

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Pacific

Planning Area(s): Southern California

Title: Investigation of PCB and PAH Contaminants in Archived Samples of Platform Resident Fish (PC-08-07)

BOEM Information Need(s) to be Addressed: The fate of spent offshore platforms and pipelines off California has been a subject of considerable debate, much of which is focused on the potential importance of the fish populations at these facilities. The question of contamination and contaminant load in platform resident fish and shellfish continues to arise during discussions with both State and Federal agencies regarding the importance of platform resident populations. Given the recent mercury and PCB alarm concerning these compounds and their harm to humans when concentrated in edible fish tissue, it is timely to determine which contaminants are contained in various tissues of resident fish and shellfish at platforms. Knowledge of the quantity and extent of contaminants in fish and shellfish tissue along with the regional geospatial background is essential for fully evaluating the various options proposed for decommissioning California's offshore oil platforms.

Total BOEM Cost: \$236,853 **Period of Performance:** FY 2008-2010

Conducting Organization: USGS Biological Resources Division, Columbia Environmental Research Center

Principal Investigator: Dr. Robert Gale

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Description:

Background: Despite the fact that the question of contamination and body burden continues to arise during most discussions of resident fish and shellfish at platforms, very little study has been made of this subject. The most common contaminants discharged at platforms are hydrocarbons and trace metals. Given the recent mercury and PCB alarm concerning these compounds and their harm to humans when concentrated in edible fish tissue, it is timely to determine which contaminants are contained in various tissues of resident fish and shellfish at platforms. However, the contaminant load must be seen against the background load in the area. The question regarding contamination in platform fish is often debated in discussions of the importance of platform resident populations. Some investigations done during the 1960's and 1970's indicate relatively high levels of zinc in tissue from fish collected at platforms.

Work done in 1991 on polycyclic aromatic hydrocarbon (PAH) metabolites in fish bile indicates that fish collected near natural tar seeps, at nearby natural reefs, and at the mainland carry a gradient of PAH's. The contaminants present in platform resident fish and shellfish must be compared to that of the fish in the geospatial background to establish the relative importance of

such contaminants given the overall picture of the region. In addition, comparison to the geospatial background will help to isolate the platform contribution to the contaminant load. The geospatial background has been developed by the Southern California Coastal Water Research Project (SCCWRP). The SCCWRP data and reports are free and readily available through the Internet at <http://www.sccwrp.org>. Thus, in order to reach conclusions about the environmental consequences of decommissioning platforms on local and regional fish populations, the sources of fish recruiting to those populations and the general pollution load carried by reproducing adults at platforms must be known. 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.

The BOEM-funded study *Reproductive Ecology and Body Burden of Resident Fish Prior to Decommissioning*, NSL PC-05-02, Agreement Number 1435-01-05-CA-39315, was awarded in FY 2005. That investigation focuses on heavy metal contamination in fish tissue and will not determine poly-chlorinated biphenyls (PCB’s) or PAH contamination. However, samples of tissue from all fishes collected for PC-05-02 were archived at the USGS/BRD, U.S. National Contaminants Laboratory, Columbia Environmental Research Center (CERC), in Columbia, Missouri.

Objectives: (1) Survey and quantify the extent of PCB’s and PAH’s and/or metabolites in archived tissues of platform resident fish species in relation to the local and regional geospatial background quantity; (2) Compare platform resident body burdens and contamination levels of PCB’s and PAH’s and/or metabolites to those found in similar size and species of fish and shellfish at various locations away from platforms; (3) Relate the level of PCB’s and PAH’s and/or metabolite contaminants in platform species to the local and regional geospatial background quantity and variability of contaminants in fish and shellfish.

Methods: (1) Using tissue samples from *Reproductive Ecology and Body Burden of Resident Fish Prior to Decommissioning*, Report 2009-019 (see <http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Pacific-Region/Studies/Completed-Studies.aspx>) and appropriate techniques, analyze tissue samples for PCB’s and PAH’s and/or metabolites; (2) Compare the PCB and PAH and/or metabolite contaminant load of platform resident species to the geospatial background of the areas off Point Conception, within the Santa Barbara Channel, and within the San Pedro Basin. The present study will use the same methodology as SCCWRP to determine PCB and PAH and/or metabolite contaminants in fish from platforms and natural areas; therefore, comparison of results from the present study to SCCWRP data is suitable.

Current Status: Second and final report to be published February 2013.

Final Report Due: 2011; overdue.

Publications Completed:

- *Comparison of concentrations and profiles of polycyclic aromatic hydrocarbon metabolites in bile of fishes from offshore oil platforms and natural reefs along the California coast.*

Affiliated WWW Sites: <http://pubs.usgs.gov/of/2012/1248/of2012-1248.pdf>

Revised date: January 9, 2013