

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***

Section 404(b)(1) Guidelines USACE SPD 2014

*Guidelines and Principles
to achieve Biological Goals
and Minimize and Mitigate Impacts
to **Species or Habitat**
using **Watershed or Landscape Approach***

Preliminary draft Wetland Area Protection and Dredge and Fill Permitting Policy

*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

Key Logic

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 water quality control programs with prospects to expand to wildlife and habitat

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

20+ years of collaborative development of unique tools

General Framework

Regulatory or Management Decisions & Questions

Develop Conceptual Models of Condition Cause & Effect

Identify & Classify Needed Data Using USEPA System

1-2-3 Data Framework

Level 1: Inventories & Metrics
based on maps and remote data

Level 2: Rapid Assessment of
Projects, Landscapes

Level 3: Intensive Assessment of
Selected Aspects of Condition

Special Studies of Methods &
Hypothesis Testing

CA Data Management

Regional Data Centers, BIOS

CE DEN

Analysis &
Interpretation

Condition Assessments
(formatted to inform & answer)

Public Reporting

My Water
Quality Portals

EcoAtlas

Project &
Program
Reports

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)

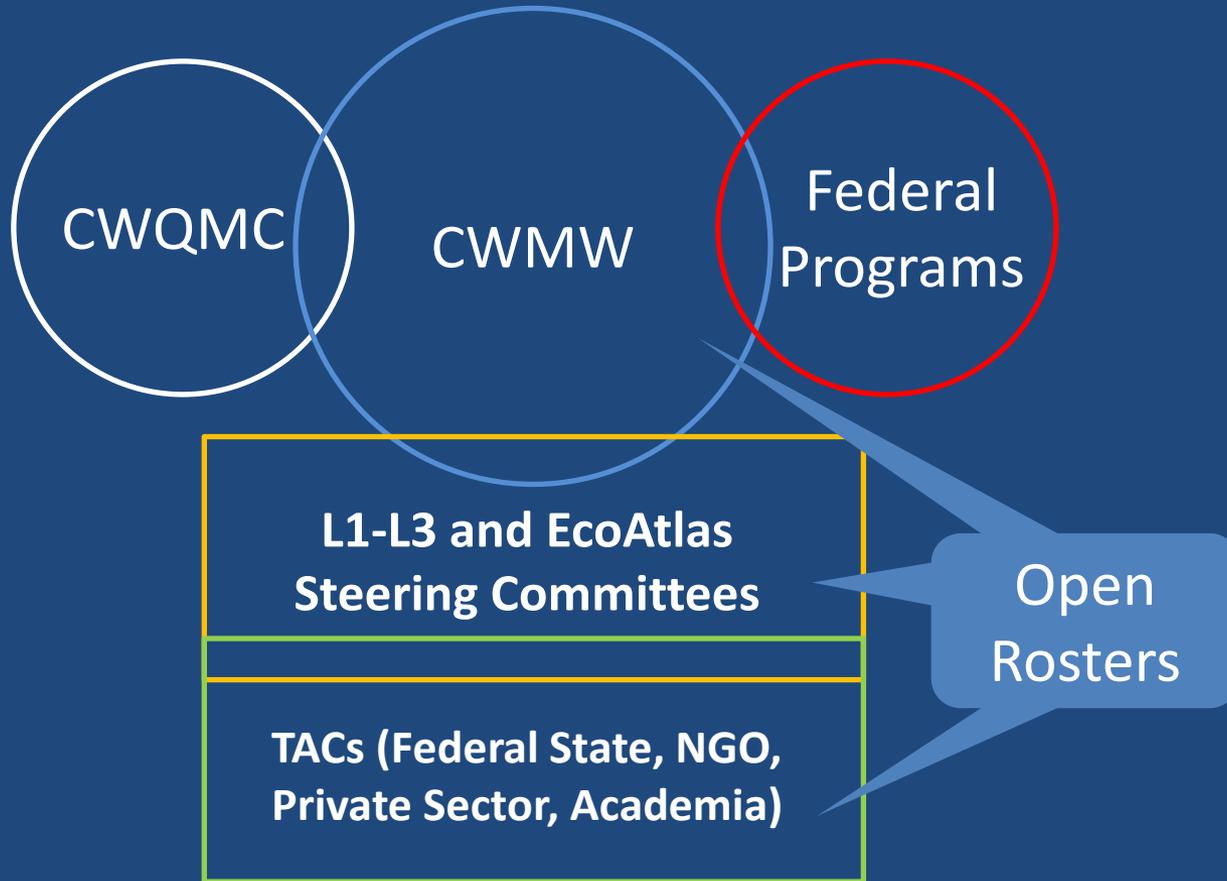
Public Reporting

My Water Quality Portals

EcoAtlas

Project & Program Reports

Present Governance Structure



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 compliance and effectiveness based on wetland abundance, diversity, and condition

Overview of Selected Tools

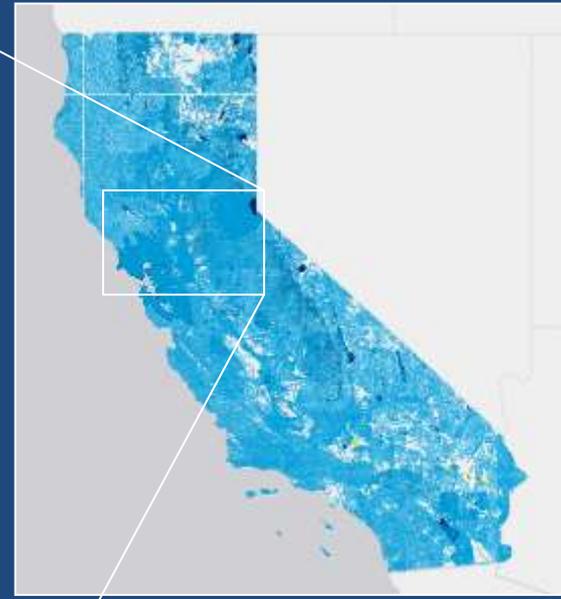
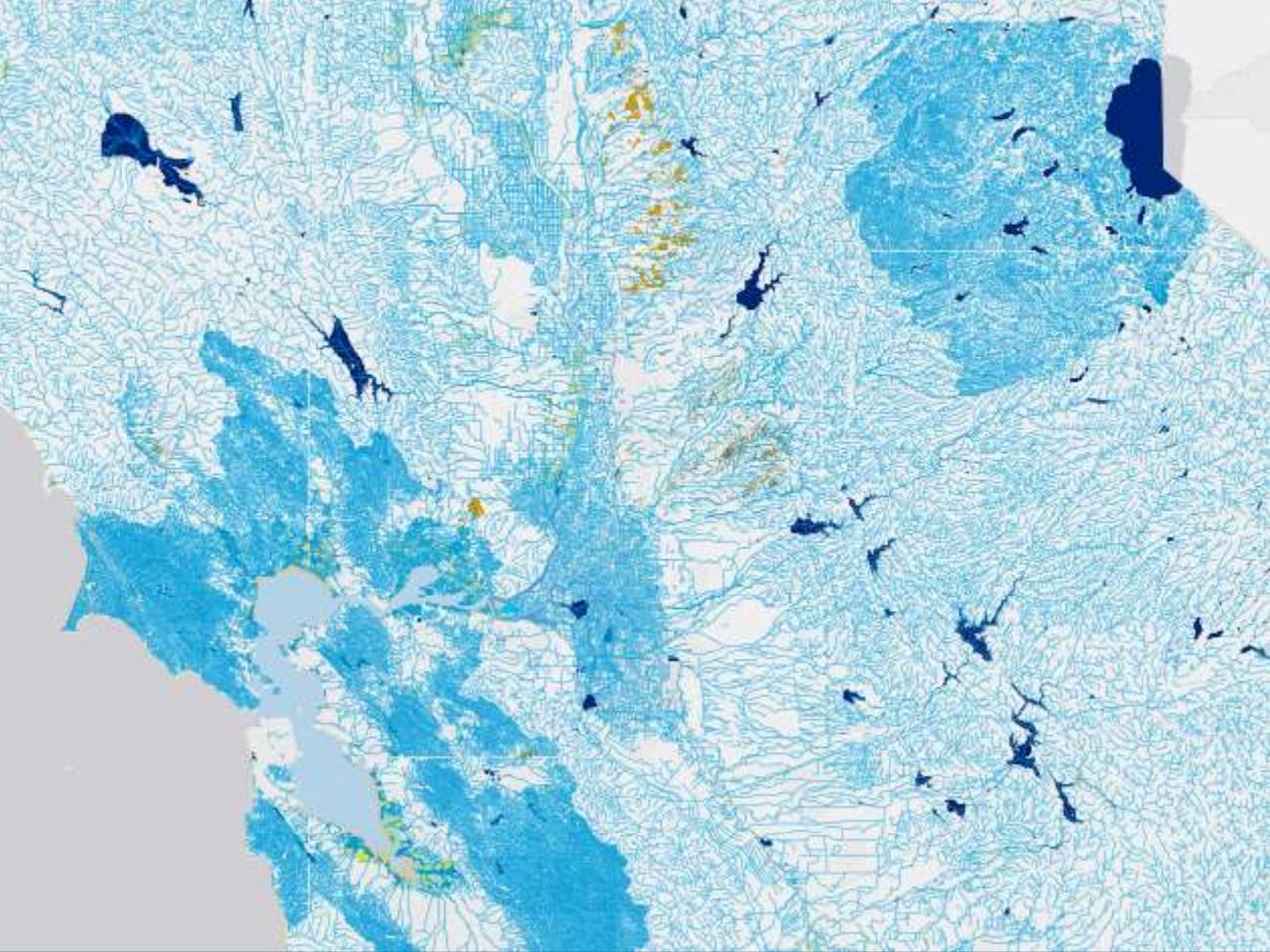
- CARI
- RipZET
- Project Tracker
- CRAM
- Probabilistic Survey Design (GRITS)
- Cumulative Frequency Distribution
- Project Performance Curves
- GreenPlan-IT (LID tools)
- Landscape Profile Tool
- EcoAtlas

