

Building Capacity of the California Wetland Program to Protect & Restore Vernal Pools

Sarah Pearce & Sarah Lowe

San Francisco Estuary Institute-Aquatic Science Center (SFEI-ASC)
Vollmar Natural Lands Consulting, Inc.
Carol W. Witham Consulting



Project Goal

Develop tools to support monitoring and assessment of Vernal Pool Systems at a Landscape Scale



Project Background

California Water Quality Monitoring Council
My Water Quality
A COLLABORATION BETWEEN THE CALIFORNIA ENVIRONMENTAL PROTECTION AND NATURAL RESOURCES AGENCIES

CA.GOV WATER QUALITY

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Portals About Us Workgroups

California Wetland Monitoring Workgroup (CWMW)

WRAMP Framework | Studies/Reports/Presentations | Training | Membership | Meetings

The California Wetland Monitoring Workgroup's mission is to develop a comprehensive stream, wetland, and riparian area monitoring program through coordination and cooperation among local, state, and federal agencies and policy aspects of wetland monitoring tool development in California.

- Workgroup Charter (updated August 2014)
- Workgroup Roles and Responsibilities (updated)
- Tenets of a State Wetland and Riparian Area Monitoring Program (WRAMP)

Announcements

- Registration for CRAM Trainings
- For a brief introduction to WRAMP and CRAM

WRAMP Framework

What is WRAMP?

The Wetland and Riparian Area Monitoring Plan (WRAMP) is a three-level framework for making these three levels of assessment...

California Wetland Monitoring Workgroup
Tenets of a State Wetland and Riparian Area Monitoring Program (WRAMP)

April 2012

CRAM

California Rapid Assessment



CRAM is a cost-effective and scientifically defensible rapid assessment tool for monitoring the conditions of wetlands throughout California. It is designed to assess ambient conditions within watersheds, regions, and throughout the State to assess the performance of compensatory mitigation projects and...

ENTER DATA VIEW DATA FIELD DATA

...aquatic resources using a watershed or sub-watershed assessment and analysis, and provides the ability to assess the quality of aquatic resources within a watershed.

EcoAtlas

Where are the aquatic resources and how are they doing?

EcoAtlas

Statewide

- Kern
- Kings
- Los Angeles
- Monterey
- Orange
- Riverside
- San Bernardino
- Santa Ana
- Santa Clara
- Santa Cruz
- Stanislaus
- Tulare
- Yuba

All this location

CRAM Wetlands

CRAM Wetlands

CRAM Wetlands

Project Team

San Francisco Estuary Institute-Aquatic Science Center (SFEI-ASC)

Sarah Lowe, Sarah Pearce, Cristina Grosso, Josh Collins,
Lawrence Sim, Shira Bezalel, and Gemma Shusterman

Vollmar Natural Lands Consulting, Inc.

Cassie Pinnell, John Vollmar, Ivy Poisson,
Eric Smith, Misaki Yonashiro

Carol W. Witham Consulting

Carol Witham and Bob Holland

Project Tasks



Level 1 - Update the geospatial dataset for vernal pools in the GCV



Level 2 - Rapid Assessment of Condition using CRAM

- Conduct an ambient baseline survey
- Develop a Habitat Development Curve



Outreach - Make the information publicly accessible

- Upload the Vernal Pool areas to the EcoAtlas basemap
- Add Vernal Pool CRAM data, CDF and HDC to EcoAtlas
- Add vernal pool projects in Project Tracker in EcoAtlas
- Presentation to stakeholders

California Rapid Assessment Method for Wetlands (CRAM)

What *is* CRAM?

- CRAM is a field-based “walk and talk” diagnostic assessment tool.
- It provides rapid, repeatable, numeric assessment of the *overall condition* of a wetland (capacity or potential of a wetland to provide the functions and services expected).
- Assessments use visible indicators of wetland form, structure, and setting, relative to the least impacted reference condition.
- Provides a common language

Peer Review

- Rapid Assessment in California (Sutula et al. 2006)
- Mitigation project review (Ambrose et al. 2005, 2006)
- USACE ERDC Review (2008)
- CRAM Validation (Stein et al. 2009)
- State Water Board peer review (2009-12)
- SWAMP Endorsement (March 2013)

Geographic Scope of CRAM

All Wetland Types in California

- Riverine Wetlands
 - Confined and Non-Confined
 - Tidal Riverine
 - Episodic
- Depressional Wetlands
 - Perennial/Seasonal Depressions
 - Vernal Pools
 - Playas
- Lakes
- Estuarine Wetlands
 - Saline and Non-Saline
 - Bar-built (Seasonal)
- Slope Wetlands
 - Channeled and Non-Channeled Meadows
 - Seeps/Springs
 - Forested Slope



CRAM Structure- Vernal Pool

- For all wetland types, CRAM recognizes 4 *attributes* of wetland condition (consistent across all modules).
- Each attribute is represented by 2-3 *metrics*, some of which have *submetrics*.
- 4 mutually exclusive alternative states
- Scores range from 25-100

