



Bar-built Estuary

Monitoring and Management



Intermittently Open
Estuaries: Science &
Management Perspectives

September 28, 2016

SCCWRP

Problems

- Lack of a statewide inventory of the resources
- Disparate management of resources by multiple agencies for protection of various species
- Limited ability to compare data among systems
- Limited understanding of habitat loss due to historical land form changes
- Limited understanding of habitat change due to mouth management

Goal

- Build tools and compile the data necessary to systematically manage California's BBEs while accommodating for local management objectives.

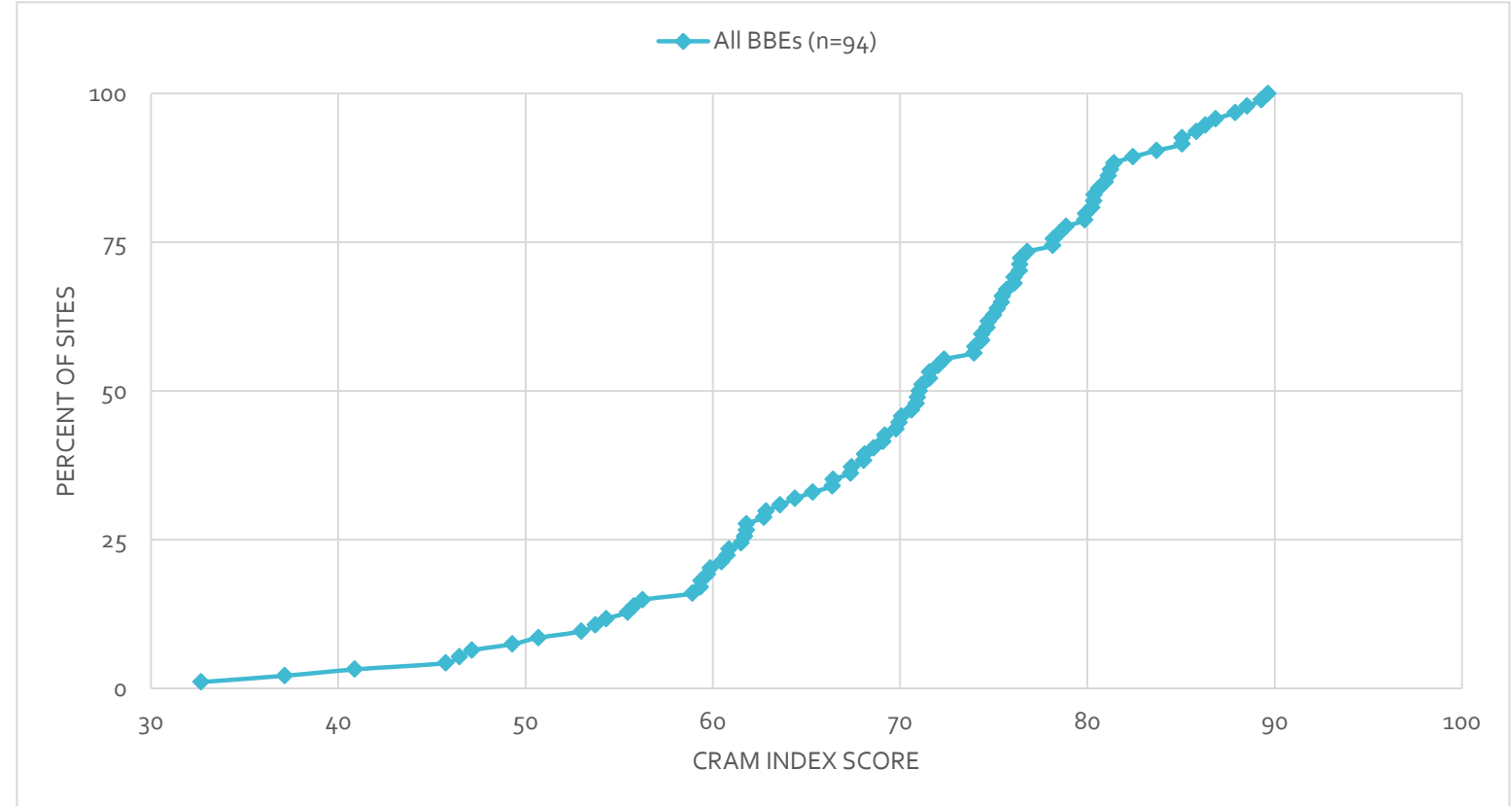
Solutions

- Lack of a statewide inventory of the resources
 - Inventory now complete of all California coastal confluences (SCCWRP, TNC, IEC)
- Disparate management of resources by multiple agencies for protection of various species
 - Working with coastal resource managers (USFWS and State Parks) to implement standardized monitoring tools
 - Working with NOAA/NMFS on standard BBE breaching guidance
- Limited ability to compare data among systems
 - Developed BBE CRAM module
 - Assess the condition of ~100 BBEs using watershed land cover and stressor analysis, CRAM, temp/depth loggers, topographic surveys (inundation maps), beach sediment grainsize, etc.
- Limited understanding of habitat loss due to historical land form changes
 - Map 1850 habitats of BBEs using USGS T-sheets and compare them to current habitat maps
- Limited understanding of habitat loss due to historical land form changes
 - Developed Inundation Periodicity Index



