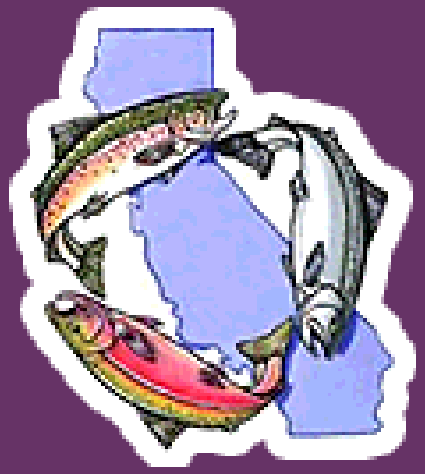


Climate Change and Instream Flow Needs

Afternoon Sessions at the 3rd Steelhead Summit held in Ventura, California on December 3, 2018.

Presentations

Drought, Fire, and Floods — Adapting to a New Era of Climate Change

Southern California Steelhead Fire Regime: Landscapes and Life-Cycles, Mark Capelli, PhD, Southern California Steelhead Recovery Coordinator, NOAA Fisheries

Implementing Risk Mitigation Strategies to Protect Vulnerable Native O. mykiss Populations in Southern California, Sandra Jacobson, PhD, CalTrout

Effects of the Thomas Fire on Oncorhynchus mykiss and Stream Communities of the Los Padres National Forest, Kristie Klose, PhD, Forest Fisheries Biologist

Balancing Habitat and Public Safety for Future Conditions, Pam Lindsey, Watershed Ecologist, Ventura County Watershed Protection District

Fire and Flow Forum; A Stakeholder Response to Rise of Climatic Threats in Southern California Watersheds, Stacie Smith, NOAA Restoration Center

Instream Flow Needs for Improving Steelhead Recovery

Environmental Engagement in Groundwater Sustainability Agencies to Protect Groundwater Dependent Ecosystems and Steelhead as Beneficial Users, Candice Meneghin, Friends of Santa Clara River

Creative Water Transactions to Enhance Streamflow, Tom Hicks, JD, Hicks Law

Moving Into Action: Finding Real Solutions for Fisheries and Communities in Ventura County, Regina Hirsch, Watershed Progressive

Restoration in an Era of Climactic Extremes, Mauricio Gomez, South Coast Habitat Restoration

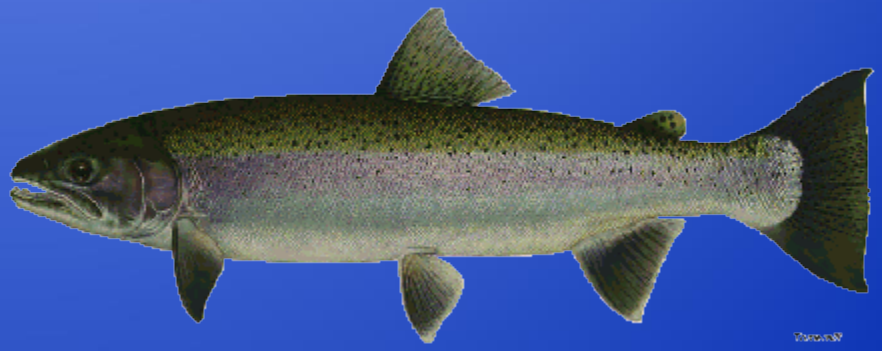
Southern California Steelhead and the Chaparral Fire Regime

National Marine Fisheries Service

3rd Steelhead Summit Conference

Ventura, CA
December 3-5, 2018

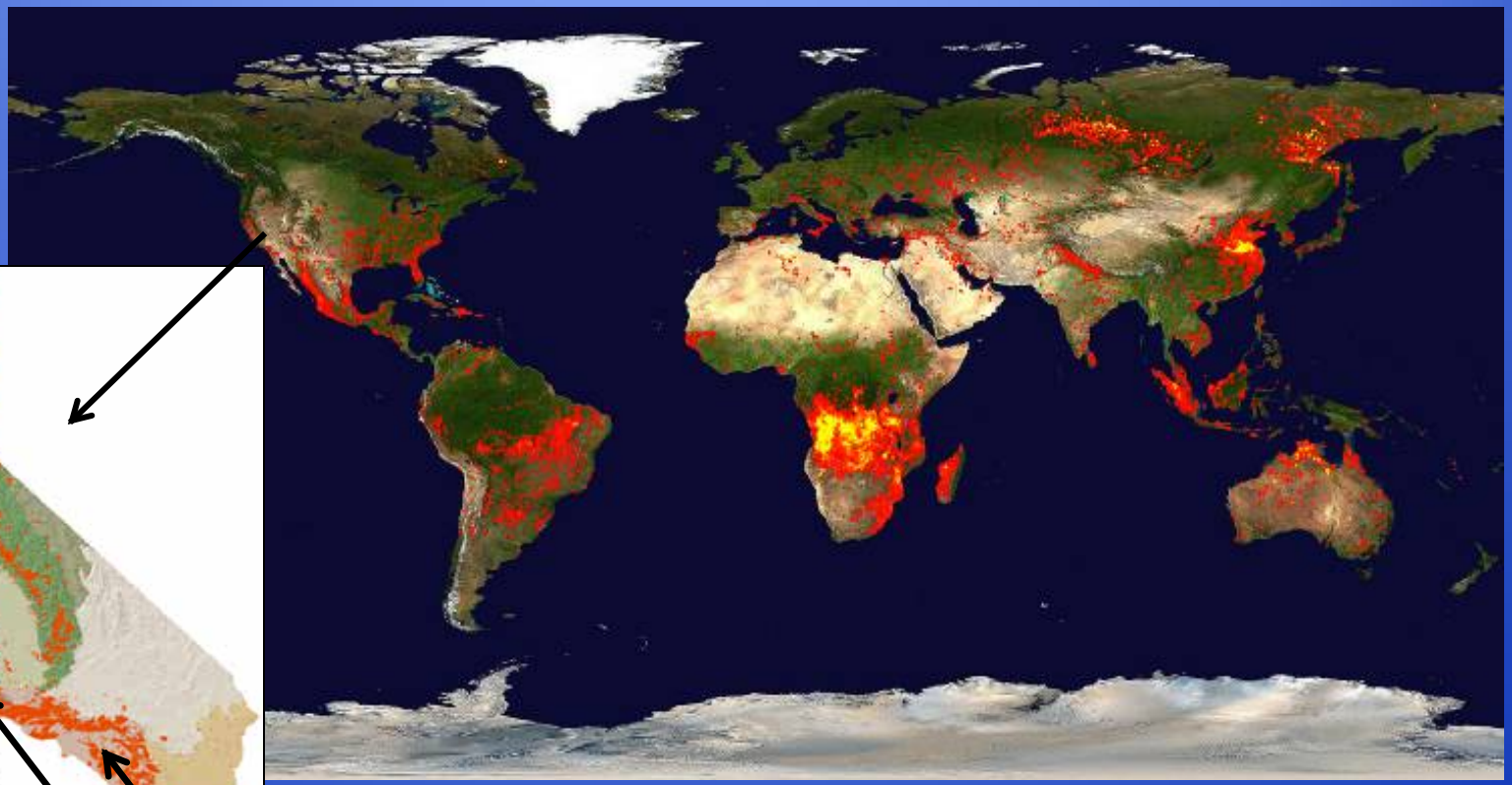
Mark H. Capelli
Recovery Coordinator



National Marine Fisheries Service

California Wildfires

South-Central/Southern California



World Fire Hotspots

National Marine Fisheries Service

Wildfire Effects on Riverine & Watershed Habitats

Physical

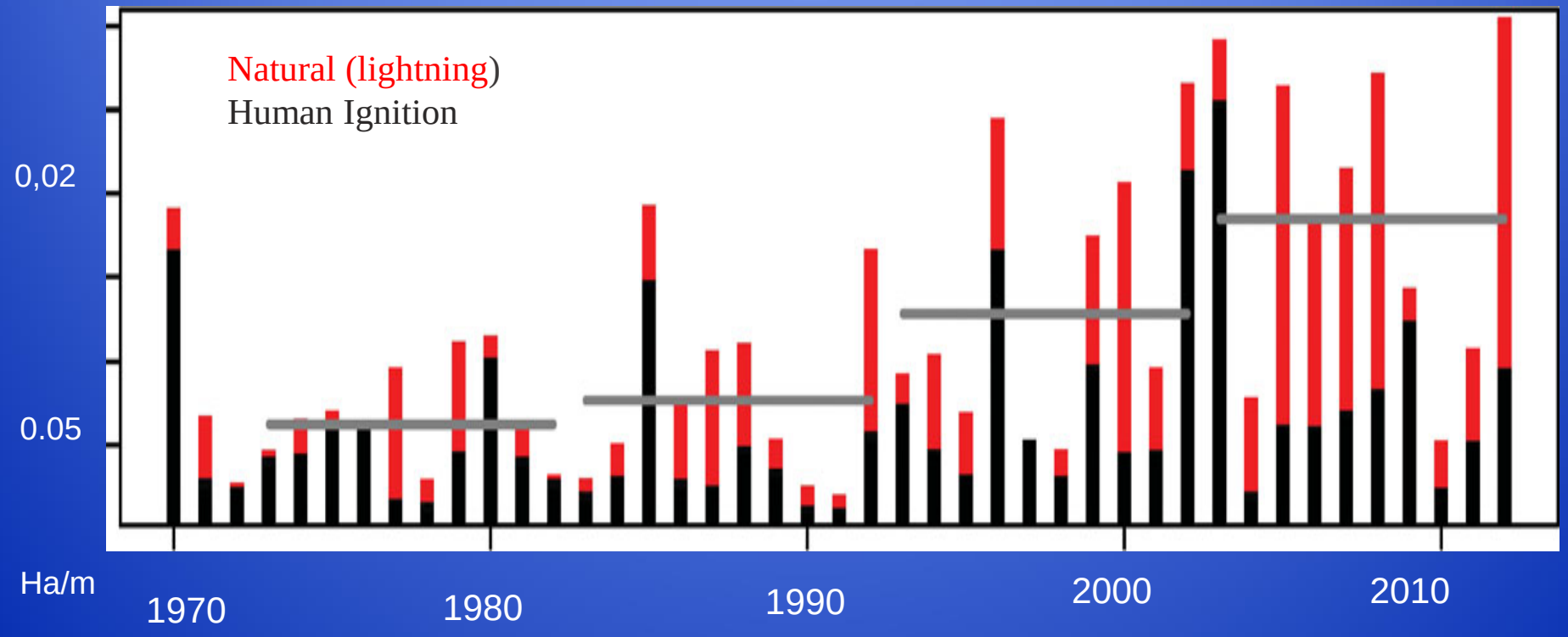
- Hydrology
- Erosion/sedimentation
- Turbidity
- Nutrient loading
- Water Chemistry
- Water temperature

