Testimony: Texas Rigs-to-Reefs Program in the Gulf of Mexico – Overview
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Hearing: 17 May 2017, House Committee on Natural Resources Subcommittee on Energy and Mineral Resources

1.0 Introduction

Good morning Chairman Gosar, Congressman Lowenthal, and other members of the Subcommittee. My name is Dale Shively and I am the Program Leader for the Artificial Reef Program in the State of Texas. The program is administered through the Texas Parks and Wildlife Department Coastal Fisheries Division (TPWD). Our mission is to manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing, and outdoor recreation opportunities for the public.

My testimony today will focus on the management and enhancement of marine habitat in the Gulf of Mexico using man-made materials, and in particular, decommissioned petroleum platforms through the Rigs-to-Reefs Program.

2.0 Texas Artificial Reef Program - Background

The Texas Artificial Reef Program is similar to other artificial reef programs in U.S. coastal states by serving as the State mandated program in which marine habitat is conserved and enhanced through the use of man-made materials such as decommissioned petroleum platforms, ships, concrete, and pre-designed materials.

Texas is very active in the creation and enhancement of artificial reefs in the Gulf of Mexico and has one of the strongest reef programs in the nation. While Texas state waters extend from the coastal shoreline to nine (9) nautical miles into the Gulf, the program's artificial reefs range from 6 to 100 miles from shore. [Please refer to the map attached to the end of this testimony]. Currently, the Texas Artificial Reef Program has 88 individual reef sites ranging from 40 – 1,650 acres in size.

Resource managers have been involved in artificial reef development off the Texas coast for nearly 60 years. The donation of 12 Liberty Ships in 1975-76 formed the foundation of the current Artificial Reef Program and represented the first successful reef development activity by TPWD utilizing stable, durable, and complex material. In 1989, the Texas Legislature directed TPWD to develop the artificial reef potential off Texas. The Texas Artificial Reef Plan was adopted in 1990 creating the Artificial Reef Program (Stephan 1990).

The program consists of four (4) main subprograms: Nearshore Reefs, Ships-to-Reefs, Rigs-to-Reefs, and Biological Monitoring and Research. The focus of the Nearshore Program is to create and enhance marine habitat in coastal waters offshore to the state boundary (9 nautical miles), also known as the Texas Territorial Waters. This provides habitat for adult and juvenile marine species using small profile materials in waters that average 50 – 80 feet in depth. These reefs are important to local fishermen and divers that do not care to venture too far offshore.

The Ships-to-Reefs Program develops reef sites using derelict and obsolete vessels such as barges, shrimp boats, tug boats, tankers, WWII Liberty Ships, and larger vessels such as the 473ft USTS *Texas Clipper* and 371ft MV *Kraken.* These materials make excellent marine habitat while providing for additional fishing and recreational diving opportunities.

While those programs are important, the major focus of the Texas artificial reef program since its beginning in 1990 is in conserving and enhancing marine habitat by use of decommissioned petroleum platforms through the Rigs-to-Reefs Program. To date, over 150 petroleum structures and components have been reefed (or are in process) at various sites off Texas. The reefs provide a massive amount of hard substrate in areas where marine life has developed for years. Even though the tops of some platforms exceed 100 feet in depth after reefing, the majority are cut around 85 feet, preserving as much marine growth as possible.

Numerous fish species are found on the structures at all depths. We know this through our biological monitoring and research program. The Texas Artificial Reef Program conducts biological monitoring at numerous reef sites including platform reefs with internal staff and through research contracts with local universities (TAMU-Galveston, TAMU-Corpus Christi, and UT-Rio Grande Valley) and the U.S. Geological Survey.

Staff use many monitoring methods including vertical longlines, camera arrays, remotely operated underwater vehicles, and scuba diving to acquire extensive biological and water quality data. Data collected are used to track long-term trends in relative fish abundance and to determine how well individual reefs are functioning. It is the goal of the program to fully understand the best methods of developing artificial reefs, their impact on marine populations, and to determine the biological and economic impacts of artificial reefs off Texas.

The Texas Artificial Reef Program develops reef sites in three (3) biotic zones: Coastal (Beach to 100ft), Offshore (100-200ft) and Blue Water (200ft+). The subprograms mentioned above cover these areas. The Nearshore component contains reefs out to 80ft, while the Rigs-to-Reefs and Ships-to-Reefs Programs extend its impact on marine habitat to the offshore and blue water areas. All subprograms combined show that the Texas Artificial Reef Program has made a significant contribution to the health and enhancement of marine life in various biotic communities. Also, by distributing reefs along the coast and into the Gulf, it is hoped that Texas will maintain a “buffer” from catastrophic impacts such as hurricanes and oil spills which can decimate large, localized areas. For example, a large oil spill in the northern Gulf could significantly impact the natural and artificial reefs in the area, while platform reefs in the southern Gulf of Texas may feel little impact. This could be important for populations of certain fish species such as red snapper (*Lutjanus campechanus*).

