



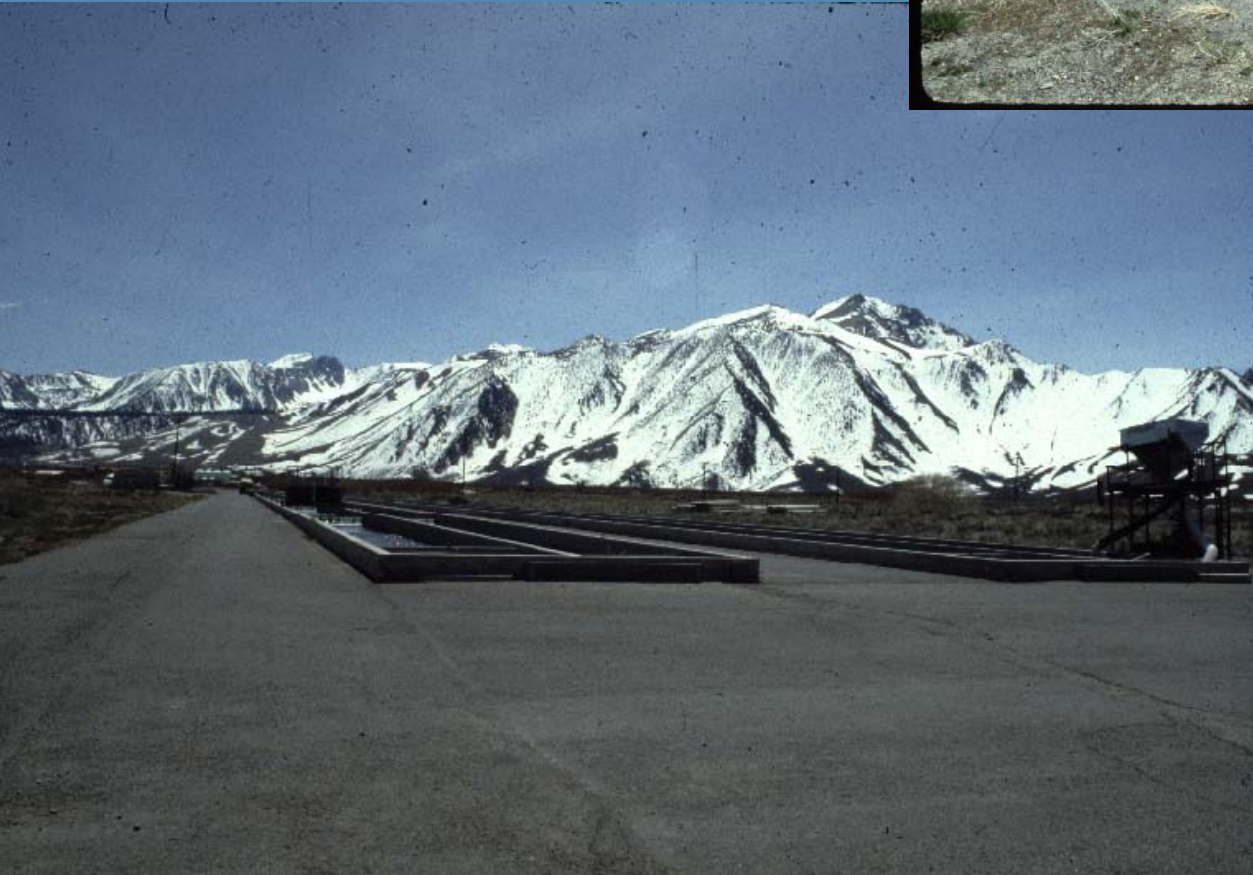
# 10 Years of Bioassessment In California