Biological

- Primary productivity
- Invertebrate production
- Riparian cover
- Community structure
- Invasive species
- Vegetation type conversion

Wester U.S. Wildfires

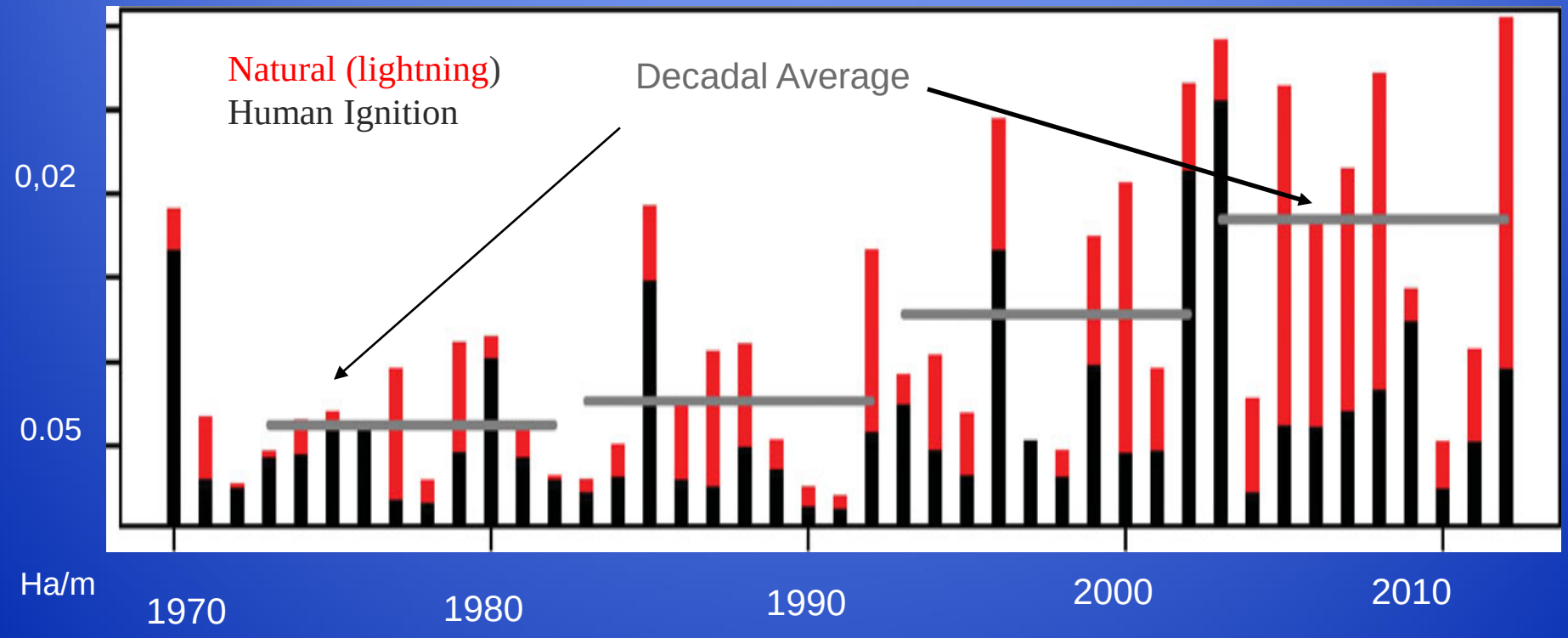
Annual Burned Area in Large (> 400 ha) Grass and Shrubland Fires



Westerling, A. L. 2016

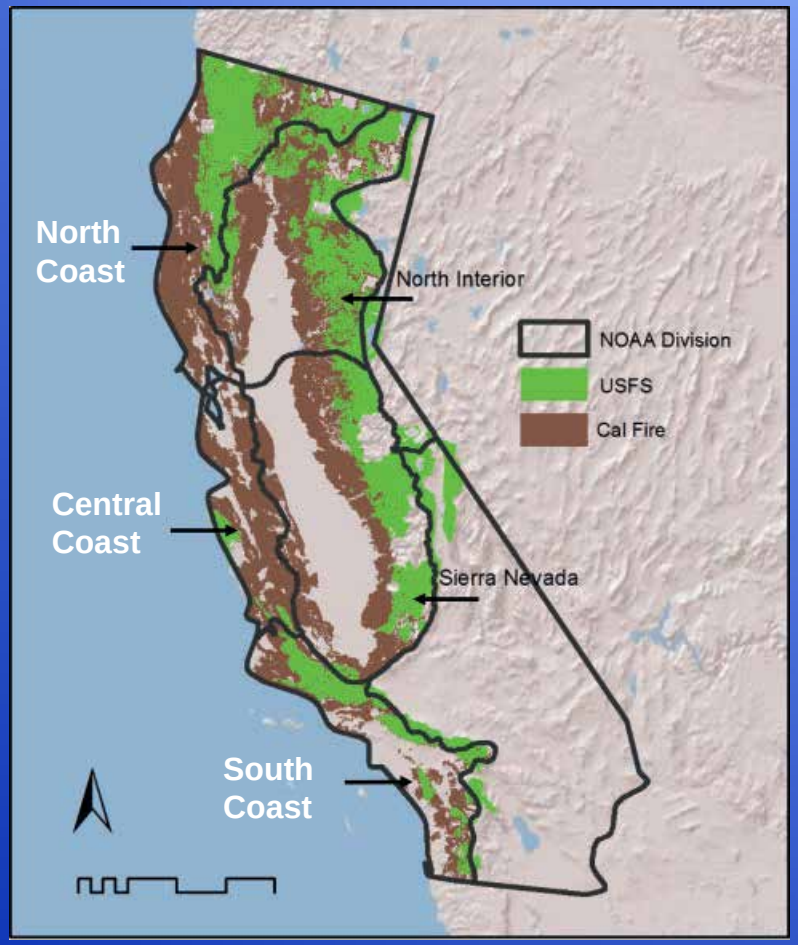
Wester U.S. Wildfires

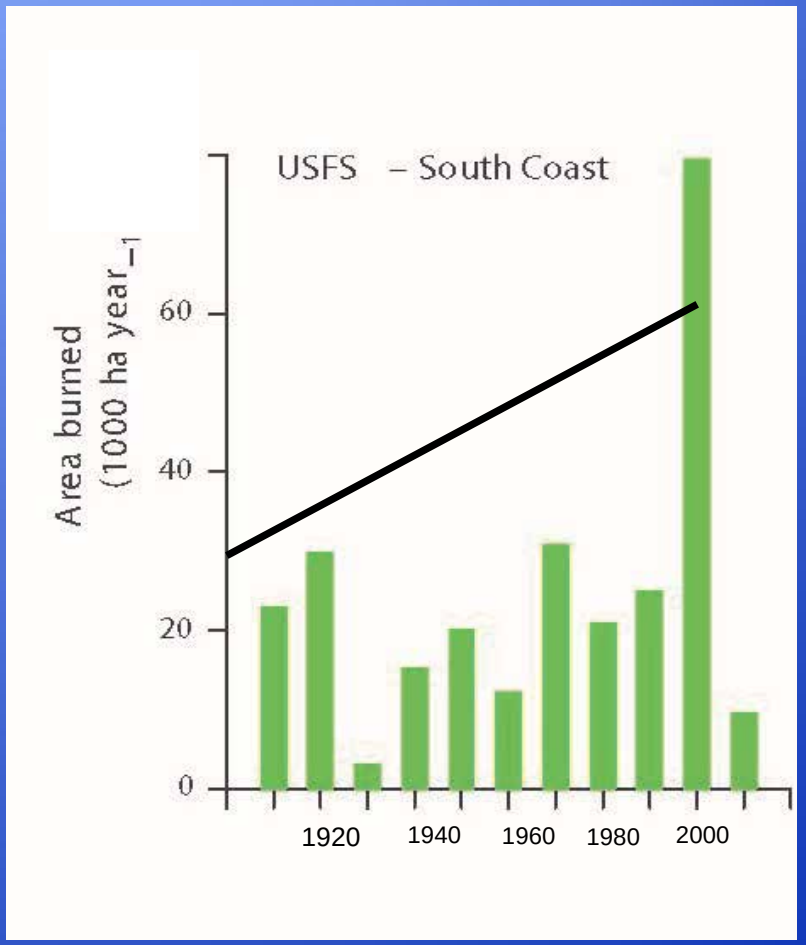
Annual Burned Area in Large (> 400 ha) Grass and Shrubland Fires



