

# 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)

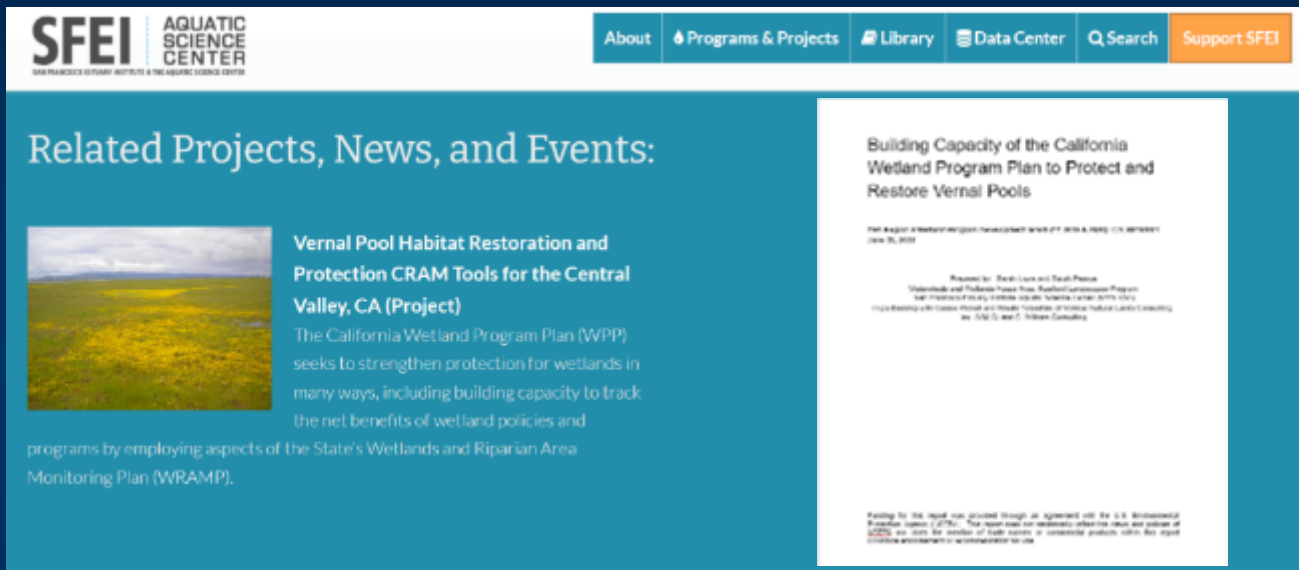
Vollmar Natural Lands Consulting, Inc.

Carol W. Witham Consulting

March 1, 2023




# Project completed in 2022



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### Vernal Pool Habitat Restoration and Protection CRAM Tools for the Central Valley, CA (Project)

The California Wetland Program Plan (WPP) seeks to strengthen protection for wetlands in many ways, including building capacity to track the net benefits of wetland policies and programs by employing aspects of the State's Wetlands and Riparian Area Monitoring Plan (WRAMP).

**Building Capacity of the California Wetland Program Plan to Protect and Restore Vernal Pools**

Final Report to Wetland Program Development (WPP) 2019 & 2020 (14 SEPTEMBER 2022)

Presented by: Scott Cook and Sarah Pearce  
Wetlands and Riparian Area Program, Department of Fish and Wildlife, California State University, Chico  
In collaboration with: Center for Applied Research on Wetlands, National Wetlands Consulting, Inc. (NWC), and C. Wilson Consulting

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**EPA Region 9 Wetland Program Development  
Grant (FY 2019 & 2020): CD\_99T93601  
June 30, 2022**