3.0 Development of the Rigs-to-Reefs Program – Background

Offshore oil and gas exploration began in the Gulf of Mexico shortly after the end of World War II. Early in 1946 Kerr-McGee acquired the first offshore leases 43 miles South of Morgan City, Louisiana. The leases covered about 40,000 acres in fairly shallow waters. In 1947, petroleum

platforms first began functioning as artificial reefs when Kerr-McGee completed the world's first commercially successful oil well out of sight of land by developing new technology to drill in 18 feet of water 10 ½ miles offshore. To date, as technology has improved, offshore oil and gas development have expanded into waters well over 7,000 feet. Currently, there are approximately 2,300 platforms on the Federal U.S. Outer Continental Shelf in the Northern Gulf of Mexico.

Petroleum platforms facilitate the extraction and processing of oil and natural gas after the drilling rigs have discovered hydrocarbons and developed wells to bring them to the surface. The fixed platforms, primarily offshore Louisiana and Texas, come in a variety of sizes and configurations. These range from simple single pile (leg) caissons to complex compliant towers in 1,754 feet of water. For deep waters, greater than 1,500 feet, advances in technology have allowed for the installation of floating production platforms such as semi-submersibles, tension leg platforms, and spars.

In addition to supplying oil and gas, the fixed platforms on the continental shelf and slope provide an important source of hard substrate, or reef habitat, for many fishes and marine organisms. The Gulf of Mexico Fishery Management Council estimated the total natural reef habitat in the Gulf of Mexico to be approximately 15,000 square miles, only one-third of which is off Louisiana and Texas where 99% of the platforms in the Gulf of Mexico exist (GMFMC 1989). Gallaway et al. (1981) estimated that petroleum platforms provided just under 2,000 square miles of reef habitat, increasing the amount of reef fish habitat by an estimated 27%. This particular habitat is important in the northern Gulf of Mexico since bottom habitat is typically dominated by clay, silt and/or sand with little to no relief.

With the development of petroleum production in the Gulf of Mexico, numerous fishermen from Texas to Florida quickly recognized the bountiful fishery resources beneath these platforms. Since their installation the platforms have become an important fishing destination for both recreational and commercial fishermen and have long been recognized as de facto artificial reefs. It has been estimated that nearly 20 to 50% more fish occur at platforms than over the nearby soft bottoms of the Gulf of Mexico (Dressen 1989). Researchers have documented species composition and abundances of fishes at several platforms and concluded that each standing platform seasonally serves as critical habitat for thousands of fish, many of which are commercially and recreationally important (Stanley and Wilson 1996, 1997, 1998, 2000b). Furthermore, it has been determined that anglers who fish around platforms catch more, larger, and more desirable fish than marine recreational fishermen who fish other areas of the Gulf (Witzig 1986). Researchers using data from the US National Marine Fisheries Marine Recreational Fisheries Survey have estimated that 30% of the recreational fisheries catch were caught near platforms off Louisiana and Texas (Avanti, Inc. (1991).

Many petroleum platforms have a productive life span of 30-40 years before oil reserves are too low to make them economically viable to operate. At this point, platforms are decommissioned and removed from the sea floor per federal regulation. Over the years, as petroleum platforms became more identified as valuable marine habitat, their removal and scrapping caused concern

by scientists and citizens that there was a need to protect this existing marine habitat. In 1980, the U.S. Minerals Management Service (MMS), along with other agencies, academia and the petroleum industry, initiated an effort to develop a Rigs-to-Reefs Program for the Gulf of Mexico. This goal was realized when The National Fishing Enhancement Act was signed into public law (Public Law 98-623, Title II) in 1984. Dauterive (2000) discusses the development of the Rigs-to-Reefs policy, progress, and perspectives through the 1990s. During this same time frame, the Texas Artificial Reef Program was officially established and reefed its first petroleum platform, the Transco Exploration Company 8-pile structure, at High Island A-492 in 1990.