Westerling, A. L. 2016

South Coast Wildfires





Keeley and Syphard 2017

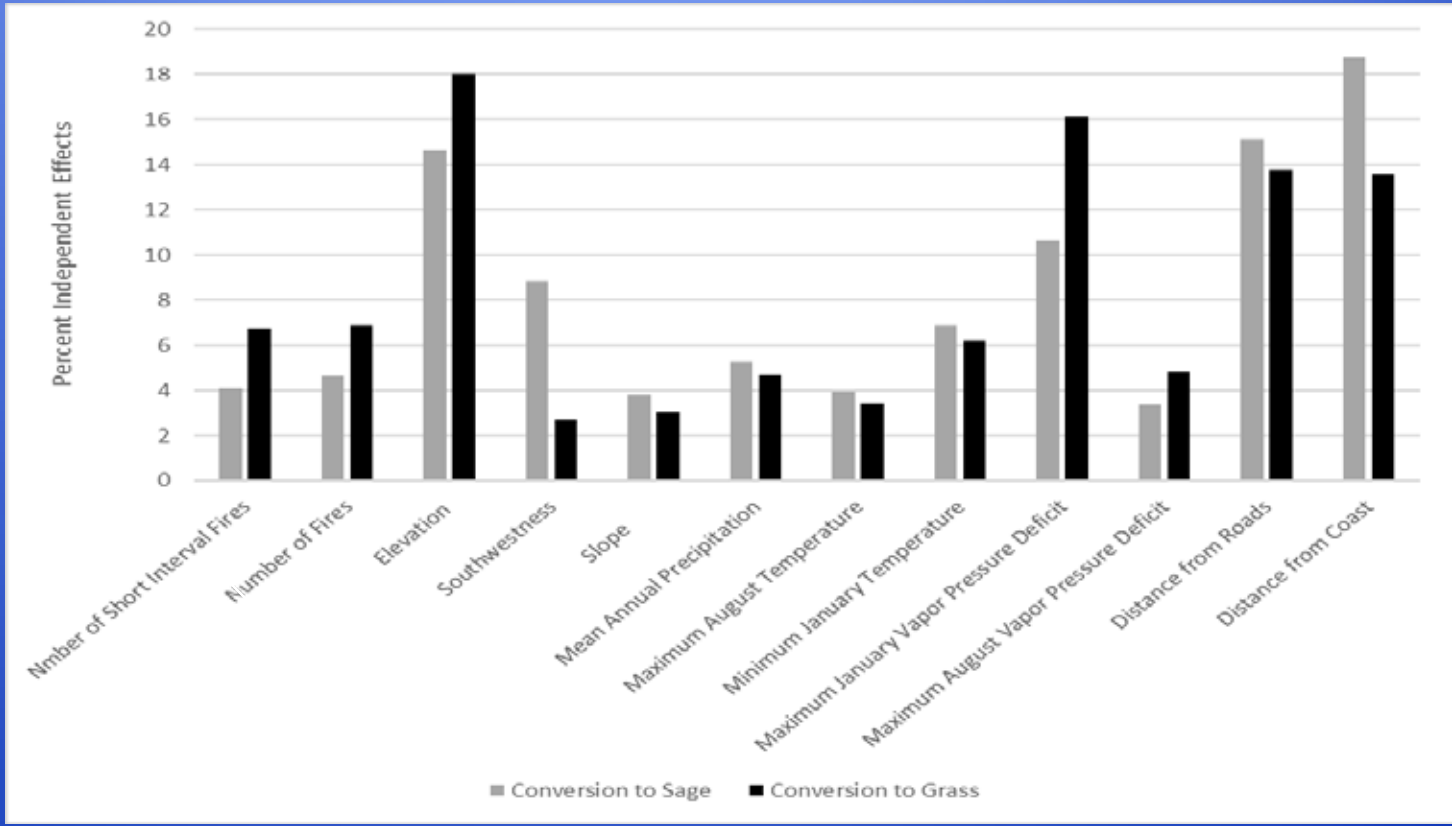
National Marine Fisheries Service

Vegetation Type Conversion

Chaparral Conversion – Sage Scrub or Grass

Sage Conversion

Grass Conversion



Dewees et al., 2018

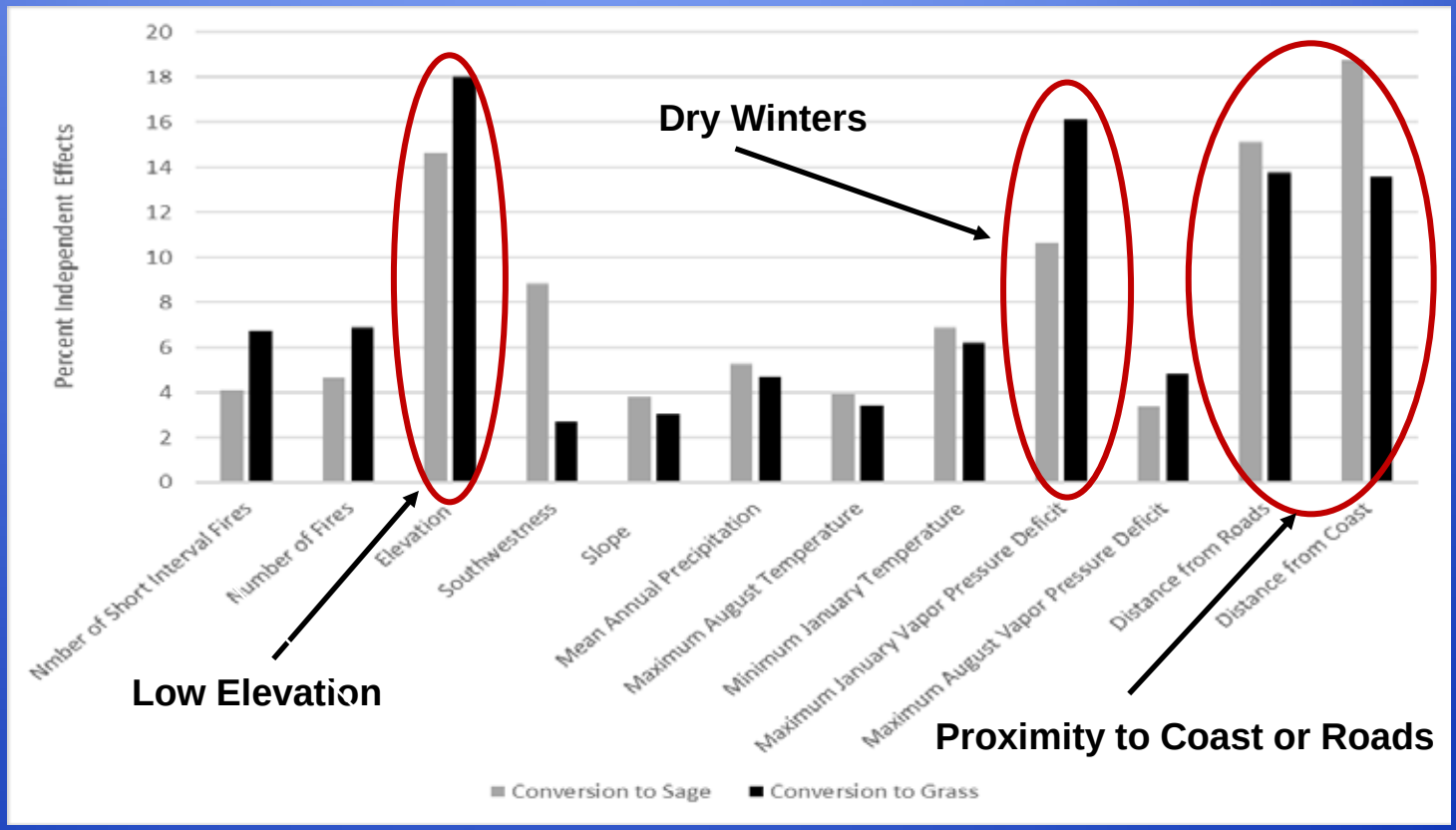
National Marine Fisheries Service

Vegetation Type Conversion

Chaparral Conversion – Sage Scrub or Grass

Sage Conversion

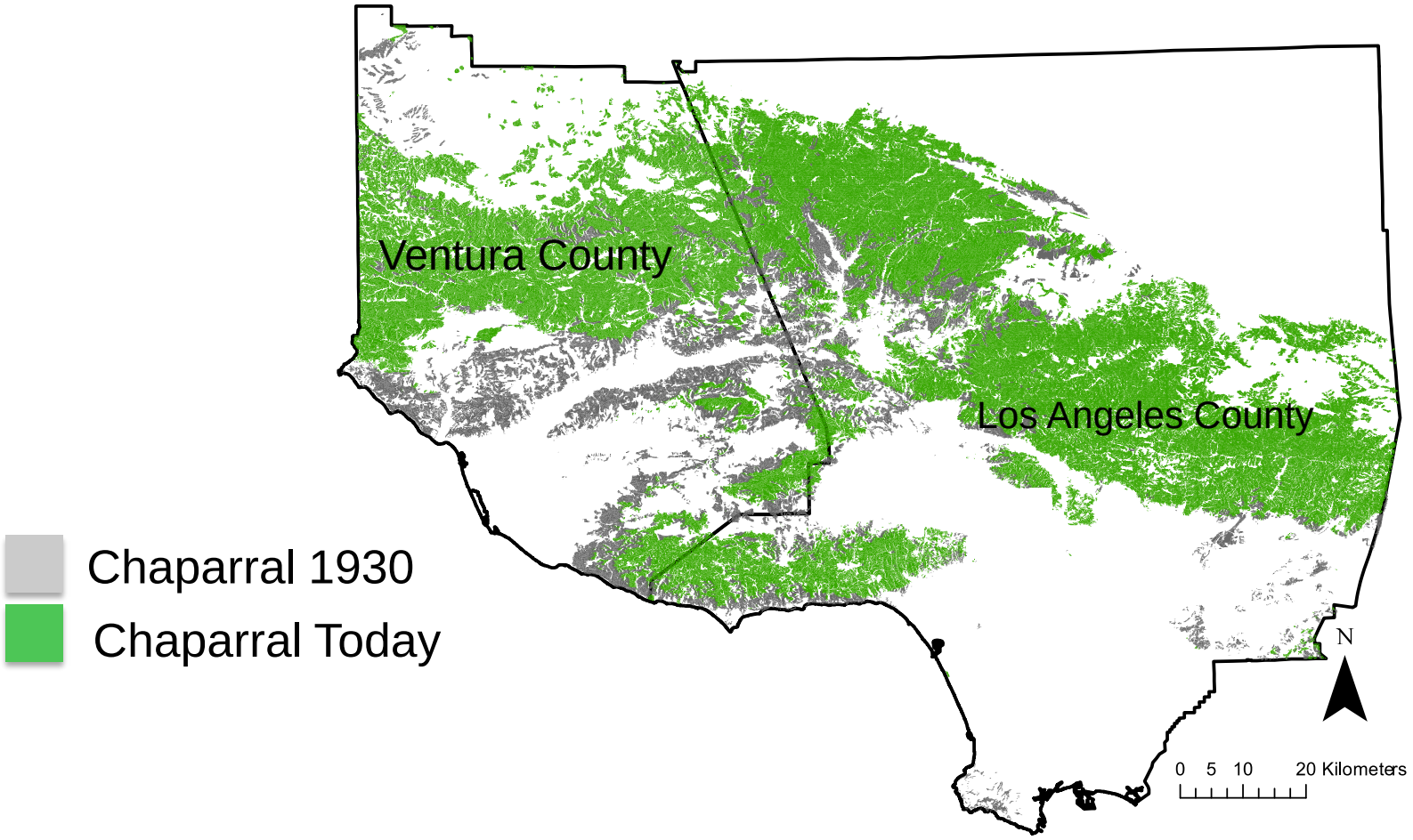
Grass Conversion



Dewees et al., 2018

National Marine Fisheries Service

Vegetation Type Conversion



D'Antonio et al. 2018

National Marine Fisheries Service

Wildfire Effects on Steelhead Habitats

Day Fire: 162,202 acres.

