



Point Blue Conservation Science

The Students & Teachers Restoring A Watershed (STRAW) Program



Today's Talk

1. **Point Blue and STRAW's History**
2. **Our Approach to Community Involvement in Restoration**
3. **Our Approach to Restoration Design, Establishment, and Monitoring**

Restoration Works!!

2004



2012



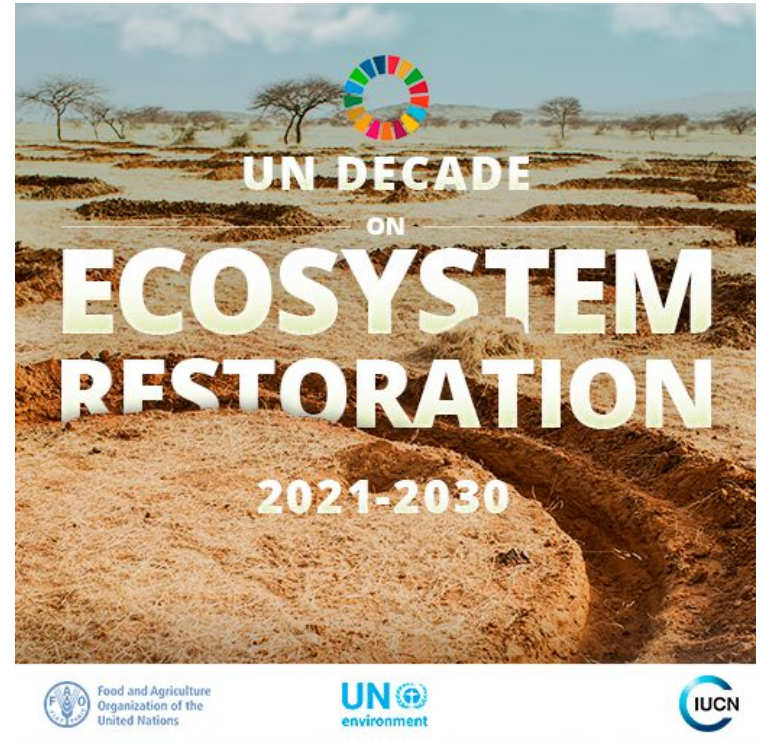
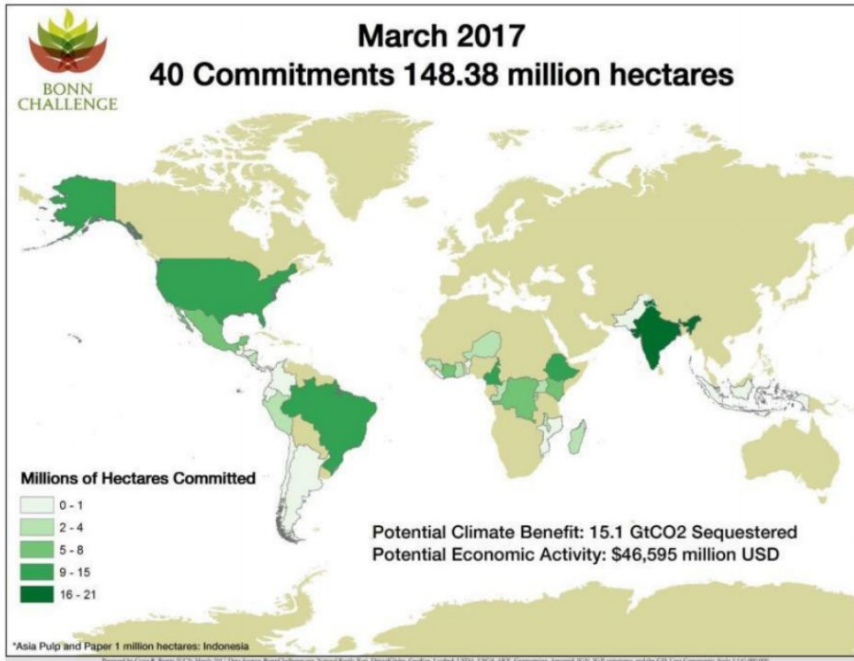
2020



Restoration Works!!