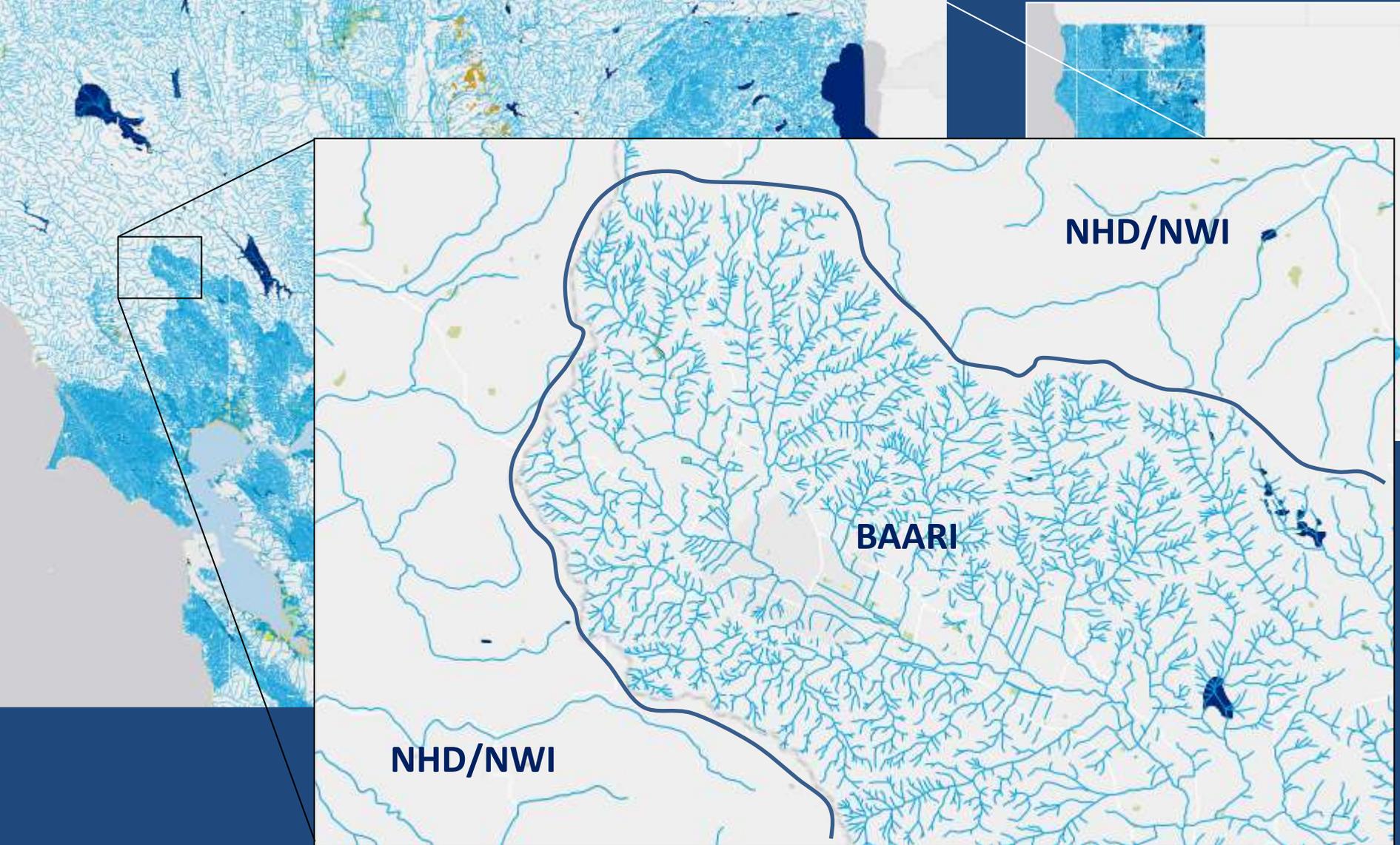
CARI

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

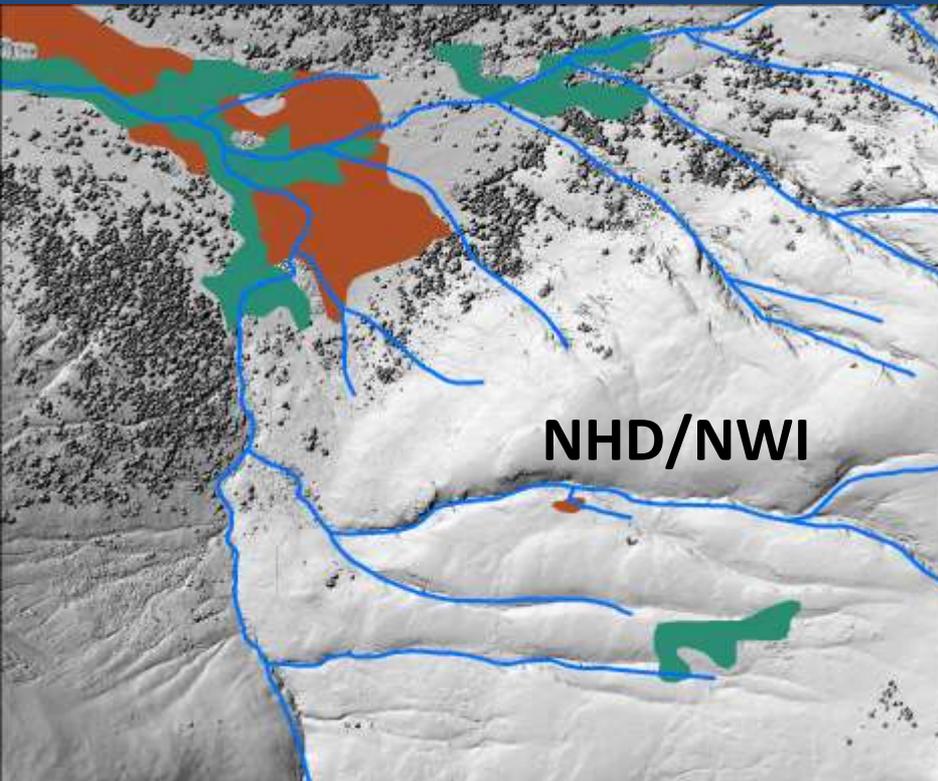




CARI methods make a significant difference in measures of aquatic resource abundance and diversity.

TARI

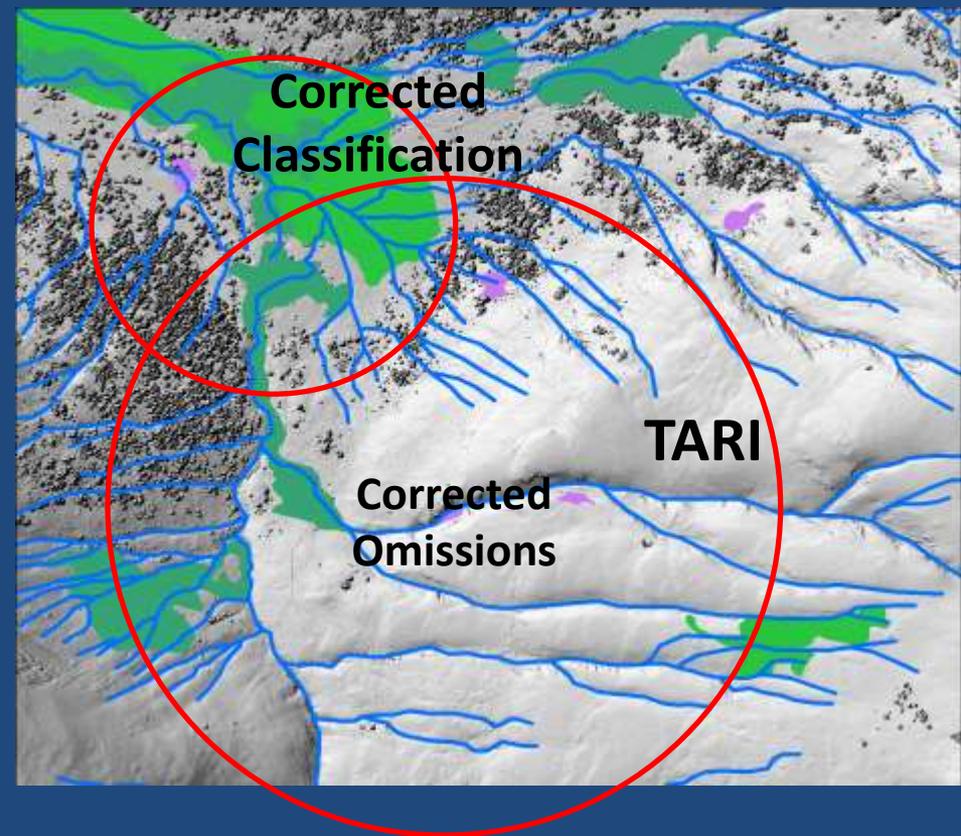
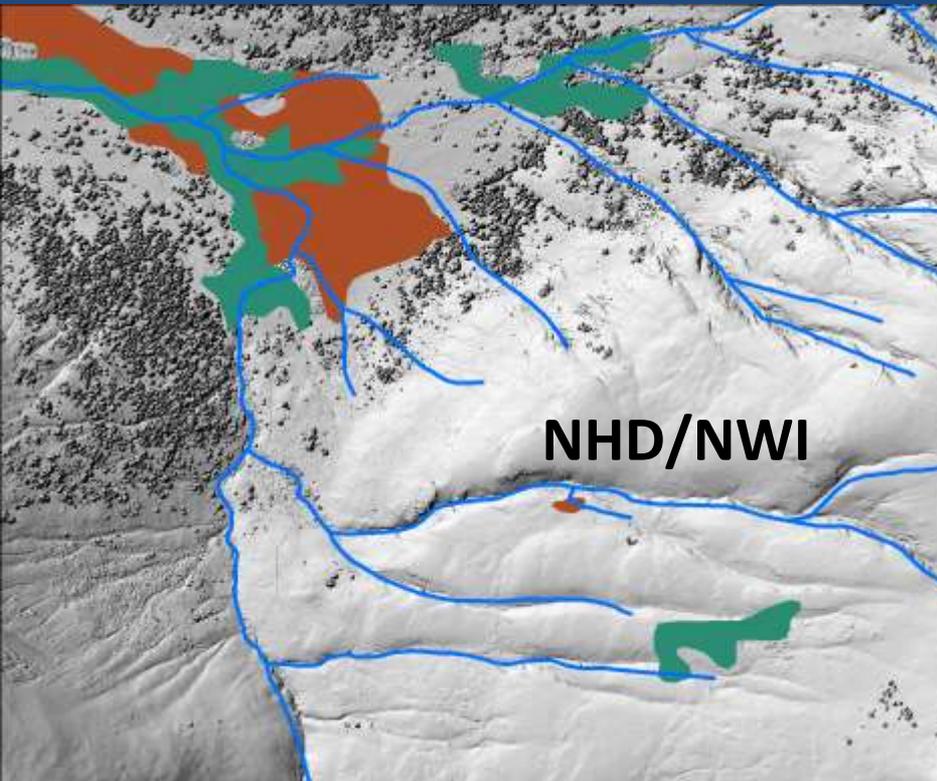
Tahoe version of CARI



- CARI includes more aquatic resources.
- Can't protect what we can't see or don't know about.

