

Lake Tahoe Basin Wetlands Monitoring and Restoration

Water Education Foundation
Headwaters Tour
June 29, 2018



06/01/2017 12:09

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Goal: Conserve and Protect Tahoe Basin Wetland (SEZ) Desired Conditions and Functions

TRPA Regional Plan Update Goals and Policies for SEZ
(Includes updating TRPA SEZ program to include the four core EPA
Wetland Program Elements)

SEZ Classification System:

Provides updated SEZ delineation criteria for identifying
different wetland functions and types using existing data and
classification systems

Status: Technical Report complete

SEZ Assessment:

Provides standardized approach for assessing the functional
condition of different wetland classes

Status: California Rapid Assessment Method tested and
applicability to Lake Tahoe Basin established.

Basin-wide SEZ Inventory and Map:

Provides a map showing location, type and condition of basin
wetlands for use in determining EIP SEZ restoration priorities and
the status of SEZ threshold.

Status: Technical Report complete.

Revise definitions for restoration, enhancement and creation:

Will distinguish different types of activities and allow for more effective
EIP project prioritization and implementation

Status: Included in 2017-2020 EPA Wetland Grant workplan, with
ambient monitoring and basinwide restoration planning

Four Core EPA Wetland Program Elements

Monitoring and Assessment

Needs:

1. SEZ Classification System
2. SEZ Assessment
3. Basin-wide SEZ Inventory Map
4. Definitions for Restoration, Enhancement, and Creation

Restoration and Protection

Needs:

1. SEZ Classification System
2. SEZ Assessment
3. Basin-wide SEZ Inventory Map
4. Definitions for Restoration, Enhancement and Creation

Regulation and Permitting

Needs:

1. SEZ Classification System
2. SEZ Assessment
3. Basin-wide SEZ Inventory Map
4. Definitions for Restoration Enhancement and Creation

Standards

Needs:

1. Definitions for Restoration, Enhancement and Creation

What is CRAM?

CRAM is a field-based “walk and talk” diagnostic tool that, when used as directed, provides rapid, repeatable, numeric assessment of the *overall condition* of a wetland based on visible indicators of its form, structure, and setting, relative to the least impacted reference condition.

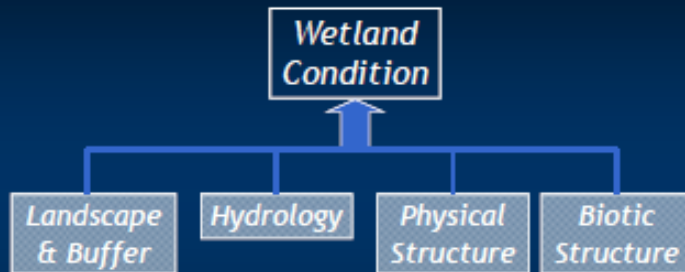
What is overall condition?

Overall condition is the capacity or potential of a wetland to provide the functions and services expected for the same type of wetland in its natural setting, assessed relative to “best” reference condition.

What CRAM is NOT

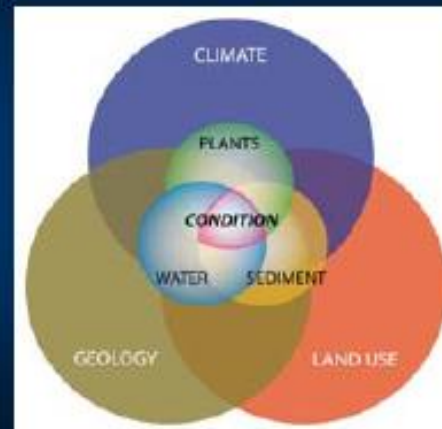
- CRAM is not a wetland identification or delineation methodology.
- CRAM is not a wetland classification system.
 - CRAM is based loosely on the HGM classification system.
- Although CRAM does not directly measure functions, it does measure the capacity for those functions to occur.
 - If the condition is “excellent”, then the functions associated with that condition are presumed to exist.

