctuary. Presently, this reef is in the planning, permitting, and contracting phase. Sometime in 2017, the reef will be constructed using 25,000 tons of marine limestone marl. Elsewhere, our artificial reef program has focused efforts on improving user access to artificial reef fishing opportunities. We have sited two new reefs in Bogue Sound (near Morehead City), which will serve as very small experimental reefs, constructed by newly designed reef structures built by NCDMF staff. Those reefs are under permit review and should be constructed in mid-2017. Also under permit review is a vessel sinking project at a nearshore site off Pine Knoll Shores (Atlantic Beach). This project is funded through state recreational fishing license money and will be completed in partnership with a local dive club. Once permits are received, we anticipate the project to progress quickly, with both vessels being sunk by mid-2017.

*Monitoring:*

Since the last ASMFC/GSMFC Artificial Reef meeting, our state programs have worked to focus our monitoring effort on collecting meaningful data to better guide fishery management decision making. We completed our first year of estuarine finfish and oyster sampling, which included 38 gillnet, longline, and chevron trap samples, as well as 114 oyster quadrat samples. The objective of this 10-year proposed study is to evaluate community differences among different materials in different estuarine environments. As for other monitoring, the two programs jointly developed and implemented protocol to (1) map all new reef construction using multi-beam side scan sonar, (2) ground-truth abiotic environmental conditions in our estuaries using water quality data sondes, and (3) evaluate stability and durability of reef materials using multiple approaches (side scan and diver surveys). Finally, the material deployment database was overhauled and expanded to include the deployment history of both the oyster sanctuary program and artificial reef program, dating back to the early 1970s.

*Outreach:*

Most notably, in 2016 the Artificial Reef program published a long-awaited new edition of its Artificial Reef Guide in both print and interactive web formats. To produce this guide, current and former staff side-scanned each reef, digitized the existing materials on site, and labeled

each material to provide information such as material type, GPS location, and deployment date. All of that is provided the public in waterproof, color print booklets for free. Online, the same guide is offered in pdf but also in interactive format, allowing users to personalize maps, measure distances, overlay various data layers, and connect to material meta-data (vessel histories, etc.). Beyond the new reef guide, the Artificial Reef program redesigned its website, offering updated information on the program and providing an avenue to collect user feedback through an anonymous survey. The Artificial Reef and Oyster Sanctuary programs also participate in numerous public meetings and conferences to present program developments.

*Other Administrative Accomplishments and Considerations:*

Throughout 2016 and continuing into 2017, both the Oyster Sanctuary and Artificial Reef programs have made tremendous progress to standardize reef construction methodology, streamline processes, and find efficiencies. Particularly, since the official transition from Loran to GPS technology years ago, a substantial error was found between the supposed and actual locations of NC reefs in many cases. For this reason, the NOAA nautical charts, state and federal permitting agencies, and USCG all held inconsistent records of reef sites and their boundaries. NCDMF has set an inter-agency meeting for mid-February 2017 to reconcile these records and subsequently provide NOAA with corrections to charted fish haven designations. In the interim, The USCG is assisting with Artificial Reef buoy removal operations in the ocean, since ocean buoys have surpassed their system life-expectancy.

As with other states, our reef construction permits are undergoing a new level of review by NOAA's Protected Resources Division in St. Petersburg, FL. As a result, our permit review timeline has been extended substantially. So, we are working with state and federal agencies to develop long-term strategies for permitting and development. In preparation for these discussions, our reef programs have written technical specifications for all acceptable reef materials and incorporated those into a new draft version of our NC Artificial Reef Master Plan. This plan will provide guidance on all aspects of reef development from conception, to permitting, to implementation, as well as monitoring. To supplement the Master Plan, the reef programs have outlined a 5-year development plan for all enhancement projects through 2021.

Virginia (briefing material 07): Nelson said that in 2016, the Virginia artificial reef program completed four deployments to existing reef locations. All of the material consisted of materials of opportunity. Overall, it was a very slow year, as 18,000 tons of material expected from the Lesner Bridge renovation project were delayed.

*Ocean deployments:*

Two deployments occurred on one of five offshore Virginia reefs managed by the program. Both were on the Triangle reef, located 25 miles off of Virginia Beach. Incidentally, this area is also part of the Virginia Wind Energy Management Area. In May, 90 tons of armored undersea cable were placed in the North West corner of the permitted reef area. In October, the Coast



Guard deployed five concrete sinkers, each weighing approximately 12,000 pounds, stacked in a pyramid shape at the site.

*Bay deployments:*

The cabbage patch reef, located in the south eastern corner of the Chesapeake Bay received two deployments in 2016. The first was the initial load of Lesner bridge material (450 tons of concrete decking pieces) deployed in March. On February 2, 2017, the first full load of this material from the Lesner Bridge was deployed, with more barge loads expected in the next few months. The second deployment consisted of five concrete Coast Guard sinkers (12,000 pounds each) stacked in a pyramid shape deployed in September.

*Plans for 2017:*

In addition to the Lesner Bridge deployments expected this winter and spring, the program is working on a new public mapping system for the reef program. Past mapping efforts included broad grid maps that utilized icons for every deployment on record. The new system, includes an interactive GIS map that will allow users to zoom in on the reef location with metadata on each deployment listed. As side scans of each reef site become available, we hope to remove material that is no longer providing relief in order to ease confusion. This information will also be available through the agency smart phone app so that anglers can locate and track reef activity in real time.

*Updated Reef Mapping:*

In April, the reef staff has a scheduled presentation at the 73<sup>rd</sup> annual Northeast Association of Fish and Wildlife Agencies conference titled "Continuing a 40-year legacy: Maintaining Virginia's Artificial Reef Program." This presentation will highlight the history of the program, challenges since losing funding and staffing, and future plans moving forward (including the new mapping application).

In 2016, the reef program was approached by a representative from the Oyster Company of Virginia with a request to donate reef tech reef modules on a regular basis to the program. The contract is still being negotiated between the agency and the Oyster Company of Virginia. If successful, this will be a source of scheduled, engineered reef material being deployed at our Chesapeake Bay reef locations, beginning in 2017.

Maryland (presentation 09, briefing material 08): Mike Malpezzi gave an update on MD activities.

*Permit:*

The Federal Corps of Engineers permit for our Chesapeake Bay sites expired in August 2015. A new permit was issued by the Corps in June 2016. This is a 10-year "umbrella permit" that covers 21 sites in Chesapeake Bay through the end of 2026.

*Deployments:*

MD deployed 55 “lo-pro” reef balls at Memorial Stadium Reef, Chesapeake Bay in May 2016. The reef balls were constructed by volunteer groups organized by a local Maryland Saltwater Sportfishing Association chapter and deployed from the Chesapeake Bay Foundation’s vessel *Patricia Campbell*.

The reef program completed three deployments at the Love Point reef site in northern Chesapeake Bay. These deployments consisted of a total of 1,900 tons of secondary use concrete materials including concrete rubble, slabs, pilings and road barriers. This material was placed either free of charge or at cost by marine contractors who would otherwise pay to have it transported to a landfill.

Seventy “mini bay-ball” reef balls were deployed at the Tilghman Island reef site in July 2016. The reef balls were constructed by volunteers from local Coastal Conservation Association (CCA) chapters and students at Carroll County Public Schools, and seeded with oyster spat at Chesapeake Bay Foundation’s Oyster Restoration Center.

Six hundred tons of concrete rubble donated by Dominion Resources was deployed at the Cedar Point reef site in Chesapeake Bay near the mouth of the Patuxent River in November 2016. The material was composed of concrete slabs, blocks, and rubble left over from demolition work at the Dominion Cove Point facility in Lusby, MD. The cost of deployment was covered by Dominion.

#### *Future Projects:*

We currently have deployments scheduled for Love Point, Plum Point, and Tangier Sound reef sites in the first quarter of 2017, all utilizing recycled materials. In addition, we anticipate a steady stream of concrete from the Baltimore region in the next year: pier renovations at Dundalk Marine Terminal, demolition and reconstruction of the I-895 overpass, and construction work in southern Baltimore. Looking further ahead, the demolition and replacement of the Rt. 301 Bridge over the Potomac River (Rt. 301) will likely be a major source of material for many of our sites in the next 3-4 years. In general, we plan on relying largely on secondary use concrete and volunteer-built reef balls in the coming year.

Delaware (briefing material 09): Tinsman provided the update for DE.

#### *Recent On-going Activity:*

During the past several years, the reef program has been deploying large concrete pieces in transects on site #9, about three miles S.E. of Rehoboth Beach, Delaware, in about 60’ of water. These low profile reefs allow us to make use of a site where 50’ clearance above structure is a permit requirement. This area holds tautog and summer flounder seasonally. Large summer flounder appear to be attracted to these structures, with fish exceeding 10 pounds and up to 13 pounds caught annually. This effort will eventually result in more than 12,000 tons of concrete products being deployed, significantly developing the S.E. portion of this site.

