Developing a Monitoring Plan using the Wetland and Riparian Area Monitoring Plan (WRAMP) Framework

CDFW Watershed Grant Programs - Proposition 1 and Proposition 68

California Department of Fish and Wildlife (CDFW) encourages Grant Applicants to create robust monitoring plans that include evaluation of baseline and post-implementation conditions to document project effectiveness during and beyond the term of the grant. To enable program-wide assessments, standardized monitoring methods should be used and monitoring should be coordinated with existing efforts. Applicants should apply the Wetland and Riparian Area Monitoring Plan (WRAMP) framework [i] and implement WRAMP tools including Project Tracker [ii] (a component of Eco Atlas [iii]) and California Rapid Assessment Method (CRAM) [iv] where feasible. Applicants should include budget for CRAM training or hire qualified consultants with CRAM credentials. Applicants are encouraged to develop collaborative CRAM training and monitoring efforts. For ecosystems where an appropriate CRAM module is not available, other rapid assessment methods should be used.

WRAMP Contact: For questions about the WRAMP framework, building CRAM and other WRAMP components into a monitoring plan, and identifying qualified CRAM practitioners, see the attached WRAMP FAQ document, and visit the California Wetland Monitoring Workgroup Website: Elements of Wetland and Riparian Area Monitoring Plan (WRAMP) [i] and the CRAM website [iv]. For additional information, please contact Cliff Harvey, California Wetland Monitoring Workgroup / State Water Resources Control Board, phone (916) 558-1709; email: clifford.harvey@waterboards.ca.gov

Recommended Monitoring Components: The table below lists recommended monitoring plan components for a subset of the priority project types included in the CDFW Proposal Solicitation Notice (PSN). A qualified practitioner must identify the appropriate CRAM module for a given project; the listed module(s) are the most commonly used. The list is not intended to be prescriptive; Level 3 monitoring plan components, in particular, will vary depending on specific project objectives and performance measures. All projects should include both baseline and post-implementation monitoring. All projects should include submission of Level 3 data to public repositories as described in the PSN, including submission of sensitive species data to CNDDB and water quality data to CEDEN.

CDFW Prop 1 PSN Priority	Project Example	Recommended Monitoring Plan components WRAMP monitoring framework
Delta Water Quality and Ecosystem Restoration Grant Program		
Improve Habitats in the Delta – Protection, restoration, or enhancement of tidal, sub-tidal, floodplain, riparian, transitional, and terrestrial habitats	Restore tidal wetland and transitional habitat	**Level 1** – Submit project to Project Tracker [ii] ; submit wetland area changes using EcoAtlas - California Aquatic Resources Inventory (CARI) Editor tool [v] **Level 2** – CRAM – Estuarine module [iv] **Level 3** – Use standardized methods to monitor: water quality including temperature and sediment; aquatic and terrestrial plants, birds, invertebrates, and fish.

CDFW Prop 1 PSN Priority	Project Example	Recommended Monitoring Plan components WRAMP monitoring framework
***Improve Habitats in the Delta* – Enhancement or development of managed wetlands for subsidence reversal and carbon sequestration**	Develop managed wetland for subsidence reversal and carbon sequestration	**Level 1** – Submit project to Project Tracker [ii] **Level 2** – CRAM – Depressional module [iv] **Level 3** – Use standardized methods to monitor: water quality; soil carbon; greenhouse gas flux; plants and birds.
Watershed Restoration Grant Program		
***Central Valley Salmon Resilience and Recovery* – Restoring instream spawning and rearing habitat**	Restore instream spawning and rearing habitat for Chinook salmon	**Level 1** – Submit project information to Project Tracker [ii] **Level 2** – CRAM – Riverine module [iv]; Proper Functioning Condition assessment [vi] **Level 3** – Use standardized methods to monitor: water quality including temperature; fish use of restored areas.
***Large-Scale Wildfire Recovery Response* – Restoration of Riparian Habitat**	Planning to restore stream: reinforce stream banks to reduce erosion; plant trees to create wildlife habitat and reduce water temperature	**Level 1** – Submit project information to Project Tracker [ii] **Level 2** – CRAM – Riverine module [iv]; Proper Functioning Condition assessment [vi] **Level 3** – Use standardized methods to monitor: water quality including temperature; plants, birds, reptiles, amphibians, mammals, and fish.
***Conservation Project Implementation* – Mountain Meadows**	Restore mountain meadow function	**Level 1** – Submit project information to Project Tracker [ii] and Meadows Clearinghouse [vii]; submit wetland area changes using EcoAtlas - California Aquatic Resources Inventory (CARI) Editor tool [v] **Level 2** – CRAM - Slope module [iv]; Proper Functioning Condition assessment [vi] **Level 3** – Use standardized methods to monitor: water quality including temperature; groundwater elevation; plants, amphibians, and birds.

