

TECHNICAL SUMMARY

Study Title: Completion Of Fish Assemblage Surveys Around Manmade Structures and Natural Reefs off California

Report Title: Completion Of Fish Assemblage Surveys Around Manmade Structures and Natural Reefs off California

Contract Number: M10AC2001

Sponsoring OCS Region: Pacific

Applicable Planning Area: Central and Southern California

Fiscal Years of Project Funding: April 22, 2010 through May 31, 2012

Completion Date of the Report: May 2012

Costs: \$775, 000

Cumulative Project Cost: \$775, 000

Principal Investigator: Milton Love

Key Words: oil platforms, platforms, California, rockfishes, *Sebastes*, decommissioning, platform decommissioning

Background and Objectives

The BOEM defines decommissioning as the process of ending oil, gas, or sulfur operations and returning the lease or pipeline right-of-way to a condition that meets the requirements of the regulations. The BOEM works to ensure that wells are plugged to prevent pollution; that pipelines are decommissioned and sometimes removed to prevent seepage of hydrocarbons and to resolve conflicts with other uses of the OCS; and that all sites are cleared of obstructions to minimize use conflicts. The BOEM will conduct detailed environmental reviews of any proposed decommissioning projects to evaluate the impacts from platform removal on regional fish populations. Obviously, when a platform is disassembled, habitat is removed, and numerous fishes and invertebrates are killed. However, yet unknown are the impacts of platform removal on regional populations of coastal organisms, particularly the economically important rockfish species, on the Pacific OCS. The assessment of the effects of platform activities and of the habitat created by the structure of platforms on marine populations greatly bears upon decommissioning issues, as questions about Essential Fish Habitat and the ecological role of Pacific OCS platforms are still unresolved.

At this time there are several key issues in the Pacific OCS platform decommissioning and reefing debate. Included is defining the ecological performance and role that platforms off California may play in the recovery of important groundfish populations (such as bocaccio, *Sebastes paucispinis*, and cowcod, *Sebastes levis*) in southern California. The Secretary of the Department of Commerce in January 2000 declared the West Coast groundfish fishery a disaster with extremely small populations remaining. BOEM-funded studies (Love et al. 2005, Love et al. 2006) have revealed that some of the platforms hold large numbers of both juvenile and reproductively mature rockfishes in numbers far greater than any natural reef that has been surveyed. The observed rockfish species include bocaccio and cowcod, both of which are species of concern, with bocaccio once considered for listing as threatened under the Endangered Species Act. Additionally, four more federally declared overfished species have been observed, sometimes in large numbers, at some platforms: canary, darkblotched, widow and yelloweye rockfishes. All of these species are subject to federal rebuilding plans, as specified by the Magnuson-Stevens Fishery Conservation Act. The Pacific Fishery Management Council and the State of California began to severely restrict targeted fishing for these species in 2002 and 2003 and created the Cowcod Conservation Area in southern California to protect that species. Since 2001, cowcod have been managed as a no-retention fishery in California. In addition, the State of

California banned the spot prawn trawl fishery in order to eliminate all by-catch of bocaccio. Populations of rockfishes at platforms, and the platforms as habitat for specific life history stages (e.g., nursery habitat for juveniles), may prove to be vital for timely recovery of the regional rockfish populations and fisheries. In order to understand the environmental consequences of decommissioning platforms on local and regional fish populations, there is a need to know the importance of platforms as fish habitat when compared to adjacent natural reefs. In particular, it is necessary to know the densities, abundances, and size classes of economically important species over both artificial and natural substrates. Such information is particularly important when the platforms harbor large numbers of resident, reproducing adults and serve as nursery habitat for juvenile fishes that eventually may “spillover” or migrate to natural areas and help to replenish populations that are commercial and recreational fishery resources. Natural reefs need to be surveyed in order to provide the context to which densities of rockfishes at oil platforms may be evaluated, and the ecological importance of platform habitat may be interpreted.

Several BOEM- and USGS-funded investigations have been completed and provide background for the present effort. The habitat value of a number of platforms on the Pacific OCS was determined during a multi-year study that was synthesized in MMS 2003-032, *The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California* (Love et al. 2003). Dr. Love and co-researchers from the Marine Science Institute (MSI) at the University of California at Santa Barbara compared fish assemblages from eight platforms and eight natural outcrops at similar depth. The observations were from the surface to the seafloor on both platforms and natural reefs over a six-year period including 2001. The analyses were based on at least 40 submersible and hundreds of SCUBA dives on platforms and on 133 submersible and hundreds of SCUBA dives on natural outcrops located throughout southern California, the Santa Barbara Channel, and off Pt. Conception and Pt. Arguello.

