

General Report of R2R Natural Sciences Committee

September 10, 2003

The Committee

Our committee included representatives from artificial reef research, fisheries research, resource management, and other programs with mandates related to artificial reefs, essential fish habitat, or offshore oil and gas production. This government committee received basic support from several private-sector representatives.

The following people participated in at least one of the three committee meetings (in alphabetical order):

Tom Bigford (NOAA Fisheries/Habitat Conservation, Silver Spring, MD), Greg Boland (MMS/Gulf of Mexico OCS Region, New Orleans, LA), Suzanne Bolton (NOAA Fisheries/Science and Technology, Silver Spring, MD), Kay Briggs (MMS, Herndon, VA), Ann Bull (MMS/Pacific OCS Region, Camarillo, CA), Linda Chaves (NOAA Fisheries/Constituent Services, Silver Spring, MD), Rebecca Cooper (formerly with NOAA Fisheries/Habitat Conservation, Silver Spring, MD), Barry Crowell (DOI Office of the Solicitor, Washington, DC; Chair of Legal Committee), Gregg Gitschlag (NOAA Fisheries/Southeast Fisheries Science Center, Galveston, TX), Churchill Grimes (NOAA Fisheries/Southwest Fisheries Science Center, Santa Cruz, CA), Melanie Harris (NOAA Fisheries/Habitat Conservation, Silver Spring, MD), Don Kent (Hubbs-SeaWorld Research Institute, San Diego, CA), Herb Leady (MMS/Gulf of Mexico OCS Region, New Orleans, LA), Andy LoSchiavo (NOAA Fisheries/Habitat Conservation, Silver Spring, MD), Milton Love (University of California at Santa Barbara/Marine Science Institute, Santa Barbara, CA), Conrad Mahnken (NOAA Fisheries/Northwest Fisheries Science Center, Manchester, WA), Larry Maloney (MMS, Washington, DC), Donna Schroeder (University of California at Santa Barbara/Marine Science Institute, Santa Barbara, CA), George Steinbach (California Artificial Reef Enhancement Program, Sacramento, CA), Jim Sullivan (formerly California Sea Grant College Program), Russ Vetter (NOAA Fisheries/Southwest Fisheries Science Center, La Jolla, CA), John Ward (NOAA Fisheries/Science and Technology, Silver Spring, MD; Chair of Social Science Committee), Mary Yoklavich (NOAA Fisheries/Southwest Fisheries Science Center, Santa Cruz, CA).

Our Charge

At our initial meeting on April 2, 2003, the Natural Science Committee working on the rigs-to-reefs issue agreed that our charge is to:

1. Review the best available scientific information (with an emphasis on ecological issues) associated with offshore oil and gas platforms related to various decommissioning alternatives that could convert platforms into artificial reefs.

2. Provide our perspectives and summarize our discussions on the pros and cons of various decommissioning options ranging from leaving platforms in place to total removal from the water.
3. Determine if the habitats provided by natural reefs are limited with respect to the organisms that inhabit them, and if artificial reefs can make a significant contribution to meeting any habitat deficits.
4. Estimate the resources needed to establish a monitoring program and to answer key research questions. MMS is holding a Decommissioning Workshop on October 26-28, 2003, which will help identify key research questions.
5. Identify any ecological “deal breakers” that could block further consideration of this idea in either the Gulf of Mexico or Pacific. Summarize our discussions about whether these platforms as artificial reefs are good for the marine environment, benign, or bad.

Key Accomplishments

Meetings – The Natural Science Committee was established in mid-March 2003 based on a direct request from NOAA leadership. Committee membership was expanded to include representatives from the DOI/Minerals Management Service and the private sector who have worked on issues related to artificial reefs, essential fish habitat, or offshore platforms. The committee met three times (April 2, May 19, and June 20). The discussions during those meetings formed the basis for this summary. Discussions were intended to provide insights to decision makers, but expressly not to suggest specific actions or to support decisions. The vast majority of input was generated from federal representatives.