Overall Index Score	Attributes		Metrics and Submetrics		
	Buffer and Landscape Context			Aquatic Area Abundance	
				Buffer:	
				Percent of AA with Buffer	
				Average Buffer Width	
			Buffer Condition		
	Hydrology		Water Source		
			Hydroperiod		
			Hydrologic Connectivity		
	Structure	Physical	Structural Patch Richness		
Pool and Swale Density					
Topographic Complexity					
Biotic		Horizontal Interspersion and Zonation			
		Plant Community Composition:			
		Number of Co-dominant Species			
		Percent Non-native Species			
		Endemic Species Richness			

CRAM Scoring

Attribute Scores = percent of total possible metric scores

*Index
Score*

57 %

*Landscape &
Buffer*

30 %

Hydrology

47 %

*Physical
Structure*

75 %

*Biotic
Structure*

Plant Comm. Composition

C

6

Horizontal Interspersion

A

12

18/24 = 75% of
Possible

CRAM Scoring

Attribute Scores = percent of total possible metric scores

*Index
Score*

52 %

57 %

*Landscape &
Buffer*

30 %

Hydrology

47 %

*Physical
Structure*

75 %

*Biotic
Structure*

Plant Comm. Composition

C

6

Horizontal Interspersion

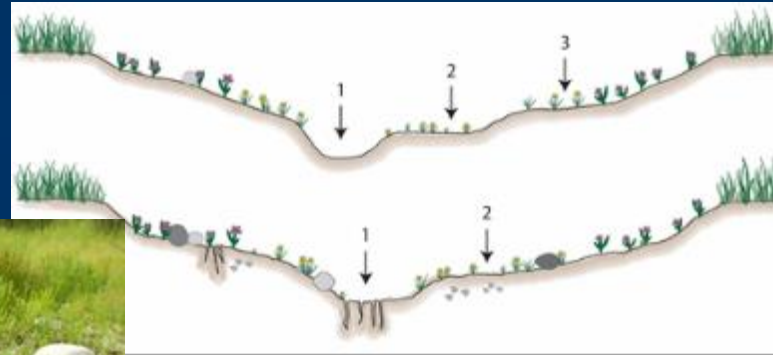
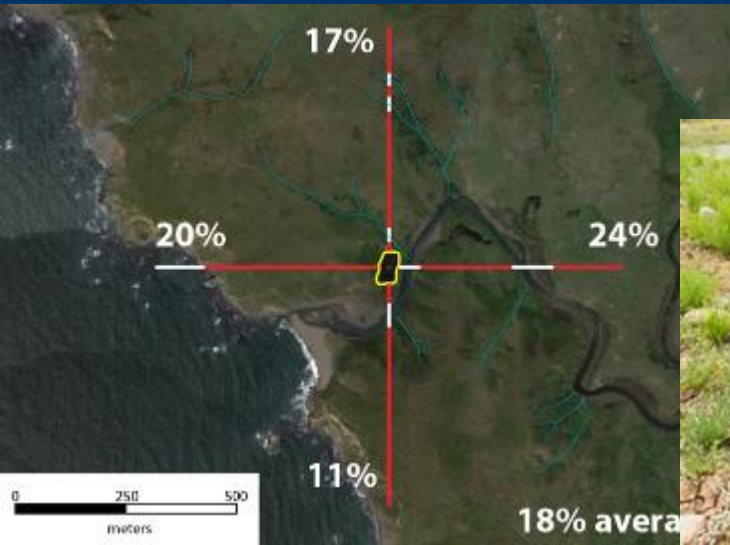
A

12

18/24 = 75% of
Possible

Complex Ecological Relationships

- Aquatic Area Abundance
- Structural Patch Richness
- Plant community composition





Index Score: 63



Index Score: 92

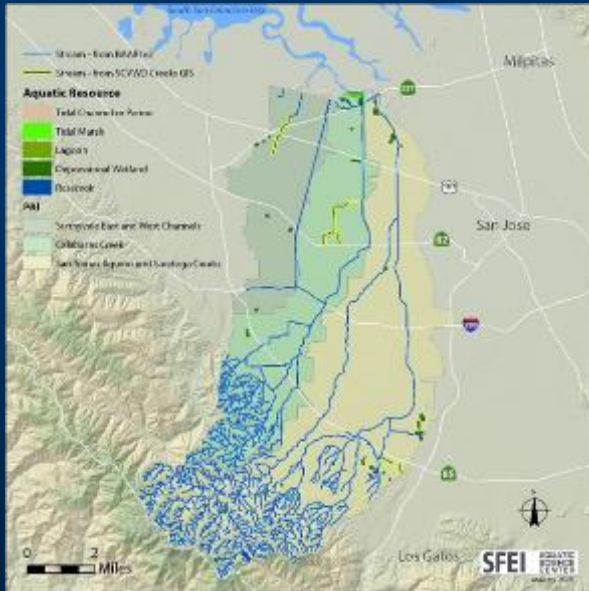
How can CRAM be used?