# Project Goal

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



# 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

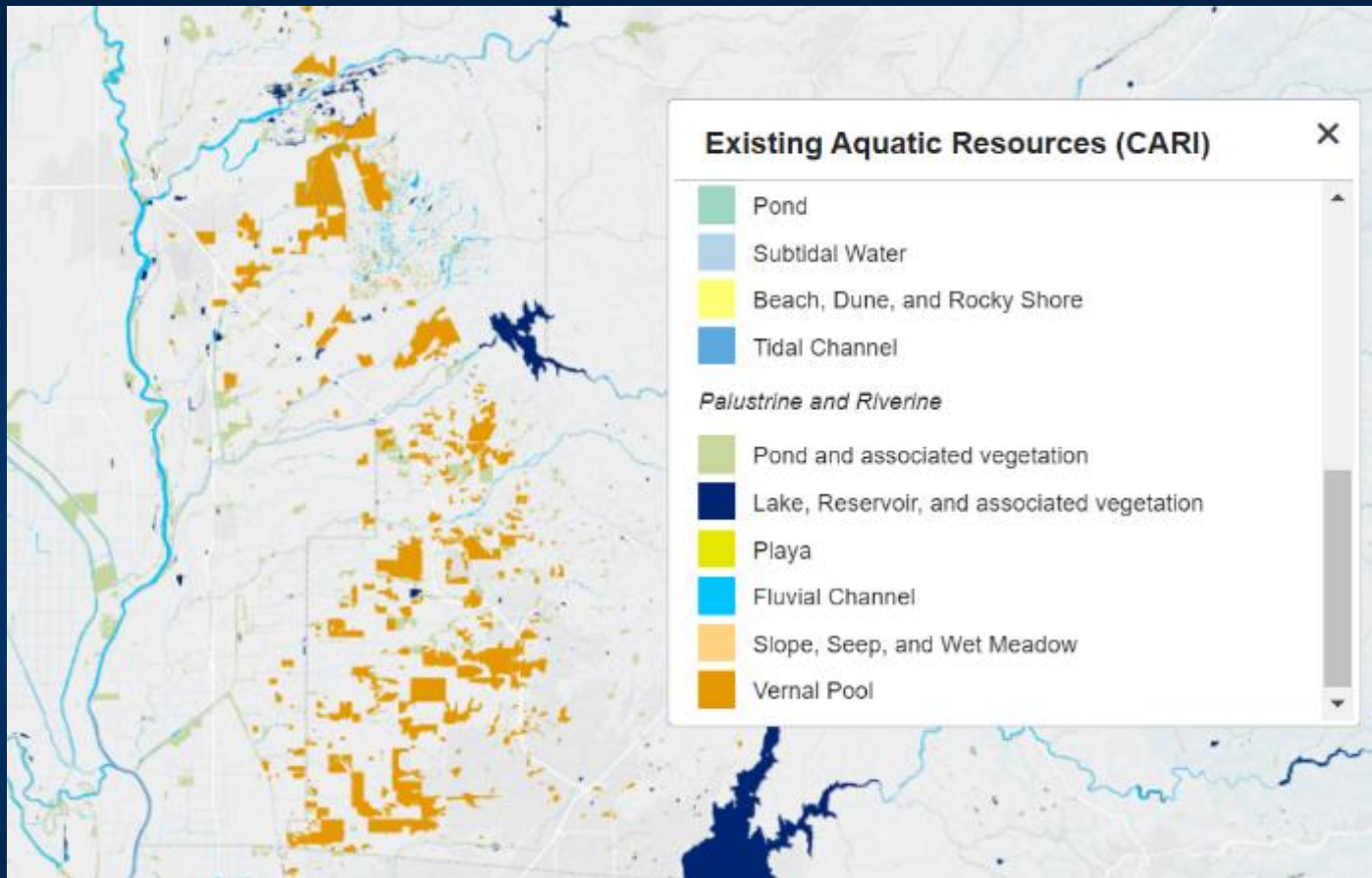
# Updated Vernal Pool Mapping

Carol Witham remapped vernal pool habitats (originally mapped in 2005, updated in 2012) using 2018 aerial imagery for the Central Valley.

The updated mapping allowed comparison of vernal pool abundance, distribution, and diversity between 2005 and 2018.

Mapping includes extant and extirpated pools, land conversion, and preserved areas.





The updated ArcGIS geodatabase and a copy of the report are available on SFEI-ASC's Data Center <https://www.sfei.org/data/changes-distribution-great-valley-vernal-pool-habitats-2005-2018#sthash.4UE36SGK.dpbs>.