CABW meeting December 2-4, 2003

Jim Harrington  
DFG Aquatic Bioassessment Lab

# California Department Of Fish and Game

## Use of Bioassessment



**Fish Hatchery NPDES  
Permit Requirements**

**Hot Creek Hatchery  
1993  
1999-2003**

# Enforcement of DFG Code 5650

## Spill Response



# Natural Resource Damage Assessment (NRDA)



or *Bucks for Bugs*

# **Rapid Biological Assessment California Stream Bioassessment Procedure (CSBP)**

## **for High and Low Gradient Streams**

**Cost effective**

**0.5 mm Mesh**

**D-frame Net**

**Richest Habitat (Riffle)**

**Sample 18 ft<sup>2</sup> Habitat**

**3 Replicate Samples or**

**1 Composite**



**Benthic  
Macroinvertebraes**

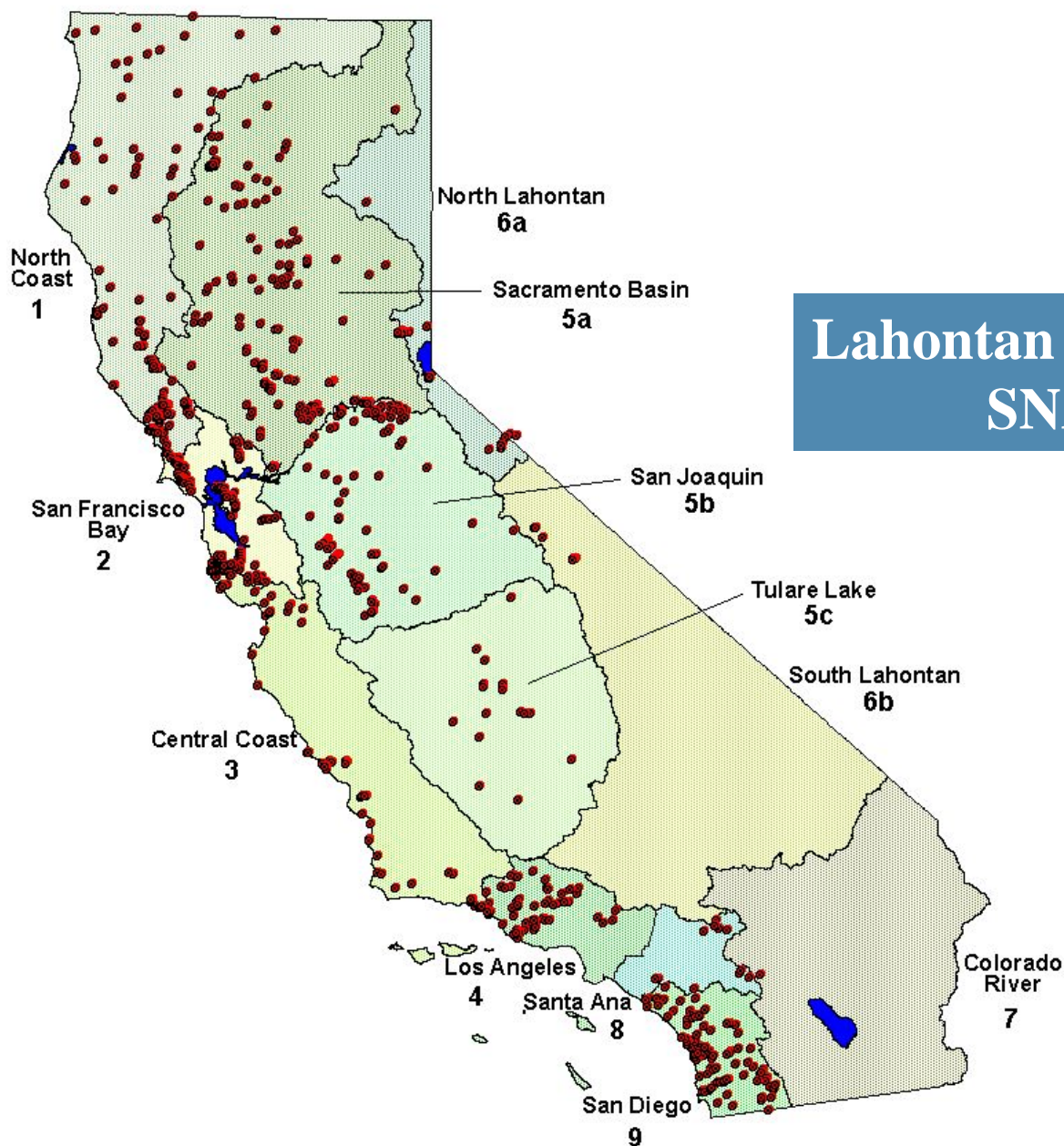
# Rapid Biological Assessment

Rapid Physical/Habitat

U.S. EPA RBP  
Quantify:  
Canopy Cover  
Stream Size  
Substrate from  
pebble Counts  
Flow



# Regional Water Quality Control Boards Bioassessment



# VARIOUS STATE MONITORING PROGRAMS

## The Status and Future of Biological Assessment for California Streams



California State Water Resources Control Board  
Division of Water Quality  
January, 2003  
Final Report



DWR Northern Division  
USGS NAWQA Program  
USFS Bioassessment Program  
Santa Clara Valley Project  
UCLA  
UC Berkeley  
UC Davis ATL  
Hoopa Valley EPA  
Yurok Tribe WQ Program  
Ventura River Bioassessment Program  
Marin County Bioassessment Program  
Upper Putah Creek Citizen  
Dry Creek Conservancy  
Truckee River Aquatic Monitors





# **DFG Efforts To Standardize Bioassessment in California**

- I. Build an Aquatic Bioassessment Laboratory (ABL)**
- II. Establish the California Aquatic Bioassessment Workgroup (CABW)**
- III. Develop and promote standardized field and laboratory protocols**
- IV. Promote the development of an Index of Biological Integrity (IBI)**



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STATE OF CALIFORNIA  
RESOURCES AGENCY  
DEPARTMENT OF FISH AND GAME  
FISH AND WILDLIFE  
WATER POLLUTION  
CONTROL LABORATORY

Aquatic Bioassessment Laboratory  
2005 Nimbus Rd. Rancho Cordova  
(916) 358-4398 or 358-5862  
[www.dfg.ca.gov](http://www.dfg.ca.gov)

# Chico State Taxonomy Laboratory Chico State Research Foundation



# DFG Aquatic Bioassessment Laboratory

## Rancho Cordova and Chico State Laboratory



**Jim Harrington**  
**Staff Environmental Scientists**

**Research/Taxonomy**

Dr. Pete Ode  
Dr. Andrew Rehn

**Enforcement**

Angie Montalvo  
Amy Tsuji

**EMAP/Field**

Mike Dawson  
Jennifer Lenz  
Shawn McBride  
Glenn Sibbald  
Nathan Brosius  
Tim Mulloy

**Taxonomist**

Doug Post  
Dan Pickard  
Brady Richards  
Joe Slovark

**Lab Techs**

Stacy Kraus  
Jennifer Moore  
Ryan Brosius  
Rueben Mahnke



**DFG's success** in developing and promoting a standardized and consistent field and laboratory protocol can be attributed to...

California Aquatic Macroinvertebrate  
Laboratory Network (CAMLnet)

Inter-laboratory QA/QC Program

CalEDAS Database Development



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# CAMLnet



Formed to provide a forum for sharing technical expertise and experience among labs performing bioassessments in California

Serves as a technical advisory body to the CABW and for the CSBP

Works to standardize the levels of standard taxonomic effort used in bioassessments using the CSBP





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**Inter-laboratory QA/QC Program**

CalEDAS Database Development

# Inter-laboratory QA/QC program



## Need:


Bioassessment data is being collected in California at a rapidly increasing rate.