- Ambient survey assessments
- Project assessments
- Wide variety of other uses, including:
 - Estimating scores in the past and in the future (hindcast and forecast). Can help with visioning.
 - Data mining- can use EcoAtlas to explore and download publically available CRAM assessments.
 - Expand information on condition over a large area where L3 data collection is cost prohibitive

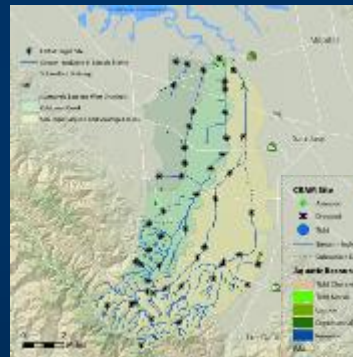
Ambient Surveys

- Spatially balanced probability surveys identify the overall condition of wetlands within a particular region, and allow for comparison between regions.

L-1 Digital Map



Sample Draw

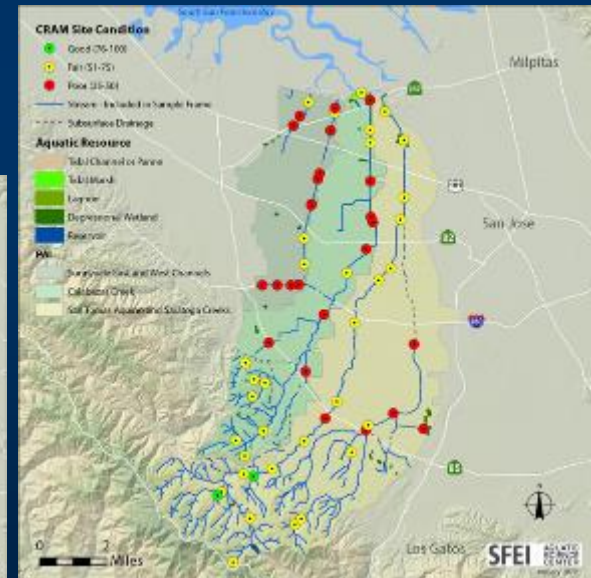


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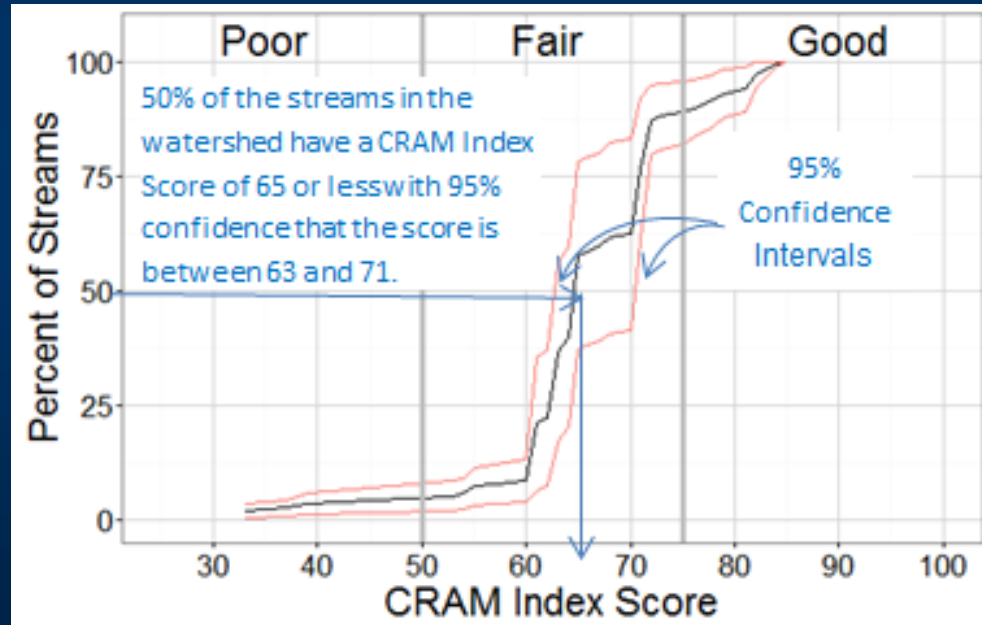
Sampled >

L-2 Condition Assessment



Ambient Surveys

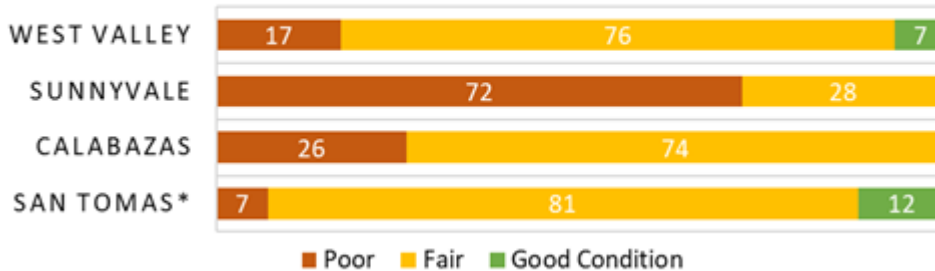
- A CRAM probability survey outputs a cumulative distribution function estimate (CDF) of the condition of the assessed wetland across the surveyed area with a known level of confidence.