# Level 2: Rapid Assessment of Condition

## 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

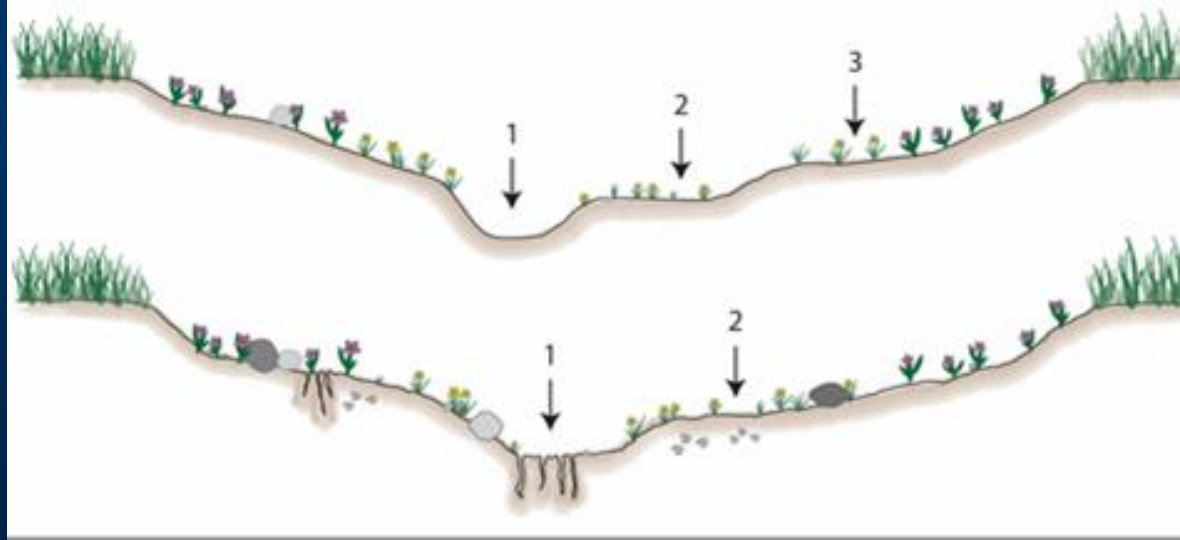
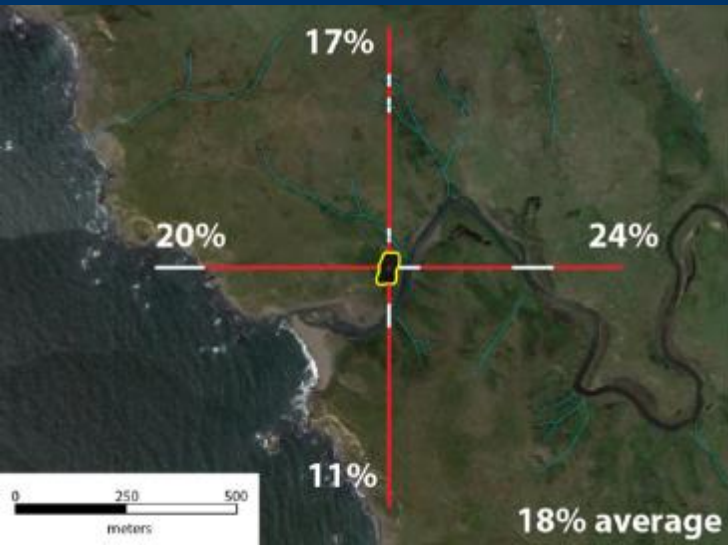
# CRAM Structure- Vernal Pool Systems

- 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, scored A, B, C, D
- 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		

# Complex Ecological Relationships

CRAM incorporates many complex ecological relationships into a relatively simple field assessment.





