

CHAPTER ELEVEN

Implementation

THIS REPORT MAKES RECOMMENDATIONS for protecting and improving subtidal habitat in the estuary. As stated previously, the recommendations are not proposed regulatory changes. However, actions could be taken by appropriate agencies in the future to further improve subtidal habitat through their own regulatory processes. The background information and associated goals in this report are designed to help resource agencies and other organizations implement subtidal habitat development, restoration, or enhancement projects. This information can be used in designing research, taking management actions, implementing protection strategies or restoration projects, or updating existing laws and policies. Agencies and other organizations can also use the document and associated goals to raise funds for scientific research and restoration projects.

To implement the subtidal goals at a broader level, agencies and other organizations may use this document to develop or modify their policies based on the goals presented herein. Any policy modification or policy development will entail a separate process in which an individual agency will need to analyze the recommendations in the context of their existing authorities and mandates.



Creosote pilings provide space for organisms to attach to but may also release toxins into bay waters.



Regulatory Agencies' Roles

Several agencies regulate activities within the subtidal area of the bay. Some are focused on species protection, fisheries management, or water quality. Others have a broader habitat focus, while others must balance ecosystem and development needs. In reviewing these goals, some agencies may decide to take regulatory action through their existing authorities or to expand their current authorities through legislation or regulation changes. In either case, agencies must utilize existing public rule making processes. The following discussion describes and lists potential actions that agencies with regulatory authority may consider implementing to protect subtidal habitats.

While these regulatory measures would likely reduce impacts to the subtidal habitats, as set forth in previous chapters, more research about these habitats is needed. As research is completed to better understand the functions and ecosystem services of subtidal habitats, information gained should directly inform management actions such as those listed below. In the interim, the Subtidal Goals Project recommends using a precautionary approach in managing subtidal habitats.

Examples of Potential New Regulatory Guidance

Benthic disturbance:

Benthic disturbance can occur in many forms. Blasting, dredging, and sand mining literally remove the substrate on or in which organisms live. Placing new structures, be they pier pilings, floating docks, outfalls, or pipelines, also eliminates the surface, and in some cases, subsurface in which organisms live. Similarly, mechanical destruction from anchors and mooring devices can impact aquatic vegetation. Because dredging, sand mining, and placing

structures are the most widespread human activities that disturb the subtidal bottom to the degree of actually removing habitat, limiting these activities would protect subtidal habitats.

- Avoid new dredging, sand mining activities or removal of native rock from the bay, especially in areas with aquatic vegetation or high density shellfish beds.
- Avoid locating projects that include or may require dredging in areas of high sedimentation.
- Avoid placing structures in subtidal or intertidal areas of the bay, especially in areas with or adjacent to eelgrass, aquatic vegetation, or shellfish beds.

Benthic disturbance: damage to habitat

Subtidal habitat can also be impacted from loss of light penetration and extended periods of turbidity and high suspended sediment loads. Potential regulatory considerations for activities that create these types of impacts (i.e., dredging, vessel propeller wash, and placing structures) could be improved by the following regulatory considerations.

- Remove illegal structures, including mooring facilities, from areas with submerged aquatic vegetation.
- Locate proposed structures, including ferry terminals, away from areas with submerged aquatic vegetation, particularly eelgrass.
- Avoid anchoring barges in areas of submerged aquatic vegetation.
- Create no wake zones for vessels within 150 feet of submerged aquatic vegetation.
- Locate ferry routes a minimum of 150 feet from submerged aquatic vegetation.
- Avoid new dredging projects within 150 feet of submerged aquatic vegetation.

Implementation Approach: Adaptive Management

As discussed in Chapter 2, the Subtidal Goals Project advocates an adaptive management approach to implementation both at project-specific and overall program levels. Although it is not perfect, adaptive management is probably the best way to increase knowledge of the functions and values of the habitats the Subtidal Goals Project purports to protect and to evaluate the success of the Subtidal Goals Project itself.

Applying adaptive management would represent a serious commitment on the part of the Subtidal Goals Project. Implementing adaptive management at the project scale would require that the adaptive process (Figure 2-3) be

designed into, and required as part of, any project to restore or enhance subtidal habitats. The value of knowledge must be seen as equivalent to the value of the actions themselves, given the level of uncertainty about the value of the actions. Requirements for project implementation would include conceptual and simulation modeling, predictions of outcomes, performance measures, a specific research and monitoring plan to evaluate progress and ecosystem response before and for some time after project completion, and a mechanism for reporting and, more importantly, responding to results as they become available.

In contrast to the project level, adaptive management can be implemented at the program level only if an institutional framework can be established that has the resources to do it. This will require a large-scale, long-term view and substantial budget both for the actions (including project-level adaptive management) and at the program level for the process of evaluation and revision.