TARI

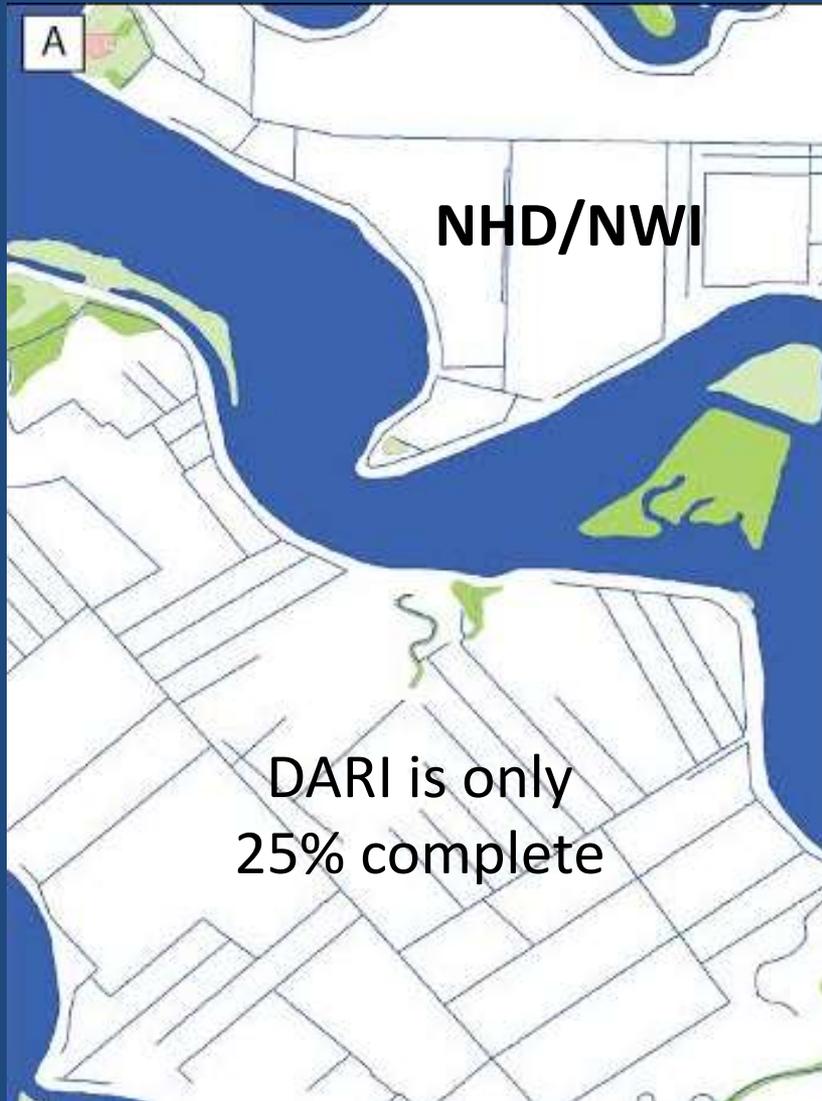
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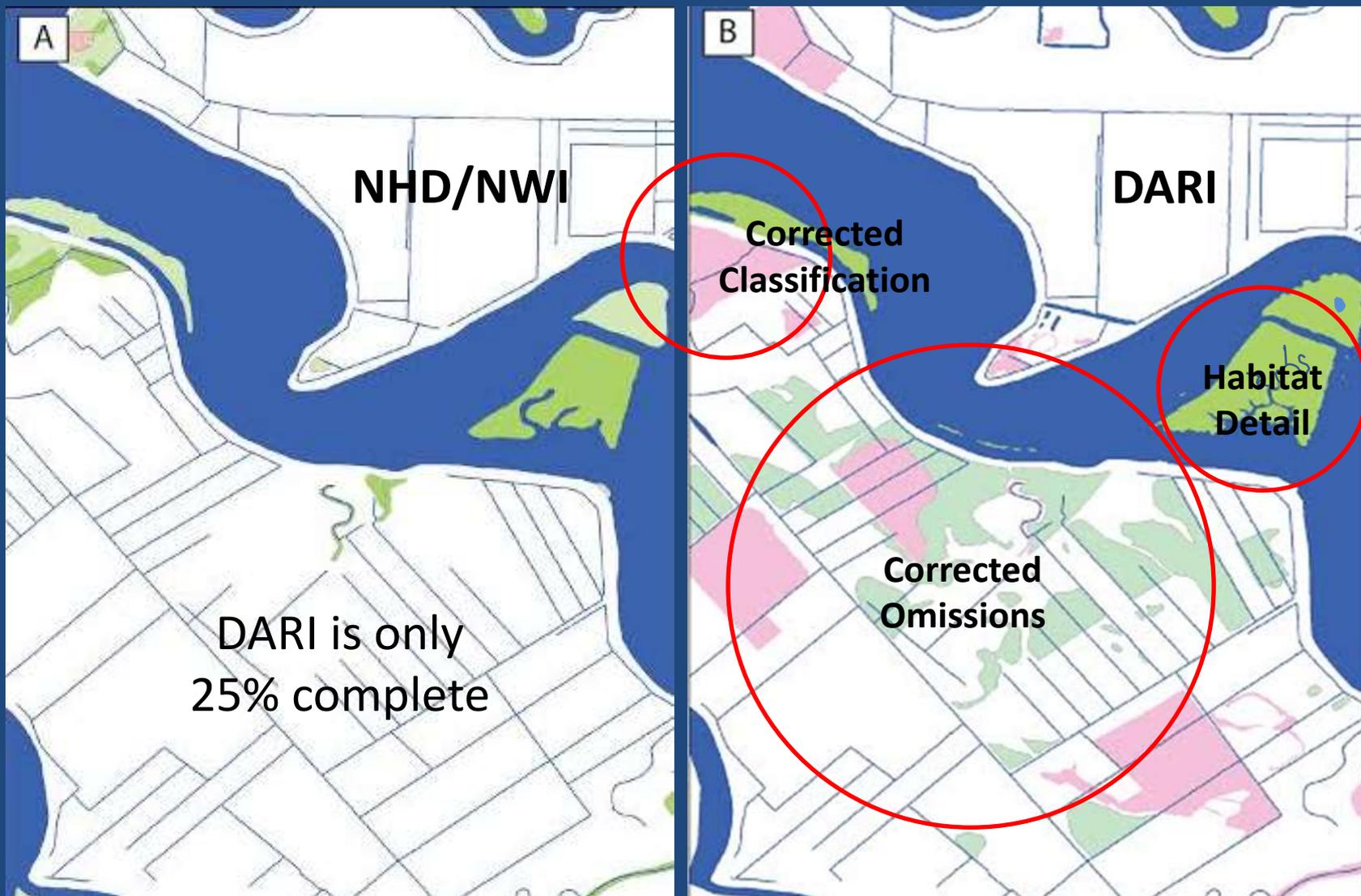
DARI