Index Score: 63

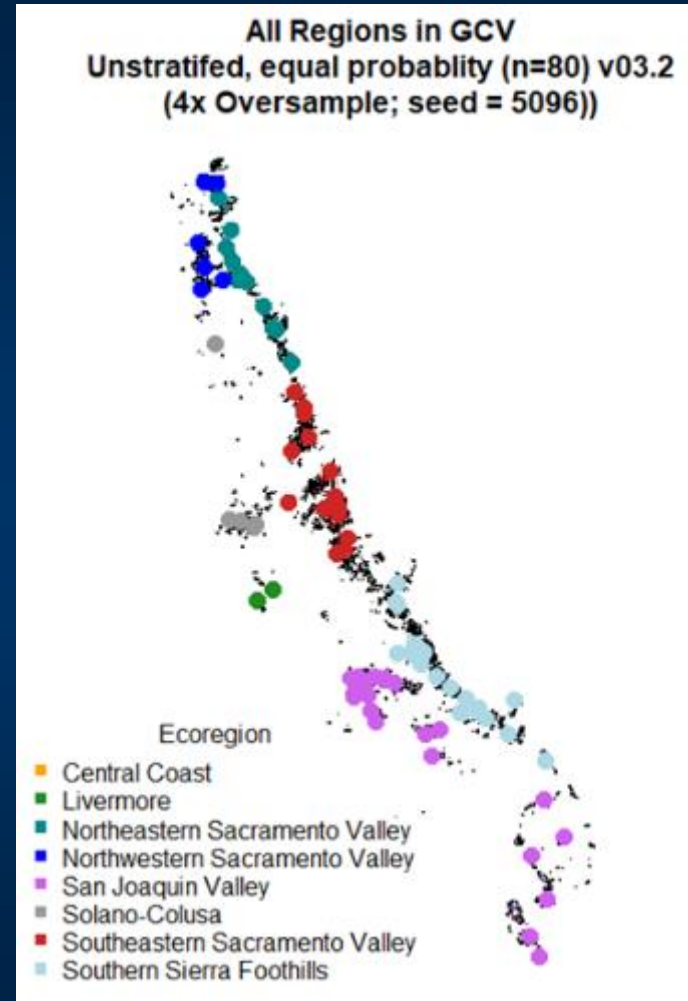


Index Score: 92

# Ambient Survey of Condition

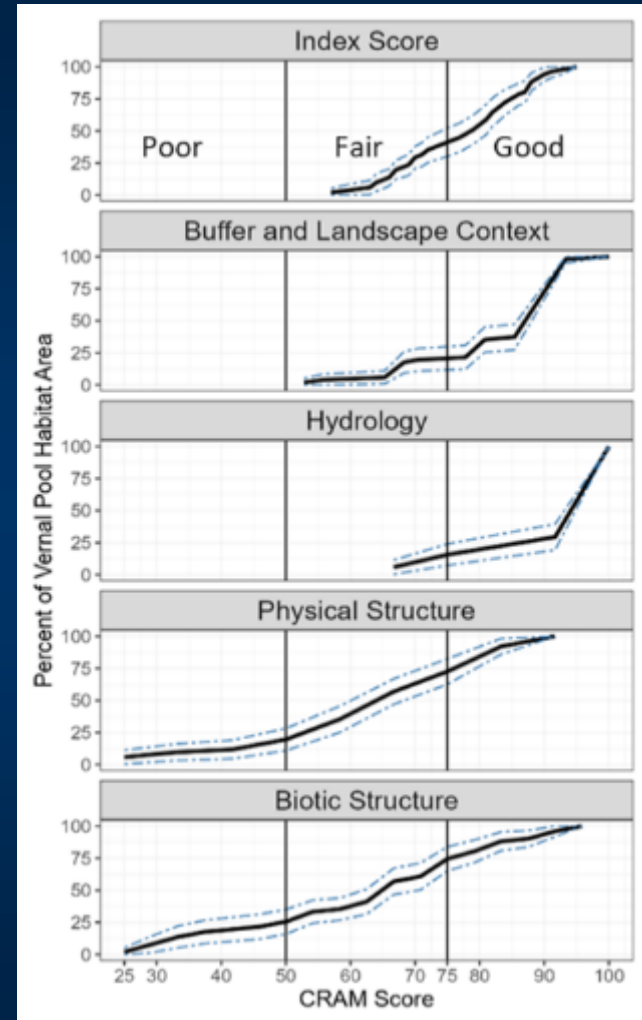
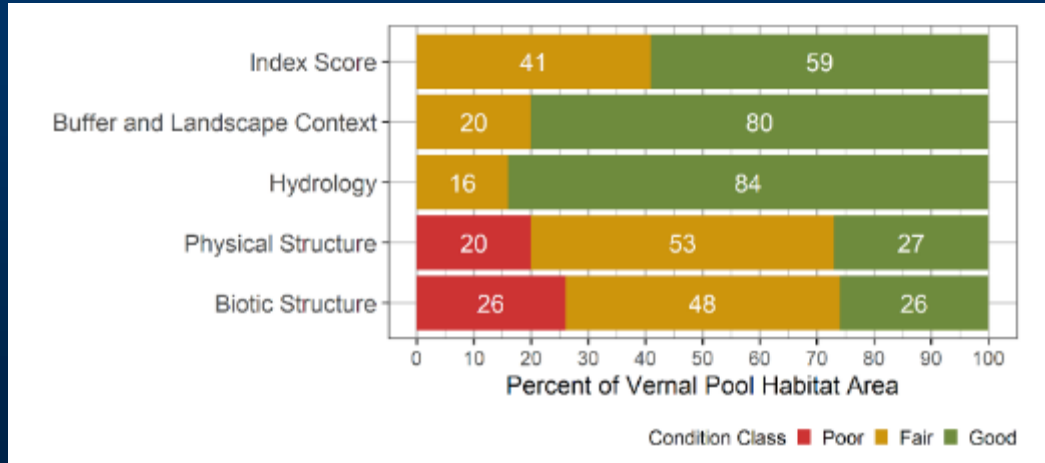
Spatially balanced probability surveys identify the overall condition of wetlands within a particular region, and allow for comparison between regions.