2016:

The major effort of the reef program in 2017 was preparation of the Zuni/Tamaroa, a 205' Navy tug/USCG cutter. This vessel has had a storied history, participating in the battle of Iwo Jima in WWII, the rescue of passengers from the sinking of the liner Andrea Doria in the 1950s and the rescue of 6 people during the "Perfect Storm" in the 1990s. Regulatory issues slowed the efforts and we lost our weather window in October, 2017. This necessitated an extension of our federal aid project into 2017 in order to complete the work and sink the vessel in calm weather. Deployment is expected by early summer, 2017 on the Del-Jersey-Land site, 26 nm S.E. of Indian River Inlet. The Delaware Reef Program is the lead agency on this project, conducted jointly with New Jersey. Delaware is providing SFR funds and the New Jersey Annie E. Casey Foundation providing the required 25% matching funds. This is a second example of cooperative efforts of multiple states to conduct reefing efforts in the mid-Atlantic area.

*Loss of "Banked Match" for SFR funds:*

Following the first round of subway car deployments (2001-2003), Delaware requested and was granted permission to "bank" the donation of clean-up costs and transportation costs for 619 NTC subway cars for use in future project segments. This amounted to over \$6M. Use of this never-ending supply of matching funds has made reefing very easy. During 2016, federal auditors took exception with this practice. Project renewal for 2017 was already well underway and the SFR Office allowed us to use the banked match, as proposed in this final project segment. In 2018, Delaware will have to generate match within the project segment during which SFR funds are spent. This will make life much more challenging and may make large vessel projects very difficult.

*2017-18:*

During 2017 and 2018 the Delaware Reef Program hopes to acquire, clean, prepare and reef a 325' "Stealth Vessel", which will create the best fish habitat, the best fishing destination, and the best dive destination in the Mid-Atlantic region. This project is currently in the late planning stages and details cannot be shared at this time.

New Jersey (presentation 06): Clarke said that NJ deployed five vessels and nine concrete projects in 2016. Vessels include: Tobacco Point (95'), Ohio Dredge (80'), Harbor Charlie (65'), F/V Austin (68'), and the F/V Lisa Kim (115'). Concrete deployments include four barge loads at Sandy Hooke, 3 barge loads at Sea Girt, and two barge loads at Axel Carlson.

NJ has 16 future deployment lined up, including tugs, F/Vs, Caisson doors, barges, and dredge rock. The Zuni Tamaroa is a 206' US Navy ship that participated in the attack on Iwo Jima and was the vessel in the "Perfect Storm" movie that saved the USCG Helicopter Rescue team.

New York (briefing material 10): LaPorta said that in May 2016 Marine Resources regained Division status in NYSDEC. This change is resulting in some staffing increases. He is still flying the Reef Program solo.

The New York Reef Program holds valid permits for six of its ocean sites: Rockaway Reef, Hempstead Reef, Fire Island Reef, Moriches Reef, Shinnecock Reef and Twelve Mile Reef. Twelve Mile Reef is New York's largest (850 acres) and deepest (120-140 FSW) site and is currently undeveloped. The Hempstead and Fire Island Reefs are second largest at 740 acres each and are approximately half improved.

The program is currently undergoing the scoping process for a Supplemental Environment Impact Statement (SEIS) to update New York's current GEIS & Reef Plan. The SEIS will be a requirement for future reef permits which expire in late 2018.

The *SUNY School of Marine and Atmospheric Sciences* completed a contracted biological monitoring study comparing the use of multiple survey methods on two oceanic sites. The project's final report is pending review and will be incorporated into the future SEIS.

An update on the *Rockaway Delivery Lateral Northeast Connector Project remediation* work on Rockaway Reef. The 450 sections of 13 foot by 3 foot concrete coated steel pipe deployed on 16 targets in October 2015 have been colonized and are now home to healthy populations of tautog, black sea bass, scup and lobster among other inhabitants.

*New York Environmental Protection Fund (EPF)* monies have been secured to deploy an 85 foot steel tugboat on the Fire Island Reef later this year. EPF is a potential revenue source for future reef projects.

The U.S. Coast Guard Aids to Navigation (USCG ATON) successfully deployed 75,000 pounds of concrete buoy sinkers on the Hempstead Reef in March of 2016. Recent contact was made by the same USCG ATON requesting permission to deploy additional sinkers on New York reef sites in the near future.

The Artificial Reef program was contacted by and has been in ongoing discussion with the Tappan Zee Construction Company (TZC) who is undertaking both construction and demolition of the Tappan Zee Bridge. Program has also been contacted by various Marine Contractors regarding the use of its reefs sites for material disposal. This project has potential to yield large volumes of concrete and steel beginning this year.

*The New York Reef Building Foundation, (NYRBF)* a western Long Island organization formed by local fishermen received its 501c3 not for profit status in August of 2016. The next step for this organization will be to raise funds for select future reef projects.

Rhode Island (briefing material 11): Christopher Deacutis gave the Rhode Island update.

The water quality in the urban Providence River has shown improvements due to increased treatments of wastewater discharges (including a >50% decrease of nutrients), major decreases (> 90%) in toxics from dischargers, and major decreases in raw sewage discharges from Combined Sewer Overflows. The RI Department of Environmental Management Division of Fish & Wildlife Marine Fisheries Program is engaged in a multi-year collaborative study with TNC funded by Sport Fish & Wildlife Restoration funds to examine whether fish habitat has

improved in the urban Providence and Seekonk Rivers. Seining surveys (12-14 sta) as well as benthic video transects and water quality measurements (temperature, salinity, dissolved oxygen) in these urban areas were initiated in summer 2016 and will continue with the addition of fish pot surveys through 2017. Overall, we will be looking for evidence of changes in juvenile fish species occupying these areas due to both warmer local waters and improved water quality (decreased toxicity and less hypoxia).

This information will be used to develop plans for habitat improvement opportunities. Once we have an idea of where the best zones are for juvenile fish and what species are utilizing the area, we will develop plans for potential habitat enhancement and restoration efforts that can improve the conditions for growth and survival of juvenile fish. We will be considering a variety of habitat enhancement and restoration techniques, from “reef balls” to oyster cultch reefs, to other types of structures, as well as any opportunities to improve the few areas of salt marsh that provide fish habitat.

Massachusetts (briefing material 12): Rousseau said that the MA Division of Marine Fisheries (DMF) continues to administer the MA Artificial Reef Program on a part time basis. To date, the Program has relied on Federal Aid in Sport Fish Restoration (Wallop-Breaux) money for reimbursement of a portion of agency funds for staff time used to provide technical assistance on projects that provide benefits to recreational fishing, including artificial reefs. Agency personnel direct resources toward supporting projects that promote and advance responsible artificial reef development.

*In 2016 MA DMF:*

Created a new 10 acre artificial reef two miles off Saquatucket Harbor in Harwich, the first artificial reef deployment in MA in a decade. Concurrent with creating the reef, a regulation prohibiting all commercial fishing activity on the Harwich reef site and within a buffer zone extending an additional 100 meters from the site in all directions was enacted. This regulation establishes the Harwich artificial reef site as the first and only site in Massachusetts dedicated exclusively to recreational saltwater fishing.

Received funding from the MA Marine Recreational Fisheries Development Fund for long-term support of reef monitoring and development. These funds support monitoring efforts at all permitted artificial reef sites in MA. In 2016, acoustic receivers were deployed to five artificial reef sites to begin tracking the patterns of tagged migratory fish species of commercial and recreational importance.

Explored new potential artificial reef sites in lower Cape Cod Bay. Collaborated with the Cape Cod Bay Commercial Charter Captains Association to site additional near shore artificial reefs in the southern portion of Cape Cod Bay. Work is expected to begin late summer, 2017.

Attended National Artificial Reef Workshop on June 9-10, 2016 in Alexandria, VA. The Workshop was sponsored by NOAA fisheries and included more than 80 invited participants affiliated with artificial reefs nationwide. The workshop focused on the future direction of artificial reefs in US waters.

With funding from a National Fish and Wildlife Foundation Hurricane Sandy grant, DMF launched a project focused on siting and designing near shore artificial reefs. Alternatives to shoreline armoring, beach re-nourishment and other traditional coastal protection measures has become an emerging issue in MA due to predicted climate change scenarios. The intent of this project is to examine the feasibility of reefs that could be used for shoreline protection as well as serve as productive biological habitats. The project was initiated after discussions of how to beneficially reuse dredged rock material expected to come from the USACE Boston Harbor Deepening Project in 2017. A multi-agency working group of Federal, State, Local and nonprofit resource agencies vetted potential options for the beneficial reuse of dredge rock. In 2015, 33 preliminary sites were identified and filtered down to 10 potential sites through a site selection process. In 2016, two sites were selected and pre-permitting studies were initiated.

Louisiana (briefing material 13): McDonough said that the Program continues to be very active in accepting new platforms into permitted artificial reef sites. Multi-beam survey imagery of the offshore reefs can be found at: <http://www.wlf.louisiana.gov/fishing/artificial-reef-program>. In 2016 they accepted:

76 established offshore reefs

Oil & gas jackets accepted (380 total)

15 deployed in 2016

29 additional structures permitted for deployment

28 in permit process

Drill rig legs accepted (8 total)

The Program now has five established nearshore reefs. Our Artificial Reef Council approved twelve Nearshore Planning Areas. There is one active permit request for a new nearshore reef. The Program is actively soliciting the owners of platforms within Nearshore Planning Areas for potential reefing opportunities.