Establishing a San Francisco Bay Subtidal Habitat Forum

Consistent and enduring support for implementing the Subtidal Goals Project from individual agencies may be difficult to secure given political changes, staff turnover, budget fluctuations, and shifts in priorities. Successful implementation of the goals will require an entity or entities charged with raising funds and overseeing the realization of the goals in this document and the process of adaptive management necessary to realize the ecosystem benefits envisioned by this program. Implementation will require organizing stakeholders, identifying private owners of subtidal parcels, monitoring and tracking restoration projects, reviewing and reporting on knowledge gained and on progress in implementing the goals, revising the goals as needed, and educating the public about subtidal habitat in the estuary. This implementing entity might be an existing organization, a collaborative partnership among several agencies, or a new entity (such as a Joint Powers Authority or special district) created for this purpose.

The Subtidal Goals Project recommends that the lead entity (or entities) establish a Bay Area Subtidal Habitat Forum (Forum) to engage a broad network of agencies and partners who will participate in implementing subtidal habitat research, protection, and restoration goals. This Forum, made up of local, state, and federal agencies, academic institutions, non-profits, businesses, and industry, would increase regional coordination, collaborative planning and support for and awareness of subtidal protection and restoration. The Forum should be charged with leading adaptive management and making sure progress is being made towards the goals included in this document.

Thoughtful planning must be put into the process by which the Forum is constituted, including how leadership is selected, which members should be included for participation and how they will be selected, which operating practices should be adopted, which agency staff resources will be provided, and what additional funding or resources are needed and where those resources will come from.



A truck loaded with donated Pacific oyster shell.

Native Oyster Restoration

Projects: at the Marin Rod and Gun Club and the Berkeley Marina. Several innovative partnerships have been led by Robert Abbott and Rena Obernolte (Environ Corporation) and multiple public and private partners, including Drakes Bay Oyster Company (donated clean Pacific oyster shell); Marin Rod and Gun Club (provided permission and access to use 30 acres of subtidal land); Jerico Products (donated barge to help with reef ball and shell pallet installation; donated native mined shell for reef ball mixture); and others.

Bair Island Sediment Task

Force: The Bair Island Task Force is a partnership between the Port of Redwood City, the US Army Corps of Engineers, US Fish and Wildlife Service, NOAA Fisheries, Bay Planning Coalition, Save The Bay, San Mateo County Board of Supervisors, the San Francisco Bay Conservation and Development Commission and others that has worked to accomplish navigational dredging at the Port of Redwood City and the beneficial re-use of the dredged sediment for habitat restoration at Inner Bair Island. As a result, approximately 200,000 cubic yards of sediment were pumped to Bair Island instead of being dumped in the bay or ocean. This contributed to the more-than 1 million cubic yards of soil needed to raise the elevation of Bair Island in preparation for its eventual return to a tidal wetland. At the same time, the dredging of the channel at the Port of Redwood City is crucial to ensure the ongoing economic health of the Port and surrounding businesses, and to maintain the Port's important contributions to the local and regional economies.



A boat is donated for restoring oyster beds.

Beneficial re-use of dredge material from the Port Of Oakland 50-Foot Deepening Project:

Oakland Harbor is the second largest port on the West Coast and the fifth largest container port in the nation. The federal channels of the Oakland Harbor and Port-maintained berths were deepened from -42 feet to depths of -50 feet. Approximately 12.8 million cubic yards of sediment were dredged for this project and used to create eelgrass beds and to enhance shallow water and wetland habitats at the Middle Harbor Enhancement Area, the Hamilton Army Airfield Wetlands Restoration project, and the Montezuma Wetlands Restoration project. Multiple partners contributed to the planning of this effort, including Port of Oakland, San Francisco Bay Conservation and Development Commission, Army Corps of Engineers, Bay Planning Coalition, East Bay Regional Park District, the California Coastal Conservancy, and others.



A crane lifts Reef Balls™ for placement into offshore intertidal and subtidal areas.

Existing successful regional partnerships can provide a model framework for developing the Forum. Several groups of agencies have enlisted the aid of experts and stakeholders to form advisory boards to establish long-term regional goals. It is important to look to these examples and build on lessons learned and draw on their experiences. Some successful examples of regional partnerships towards advancing vetted habitat goals include:

- **San Francisco Bay Joint Venture:** The Joint Venture brings together public and private agencies, conservation groups, development interests, and others to protect, restore, increase and enhance all types of wetlands,



San Francisco Bay Joint Venture

riparian habitat, and associated uplands throughout the San Francisco Bay region to benefit birds, fish, and other wildlife. The diverse partners of the Joint Venture have been successful in advancing regional restoration projects, coordinating information about science and technical issues, and building collaborative partnerships for the benefit of multiple species and habitat types.