- Level 1 mapping
- GRTS survey design
- Sample draw- target 50 sites, 4x oversample



# Ambient Survey Results

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.



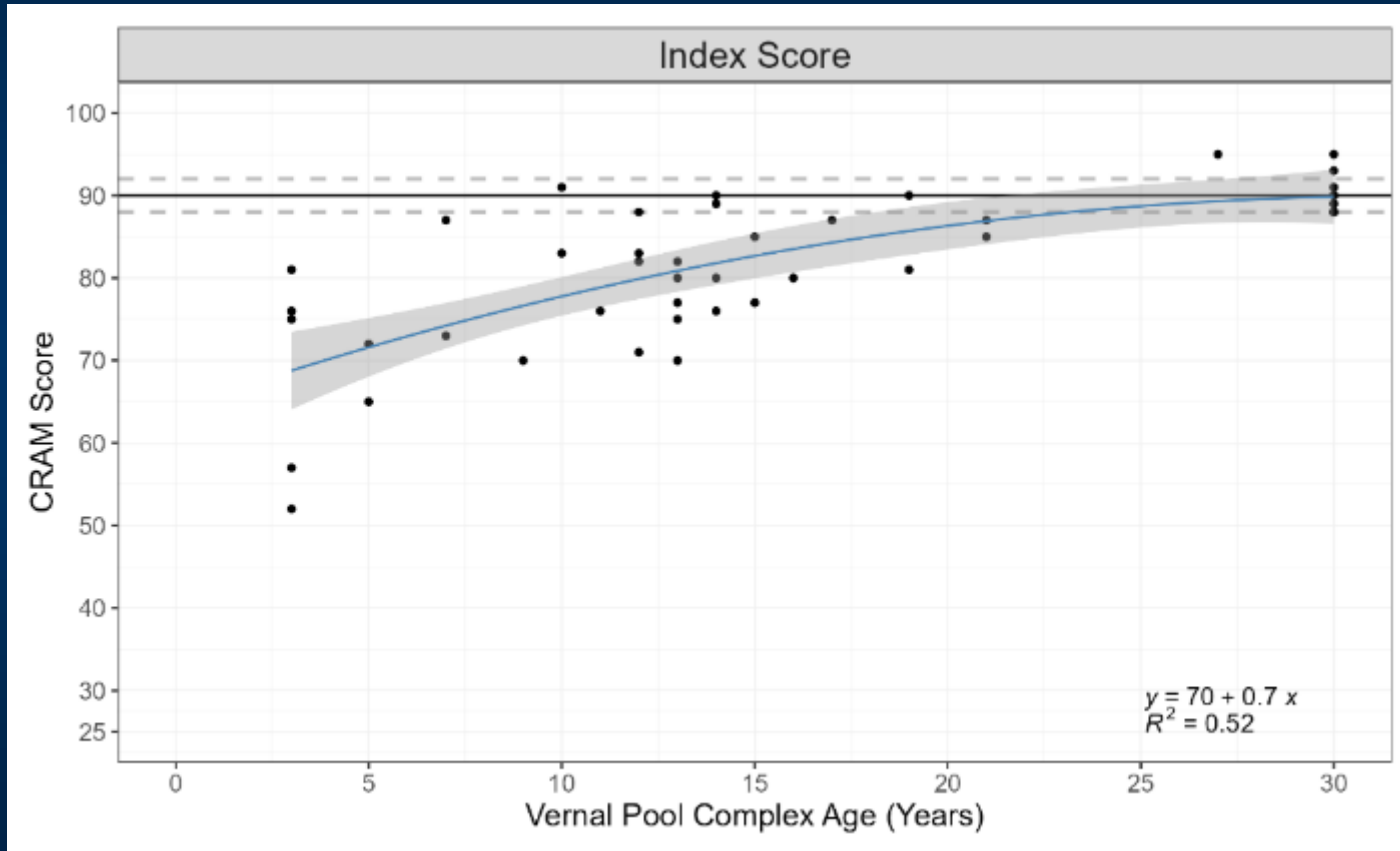
# Habitat Development Curve

Habitat Development Curves (HDCs) are built by assessing the condition of projects of different ages to characterize different developmental stages. Also