The Program now has 27 established inshore reefs. The Artificial Reef Council also approved two new inshore reef sites located in the southwest portion of Lake Pontchartrain and the southeast portion of Calcasieu Lake. Permitting for these new sites, as well as enhancing the existing Point Mast reef site in Lake Pelto is ongoing. These three inshore reef projects are slated to be constructed later this fiscal year. The Program has been conducting pre-deployment monitoring at the planned inshore project sites, and post-deployment biological monitoring at the recently enhanced Independence Island reef site.

The Program continues multi-beam surveys of selected reef sites, followed by high resolution video ROV surveys.

Mississippi (briefing material 14): Jimmy Sanders provided the update for MS.

During 2016, the Artificial Reef Bureau (ARB) continued to monitor fish assemblages and physiochemical parameters at selected inshore reef sites. Personnel periodically checked and re-marked 22 inshore reefs in the three (3) coastal counties (Hancock, Harrison and Jackson) to assist small boaters in locating the low-profile reefs. Offshore reef sites were visited to check reef sustainability, subsidence rates, and fish community structure. ARB staff also assisted the Finfish Bureau with collecting samples for a reef fish assessment project funded by NFWF.

The ARB continued work on securing and deploying structure. In 2016, the ARB secured approximately 1,475 concrete culverts from five local construction companies. This material was stockpiled at the Gulfport staging site for future offshore deployments. During the months of May and June, the ARB deployed 222 juvenile reef fish habitat boxes in FH-3, FH-13, and FH-14 for the Coastal Impact Assistance Program (CIAP).

Artificial Reef Bureau members also used side scan equipment for in house applications and to assist the Shellfish Bureau. Mapping to monitor deployed cultch material was completed in April for the Mississippi Oyster Cultch Early Restoration Project. ARB members also utilized side scan equipment to map historic oyster bed locations in Biloxi Bay. Eleven inshore artificial habitats were side scanned to assess reef status and precise boundaries of deployed habitat.

Additionally, the ARB partnered with NFWF to complete the Artificial Reef Habitat Mapping Program. This program consisted of 100% multi-beam coverage and 100% side scan sonar coverage and included the survey of all 15 offshore Artificial Reef sites and all 8 Rigs to Reefs sites. The survey provided the following: coverage graphic of the location of each feature, an image of the side scan feature, a 3-D perspective image from the multi-beam point cloud, position of the feature in NAD83, the dimensions of the feature and the minimum depth of the feature below Mean Lower Low Water (MLLW).

Throughout the year, the ARB contributed to multiple outreach events and educational meetings. Staff personnel represented the bureau and MDMR at several outreach events including Capital Day in Jackson, MS in February, the Biloxi Boat Show in Biloxi, MS in March and the Wildlife Expo in Jackson in August. In March, the ARB attended the GSMFC & ASMFC Artificial Reef Subcommittee Meeting in San Antonio, TX. In June, ARB staff also attended the Artificial Reef workshop in Alexandria, VA. In October, ARB staff members attended the Gulf States Marine Fisheries Commission 67th Annual Spring Meeting.

Lastly, the ARB is currently preparing for and working on ongoing projects. The CCA and the ARB are collaborating to deploy concrete culverts within Cat Island Reef site. Also, MDMR is working with Oscar Renda Contracting to obtain and deploy valuable artificial reef material. The concrete culverts will be deployed in several locations in FH-1, FH-2 and FH-13.

Alabama (briefing material 15): Newton said that The Alabama Marine Resources Division (AMRD) continues to be active in maintaining, constructing, and deploying artificial reefs within its territorial waters and adjacent Federal waters of the Gulf of Mexico up to 65 nautical miles offshore of Alabama.

Inshore reefing projects during 2016 resulted in the construction of 2 new reefs near Point Clear and Fort Morgan, Alabama and the enhancement of existing reefs. The 9.7 acre reef near Point Clear was constructed with 9,710 tons of 3" X 6" limestone aggregate and 6 USCG approved lighted pilings. The 3.6 acre reef north of the Fort Morgan Peninsula was constructed with 5,490 tons of 3" X 6" limestone aggregate and 4 USCG approved lighted pilings. A total of 26,460 tons of 3" X 6" limestone aggregate was deployed to enhance 13 existing inshore fishing reefs covering approximately 22 acres. Two additional inshore fishing reefs sited on approximately 21 acres of historic oyster bottoms were enhanced with 9,102 tons of #2 limestone aggregate. In total, \$2,197,922 were invested in inshore reef construction projects during 2016.

A USACE permit to construct new inshore reefs in the Mississippi Sound and Pelican Bay has been acquired and a \$400,000 contract has been awarded to construct the reefs. A total of 132 pedestal style modules will be deployed to construct approximately 24 acres of new reef bottoms. Construction is expected to begin in February 2017.

Alabama Marine Resources Division continues to develop the reef habitats within the nearshore zones offshore of Alabama (Gulf beach to 9 miles offshore). A USACE application submitted in May 2014 is still pending authorization. An Endangered Species Act (ESA), Section 7 consultation with NMFS has been completed and a National Historic Preservation Act (NHPA), Section 106 cultural resources remote sensing survey is currently being conducted.

A USACE permit application to construct 3 snorkeling reefs has been submitted and AMRD is waiting on ESA and NHPA concurrence. Each of the 3 proposed snorkeling reefs are approximately 8 acres in size and depth ranges from approximately 8' to 23'. In addition to seeking authorization to develop additional reef zones in the nearshore waters offshore of Alabama, AMRD has constructed 25 new reef sites using 125 pedestal-style, low profile anchored reef modules. These reef modules deployed approximately three miles offshore of Baldwin County, Alabama have been heavily utilized by juvenile gray triggerfish and red snapper. Additional habitat in the same general area, therefore, should increase the production potential in these nearshore waters.

Alabama continues to develop the Rigs-to-Reefs program. The jacket of the MP 255 platform was cut approximately 90' below sea level and reefed on site in approximately 333' of water 54 nm south of Fort Morgan, Alabama. Also, the jacket of the MP 261 platform is scheduled to be reefed later in 2017. The top section of MP 261 will be cut at 110' and placed approximately 50 nm south of Dauphin Island, AL in the Tatum-Winn North Artificial Reef Zone.

Modular type concrete units and "materials of opportunity" were utilized to create and enhance numerous offshore reefs. Eleven existing reef sites were enhanced with 36" and 48" culvert pipe, large manholes and box culverts. Additionally, a "scattered" reef was created with the concrete materials of opportunity. The "scattered" reef was created by placing culverts/manholes approximately 20' around a single 650' diameter area. Fifty large relief pyramids were similarly deployed to enhance existing reefs and construct new reef sites. Previously deployed 25' tall pyramids appear to be utilized by a more diverse reef fish assemblage, therefore, constructing additional reefs with these large pyramids could result in a



more stable reef community. The large pyramid modules were utilized to construct 17 new reef sites containing 2 modules per site and a single pyramid was deployed at 16 existing reef sites where the previous structure had subsided or was reaching the end of its usable life.

Alabama Power Company, Cooper T. Smith and the Alabama Wildlife Federation donated resources to construct a large artificial reef approximately 25 nm offshore of Alabama. The reef was constructed with two 18' X 40' boilers placed inside of a 195' X 35' hopper barge. A pre-bid meeting for the construction of a shipwreck reef is scheduled for February. The project has a \$1,000,000 budget and the winning contractor will be selected based upon the largest, most complex shipwreck proposed within budget.

*Break*

Florida (presentation 10, briefing material 16): Mille, Bradley Ennis, and Christine Kittle gave the FL update.

The primary objectives of the Florida Fish and Wildlife Conservation Commission state artificial reef program are to provide financial and technical assistance to coastal local governments, nonprofit corporations, and state universities to help develop, monitor, and evaluate artificial reefs in Florida's state and Federal waters. The FWC Artificial Reef Program coordinates administers state funding (recreational fishing license and general revenue funds) and federal funding (USFWS Sport Fish Restoration Program funds) as grant agreements to local governments, state universities, and non-profits to implement new artificial reef construction, research, and monitoring activities statewide.

As of December 2016, Florida reports a total of 3,264 public artificial reefs. 1,061 of the public reef deployments are off of Florida's Atlantic Coast and 2,203 on the Gulf Coast. During 2016, a total of 115 new deployments were completed state-wide; 28 off the Atlantic Coast and 87 off the Gulf Coast.

Five artificial reef construction projects were funded using federal dollars. Four of the five projects took place on the Atlantic Coast and one of the projects took place on the Gulf Coast. Two additional projects were planned for the Gulf Coast but were not successfully completed. Within the Atlantic Coast activities, two construction activities occurred off central east Florida (St. Lucie County; Martin County) and two construction activities took place off southeast Florida (Palm Beach County; Miami-Dade County). The completed Gulf Coast reefing activity, took place offshore of the Florida 'Panhandle' area (City of Carrabelle and the City of Mexico Beach).

