ATTACHMENT 5

Waste Discharge Requirements
and
Water Quality Certification
Oak to Ninth Project
City of Oakland, Alameda County

Assessment of the Habitat Value of Pier Pilings (Zabin, 2011)

An Assessment of the Habitat Value of Pier Pilings at the Ninth Avenue Wharf and Vicinity and Recommendations for the Oak to Ninth Project

Prepared for:

LSA Associates, Inc.
157 Park Place
Point Richmond, CA 94801
(510) 236-6810

Prepared by:

Chela Zabin, PhD
170 W. Cliff Drive #58
Santa Cruz, CA 95060
(415) 272-9142

May 15, 2011

Table of Contents

List of Figures

Objectives

The objectives of this report are 1) to provide a qualitative assessment of the habitat value of two sets of pier pilings that are proposed for demolition, and 2) make recommendations for the provision of habitat that might be lost by the removal of the pilings.

Background

The proposed removal of the pier pilings and pier is part of the planned Oak to Ninth Avenue Project, an extensive mixed-use development of 66 acres along Oakland's waterfront. The proposed project includes 3,100 housing units, 200,000 square feet of commercial and retail space, two new marinas with 175 slips, 32 acres of public parks and open space, and a Maritime Museum at the old Ninth Avenue Terminal building.

Shoreline improvements are proposed as part of the development. These include the demolition of a timber wharf at Shoreline Park West, which is in disrepair and unsafe for public use. The wharf removal is being proposed as a compensation for fill that will be placed in the Bay as part of shoreline improvements elsewhere on the project site. In addition, a portion of the Ninth Avenue Wharf (just east of Shoreline Park West) will be removed as part of a structural and seismic retrofit. The project proposes to remove 1194 wooden pier pilings at Shoreline Park West and 1230 pier pilings at the Ninth Avenue Wharf (Neil Nichols, Moffatt and Nichol, personal communication to Steve Granholm, February 22, 2011).

A wetland mitigation plan for the project envisions the creation of tidal marsh and adjacent shoreline improvements to stabilize the shoreline, increase native plant cover and provide improved habitat for use by native water birds and other wildlife. The plan calls for removal of the wharf at Shoreline Park West and part of the Ninth Avenue Wharf to decrease shadow fill and increase habitat for shorebirds, waterfowl, and marine mammals. In addition, the rip-rap along the shoreline at Shoreline Park West, which consists of scrap cement and other dumped materials, will be replaced with a more visually appealing substrate (new rock rip-rap).

Survey Methods

I visited the site by boat on December 13, 2010 with Stuart Moock (Garcia and Associates), Steve Granholm (LSA Associates) and Matt Ricketts (LSA Associates). To examine the use of the pier pilings by marine animals and algae, we surveyed the pilings from the boat for about 3 hours centered around the low tide, which was 2.2 ft at 12:30. There was little wind, and we were able to see ~1-2 ft below the water's surface. The boat was able to nose in between sets of pilings, and to cruise slowly parallel to the outside of the pier, so that we could stop frequently to visually examine the pilings. We recorded all species of marine invertebrates and algae observed.

In addition, we assessed whether the outermost (bayside) pilings and the pilings further under the pier (shore side) differed in fouling community composition (i.e. marine invertebrates and algae) and whether pilings on different sides of the pier structure (Shoreline Park West and Ninth Avenue Wharf) were different from one another, in terms of the substrate and the fouling community.

Organisms that could be visually identified were recorded in a field notebook and photographed *in situ*. We also collected algae and invertebrates from pilings and a buoy for later identification. These were keyed to the lowest possible taxonomic level at the Romberg Tiburon Center using Light's Manual and in consultation with taxonomic experts.

Findings

On the whole, the pilings near Shoreline Park West were in a state of disrepair. Many were broken and hanging loose from the pier; in other cases only submerged stumps remained (Fig 1). Some of the pilings had been wrapped with PVC. It was difficult to tell whether all of the pilings had a creosote coating, but many of the ones we saw clearly had some creosote (Fig 2).