assessed are minimally impacted wetlands that represent reference conditions.

The curve represents the expected rate of improvement of a project through time.

From 90 candidate CRAM assessments, ultimately 49 existing and new CRAM assessments were utilized to build the curve.

# Vernal Pool Central Valley HDC

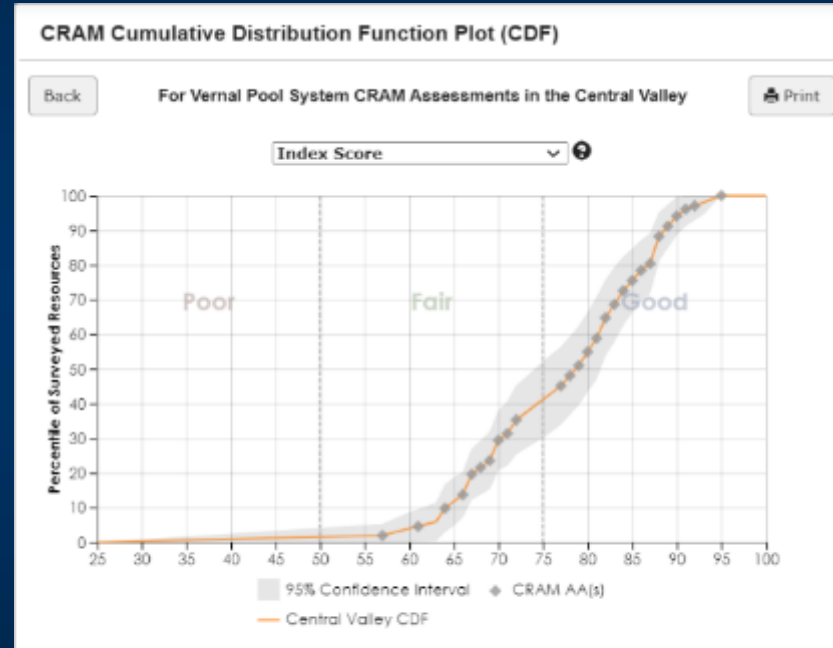
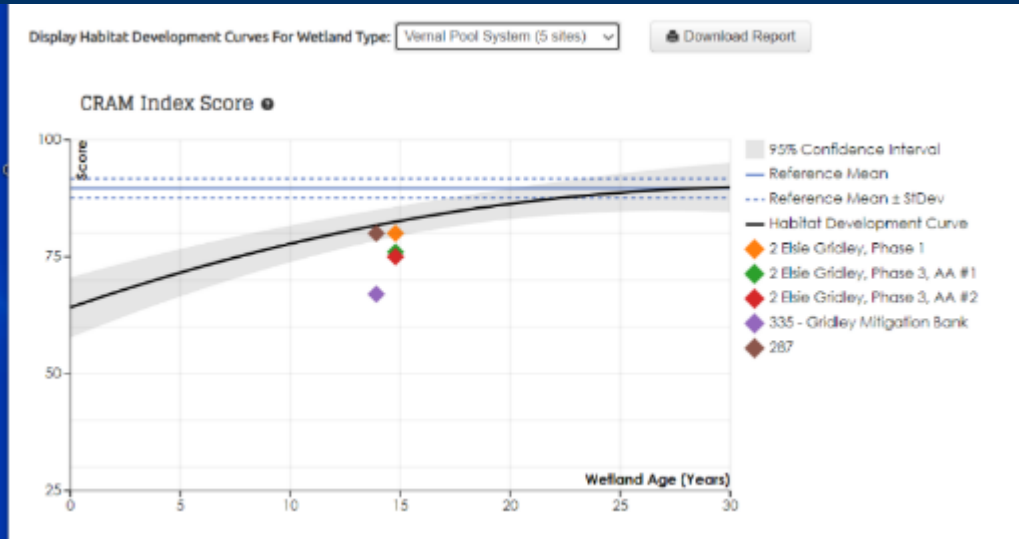