Delta version of CARI



DARI

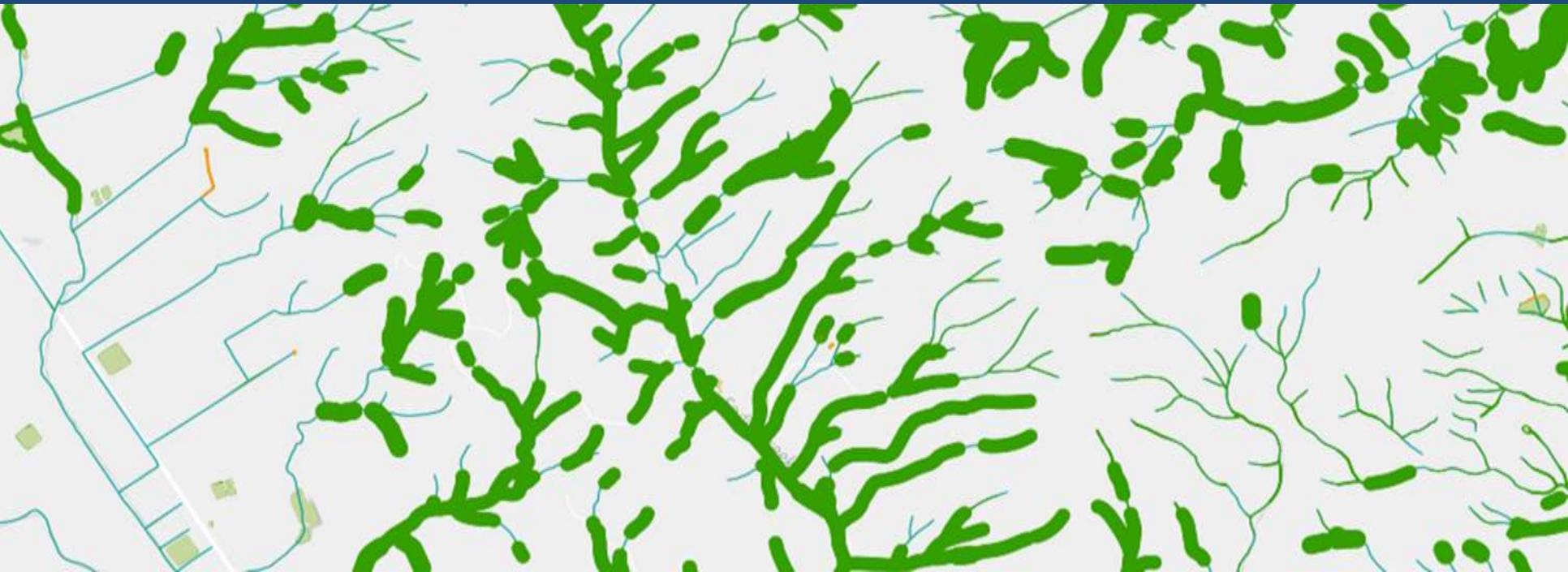
Delta version of CARI



RipZET

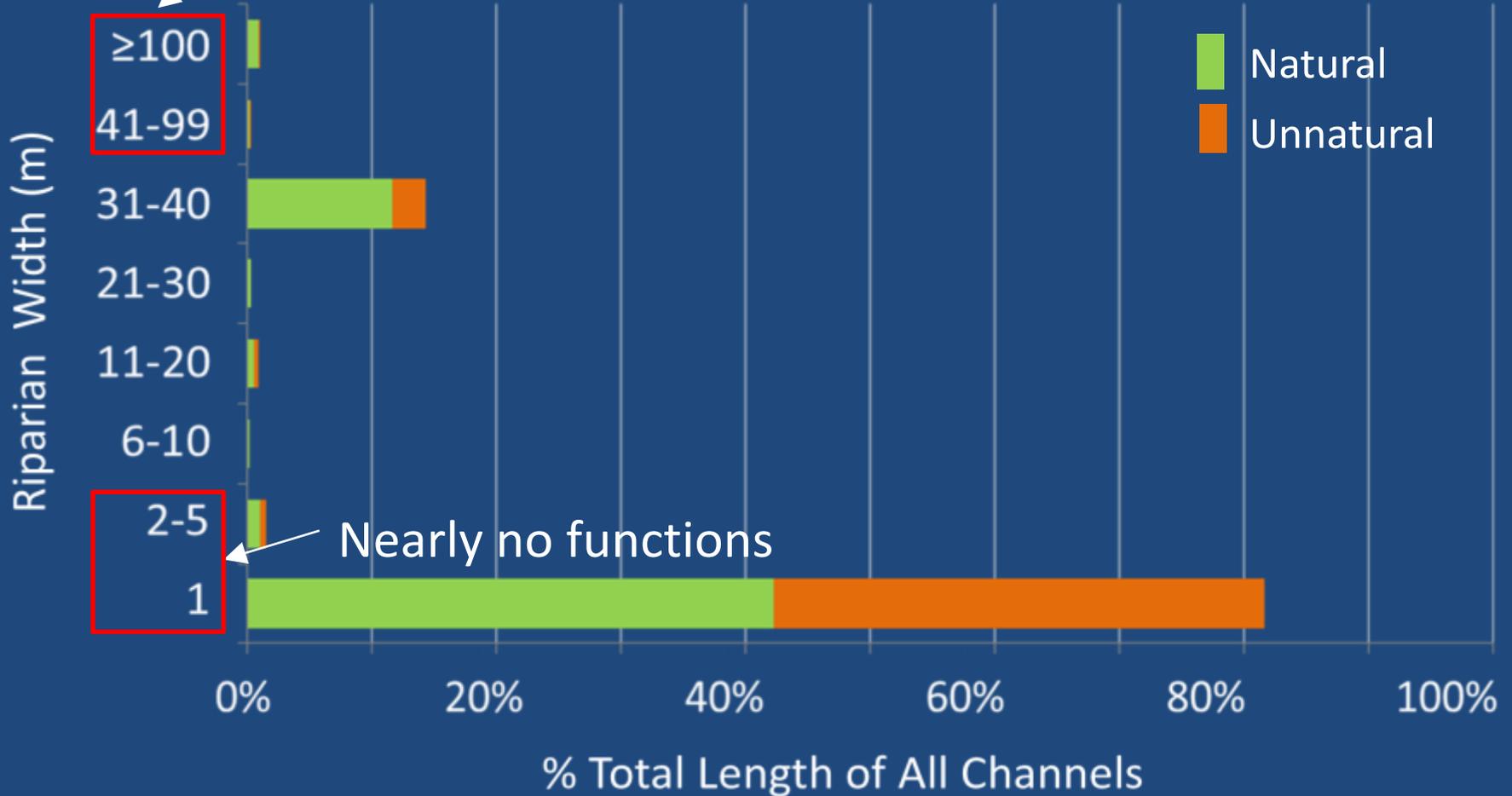
Riparian Zone Estimator Tool

- 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

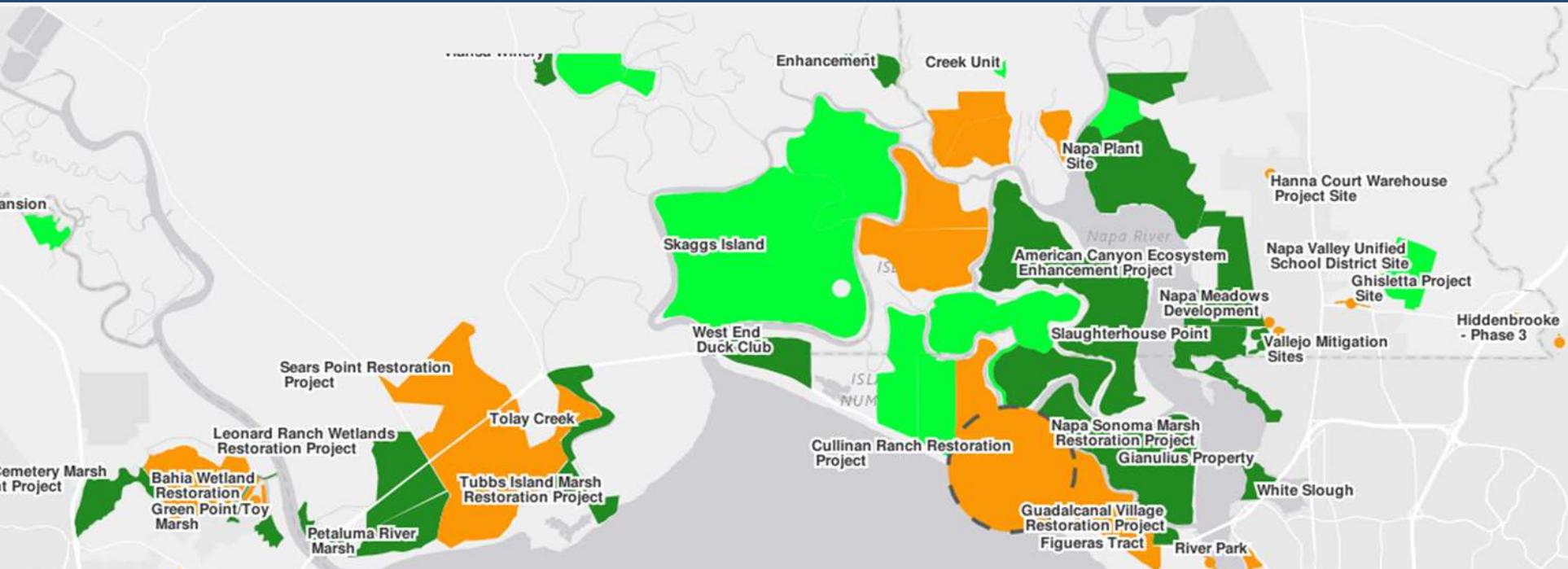
Maximum number and levels of functions including riparian wildlife support



Project Tracker

(Operational in Bay Area with prospects elsewhere)

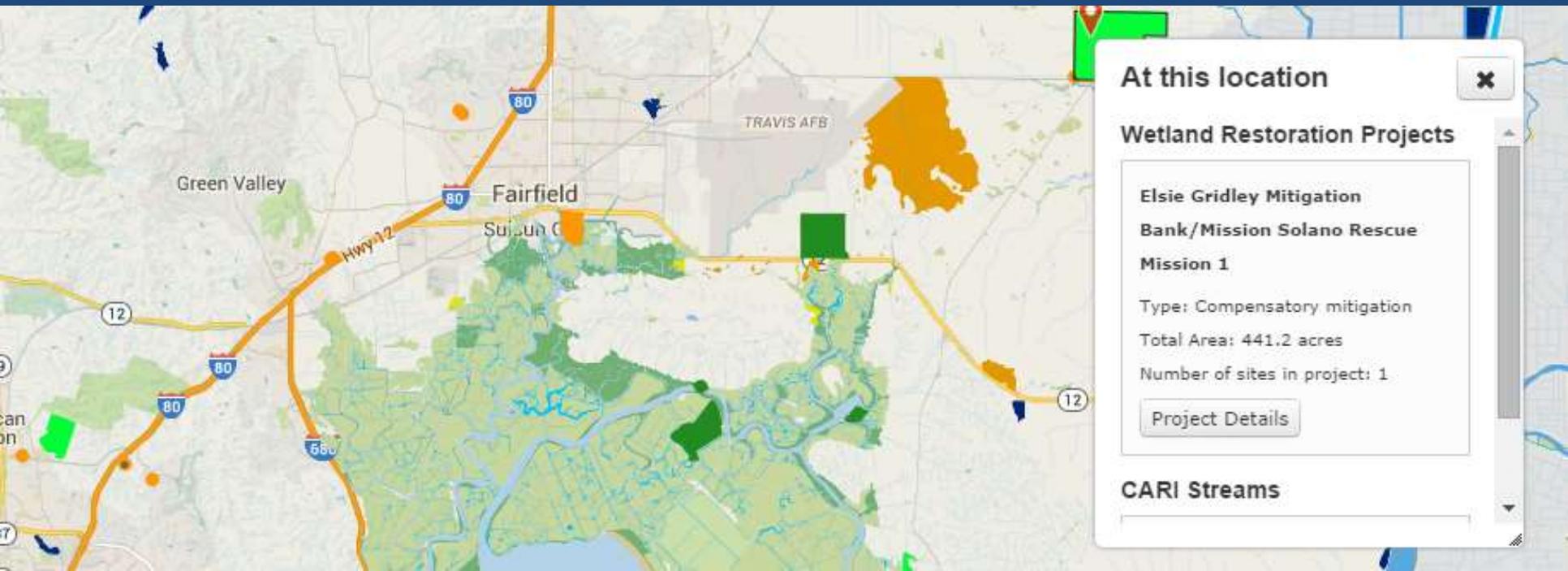
- Maps of projects provided through permits (pending Online 401)
- Maps of proposed surface waters within projects (CARI)
- Data and information sharing through project maps
- Searchable maps and lists of projects

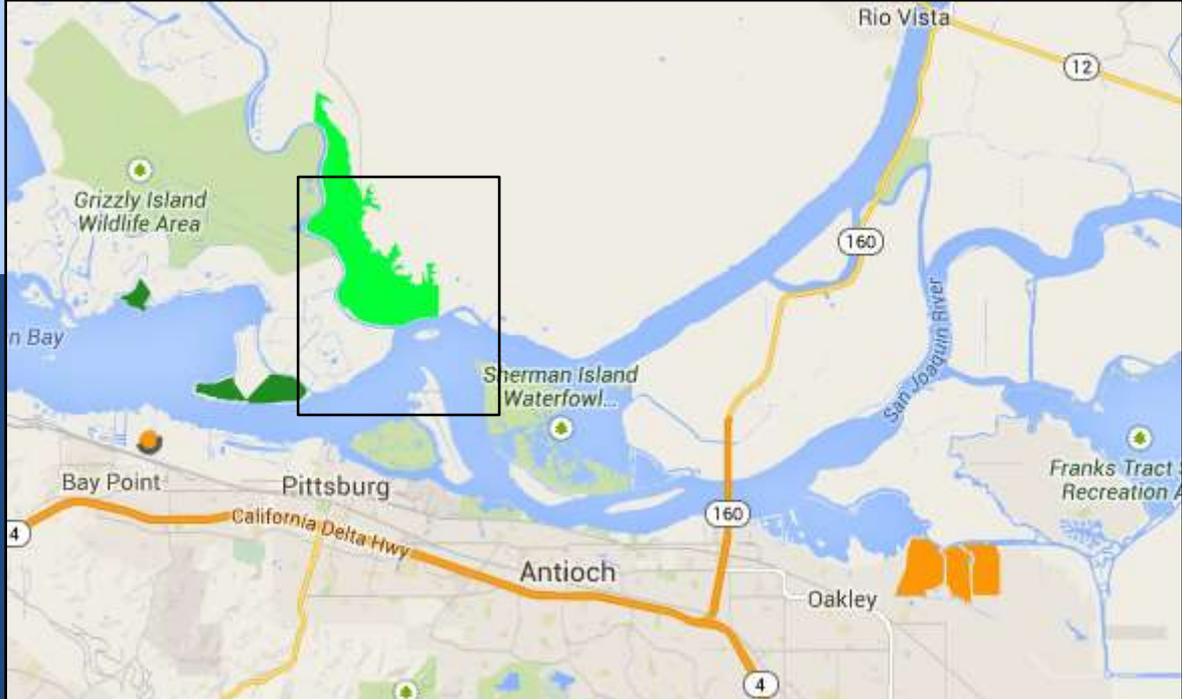
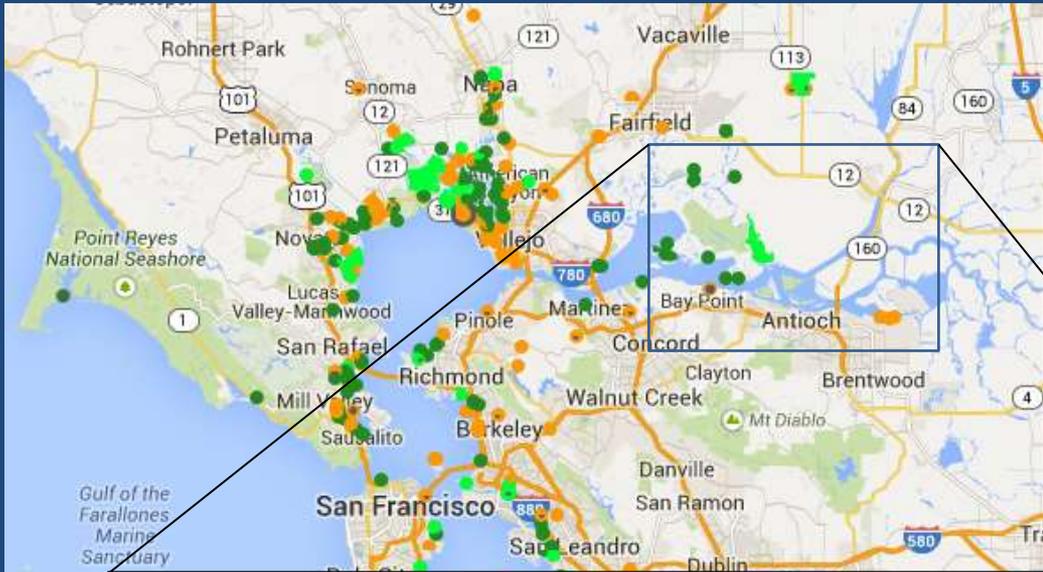