The MSI researchers found that platform fish assemblages are somewhat different from those of natural reefs. However, these differences were due almost entirely to the greater numbers of fishes around platforms, rather than large differences in species composition between platforms and natural outcrops. At least 85 species of fish were observed at platforms and 94 species at the outcrops. Rockfishes dominated both habitats, comprising 89.7% of all fishes at platforms and 92.5% at outcrops. Almost all of the more abundant species that the researchers observed were more common around platforms. Tremendous numbers of young-of-the-year (YOY) rockfish from several species settled at Platform Gail in 1999 with a lesser number recruiting to Platform Gilda. Species that were more common at one or more platforms than at natural reefs included cowcod and bocaccio (YOY, juvenile, and adult), copper, greenspotted, greenstriped, YOY and juvenile widow, vermilion, canary and flag rockfishes and YOY, juvenile, and adult lingcod.

A BOEM-sponsored study *Fish Assemblages Associated with Platforms and Natural Reefs in Areas Where Data are Non-Existent or Limited*, BOEMRE Study 2010-012, expanded on the results of the earlier study. It summarized work from 2004–2009 at 20 platforms and 110 natural reefs off southern and central California. This study again found that rockfishes were dominant around both platforms and natural reefs: 42 rockfish species, comprising 83.8% of all fishes, were observed around platforms and 43 species (87.5% of all fishes) were observed at natural reefs. It was clear that the midwaters of many platforms serve as nursery grounds, at least in some years, for a range of rockfish species including blue, squarespot and widow rockfishes and bocaccio. In general, densities of young rockfishes were higher around platform midwaters than around most natural reefs. Platform bottoms varied greatly in fish assemblage composition, primarily reflecting differences in platform bottom depth. While rockfish YOY sometimes occurred in substantial numbers around platforms, platform bottom assemblages were more characterized by subadult and adult rockfishes. Shell

mound fishes assemblages somewhat resembled those of the associated platform bottoms, but also included more dwarf species, as well as those species that were adapted to living on low, but hard, relief and in the ecotonal areas between soft substrata and hard bottom. In general, this study found that the fish assemblages of platforms and natural reefs were different, and that this difference was based on densities of individual species, rather than by the presence or absence of those species. It was also found that the bottoms of some platforms harbor higher densities of larger, and economically important, fishes than do most natural reefs.

Additional BOEM-supported research has further examined the role that platforms play as fish habitat. Emery et al. (2006) demonstrated that, in the absence of a platform, many of the young rockfishes that recruited to this human-made structure would not have survived to find natural reefs. In a limited survey, Love and York (2005) found that at least one pipeline can provide considerable habitat for many juvenile rockfishes, particularly for young cowcod. Densities of most fish species were far higher around the pipeline than on adjacent soft substrate sea floors. Love and York (2006) examined the role that platform bottom complexity plays in species composition. They found that large economically important species, such as cowcod and bocaccio, are found around those parts of a platform where the bottom crossbeam has been undercut, creating a crevice used for sheltering. In addition, research has shown that, compared to natural reefs, some platforms harbor much higher densities of large individuals of overfished species (Love et al. 2003). Results from a pilot study (Love et al. 2005) indicated that these platforms likely produce far more larvae of these overfished species per unit area than do natural reefs.

The BOEM has recognized that there is not yet enough data to extrapolate the importance of platforms and associated structures fish assemblages when compared to those of natural reefs. One data gap has been information about the number and size of natural reefs in the vicinity of platforms. Recognizing this need, BOEM has funded through USGS sea floor mapping in the eastern Santa Barbara Channel, currently being conducted by Dr. Guy Cochrane, United States Geological Survey.

Pacific OCS platforms reside in a variety of depths and oceanographic conditions (Love et al. 2003). This physical variability propagates to the biotic populations associated with these offshore structures, and suggests that a case-by-case scenario is likely for decommissioning decisions. In order to analyze the environmental consequences of platform decommissioning on local or regional fish populations, it is essential to know the role that each platform plays as fish habitat, particularly as compared to those natural reefs in the vicinity of platforms. Data necessary for these comparisons include densities and size structures of the fishes inhabiting both platforms and natural reefs and the location, area, and number of these natural reefs.

The primary goal of the present study is to fill gaps in information about the importance of POCS platform fish assemblages in southern and central California compared to those of nearby natural reefs.

- a) What is the relative contribution of platform fishes to the total hard structure fish assemblages (platforms and natural reefs) in the region?
- b) What is the comparative importance of various platforms as fish nursery grounds?
- c) What is the relative importance of platforms as regional fish larvae producers?

Specific objectives of this study were:

- 1) To survey the fish assemblages at platforms in order to continue long-term and short-term studies, to acquire information from platforms that have never been surveyed, to encompass a wide range of structures, occupying a diversity of water depths, geographic locations, and water masses.
- 2) Estimate the densities of all species at both platform and natural reef habitat and characterize the habitat of each fish observed.
- 3) To synthesize the data into a report describing the ecological performance of platforms as rockfish habitat and as rockfish producers.

Literature Cited

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