CRAM Design: Attributes



- For all wetland classes, CRAM recognizes 4 *attributes* of wetland condition (consistent across all modules).
- Each attribute is represented by 2-3 *metrics*, some of which have *submetrics* (some differences between modules).

Wetlands in the Physical Landscape



Model of Forcing Functions

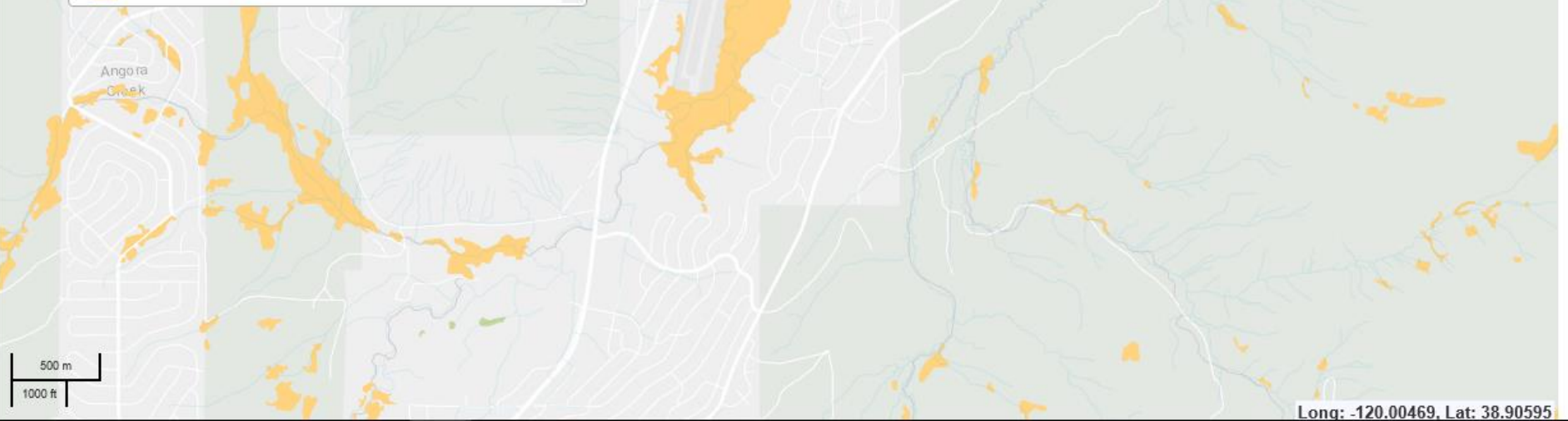
- Wetland condition responds to region-scale forcing functions (geology, climate, land use)
- Wetland condition responds to site-scale forcing functions (water, sediment, vegetation)
- CRAM is sensitive to results of all of these forcing functions

Existing Aquatic Resources - CARI

- Tidal Marsh
- Managed and Muted Tidal Habitats
- Pond
- Subtidal Water
- Beach, Dune, and Rocky Shore
- Tidal Channel

Palustrine and Riverine

- Pond and associated vegetation
- Lake, Reservoir, and associated vegetation
- Playa
- Fluvial Channel
- Slope, Seep, and Wet Meadow
- Vernal Pool