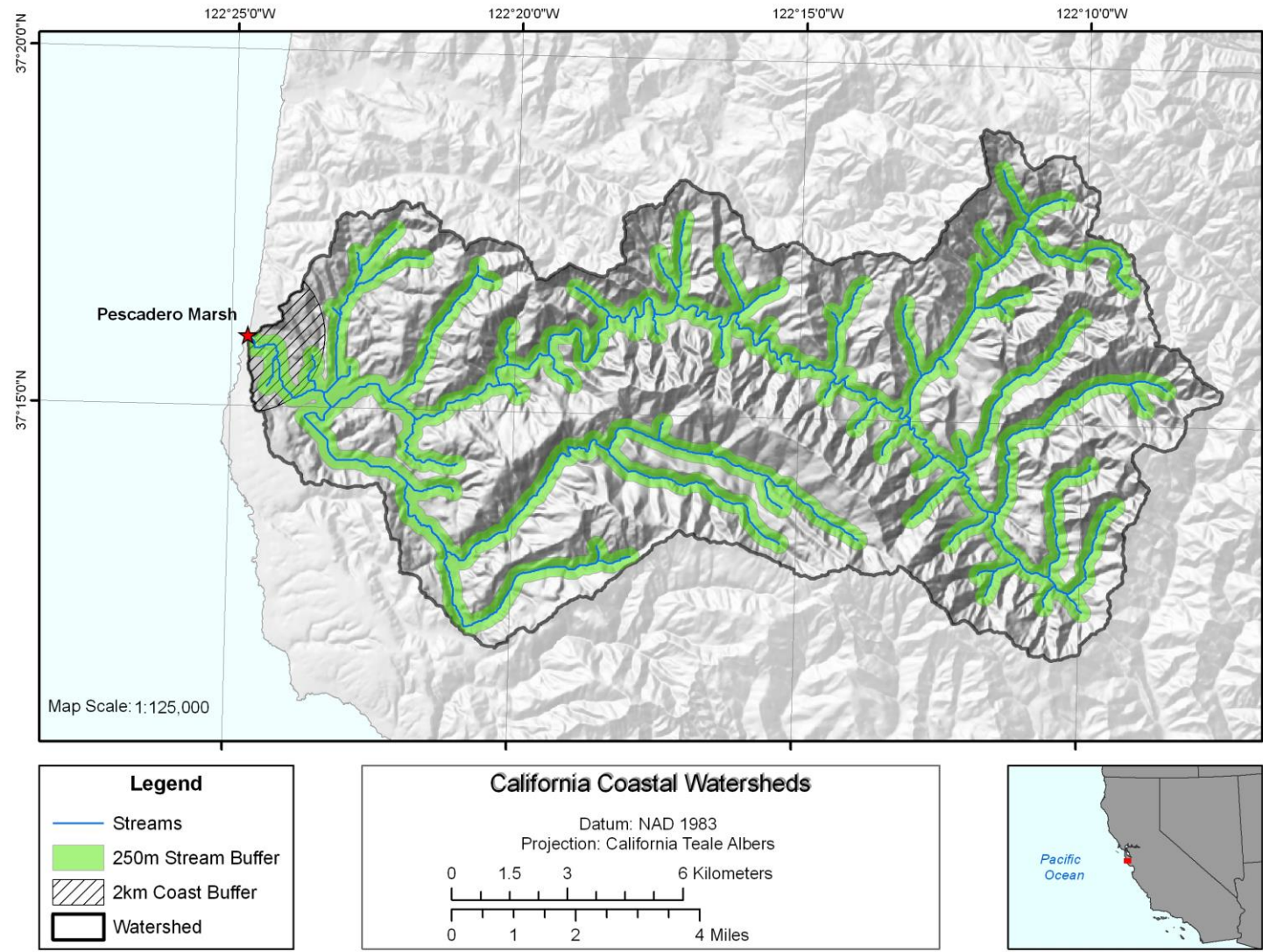
The Monitoring Tools

CRAM for Bar-Built Estuaries



www.cramwetlands.org

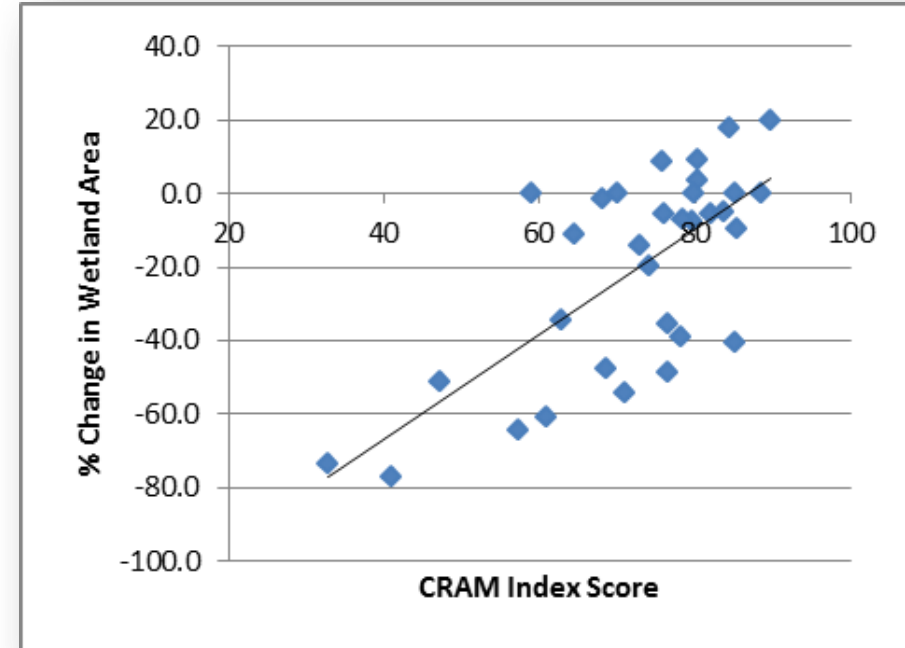
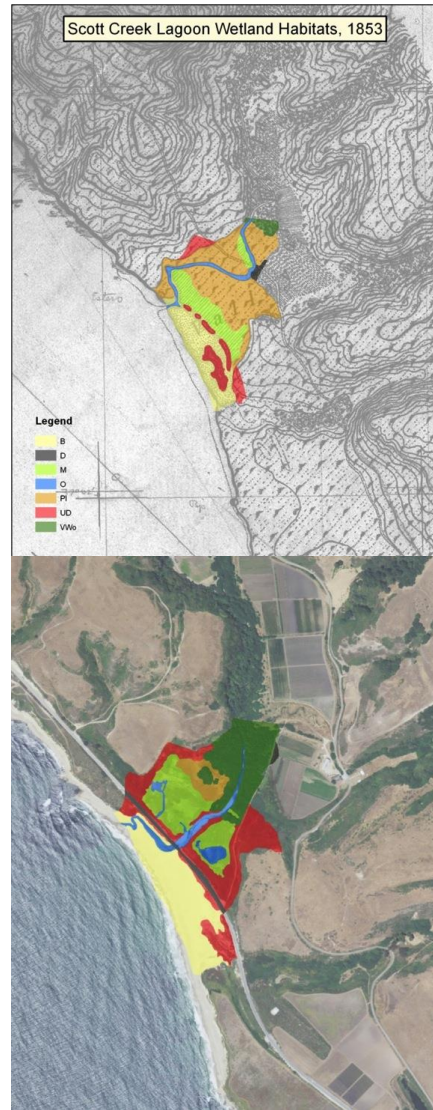
Watershed Land Cover and Stressors



Watershed Land Cover and Stressors

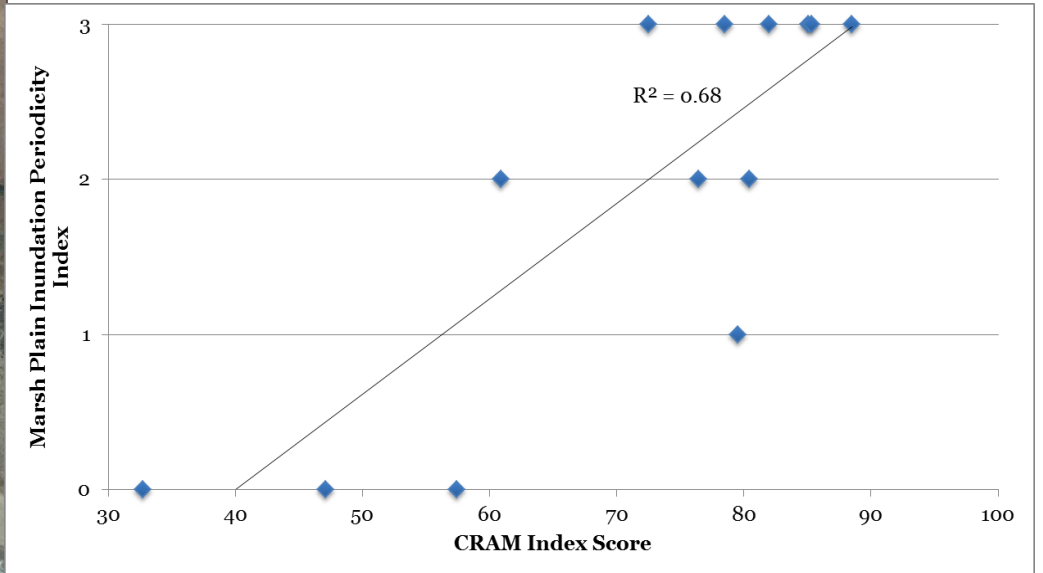
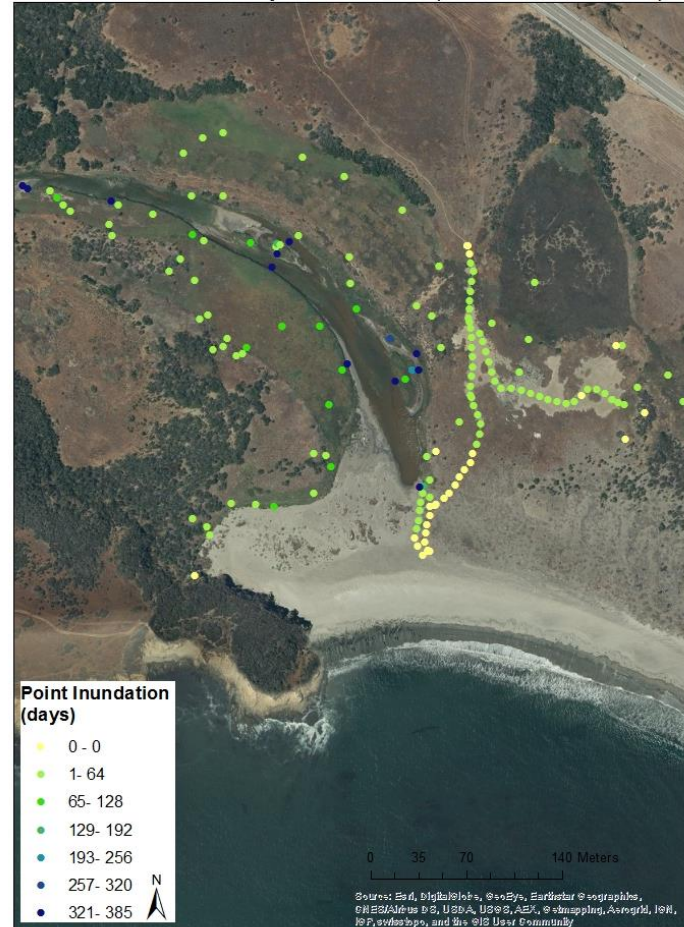
CRAM	GIS data
Buffer and Landscape	Percent Impervious (-)
stream corridor	Percent Impervious (-)
adjacent aquatic area	Percent Impervious (-)
adjacent aquatic area	Percent Agricultural (+)
Hydrology	Percent Impervious (-)
Hydrology	Percent Agriculture (-)
Hydrology	Percent Dams (-)
Hydrology	Density of Gravel Mines (-)
water source	Percent Impervious (-)
water source	Percent Agricultural (-)
Index	Percent Impervious (-)