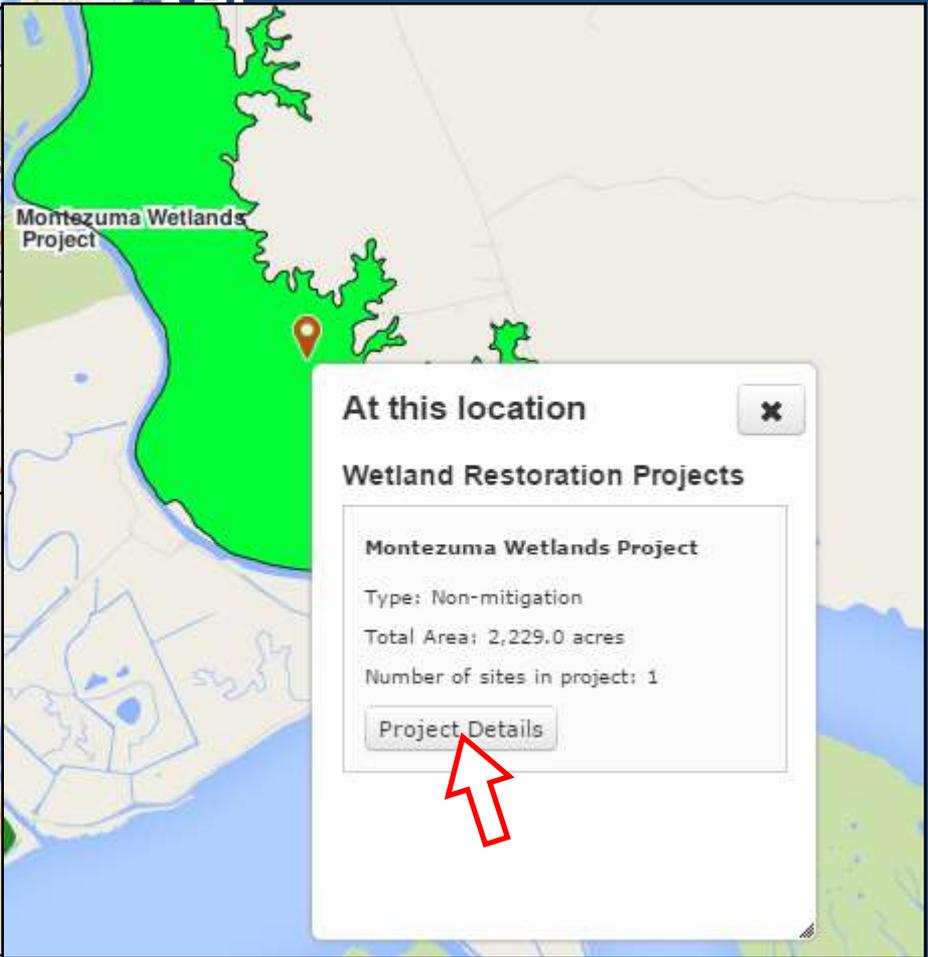
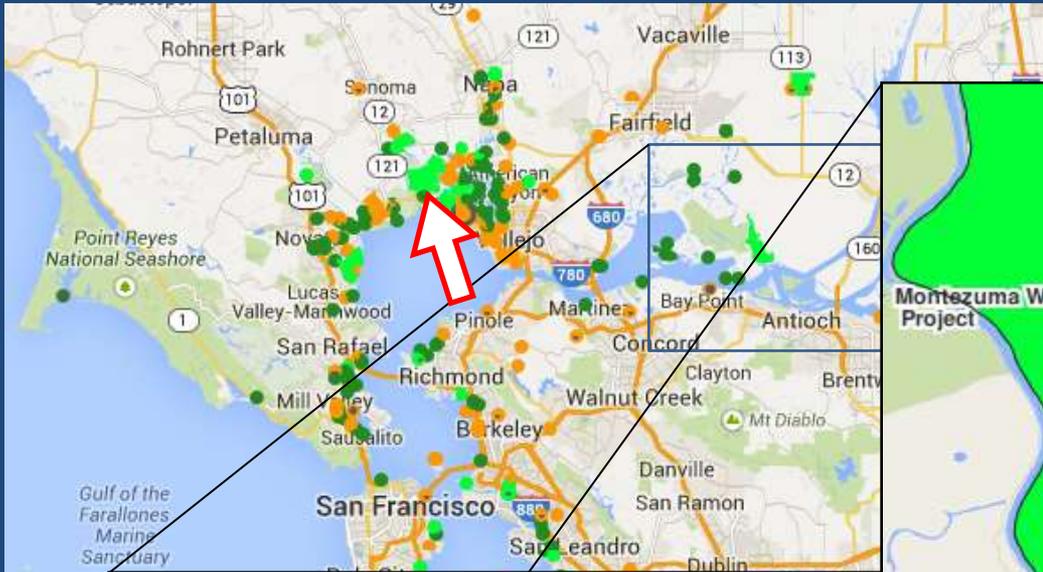
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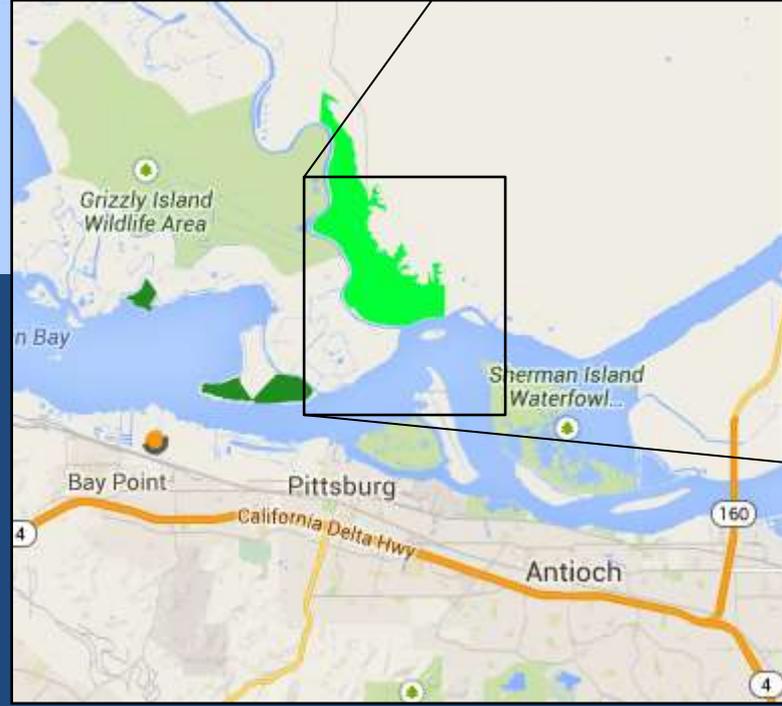
At this location ✕

Wetland Restoration Projects

Montezuma Wetlands Project

Type: Non-mitigation
Total Area: 2,229.0 acres
Number of sites in project: 1

[Project Details](#)



Montezuma Wetlands Project

Basic Information

Files & Links

Project Map

Status

[Upload files or links](#)

Project Type

Project Area

Project Identification ?

| ID | Type |
|-------------|-------|
| 02-48-D0005 | RWQCB |
| 194050 | USACE |
| 201051 | RWQCB |

Habitat Plan ?

Habitat

Name

File Type

2006/2007 Biological Survey Report

Monitoring Report

 [Montezuma Biological Survey Rpt 2006-2007.pdf](#)

2008/2009 Biological Survey Report

Monitoring Report

 [2008-2009 Biological Survey Rpt 2.pdf](#)

2010/2011 Biological Survey Report

Monitoring Report

 [2010-2011 Bio Rpt Appendices A-E.pdf](#)

 [2010-2011 Bio Rpt Figures 25-39.pdf](#)

 [bio report 2010-2011 Final.pdf](#)

 [2010-2011 Bio Rpt Figures 1-24.pdf](#)

 [2010-2011 Bio Rpt Tables 1-5.pdf](#)

2012 Sediment and Water Quality Report Appendices H and I

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



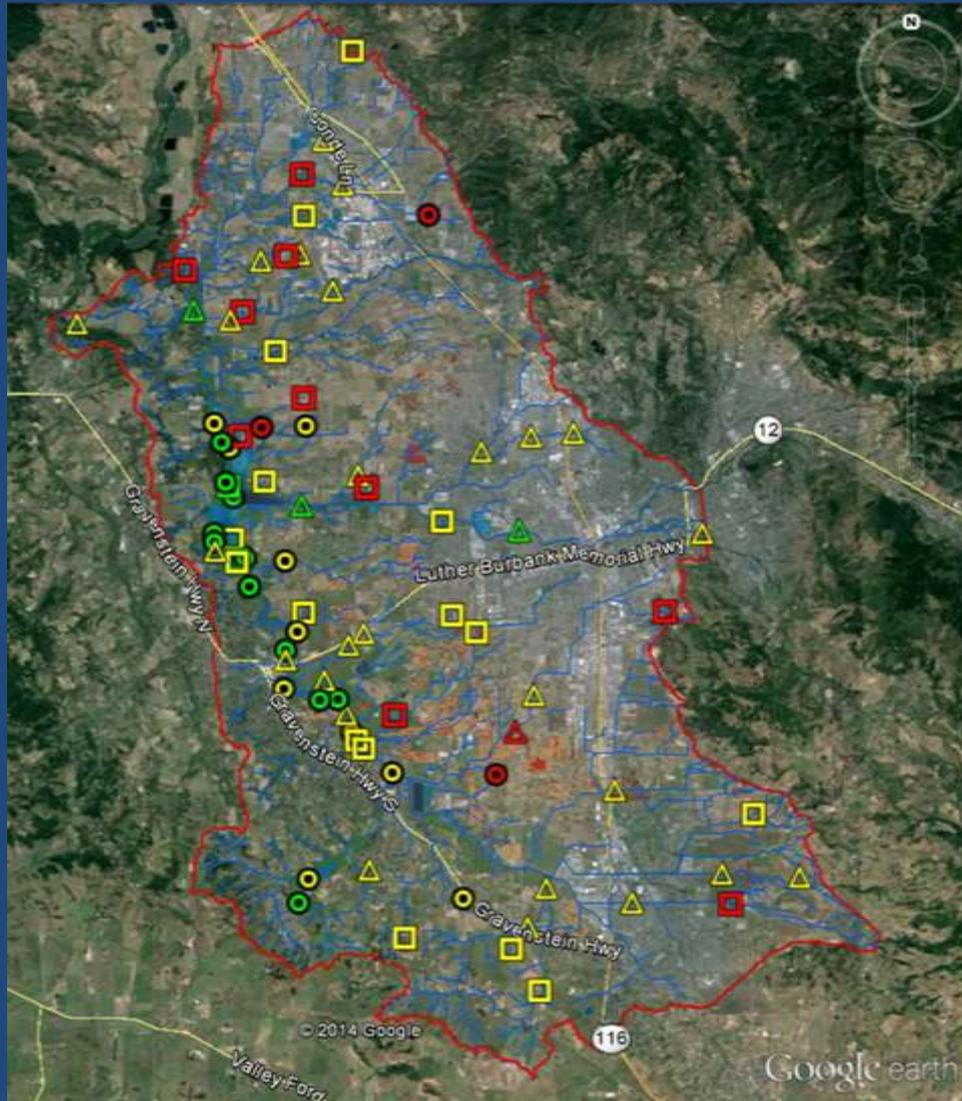
- **Probabilistic Survey Design (GRTS)**
- **Cumulative Distribution Function (CDF)**
- **Project Performance Curves (PCs)**