Sespe Creek 2002 - before fire

2008 - after fire

National Marine Fisheries Service

Wildfire Effects on Steelhead Habitats

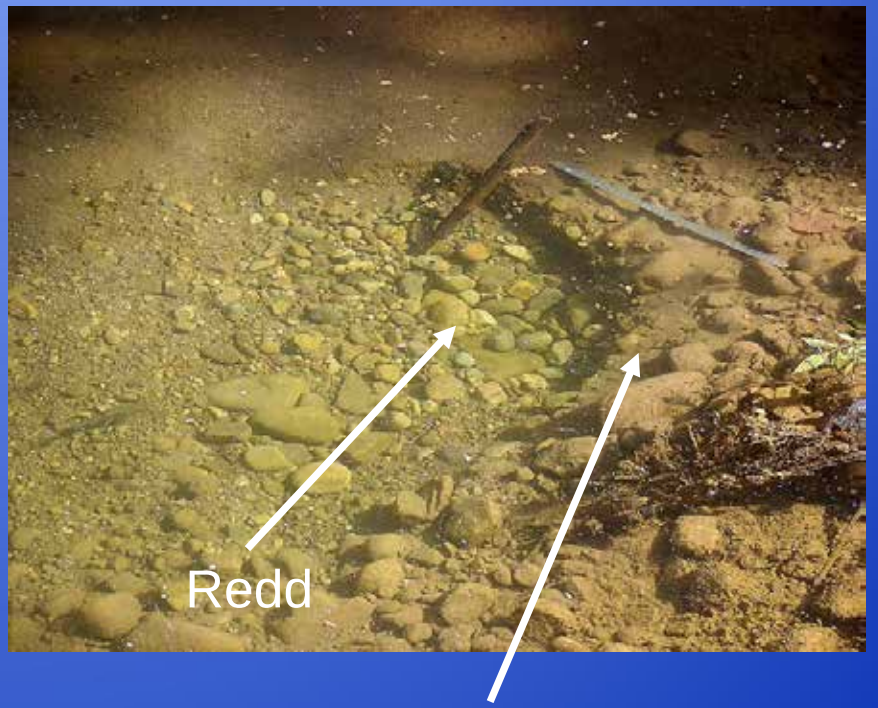
Santa Ana River – Harding Creek

2006 - before fire

2007 - after fire

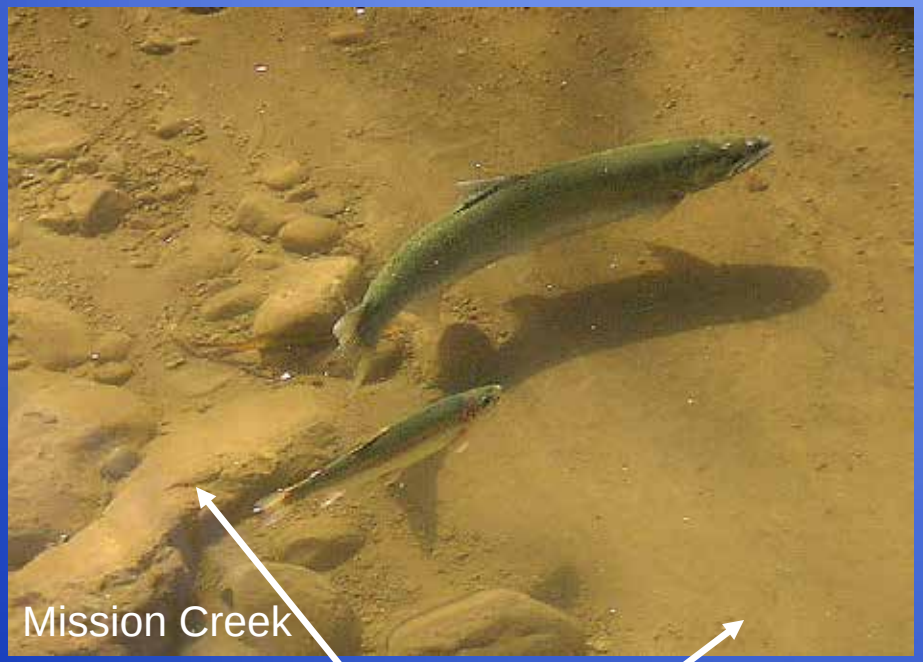
National Marine Fisheries Service

Wildfire Effects on Steelhead Habitats



National Marine Fisheries Service

Wildfire Effects on Steelhead Habitats



Fine Sediment

Fine Sediment

National Marine Fisheries Service

Wildfire Effects on Steelhead Habitat

Sorted Sediment

Sorted Sediment

Viable Salmonid Population (VSP)

Abundance

Biological Productivity

Biological Diversity

Spatial Distribution

Viable Salmonid Population (VSP)

Abundance

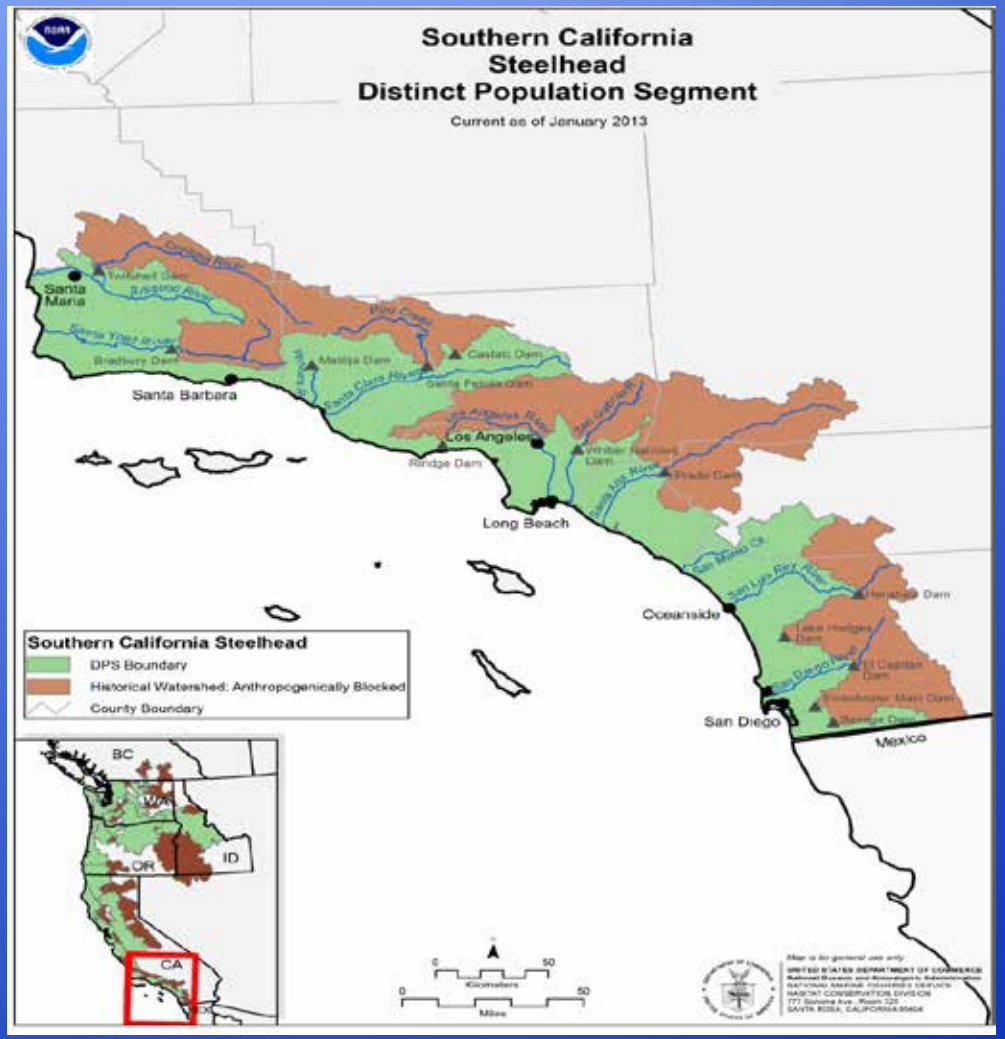
Biological Productivity

Biological Diversity

Spatial Distribution

Southern California Steelhead DPS

- Chaparral
- Oak Woodland
- Coastal Sage Scrub
- Native grasses
- Riparian
- Wetlands



DPS-Wide Viability

Strategy

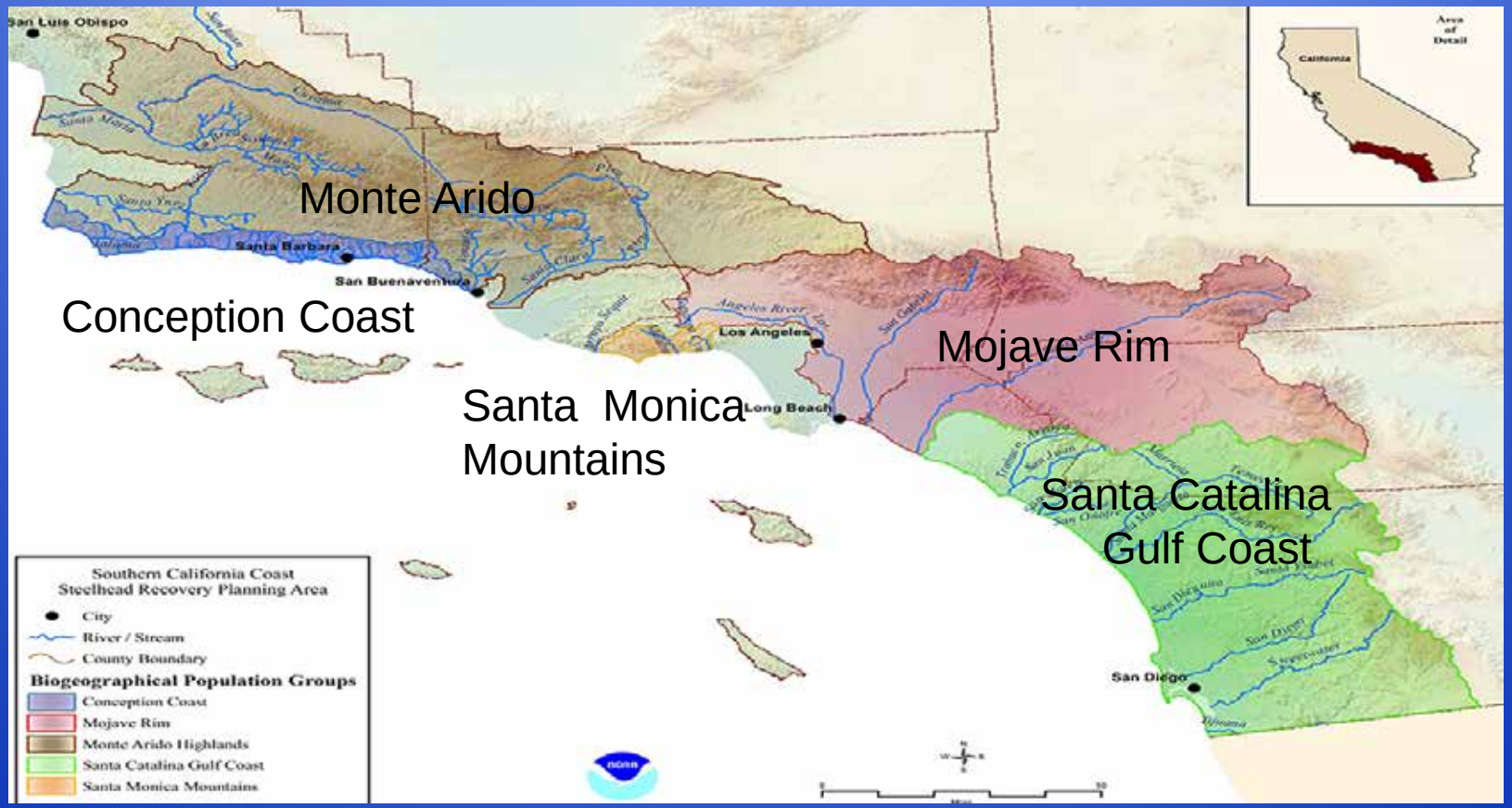
- Minimum number viable in each biogeographic region
- Occupy watersheds with drought refugia
- Minimum geographic separation (wildland fire analysis)
- Exhibit life history diversity