*Bay County (Northwest Florida, Gulf of Mexico)*

On May 14, 2016, Bay County, located in Northwest, Florida, five prefabricated artificial reef modules. One reef complex was used among the five reef sites. The reef complex used was a prefabricated module called a "Super / Ecosystem Reef". The "Super Reef" Artificial Reef module is a concrete tetrahedron module measuring 15 ft. tall and 15 ft. wide at the base, with

nine 12 inch by 18 inch rectangular openings through each of three upright limestone studded concrete sides. This module alone weighs approximately 36,000 lbs. Each "Super Reef" has two "Ecosystem Reefs" placed on top. The "Ecosystem Reef" module are three layers of the cylindrical shaped limestone embedded concrete disks approximately 3 ft. in total height. The total height of the "Super / Ecosystem Reef" is 18 ft. tall. There were a total of five of these modules deployed. All of these reef structures were designed, manufactured, and deployed by Walter Marine of Orange Beach, Alabama. The total cost for the project was \$60,000 provided by state funds.

*Broward County, Lady Luck (Southeast Florida, Atlantic)*

On July 23rd, 2016 1.25 miles of Pompano Beach in Broward County, Florida, the *Lady Luck* (formerly known as the Newtown Creek), is a 324 ft. sludge tanker was sunk. The ship is the centerpiece of what will become known as Shipwreck Park, surrounded by 16 other existing wrecks covered with marine life. The ship was towed from New York to a facility on the Miami River for cleanup and preparation for deployment. One of the unique aspects of this wreck is that it contains concrete sculptures in honor of one of its main sponsors, Isle Casino. Artist Dennis MacDonald created an underwater casino scene with five oversized dice, a card table with an octopus and three card "sharks", a life size mermaid barmaid, and a steel slot machine. A comprehensive sink plan was assembled by Resolve Marine and the *Lady Luck* began its slowed decent at 8:30 am on the 23rd. It took almost 8 hours for the *Lady Luck* to be deployed. She is now resting upright in 120 ft of water at 26° 13.807' N, 80° 03.807' W. It took over the expected amount of time and water to successful flood the *Lady Luck* and with hundreds of impatient private boater the day was hectic. After deployment and dive inspection to remove diver and fishing hazards, traces of small amounts of oil were seen seeping from the ship. The next day the USCG was made aware of the oil. Total funds for the project was \$800,000 from local donations from The Shipwreck Park Inc., The City of Pompano Beach and Isle Casino Racing Pompano Park. For a 3-D of the ship before deployment and to see additional pictures please visit <http://shipwreckparkpompano.org/index.html>.

*Broward County, Limestone Boulders (Southeast Florida, Atlantic Ocean)*

On September 28, 2016 Broward County and McCulley Marine Services deployed 510 tons of clean limestone boulders off Deerfield Beach in a water depth of 67 ft. All material was deployed in the issued USACE Permit #SAJ-1989-90804 (Site A1) and Florida Department Environmental Protection Permit #06-0324675 (Site Deerfield Shallow). The new artificial reef is an addition to last year's 'Mt. Deerfield' project. The deployment was completed in compliance with the permit requirements.

Once the tug and barge cleared the area, the dive team made a final inspection. The boulders spread in a 60 ft. diameter footprint and piled 15 ft. high with a clearance of 52 ft. to the surface. The final coordinate for the reef is: N 26° 19.0654' W -80° 03.7202'. The artificial reef was created using FWC Grant #15234 for \$60,000.00 of state funds.

*City of Mexico Beach (Bay County, Northwest Florida, Gulf of Mexico)*

Between May 9 and May 10, 2016, the City of Mexico Beach, located in eastern Bay County in Northwest Florida, deployed 77 structures consisting of prefabricated modules and secondary use materials. 49 Florida Limestone Artificial Reefs, 17 Grouper ecosystem reefs, 1 Florida

Special Tetrahedron, 2 large cable reels and 8 chicken transport devices with one to six structures placed at each patch reef for an average of three modules per patch reef for a total of 26 patch reefs distributed among eight permitted sites in Gulf of Mexico state and Federal waters.

Five different pre-fabricated structural designs were used among the 26 patch reefs. One type of structure was a prefabricated module called a "Florida Limestone Artificial Reef". The "Florida Limestone" Artificial Reef module is a concrete tetrahedron module measuring 8 ft. tall and 10 ft. wide at the base, with three 12 inch by 18 inch rectangular openings through each of three upright limestone studded concrete sides. This module alone weighs approximately 6,000 lbs. There were 49 of these units deployed. The second type of module deployed was a prefabricated module called a "Grouper Ledge / Ecosystem" hybrid module measuring 6 ft. tall, 5 ft. wide, and 10 ft. long, with a single large opening on one side with three layers of the cylindrical shaped limestone embedded concrete disks placed on top. There were 17 of these units deployed. The third type of structure was a prefabricated module called a "Florida Special". The "Florida Special" is a steel reinforced concrete tetrahedron with steel sides measuring 10 ft. tall and 11 ft. wide at the base and weighs approximately 6,000 lbs. There was one of these units deployed. The fourth structure deployed were secondary-use cable reels with stand assemblies. The cable reels are steel spool structures measuring 11 ft. tall, 16 ft. wide and 30 ft. long. Each spool weighs approximately 36,000 lbs. The fifth structure deployed were secondary-use steel chicken transport devices. These chicken transport devices are constructed of steel and measure 4 ft. tall, 4 ft. wide and 8 ft. long. Each steel chicken transport device weighs 800 lbs. All of these reef structures were either designed and manufactured or acquired by the City's competitively selected marine contractor, Walter Marine of Orange Beach, Alabama.

Fourteen of the deployed structures ("Florida Limestone/Grouper Ledge" modules and chicken transport devices), were designated as research refugia reefs by the City of Mexico Beach and Mexico Beach Artificial Reef Association (MBARA). The exact coordinates of these sites will not be published to allow MBARA divers to monitor the fish populations over time. This will allow data collection for comparison of publicly noticed artificial reefs with unpublished artificial reefs.

The total cost for this project was \$142,888.64. The City of Mexico Beach contributed a total of \$25,201.64, the Mexico Beach Artificial Reef Association contributed a total of \$57,687.00, the state share was \$10,000.00, and the federal grant funds expended were: \$50,000.00.

*City of St. Marks (Franklin County, Big Bend Region of Florida, Gulf of Mexico)*

The City of St. Marks deployed 101 pre-fabricated modules at 25 patch reef locations within the St. Marks Artificial Reef permitted area (SAJ-19689-60014). The St. Marks Artificial reef permitted area is a 17 acre rectangular shape permitted area located in Apalachee Bay in the Gulf of Mexico, south of Wakulla County, with the center of the existing site being located approximately 5.3 nautical miles to the south of the entrance to the St. Marks River. The approximate depth of water within the site varies from 18-21 feet relative to the MLLW.

All reef material was deployed during a single deployment operation on 12/3/2016. The

deployment operations was performed by the subcontractor Coleen Marine. Coleen Marine used spuds and live boating in order to place reef material at designated patch reef locations. Patch reef locations were marked using an anchored buoys. FWC staff was on site during deployment operations. No permit compliance issues were observed during the deployment operations.

The total cost for this project was \$49,612.12. The state share of this project was \$49,612.12. There was no federal funds or local match provided for this project.

#### *Escambia County (Northwest Florida, Gulf of Mexico)*

On January 13, 2016, Escambia County sunk tug boat *Ocean Wind* roughly 10 nautical miles southeast of Pensacola Pass in 82 ft. of water. *Ocean Wind* was built in 1952 and served as a ship docking assist tug, most recently in Pensacola, until it was retired in September 2013. It is 87 ft. long by 25 ft. wide with a draft of 10 ft. The height from the keel to the top of the mast is 37 ft. Prior to being sunk, *Ocean Wind* was removed of bilge waste, hydrocarbon residue in the steering system, diesel and oil pipes in the engine room, and cleaning of fuel tanks. All rooms had been stripped down to the exposed wall and base flooring. All areas observed, including the engine room, were broom-swept with no loose debris, and there were no residual oil on the walls or floors. Additionally, numerous holes had been cut on the deck of the boat and between the rooms in the interior of the tug to help and control the flooding process of the vessel during deployment. The tug was successfully deployed and resting upright and stable on the seafloor.

The total cost for this project was \$145,000. The state share of this project was \$100,000.00 with county match of 45,000.

#### *Martin County (Central Florida, Atlantic Ocean)*

Martin County deployed 3,245 tons of clean secondary-use concrete culverts, poles, pilings, barricades and other concrete and reinforced steel construction materials to create four patch reefs within northwest corner of the MC South County Phase 3 permitted area and three patch reefs within the western edge of Sirotkin permitted area. All material was deployed between July 28th and August 16th 2017. Both reef sites are in federal waters and permitted to Martin County by the USACE Permit Number SAJ-2006-01955 (IP-LCK), and SAJ-1995-04128 (IP-MJW) respectfully. The patch reefs were spaced 800 ft. apart based on conditions set in the Martin County Artificial Reef Plan. The Sirotkin patch reefs were planned to create a dive trail between the existing Tetrahedron Reef "Black" and the Railroad Tie Stack Reef. The total cost for both project was \$180,000. Martin County contributed \$38,000, the state share was \$92,000 and the federal grant funds expended were: \$50,000.