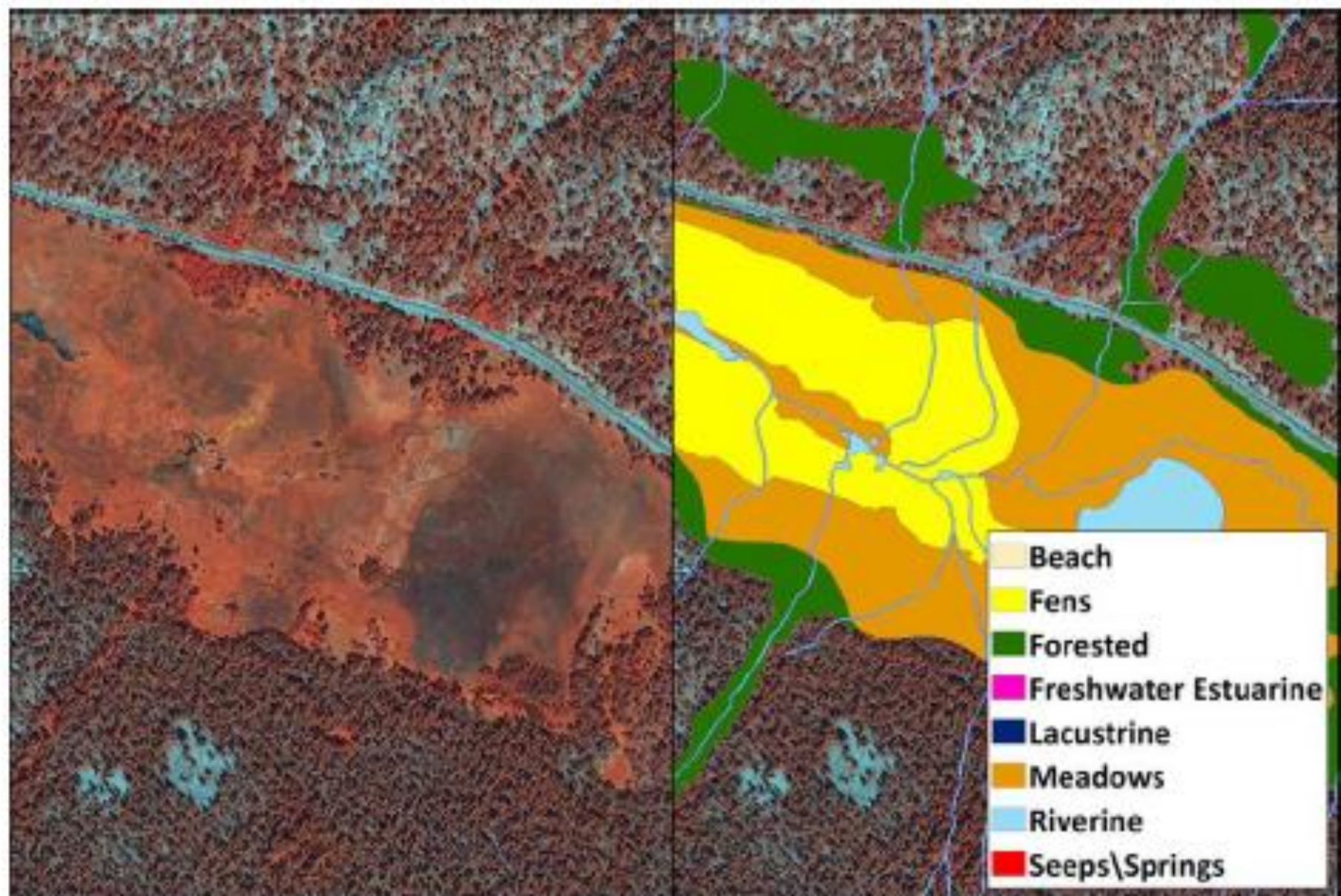


Figure 8. Close up of SEZ features for a portion of the Lake Tahoe Basin. Color-infrared imagery (2010 WorldView-2) is shown on the left; SEZ types superimposed with the imagery is shown on the right.