# CRAM CDFs and HDCs are accessible on EcoAtlas

www.ecoatlas.org

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



0% of the surveyed resources for the Central Valley CDF have a CRAM score of 0 or less.

There are 46 total Vernal Pool System CRAM AA(s) in the selected evaluation area.

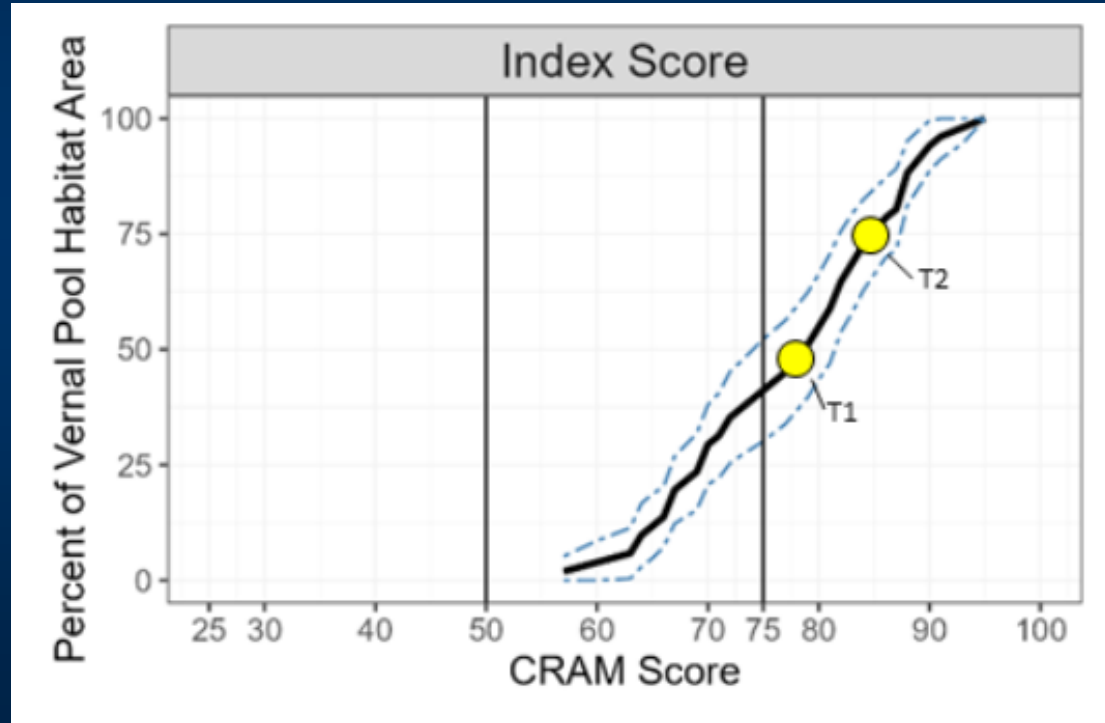
0% of these AA(s) (n=0) in your selected evaluation area have a CRAM score of 0 or less and 0 have a score of exactly 0

