San Francisco Bay Creosote Piling Removal and Pacific Herring Restoration Project: Pilot Site Selection Using Spatial Models and Regional Datasets for Screening Prior to Completion of Site Specific Investigations

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In support of the San Francisco Bay Subtidal Habitat Goals (Goals) and enhancement of Pacific herring habitat, the California State Coastal Conservancy (Conservancy) has initiated a pilot project to remove creosote pilings and restore herring spawning habitat under a grant from the National Fish and Wildlife Foundation (NFWF). Creosote contains a mixture of chemicals, many of which are toxic to marine organisms, and has proven detrimental to herring eggs that are adhered to treated piles and timbers. To complete this work, the Conservancy has retained the assistance of AECOM and Merkel & Associates to assist in bringing the project to fruition.

The Goals report includes an appendix document, Removal of Creosote Treated Pilings and Structures from San Francisco Bay (SFEI 2010) identifying over 30,000 creosote pilings (an underestimate as subtidal pilings could not be located and mapped) clustered in 630 “hotspots” throughout the bay. The large number of piles spread through the Bay posed a significant challenge to development of a cost effective means of selecting sites within which to undertake a pilot project that meets multiple goals of a large quantity of piles being removed, providing high benefit to herring, and providing opportunities to replace lost pile habitat with more desirable spawning habitat. To address this challenge a multi-tier screening process was developed that included a desktop GIS analysis and modeling (Tier I), a subsequent site specific remote data evaluation (Tier II), and field data collection (Tier III). At each tier, the number of sites moving forward in the analysis was filtered down. The Tier I modeling intersected existing and new data layers with habitat restoration opportunities predicted through habitat suitability modeling. Tier I reduced potential sites from 630 to 11, Tier II dropped the number to six, and Tier III resulted in the final selection of two sites.

Keywords: herring, creosote piles, eelgrass, oysters, San Francisco Bay, subtidal restoration

Poster Topic: Habitat Restoration: Fish

Preliminary Two-Year Comparison of Effectiveness Monitoring for the Bobcat Flat Rehabilitation Project, Tuolumne River, CA

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The downward trend in anadromous salmonid populations in California has been attributed to the loss and degradation of existing spawning and rearing habitat. In-channel habitat rehabilitation (gravel augmentation) targeting fall-run Chinook salmon spawning and rearing habitat enhancement was carried out in two phases (2005 and 2011) at river mile 43 ("Bobcat Flat") within the lower Tuolumne River below La Grange Dam. The primary goal of the Bobcat Flat Rehabilitation Project is to enhance spawning and rearing habitat for Chinook salmon. Two years (2013 and 2014) of a 3-5 year monitoring plan to evaluate post-rehabilitation effectiveness has been completed. Preliminary results from year 1 young-of-the-year (YOY) rearing surveys revealed that the restored reach supported higher numbers of rearing YOY fall-run Chinook salmon than unrestored reaches (restored = 58.9 fish/50 ft; unrestored = 51.0 and 34.3 fish/50 ft). However, variation in fish density increased when viewed at successively smaller scales (i.e. site, mesohabitat, and microhabitat). Mean combined habitat suitability index (HSI) scores (0-1.0) developed from observed depth, velocity, and cover data at 170 cfs, ranked the restored reach (0.17 median HSI; n=92) just below the upstream reference reach (0.20 median HSI; n=71) and higher than the downstream reach (0.13 median HSI; n=64). Overall, Year 1 HSI analysis revealed that fish utilized expected velocity ranges, though preferred a wide range of depths and demonstrated very high preference for instream woody cover. Interim interpretation of Year 1 monitoring results suggest that: (1) rearing YOY fall-run Chinook salmon may be over-crowded within the selected study reaches; and (2) gravel augmentation projects should target sites having intact, quality riparian woody vegetation, as this can provide more suitable rearing habitat than sites lacking such conditions. Analysis of Year 2 monitoring results is underway, which includes an evaluation of relative benthic macroinvertebrate production between restoration and reference sites.

Keywords: river rehabilitation, effectiveness monitoring, Chinook salmon, rearing habitat, benthic macroinvertebrates

Poster Topic: Habitat Restoration: Fish