STREAM HEALTH OF THE COYOTE CREEK AND GUADALUPE RIVER WATERSHEDS USING WRAMP

CALIFORNIA'S WETLAND AND RIPARIAN AREA MONITORING PLAN (WRAMP)

WRAMP is a framework and toolset for collecting and managing information to assess the condition of aquatic resources. This assessment of stream condition in the Coyote Creek and Guadalupe River watersheds used the following WRAMP tools:



California Aquatic Resources Inventory: CARI is a digital dataset of surface waters

throughout the state, a standardized mapping methodology, and a classification system with crosswalks to other systems used by USFWS, CalFire, USGS, Habitat Joint Ventures, and other agencies. www.sfei.org/it/gis/cari



California Rapid Assessment Method: CRAM is a cost-effective and scientifically defensible, standardized method for monitoring the overall ecological condition or health of wetlands and streams throughout California. www.cramwetlands.org

Online data access, visualization, and

EcoAtlas

summarizing tools: EcoAtlas is an information visualization and delivery system for environmental regulatory and management programs. The Project Tracker enables users to map and track natural resource management actions, including restoration and mitigation projects. The Landscape Profile Tool uses web services and spatial queries to aggregate environmental information for any user-defined area throughout the state. www.ecoatlas.org

WRAMP PARTICIPATING AGENCIES AND WORK GROUPS

http://www.mywaterquality.ca.gov/monitoring_council/wetland_workgroup/wramp/



Stevens, D.L., Jr., and A.R. Olsen. 2004. Spatially balanced sampling of natural resources. Journal of the American Statistical Association 99(465): 262-278. EOA, Inc. and San Francisco Estuary Institute. 2011. Ecological Monitoring & Assessment Framework. Stream Ecosystem

Condition Profile: Coyote Creek Watershed Including the Upper Penitencia Creek Subwatershed. Final Technical Report #2. Prepared for: Santa Clara Valley Water District.

San Francisco Estuary Institute & Aquatic Science Center. 2013. Statistical Design, Analysis and Graphics for the Guadalupe River Assessment. Technical Memoranda Two, Four & Five. Report prepared for the Santa Clara Valley Water District Agreement Number A3562F. SFEI Contribution No. 687. Richmond, California.

SFEI AQUATIC SCIENCE CENTER Santa Clara Valley Water District Sarah Lowe, Cristina Grosso, Sarah Pearce April Robinson, Micha Salomon, Pete Kauhanen, Gemma Shusterman, Shira Bezalel and Josh Collins -SFEI-ASC

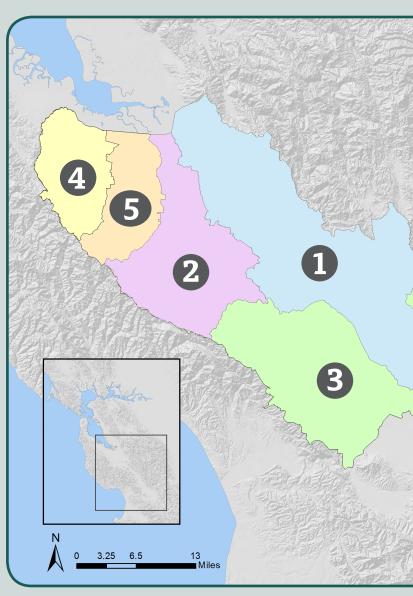
Doug Titus, Lisa Porcella and Matt Parsons - SCVWD

THE SANTA CLARA VALLEY WATER DISTRICT (SCVWD) IS IMPLEMENTING WRAMP



The voter-approved Safe Clean Water and Natural Flood Protection Program of the SCVWD includes priorities to restore wildlife habitat and

provide open space. Under these priorities, the Ecological Data Collection and Analysis project is using WRAMP as an integral part of its comprehensive, watershed approach to planning and protecting natural resources and assets. The SCVWD is applying WRAMP in five watersheds in Santa Clara County using the following tools:



The SCVWD Ecological Data Collection and Analysis project began watershed based stream assessments in 2010 to establish ecological service indices (ESIs) that are science based, standardized and repeatable. The assessments are conducted on an ongoing basis with repeat assessments over time to determine if ecological levels of service are maintained or improved.

The SCVWD expects that their watershed approach to ecological monitoring and assessment will increase the effectiveness of its management actions by improving their coordination and positive cumulative effects.