Restoration Really Works!



- **Mission:** We work to advance the conservation of birds, other wildlife, and ecosystems through science, partnerships, restoration and outreach. We work to reduce the impacts of climate change, habitat loss, and other environmental threats while developing nature-based solutions to benefit both people and wildlife.
- **160 passionate & dedicated scientists** on the ground and in partnership from Alaska to Peru, from the Sierra to the Sea, and as far as Antarctica
- **Founded in 1965** as Point Reyes Bird Observatory
- **Headquartered** in Petaluma!
- **SCIENCE** is at the core of everything we do
- **Current Priority:** increasing the pace and scale of climate-smart conservation to address one of the most pressing challenges of our time: climate change





STRAW's Goals

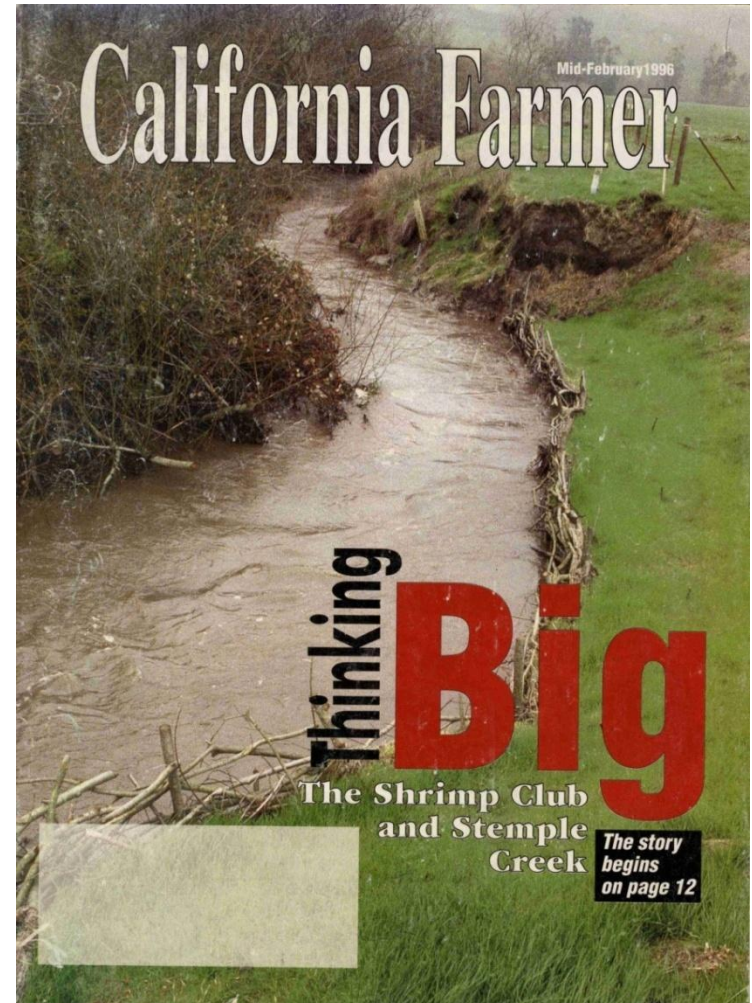
- 1. Empower Students
- 1. Support Teachers
- 1. Provide Education
- 1. Reconnect Communities
- 1. Restore The Environment



The Big Picture

Since 1992:

- Over 40,000 Students
- More than 10,000 volunteers
- Over 550 restorations
- Over 40,000 native plants
- Over 35 miles of riparian habitat
- Over 6 acres of marsh/upland transition zone habitat



Kids Are Empowered

“I think this project changed everything I thought we could do. I always thought kids meant nothing. I feel that it did show me that kids can make a difference in the world, and that we are not just little dots.”