[i] https://mywaterquality.ca.gov/monitoring_council/wetland_workgroup/wramp/index.html

[ii] https://www.ecoatlas.org/regions/ecoregion/statewide/projects

[iii] https://www.ecoatlas.org/

[iv] https://www.cramwetlands.org/

[v] https://www.ecoatlas.org/about/#cari-editor

[vi] https://www.blm.gov/or/programs/nrst/pfcassess.php

[vii] https://meadows.ucdavis.edu/

CDFW Watershed Grant Programs

The purpose of this FAQ sheet is to provide a resource for habitat restoration practitioners to better understand the WRAMP framework and develop more successful monitoring plans for their projects.

1. What is WRAMP?

The Wetland and Riparian Area Monitoring Plan (WRAMP) is a plan for comprehensive monitoring and assessment of aquatic resources using a watershed or landscape context. WRAMP incorporates the U.S. EPA's three-tier system for classifying monitoring questions and methods, as well as the EcoAtlas toolset, to provide the framework to ensure that monitoring data are relevant and cost-effective. Although WRAMP has been applied to support a watershed approach to wetland and stream protection in California, the framework can be adjusted to generally support ecosystem and habitat planning, assessment, monitoring, and reporting.

Visit the WRAMP Framework page for more information:
https://mywaterquality.ca.gov/monitoring_council/wetland_workgroup/wramp/index.html

2. What are the different "levels" of WRAMP?

A central aspect of the WRAMP framework is a classification of environmental monitoring data, their methods of collection, and their stated purposes into the following three levels:

- **Level 1.** This level of monitoring is focused on questions and data pertaining to spatial relationships that can be quantified or displayed through **maps and imagery**. Typical datasets include map-based inventories of aquatic areas and related resources, monitoring stations, restoration projects and other activities, landscape ecology metrics calculated through Geographic Information Systems (GIS), and map-based displays of Level 2 and Level 3 monitoring data.

- **Level 2.** This level of monitoring focuses on questions and data about the overall **condition or health of habitats** using rapid, field-based semi-quantitative, monitoring measures, without intensive laboratory analysis of field samples or data processing. Prominent Level 2 methods used in California include Proper Functioning Condition (PFC; www.blm.gov/or/programs/nrst/pfcassess.php) and the California Rapid Assessment Method (CRAM; https://www.cramwetlands.org/) for assessing the health of wetlands and streams, but other assessment methods are also available.

- **Level 3.** This level of monitoring is focused on specific aspects of health or overall condition based on **quantitative field measures**. Common types of Level 3 data for wetlands and streams include the distribution and abundance or density of plant and animal species, concentrations of contaminants or other chemical constituents of habitats or food webs, hydrological and geomorphic parameters, biomass, and primary or secondary productivity. While there are many standard Level 3 methods, they often differ among monitoring efforts for a given kind of Level 3 data, due to differences in site-specific conditions.

3. What can I do with WRAMP and the EcoAtlas toolset?

The WRAMP framework helps design and coordinate monitoring to efficiently address the questions and to support the decisions of managers and regulators regarding wetlands, streams, and riparian areas. The EcoAtlas toolset can help implement the framework, especially with regard to Level 1 and Level 2 concerns. For example, restoration practitioners are often required to add their projects to Project Tracker, monitor the condition of their projects using CRAM, and use other EcoAtlas tools to describe the relationships of their projects to other management activities in a watershed or landscape context. The WRAMP framework can also be implemented using other Level 1 and Level 2 tools, although the use of EcoAtlas tools adds value to monitoring efforts by promoting their coordination and information exchange. The framework also helps determine when Level 1-3 tools are most appropriate, and can help match Level 3 methods to individual monitoring sites. Furthermore, EcoAtlas facilitates the following critical tasks:

a. Evaluate the project setting when planning a wetland project
b. Assist with developing permitting conditions for a project
c. Monitor and track progress for completed projects
d. Track and calculate net change in wetlands in the future
e. Document accomplishments of habitat restoration