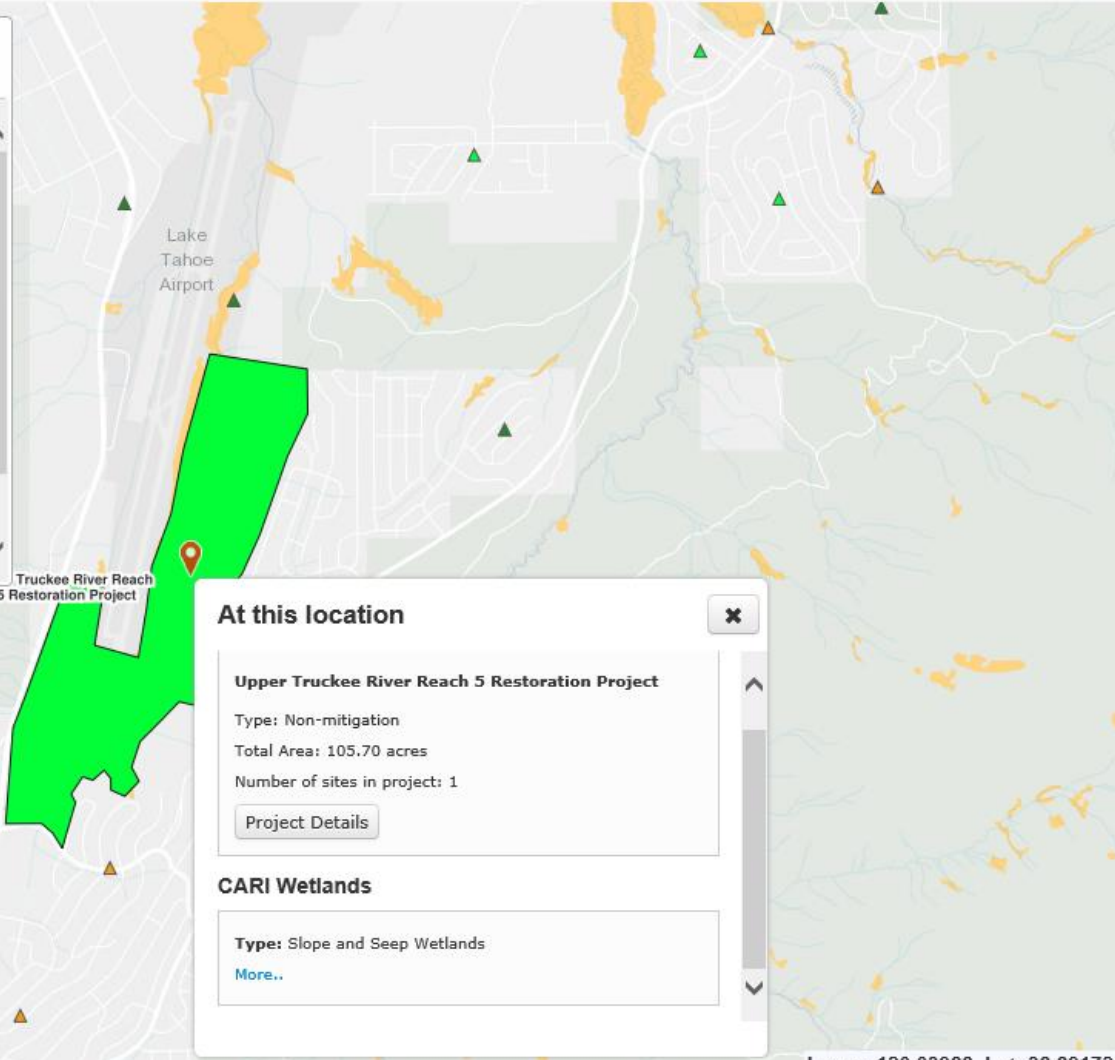
Habitat Projects

Info on this data

Transparency

Site Status

- Completed
- In Construction or Implementation
- In Planning
- Proposed
- Approximate Boundary



At this location

Upper Truckee River Reach 5 Restoration Project

Type: Non-mitigation
Total Area: 105.70 acres
Number of sites in project: 1

[Project Details](#)

CARI Wetlands

Type: Slope and Seep Wetlands

[More..](#)



Project
01.02.01.0007 - UPPER TRUCKEE RIVER AND MARSH RESTORATION

View Fact Sheet

Planning/Design | Implementation | Post-Implementation | Completed

Project Overview

- Basics
- Location
- Organizations
- Performance Measures
 - Expected Performance Measures
 - Reported Performance Measures
 - Threshold Categories
- Reported Expenditures
- Project Details
- Local and Regional Plans
- Watersheds
- External Links
- Notes
- Photos