-Megan Marsh

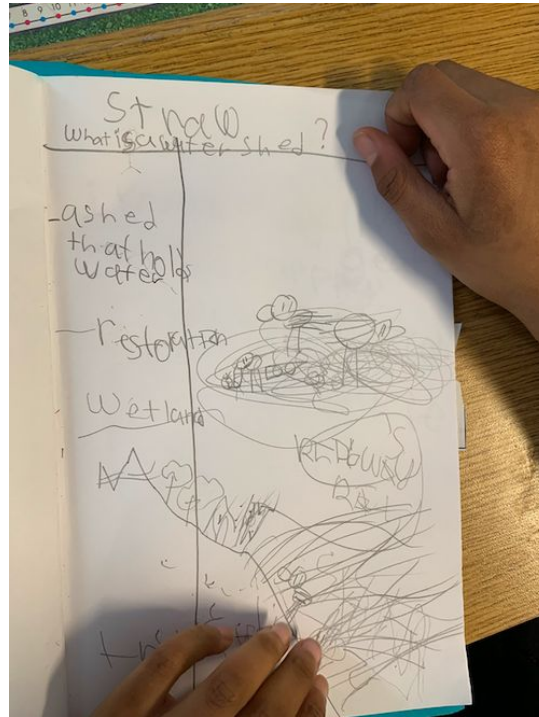
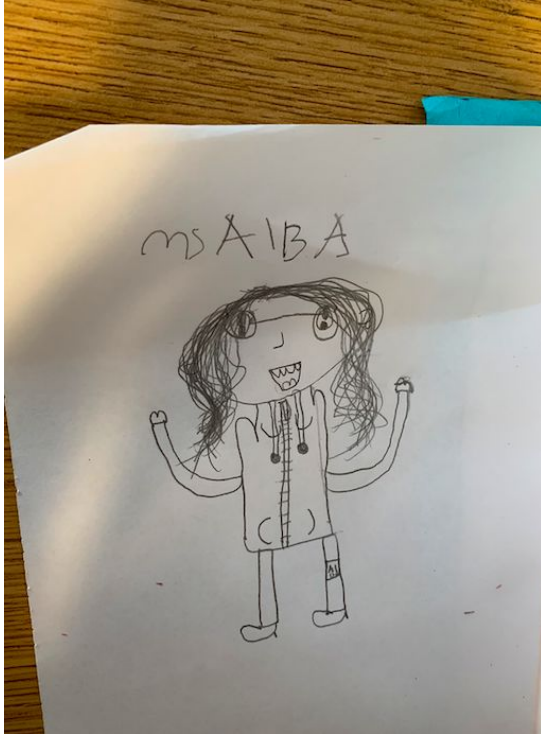


“... uses the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective.

Geneva Gay (2010)

On the definition of culturally relevant teaching

Embracing Diverse Learning Behaviors



Bilingual Education - Surpassing the Language Barrier



Chaperone Circles

Intergenerational
approach and support.

- Helps create an experience for both younger and older people
- Supports the experience the young people have in the field (that they can do the work)
- Creates a home that is environmentally conscious.
- Do circles in both Spanish and English.