< 5% extinction risk in 1000 years

National Marine Fisheries Service

Southern California Steelhead DPS

Biogeographic Population Groups



DPS-Wide Viability

Goals

- Preserve over-all species diversity (genetic, phenotypic, life-history)
- Protect species from extinction due to catastrophic disturbance (wildfires, flooding, droughts)

Note: 1000-year time horizon

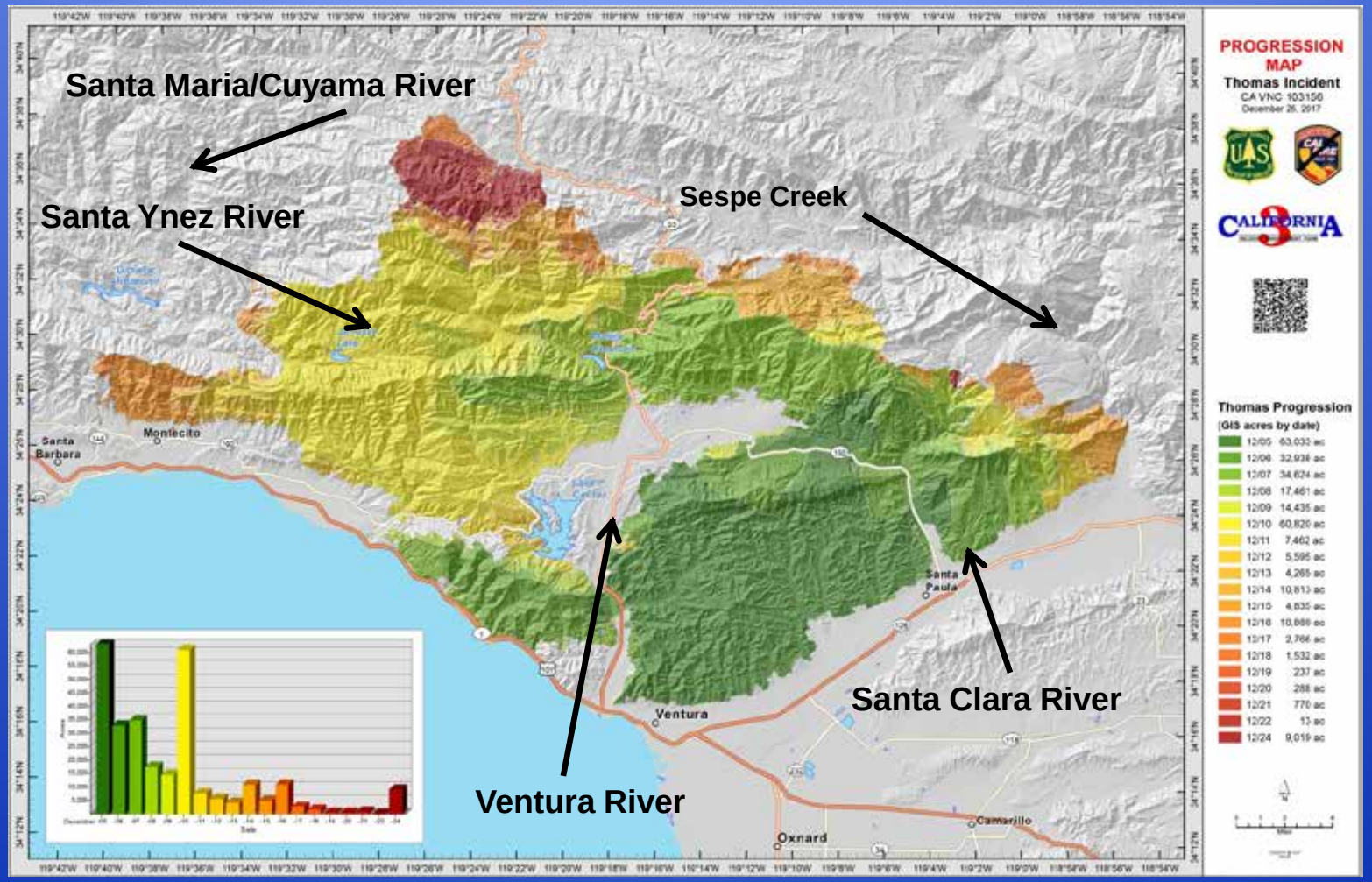
Southern California Steelhead Recovery Planning

The three most prominent natural disturbances that appear to pose a risk to entire populations are wildfires, droughts, and debris flows . . .