4. How do I use WRAMP?

WRAMP is often required for various landscape restoration programs. Depending on your task, you would make use of a different tool in the toolset:

- If you wish to submit your project, you could use Project Tracker.
- If you are assessing the overall condition of a project, you could use CRAM.
- If you wish to assess the landscape context of a project, you could use the Landscape Profile Tool (www.ecoatlas.org/about#landscape-profile).
- If you wish to update the aquatic resources visualized in EcoAtlas map, then you would use the CARI Editor (www.ecoatlas.org/about/#cari-editor).

All of these tools are described below, with links to further resources.

5. How can I add my project into EcoAtlas?

EcoAtlas Project Tracker (https://ptrack.ecoatlas.org/) provides a consistent way to collect project information and ensures projects can be compared to one another in key metrics. Proposition 1 Grant Program Guidelines by multiple agencies require entry into Project Tracker. The steps for entry are described here in an easy-to-understand sequence: https://ptrack.ecoatlas.org/instructions

6. What is CRAM and how do I use it?

The California Rapid Assessment Method or CRAM is the most widely used "Level 2" monitoring tool for assessing the overall condition or health of wetlands and streams. Different types of wetlands, as defined by the California Aquatic Resources Inventory (CARI), are assessed using different CRAM modules throughout California. Visit the CRAM website for SOPs and field books (www.cramwetlands.org/documents).

CRAM assessments are displayed in EcoAtlas and the Landscape Profile Tool, where they capture a snapshot of landscape condition or show the development of a habitat over time. This information, in turn, can fulfill monitoring requirements or assist decision makers in determining how to prioritize restoration opportunities.
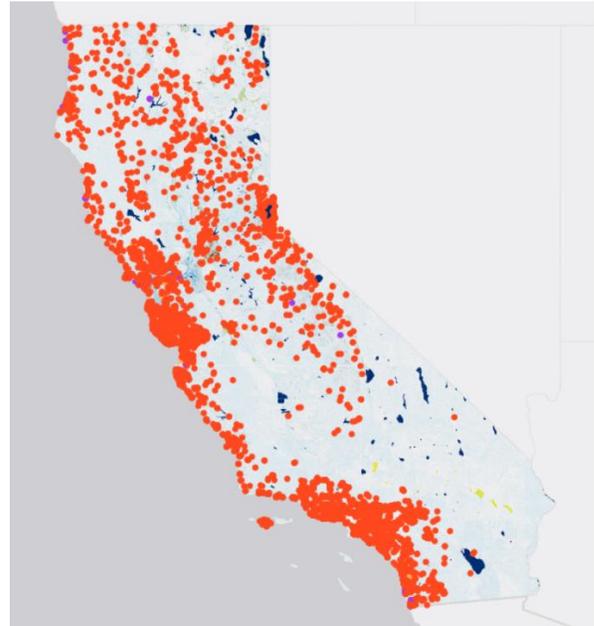
EcoAtlas retrieves CRAM assessments entered through eCRAM and displays the scores on a project's page if the project's footprint and CRAM assessment area intersect with each other. CRAM is especially useful as a way to demonstrate the project's effect in improving the condition of the aquatic features by conducting pre- and post-project CRAM assessments.

Consult the CRAM website for a list of trained practitioners: www.cramwetlands.org/training/participants. If you are interested in getting trained in CRAM, visit the CRAM training calendar (www.cramwetlands.org/training) for upcoming opportunities.

7. How can I update the map in EcoAtlas?

The California Aquatic Resources Inventory (CARI) is the basemap used in EcoAtlas and is a seamless statewide map compiled from multiple data sources and standardized to a common classification system. The CARI Editor invites people knowledgeable about landscape changes to enrich the CARI map with this knowledge. Recording and reviewing these changes is important to ensure that CARI remains current and authoritative as a map of California's aquatic resources. Learn more about the CARI editor: www.ecoatlas.org/about#cari-editor