Historical Loss/Alteration of Habitat



Inundation Periodicity Maps

Villa Creek Estuary Inundation (6.10.15 - 6.28.16)





Using the Tools

Three Management and Conservation Prioritization projects
in California

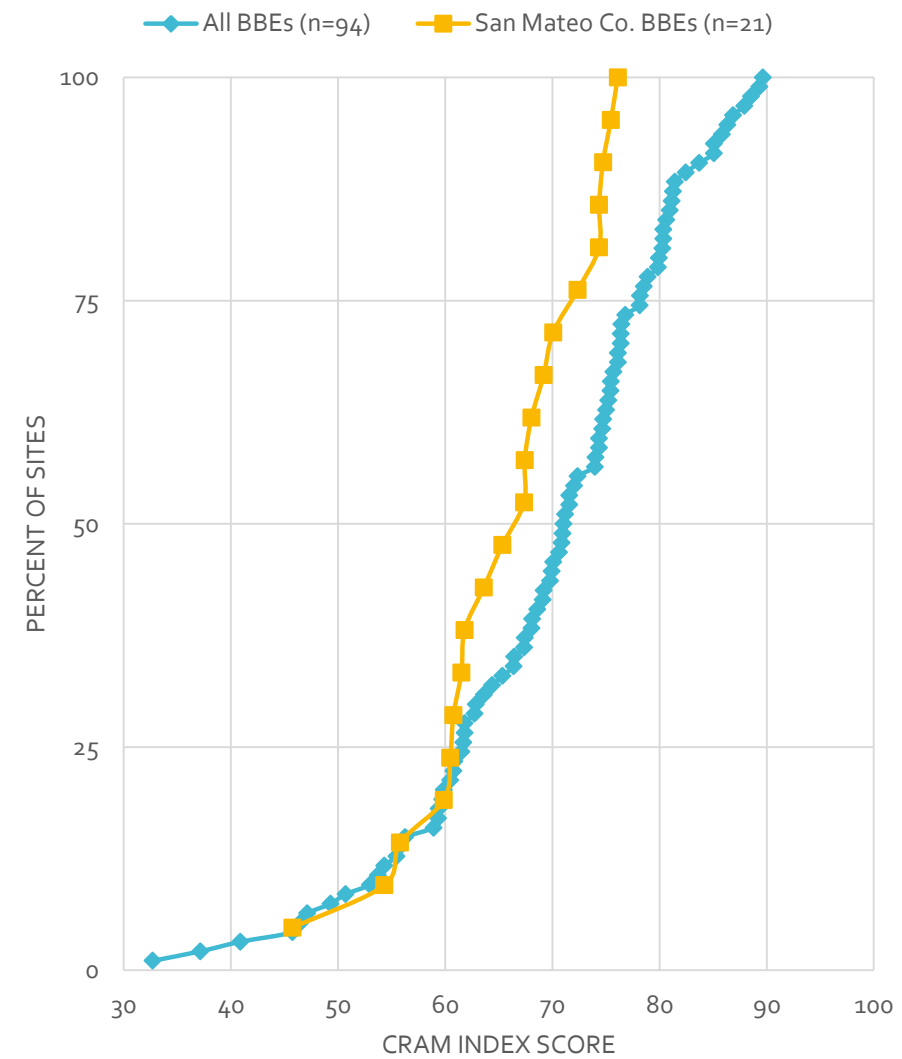
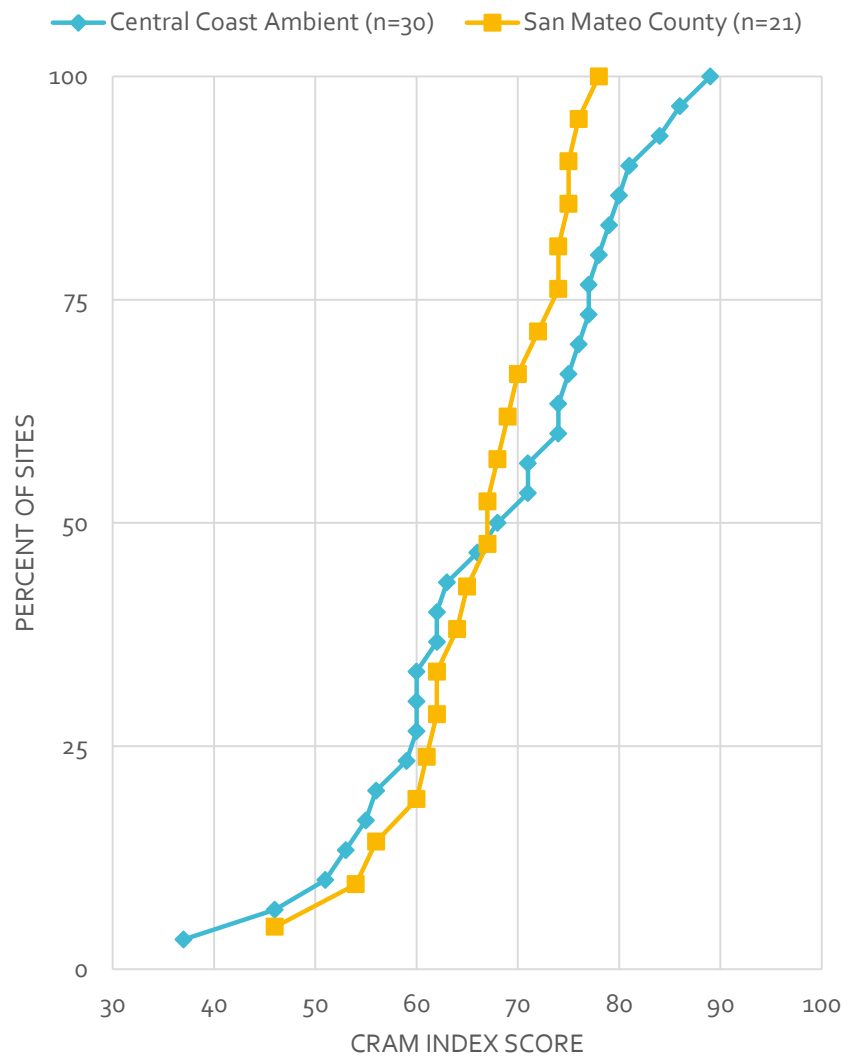
Assessment and Management Prioritization Regime for the Bar-built Estuaries of San Mateo County



