Compliance & Effectiveness Monitoring Framework for Water Quality Control and Habitat Conservation

Assessing the Performance of Public Policies, Programs, Plans and Projects

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Starting Premise

CWA and ESA (CA and Federal programs) are adopting similar watershed/landscape approaches to protect the same resources.
HCP Addendum Federal Register 2000

Guidelines and Principles to achieve Biological Goals and Minimize and Mitigate Impacts to *Species or Habitat* using *Watershed or Landscape Approach*
Guidelines and Principles
to achieve Biological Goals
and Minimize and Mitigate Impacts
to Species or Habitat
using Watershed or Landscape Approach
The California Water Boards shall use a **watershed approach** in reviewing compensatory mitigation plans to protect the **beneficial uses** of state waters.

The “RARE” beneficial use means special status wildlife.
The watershed/landscape approach will improve the cumulative effect of restoration/mitigation.

Success requires coordination across all projects affecting resource abundance, diversity and condition.

Coordination requires a common framework and toolset for consistent compliance and effectiveness monitoring.
The Catch Phrase

Protect the abundance, diversity, and condition of aquatic resources (= CA and federal surface waters) in a project area (= watershed or other landscape)
Overview of the Framework

WRAMP
Wetland and Riparian Area Monitoring Plan

WRAMP is not a program. It’s a framework and toolset to be implemented through existing programs

Focused on wetland protection through water quality control programs with prospects to expand to aquatic and terrestrial wildlife and habitats

Data access and tools vary in development but progress is being made on many fronts

20+ years of collaborative development
General Framework

Biological Goals & Objectives, Water Quality Standards, Management SOPs, etc.

Develop Conceptual Models of Condition Cause & Effect

Identify & Classify Needed Data Using USEPA System

1-2-3 Data Framework
- CA Aquatic Resource Inventory (CARI) & Classification System, RipZET, Delta Landscape Metrics
- CA Rapid Assessment Method (CRAM), PFC
- SWAMP, IEP, RMPs HCP/NCCP Monitoring Methods
- Agencies, Academia, RMPs, Scientific NGOs

GRTS (PSA, RMPs), Project-specific Designs

CA Data Management
- SCCWRP, SFEI, MLML
- CEDEN

Analysis & Interpretation

Condition Assessments (formatted to inform & answer)

Public Reporting
- My Water Quality Portals
- EcoAtlas
- Project & Program Reports
Present Governance Structure

- CWQMC
- CWMW
- Federal Programs

- L1-L3 and EcoAtlas Steering Committees
- TACs (Federal State, NGO, Private Sector, Academia)

Flexible Rosters
Open Rosters
Participating CA State Agencies

- Coastal Commission
- Department of Fish and Wildlife
- Department of Parks and Recreation
- CalTrans
- Department of Water Resources
- Resources Agency
- State Lands Commission
- State Coastal Conservancy
- Regional Water Quality Control Boards 1-6, 8, 9
- Delta Conservancy
- State Water Resources Control Board
Participating Federal Agencies

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- Natural Resources Conservation Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

Other Agencies and Entities

- Moss Landing Marine Laboratories
- San Francisco Estuary Institute and Aquatic Science Center
- Southern California Coastal Water Research Project
- Habitat Joint Ventures
New and Emerging Tools

- Help develop and align water quality and habitat objectives for wetlands and riparian areas

- Track and report project compliance and effectiveness based on wetland abundance, diversity, and condition
Overview of Selected Tools
Yep – there’s more!

- CARI
- RipZET
- Project Tracker
- CRAM
- Probabilistic Survey Design (GRITS)
- Cumulative Frequency Distribution
- Project Performance Curves
- GreenPlan-IT (LID tools)
- Landscape Profile Tool
- EcoAtlas
CARI
CA Aquatic Resource Inventory

Inventory of Aquatic Resource Abundance and Diversity

- Statewide map of abundance and diversity of surface waters
- Intensifies NWI and NHD
- Supports statewide status & trends assessment
- Basemap for My Water Quality Portals
- Regional versions possible
CARI methods make a significant difference in measures of aquatic resource abundance and diversity.
- CARI includes more aquatic resources.
- Can’t protect what we can’t see or don’t know about.
DARI
Delta version of CARI

DARI is only 25% complete
RipZET
Riparian Zone Estimator Tool

- Visualizes the National Research Council’s riparian definition
- Width varies with riparian function, topography, vegetation
- Runs on CARI or other maps of surface waters
Example RipZET Output

Maximum number and levels of functions including riparian wildlife support

- Nearly no functions
- Natural
- Unnatural

Riparian Width (m)

% Total Length of All Channels

- ≥100
- 41-99
- 31-40
- 21-30
- 11-20
- 6-10
- 2-5
- 1
**Project Tracker**

(Operational in Bay Area with prospects elsewhere)