The Ninth Avenue Wharf reportedly has both concrete and green timber (non-creosoted) pilings (Moffatt and Nichol 2006). The timber pilings on the bayside edge support a timber apron, which will be removed as part of the retrofit. The pilings we were able to inspect were the outermost 2-3 rows of timber pilings. Some of these appeared to be covered in creosote.

Because we could not access pilings further under the wharf structures, we cannot be sure about the fouling community composition, but we saw little obvious difference in species cover and composition between pilings at the outer edge of the pier and those several rows under the pier. There was little algal cover and this tended to be found only on the outer row; with the exception of a few patchily distributed organisms, the animal species appeared similar on all pilings examined.

Macroalgal cover appeared to be limited to small patches of *Ulva* spp. and small amounts of a tufty red alga tentatively identified as the non-native *Caulacanthus okamurae*. A native red alga *Gratelopia lanceolata* and a non-native *Lomentaria hakodatensis* were found on the buoy we inspected, but not on the pilings. These species are common on floating docks throughout the Bay (pers. obs.). The native brown rockweed *Fucus distichus* was abundant on the shoreline rip-rap in the areas surrounding the pilings (Fig. 3), but was not found on the pilings themselves.

Invertebrate animals were the numerically dominant organisms on the pilings. Barnacles (*Balanus crenatus* and *Amphibalanus amphitrite*) were by far the most abundant organisms (in

the 100s-1000s of individuals/piling) above and just below the waterline. Mussels (*Mytilus* spp.), native oysters (*Ostrea lurida*) and limpets were also common (10s of individuals/piling) (Fig. 4). Large numbers (100s of individuals) of the large non-native solitary tunicate *Styela clava* were found on some of the pilings; there were also a few pilings that had significant cover of the non-native colonial tunicate *Didemnum* sp.

Other species observed included the nudibranchs *Dialula sandiegensis* and *Anisodoris nobilis*, the solitary tunicates *Ascidia zara* and *Ciona sp*., the limpet *Lottia limulata,* the bryozoans *Scrupocellaria diegensis, Bugula sp. and Watersipora sp.,* a yellow sponge (likely *Halicondria sp.),* the orange finger sponge *Clathria prolifera*, kelp crabs (*Pugettia spp.)*, grapsid crabs, tubeworms and chitons.

While herring will use many types of hard substrate for egg attachment, herring have not been reported far into the Oakland harbor and are unlikely to use this site (personal communication, Ryan Bartling, California Department of Fish and Game, January 2011).

Discussion

The recently released San Francisco Bay Subtidal Habitat Goals Report (2010) recommends the removal of derelict creosote pilings, both for aesthetic and environmental reasons. Such structures have negative or minimal beneficial habitat functions, because they provide habitat for numerous non-native fouling species, contain toxic compounds that may affect Pacific herring as well as other native fish and invertebrate species living on or near pilings, and alter water flow. Fouling communities that assemble on homogeneous, vertical substrates (such as pilings) are substantially different from those that assemble on more horizontal structures, such as rocky reefs (e.g. see Knott el al. 2004). On the other hand, pilings, rip-rap, seawalls, and other artificial hard substrates also can provide substantial settlement space for some native species, such as native oysters, which are themselves the target of restoration efforts.

The proposed removal of pilings and wharf structures at Shoreline Park West and the Ninth Avenue Wharf will provide two ecological benefits: (1) removing a source of toxic material and (2) eliminating a habitat for non-native species. These improvements will also return this segment of shoreline to a more aesthetically pleasing and natural configuration and increase its use by native birds and wildlife.

