Regional Wetlands Monitoring in San Francisco Bay

Joshua N. Collins, Environmental Scientist, San Francisco Estuary Institute, Oakland, CA 94621, ph. 510-746-7365, fax 510 746 7300, josh@sfei.org

In the San Francisco Bay Area, the community of wetland scientists and managers is implementing a long-range plan to conserve and restore the region's wetland resources. A major product of the Bay Area Wetlands Restoration Program is a regional plan to monitor the performance of restoration projects, relative to ambient condition, and the effects of the projects on the estuarine ecosystem. This paper will focus on the design of the regional monitoring plan and its initial implementation.

This is the first attempt to conduct wetland monitoring throughout the region. The program has therefore started with the fundamental tasks of developing conceptual models of wetland form and function, synthesizing management questions, using the models and questions to select what to measure, developing standard protocols for data collection and analysis, and designing an information system to share data and understanding.

The approach is rather basic. Regional wetland monitoring is seen in five major parts, habitat inventory, project tracking, ambient assessment, directed special studies, and information management. The inventory has involved all levels of government to develop a GIS of wetland resources of sufficient detail and accuracy to inform local management decisions. Separate coverages exist for past, present, and proposed wetland restoration projects, and data pertaining to these projects are being compiled in the online GIS information system.

The inventory serves as the sample frame for ambient assessment. During this first year of ambient monitoring, a stratified-random design is being employed within a spatially hierarchical framework. A total of 30 1-m^2 plots have been randomly selected within the intertidal zone. Each plot is used to identify the intertidal drainage system of third-order or smaller that contains the plot, the habitat patch that contains the drainage system, and the watershed that contains the habitat patch. Contaminants and benthos are assessed at the plot level, vegetation and hydro-geomorphology are assessed at the patch level, and stressors are assessed at the watershed or landscape level. Overall landscape ecology metrics, such as connectedness, are also assessed at the landscape level based on a variety of ecological measures of distance, such as mean dispersal distances of key wildlife species. A rapid assessment method is also being developed to augment the more intensive fieldwork, the results of which will be used to calibrate the rapid methodology.

Project tracking at this time is limited to project mapping, review of new project designs, and review of monitoring data from existing projects of special importance. It is intended that the ambient methods will be built into project monitoring, such that projects contribute to the ambient picture, and such that the trends within and between projects can be compared to ambient trajectories.

Most of the special studies are focused on improving our understanding of functional interactions between biotic and abiotic processes, and on indicator development. The information system is designed to facilitate data uploads, data sharing through map-based and menu-based queries, and landscape scenario planning based on spatial-temporal patterns in water supplies, sediment supplies, plant assemblages, and key wildlife species. The program promises to integrate through spatial scales to meet the information needs of managers at all levels of government.