Since that time, the Rigs-to-Reefs program has undergone several modifications, with the most significant event occurring after Hurricane Katrina hit the Gulf coast in 2005. Numerous petroleum platforms were damaged or destroyed and many lay scattered on the ocean floor. Platform operators applied to MMS to convert many of these downed platforms to artificial reefs by leaving them in place after hazardous wastes were removed. As a concern to this hurricane damage and the impact of artificial reefs being scattered across the Gulf without management planning, MMS drafted *Rigs-to-Reefs Policy Addendum: Enhanced Reviewing and Approval Guidelines in Response to the Post Hurricane Katrina Regulatory Environment* (Addendum) in 2009 to establish specific guidance (MMS 2009).

Soon after this event in May 2010, the MMS was restructured into the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), which in turn, underwent a major reorganization in October 2011. BOEMRE was replaced by the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE). BSEE currently oversees the decommissioning of obsolete platforms and their use as artificial reefs.

On September 15, 2010, prior to this restructuring, BOEMRE issued a Notice to Lessees (NTL) entitled *Decommissioning Guidance for Wells and Platforms* (also known as the Idle Iron Policy) (BOEMRE 2010). This notice clarified the BOEMRE policy of removing platforms from the ocean bottom as soon as possible but no later than five (5) years after decommissioning the platform (i.e. platform no longer useful for operations).

This created a sense of urgency for many petroleum companies in the Gulf of Mexico, many of which, bypassed state Rigs-to-Reefs Programs altogether to facilitate removal thereby creating a significant loss of marine habitat. This urgency still exists today. In the last five (5) years, platform removals in the Gulf have averaged 207 per year. At that rate, it is feasible that all 2,300 standing platforms in the northern Gulf of Mexico could disappear by 2027, creating a significant loss of marine habitat.

4.0 How the Rigs-to-Reefs Program Works in Texas

Texas statutes allows the oil and gas industry to donate their obsolete petroleum structures as artificial reefs in the Rigs-to-Reefs Program in lieu of the standard salvage removal option required by federal law. Through the Rigs-to-Reefs program, a petroleum company can offer a decommissioned platform to TPWD for reefing versus taking it to shore for recycling. The

difference in cost between reefing it and recycling it is termed a *realized savings*. In a typical reef donation, the petroleum company will save money by entering into an agreement with TPWD to reef the platform. The company then reefs the platform at their expense, while donating a percentage of the realized savings to the state management agency. Donation amounts vary due to the size and type of platform, its location, and water depth.

Texas donations have ranged from less than $100,000 - $2.5 million. We have waived the donation in several cases where reefing would have been a net loss to the company to insure we acquired the habitat for the reef program. These funds are deposited into the Texas Artificial Reef Donation Account and used for further reefing activities at other reef sites, maintenance of buoys, and research. To date, the program has generated over $26 million through the Rigs-to-Reefs program.

Only the platform leg (jacket) is reefed. Decks are taken into shore and recycled because they are the area where petroleum production occurs and are too difficult to clean. Not all platforms are good candidates for reefing. Reefing a platform in place or towing it to an existing reef site is dependent on the size of the structure, clearance requirements as directed by the US Coast Guard, proximity to navigational safety fairways, water depth, and tow distance.

While the process of reefing a platform can be fairly straight forward, the restrictions of some federal agencies can cause complications and delays. For instance, the US Army Corps of Engineers-Galveston District (USACOE) recently changed our permitting requirements that had been in effect since 1990. In the past, when a permitted reef site approached expiration (typically every 5 years), TPWD would request an extension so that the site was available for reefing activity as platforms became available. Currently, the reef permit expires after each reefing event. To use the reef again, TPWD must resubmit a reefing request for each new reefing event. This can take 3-6 months per request, and in some cases, has resulted in our program loosing platforms because the operator would not wait before removing the platform. At present, of the 88 reef sites in Texas waters, 56 are expired. We currently have 5 permits awaiting approval by the USACOE.

Other complications arise when platforms are located in a sanctuary, as is the case of High Island 389A, a platform what as installed years before the US National Oceanographic and Atmospheric Administration (NOAA) developed a National Marine Sanctuary in the Flower Gardens Banks area of the Gulf of Mexico. The platform is now within that sanctuary boundary, and the additional permitting process has delayed the reefing for over 5 years now.

5.0 Value of Petroleum Platforms as Marine Habitat in the Gulf of Mexico

Fisheries of the U.S. have undergone extensive analysis in recent years in response to overfishing and other threats. In 1996, Congress passed the Sustainable Fisheries Act in as an amendment to the 1976 Fishery Conservation and Management Act emphasizing the protection of essential fish habitat (EFH). Eight national fishery management councils were established to incorporate EFH into their fishery management plans. Creating new, and enhancing existing, habitat is one

of the recommendations in the 1998 Gulf of Mexico Fishery Management Council document: *Generic Amendment for Addressing Essential Fish Habitat Requirements in (existing) Fishery Management Plans of the Gulf of Mexico*. Habitat added by artificial reefs, especially decommissioned petroleum platforms off the coast of Texas are essential in increasing hard surface area for sessile organisms and other marine life.

