CHAPTER 5

RESEARCH AND MONITORING RECOMMENDATIONS

When Governor Davis vetoed SB 1, a bill that would have allotted some of the savings derived from reefing platforms to California, he wrote, " There is no conclusive evidence that converted platforms enhance marine species or produce net benefits to the environment…it is premature to establish this program until the environmental benefits of such conversions are widely accepted by the scientific and environmental communities." And, with respect to assessing the effect of different decommissioning options on marine populations, Holbrook et al. (2000) state that the key marine ecological question is, "What is the effect of each decommissioning alternative on regional stocks of reef-associated species in general, or of particular targeted species?" Clearly, in the decommissioning process, there is a need for additional information.

Below we list examples of research that would be useful in addressing these issues. Many of these examples have been suggested by various resource managers. The first two tasks are necessary to resolve issues regarding attraction or production of platform and natural habitats as well as helping to define essential fish habitat. In addition to aiding in the platform decommissioning process, these three tasks will also aid in future coastal zoning and mapping that would occur in any future boundary expansion of the Channel Islands Marine Sanctuary.

Compare ecological performance between oil platforms and natural outcrops and determine if any oil platforms serve as Essential Fish Habitat for focal species.

What fishes live around platforms and nearby natural reefs?

In order to assess the relative importance of a platform to its region, it is essential to conduct basic surveys not only around the platform, but also at nearby reefs. A majority of platforms have not been well surveyed or have not been surveyed at all. Both scuba and submersible surveys must be conducted.

How does fish production around platforms compare to that at natural outcrops?

Fish production can be assessed and compared between habitats by examining a number of ecological yardsticks. These include (1) fish growth rates, (2) mortality rates, and (3) reproductive output. As an example, we conducted a pilot study comparing the growth rates of young-of-the-year blue rockfish at Platform Gilda and Naples Reef. More research needs to be conducted in all of these areas. For instance, mortality rates can be estimated by sequential surveys of the densities of young fishes at a specific platform or natural outcrop. Reproductive output (larval production in the case of rockfishes) can be quantified by first estimating the size frequency and density of a species at a platform or natural outcrop. Then, using size-fecundity relationships from the literature, the potential annual larval production for that species can be calculated.

How does trophic structure around platforms compare to that at natural outcrops?

How do platforms and natural outcrops compare in terms of habitat value?

A relatively new measure called Habitat Value (HV) allows comparisons between habitats, incorporating fish density, fish length, and fish regularity of occurrence. In Stephens et al. (1999), we presented a preliminary analysis of nine platforms and found that platform HVs tended to be much higher than those for open coastal soft substrate, higher than low relief deep rock outcrop and in the same range as wetlands and kelp/rock natural outcrops. An analysis of all of the platforms and as many outcrops as possible should be conducted.

Can we identify areas that are Essential Fish Habitat?

All of the above studies contribute to answering this question.

Define the spatial distribution of economically important species (all life history stages) within the region of interest and define connectivity of habitats within this region.

What is the relative contribution of platforms in supplying hard substrate and fishes to the region?

This research would put in perspective the relative contribution of platforms in supplying hard substrate and reef fishes to their environment.

First, this requires an assessment of the rocky outcrops in the vicinity of each platform; this is derived from seafloor mapping. Much of the seafloor in the vicinity of platforms remains to be characterized. Once the mapping is complete, visual surveys of the outcrops, using a research submersible, will determine the fish assemblages and species densities in these habitats. Knowing the areal extent of both natural and platforms habitats and the densities of each species in both of these habitats, it is then possible to assess the total contribution of each platform to the fish populations and hard substrate in that region.

How long do fishes reside at platforms?

It remains unclear how long fishes are resident around a platform. For instance, do the large numbers of fishes, such as the overfished bocaccio and cowcod, remain around the platforms for extended periods? One settled on a platform, how long do young-of-the-year fishes remain there? A knowledge of the residence time of these species would allow for a more accurate determination if platforms form optimal habitat for these species and if they are indeed acting as long-term marine reserves. Residence time can be determined through the use of both tagging studies and observations of a year class through time.

Acoustic tags are one way to determine fish residency. In a pilot study, Dr. Christopher Lowe, at California State University, Long Beach, captured and acoustically tagged rockfishes at Platform Gail and, after one year has determined that all have remained around the platform. Broader studies, covering additional platforms, outcrops, and species are needed.

What are the effects of platform retention or removal on fish populations within a region?

As an example, what effect would platform retention or removal have on fish recruitment? For instance, would the young rockfishes that settle out at a platform survive in the absence of that platform? Our surveys demonstrate that planktonic juvenile fishes, particularly rockfishes, often settle out of the plankton to a platform in substantial numbers. If that platform did not exist, would these young fishes have found, and settled upon, natural outcrops? In a pilot project, we are using radar-derived (CODAR) current data to estimate where the young rockfishes that settled at Platform Irene would have gone if Irene had not existed. We identify the direction and distance of pathways from the platform to natural outcrops. A directional histogram of radar-derived trajectories will show the degree to which surface currents potentially carry larvae in any given direction from the platform site. Knowing how long it would take rockfish larvae to reach suitable natural outcrops, and what percent of these larvae would likely die before reaching these outcrops, will give a sense of the importance of a platform as a nursery ground. Similarly, using a synthesis of oceanographic information, it is possible to model the drift direction of larvae produced by fishes living at a platform.

It would be useful to understand the natal origins of fishes residing at platforms and natural outcrops. Both genetic and otolith microchemistry techniques might aid in determining the degree of dispersal of fishes produced at platforms and natural outcrops.

Understand how habitat modification of platform environment (e.g., removal of upper portion or addition of bottom structure) changes associated assemblages of marine life at offshore platforms.

All decommissioning options except leave-in-place involve modification of the current physical structure of offshore platforms. Is it possible to increase fish diversity and density by altering the seafloor or the platform itself? For instance, it would be useful to add complexity, in the form of quarry rock or other structure, to the shell mound around a platform, and follow the changes in fish assemblages.

Descriptive information such as depth distribution and life history information is also useful in determining how decommissioning options affect the environment. Experimental research, using a BACI design or similar approach, can aid in predicting how the biotic community will respond to such structural changes.

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