- Maps of projects provided through permits (pending Online 401)
- Maps of proposed surface waters within projects (CARI)
- Data and information sharing through project maps
- Searchable maps and lists of projects
### Montezuma Wetlands Project

#### Basic Information

- **Status**: Upload files or links

#### Project Type

- **Name**: 2006/2007 Biological Survey Report
- **File Type**: Monitoring Report

#### Project Area

- **Name**: Montezuma Biological Survey Rpt 2006-2007.pdf

#### Project Identification

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#### Habitat Plan

- **Name**: bio report 2010-2011 Final.pdf
- **File Type**: Monitoring Report
CRAM
California Rapid Assessment Method
For Wetlands, Streams, and Riparian Areas

- Standardized measure of wetland condition as capacity to provide high levels of intrinsic functions
- Separate modules for each CARI wetland class
- Comprehensive training program
- Statewide database
- Probabilistic Survey Design (GRTS)
- Cumulative Distribution Function (CDF)
- Project Performance Curves (PCs)

Example based on CRAM
Probabilistic survey of ambient or baseline condition

Probabilistic Survey Design

Probabilistic survey of project performance
Example CRAM Ambient Assessment

Cumulative Distribution Function

Existing (real data)
Desired (hypothetical ideal)
Example CRAM Ambient Assessment

Cumulative Distribution Function

Cumulative Distribution Function

CRAM Score

Percent Total Stream Length

Project

73
Performance Curve
Forecasting project performance over time

- Project Age (years)
- CRAM Score

Reference Condition

statewide tidal marsh example
Example CRAM Ambient Assessment

Cumulative Distribution Function

Percent Total Stream Length

CRAM Score

Project

Future

83
GreenPlan-IT
LID Site Suitability Tool, Hydrology Models, Optimization Tool

- Uses local and regional data (transportation, storm water infrastructure, CARI, land use, etc.)
- Generates ranked LID Location Opportunity Map
- Incorporates cost factors, hydrology and pollutant load models
- Generates optimal watershed-based Green Plan
Example GreenPlan-IT Output

Opportunity Map

Hydrology Models

Watershed Green Plan

Optimization Tool
Landscape Profile Tool

- Abundance and Diversity of Aquatic Resources and Other Information Summarized for User-defined Watersheds or Other Landscape Areas

- Generates custom maps, graphs and tables as automated PDF that can be downloaded

- Current focus is on 401/WDR but program-specific versions are possible (Stormwater, TMDL, LSA, THP, HCP/NCCP, etc).
Landscape Profile

User Defined Region

Total Profile Area: 472,774.0 acres or 738.7 miles²

Abundance and Diversity of Existing Aquatic Resources
California Aquatic Resource Inventory (CARI)

Marine and Estuarine Resources: 460 acres / 0.7 miles²

- Tidal Marsh: 33.7%
- Tidal Flat and Marsh Panne: 23.3%
- Subtidal Water: 41.1%
- Beach, Dune, and Rocky Shore: 1.8%

Palustrine Resources: 10,953 acres / 17.1 miles²

Landscape Profile

- Historical Aquatic Resources
  - Estuarine and Marine: No historical estuarine or marine resources found
  - Palustrine: No historical palustrine wetlands or terrestrial features found

- Ecological Restoration based on Wetland Projects within Profile – Total Records: (9)

- Aquatic Resource Condition based on California Rapid Assessment Method for Wetlands (CRAM) within Profile – Total Records: (36)

- Human Population based on 2010 Census

- Species of Special Status based on CNDDDB Species Information

- Developed Land Cover by NLCD 2011 Category

View data source details
EcoAtlas aggregates data and information from many sources to inform key environmental regulatory and management decisions.

- Project Tracker and Landscape Profile Tool reside in EcoAtlas.

EcoAtlas is the information delivery system behind multiple My Water Quality Portals.
Strategic Goal

- Support *landscape scenario planning* to identify target levels of essential ecosystem services of state and federal inland waters
- Coordinate efforts across public policies, programs and projects to achieve the ideal
- Maximize the efficiency of coordinated efforts to routinely track and report progress
Important Tools Not Covered in This Presentation

- “VegCAMP” visualize vegetation communities
- "S&T" (Status and Trends) net change in surface water diversity & extent
- “Watershed Mapper” on-screen & automated watershed delineation
- “RWSM” regional and watershed estimates of pollutant mass loading
- “Landscape Metrics” (Head-of-Tide, Shoreline Change, Landscape Ecology)
- “CD3” sort and display water quality data
- “SLRV” & “OCOF” estimate and visualize tidal flooding
- “Historical Ecology” understand natural analogues to resilient future ecosystems