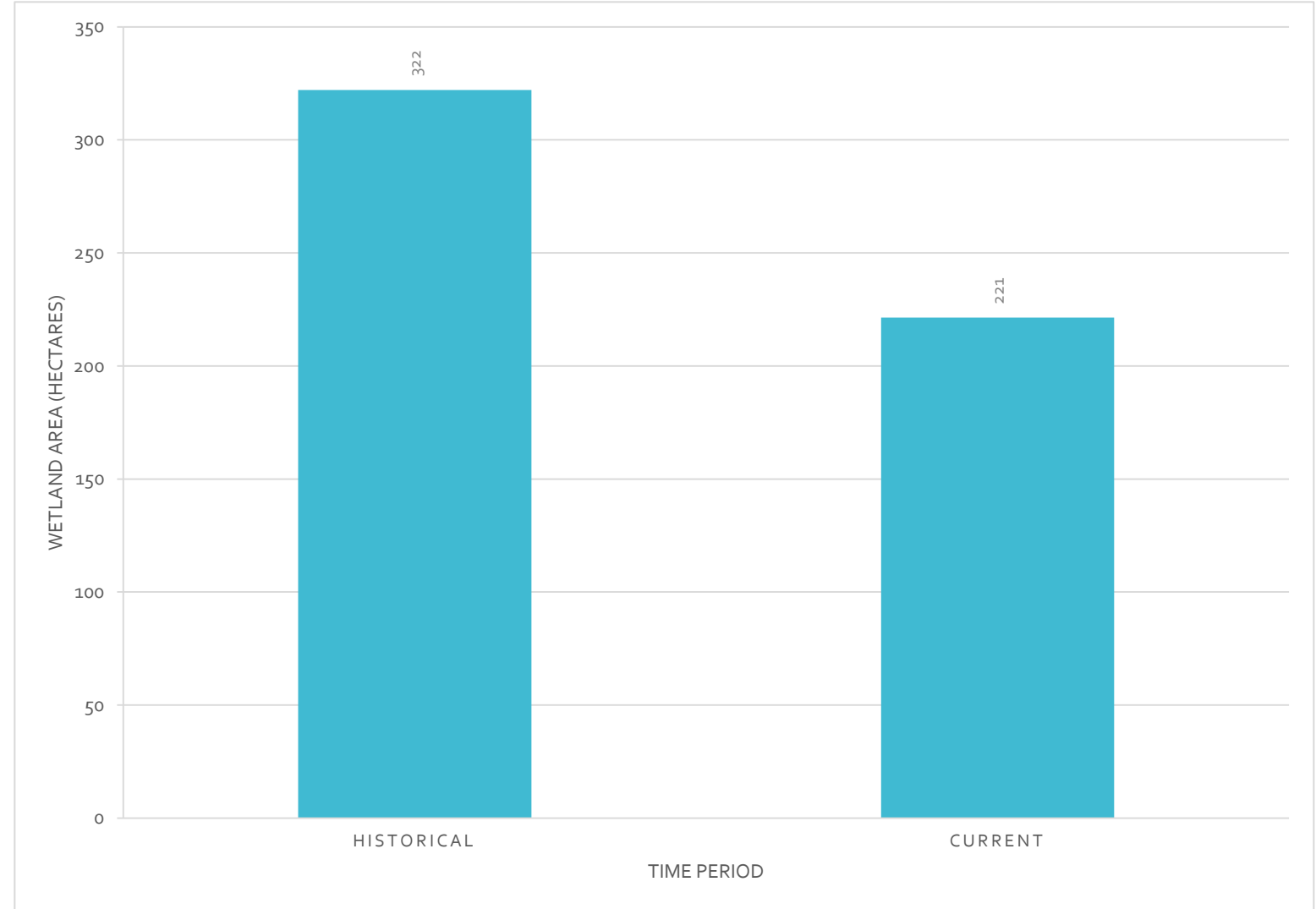
- For 22 bar-built estuaries:
 - Watershed stressors
 - BBE Condition (CRAM)
 - Historic loss/alteration of habitat
 - Special Status Species Survey
- Combined to direct restoration and conservation