Therefore, standardization of laboratory techniques is critical

## Goal:

Assess the quality of taxonomic data and its impacts on bioassessment metrics

Assure that taxonomic data from different sources can be included



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**CalEDAS Database Development**



# CaEDAS

## Environmental Data Analysis System

A modified Access database containing the  
Benthic Master Taxa list

Based on the CAMLnet list of taxonomic effort

Primarily for internal DFG use – for now  
No technical Support

DWR assisted conversion to SWAMP format



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# California Aquatic Bioassessment Workgroup

**to bring together all entities involved in bioassessment in California, disseminate information on implementing biocriteria and providing a forum for scientific review of protocols used to develop biocriteria in California**



# California Aquatic Bioassessment Workgroup

- 1994 Established as a forum to communicate and exchange information
- 1995 Finalization of the California Stream Bioassessment Procedures (CSBP)
- 1996 Formulate the process for developing biocriteria in California
- 1997-1999 Provided a forum for updating attendees on bioassessment and gave examples of current projects
- 2000- 2001 Changed format from 3 day workgroup to 2 day platform presentation and panel discussion



# 2002 California Aquatic Bioassessment Workgroup

## Workgroup 1:

Diagnosing Aquatic Resource Impairment Using Chemical, Toxicological, Physical and Biological Tools

## Workgroup 2:

Developing Biocriteria and How Water Resource Managers Can Use an Index of Biological Integrity

The Use of Bioassessment in Developing and Implementing Total Maximum Daily Loads (TMDL's) RWQCB

## Workgroup 3:

The EPA's Environmental Monitoring Program (EMAP) in California and How Water Resource Managers Can Use the Information





# 2003 California Aquatic Bioassessment Workgroup

## Workgroup Session 1:

Collecting and Using Fish Data in Bioassessment Programs

## Mini Session:

Bioassessment in the FERC Re-licensing Process and Assessing the Effects of Hydroelectric Projects on the Health of California Streams and Rivers

## Workgroup Session 2:

Complementary Methods of Determining the Biotic Health of Streams and Rivers in California



# 2003 California Aquatic Bioassessment Workgroup

## Mini Session:

Building on the Western Pilot Environmental Monitoring and Assessment Program (EMAP) and Enhancing State Water Quality Monitoring to Better Address Nonpoint Source Pollution in California

## Workgroup Session 3:

Transitioning from Coastal to Inland EMAP and Developing Rapid Protocols for Assessing the Condition of California Wetlands

## Workgroup Session 4:

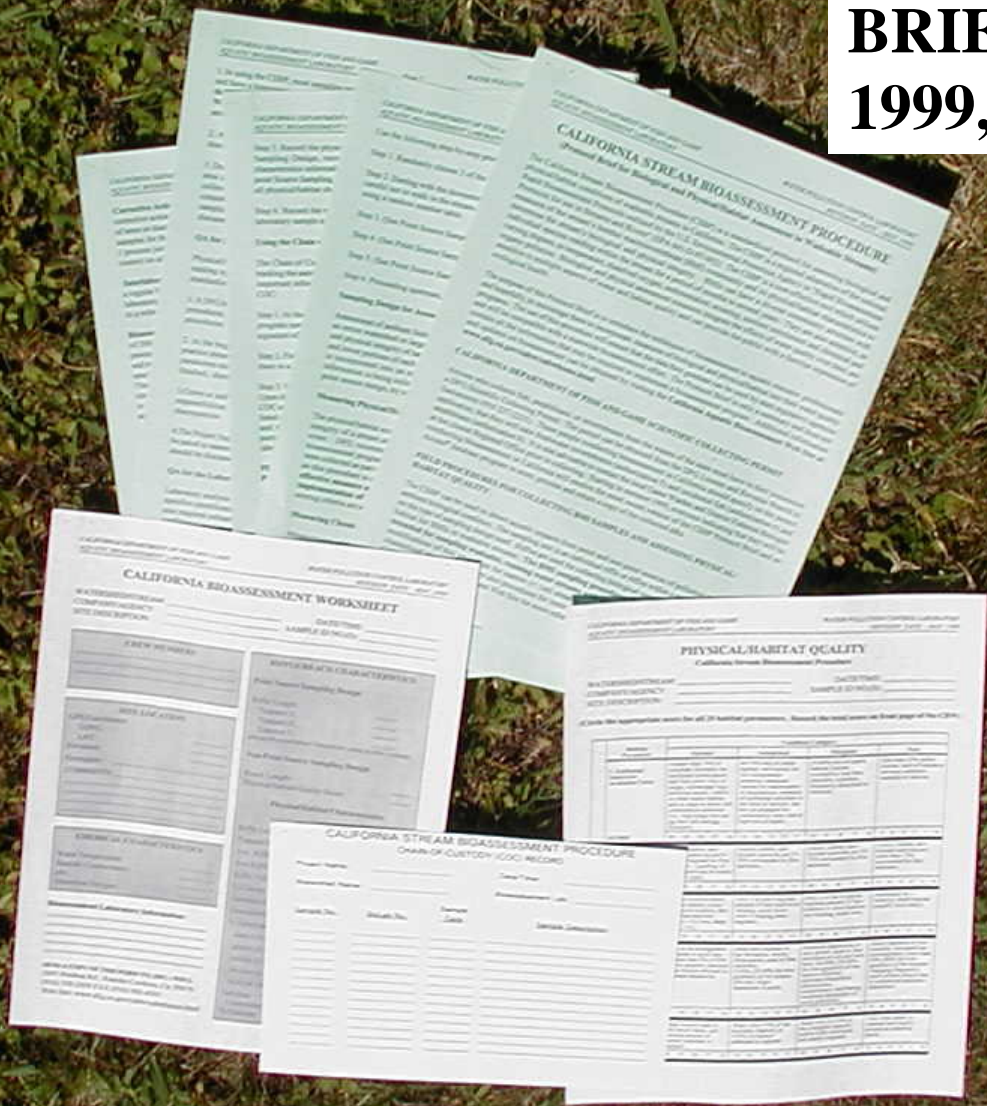
Concepts behind Tiered Aquatic Life Uses (TALU) and Use Attainability Analysis (UAA) and How they can be Used in California Water Quality Regulation