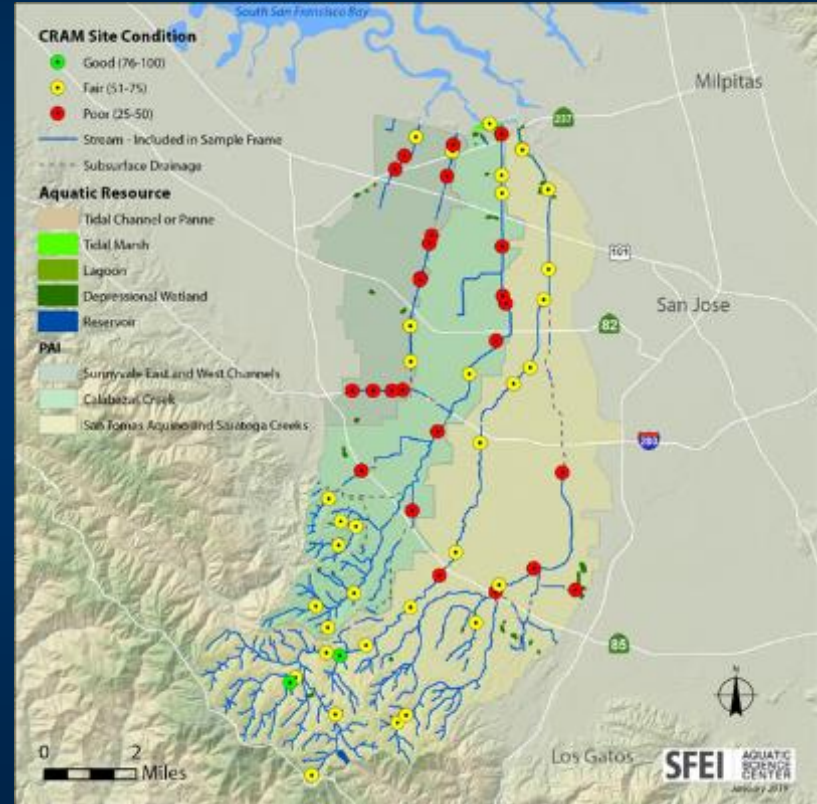
Ambient Surveys

- Compare condition among regions
- Identify where to focus restoration/preservation efforts
- Help managers think about restoration goals in a watershed or landscape context

PERCENTAGE OF STREAM MILES IN POOR, FAIR, OR GOOD ECOLOGICAL CONDITION



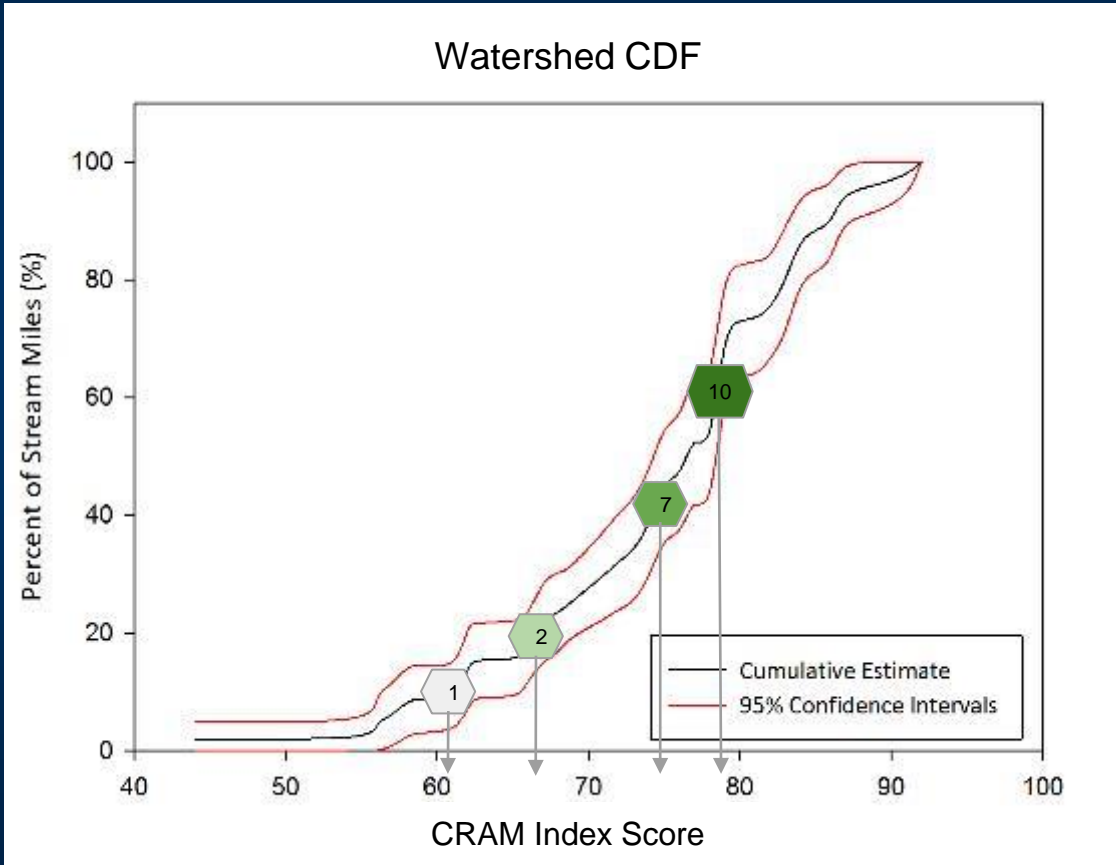
* San Tomas-Saratoga



Support Wetland Projects

- Evaluate and track the overall ecological condition within the Project footprint.
- Assist with evaluating impact avoidance and minimization
- Characterize reference sites and reference ranges for projects
- Evaluate if projects are performing as expected by using regional habitat development curves (HDCs)

Plotting project condition scores on the local CDF curve



Where does the Project Condition fall in relation to the overall watershed CDF curve?