Example based on CRAM

Probabilistic survey of ambient or baseline condition

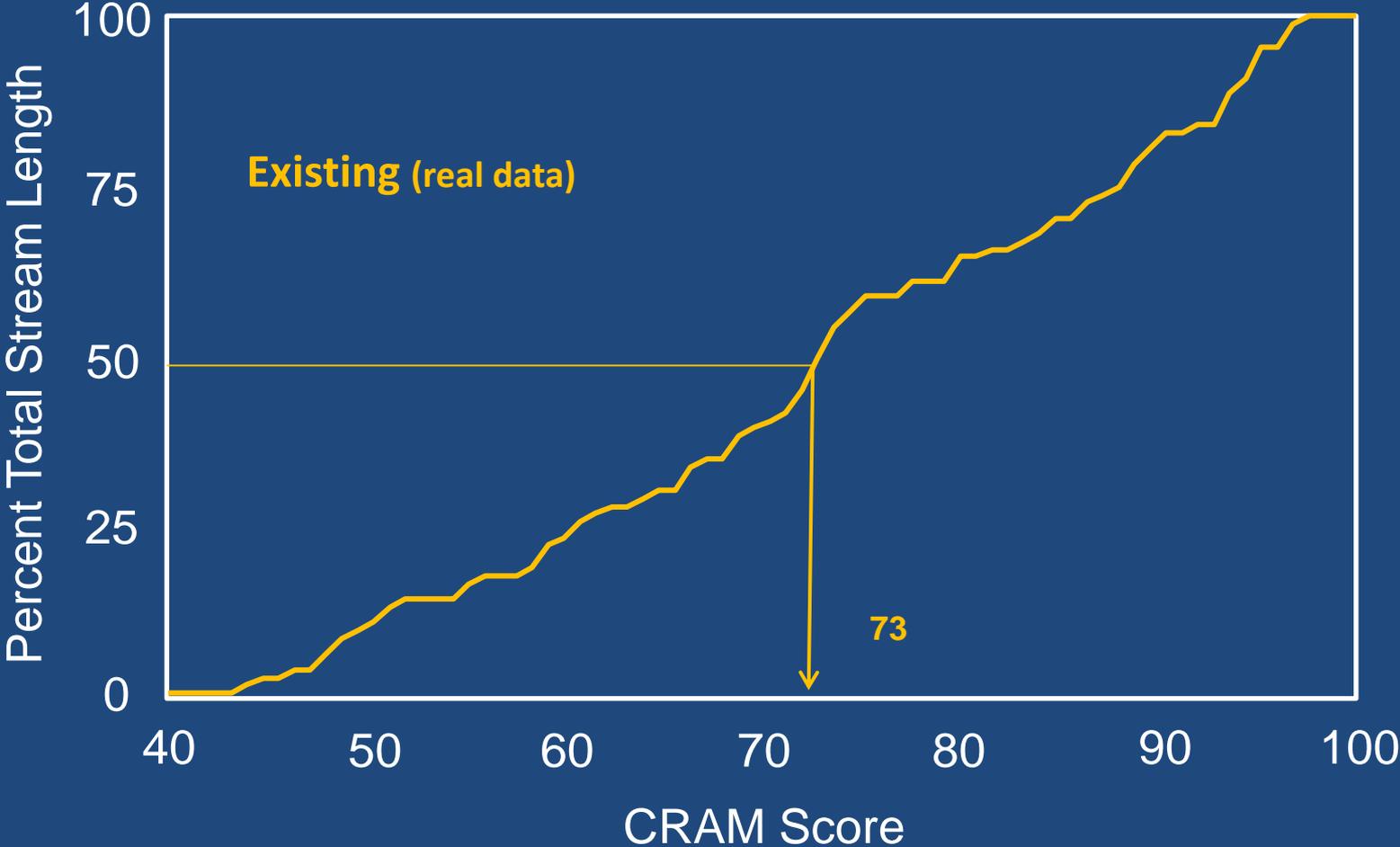
Probabilistic Survey Design

Probabilistic survey of project performance



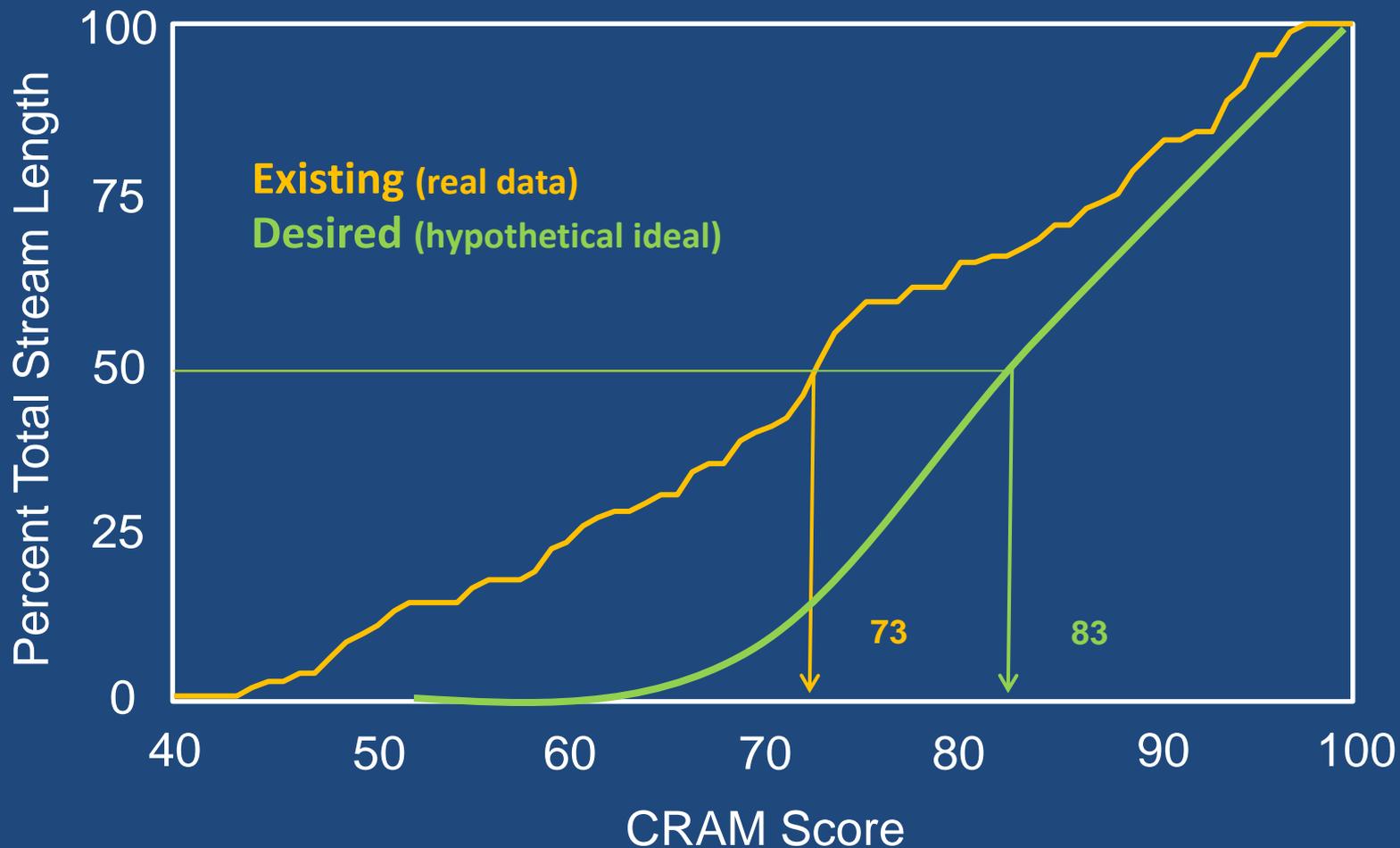
Example CRAM Ambient Assessment

Cumulative Distribution Function



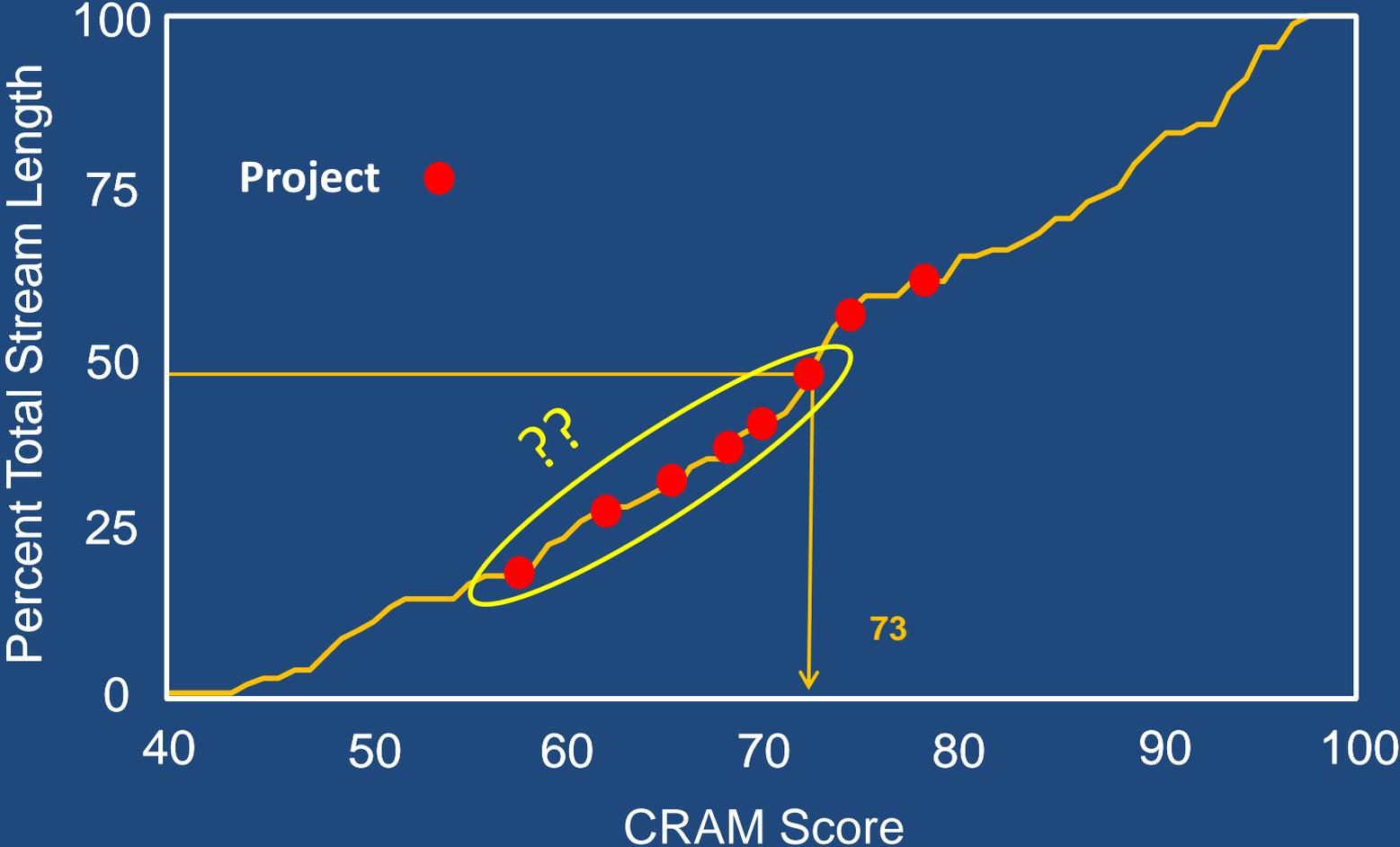
Example CRAM Ambient Assessment

Cumulative Distribution Function



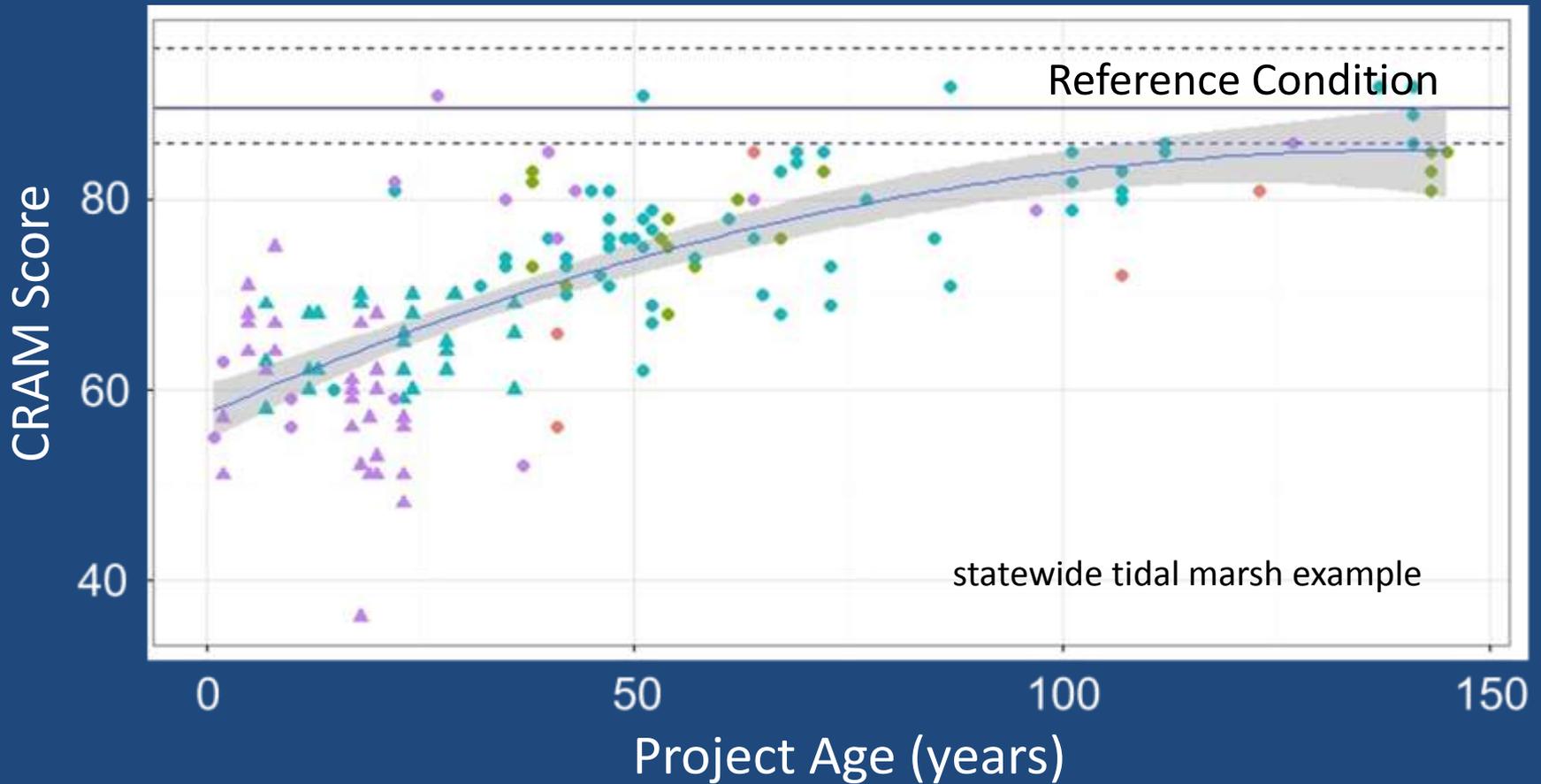
Example CRAM Ambient Assessment

Cumulative Distribution Function



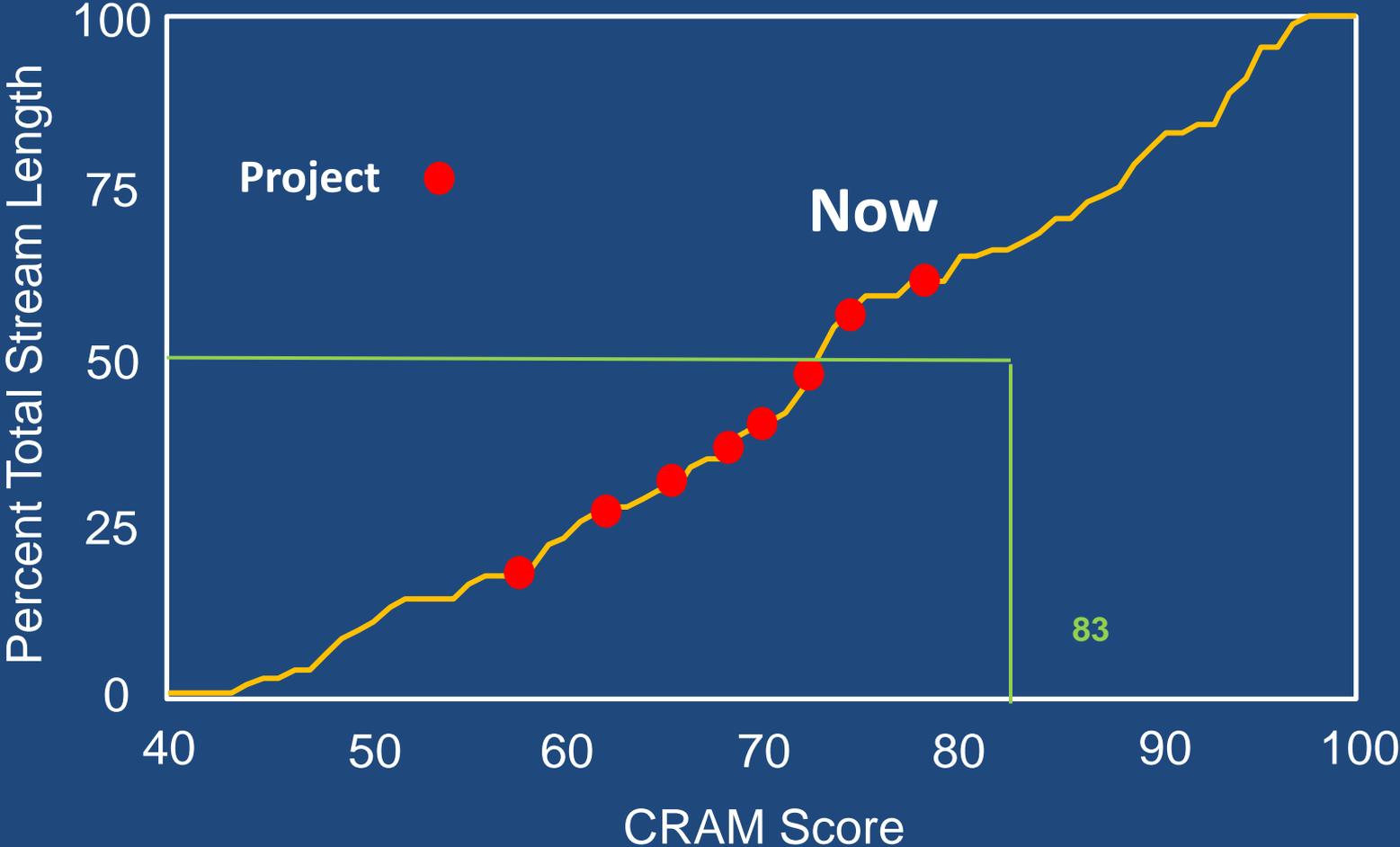
Performance Curve

Forecasting project performance over time



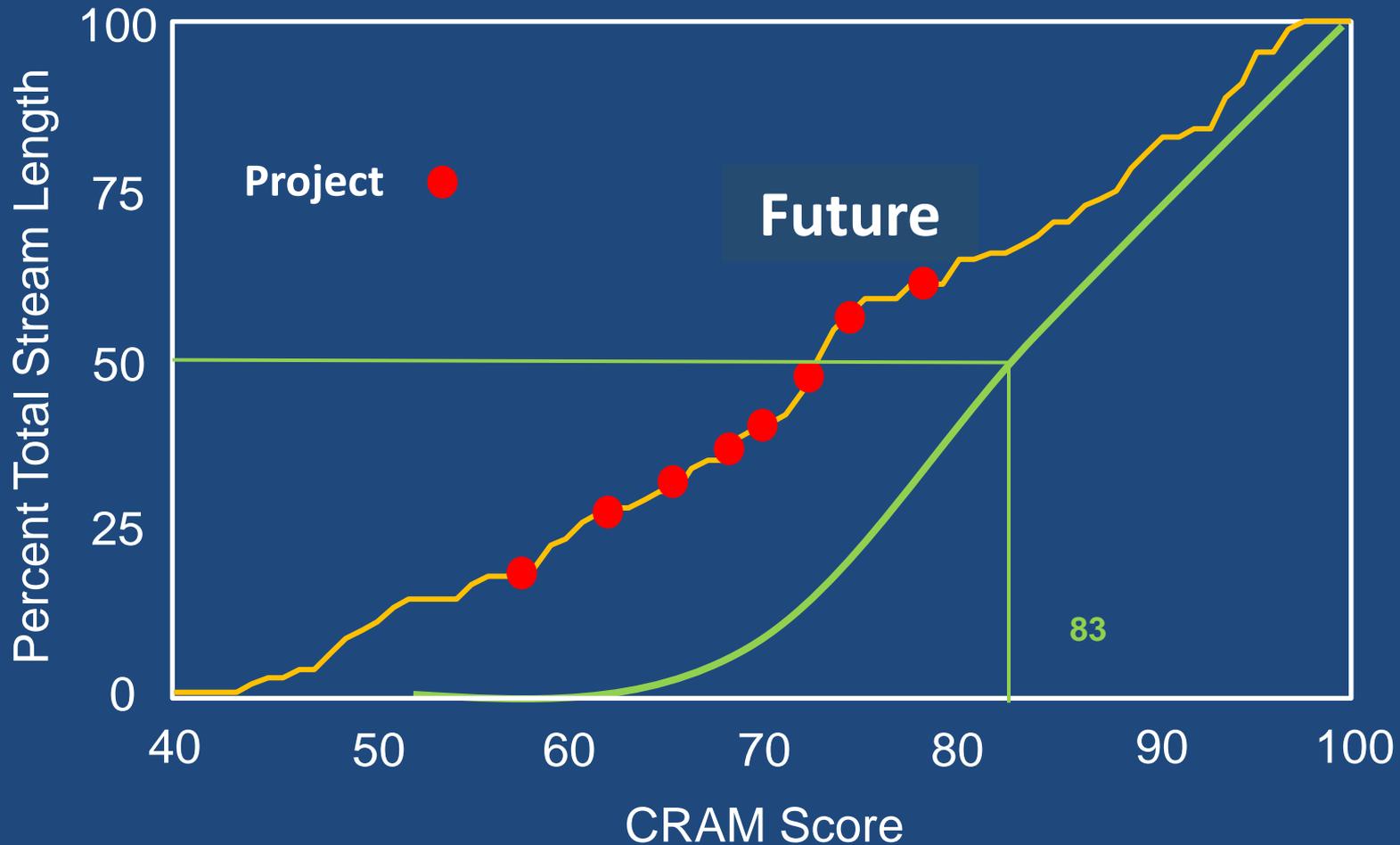
Example CRAM Ambient Assessment

Cumulative Distribution Function



Example CRAM Ambient Assessment

Cumulative Distribution Function



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

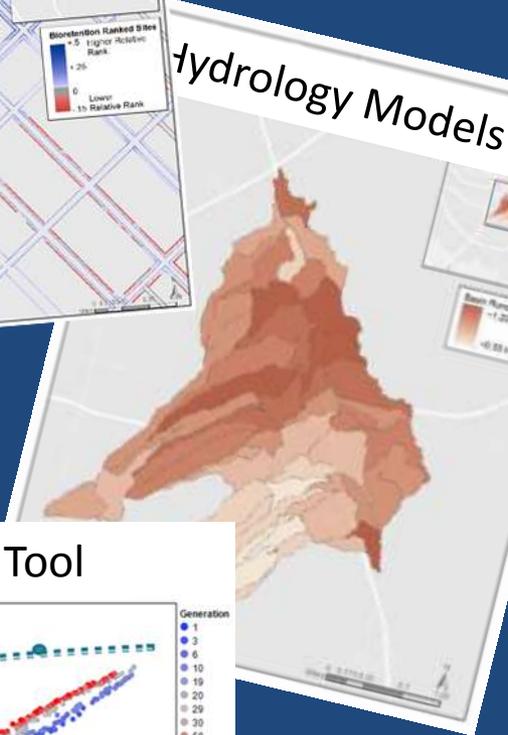