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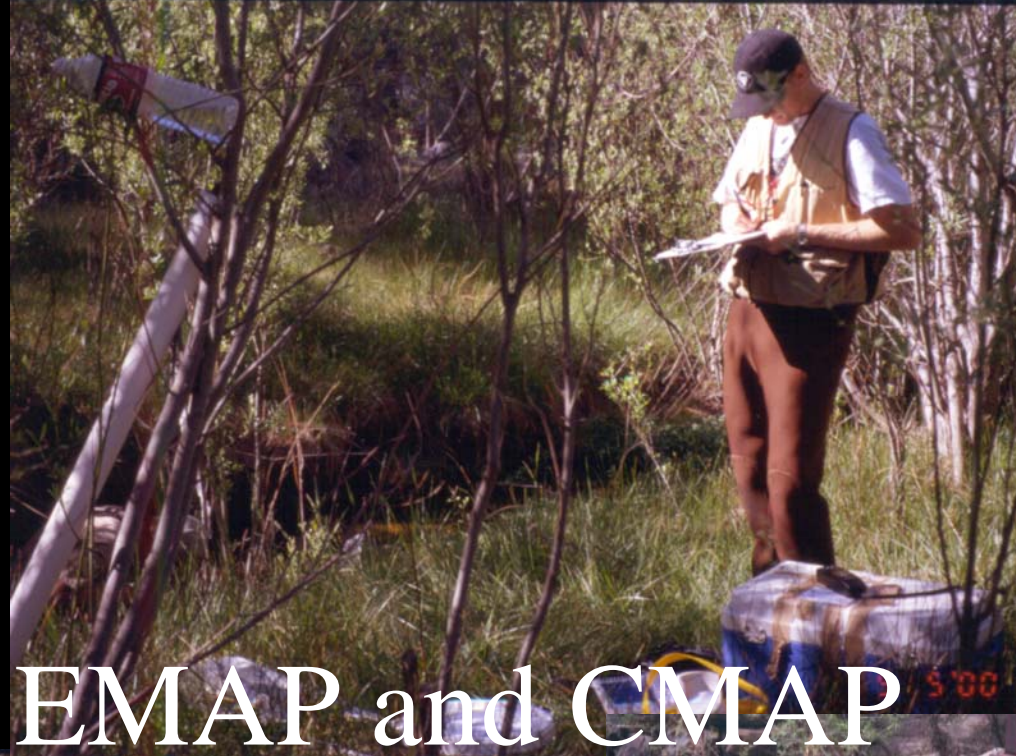
# CSBP PROTOCOL BRIEF – 1993, 1996, 1999, **CSBP 2003**