CRAM

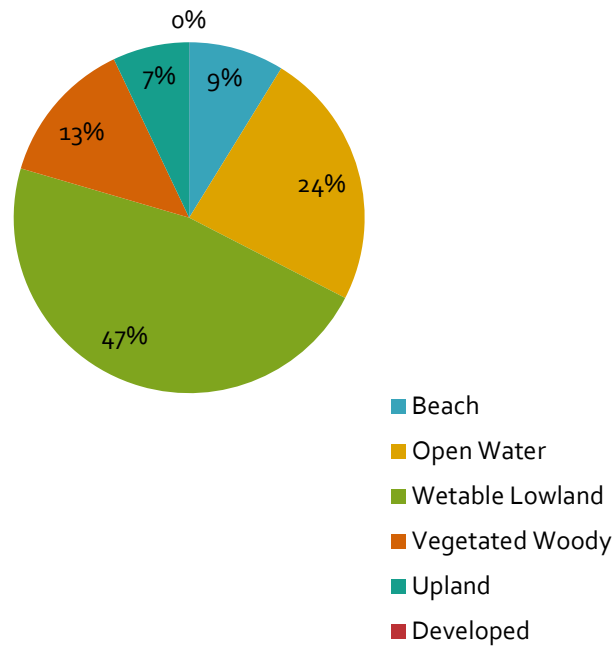


Habitat Change Analysis

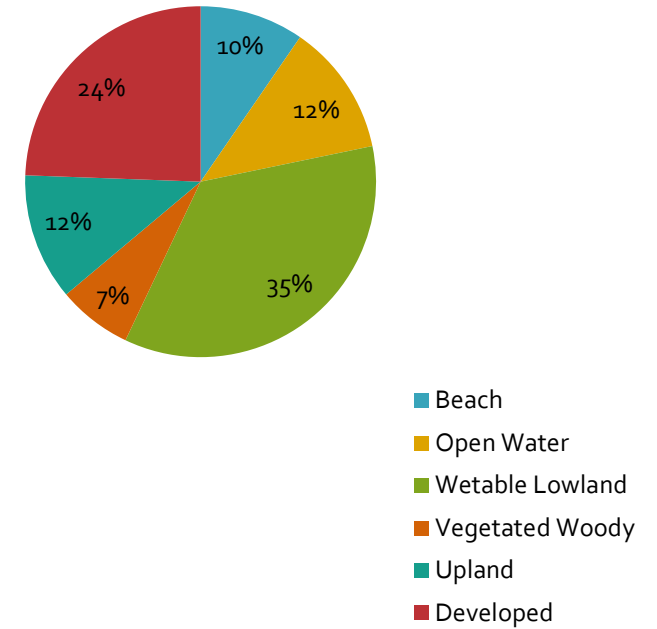


Habitat Change Analysis

Historical BBE Level 2 Habitat Composition



Current BBE Level 2 Habitat Composition



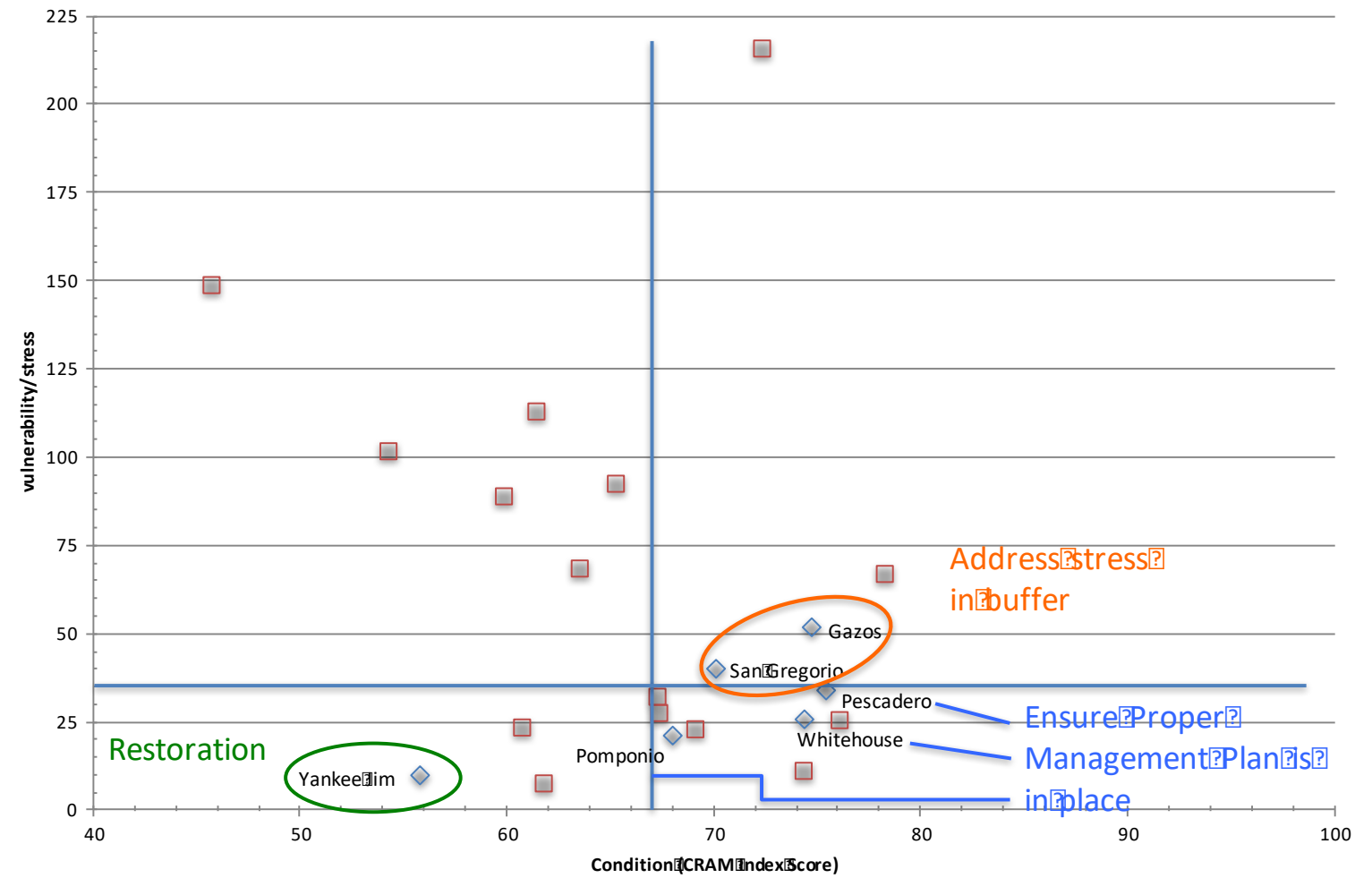
Special Status Species

Coastal Drainage Name	Snowy Plover	Coho	Steelhead	Western Pond Turtle	Tidewater Goby	Red-Legged Frog	SF garter snake	Saltmarsh common yellowthroat	Monarch Butterfly	Brackish water snail
San Pedro Creek			P		HP	P				
Martini Creek			P							
San Vicente Creek						W	W			
Arroyo de en Medio										
Frenchmans Creek			P			W	W		P	
Pilarcitos Creek			P		HP		P	P		
Canada Verde						W				
Lobitos Creek			P					P		
Tunitas Creek	P		P		P	W	W			
San Gregorio Creek		P	P		P	W	W	P		
Pomponio Creek			P		P					
Pescadero Marsh	P	P	P	P	P	P	P	P		P
Lake Lucerne					P	P			P	
Spring Bridge Gulch										
S. Spring Bridge Gulch										
Yankee Jim Gulch					P					