Example Project X:

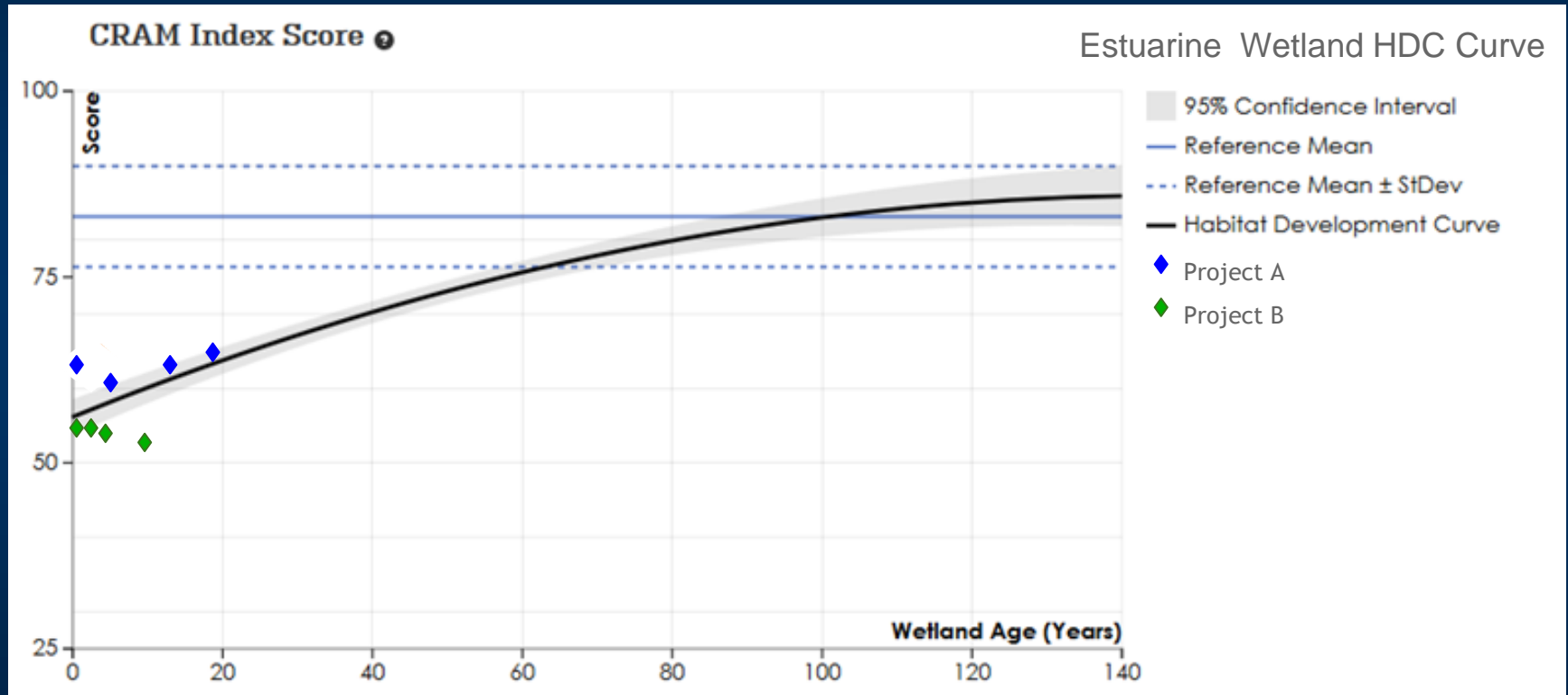
Year 1 = 63 (in the bottom 17th percentile)

Year 2 = 67 (23rd percentile)

Year 7 = 75 (42nd percentile)

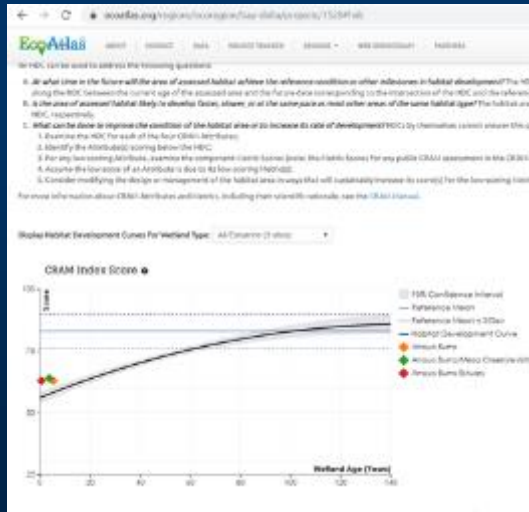
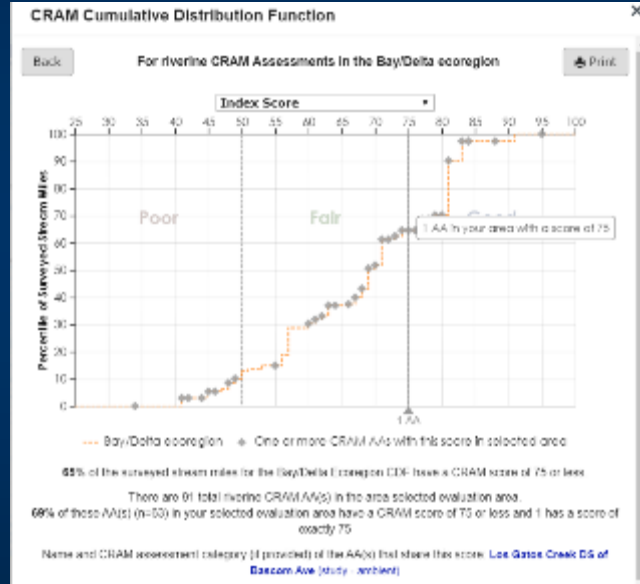
Year 10 = 78 (above the 50th percentile)