Example GreenPlan-IT Output

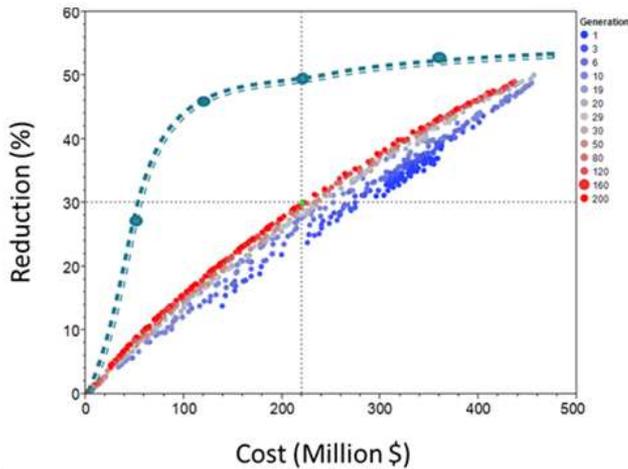
Opportunity Map



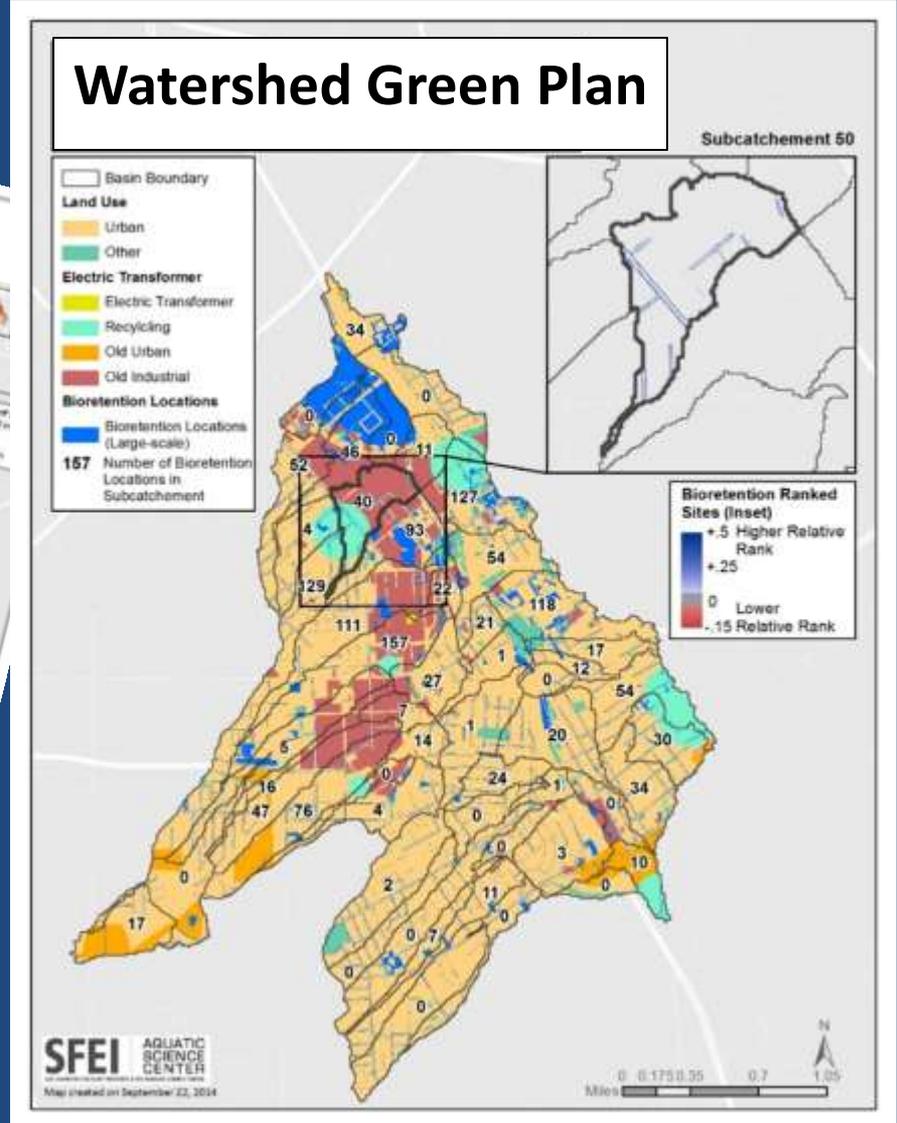
Hydrology Models



Optimization Tool



Watershed Green Plan



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 Profiles

[Auto-delineated basin by StreamStats](#)

[Draw your area of interest](#)

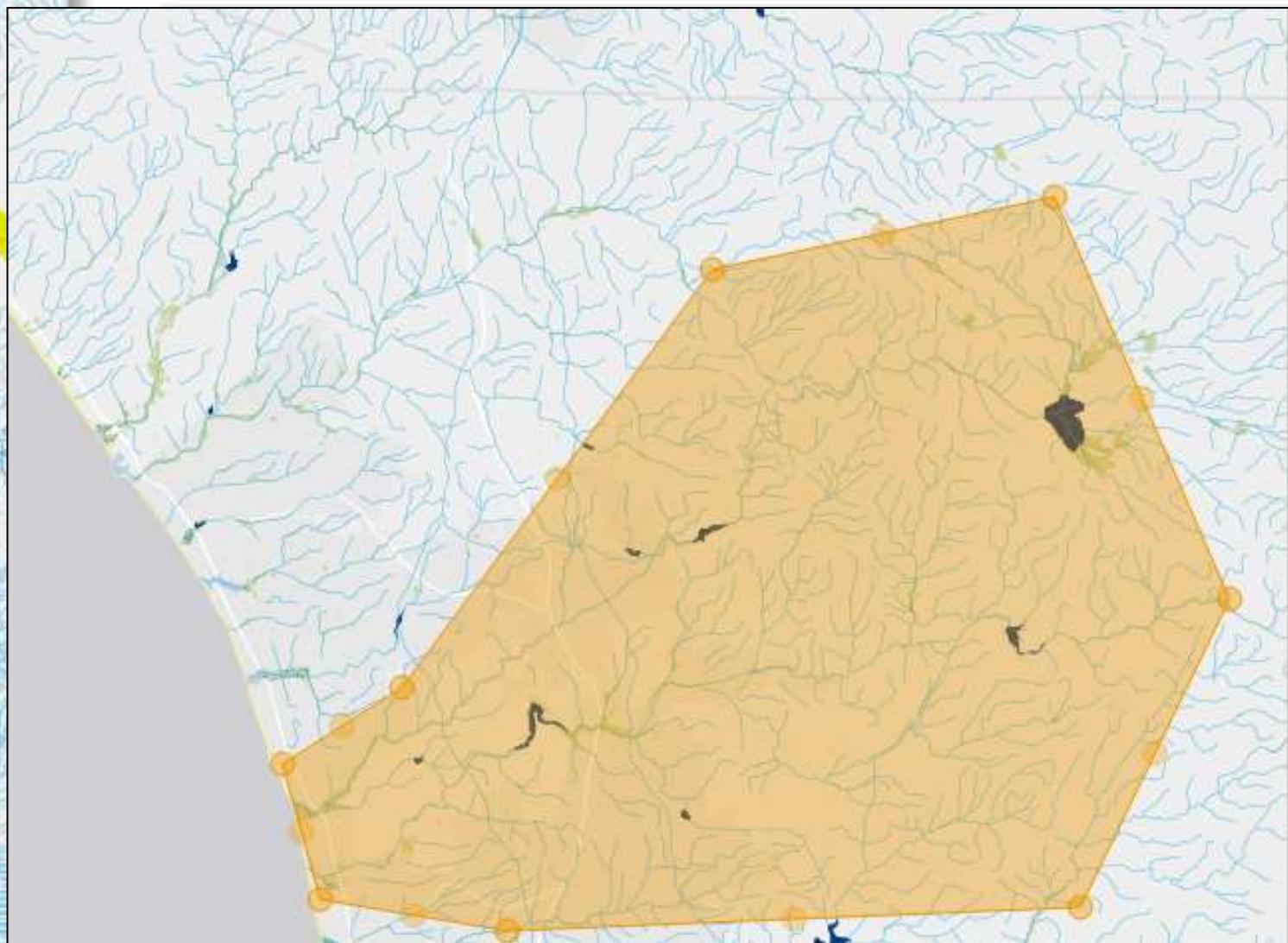
[Pre-defined areas](#)

[KML Upload](#)





Landscape Profiles



Landscape Profiles

Landscape Profile

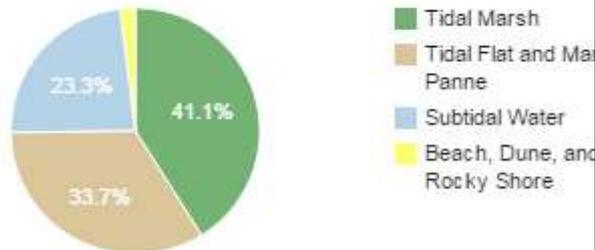
User Defined Region

Print Report

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



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)

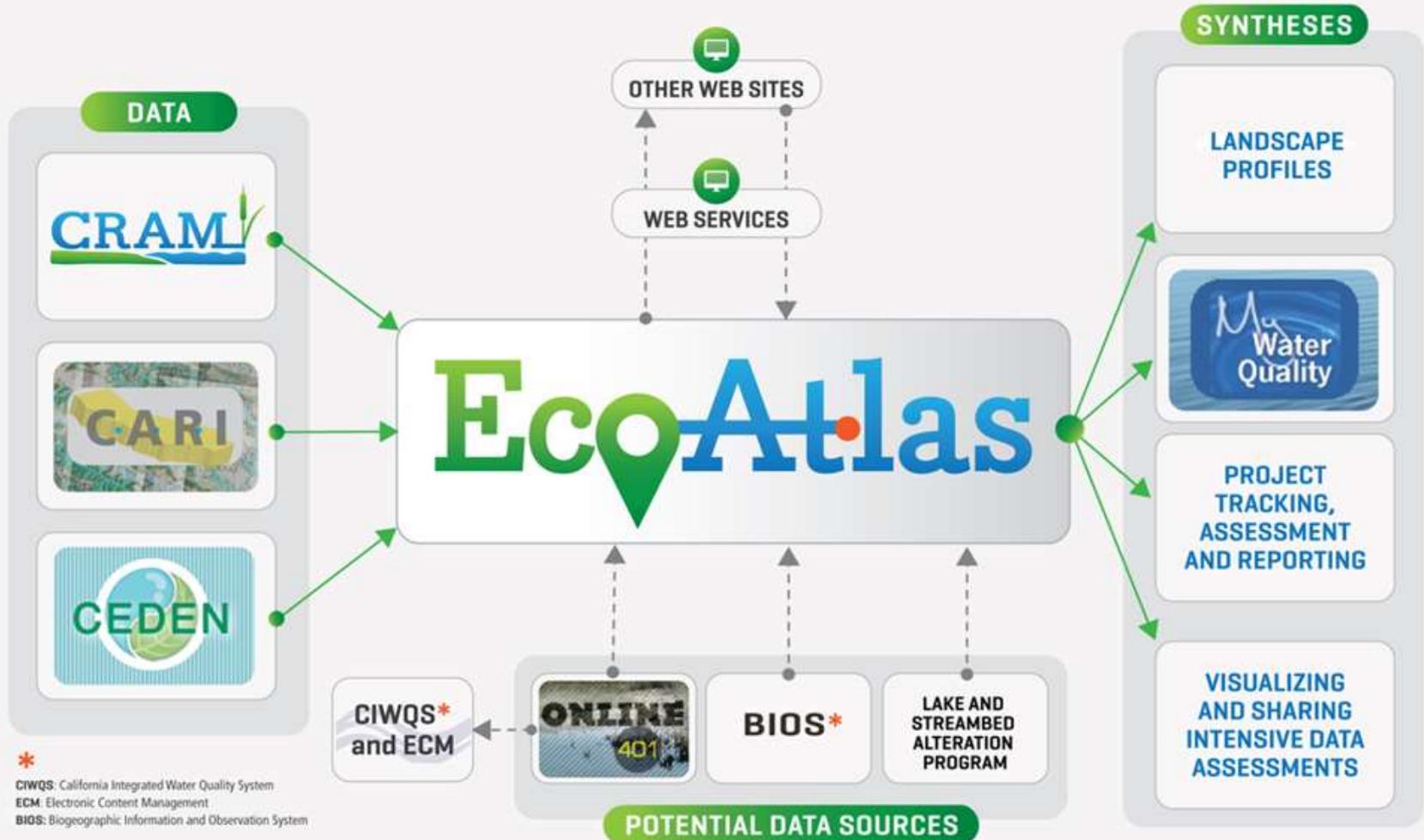
+ Human Population based on 2010 Census

+ Species of Special Status based on CNDDB Species Information

+ Developed Land Cover by NLCD 2011 Category

[View data source details](#)

EcoAtlas Information System



EcoAtlas Information System



- 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

Thank You



Partial List

- “VegCAMP” visualize vegetation communities
- “CARI” visualize past and present surface waters and related habitats
- “RipZET” visualize past, present, & potential riparian functional width
- “S&T” (Status and Trends) net change in surface water diversity & extent
- “Online 401” web-based tracking of CWA Section 401 Certs
- “Project Tracker” visualize projects & share their information
- “Watershed Mapper” on-screen & automated watershed delineation
- “CRAM” (CA Rapid Assessment Method for wetlands and streams)
- “Landscape Metrics ” (Head-of-Tide, Shoreline Change, Landscape Ecology)
- “CD3” sort and display water quality data
- “LID Siting Tool” locate and track LID
- “SLRV” & “OCO” estimate and visualize tidal flooding
- “Landscape Profile Tool” summarize information for user-defined areas