- CARI to characterize the abundance, and diversity of aquatic resources;
- Probabilistic surveys using CRAM to evaluate the overall ecological condition of streams, and
- Intensive assessment and focused studies to support specific management actions such as fish passage improvements and stream, upland, and wetland and riparian habitat revitalization.

http://www.valleywater.org/SCW-D.aspx

SCVWD has completed ambient assessments in the **1** Coyote Creek and **2** Guadalupe River watershed (2010 and 2012 respectively) and is currently assessing the **3** Pajaro River and **4** Lower San Francisco Bay peninsula watersheds in 2015 and 2016. The **5**West Valley watershed assessment is planned for 2017.

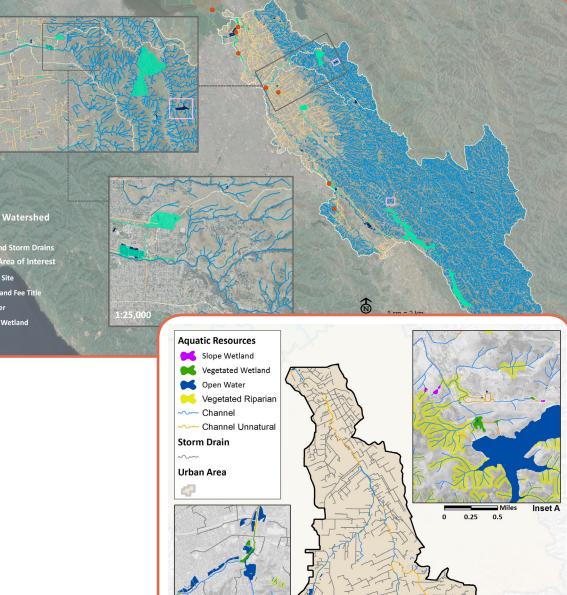
The watershed assessments characterize the abundance and diversity of aquatic resources, and overall ecological condition of streams within each watershed.

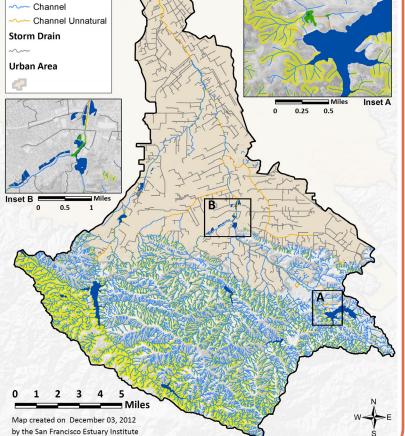
BENEFITS OF THE WATERSHED APPROACH

The WRAMP framework is consistent with the federal and state's watershed approach to mitigation planning, and has been shown to:

- Provide a systematic, scientific framework for actions to improve stream conditions;
- Support effective design options for capital projects;
- Maximize the return on investments in ecosystem health;
- Improve access to data and information; and
- Improve public reporting of program performance.

DETERMINE ABUNDANCE AND DIVERSITY OF AQUATIC RESOURCES





2 ASSESS OVERALL STREAM HEALTH

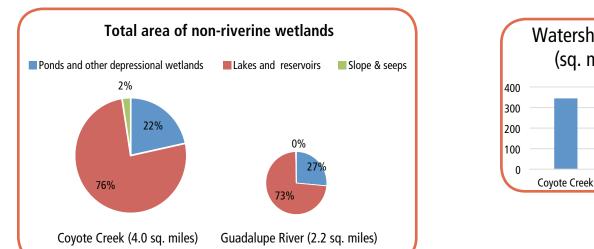
A probability sample is used to characterize the overall health of all streams within the watersheds with known levels of confidence.

2.2 Conduct field assessments using CRAM.

Field observations are carried out by trained CRAM practitioners.

CASE STUDY: SCVWD's Coyote Creek and Guadalupe River Assessments

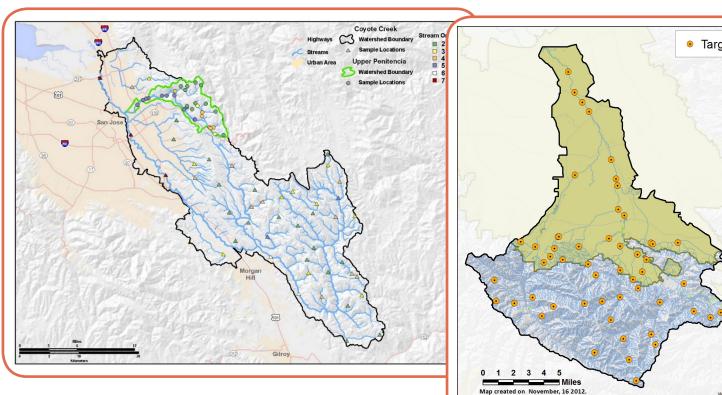
Knowing the amounts and types of aquatic resources within the watershed lets managers track changes in their condition over time.