Starting 2000

60 sites/year  
Probabilistic



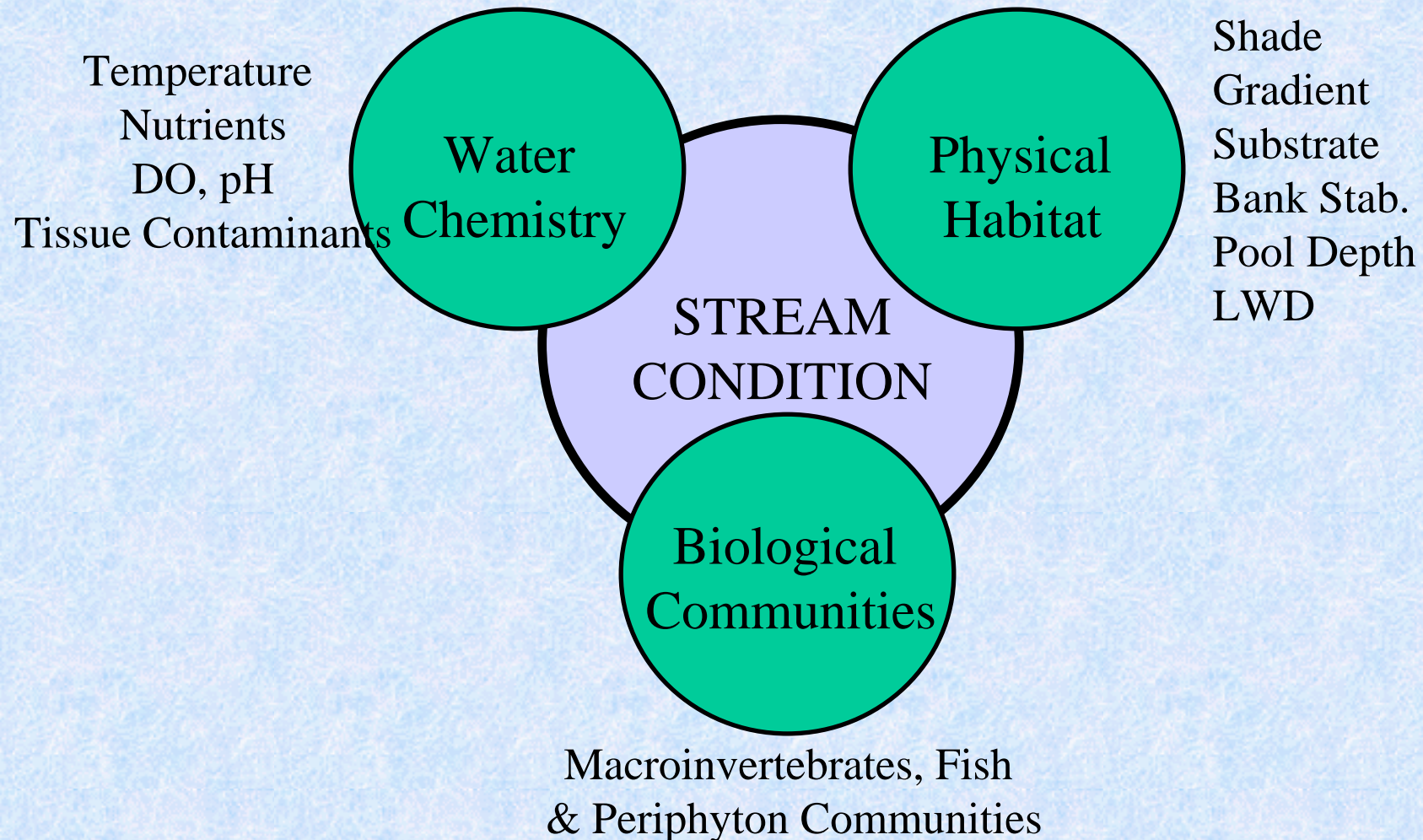
# Western Pilot EMAP and CMAP



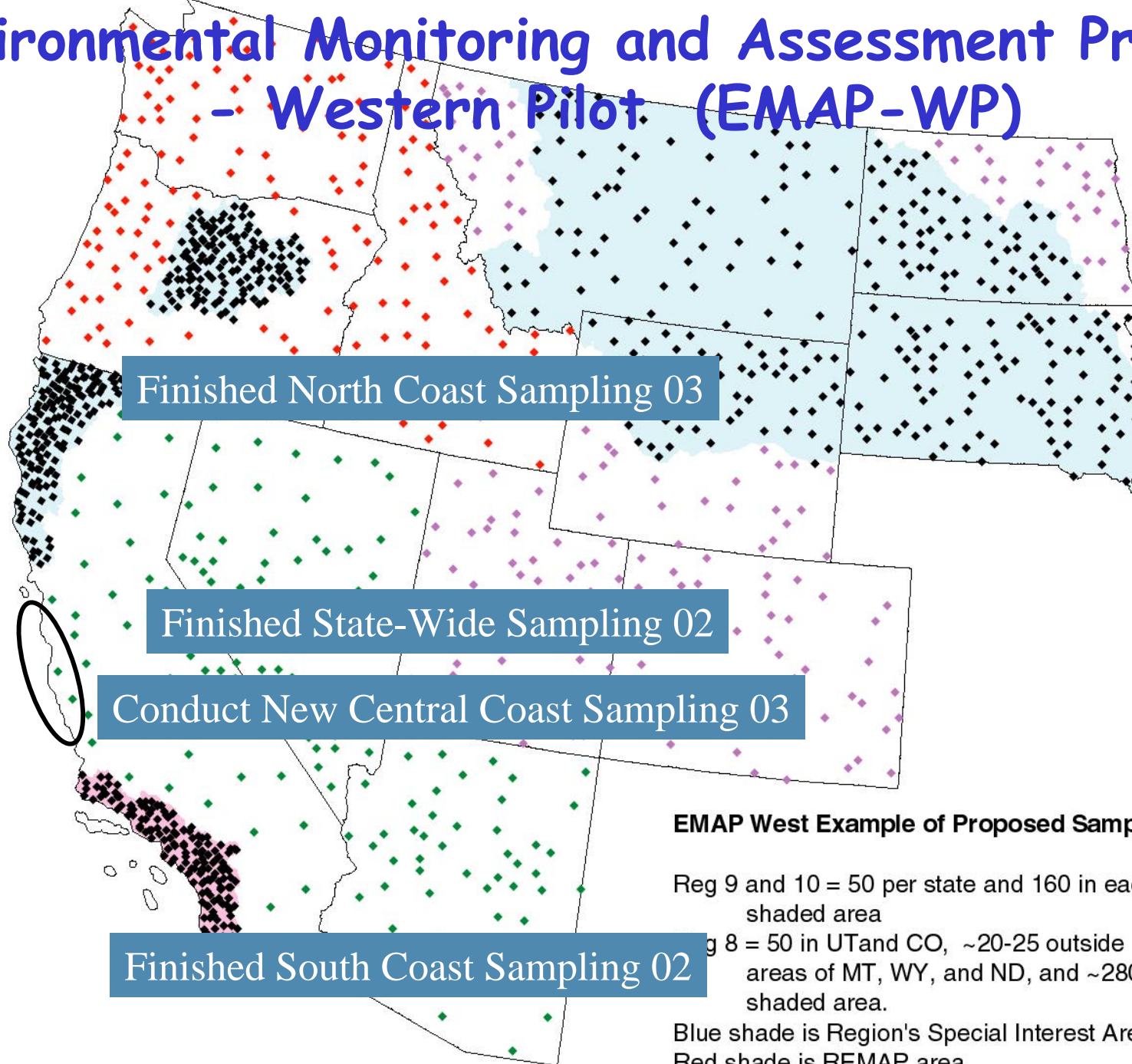