#### *Miami-Dade County (Southeast Florida, Atlantic Ocean)*

Miami- Dade County deployed 930 tons of limestone boulders at a depth of 50 feet within the Anchorage Artificial Reef Site. The 3 to 5 foot diameter limestone boulders created four patch reefs between three existing steel reefs, the Larsen Barge, Army Tanks and No. 7, within the Anchorage Artificial Reef Site. The deployment coordinates are located 3.5 nautical miles at a bearing of 30° from Government Cut. The Anchorage Artificial Reef Site is a rectangular permitted area located in state waters off Miami-Dade County in the Atlantic Ocean. The Anchorage Artificial Reef Site is permitted to Miami-Dade County by the USACE Permit Number

SAJ-2003-04250 (IP-PK), which is valid until July 24, 2024, and by the Florida Department of Environmental Protection Permit Number 13-0180248-001, which is valid until August 14, 2016. The deployment locations were located within the eastern center of the permitted site. Analysis of LIDAR survey information and visual assessment radial surveys conducted using SCUBA at the proposed deployment location confirmed sand substrate with no exposed hardbottom or submerged aquatic vegetation within 150 ft. of the project boundaries.

The total cost for this project was \$175,942.38. The state share was \$55,942.38 and the federal grant funds expended were \$120,000.00.

*Pinellas County (Central Florida, Gulf of Mexico)*

Pinellas County deployed over 2,000 tons of secondary-use concrete comprised of clean culverts, pilings, slabs, and rubble within the existing Veteran's Reef Permitted Area (SAJ-1998-00788 (IPMLS)). The Veteran's Reef Permitted Area is located approximately 9.6 nautical miles west of Hurricane Pass (Pinellas County) in Federal waters in the Gulf of Mexico. Pinellas County publicly advertised request for reef construction services and awarded the project to McCulley Marine Services, Inc. (Bid No. 156-0130-B(LN)). Four barge loads of secondary-use concrete were deployed within the northwest section of the Veteran's Reef Permitted Area Between June 16, 2016 and June 27, 2016 creating four patch reefs in close proximity to each other (~100 ft.) comprised of approximately 500 tons of material for a total deployment material weight of 2,000 tons. Collectively, the four patch reefs had a maximum relief of 15 ft. and a minimum vertical clearance of 30 ft.

Reimbursed services for this project included loading, transportation, and deployment of secondary-use concrete material from the Pinellas County Artificial Reef Program Staging Area to the Veterans Artificial Reef Permitted Area. The total cost for this project was \$89,000.00. The state share of this project was \$89,000.00. There were no matching funds.

*Palm Beach County, Ana Cecilia (Southeast Florida, Atlantic)*

On July 13th, 2016 Palm Beach County sunk the *Ana Cecilia*, 170 ft. long cargo vessel. The ship, built in 1972, and is most recently known for the drug smuggling confiscation by The U.S. Custom and Border Protection in 2015. The ship has three plaques honoring missing or lost at sea community members, Austin Stephanos, Perry J. Cohen, Palm Beach County Sheriff Deputy Fernandez Jones, Jaden Jones, and Willis Bell. The *Ana Cecilia* is the 45th ship to be scuttled in Palm Beach County (PBC) in recent decades and was successfully flooded and sunk upright 1.25 miles off the Lake Worth Inlet in 85 feet of water (coordinates: 26 47.118/-80 00.960). The total cost of this project was \$103,750 all provide by local funds.

*Palm Beach County, Modules (Southeast Florida, Atlantic Ocean)*

Palm Beach County deployed 100 prefabricated modules and 250 tons of limestone boulders within the Palm Beach County Jupiter Inlet Site C permitted (SAJ-2006-7012 (IP-JWH) valid until February 14, 2018. The Palm Beach County Jupiter Inlet Site C permitted area is a rectangular permitted zone measuring 0.77 nautical mile wide and 0.93 nautical miles long, encompassing approximately 0.75 square nm of area in federal and state waters off Palm Beach County. The permitted site is located approximately 0.5 nautical miles on a bearing of 45 from Jupiter Inlet,

Florida. Post deployment surveys confirmed sand substrate with no exposed hardbottom or submerged aquatic vegetation within the project boundaries.

Three different modules were used to create 25 patch reefs, each patch reef consisting of approximately four modules placed in the shape of a diamond. The patch reefs are generally oriented as two columns running northwest to southeast for approximately 750 feet within the permit boundaries. The 250 tons of limestone boulders mark the furthest northwest deployment.

One type of structure was a prefabricated module called a "Florida Limestone Artificial Reef". The "Florida Limestone" Artificial Reef module is a concrete tetrahedron module measuring 8 ft. tall and 10 ft. wide at the base, with three 12 inch by 18 inch rectangular openings through each of three upright limestone studded concrete sides designed by Walter Marine of Orange Beach, Alabama and constructed locally by McCulley Marine of Ft Pierce, Florida. This module alone weighs approximately 6,000 lbs. There were 50 of these units deployed. The second type of module deployed was a prefabricated module called a "Coral Head". These modules were constructed using thick mesh metal sheets, bent and oriented into horizontal and cylindrical shapes similar to sponges and coral and then covering the sheets with sprayed gunite (shotcrete) concrete. These modules measure approximately 8 ft. tall by 10 ft. wide at the base, with vertical and horizontal openings and ledge space throughout the structure. There were 30 of these units deployed. The third type of structure was constructed with the assistance of volunteer boy scouts which consisted of stacking and cementing cinder blocks to form modules structures measuring approximately 6 ft. tall by 10 ft. wide at the base. All 20 of these cinder block modules were different shapes and complexity with a singular steel reinforced column placed in the middle for lifting with a crane during deployment.

There was total of three deployment days for this project August 8, August 9, and August 11, 2016. All deployments were performed by the subcontractor McCulley Marine. McCulley Marine utilized a unique mooring technique for all deployments in order to assure high accuracy of placement of reef materials. The total cost for this project was \$156,977. The Palm Beach County contributed a total of \$96,977.00, the state share was \$20,000.00, and the federal grant funds expended were: \$40,000.00.

#### *Sarasota County (Central Florida, Gulf of Mexico)*

The Reef Ball Foundation deployed 51 prefabricated reef modules at a single location (82 48.112' W, 27 12.520 N) within the Sarasota County M-8 permitted site (SAJ-1994-2027). The Sarasota County M-8 permitted site is located approximately 13.9 nautical miles on a bearing of 252° from New Pass in federal waters on Florida's Gulf coast. The total reported tonnage for this deployment was 126 tons based on known weight of individual modules. The prefabricated reef modules for this project were manufactured by the Reef Innovations. Two types of modules were deployed for this project Goliath Ball (50) and Pallet Ball (1) forms.

All reef material for this project was deployed on November 23, 2016. Deployment operations were performed by the subcontractor Florida Dredge and Dock, LLC out of Tarpon Springs Florida. Deployment operations were observed and coordinated by Reef Innovations and Sarasota County. The total cost for this project was \$60,000.00. The state share of this project was \$60,000.00 with no federal funds or local match.

*St. Lucie County (Central Florida, Atlantic Ocean)*

St. Lucie County deployed 1,550 tons of clean concrete culverts, concrete railroad ties, concrete light poles, concrete storm water basins and other concrete construction materials at a single location (27 31.790' N, 80 10.652' W) within the St. Lucie County North Nearshore permitted (SAJ-2008-3568 (IP-GGL)). The St. Lucie County North Nearshore permitted area is a square permitted zone measuring one nautical mile on a side, encompassing approximately one square nm of area in federal waters off St. Lucie County. The permitted site is located approximately 5.6 nautical miles on a bearing of 61° from Ft. Pierce Inlet, Florida. Post-deployment surveys confirmed a continuous and compact patch reef with a relief of 19 feet at a depth of 57 feet within the permit area boundaries. There was total of three deployments for this project July 13, July 15, and July 20, 2016. All deployments were performed by the subcontractor McCulley Marine. McCulley Marine utilized mooring technique for all deployments in order to assure accuracy of placement of reef materials. No issues were reported in the deployment operations. The total cost for this project was \$65,500.00. The St. Lucie County contributed a total of \$5,502.00, the state share was \$19,998.00, and the federal grant funds expended were: \$40,000.00.

*Volusia County (Central Florida, Atlantic Ocean)*

Between August 22nd and September 21st, 2016, Volusia County, deployed seven patch reefs each consisting of 400 tons of clean secondary-use concrete barriers, for a total deployment weight of 3,310 tons. Three of the seven patch reefs were deployed in Sunglow permitted area and the remaining patch reefs in Flagler permitted area (SAJ-2014-0037 SP-TSD). The patch reefs were spaced 250-400 ft. apart with a vertical profile of 20 ft., and depth ranging between 38 to 50 ft. The total cost for the project was \$159,960. Volusia County contributed \$99,960, the state share was \$60,000.

**Completed or Ongoing State Funded Artificial Reef Monitoring Projects During 2016**

*Martin County Fish and Benthic Monitoring (Southeast Florida, Atlantic Ocean)*

Martin County, was contracted to perform fish and benthic surveys as well as collect multi-beam imagery at two permitted reef sites (Donaldson Reef and South County Reef) out of the St. Lucie Inlet in order to compare fish and benthic communities associated with two artificial reef sites in Martin County ranging in age from two years to eight years. This study will compare fish communities at reef locations in permit sites designated for fisheries habitat enhancement and general recreation (.i.e. angler, scuba). Fish censuses for this study include identification of trophic guilds and size classes to describe utilization by fishes, and are being conducted using the Reef fish Visual Census (RVC) method for comparison to the multi-year RVC database in Martin County.

