

California Aquatic Resources Status and Trends Program: Mapping Methodology

Eric D. Stein¹, Jeff Brown¹, Kristen Cayce², Marcus Klatt², Micha Salomon², Patricia Pendleton³, Shawna Dark³, Kevin O'Connor⁴, Charlie Endris⁴

¹ Southern California Coastal Water Research Project, Costa Mesa, CA

² San Francisco Estuary Institute, Richmond, CA

³ California State University, Northridge, Northridge, CA

⁴ Central Coast Wetlands Group, Moss Landing Marine Laboratories, Moss Landing, CA

BACKGROUND AND PURPOSE

The ability to track changes in wetland area is a foundational element of California's wetland monitoring and assessment programs. It not only provides the basic information to report on wetland status and trends over time, but is also crucial for accurately assessing the Federal and State "no net loss" policies in terms of wetland quantity and evaluating the effectiveness of current regulatory and management programs (e.g., Porter-Cologne Water Quality Control Act, Clean Water Act §401, CA Fish and Wildlife Code §1600). Furthermore, monitoring trends and tracking net change provide a foundation for monitoring the long-term effects of climate change and other natural disturbances (e.g., fires, floods, and droughts) on wetland resources, and the effect of these trends on habitat and species conservation efforts.

Developing an agreed upon approach for assessing wetland gains and losses using a combination of ambient surveys and project tracking is a necessary first step to better our capacity to answer fundamental management questions. Complete survey mapping of a state the size of California on a regular basis is cost prohibitive and logistically challenging. A cost estimate to update mapping of streams and other aquatic resources is \$3,000 per USGS quadrangle, and California has 2,800 quadrangles (CWMW 2010)². Not only does the state of California lack the \$8.5 million for comprehensively mapping, but this cost would need to be incurred every 5 to 10 years in order to assess change over time. The National Wetland Status and Trends (S&T) Program (administered by US Fish and Wildlife Service (USFWS)) has addressed this challenge by adopting a probabilistic approach to wetland change assessment. Probabilistic mapping provides a method to produce extent and trend information in a practical, cost-effective manner. Because probability-based mapping requires significantly fewer resources, it allows for more frequent production of maps and extent and trend estimates. These probabilistically-selected maps will serve as updates to the California Aquatic Resources Inventory (CARI), a standardized statewide map of wetlands, streams, and riparian areas that is used for Level-1 landscape assessment. The maps can also serve as a sample frame to support Level-2 or -3 condition assessments if locations for condition assessment are selected from the status and trends plots.

Although sufficient for a national assessment, the National S&T plots by themselves are insufficient for assessing status and trends of California's wetland and riparian resources. The US Fish and Wildlife Service (USFWS) National S&T Program includes only 257 plots in California, covering approximately 0.6% of the land area, mostly concentrated along the coast. Furthermore the national program does not include streams, and is based on older vintage

National Wetlands Inventory maps that omit many of the wetland and riparian areas of California.

Previous US Environmental Protection Agency (USEPA) funding supported development of the first phase of a status and trends program for California. That effort evaluated other Federal and State programs, identified key technical challenges for S&T implementation in California, and used a model-based approach to test various design alternatives. The Phase 1 effort produced a set of recommendations for optimum plot allocation, plot size, and stratification, and tested the design in a limited geographic area. These analysis conducted during Phase 1 of this project resulted in a recommendation that S&T plots be 4 km² in size (2 km x 2 km) and that mapping for each plot include all elements within sample plots, including aquatic resources and upland land use. This will provide information about proximal anthropogenic influences and impacts on wetlands and aquatic resources and allow other programs to take advantage of the plots to fulfill part of their programmatic needs.

Although all natural and anthropogenic resources within each plot will be mapped, the main focus and intensity will be devoted to the aquatic resources. Unlike other programs, ***the California S&T program includes wetlands and streams*** (regardless of whether or not the streams include wetland areas). Standard procedures and quality assurance measures will help minimize mapping and interpretation errors, which in turn will maximize the confidence and reliability of the mapping results.

The purpose of this document is to describe the mapping standards and methods³ that should be applied when mapping ***wetlands and other aquatic resources*** (e.g., lakes, streams) within the California Status and Trends (S&T) plots. This document provides only minimal guidance pertaining to the upland and developed portions of the S&T plots, as they relate to interpreting changes in aquatic resources. Additional protocols would need to be developed, consulted and/or applied for programs that need detailed information about upland resources.

Full Text:

http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/833_AquaticResourcesStatusAndTrends.pdf