Best available information – In direct response to Charges #1 and #2 above, committee members debated whether there was sufficient natural science information available to provide the types of scientific review requested by NOAA leadership and needed by all involved in rigs-to-reefs discussions. After much deliberation, all committee members individually decided that the existing body of natural science information could support our efforts to address Charges #3 through # 5.

With support from NOAA Fisheries’ Office of Constituent Services, the committee established an intranet site and posted key reports and sources for individual use:

www.noaa2r.intranets.com

Postings at that website, coupled with other references, support the following conclusions.

Our Approach

1. Comfort level with natural science information – Committee members agreed that while we will never achieve perfect knowledge on science issues associated with the various options of decommissioning the platforms (see Conclusions section), we do have sufficient information to proceed. Caveats were provided wherever appropriate to clarify information. There are potential benefits from the retention of the habitat and the fishes living on and around the platforms. These benefits include the retention of sites for fish recruitment and larval production, and the retention of the existing marine biomass of both fishes and invertebrates. There is not enough information to determine if these benefits are regional in nature or are realized locally. It is also recognized that there are many social, economic, legal, and regulatory issues associated with any policy recommendation. These areas were considered by this Committee to be outside our basic charge. Other committees will offer their input, and agency leadership will make any final decisions.

2. Overall framework – Site-specific data from the platforms and their surrounding environments should be taken into account when making decisions about the fate of individual platforms. A case-by-case evaluation would confirm the specific benefits attributed to each structure and help to weigh other factors that could impact the decision to retain it. This would likely be done under NEPA. The evaluations should also form a basis for determining the optimal configuration for any retained platform. This would include location where the platform is to be retained, the depth at which a platform jacket is to be severed below the waterline, the appropriate remediation for any contamination found, and any alternate uses that may be appropriate.

Our Committee developed a set of general statements and some specific thoughts, where appropriate, for the Gulf of Mexico and Pacific coasts. This approach was chosen for the following reasons:

- Habitat availability differs – Benthic habitats in the Gulf of Mexico are mostly soft bottom (i.e. unconsolidated sediments such as sand and mud), while the Pacific coast has extensive hard substratum habitat (including complex structures of rock outcrop and cobble and boulder fields). Thus, it is likely that biological communities associated with complex structures in the Gulf are limited compared to the Pacific coast. Both systems can be limited by the supply of new recruits. Differences in habitat availability could lead to different goals and purposes for converting a platform for some alternate use.
- General interest differs – Committee members have greater professional expertise and involvement in issues related to habitats and associated organisms off the Pacific coast than with those in the Gulf of Mexico. Hence, we were more prepared to discuss issues related to decommissioning platforms off the Pacific coast.
- R2R program maturities differ – Texas and Louisiana have well-established rigs-to-reefs programs while the Pacific states do not currently have rigs-to-reefs programs, although several attempts have been made in the last seven years to establish a program in California. Decommissioning of California platforms will begin in five years. Combined with the lack of a California state rigs-to-reefs program, this placed greater emphasis on focusing our discussions on the Pacific.

- Structural differences – There are approximately 4000 platforms in the Gulf of Mexico and only 26 off California. Although the Gulf of Mexico has deep-water platforms, the vast majority are small structures in relatively shallow water (less than 200 m). Most of the Pacific platforms are large, North Sea-type structures, up to 10x the height of the majority of Gulf facilities, and located in deep water (maximum depth of 363 m).

3. Presenting our conclusions– We agreed to summarize our discussions as a series of statements related to the primary choices for decommissioning platforms, i.e., leaving the platform in place as an artificial reef, moving it to a designated reef location, or removing it from the ocean.

4. Issues addressed – Our discussions focused on possible dispositions for the platform. Committee members decided not to discuss secondary and tertiary uses (aquaculture, wind power, prisons, Navy Seal training facilities, and others) of decommissioned platforms because those are societal issues outside our natural science charge. We understand that those are issues that should be addressed by both the Legal and Social Sciences Committees.