Basics

EIP Category

- Focus Area 01 - Watersheds, Habitat, and Water Quality
- Program 01.02 - Watershed Management
- Action Priority 01.02.01 - Restoring the Upper Truckee Watershed
- Project 01.02.01.0007 - Upper Truckee River and Marsh Restoration

Stage Planning/Design

Project Description Restore natural hydrologic processes and functions in the marsh through creation of a new river channel(s) or major alterations to existing channel. Increase area of SEZ and associated habitat types. Reduce sediment sources and increase sediment deposition and filtering particularly in high flow events. Construct improvements and educational materials to support and direct public access. Protect and enhance populations of TYC and other special status species.

Old EIP # 906,560, 990

Estimated Total Cost \$16,178,000

Secured Funding \$5,918,000 **Unfunded Need** \$10,260,000

Planning / Design Start Year 2003

Implementation Start Year 2019 **Completion Year** 2022

Primary Contact Penny Stewart (penny.stewart@tahoe.ca.gov)

Attributes

- This project is on the 5-Year List

Added On 03/10/2017 **Last Updated** 03/10/2017

Location

To zoom, hold down the Shift key and drag a rectangle.

Location Information

Latitude: 38.9373
Longitude: -119.9966
State: CA
County/City: City of South Lake Tahoe
Watershed: Trout Creek
Info: 16202.919094

Location Notes

Organizations

Organization	Lead Implementer	Implementer	Funder	Primary Contact
California Tahoe Conservancy (CTC)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Penny Stewart - California Tahoe Conservancy (CTC)
U.S. Bureau of Reclamation (USBOR)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	None
U.S. Environmental Protection Agency (USEPA)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Jack Landy - U.S. Environmental Protection Agency (USEPA)

Expected Performance Measures

EIP Performance Measure	Subcategories	Expected Value

Project Information
 Habitat Projects

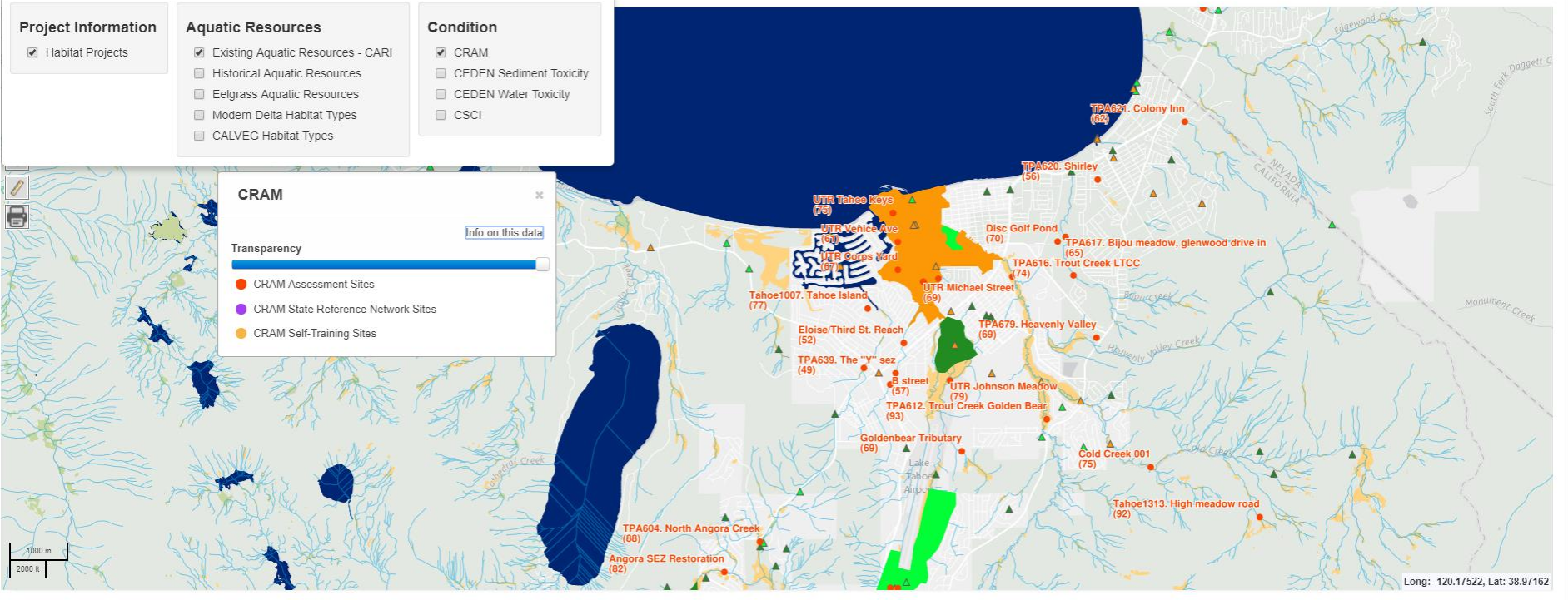
Aquatic Resources
 Existing Aquatic Resources - CARI
 Historical Aquatic Resources
 Eelgrass Aquatic Resources
 Modern Delta Habitat Types
 CALVEG Habitat Types