Evaluate if projects are performing as expected by using regional habitat development curves (HDCs)



CRAM CDFs and HDCs are Tools Accessible on EcoAtlas

EcoAtlas is a statewide website, endorsed by the CWMW, that supports local and state regulatory agencies and the public with wetland monitoring and assessment data and other spatial datasets.

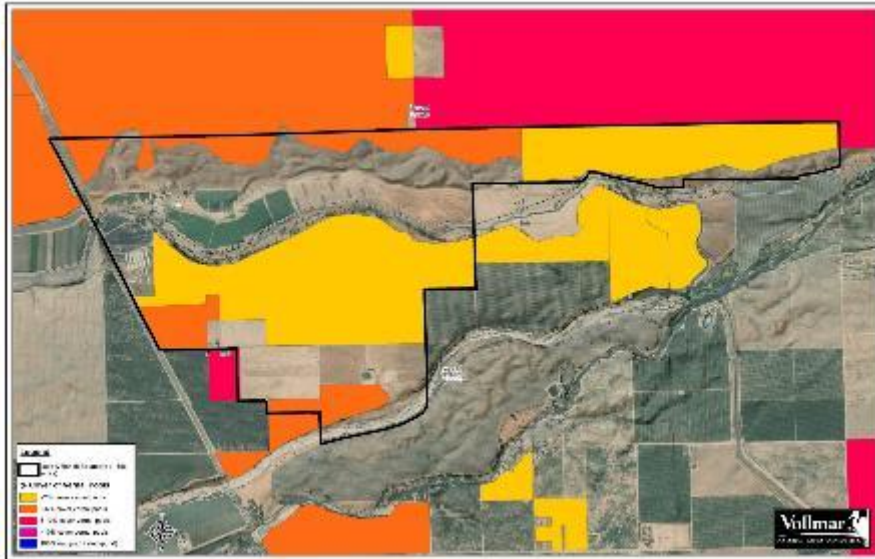


Status of the Vernal Pool Project

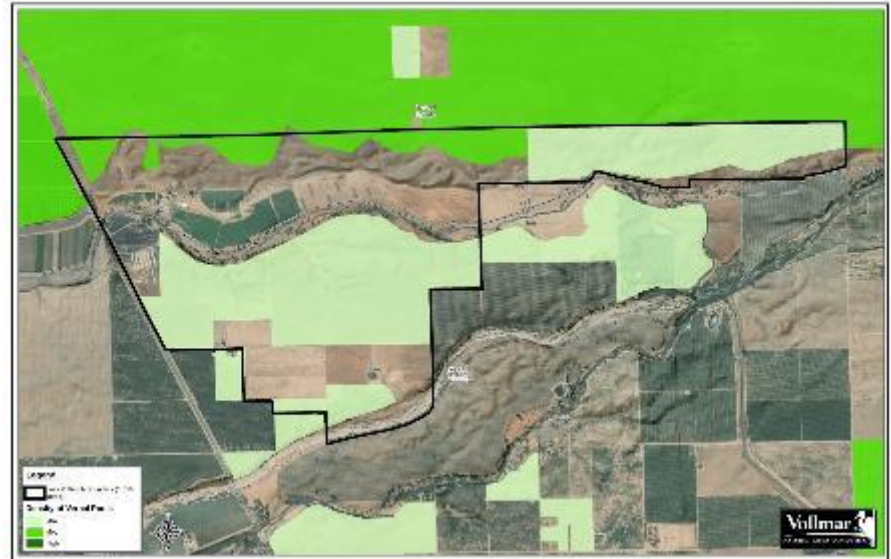
Work in Progress

- Level-1: Update the geodatabase of vernal pool areas in GCV

% Cover of Vernal Pools



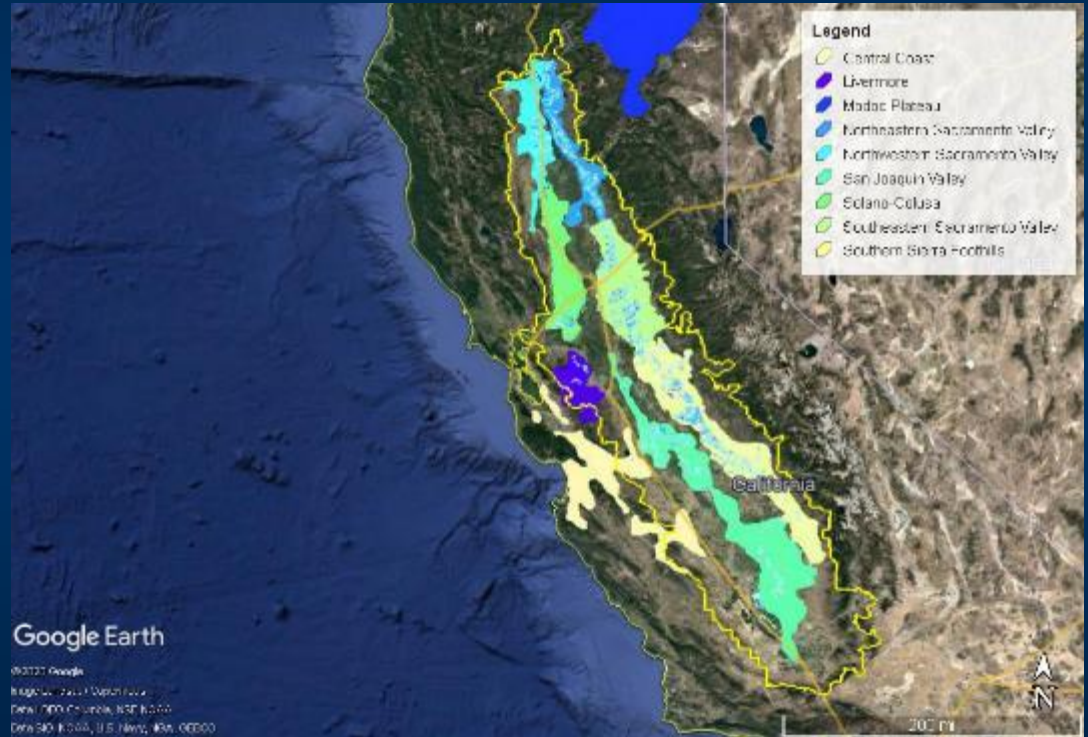
Density of Vernal Pools

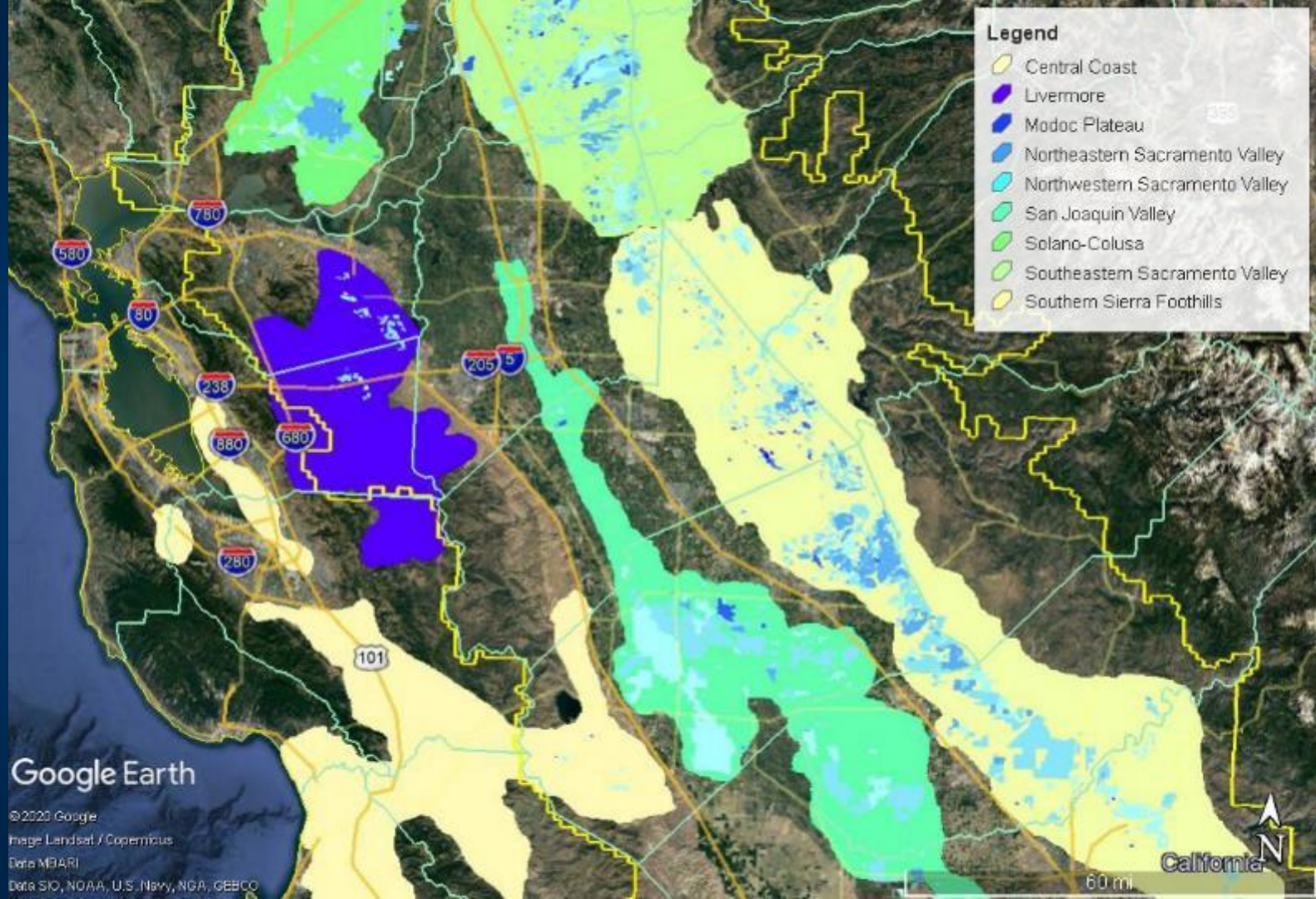


Work in Progress

- Level-2: Rapid Assessment employing CRAM

Ambient Survey and
