

Cooperative Pilot Project to Assess Stream Water and Habitat Quality of California Private Forest Lands April 2, 2015

Objective

The intent of this project is to establish a collaborative monitoring framework for applying California's SWAMP ecological performance measures to evaluate water and habitat quality in streams on private forest lands. Direct collaborators include the State Water Resources Control Board, Department of Fish and Wildlife, Department of Forestry and Fire Protection, California Forestry Association, and private industrial forest owners.

Background

Over the past decade California has adopted ecological performance measures to evaluate resource management practices and support effective regulatory policies. Recently, wadeable streams have been the focus of a large multi-agency effort to develop standardized technical and regulatory tools for measuring and assessing biological integrity as ecological performance measures. The State Water Board is currently developing guidance for the application of these tools that will become part of its Inland Surface Waters and Enclosed Bays and Estuaries Plan.

This regulatory guidance is built upon a foundation of technical work overseen by the State Water Board's Surface Water Ambient Monitoring Program (SWAMP), which is responsible for coordinating chemical, physical and biological water quality monitoring in the state's surface waters. Over the past decade, SWAMP had invested a considerable portion of its annual budget to develop standard tools for measuring the health of streams based on the composition of invertebrate and algal communities that reside in them (bioassessment). SWAMP's bioassessment protocols are derived from a widely accepted nationwide EPA program, and have been used as the standard method for evaluating stream health throughout California since 2000.

Although ecological integrity monitoring of streams has occurred in all regions of California, private forest lands are under-represented in state monitoring programs primarily because of access issues. Currently, monitoring on private forest lands is a small percentage of the statewide sampling program. Forest lands in California contain some of the best ecological conditions available in the state, and a significant proportion of these are on private managed forests. It is essential for private forest lands to be incorporated into statewide ecological monitoring programs both to provide a complete picture of statewide stream conditions and to transfer the benefits of ecological condition monitoring to the management of streams that drain forest ecosystems.

The intent of this project is to establish a monitoring framework to support collaborative monitoring for applying California's SWAMP ecological performance measures to evaluate water and habitat quality in streams on private forest lands. Direct collaborators include California State Water Resources Control Board, Department of Fish and Wildlife, Department of Forestry and Fire Protection, California Forestry Association, and private industrial forest owners. This project will also collaborate with US Forest Service scientists currently conducting a similar probability based monitoring program with SWAMP on California public forest lands.

Monitoring Approach

Measuring Site Condition - This project will use the SWAMP Protocol which is a well-tested, standardized method for direct site assessment of channel hydrologic and geomorphic conditions, stream and riparian habitat type, water chemistry, and benthic macroinvertebrate and algal community composition. Sites will be assessed using the full SWAMP protocol and additional measures relevant to forestry such as riparian canopy cover, vegetation and species stand type will be included. Some sample locations will be permanently marked (monumented) to help field crews locate the exact stream site for long-term trend monitoring. Sampling will be conducted by experienced CDFW field crews, biological and chemical samples will be processed by certified laboratories. SWAMP bioassessment data provide direct measures of ecological condition and can be used to compare stream reaches across space and time.

Determining Stream Condition of Private Forest Lands - This project will follow the sampling framework developed for the SWAMP Perennial Stream Assessment (PSA) program which uses a probability-based method for site selection. Site locations are selected randomly from a sample frame (stream network database) in a design that allows us to infer the condition of a large stream population from a relatively small sample of sites. Results can answer the general question "what are the physical, chemical and biotic condition for the entire stream network?". For this project, sites will focus on private forest lands throughout California, supplementing an extensive data set of sites that have already been sampled on public forest lands and non-forest lands in Northern California. Private forest lands will be sampled over a three year period to assess stream health biological objectives set by California's forest practice rules and environmental law, and develop guidance for applying ecological performance measures of managed forests.

Determining Reference Condition on Private Forest Lands - Twelve reference sites will be targeted by SWAMP and resource managers to represent the best ecological conditions currently available on private forest lands. These reference sites will augment the SWAMP Reference Condition Management Program (RCMP) database.

Sampling Effort for this Project - The scope of this pilot project is to select 60 probability-based sites on private forest lands; based on previous SWAMP probability-based monitoring, this number of sites is a minimum needed to evaluate the general biological condition of private forest land streams with a satisfactory level of statistical confidence. Because of California's diverse geology and ecology, assessment and reference sites will be evenly distributed among the four forest-dominated ecological regions in California: Coast Range, Klamath Range, Cascade Range and Sierra-Nevada Range. A total of 15 assessment sites and 3 reference sites will be selected within each of the four eco-regions to be sampled over the three year period. These sites will complement existing data from adjacent National Forest and BLM public forest lands.

Project Costs - costs of sampling, processing and recording data are estimated at \$8,000 per site. Because this will be a collaborative planning and sampling effort between private landowners and SWAMP this amount is at the lower end of similar project site-cost estimates. A project cost estimate for the 72 sites (60 probability-based and 12 reference sites) is a total of \$576,000 over a three year period (\$192,000 per year for three years, sampling 24 sites per year).

Outcomes

This project will provide a valuable framework to support long term collaborative monitoring on private managed forest lands in California and allow information from private forest lands to be integrated with information from other datasets from forest lands and non-forest lands in the state. Ongoing collaborative monitoring will over time increase the number of sample data points, resulting in improved data precision. Ultimately, this will provide a foundation that can be used to sustain a long term collaborative monitoring program that is better able to ask and answer more specific monitoring questions with objective data that are trusted by all stakeholders.