With the lack of natural hard substrate in the Gulf of Mexico offshore of Texas and the decline of many marine species Gulf-wide in recent years, the need for sustainable marine habitat is critical. In addition, the steadily increasing popularity of sport diving and fishing off Texas makes the use of obsolete petroleum structures a highly attractive option in creating artificial reefs. Benefits of using platforms as reefs include: 1.) social and economic benefits to the local community through the recreational/charter fishing and diving industry; 2.) petroleum jackets have life spans as reefs that can exceed 300 years; 3.) the high vertical profiles of platforms attract both pelagic and demersal fishes, and invertebrates; and 4.) depending on location, platform reefs can hold a large biomass of commercially and recreationally important fish species (GSMFC 2004).

A vast amount of research has been done on the value of obsolete petroleum structures as marine habitat. It is well documented that oil and gas platforms function as important artificial reefs by providing habitat for a variety of marine species only associated with coral reefs, since many of these reef species are habitat limited (Moran 1986, Parrish 1987, Sale 1991, and numerous articles in Stanley and Scarborough-Bull 2003). In addition, platforms are excellent artificial reef material and meet the National Artificial Reef Plan requirements for function, compatibility, stability, and durability needed for prime marine habitat (NOAA 2007).

Petroleum structures simulate the biological benefit of natural hard substrate in southern Gulf waters off Texas. We have observed 151 marine fish species on many of our petroleum structure reefs which is more than double the 66 species that past researchers have seen on natural reefs like the south Texas banks (Dennis and Bright 1988). These artificial reefs provide substrate for habitat-limited sessile invertebrates such as barnacles, oysters, mussels, bryozoans, hydroids, sponges, and corals. Motile invertebrates and fish species are able to use the encrusting organisms as a source of food and shelter.

Petroleum structures provide the basis for the development of an interactive food web. The high vertical profiles of these reefs attract both pelagic and demersal fishes. Petroleum structures also provide habitat for species that feed nocturnally over soft bottoms away from the artificial reef, but which return during the day for cover. Additionally, petroleum structures attract transient species, which may be present at a reef for periods of a few hours to a few days.

Resident fish species seen on many petroleum structure reefs that are dependent upon sessile and motile invertebrates as a food source and the structure for protection include blennies (Blenniidae), small grazers such as butterfly fishes (Chaetodontidae) and large grazers such as sheepshead (*Archosargus probatocephalus*). Resident fish species relying on reef sites for cover include the Atlantic spadefish (*Chaetodipterus faber*) and red snapper. Other fish such as lookdowns (*Selena vomer*), Atlantic moonfish (*Vomer setapinnis*) and Atlantic creolefish

(*Paranthias furcifer*) are frequently seen feeding on macro-zooplankton and suspended particulate matter.

In addition, red snapper, tomtate (*Haemulon aurolineatum*), and various grouper species (Serranidae) are typically found feeding at areas away from the reef at night and returning during the day for cover. Large pelagic predators, such as mackerels (Scombridae) and jacks (*Caranx spp*.), are also present near the reef site in the pursuit of schools of prey species. Often, divers will see barracuda (*Sphyraena barracuda*), almaco jack (*Seriola rivoliana*), hammerhead sharks (*Sphyrna spp*.), and cobia (*Rachycentron canadum*). On occasion sea turtles and marine mammals are observed near petroleum reefs.

6.0 Social and Economic Benefits of Texas Artificial Reefs

Artificial reefs enhance the fishing opportunities for anglers targeting fish associated with artificial reefs. There are over 1.2 million saltwater recreational anglers (16 years and older) in Texas. Ditton et al. (1990) found that 47% (564,000) of these anglers fished from a boat in the Gulf of Mexico and approximately 300,000 to 400,000 anglers had fished at offshore platforms or artificial reefs. In a 1995 survey, party boats on the Texas coast took an estimated 372 trips to TPWD reefs or about 1,310 trips to any artificial reef in the previous twelve months. Trips to artificial reefs accounted for 40% of the total number of trips taken offshore by the survey group (Ditton et al. 1995).