CDFG  
U.S. EPA  
SWRCB  
RWQCB



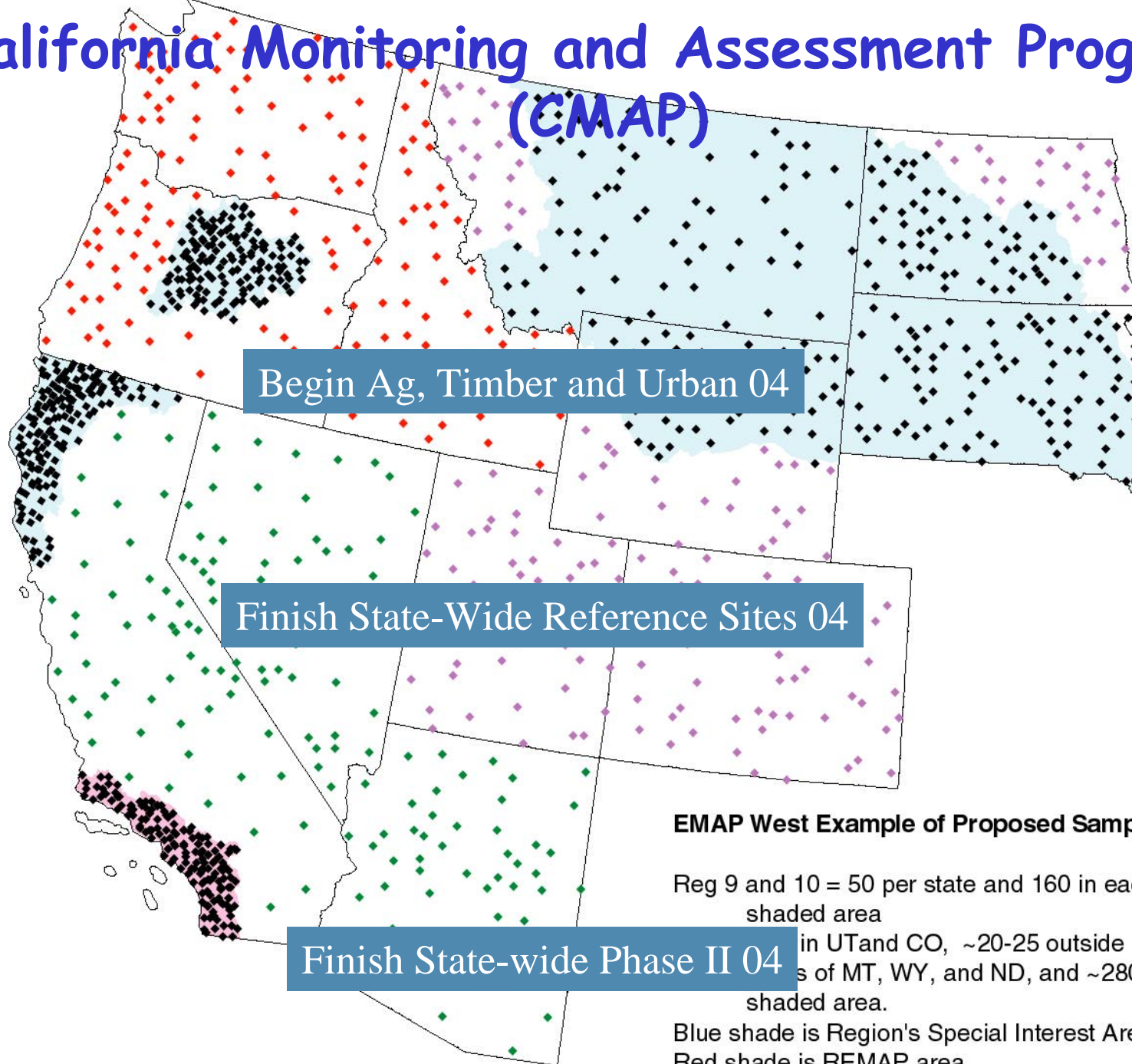
# COMPONENTS OF FULLY INTEGRATED ECOLOGICAL ASSESSMENT