CRAM site name, assessment category (i.e. study type if provided), and visit date for the AA(s) that share this score:

# Vernal Pool CRAM tools can support projects

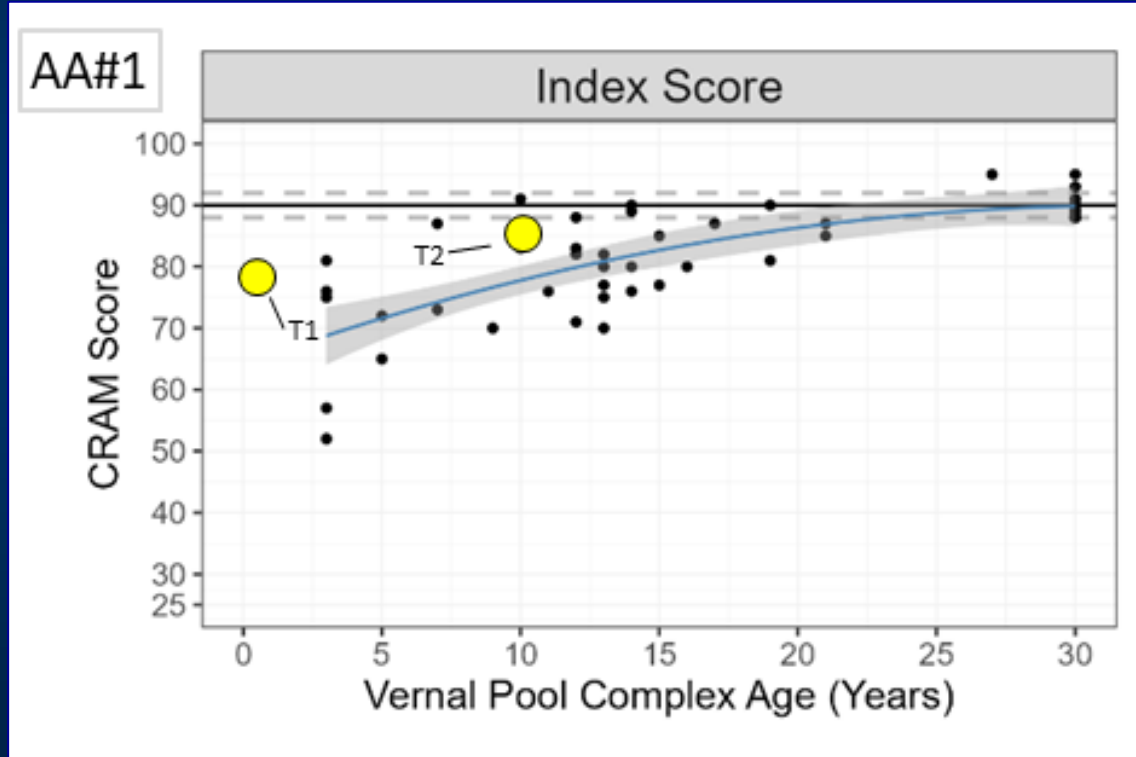
These tools can support vernal pool projects, including project siting, planning and monitoring.

- CDFs provide a landscape context for project evaluations and tracking.



# Vernal Pool CRAM tools can support projects

HDCs can forecast the expected condition of a project at a future date, can estimate the number of years for a project to reach reference condition, and can help establish project performance targets.



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Thank you