*Assessment of Natural and Artificial Reefs off Palm Beach County, Palm Beach County Reef Research Team (Southeast Florida, Atlantic Ocean)*

A non-profit group, The Palm Beach County Reef Research Team, was contracted to perform fish monitoring and mapping dives on 21 artificial and natural reefs during 2016 to continue a 20 year long-term reef monitoring effort off of Palm Beach County. The main objective for this research project was to assess and compare fish and benthic assemblages on both artificial reefs of differing structural makeup and adjacent natural reefs. As of January 2017, The Reef

Research Team has finished the dives associated with this project and will be submitting a final report summarizing their findings early this summer. A total of 145 species of fish representing 44 families were recorded during the 26 point count surveys in 2015. Overall, in comparing substrate types among the artificial reef sites, combination sites (i.e. reef sites with both natural hard bottom and artificial reef structures) had the highest averages for species and family counts and numbers of individuals; these averages were all greater than those of the natural reefs.

*Sarasota Bay Estuary Program Assessment of Fish Assemblages on Intercostal Reef Modules and Surrounding Habitats (Central Florida, Gulf of Mexico)*

A non-profit group, The Sarasota Bay Estuary Program, was contracted to survey three artificial reef permitted sites within Sarasota Bay (Hart's Family Reef, Walker's Reef, and Sportfish Angler's Club Reef) using sidescan sonar imagery and conduct fish census surveys using baited underwater cameras in order to better characterize fish species utilization of inshore artificial reef modules. The SBEP has subcontracted the sidescan and BRUV surveys to CB&I. As of January 2017, a sidescan survey has been completed and BRUV monitoring is scheduled to begin this summer.

*Assessment of User Activities on Artificial Reefs and Natural Reefs off Pinellas County, University of South Florida (Central Florida Gulf Coast).*

FWC contracted with the University of South Florida to engage in a project utilizing passive acoustic listening devices to assess boating activity over and immediately adjacent to three artificial reef sites and their paired natural reef sites. The final report from the acoustic dataset indicated that the artificial reef sites are receiving significantly higher boating visitation activity than the paired natural reef sites.

*Targeted Lionfish Removals on Northern Gulf of Mexico Artificial Reefs, University of West Florida (Northwest Florida)*

The University of West Florida (UWF) was funded by FWC to conduct a two-year study starting in 2014 to examine the effectiveness and ecological benefits of targeted lionfish removals at experimental Escambia East-Large Area Artificial Reef Site (EE-LAARS) artificial reefs (n = 27; varying module designs) off northwest Florida, where lionfish had achieved densities among the highest in the western Atlantic by 2013. The EE-LAARS reef sites were originally deployed by FWC in 2003 with the intent to use the reefs as research sites to monitor artificial reef fish communities. Subsequently, the exact coordinates of these sites were not distributed. All lionfish were removed from 17 of the selected sample sites via spearfishing from in December 2013, with nine of the sites being periodically cleared of lionfish through May 2015. The remaining 10 sites served as un-cleared controls. Both juvenile and adult lionfish quickly recruited to cleared reefs, with lionfish reaching pre-clearance densities in less than a year on reefs that were cleared only once. Lionfish removal treatment and sample timing significantly affected reef fish community structure at experimental reefs, but lionfish removal was insufficient to achieve substantial gains for most fish species, and declines in several species were observed throughout the study regardless of treatment.

*Oriskany Reef Fish PCB monitoring, Escambia County and FWC (Northwest Florida)*

The FWC and Escambia County continued sampling legal-size recreationally targeted reef fish



(red snapper, gray triggerfish, red and whitebone porgy, vermilion snapper, gag, red, and scamp grouper) for polychlorinated biphenyl (PCB) analysis (using skin-on lateral muscle tissue fillets) in compliance with requirements of the EPA risk-based PCB disposal permit for the ex-U.S.S. Oriskany (CVA-34), sunk as an artificial reef in 212 feet of water 22.5 nautical miles off Pensacola

Pass on May 17, 2006. Between Dec. 14, 2006, and April 24, 2015, 13 reef fish sample collection events were completed, nine during the spring and four during late fall/winter. A total of 438 reef fish collected on the Oriskany have been retained for PCB sampling from December 2006 through April 2015. Collected species include nine reef fish species: 241 red snapper, 102 vermilion snapper, 30 red porgy, 24 whitebone porgy, 16 scamp grouper, 11 bank sea bass, seven gag grouper, four red grouper, and three gray triggerfish.

Of the nine fish species retained for analysis, only Red Snapper and Vermilion Snapper were caught with typically at least 11 or more legal-size fish per sample event (even though at least 15 were targeted). For Red Snapper, initially the mean total PCB level within the first three years had values exceeding the EPA screening value of 20 ppb, but by sample round 6, collected at 3.5 years, the mean total PCB level decreased to below the EPA screening value and remained low through sample round 10 at 5.9 years, but increased to 28 ppb during round 11, 6.9 years after sinking, and then dropped to 7 ppb. For Vermilion Snapper, mean total PCB levels were consistently below 20 ppb. For the other six species, mean total PCB levels exceeded 20 ppb for some samples, but the number of fish caught were below the minimum 15 fish required for human health risk assessment. The highest recorded total PCB concentrations for any of the individual 412 Oriskany Reef PCB sampled fish were from red porgy (1,654.7 ppb) during sampling round four and 1,222.7 ppb in sampling round eight). These individual Oriskany Reef fish had total PCB levels 24 to 33 times higher than the FDOH screening level. Only five legal size piscivorous grouper (scamp) were available for capture at the Oriskany Reef with two of three captured in sampling round eight exceeding the FDOH screening threshold (highest concentrations 208.7 ppb and 94.1 ppb respectively), and one captured in sampling round eight exceeding the FDOH screening threshold (292 ppb).

The downward trends of red snapper mean total PCB levels to below screening levels and the consistently low vermilion snapper mean PCB levels did not result in fish consumption advisory actions. The remaining analyzed species (triggerfish, groupers, porgy) represent too few specimens sampled with too great a PCB variability among individuals of the same species to take any species specific fish consumption advisory action, but due to elevated levels observed in scamp grouper and bank seabass, Escambia County requested a toxicology consult from the Florida Department of Health and on June 27, 2016, the FDOH issued the following consumption “guidelines” (The Department of Health does not offer advisories for fish species caught outside of state waters): Bank Seabass – two meals per week; Scamp Grouper – one meal per week.

Oriskany Reef sampling and monitoring will continue until directed otherwise by EPA Region 4. The next sampling event is scheduled to place in April 2017.

### **Other Program Updates**

*Natural Resource Damage Assessment (NRDA)*

A northwest Florida regional artificial reef project involving Escambia, Santa Rosa, Walton, Okaloosa and Bay Counties and the city of Mexico Beach was moved from NRDA Phase II to designation as one of 28 Florida NRDA phase III projects with a project cost of 11.4 million dollars. Further project planning continued during 2014-2015 where FWC Artificial Reef Program Staff coordinated with Trustees on development of a project Biological Assessment and Environmental Impact Statement. The Trustees approved the Deepwater Horizon Oil Spill Programmatic and Phase III Early Restoration Plan and Early Restoration Programmatic Environmental Impact Statement (“Phase III Plan”) on October 2, 2014 and on February 26, 2015 a Memorandum of Understanding was executed between the Florida Department of Environmental Protection and FWC to implement the specified NRDA Phase III early restoration projects. The February 26, 2015 MOU included the stipulations for the \$11.4M Florida NRDA Artificial Reef Project and allowed for funds to be released from FDEP to FWC. In accordance with the MOU, during May 2015, the FWC Artificial Reef Program Administrator hired a full-time Fishery Biologist, Alex Fogg to provide contract management oversight of the FWC NRDA Artificial Reef Project. Six construction agreements were executed with Escambia County, Santa Rosa County, Walton County, Okaloosa County, Bay County, and the City of Mexico Beach, by January 31, 2016, all grants were executed. Construction commenced in September 2016 off Mexico Beach and is anticipated to continue through early 2018.

Texas (presentation 11, briefing material 17): Shively provided the TX update.

Currently TX has 86 permitted reef sites with one additional site pending approval, enhancing over 7,000 acres of marine habitat. Sites range in size from 31 to 1,650 acres. Most are part of the Rigs to Reefs program and are located in Federal waters.

The Program is comprised of several subprograms:

*1. RIGS-TO-REEFS (R2R) PROGRAM:*

A. Background: This subprogram is the main source of funding for the Program. As petroleum production decreases or ceases at offshore platforms in federal waters off Texas, petroleum companies are obligated through the Bureau of Safety and Environmental Enforcement (BSEE) and Bureau of Ocean Energy Management (BOEM) to remove the platform, take it into shore for scrapping, and cleanup the ocean bottom to some state similar to what it was before the platform was installed. (These two Bureaus are descendants of the U.S. Minerals Management Service which was reorganized after the Deepwater Horizon Oil Spill (aka BP oil spill and Macondo Blowout) in April 2010).