In a study targeting the USTS *Texas Clipper* reef, Malki et al. (2010) conducted an economic assessment of the ship reef and found that from 2008 – 2010 anglers spent an average of $458.02 per trip, which correlated to an economic impact of over $1 million to the local economy just from the *USTS Texas Clipper.*

A study of fishing at artificial reefs by Schuett et al. (2016) found the highest percentage of boat owners in Texas took one to five trips to the Gulf in the last 12 months and fishing at standing rigs and oil production structures was highly important. With this heavy demand for fishing on artificial structures, the creation of the petroleum structure reefs helps meet these demands and aid in increasing optimum yield of finfish and other marine life.

While most recreational diving in Gulf of Mexico waters off Texas occurs at the Flower Gardens National Marine Sanctuary, approximately 80 nautical miles south of Galveston (Ditton et al. 1999), petroleum platform reefs also offer various diving opportunities for divers dependent on their level of skill and training. Typical recreational divers may venture down to 120-130 feet, while deeper platform reefs are used by the increasingly popular technical diving community who can exceed depths of 200 feet.

Ditton et al. (1999) found that an estimated 250,000 divers reside in Texas and annual economic impacts to the state are about $2 million per year. Approximately 50% of diving activities occurs in salt water. Malki's 2010 study found that divers spent an average of $2,020.07 per trip, which correlated to an economic impact of from 1.4 to over 2 million dollars to the local economy. With

ever increasing demands for diving resources, petroleum reefs can provide more diving opportunities.

A 2015 survey of 55 Texas dive shops showed that 19.1% claimed that platform removals have devastated their businesses and as a result, 48.9% of their clients do not dive the Gulf as much or have quit diving in the Gulf all together. Of individual divers who dove Texas Gulf coast waters in 2014, 69% indicated they dove petroleum platforms. Overall, the study found that the additional impact of diving artificial reefs in Texas in 2014 was $1.2 million and resulted in 11 full-time jobs (Braddy et al. 2016).

7.0 Overall Benefits of Petroleum Platforms as Artificial Reefs

Overall benefits of maintaining petroleum platforms as marine habitat can be summarized as:

- It is well documented that oil and gas platforms function well as artificial reefs by providing habitat for a variety of species otherwise only associated with coral reefs, since many of these species are habitat limited (Moran 1986, Parish 1987, Sale 1991). Function, in this case, refers to the selection of materials which are known to be effective in stimulating desired growth of micro- and macro-organisms and providing habitat for target species. This fact is further emphasized by the observation that in Louisiana and Texas waters of the Gulf, over 50-70% of all recreational angler trips in the Exclusive Economic Zone are destined for one or more of these platforms (Reggio 1987, Ditton et al. 1990).

- Oil and gas platforms are very stable, rarely moving from where they are placed. From 2009-2012, the Louisiana Department of Wildlife and Fisheries contracted a professional surveyor to use multibeam technology on all of Louisiana's offshore artificial reefs, 71 at the time. The water depth at the reefs ranged from 50-600 feet. A majority of the deployed platform jackets at the artificial reefs had been in the path or influence of one or more major hurricanes, i.e. Andrew 1992, Lili 2002, Katrina & Rita 2005, and Gustav and Ike 2008. Of the 320 platform jackets surveyed within these artificial reefs, only 5 structures had detectable movement but those movements could be attributed to survey error or possible interaction with drill rigs and derrick barge anchoring systems operating within the artificial reefs.

- Platform jackets are durable structures designed to withstand the ocean environment. Based on an estimated 15 year life remaining on existing cathodic protection, and utilizing the average corrosion rate of steel immersed in saltwater, researchers have estimated a life span of approximately 300 years (Quigel and Thorton 1989). Nineteen percent of the platform jackets deployed as artificial reefs were originally installed as production platforms in the Gulf of Mexico in the late 1950's through the 1960s. These jackets are now reefed and continue to provide durable habitat over 60 years later.

- Petroleum platforms are readily available, with over 2,300 in the Gulf of Mexico The size of the structure, complexity, water depth, distance from shore, proximity to a reef site and resale value dictate whether or not an obsolete platform should become a reef (Pope 1988).

8.0 Summary

In summary, petroleum platforms are a significant part of the marine ecosystem in the Gulf of Mexico. They provide large areas of hard substrate for the attachment of marine organisms, which in turn, create the foundation of a robust marine environment for all marine life, including highly targeted game and commercial fishes. The money saved by converting platforms to reefs helps petroleum companies and allows state management programs to create and study other reefs. The Rigs-to-Reefs program is a win-win situation for all and puts older resource materials to good use. It is good for business, government, and the environment.

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Figure 1. Texas Artificial Reef Program in the Gulf of Mexico, extending from Louisiana to Mexico and offshore to over 100 nautical miles. The map represents 88 reef sites (red stars).