# Environmental Monitoring and Assessment Program - Western Pilot (EMAP-WP)



# California Monitoring and Assessment Program (CMAP)



Begin Ag, Timber and Urban 04

Finish State-Wide Reference Sites 04

Finish State-wide Phase II 04

**EMAP West Example of Proposed Sample scheme.**

Reg 9 and 10 = 50 per state and 160 in each shaded area

in UT and CO, ~20-25 outside shaded areas of MT, WY, and ND, and ~280 within shaded area.

Blue shade is Region's Special Interest Areas  
Red shade is REMAP area

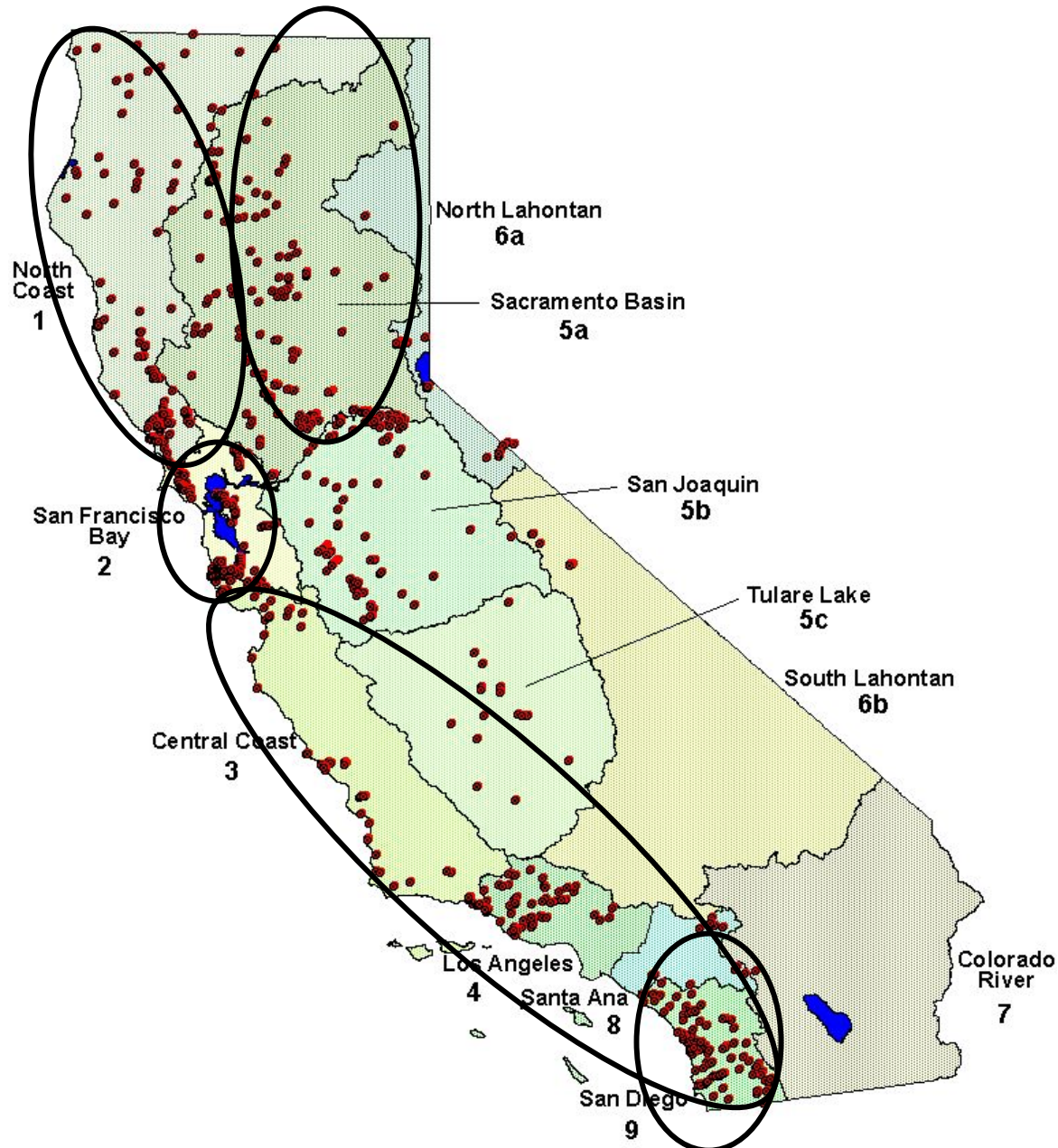




# DFG Efforts To Standardize Bioassessment in California

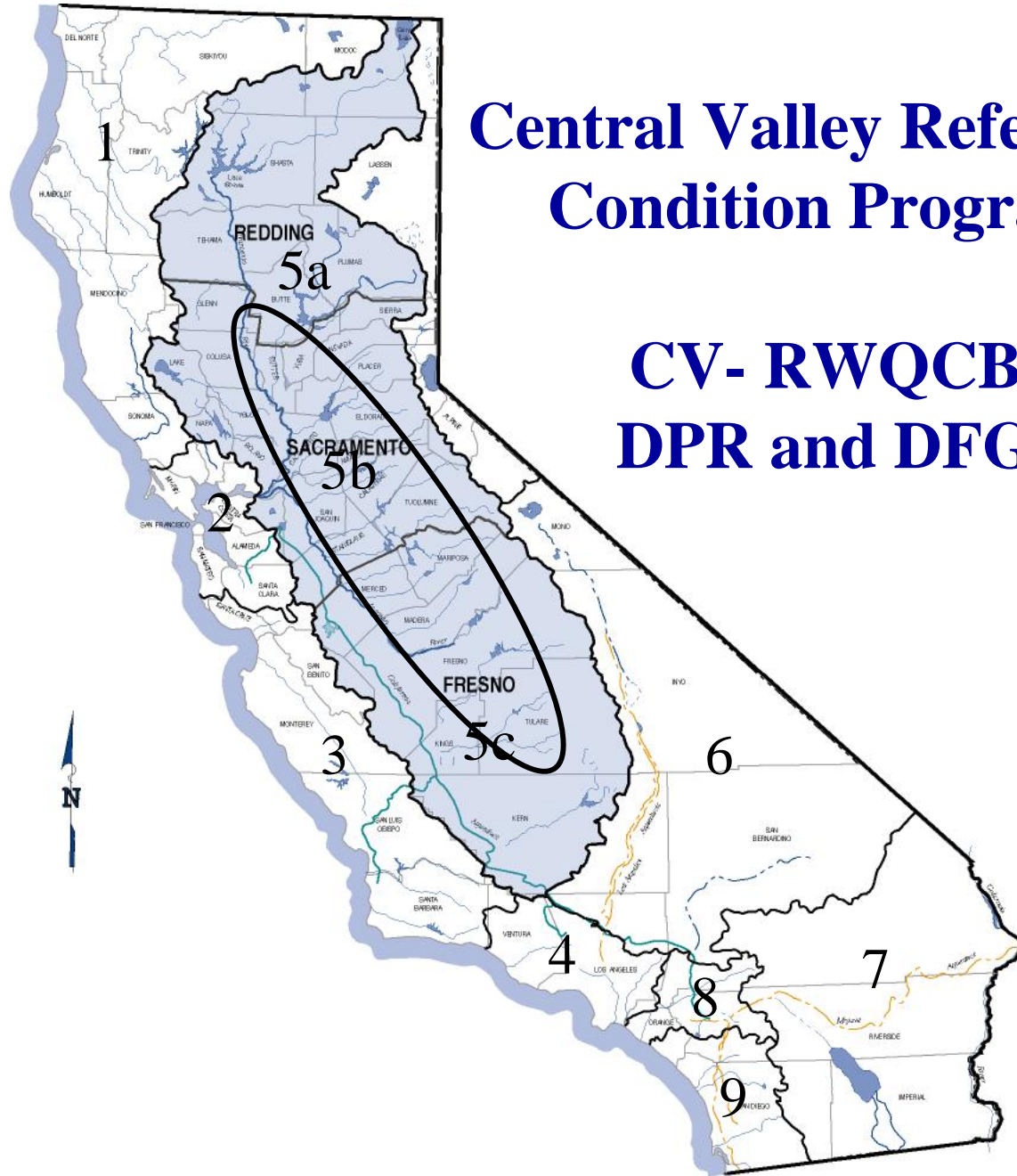
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# BIBI Development Throughout California



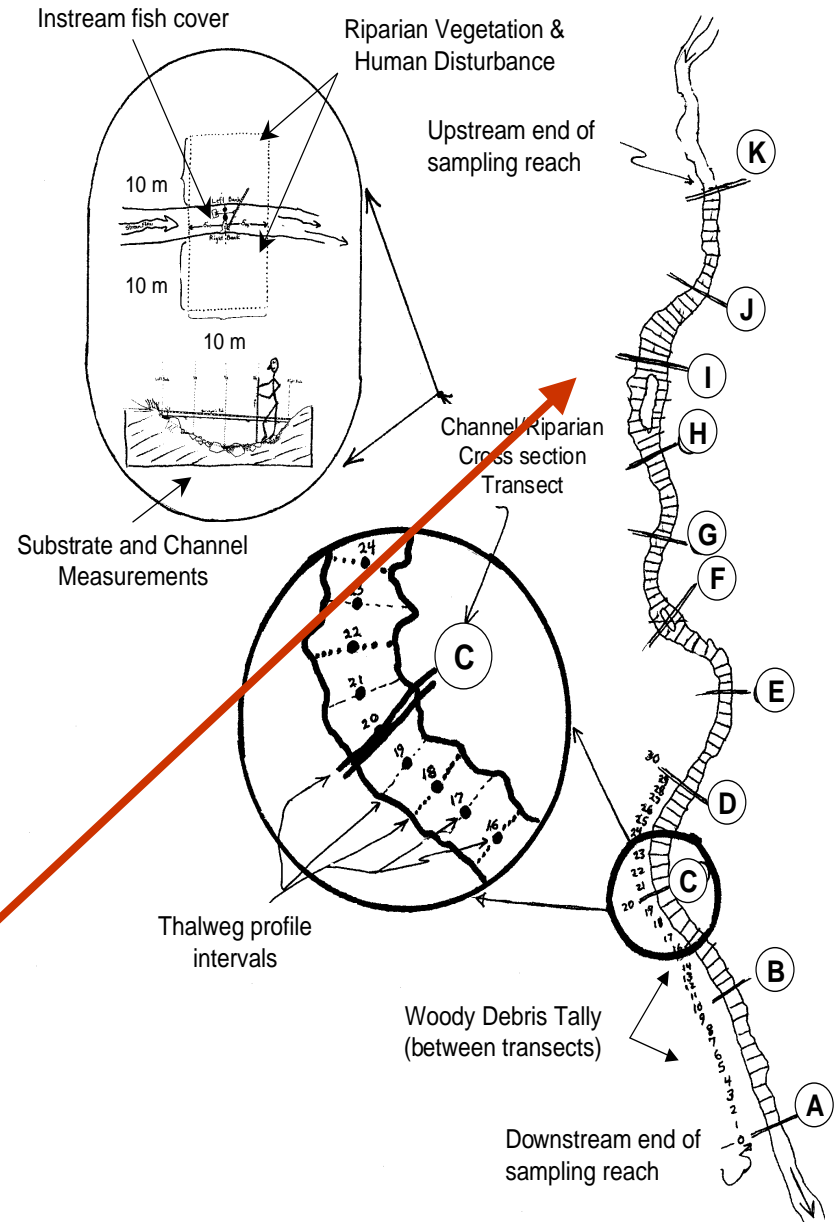
# Central Valley Reference Condition Program