Boughton et al. 2007

National Marine Fisheries Service

Thomas Fire 2017

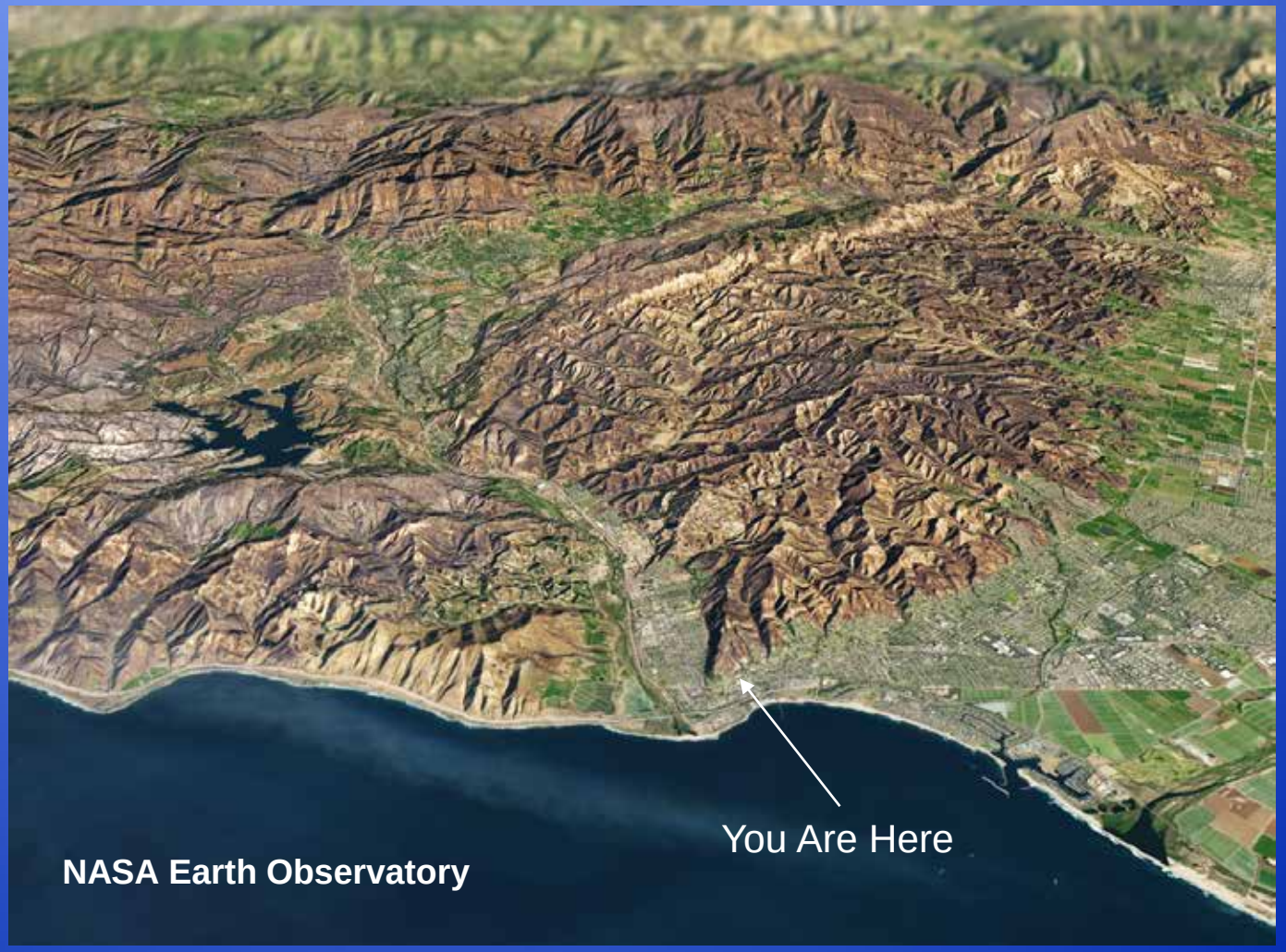


National Marine Fisheries Service

Thomas Fire 2017

Ventura River

Watershed



National Marine Fisheries Service

Thomas Fire 2017

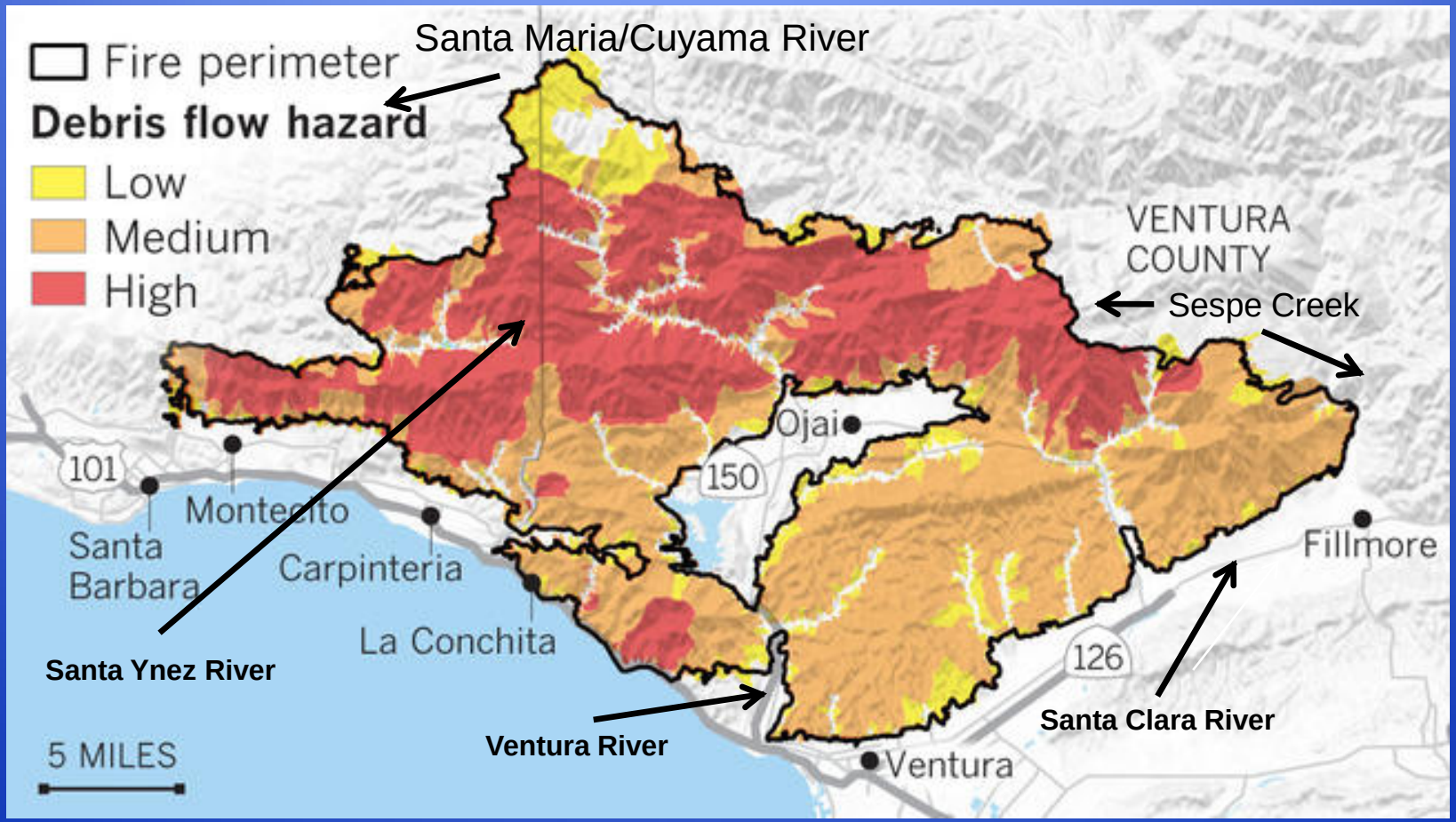
Upper

Ventura River

Matilija Creek

Watershed

Thomas Fires 2017

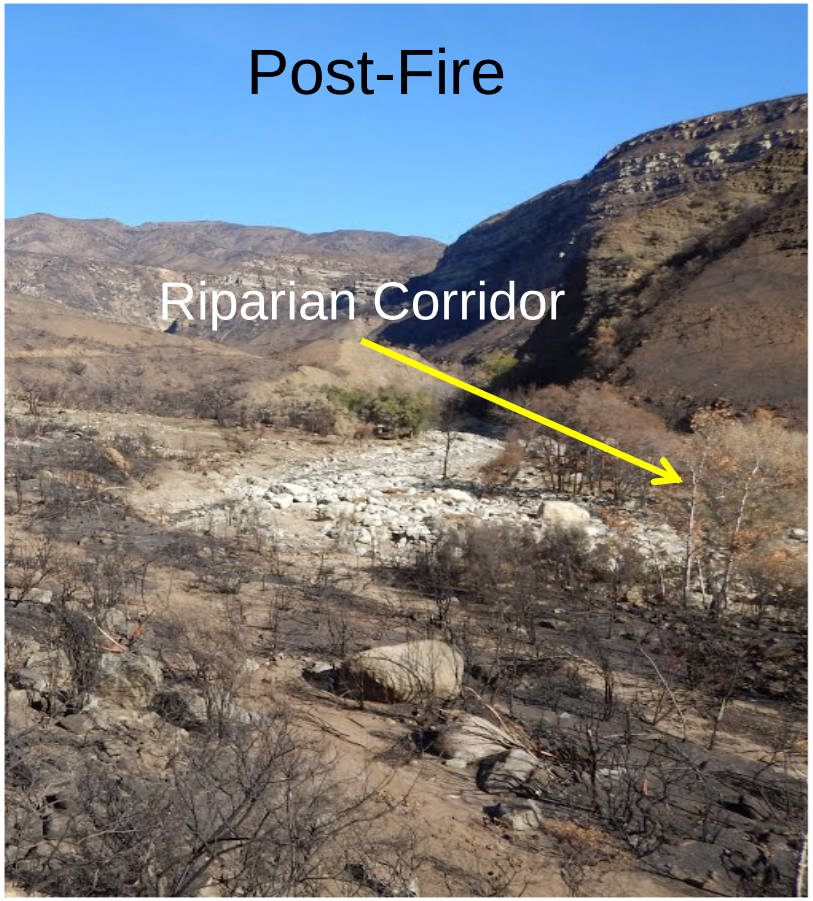


USGS

National Marine Fisheries Service

Thomas Fire 2017

Matilija Canyon



National Marine Fisheries Service

Thomas Fire 2017

Matilija Canyon Post Thomas Fire/Rainfall

Debris Flow

Debris Flow

National Marine Fisheries Service

Thomas Fire 2017

Matilija Canyon Post Thomas Fire/Rainfall

Thomas Fire 2017

Matilija Canyon Post Thomas Fire/Rainfall

Southern California Steelhead DPS

Largest Recent Southern California Wildfires

2003: Cedar Fire – 1,041 km2

2007: Witch Fire – 801 km2

2007: Zaca Fire – 972 km2

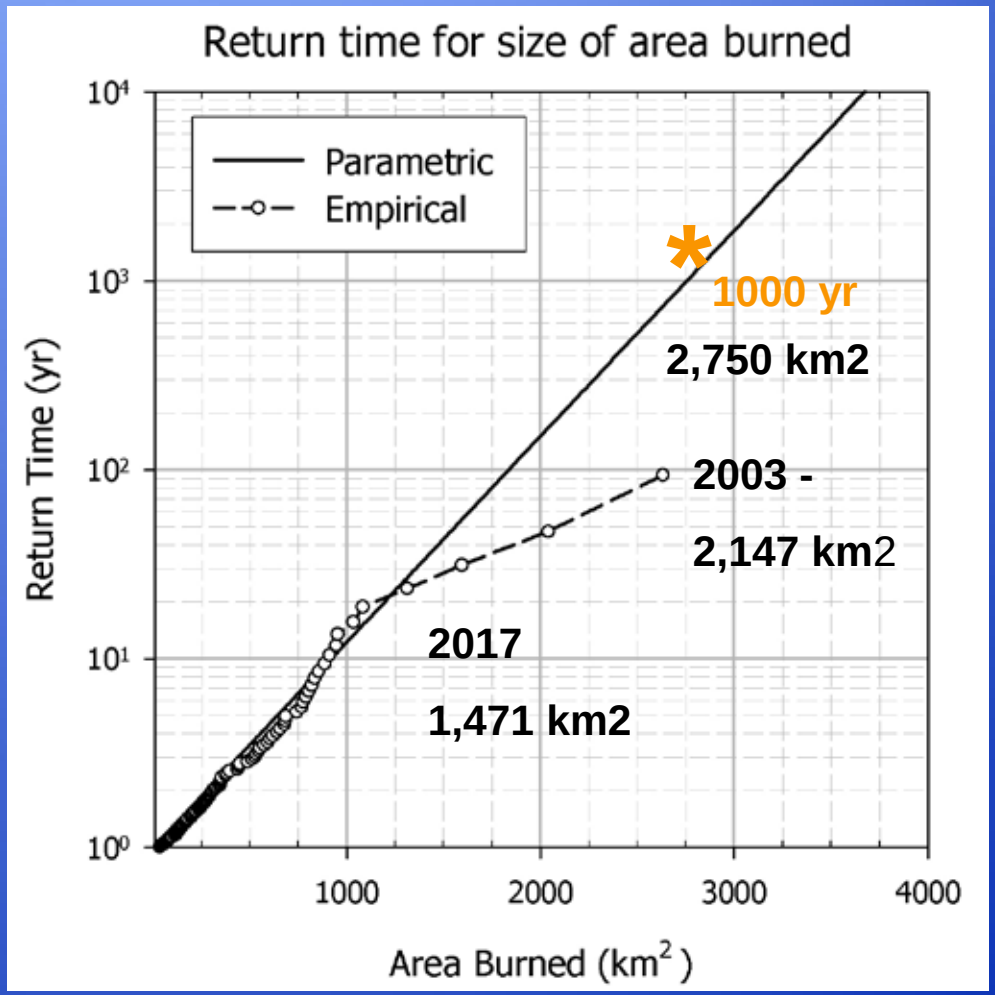
2009: Station Fire – 650 km2

2017: Thomas Fire – 1,141 km2

Southern California Fire Frequency

*Projected Thousand-Year Wildfire Burn Area

Based on 1910 – 2003 Data



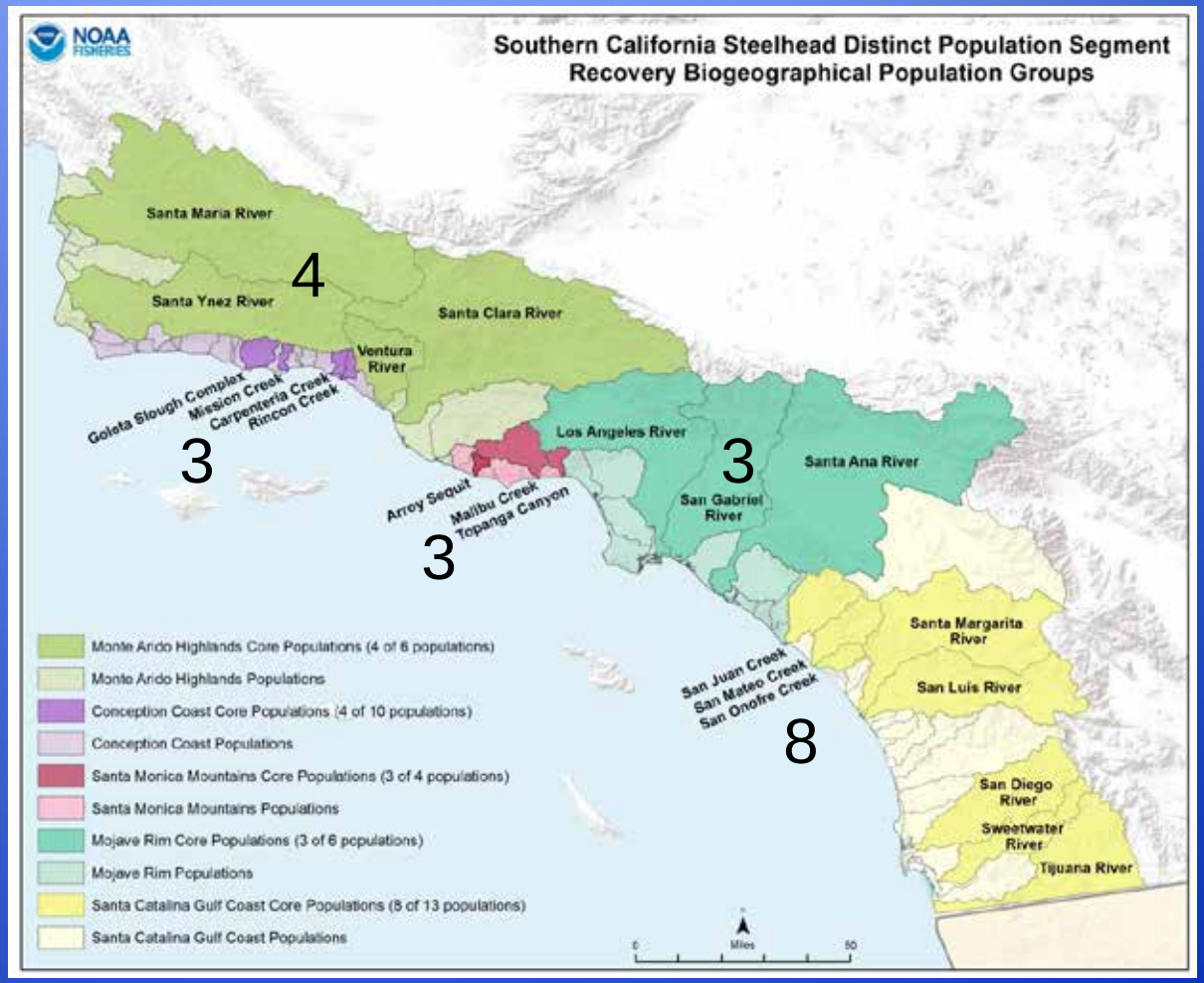
Boughton et al. 2007

Southern California Steelhead DPS

Number of Populations Required for Recovery:

21

Populations



Southern California Steelhead DPS

Threats to Recovery

* Access to Spawning and Rearing Habitat
* Degradation of Instream/Riparian Habitat
* Spread of Non-Native Species