The disadvantage to piling removal is the loss of hard substrate habitat for native species such as oysters, mussels, limpets and other hard-substrate dependent grazing gastropods. The San Francisco Bay Subtidal Habitat Goals Report (2010) recommends the protection and

enhancement of native oyster populations. With these facts in mind, the following recommendations are proposed:

1. Where feasible, extend the placement of suitable heterogeneous hard substrate (such as stone rip rap, preferably native source, or Reef Balls[1]) from the shoreline into the shallow subtidal (2-3 m below MLLW). This will provide habitat for native shoreline species dependent on hard substrate. Such substrate could be incorporated into the shoreline erosion protection design and could be integrated in a living shoreline approach that includes shoreline softening and restoration of native upland and marsh vegetation.

2. Where replacement of existing rip-rap and other hard intertidal structures is planned, take actions to preserve the *Fucus* currently growing along the shoreline edges. Such actions could include incorporating pieces of the existing rip-rap with *Fucus* attached to them into the new seawall, or transplanting adults following methods such as those being developed by Peter Raimondi's laboratory (University of California, Santa Cruz). Fleshy macroalgae like *Fucus* provide habitat for native fish, invertebrates and other algae, and may facilitate other organisms such as native oysters in the intertidal zone by mitigating heat stress (see Whittaker et al. 2010 and references therein). Populations of *Fucus* may be difficult to regain once lost, as their propagules have a limited dispersal distance (Sousa 1984, Stekoll and Deysher 1996).

3. Removal of creosote pilings may resuspend toxins. Recommendations for removal methods that minimize release of toxins are discussed in two recently released reports: Removal of Creosote-Treated Pilings and Structures from San Francisco Bay (Werme et al. 2010) and San Francisco Bay Subtidal Habitat Goals Report (California State Coastal Conservancy and Ocean Protection Council et al. 2010).

[1] http://www.reefball.org/

References

Knott NA, AJ Underwood, MG Chapman and TM Glasby. 2004. Epibiota on vertical and on horizontal surfaces on natural reefs and on artificial structures. Journal of the Marine Biological Association of the United Kingdom 86(6): 1117-1130.

Moffatt & Nichol. 2006. Oak to Ninth Avenue Development Proposed Shoreline Improvements. Report prepared for Signature Properties. 67 pp.

California State Coastal Conservancy and Ocean Protection Council, NOAA National Marine Fisheries Service and Restoration Center, San Francisco Bay Conservation and Development Commission, and San Francisco Estuary Partnership. 2010. San Francisco Bay Subtidal Habitat Goals Report: Conservation Planning for the Submerged Areas of the Bay. 50-Year Conservation Plan. 180 pp.

Sousa WP. 1984. Intertidal mosaics: patch size, propagule availability, and spatially variable patterns of succession. Ecology 65:1918-1935.

Stekoll MS and L Deysher. 1996. Recolonization and restoration of upper intertidal *Fucus gardneri* (Fucales, Phaeophyta) following the Exxon Valdez oil spill. Hydrobiologia 326/327: 331-316.

Werme C, J Hunt, E Beller, K Cayce, M Klatt, A Melwani, E Polson and R Grossinger. 2010. Removal of Creosote-Treated Pilings and Structures from San Francisco Bay. San Francisco Estuary Institute. Report to the California Coastal Conservancy. 24 pp., plus appendices.

Whittaker SG, Smith JR and Murray SN. 2010. Reestablishment of the Southern California Rocky Intertidal Brown Alga, *Silvetia compressa:* An experimental investigation of techniques and biotic and abiotic factors that affect restoration success. Restoration Ecology 18 (S1): 18-26.

Figures

Figure 1. Broken pilings, hanging from the pier, were typical at the Ninth Avenue Wharf.

Figure 2. Many of the pilings at the Ninth Avenue Wharf are coated in creosote.

Figure 3. The native brown rockweed *Fucus gardneri* is plentiful in the intertidal zone rip-rap at the site.

Figure 4. Barnacles dominate the pilings in the high intertidal zone at the site; native oysters, mussels and limpets are also present.