Creek Mouth SW Pigeon Point										
Gazos Creek	P		P		P					
Whitehouse Creek			P			W	P			
Cascade Creek										
Ano Nuevo Creek	P		P			W	W			

Prioritization Strategies

1. Iterative Selection based on prioritization of collected data
2. Health-Vulnerability Graph
3. EPA Decision Support Tool

Prioritization Example



Prioritization Combination

Site Name	Index Score	Prioritization 1	Prioritization 2	Prioritization 3	Total
San Gregorio Creek	70	1	1	1	3
Yankee Jim Gulch	56	1	1	1	3
Pescadero Marsh	75		1	1	2
Gazos Creek	75	1	1		2
Whitehouse Creek	74		1	1	2
Spring Bridge Gulch	76			1	1
Tunitas Creek	74			1	1
Pomponio Creek	68		1		1
Ano Nuevo Creek	67			1	1
Frenchmans Creek	65	1			1
S. Spring Bridge Gulch	64			1	1
Martini Creek	62			1	1
Creek SW Pigeon Point	61			1	1
Pilarcitos Creek	60	1			1
Cascade Creek	78				0
San Pedro Creek	72				0
Lake Lucerne	69				0
Lobitos Creek	67				0
San Vicente Creek	62				0
Canada Verde Creek	54				0
Arroyo de En Medio	46				0