* Wildfires
* Loss of Estuarine Habitat

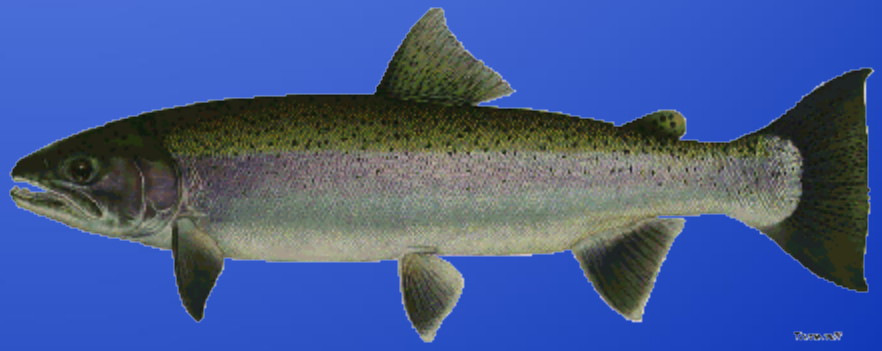
Southern California Steelhead and the Chaparral Fire Regime

National Marine Fisheries Service

3rd Steelhead Summit Conference

Ventura, CA
December 3-5, 2018

Mark H. Capelli
Recovery Coordinator



Effects of the Thomas Fire on *Oncorhynchus mykiss* and stream communities of the Los Padres National Forest

Kristie Klose[1], Scott D. Cooper[2], Jason White[3]and Erika Eliason[2]

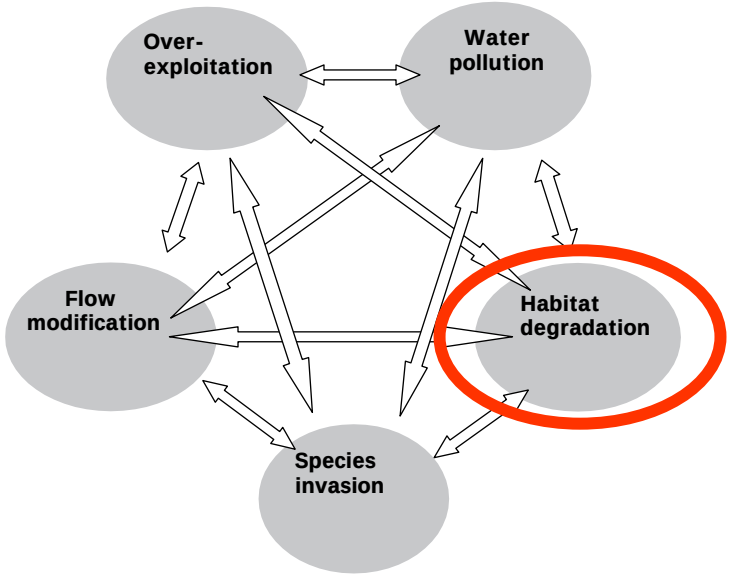
[1]United States Forest Service, Los Padres National Forest
[2]Department of Ecology, Evolution, and Marine Biology,
University of California – Santa Barbara
[3]South Coast Habitat Restoration – Earth Island Institute

kristieaklose@fs.fed.us

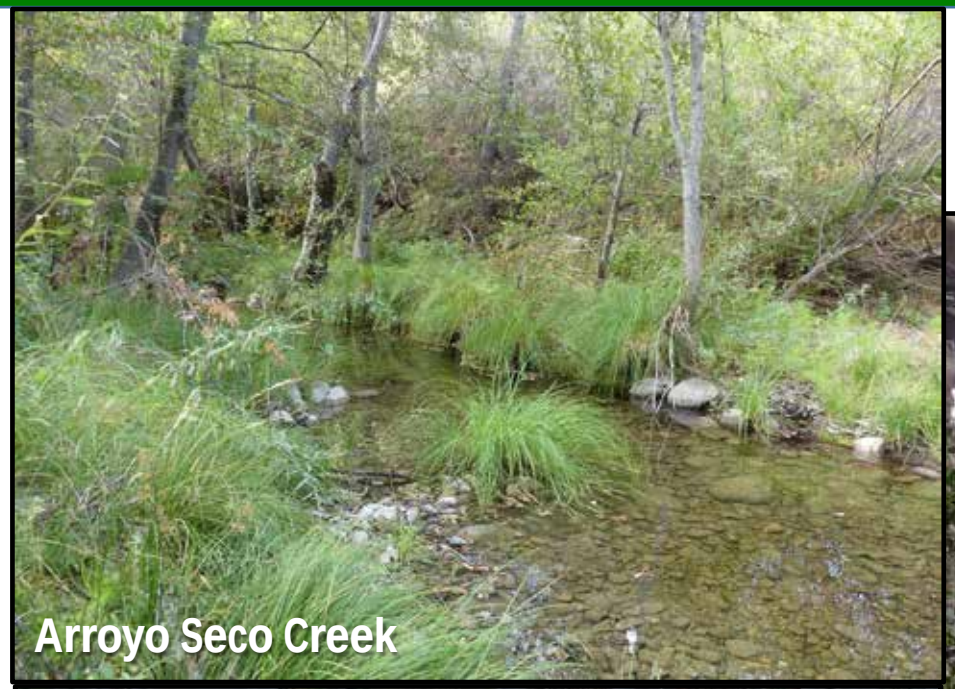
Stream Communities

- Freshwater ecosystems are the most endangered systems worldwide
- Reduced biodiversity is far greater in freshwaters than most terrestrial ecosystems
- The richness of inland waters as habitats makes them vulnerable to anthropogenic and environmental change

Major threats to freshwater biodiversity:



Source: Dudgeon et al. 2005


Arroyo Seco Creek


Matilija Creek


Santa Paula Creek

Multiple Fire Effects on Streams

- Increased temperatures
- Reduced riparian cover
- Increased sedimentation
- Decreased pool:riffle ratios
- Habitat fragmentation due to loss of corridors and connectedness
- Reduced species diversity and density, even local extinction