Primary Conclusions/Synthesis of Current Knowledge

The Committee’s discussions focused on the six topics listed below. The following statements apply to decommissioned platforms in the Gulf of Mexico and off California unless otherwise stated.

1. Reasons to leave a decommissioned platform in place as an artificial reef, i.e., reasons not to remove:

- Existing platforms represent established high vertical relief habitats supporting a diverse assemblage of fishes. Removing platforms would cause the removal of these habitats with the attendant loss of the diverse biological communities associated with them. The hard substratum habitats would revert to pre-platform sandy bottom habitats and the associated community.
- Because total removal in deep Pacific waters will most likely include the use of explosives, a high percentage of resident finfish, particularly those with swim bladders, would be killed. Those not killed will be displaced and will need to find alternate habitat in order to survive. The potential to harm marine mammals and sea turtles, particularly with the use of explosives exists in both the Gulf of Mexico and off the Pacific coast.
- Resident finfish on platforms may contribute recruits to local populations that have been dramatically reduced in recent years. These declines are due both to overfishing of adults and subadults and to changing ocean conditions that have been adverse to survivorship of young stages of these fishes. While recruits associated with platforms may contribute to local populations, the overall effect at the population level would probably be small, given the large availability of natural habitat off California and relatively small size of platforms. It is possible that platforms could have more of an effect on populations of certain key species (i.e. over-exploited, threatened, or endangered) than those of abundant species.

- If platforms are removed, both the mussel beds associated with the platforms and their fisheries will be lost. We understand that the shoreside implications of that loss will be addressed by the Social Sciences Committee.
- If contaminants are present and associated with soft sediments, platform removal would create disturbance that may worsen the contamination problems.

2. Reasons to move a decommissioned platform to another marine location to create or expand an artificial reef:

- Platforms in deep waters that are very large could be cut into pieces and used to create more than one reef in various seafloor habitats and depths.
- If there are contaminant issues, they may be dealt with more completely during removal when the site is more available and accessible.
- If the current platform site is not suitable as a reef due to other uses, another reef location could provide more habitat benefits for individual reefs or several reefs that could be coalesced into a larger area with increased diversity and abundance.

3. Reasons to remove a decommissioned platform from the water:

- Platform removal could reduce the numbers of fish potentially exposed to any contaminants (e.g., barium, zinc, PCB, and VOC have been detected in elevated concentrations at the 4H Shell Mounds). This would apply only if the contaminants were a hazard to marine life (i.e., leaching and bio-available) and if the contaminants could not be adequately remediated.
- Platform removal would restore soft demersal habitats (and potentially EFH).
- Platform removal would reopen potential trawl fishing grounds. Several members felt that this issue should be addressed in greater detail by the Social Sciences Committee, as trawling is an activity that has socio-economic value. Note that almost no trawling is allowed within state waters off California, and trawling is currently greatly restricted on much of the continental shelf off the west coast inside the new Rockfish Conservation Areas.

4. Other points worth noting:

- While not a natural science issue, Committee members noted that, in California, there is no existing State Rigs-to-Reefs Program, and complete removal is the only current decommissioning alternative contemplated by MMS Decommissioning Regulations.
- There are no designated areas along the Pacific coast to move platform pieces to create a reef; there are several designated reef sites in the Gulf of Mexico. The California Department of Fish and Game's permit for existing reef sites excludes oil platform legs, but does not prohibit the use of some portions of offshore oil platforms. The permit does state that the use of oil platform parts is not requested though, and would require future modification of the permit. The California reef sites of Bolsa Chica (offshore Long Beach) and Big Sycamore Canyon Ecological Reserve (Ventura County) are south of Point Conception and could accept some portion of platform material, which would probably need to be augmented with quarry rock to meet the California artificial reef requirements.