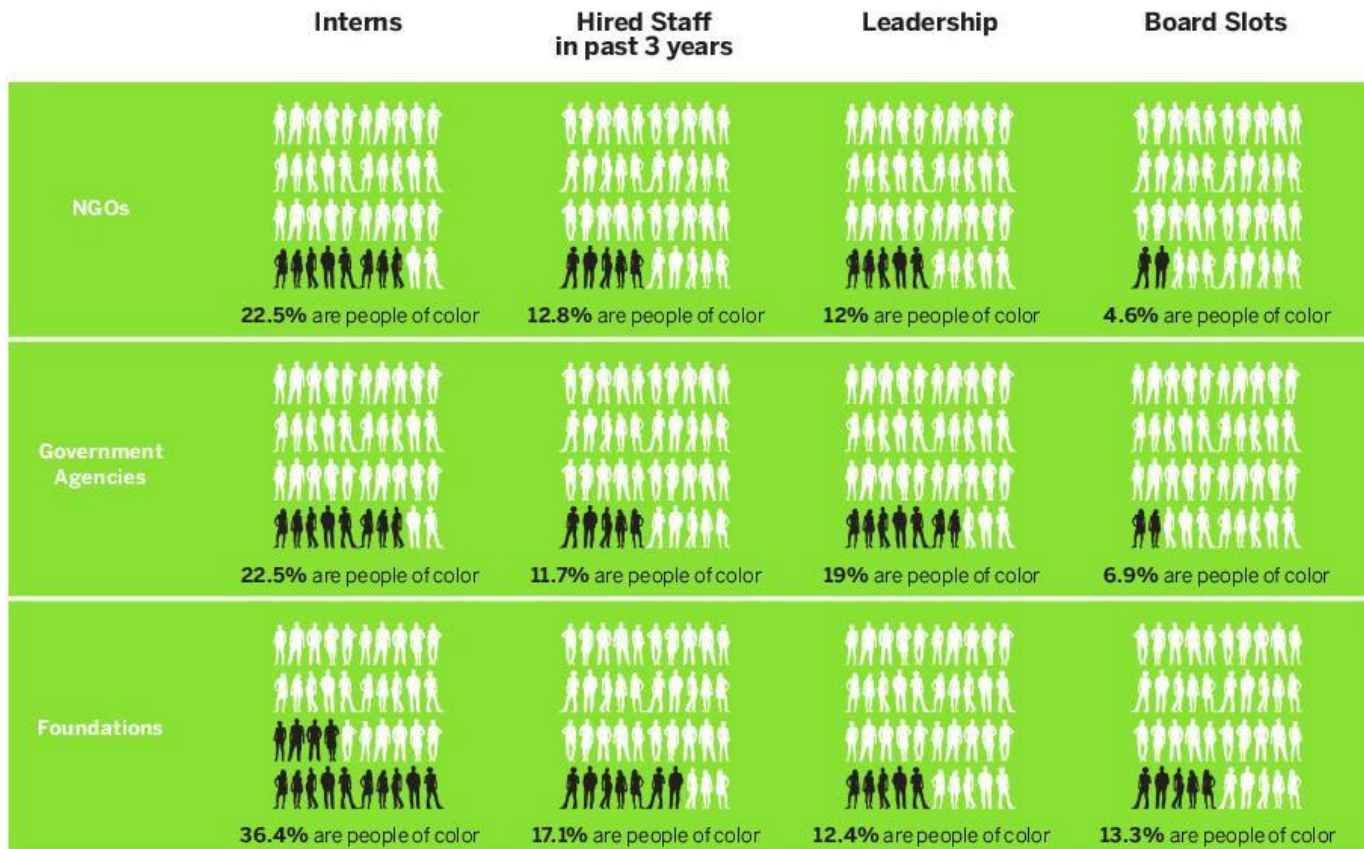


Watershed Week



STRAW's Community College Conservation (CCCI) Internship Goals:

1. Learn the theory behind and practices in environmental science.
2. Create a practice of self-awareness and critical thinking to navigate the predominately white environmental field as BIPOC.
3. To create a sense of belonging and build a supportive community.



Community College Student Population

Undergraduate Student Population



40% of all undergraduates are in community college

~6 M (US), 2 M (CA)



$\frac{2}{3}$ of CC students are *people of color and/or of low socioeconomic status*

68% (CA)

1. <https://nscresearchcenter.org/signaturereport13/>
2. <http://californiacommunitycolleges.cccco.edu/PolicyInAction/KeyFacts.aspx>

CCCI Structure

Duration:

- 10 week program

Location:

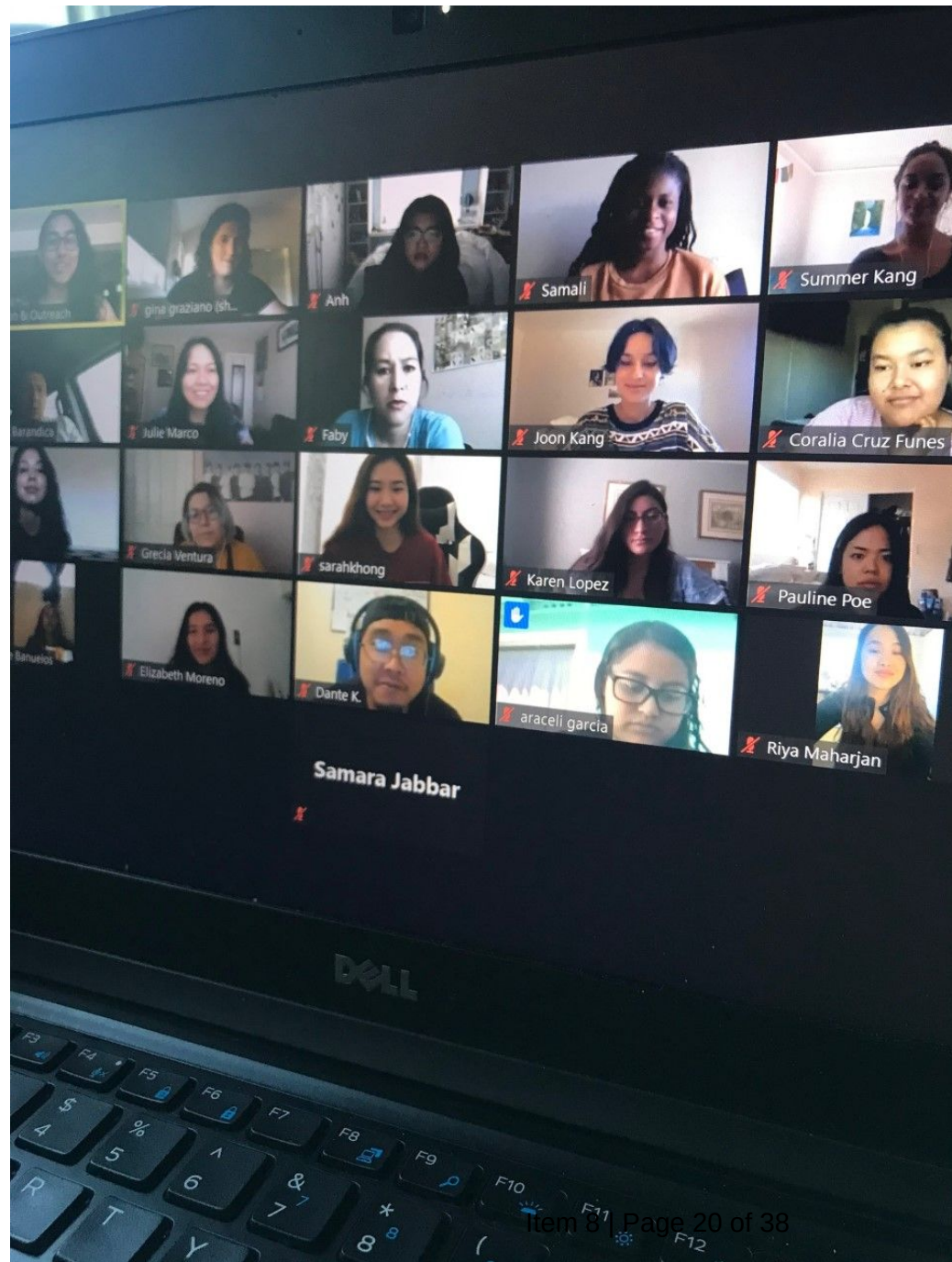
- Virtually & Field Visits

Program

- Once a week
- 2 hour webinars
- Full day field visits
-

Post - Program Apprenticeships

- Full-time or part-time
- Flexible length... semester, 9 months



Climate Smart Restoration

An innovative and empowering approach to restoration,
and environmental and social justice



Our Role In Restoration:

1. Revegetation
2. Biotechnical Erosion Control
3. Invasive Plant Control
4. Community Engagement
5. “One-Stop” Project Management
 - Planning/Design
 - Implementation
 - Maintenance
 - Monitoring & Reporting





Partners!



SFBRA Staff!