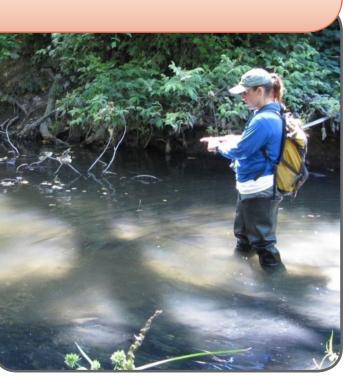


	Watershed Area	Total Stream Miles		
	(sq. miles)	3000		
400		2500		
300		2000		
		1500		
200		1000		
100		500		
0		0		
	Coyote Creek Guadalupe River		Coyote Creek Guadalupe River	

- The Coyote Creek watershed is about twice as large as the Guadalupe River watershed.
- Coyote Creek has >60% more stream miles.
- Coyote Creek has about twice as many acres of wetlands, but roughly similar proportions of wetland types.

2.1 Develop the sample draw using the CARI streams dataset.





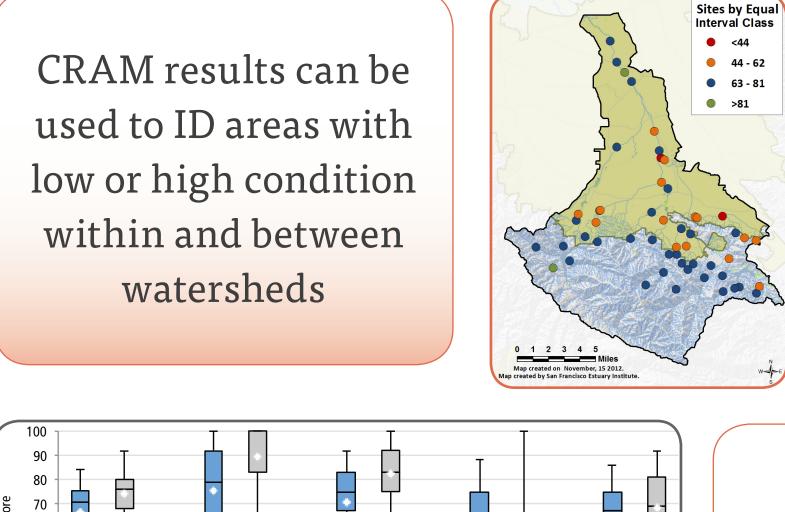
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			Hydrologic Connectivity		
Tenegraphic Complexity		Physical	Structural Patch Richness		
Topographic Complexity		Biotic	Topographic Complexity		
Plant Community Composition:			Plant Community Composition:		
Number of Plant Layers Present	ructuro		Number of Plant Layers Present		
	ucture		Number of Co-dominant Species		
Percent Invasion			Percent Invasion		
Horizontal Interspersion			Horizontal Interspersion		
Vertical Biotic Structure			Vertical Biotic Structure		

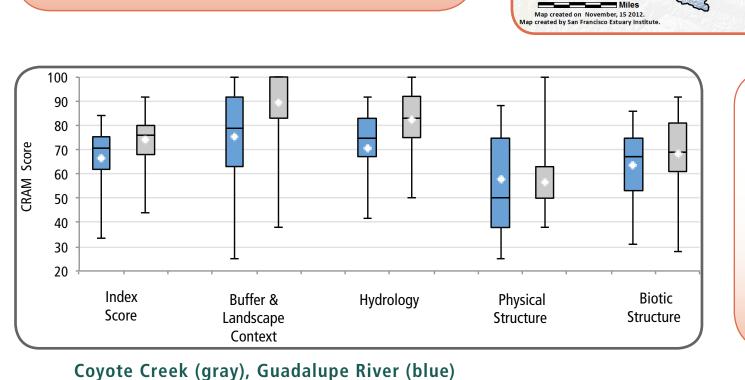
2.3. Enter data into eCRAM (www.cramwetlands).