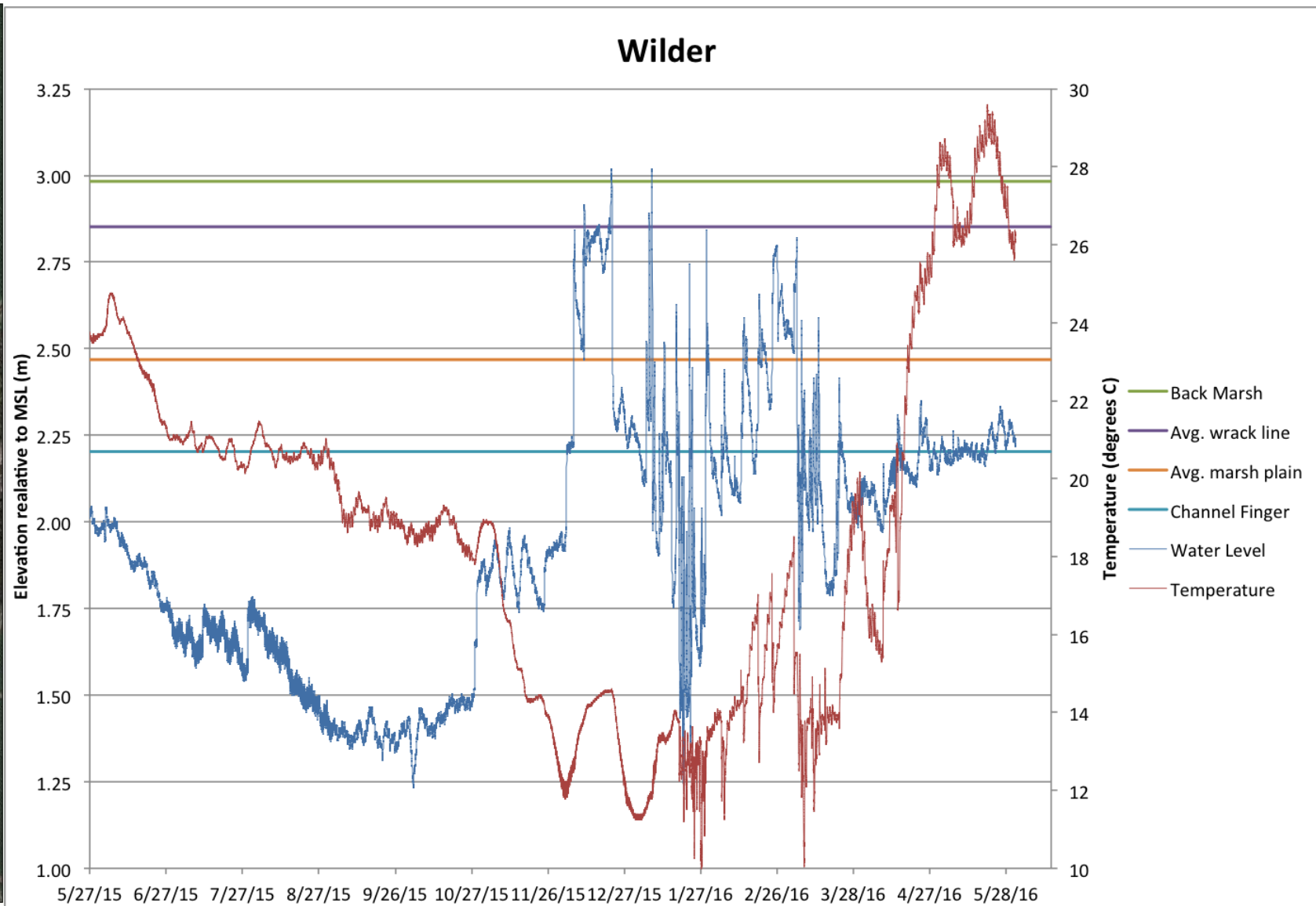
Development of a Bar-built estuary monitoring system and resource management prioritization tool for California State Parks



- For 30 bar-built estuaries:
 - BBE Condition (CRAM)
 - Watershed stressors
 - Historical loss/alteration of habitat
 - Temp/Depth loggers
 - Marsh plain and beach topo survey
 - Beach sand grain size analysis
 - SLR Vulnerability (SCCWRP method)
- Combined to assist with management, restoration, etc.
- Establish long-term water level monitoring program at multiple sites



Wilder Inundation (5.27.15 - 5.31.16)



Guidance for Management of Bar-built Estuaries in California



West Coast Region
National Marine Fisheries Service

- For 3 focal bar-built estuaries:
 - Identify key biological and physical parameters that influence lagoon habitat function
 - Identify, compile and summarize existing information
 - Characterize each focal system based on key physical and biological parameters
 - Develop recommendations regarding sandbar management and other important management actions for achieving favorable habitat function
- Results can be applied to similar (non-focal) lagoon systems