Condition
 CRAM
 CEDEN Sediment Toxicity
 CEDEN Water Toxicity
 CSCI

CRAM
Info on this data

Transparency

CRAM Assessment Sites
 CRAM State Reference Network Sites
 CRAM Self-Training Sites



How is CRAM Being Used?

- **Ambient** Assessments- statewide and watershed scale
- **Project** Assessments
 - Baseline Conditions
 - Impact Assessment and Alternative Comparison
 - Restoration/Mitigation Planning and Permitting
 - Long-term Monitoring

Ambient Assessment

- A probabilistic survey conducted for wetlands in a specific wetland class.
- Requires a “complete” map of all wetlands and a sampling methodology that relates each sampled point to a wetland area for which the point represents the wetland condition (e.g., GRTS).

Project Assessment

- A structured assessment of wetland condition used to support an application for an approval or permit, an environmental review, an alternatives analysis, a mitigation proposal, or any similar use or action.
- An assessment conducted for monitoring such projects.
- May be conducted by project applicants or by reviewing agencies.

Project-Related Uses of CRAM

- Sampling the full range of wetland condition at an impact site, which can assist with impact identification, avoidance, and minimization.
- Identifying mitigation requirements.
- Identifying reference conditions and reference sites for the project and mitigation sites.
- Characterizing existing condition in aquatic resources proposed for enhancement or rehabilitation.
- Assessing performance of compensatory mitigation projects.

Wetlands role in quality and health of Lake Tahoe

From: “ESTIMATED FSP LOAD REDUCTIONS OF SELECT STREAM RESTORATION PROJECTS IN THE UPPER TRUCKEE RIVER WATERSHED,”
(FINAL REPORT, MARCH 2014; 2ND NATURE):

Table 15. Estimated annual cost to remove 1lb of FSP (\$/lb of FSP removed/yr).

Project Name	Estimated Restoration Cost (USD\$)	0.5% Annual Adaptive Management	Annual Cost (\$/yr) (10 yr period)	FSP Load Reduced (MT/yr)	Annualized Unit Cost (\$/lb of FSP removed/yr)
UTR Middle Reaches 1&2	\$4,060,000	\$20,300	\$ 426,300	22.3	\$ 8.68
UTR Sunset Reach 5	\$6,500,000	\$32,500	\$ 682,500	29.7	\$ 10.44
Trout Creek Upper Reach*	\$2,630,000	\$13,150	\$276,150	11.0	\$ 11.37
UTR Golf Course Reach	\$10,000,000	\$50,000	\$ 1,050,000	31.5	\$ 15.12
UTR Sunset Reach 6	\$5,600,000	\$28,000	\$ 588,000	12.4	\$ 21.42
Angora Sewerline	\$620,000	\$3,100	\$ 65,100	0.77	\$ 38.20
UTR Airport Reach	\$7,800,000	\$39,000	\$819,000	7.8	\$ 47.69
Angora SEZ	\$4,400,000	\$22,000	\$462,000	0.65	\$ 320.15