CRAM		Wetland Condition (CRAM)			
Assessment Form NAME: Assessment 1 WETLAND TYPE: Riverine Non- Version: 6.1* eCRAM ID: 4233 eCRAM User: cristina@sfei.		CRAM AA Locator			
Get Help Settings	ng	Limit above list to AAs currently visible in map window			
Save Assessment	Buffer And Landscape Context: Average Buffer Width	Filter AAs by:			
Basic Information Riverine Information		Wetland Type	•		
Documents and Photos	Transect Buffer Width (m) Transect Buffer Width (m)				
Buffer And Landscape Context 52.79	A 150 E 174	AA Category			
Stream Corridor Continuity D (3) Percent Of AA With Buffer A (12)	B 175 F 175				
Average Buffer Width B (9)		Filter by Index Score	25 - 100		
Buffer Condition B (9)	C 180 G 175		5		
Hydrology 58.33	D 230 H 200 +	25	100		
Water Source A (12) Channel Stability C (6)		20			
Hydrologic Connectivity D (3)	Average Buffer Width: 182	Filter by Assessment Year	2005 - 2015		
Physical Structure 62.50	Show Comment	4			
Structural Patch Richness D (3)		2005	2015		
Topographic Complexity A (12)		2003			
Biotic Structure 83.33 Plant Community		Clear	Download All Public CRAM Data		
floating or canopy-forming	Buffer And Landscape Context: Buffer Condition	ordar	Bownioad / in Fubic Or V in Bala		
short					
medium	A Buffer for AA is dominated by native vegetation, has undisturbed soils, and a solution of the solution of				
tall	Buffer for AA is characterized by an intermediate mix of native and non-na undisturbed soils and is apparently subject to little or low impact human v				
very tall Number Of Plant Layers Present A (12)	● B OR				
Number Of Co-dominant Species D (3)	Buffer for AA is dominated by native vegetation, but shows some soil disturbance and is apparently subject to little or low impact human visitation.		Dete antened into a CDANI:		
Percent Invasion A (12) Plant Community Score 9		C Buffer for AA is characterized by substantial (>75%) amounts of non-native vegetation AND there is at least a moderate degree of soll disturbance/compaction, and/or there is evidence of at least moderate intensity of human visitation.		Data entered into eCRAM is	
Horizontal Interspersion And Zonation B (9)	Buffer for AA is characterized by barren ground and/or highly compacted				
ertical Biotic Structure A (12)			• •1 1	A . 1 1	
Wetland Disturbances And Conversions	Show Comment		visible on EcoAtlas and can		
Hydrology					
Physical Structure					
Biotic Structure Buffer And Landscape Context					
Save Assessment	Hydrology: Water Source		be downloaded in tabular		
Save Assessment	njarolegji nato osaroo				
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			format for fi	arther analyses.	

3 RESULTS

3.1 Summarize CRAM Scores.





3.2 Cumulative Distribution Function Plots (CDFs) of CRAM Index Scores for Streams.

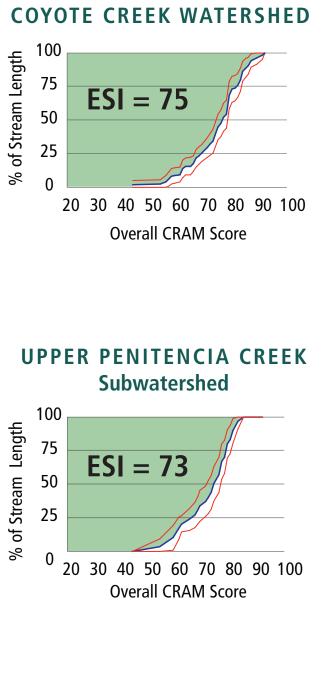
CDFs, based on the probability sample draw characterize the condition of all streams within the whole watershed.

> As management actions within the watersheds improve and revitalize streams over time, one would expect conditions to improve, shifting the CDF curves to the right.

> > Comparing CDFs from Coyote Creek and Guadalupe River watersheds indicates that Guadalupe River streams have lower CRAM Scores as evidenced by the whole curve being shifted left by about 5 CRAM points.

