Title	The Environmental Status of Artificial Structures Offshore California
Administered by	Pacific OCS Region
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Procurement Type(s)	Cooperative Agreement
Performance Period	FY 2020–2022
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PICOC Summary	Write one or two sentences for each of the following elements, as appropriate.
Problem	Decision makers need information about how offshore projects that contribute significant amounts of hard substrate into the marine environment may be evaluated, managed, and potentially incorporated into an artificial reef program.
Intervention	Field surveys of natural and artificial habitats and subsequent analyses of survey data.
Comparison	Comparisons among natural and artificial habitat types according to depth and biogeographic zone.
Outcome	Evaluation criteria that can be used to inform decommissioning decisions by the State of California, BOEM, and Bureau of Safety & Environmental Enforcement (BSEE); information about potential artificial reef consequences of offshore wind in the California Current System.
Context	Southern California Planning Area

BOEM Information Need(s): Offshore energy development changes the distribution and abundance of local marine habitats and species via the introduction of artificial substrate (Schroeder and Love, 2004; Boehlert and Gill 2010). This "artificial reef" effect potentially modifies a variety of local and regional processes, including those that drive the ecological dynamics of managed, sensitive, or non-native species. Artificial reefs may also enhance certain human activities such as fishing or diving. Decision makers must therefore understand how offshore projects that contribute significant amounts of hard substrate into the marine environment may be evaluated, managed, and potentially incorporated into an artificial reef program. In the Pacific OCS Region, habitat issues are of particular importance due to (1) the imminent decommissioning of oil and gas platforms, which may remove potentially important habitat for managed fish species, and (2) the introduction of new artificial habitat from floating offshore platforms. Information produced from this study will be used in NEPA and consultation documents when reviewing offshore projects that add marine infrastructure into the environment.

Background: The National Fishing Enhancement Act of 1984 (NFEA; 33 U.S.C. 2101) was enacted to promote and facilitate efforts to establish artificial reefs in U.S. waters. The NFEA calls for the use of the best scientific information available to site, construct, and subsequently monitor and manage artificial reefs in a manner which will enhance

fishery resources to the maximum extent practicable, minimize environmental risks, and avoid conflicts with other stakeholders. To accomplish these goals the NFEA directed the formation of a National Artificial Reef Plan (NARP).

On the Outer Continental Shelf (OCS), a departure from complete platform removal during decommissioning may be granted to a lessee if the remaining structure is incorporated into a state artificial reef program that complies with the NARP and satisfies the U.S. Coast Guard navigational requirements. In southern California, it remains undetermined to what extent platform habitat (including shell mounds) and other similar man-made structures (such as pipelines, cables, and metal-hulled shipwrecks) contribute to regional scale ecological dynamics compared to natural substrates. This is due in part to the lack of a comprehensive understanding of the extent of man-made habitat available and variation in the quality of these habitats across and nearby the Southern California Bight (SCB). Because of the necessity of the State of California's acceptance of a reefed platform into their artificial reef program, current information needs include understanding the status of the current network of artificial habitats in California and determining how these artificial habitats are functioning in reference to nearby natural areas.

Objectives: The overall objective of this study is to evaluate the current status of artificial reef habitat in and nearby the SCB to inform future National Environmental Policy Act (NEPA) analyses regarding the ongoing and proposed changes to marine habitats from offshore energy activities, and to provide guidance to assess and manage future artificial reef proposals and projects at a regional scale, especially Rigs-to-Reefs projects.

Methods: Using available information on the distribution of artificial structures offshore southern California (*e.g.*, Lewis and McKee, 1989; MarineCadastre.gov), the physical characteristics of artificial structures will be determined using site-appropriate methods and may include multibeam or side scan sonar. Biological characteristics will be assessed using visual surveys via SCUBA divers, remotely operated vehicles, or submersibles. Sociological status (human use) will be assessed by summarizing recreational fishing data, direct observation, and by collecting new data via guided discussions with stakeholders. Similar data on selected nearby natural habitats will also be collected to provide a basis for comparison. The data collected will be analyzed using multivariate statistical methods (*e.g.*, boosted regression trees) to identify characteristics of natural and artificial reefs associated with high productivity and resilience. Ecosystem services will also be analyzed.

Specific Research Question(s):

1. What is the physical, biological, and sociological status of artificial structures within the Southern California Planning Area?

2. Which physical, biological, or geographical features are important in determining the ecological status and productivity of these reefs?

3. What criteria should be used to evaluate future artificial reef proposals to determine environmental benefits and ecosystem services?

References:

Boehlert, G.W. and Gill, A.B., 2010. *Environmental and ecological effects of ocean renewable energy development: a current synthesis*. Oceanography 23: 68-81.

Lewis, R.D. and McKee, K.K., 1989. *A Guide to the Artificial Reefs of Southern California. California Department of Fish and Game*, 72 p.

National Oceanic and Atmospheric Administration (NOAA), 1997. *National Artificial Reef Plan (as Amended): Guidelines for Siting, Construction, Development, and Assessment of Artificial Reefs*. 60 p. http://www.nmfs.noaa.gov/sfa/management/recreational/documents/narp_cover_3.pdf, downloaded January 24, 2017.

Schroeder, D.M., and Love, M.S., 2004. *Ecological and political issues surrounding decommissioning of offshore oil facilities in the Southern California Bight*. Ocean & Coastal Management 47:21–48.