*Trout Creek Restoration was completed in 2001 for an estimated cost of \$2,000,000 (see Table 3). These costs were adjusted for inflation to represent 2014 \$US dollars (a cumulative inflation rate of 32% using CPI estimates.)

From: “ESTIMATED FSP LOAD REDUCTIONS OF SELECT STREAM RESTORATION
PROJECTS IN THE UPPER TRUCKEE RIVER WATERSHED,”
(FINAL REPORT, MARCH 2014; 2ND NATURE, cont’d):

Table 17. Annualized unit cost estimates for a series of urban water quality improvement strategies developed for Placer County (\$/lb of FSP removed/yr). From Table ES.3 in 2NDNATURE and NHC (2011).

Urban Strategy	Annualized Unit Cost (\$/lb of FSP removed/yr)	
	Low Estimate	High Estimate
Water quality minded road operation improvements	\$ 3.50	\$ 4.25
Increased implementation of private parcel BMPs (stormwater volume reductions)	\$ 20.00	\$ 41.00
Water quality improvement projects (WQIP)	\$ 70.00	\$ 88.00

TMDL Performance Measures

Non-Urban Source Category accomplishments are tracked and reported using relevant Tahoe Regional Planning Agency Environmental Improvement Program Performance Measures (PMs). The PMs were selected based on relevance to lake clarity, alignment with existing reporting efforts in the Tahoe Basin, and feasibility of data collection. Links included with the TMDL PMs below provide tracking and reporting guidance, key definitions and informative context for Non-Urban Implementing Partners to accurately track and report TMDL PMs in the [EIP Project Tracker](#).

Prefix numbers relate to performance measures list on the EIP Project Tracker, which also contains additional details and reporting guidance.

- [4 - Parcels With Stormwater Retrofits](#)
- [6 - Miles of Street Sweeping](#)
- [5 - Miles of Roads Decommissioned or Retrofitted *](#)
- [7 - Linear Feet of Stream Channel Restored or Enhanced](#)
- [22 - Non-Compliant Wood Stoves Removed or Retrofitted](#)
- [23 - Miles of Pedestrian and Bicycle Routes Improved or Constructed](#)
- [35 - Miles of Roads Inspected and Maintained](#)
- [37 - Acres of Disturbed Area Restored or Enhanced](#)

From: "Lake Tahoe TMDL Program--2014 Synthesis of Findings & Program
Adjustment Recommendation Memo

(<https://clarity.laketahoeinfo.org/FileResource/DisplayResource/12e9a056-6047-41e8-8e6a-8d32b04efefe>):

RECOMMENDATION... NU.1 Establish a new TMDL Performance Measure (TMDL PM) to track and report floodplain restoration activities in a manner consistent with TRPA EIP Program reporting efforts.

"...restoring floodplain connectivity and geomorphic function in riverine systems can provide substantial FSP load reductions. Furthermore, effective stream and floodplain restoration projects that increase the frequency, duration and extent of floodplain flows can result in substantial and sustained FSP load reduction opportunities.

TMDL Program Managers suggest elevating the importance of restoring and enhancing streams and associated floodplain areas by adding it as a TMDL Performance Measure (TMDL PM) using the existing EIP PM "Acres of SEZ Enhanced or Restored".

From: "LAKE TAHOE INFO STORMWATER TOOLS"
(<https://stormwater.laketahoeinfo.org/>)

Progress Towards Water Year 2017 Program Targets

Current Achievement Status

By:

Options ▾