Since many of these platforms have been in production for 30 years or more, there is a tremendous amount of marine life growing on the platform legs and conductor lines. The R2R program was sanctioned by the former U.S. Minerals Management Service to allow petroleum companies to donate their obsolete platforms to state governments as artificial reefs instead of scrapping them. There are various methods of reefing these platforms; toppling in place, towing them to an existing reef site, and partial removal (which involves removing the upper portion and placing it on the ocean bottom next to the base which is left standing in place). In all

operations now, the production decks above water are removed and taken into shore for reuse or scrapping.

Conductor lines traditionally have been left in place after being severed from the wells or removed and scrapped. In the last year, some directors of BOEM/BSEE have pushed to enforce a guideline where conductors are to be removed 15ft below mud line (BML) or, in a worse case, extend no higher than 15ft above mud line (AML). By doing this, a significant amount of hard structure (habitat) is lost. TPWD was successful in getting waivers on 2 R2R projects to keep the conductors in place in 2016. However, future R2R projects may be subject to the removal of conductors.

The preferred method of reefing in Texas is through partial removal when a platform is large (8-piles/legs or larger) and conductors cut at the same height as the platform base. Once a platform donation is arranged with a petroleum company, all work is performed by the company including all surveys, and the Texas Artificial Reef Program receives one-half of the estimated realized savings calculated from complete removal costs versus reefing costs. In the majority of cases, petroleum companies can pay the Program the donation amount and still save money, making the R2R a win-win for the petroleum company, Texas, and the marine environment.

**B. 2016 Projects Completed:**

**Petroleum Platforms Reefed in 2016**

<b>Platform</b>	<b>Outer Continental Shelf Region</b>	<b>Size</b>	<b>Reefing Method</b>	<b>Company</b>	<b>Date Reefed</b>	<b>Donation Received</b>
HI-A-334A	High Island	8-pile	Partial Removal	Fieldwood Energy	8/4/16	\$205,471.04
HI-A-334B	High Island	8-pile	Partial Removal	Fieldwood Energy	8/1/16	\$284,800.00
HI-A-334B-AUX	High Island	4-pile	Tow to HI-A-334	Fieldwood Energy	6/29/16	\$64,568.58
HI-A-334C	High Island	4-pile	Tow to HI-A-334	Fieldwood Energy	7/22/16	\$83,615.63

**C. Special Concerns:**

**C.1 Deep water Platforms:** The Program considers deep water platforms to be those in water depths greater than 500ft. To date we have one platform scheduled for reefing in 2017 and two others under negotiation. **C1.1 EB-110:** TPWD has a Material Donation Agreement with Fieldwood Energy to reef their East Breaks 110 (EB-110) 8-pile petroleum platform in 660ft of water. Fieldwood had problems with plugging wells in 2016 and now is predicting to reef the structure in 2017. A donation amount of \$2.5m was agreed upon. The base will remain standing in place and the upper portion cut at 90ft. The deck and upper portion will be taken into shore for scrapping. Conductors will be cut between -90 and -100 ft. Placing the upper portion on the bottom next to the base (as in a partial removal operation) was deemed not to be productive

since there is no light at that depth. The Program currently has the reef permit and USCG clearance authorization for this reefing.

C1.2 Other Fieldwood Energy Platforms: Fieldwood Energy owns two other deep water platforms which are in discussion to be reefed: 8-pile East Breaks 159 (924ft) and 8-pile East Breaks 160 (935ft). The USACOE permits were approved in 2016. No Material Donation Agreements have been finalized to date.

C1.3 Garden Banks Platforms: The Program has reef site permits for two Garden Banks deep water platforms: GB-142B (542ft) which is owned by Sojitz, and Chevron platform GB-189A (730ft). TPWD is negotiating the Material Donation Agreement for GB-142 and preliminary discussions have taken place with Chevron for GB-189. We hope to have these structures in our R2R program in 2017.

C2. High Island 389A: This 8-pile platform is owned by W&T Offshore and located within the boundary of the Flower Gardens Banks National Marine Sanctuary (FGBNMS) in 410ft. It is important to note that the platform has been in its current location since 1981, prior to the designation of the area as a Sanctuary in 1992. Local constituents and the Flower Gardens Banks Reef Advisory Board have worked to save the platform in its current condition for years, as it is important habitat to the ecosystem. Many corals and tropical fish species are seen on the platform and it is frequently visited by sea turtles and manta rays.

TPWD continues to work with W&T Offshore, FGBNMS, and the US Army Corps of Engineers to obtain the reef permit for a 20ac site. Only the base will remain and the upper portion above 65ft and the deck will be scrapped. The last conference call to discuss the status was held 23 JAN 2017. At this point, the USACOE must finish drafting their Environmental Assessment, after which it will be reviewed by the FGBNMS. If no additional concerns are noted, the USACOE will issue the permit to TPWD. TPWD will simultaneously be working through a Memorandum of Agreement with the FGBNMS for approval for reefing. Once approved, W&T Offshore will begin the decommissioning work. We look for permit approval in early spring 2017 with reefing to begin by late summer 2017.

#### D. Current Status to Date:

- Total Petroleum Platforms Reefed: 148
- Other Components reefed (e.g. net guards, decks, Mobile Offshore Drilling Unit legs, etc.): 11
- Total funds deposited in R2R account since program inception: \$26 million
- Material Donation Agreements signed but not reefed: 10
- Donations in various stages of completion (e.g. inquiries, donation amounts calculated, waiting on contract signatures, etc.): 57

## 2. NEARSHORE REEFS PROGRAM:

A. Background: The Nearshore Reef Program was initiated to provide reef sites closer to major ports and located in Texas state waters (9nm). The public had expressed interest in having fishing (and limited diving) opportunities closer to shore without having to travel 30nm or more

offshore. While several nearshore reef sites were already permitted, it was not until 2006 that the Program made a concerted effort to provide nearshore reefs. Currently, TPWD has nearshore reefs permitted out of each major coastal metropolitan center. Reefs range in size from 31ac at Boatman's/Lonestar reefs off Corpus Christi to the 1,650ac reef in South Padre (PS-1105 Rio Grande Valley Reef). Water depths range from 38ft to 73ft. Due to the shallow nature of these reefs, reef materials consist of low-relief concrete culvert, 1-ton quarry rock, prefabricated concrete pyramids, and some larger items such as petroleum platforms and vessels as water depths allow.

**B. 2016 Nearshore Reef Site Development:**

**Nearshore Reef Permit Projects in 2016**

<b>Reef Name</b>	<b>Outer Continental Shelf Block</b>	<b>Water Depth (FT)</b>	<b>Acres</b>	<b>USACOE Permit</b>	<b>TX GLO Surface Lease</b>	<b>USCG Clearance</b>
Sabine	HI-20	38	160	8/17/16	3/28/16	30ft - Approved
Rio Grande Valley	PS-1105	64	1,650	7/18/16	6/30/16	30ft - Approved

**C. Nearshore Reefing Highlights:**

C1. 2015 Grant: In late 2015, Program staff Chief Scientist Dr. Brooke Shipley was awarded a \$400,000 grant (with a \$400,000 match from the reef Program) for a Texas General Land Office Coastal Management Plan (Cycle 21) Grant. The grant is to create low and mid-relief habitat in the new Rio Grande Valley Nearshore Reef Site (PS-1105). Those funds became available in fall 2016 and a Request for Proposals is being drafted for bid in early spring 2017. The project will reef 250 concrete pyramids interspersed with 250 low relief (6ft x 6ft x 1ft) concrete plats containing cinder blocks to compare the impacts of high vs. low relief structure on juvenile red snapper. The study will be conducted by Dr. Rick Kline (UT-Rio Grande Valley University).

C2. 2017 Grant: As of 27 JAN 2017, Dr. Shipley was also awarded a \$300,000 Coastal Management Plan (Cycle 22) grant (with TPWD matching \$300,000) for similar reefing and study at Big Man Reef GA-220 offshore of Galveston. Funds will be available in fall 2017 and work is expected to begin in spring 2018.

C3. Rio Grande Valley Nearshore Reef PS-1105 (Cameron County): In SEP 2016, the first materials were reefed at the Rio Grande Valley Nearshore reef off South Padre by a volunteer group, Friends of Rio Grande Valley Reef. An obsolete tug and shrimp boat were reefed.

C4. George Vancouver/Freeport BA-336 Nearshore Reef (Brazoria County): A total of \$2.2m in Natural Resource Damage Assessment funds was used to award a reefing project to Callan Marine LTD (Galveston, TX) in June 2015. This project was designed to increase the amount of reef materials in the George Vancouver (Liberty Ship) Artificial Reef, approximately 6 miles from Freeport, by placing 800 concrete pyramids at a water depth of 55 feet. The site contains the Liberty Ship and other low relief materials previously reefed. All pyramids were constructed and reefed in fall 2016. This reef site is now considered complete.

C5. Matagorda Nearshore Reef BA-439 (Brazoria County): A total of \$3.6m in Natural Resource Damage Assessment funds was used to award a reefing project to Callan Marine LTD (Galveston, TX) in June 2015. This project will create a new artificial reef site approximately 10 miles offshore of Matagorda County, Texas, through deployment of 1,600 concrete pyramids at a water depth of 60 feet. The pyramids were constructed in the summer of 2016 and reefing began in JAN 2017. To date, 400 pyramids have been reefed. The project is expected to be completed by April 2017.