- There are designated reefing areas in the Gulf of Mexico. Louisiana has issued a policy (and Texas is considering one) that it will allow *in-situ* reefing on a case-by-case basis of platforms which are in 400 feet of water or greater and at least 2 miles from a shipping lane. Currently there are about 72 platforms offshore Louisiana in these depths. Fifty-four of the 72 platforms are within 2 miles of shipping lanes. Louisiana is currently working on the shipping lane issue with the U.S. Coast Guard (i.e. establishing a depth to top platforms within 2 miles of shipping lanes). Such platforms would be left in place in federal waters yet included in the state program. Some platforms offshore California are within 2-3 miles of shipping lanes.
- If platforms are left intact, this would allow for secondary uses, such as aquaculture, which could be beneficial. Responsible agencies would need to review all potential future uses to ensure that they would not compromise the reproductive success of species that prompted the primary decision to leave the platform intact.
- A fundamental policy issue is whether reefs created from platforms should be open or closed to fishing. Individual members felt that this issue should be decided on a case-by-case basis, keeping in mind that if fishing is allowed, it should not interfere with the primary benefits identified with the reef. Reefs created from platforms could be open to fishing for some gear or species and banned for others, although this would be difficult from an ecological and also enforcement standpoint. For example, Lingcod are the only non-airbladder fish common at the California platforms, and thus can be hauled to the surface and released alive. Rockfish, *Sebastes* spp., are predominant at the platforms, and not many would survive being brought to the surface and released, even if their swimbladders are deflated at the surface. California SB.1 would have closed reefs created from platforms to fishing, but the bill was vetoed by the Governor.
- Fishing is currently discouraged in 500m safety zones around most California platforms. After decommissioning, fishing may be allowed. That means that potential contributions by resident fish to nearby populations could be short-lived unless the areas are designated as no-fishing refugia. By default, refugia could become sanctuaries with improved reproductive success. However, if fishing is allowed on those platforms, this could help balance public opinion about the creation of new marine protected areas that may not allow fishing.
- Several individual members felt it would be helpful to our leaders if we gave thought to a list of prioritized additional research needed in the decommissioning process (see section below).
- Platforms will corrode after decommissioning, but even without cathodic protection might last about 300 years, shorter if infrastructure is compromised and salt water infiltrates steel supports.

5. Preliminary criteria for grouping platforms as artificial reefs off California (for management or research):

- Depth
- Geographic location (west of Santa Barbara Channel, east of Santa Barbara Channel, Pt. Conception, off Long Beach) as related by currents.
- Species composition on platforms.

6. Key research question: What benefits to the marine environment are provided by the offshore oil and gas platforms in the Pacific outer continental shelf?

Areas of investigation prior to each decommissioning decision:

1. What fishes live around platforms and near-by natural reefs? What is the availability of natural reef habitat in surrounding area?
2. How do platforms compare to natural reefs with regard to:
 - a) Fish growth rates?
 - b) Mortality rates?
 - c) Reproductive output?
 - d) Recruitment?
3. What is the relative contribution of platforms in supplying hard substrate and fishes to the region?
4. How long do fishes reside at platforms?
5. What are the effects of platform retention or removal on fish populations within a region?
6. How does structural modification of the platform and surrounding sea floor change associated assemblages of marine life (invertebrates and fishes)?

Areas of investigation after platform decommissioning:

1. How do platforms perform as artificial reefs compared to estimates?
2. How can platform performance be enhanced?

Other research questions:

1. Would reefs that are created from platforms and then closed to fishing have a significant positive effect on managed species at the population level (given large availability of natural habitat off California and relatively small size of platforms)? What about on a local scale?
2. What is the carrying capacity of a platform (juveniles and adults)?
3. What is the connectivity among local populations (i.e. among platforms, and among platforms and natural reefs)?
4. How does the value and function of a reef that is produced from a platform differ from a natural reef based on its position and size in the water column (i.e. do platforms serve same ecological functions after they are toppled or topped versus left intact)?
5. How are platforms used by protected species? How large is the area of potential impact of platform removal for protected sea turtle and marine mammal species?
6. Monitoring/research:
 - Monitor effects of decommissioning method so that future decisions could be adapted to respond to the ecological consequences.
 - Conduct intra- and interannual surveys to assess the seasonal abundance/species composition of protected species in the vicinity of platforms approaching decommissioning.