- **Southern California Wetlands Recovery Project:** The Wetlands Recovery Project (WRP) brings interested parties together to develop a coordinated, systematic, regional, and ecosystem-based approach to wetland protection. In 1997, with the execution of a Working Agreement, 19 federal and state agencies developed an organizational framework and committed to designing and implementing a Regional Strategy for acquisition and restoration in order to increase the quantity and quality of the region's wetlands. The long-term vision of the WRP is to reestablish a mosaic of functioning wetland and riparian systems that supports a diversity of fish and wildlife species. Projects completed since the WRP's inception in 1997 have resulted in the acquisition of 6,603 acres, restoration or enhancement of 2,161 acres, and planning for 3,204 acres of wetlands. More than \$500 million have been dedicated to WRP projects, including \$330 million in state funds, \$30 million in federal funds, and \$147 million in local and private funds.

Ideas for Implementation

Lead entities for the Subtidal Goals Project or a Forum, if formed, should consider the following specific ideas for implementation:

- Pursue funding for agencies to provide staff support for and participation in the Forum and smaller topic-specific subcommittees. These smaller groups would also develop and share information that would inform adaptive management for future projects.
- Identify opportunities to coordinate with ongoing federal, state, and local projects and programs.
- Identify and develop funding mechanisms or initiatives that further study or promote subtidal habitat ecosystem services. Potential sources of funds include the NOAA Restoration Center or the State Coastal Conservancy; or mitigation funds associated with subtidal leases and project activities through the State Lands Commission or the San Francisco Bay Conservation and Development Commission.
- Apply adaptive management both at the program level, through funding opportunities, requirements and other mechanisms, and at the programmatic level, as an organizing principle for undertaking, assessing and modifying implementation, and for revising the goals (and this document) periodically, possibly integrating them with other goals projects.

Surf scoters over open water subtidal habitats.



- Develop specific indicators of successful implementation. The indicators should be both quantitative—such as acreage restored and number of goals implemented—as well as qualitative/contextual—such as changes in policies. Develop monitoring and data analysis programs to track indicators and evaluate success at both a project and regional scale and to measure changes at the institutional and ecosystem levels.
- Create or take advantage of an existing regional database and entity that would house, maintain, analyze, and provide access to monitoring data provided by the monitoring program described above.
- Increase communication and coordination with public and private subtidal landowners and provide information regarding the benefits of healthy subtidal habitat.
- Develop a method to report on the program’s success in publications, on a web site, and at the State of the Estuary conference and other conferences. Facilitate information exchange among managers and restoration practitioners across habitat types to increase opportunities for multi-habitat collaborative restoration projects and to minimize potential conflicts.
- Every 10 years, conduct a wholesale review and update of the goals and their implementation.

The Forum or other entities could also work to increase public awareness of and involvement in subtidal restoration. Ideas for outreach efforts include:

- Develop a web site to keep people informed of subtidal restoration projects and volunteer opportunities.
- Provide teaching materials that can be used in local schools or with local community-based volunteer groups; involve these groups in subtidal restoration and research projects.
- Use volunteers to help implement projects and raise awareness about the values of subtidal habitat. Partner with corporations, non-profits, social groups, and agencies to implement restoration and enhancement projects.
- Encourage or assist museums, aquariums, nature centers, and agencies undertaking restoration to include subtidal habitat interpretive information in outdoor signs and indoor exhibits.



Volunteers work to restore eelgrass.

- Encourage collaborations among local artists, seafood restaurants, non-profits, and other venues to raise awareness about native oyster restoration projects.
- Create a shell-recycling program, based on standard protocols that have been developed to avoid disease and non-native species introductions, with local seafood restaurants to create a source of shell for restoration projects. (See Appendix 7-1).

Moving Forward

The Baylands Ecosystem Habitat Goals Project, the Uplands Habitat Goals Project, and the Subtidal Habitat Goals Project present an inspiring vision for what can be done to improve the condition of multiple habitat types around the bay, and the species that depend on them. Each project presents specific objectives and actions that can be tracked to help resource managers and others better understand the cumulative success of the implemented actions. Together, the three plans provide more information than has ever been available to resource managers and others engaged in ecosystem-based management and in-the-water/on-the-ground projects. The concerns regarding climate change and other long-term trends make these planning efforts even more timely and necessary for predicting, monitoring, and implementing adaptation measures to long-term changes in the San Francisco Bay watershed. If implemented, the three plans will conserve, protect, and restore important habitat for fish and wildlife, as well as the ecosystem services valued and relied on by humans.