C6. Port O'Connor Nearshore Reef MI-562 (Calhoun County): In August 2016, the reef program received \$600,000 from the TPWD Foundation, the Coastal Conservation Association (CCA), and the Building Conservation Trust (CCA's National Habitat Program). With a match of \$400,000 from the TPWD Artificial Reef fund, Callan Marine LTD was awarded a contract to reef 500 concrete pyramids in a section of the reef, designated "Keeping it Wild Reef." All pyramids have been constructed and will be reefed in summer 2017.

In addition, Shell Oil Company donated \$400,000 to reef 200 pyramids in an area of the reef designated as "Shell Oil Reef." Callan Marine is constructing the pyramids now and is scheduled to deploy them in summer 2017.

D. Current Status:

- Total Nearshore Reefs to date: 11
- Reef sizes: 31 acres to 1,650 acres

4. SHIPS-TO-REEFS PROGRAM:

A. Background: This program is designed specifically for the benefit of recreational diving, while enhancing marine habitat. Diving interest in Texas is subject to water conditions. Clear water is rarely found within 3-4 miles of the coast and most diving is directed to standing petroleum platforms over 30 miles offshore or to the Flower Gardens Banks National Marine Sanctuary located over 100 miles off the coast.

B. M/V *Kraken* Ship Reef (HI-A-424): As part of the Natural Resource Damage Assessment approved projects from 2015, a Request for Proposals (RFP) was submitted to the public on 10 December 2015 for a turn-key project to acquire, clean, and reef a large vessel offshore Texas as a diving and fishing attraction. Bids closed on March 2016, and the project was awarded to Cahaba Disaster Recovery (Tuscaloosa, Alabama).

The SCM *Fedra*, a 371ft general cargo carrier/tween deck was located and towed from Trinidad to Brownsville, TX for remediation and modification. The ship was built in Japan in 1987 as an ice class ship. Before the ship was towed, the title needed to be changed which required a new name for the vessel. Dr. Brooke Shipley (TPWD), in a creative spur-of-the-moment thought, worked with the contractor to rename the ship M/V *Kraken*.

The *Kraken* was remediated at the Port of Brownsville during summer of 2016 and was cleared for reefing by the US Environmental Protection Agency on 21 NOV 2016. Being a more modern ship, there was no asbestos or PCB materials on board. Overall, cleanup was restricted to

removing 125,585 gallons of hydrocarbons (and associated waste water), 390 cubic yards of debris and floatables, and 9,000 lbs. of ammonium sulfate (urea) that was stored onboard. The sink plan originally called for the use of explosives to open 4 holes in the stern engine compartment for flooding, but after complications getting USCG approval to move ACE (Advanced Cutting Explosive) charges onto a boat to transport to the ship, the contractor decided to use controlled flooding without explosives. More than 2,200 tons of concrete was poured into the hold to facilitate landing the ship in an upright position.

As weather worsened through Dec. 2016 and into 2017, the contractor found a small weather window from 17-20 JAN 2017. A tugboat towed the *Kraken* over 200nm from Brownsville, TX to the HI-A-424 reef site, arriving on 20 JAN. Once on site, wood paneling was removed over 4 pre-cut holes and 4 semi-cut holes over the stern were opened with cutting torches. Flooding was initiated by opening 2 10-inch valves near the stern. The stern sank first, followed by the bow. Once the valves were opened, the ship took over one hour to sink. The *Kraken* landed in an upright position on the ocean bottom in 141ft of water with zero degrees list. The project cost \$3.9m (using \$1.9 million of Natural Resource Damage Assessment funds).

#### C. Current Status:

- 12 World War II Liberty Ships were reefed at 5 sites in the mid-1970s, which later became under the management of the TPWD Artificial Reef Program;
- *VA Fogg*, a cargo ship carrying xylene, explodes in 1972, creating the original reef site for the Freeport Liberty Ships;
- USTS *Texas Clipper*, a 473ft passenger liner, reefed in South Padre Island reef PS-1122 on 17 NOV 2007;
- M/V *Kinta*, a 150ft intracoastal tanker, reefed at Corpus Christi Nearshore Reef MU-775 in 17 SEP 2014;
- M/V *Kraken*, a 371ft general cargo carrier/tween deck, reefed at HI-A-424 on 20 JAN 2017;
- 16 ships are in the Ships-to-Reefs program, not including smaller vessels such as several barges, tugboats, shrimp boats.

#### 5. BIOLOGICAL MONITORING AND RESEARCH PROGRAM:

A. Background: Biological monitoring of TPWD reef sites is mandated through the Program's management plan and TPWD legal code. Since the Program was established in 1990, monitoring has taken on several evolutions. Staff began making underwater observations and conducting fish counts through the use of SCUBA early in the program. With only three staff members, the use of volunteer divers was imperative. A formal diving program was established through membership in the American Academy of Underwater Sciences and the development of the TPWD Artificial Reef Diving Safety Guidelines in 1996. Over the years, the Program has expanded its monitoring to include data sondes, vertical long lines, underwater video and lasers, ROVs, fish collection traps, and other methods. In addition, the Program began subcontracting collaborative monitoring with local universities and funding ancillary research projects conducted by university and federal agency staff and graduate students. Currently, the

Program holds a 2-day Texas Artificial Reef Program Consortium where contractors come together to discuss research and monitoring. It also provides a forum for the presentation of research findings, many of which are published in peer reviewed journals.

B. Research Contracts: Biological monitoring and research was conducted with four universities and the U.S. Geological Survey. Periods of contracts are in parentheses.

B1. Texas A&M University – Galveston: Biomass and community structure of reef fishes on TPWD artificial reefs in north Texas (2011-2017).

B2. Texas A&M University – Corpus Christi: 1.) South Texas artificial reef research (STARR) program: fish community assessment and reef site evaluations (2011-2017) 2.) Socio-economic study of SCUBA diving on Texas artificial reefs (2014-2016).

B3. University of Texas – Rio Grande Valley: 1.) Artificial reef biological monitoring and research program: FY 2015 – 2017 (2007-2017). 2.) Rio Grande Valley reefing site pre- and post-deployment monitoring FY 2016-2017 (2015-2017).

B4. U.S. Geological Survey: Water quality monitoring of offshore (Texas) artificial reefs (2013-2017).

C. Diving:

C.1. Diving: The Program has increased its dive locker equipment and maintenance, and diver training over the years and has been a member of the American Academy of Underwater Sciences (AAUS) since 1996, with the approval of its Diving Safety Manual. The Program's Diving Safety Officer (DSO), Chris Ledford, has been instrumental in running the dive program over the years and highlights in 2016 include:

- Beginning a new AAUS Scientific Diver class with TPWD employees from the Habitat Mapping Team, Ecosystem Resource Program and Fisheries Management;
- Chris began his two year term as Secretary to the Executive Board of Directors of the AAUS;
- Chris presented a paper on the Program's use of dual laser photogrammetry in biological monitoring at the TPWD Coastal Fisheries Meeting held in February 2016;
- Chris was asked to serve on the Diving Control Boards for TAMU Galveston and the Texas Historical Commission;
- Weather prohibited some of the dive biological monitoring trips from occurring. However, 61 dive hours were completed by staff and volunteer scientific divers during 2016.

D. TPWD Artificial Reef Consortium: The Program began holding an Artificial Reef Consortium for its interagency contractors in 2014. This is an opportunity for those who hold research contracts and conduct biological monitoring to present findings and discuss monitoring results and problems. It is also an opportunity to discuss future monitoring needs, methods, and direction.

The 3rd Annual Texas Artificial Reef Program Consortium was held at the TAMU-Corpus Christi Harte Institute on FEB 11-12, 2016 and the 4th on FEB 26-27, 2017. While restricted to the



Program's contractors and other interested people, the event grows larger each year. Typically, over 50 contractors, professors, graduate students, and others attend.

TX also produced 10 reports and publications.

#### *Matching Sport Fish Restoration Funds in Delaware (presentation 12)*

Tinsman gave a presentation on how DE matches Sport Fish Restoration (SFR) Funds. He received approval from the US Fish and Wildlife Service to use donated concrete as banked Federal SFR match. He received letters from the concrete suppliers with a cost estimate for the concrete (e.g. \$45 per ton). The excess match from the cost of the concrete could be used to reef things that do not create their own match, such as ships.

He also received approval to consider the value of the subway cars that he deployed as banked match. The banked match balance kept increasing, going up to millions of dollars.

In their 2016 Federal audit they lost the ability to use banked match, which makes large vessel projects much more challenging. Potential solutions include structuring the large vessel preparation contract over several project years with threshold payments or attracting foundation or other private funding. Currently, DE and NJ are reefing the Tamaroa with the Annie E. Casey Foundation (providing the matching funds).

#### *Discuss Next Joint Meeting in 2018*

Ideas for the next meeting location include New Orleans, Key West (though Havel doesn't think ASMFC will cover travel costs), and a location where a reef is close to being deployed (for a field trip). Ballard will look into options. This time of year worked well for everyone and we will likely meet around the same time next year.

#### *Other Business Including Chair Nominations*

2017 will be Rousseau's last year as ASMFC Artificial Reef Committee Chair. Peters will step up as Chair in 2018, and Murray was nominated (and all agreed) for the position of Vice Chair.

A motion to adjourn was made and seconded.

*Meeting Adjourn 11:45*