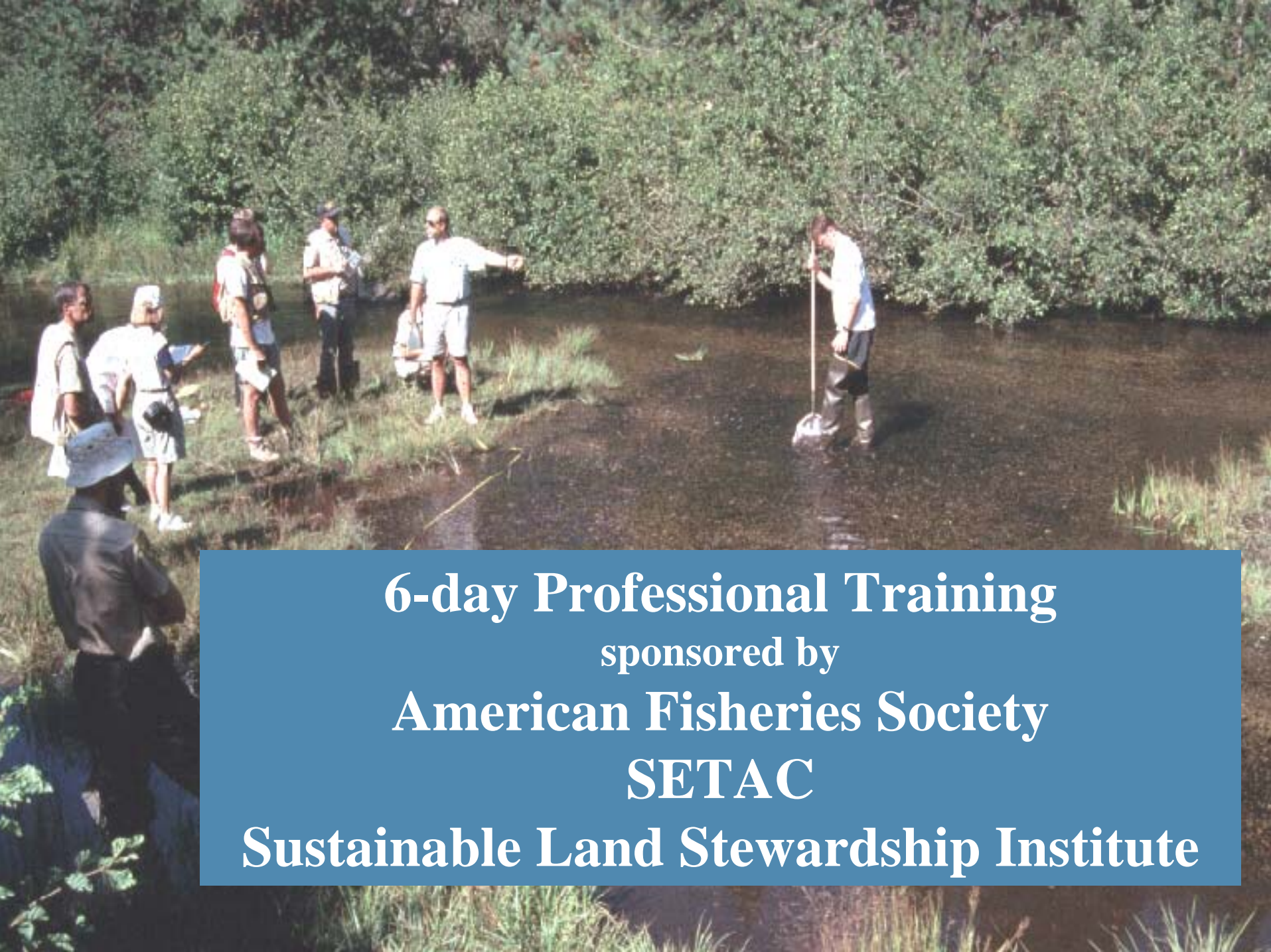
## CV- RWQCB DPR and DFG



# For Central Valley Reference Sites

## U.S. EPA EMAP Multi-habitat BMI Sampling Procedure





**6-day Professional Training**

sponsored by

**American Fisheries Society**

**SETAC**

**Sustainable Land Stewardship Institute**

An underwater photograph showing a school of fish swimming in a shallow, clear water environment. The fish are silvery with some darker spots. The background is filled with dense, green, feathery seaweed or coral. The text "Enjoy the Meeting" is overlaid in the center in a white, bold, sans-serif font.

Enjoy the Meeting