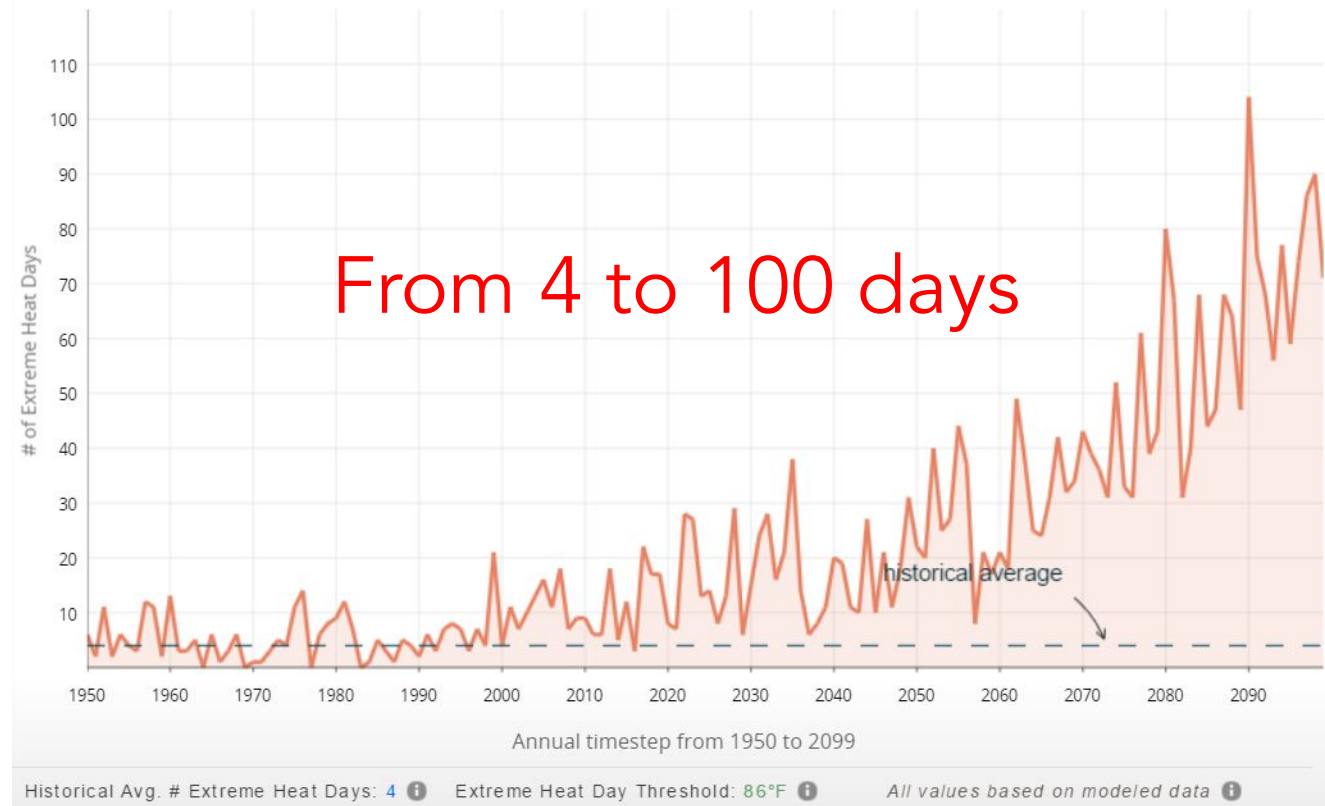


The Marsh/Upland Transition Zone



Climate change and restoration

Number of extreme heat days by year for Larkspur California



<https://cal-adapt.org/>

Climate Projections Summary

San Francisco Bay Area

More frequent & severe extreme events

heat waves, storms, flooding, droughts, wildfires

Reduced surface water supply

more evaporation, changes in dam operations

Increased groundwater demand

lowered water tables, salinity infiltration, decreased water quality

Increased stream temperatures

reduced habitat quality for native fish, especially salmonids

Rising sea level

Coastal flooding, infrastructure damage

Reduced air quality

wildfire smoke, particulate matter, ground level ozone, smog

Increased public safety & health risks (and associated \$)

levee stress, air & water quality, fire & flood risk

Climate-smart ecological restoration is the process of enhancing ecological function of degraded or destroyed areas in a manner that makes them more resilient to the consequences of climate change.