3.3 Ecological Service Indices (ESIs).

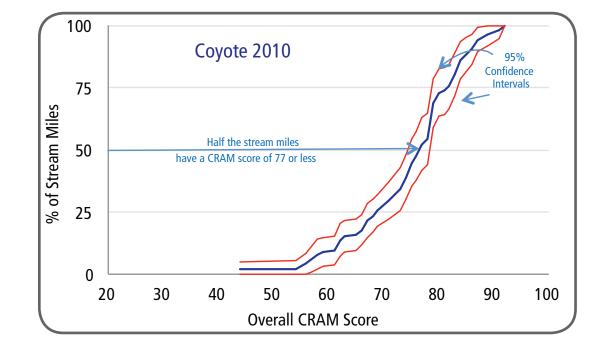
The ESI is calculated as the sum of individual CRAM scores times the proportion of the stream length represented by each score.

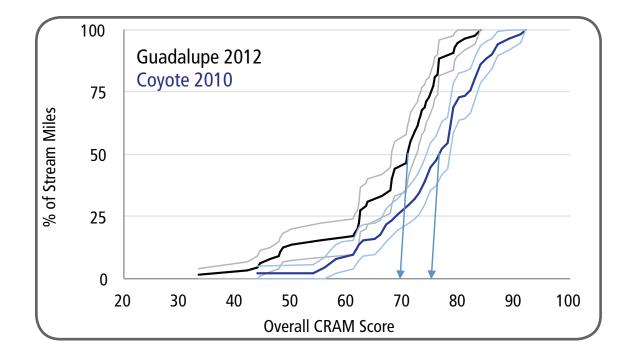




Map showing the range of possible scores (25-100) divided into 4 equal parts.

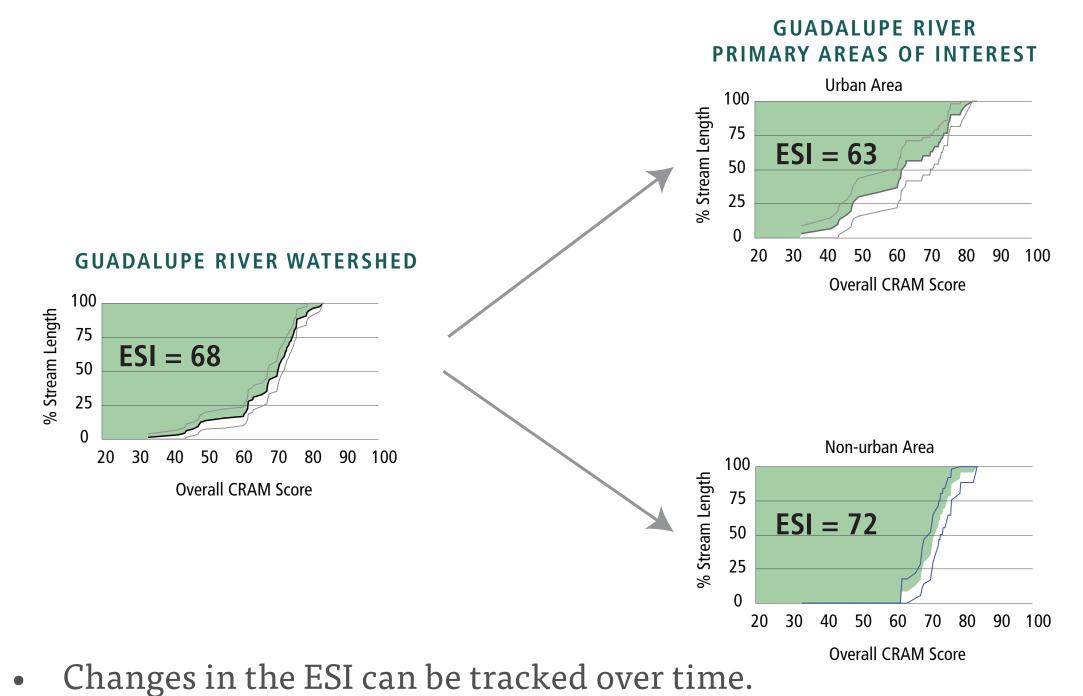
Box plots show summary statistics about the range of scores within each watershed including the inter-quartile range, median, and mean (white diamond).





The Coyote Creek watershed stream survey indicates that 50% of the streams have a CRAM Score of 77 or lower (with a 95% confidence interval between 74-78).

50% of the streams in the Guadalupe River watershed have a CRAM Score of 71 or lower (with a 95% confidence interval between 68-72).



• The SCVWD could develop watershed goals based on reaching specific target ESI levels for whole watersheds, subwatersheds and/or other areas of interest.

The ESI is a landscapelevel statistic that can be used to describe the overall ecological condition (or health) of streams within a watershed that have been assessed using a probability based sample design and CRAM.