CDF estimate for
Vernal Pool Systems in
Great Central Valley
Region in California



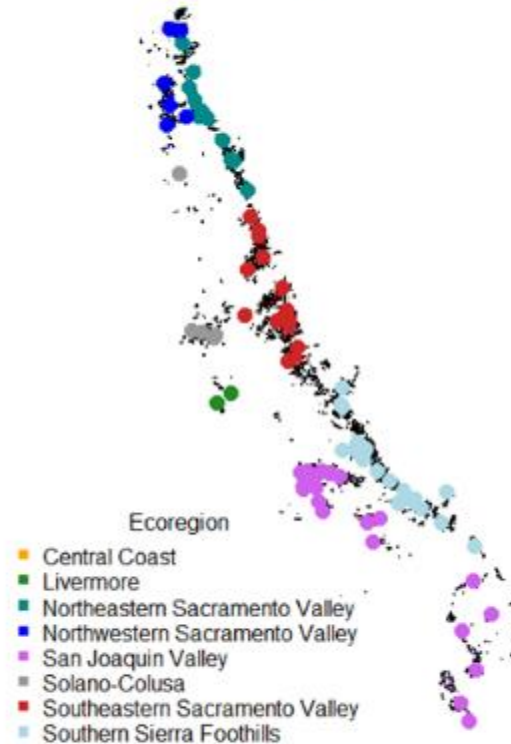


Spatially Balanced Probabilistic Survey

EPA's generalized random tessellation stratified (GRTS) survey design and analysis package in 'R' to develop a sample draw

- Unstratified across all the ecoregions
- Target 80 assessment sites across the region
- 4x oversample draw

All Regions in GCV
Unstratified, equal probability (n=80) v03.2
(4x Oversample; seed = 5096)



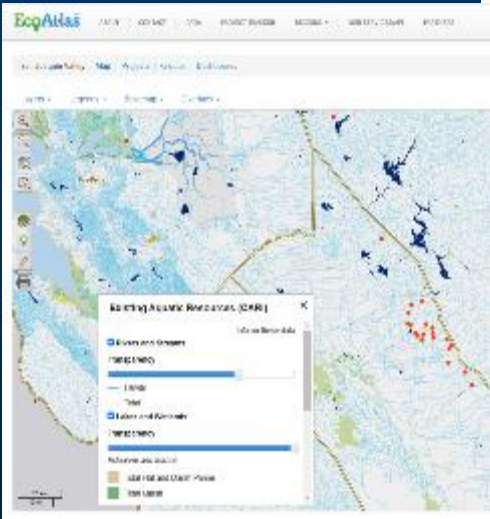
Ambient Survey

- Fieldwork in progress
- 2020 Data entry into eCRAM complete



Sampling Sheet: Visual Analysis - 10/21/20

Field No.	Date	Time	Observer
AA1	10/21/20	10:00	JD
AA1	10/21/20	10:05	JD
AA1	10/21/20	10:10	JD
AA1	10/21/20	10:15	JD
AA1	10/21/20	10:20	JD
AA1	10/21/20	10:25	JD
AA1	10/21/20	10:30	JD
AA1	10/21/20	10:35	JD
AA1	10/21/20	10:40	JD
AA1	10/21/20	10:45	JD
AA1	10/21/20	10:50	JD
AA1	10/21/20	10:55	JD
AA1	10/21/20	11:00	JD
AA1	10/21/20	11:05	JD
AA1	10/21/20	11:10	JD
AA1	10/21/20	11:15	JD
AA1	10/21/20	11:20	JD
AA1	10/21/20	11:25	JD
AA1	10/21/20	11:30	JD
AA1	10/21/20	11:35	JD
AA1	10/21/20	11:40	JD
AA1	10/21/20	11:45	JD
AA1	10/21/20	11:50	JD
AA1	10/21/20	11:55	JD
AA1	10/21/20	12:00	JD



Remaining Work



Level-1

Finalize the Vernal Pool area geodatabase



Level-2

Complete the ambient baseline survey & CDF
Develop a Habitat Development Curve (HDC)



Outreach
EcoAtlas

Make the information publicly available on

Present to stakeholders



CRAM GULCH
BRIDGE 2-144L
5 SIS R39 04

Thank you