Gardali et al. in prep

Seven climate-smart restoration principles



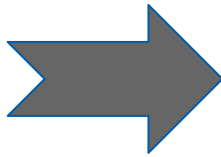
Show your work



Look forward but don't ignore the past



Consider the broader context



Build ecological insurance - redundancy



Build evolutionary resilience



Include the human community

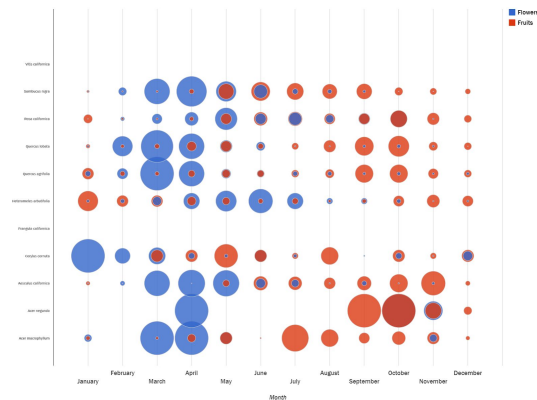


Research and monitor

Climate Smart Riparian Planting Tool

	A	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Climate-Smart Planting: Trees			Climate-related traits					Resources for wildlife							
2		Vegetation species		(Y = yes, N = no, ? = undetermined)					(Y = yes, N = no, ? = undetermined)							
3	In planting design?	Common Name	Scientific Name	Tolerates full or partial sun	Tolerates clay soil	Tolerates wet conditions	Tolerates dry conditions	Evergreen	Fire Adapted	Wildlife fruit source	Wildlife Nectar source	Wildlife Seed Source	Insectary Plant	Jan	Feb	Mar
4	Total species			0	0	0	0	0	0	0	0	0	0	0	0	0
5		big leaf maple	<i>Acer macrophyllum</i>	Y	Y	Y	Y	N	Y	N	N	Y	N			
6		boxelder	<i>Acer negundo</i>	Y	Y	Y	Y	N	N	N	?	Y	Y			F
7		California buckeye	<i>Aesculus californica</i>	Y	Y	Y	Y	N	Y	N	Y	N	Y			
8		white alder	<i>Alnus rhombifolia</i>	Y	Y	Y	N	N	N	N	?	Y	Y	F	F	F
9		red alder (coastal)	<i>Alnus rubrifolia</i>	Y	Y	Y	N	N	N	N	?	Y	Y	S	S	F
10		madrone	<i>Arbutus menziesii</i>	Y	Y	N	Y	Y	Y	N	Y	?	Y			F
11		Oregon ash	<i>Fraxinus latifolia</i>	Y	Y	Y	N	N	Y	?	Y	Y	Y			F
12		coast silk tassel	<i>Garrya elliptica</i>	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	F	F	F
13		California black walnut	<i>Juglans hindsii</i>	Y	Y	Y	Y	N	Y	N	?	Y	?			
14		tan oak	<i>Lithocarpus densiflorus</i>	Y	?	N	N	Y	Y	N	?	Y	?			
15		wax myrtle	<i>Myrica californica</i>	Y	Y	Y	Y	Y	N	Y	N	?	?			F
16		western choke cherry	<i>Prunus virginiana demissa</i>	Y	Y	Y	Y	N	Y	Y	Y	?	Y			
17		coast live oak	<i>Quercus agrifolia</i>	Y	Y	N	Y	Y	Y	N	N	Y	Y			F
18		black oak	<i>Quercus kelloggii</i>	Y	Y	N	Y	N	Y	N	N	Y	Y			
19		valley oak	<i>Quercus lobata</i>	Y	Y	Y	Y	N	Y	N	N	Y	Y			F
20		sandbar willow	<i>Salix exigua</i>	Y	Y	Y	N	N	Y	N	Y	?	Y			F
21		coastal or Hooker's willow	<i>Salix hookeriana</i>	Y	Y	Y	?	N	Y	N	Y	?	Y			
22		red willow	<i>Salix laevigata</i>	Y	Y	Y	N	N	Y	N	Y	?	Y			F
Start Here Plant Selection Climate-Smart Performance Plant Shopping List Trees Shrubs Grasses & Forbs																

cSHRMP - Climate



Implementation!



Establishment Work

- Weeding
- Browse Protection
- Irrigation
 - Handwater
 - Drip



Monitoring & Reporting - Construction Success

STRAW Plant Establishment Monitoring

Site Name: Tolay Creek Ranch
Bank/Zone: Zone B

Date: 8/19/2015
Staff: LW, JV, AM, IT

Plant Species	Planted 2012-2013	<3ft - LV	<3ft - HV	>3ft - LV	>3ft - HV	2015
LEFT BANK						
Coyote Brush (<i>Baccharis pilularis</i>)	24		☒ ①			9
CA Wild Rose (<i>Rosa californica</i>)	30	• ①	☒ ① ①		• ③	18
Snowberry (<i>Symphoricarpos albus</i>)	15		☒ ①			9
Valley Oak (<i>Quercus lobata</i>)	64	• ①	☒ ① ① ①		• ①	51
Arroyo willow (<i>Salix lasiolepis</i>)	41					

RIGHT BANK						
Coyote Brush (<i>Baccharis pilularis</i>)	24	• ①	☒ ① ① ①		• ④	28
CA Wild Rose (<i>Rosa californica</i>)	38	• ①	☒ ① ① ①		☒ ① ①	30
Snowberry (<i>Symphoricarpos albus</i>)	32		☒ ① ①		• ⑥	23
Buckeye (<i>Aesculus californica</i>) Direct Seed	28	• ②	☒ ① ① ①		• ⑧	18
Valley Oak (<i>Quercus lobata</i>)	72	• ①	☒ ① ① ① ①	• ④	• ④	55
Red willow (<i>Salix laevigata</i>)	10	• ①				2
Arroyo willow (<i>Salix lasiolepis</i>)	50					

Plant Species	Planted 2013-2014	<3ft - LV	<3ft - HV	>3ft - LV	>3ft - HV	2015
LEFT BANK						
Buckeye (<i>Aesculus californica</i>) Direct Seed	13	• ①	• ②			4
Red willow (<i>Salix laevigata</i>)	20					
Arroyo willow (<i>Salix lasiolepis</i>)	46	• ①	• ②		• ①	4

RIGHT BANK						
Red willow (<i>Salix laevigata</i>)	9	• ②	• ④		• ②	8
Arroyo willow (<i>Salix lasiolepis</i>)	71		• ⑤		• ①	4

Plant Species	Planted 2014-2015	<3ft - LV	<3ft - HV	>3ft - LV	>3ft - HV	2015
LEFT BANK						
Hawthorn (<i>Crataegus douglasii</i>)	20	• ④	☒ ① ① ①		• ①	20
Coffeeferry (<i>Rhamnus californica</i>)	11		☒ ①			11
California Blackberry (<i>Rubus ursinus</i>)	28	• ②	☒ ① ① ①			27
Blue elderberry (<i>Sambucus nigra</i>)	10	• ②	• ③		• ⑥	10
Red willow (<i>Salix laevigata</i>)	14	• ④	• ④	• ④	• ②	14
Arroyo willow (<i>Salix lasiolepis</i>)	50	• ③	• ②	☒ ① ① ①	☒ ① ①	50

RIGHT BANK						
California Blackberry (<i>Rubus ursinus</i>)	28	• ②	☒ ① ① ①			25

LV - Low Vigor (systemic stress)
HV - High Vigor (healthy / new growth)

Cause (Use Comments)	Percent
Thinning	25 %
Erosion	50 %
Flooding	25 %

General Browse (Circle One)

None ☐ Low ☒ High ☐

Densiometer Data Needed?
☒ If Yes, use form on back

Monitoring & Reporting - Validation & Function



Seven climate-smart restoration principles



Show your work



Look forward but don't ignore the past



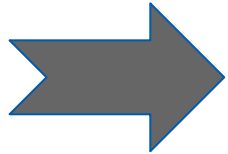
Consider the broader context



Build ecological insurance - redundancy



Build evolutionary resilience



Include the human community



Research and monitor



Include the Human Community!