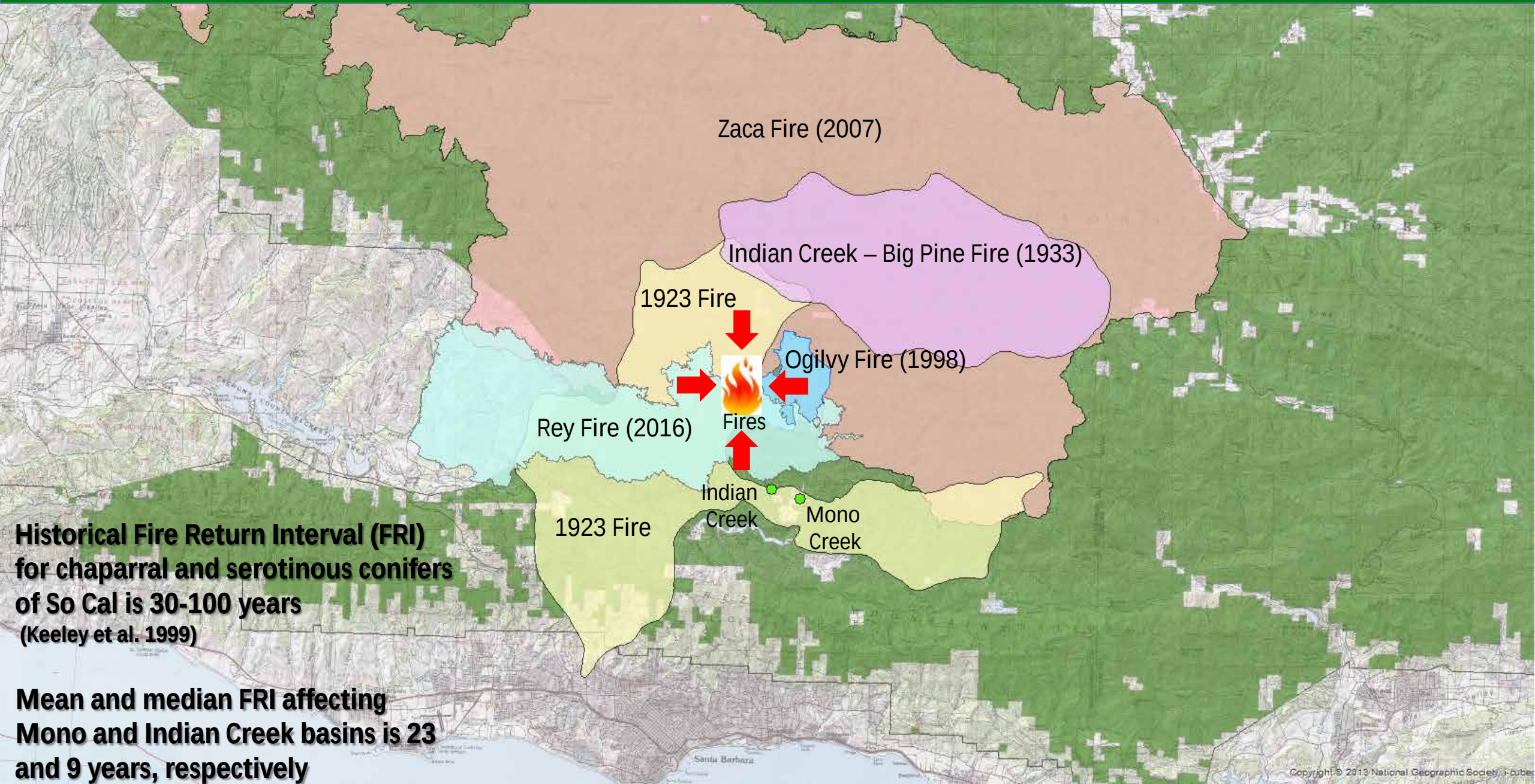

Pre Thomas Fire Lion Creek 2017


Post Thomas Fire Lion Creek 2018

Pre Thomas Fire Alder Creek 2017

Post Debris Flow Alder Creek 2018

Multiple Fires Over Past 100 Years Affecting Mono and Indian Creeks



Historical Fire Return Interval (FRI) for chaparral and serotinous conifers of So Cal is 30-100 years
(Keeley et al. 1999)

Mean and median FRI affecting Mono and Indian Creek basins is 23 and 9 years, respectively

Fire History: Mono Creek

"Before the installation of Gibraltar Dam this stream was stocked naturally by the annual steelhead run. More recently it was planted [with] steelhead. All were destroyed following the 30,000 acre Indian Creek-Big Pine Fire (1933). This fire filled the pools of the creek with sand, mud, and gravel and caused a rise in temperature sufficient to kill all fish. Each rain at present brings down further quantities of silt."

-- *California Department of Fish and Game - 1948*


Mono Creek (ca. 1924)

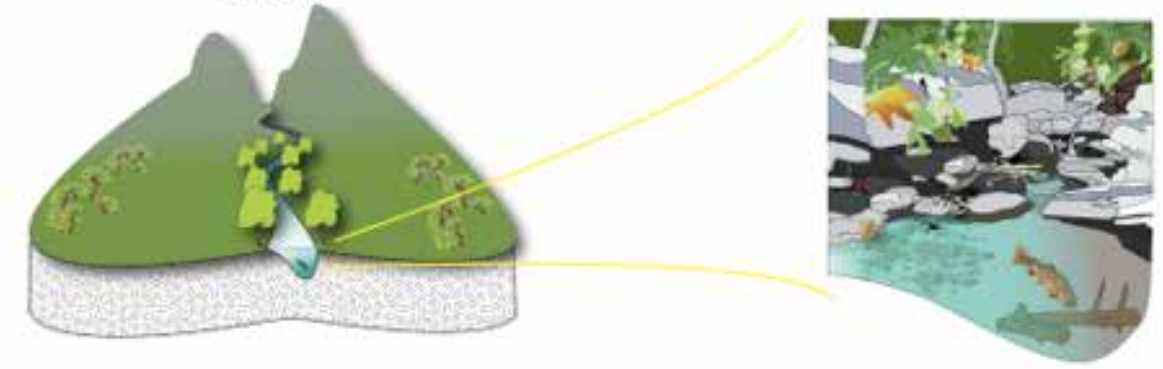

Mono Creek (1993)


Mono Creek (2017)


Mono Creek (2018)

Fire Effects to Streams

No burn



Burned upland vegetation and soils

Increased
- runoff
- sediment
- contaminants
- nutrients

Burned upland and riparian vegetation, soils; debris flow

Increased
- runoff
- sediment
- light
- temperature
- contaminants
- nutrients
- algae
- grazing invertebrates

Decreased
- leaf litter
- detritivores

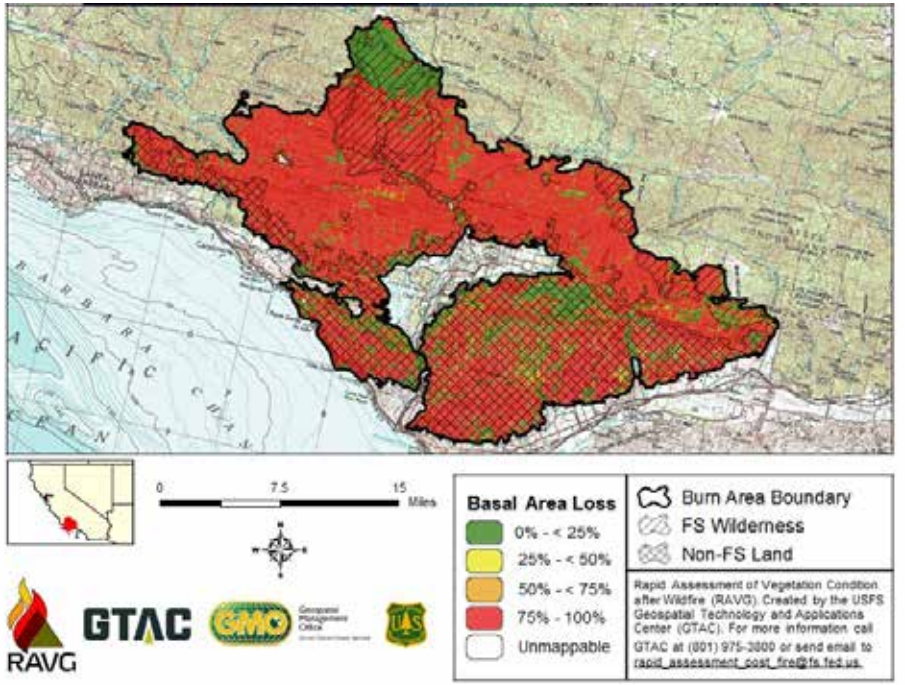
Research Questions

1. How did the Thomas Fire and associated debris flows affect trout populations in Los Padres NF?

2. How did possible environmental drivers of trout abundance differ between streams in burned and unburned basins?

3. How did environmental conditions differ between streams in burned basins where trout persisted versus basins where they were extirpated?

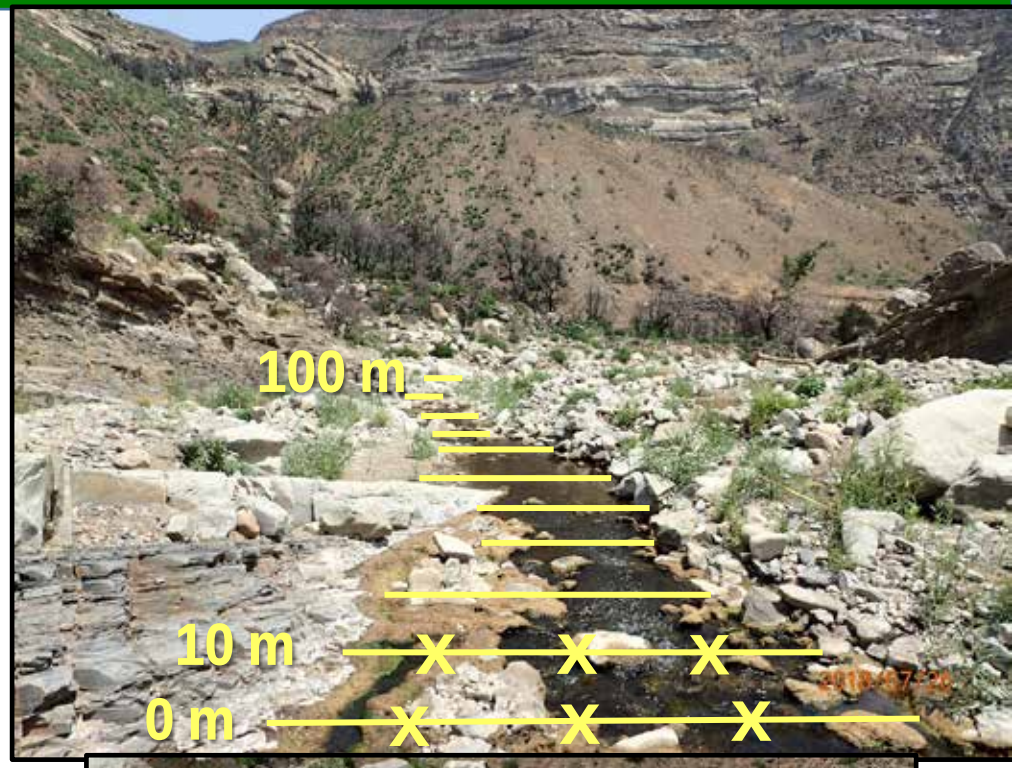
4. Are trout populations reduced by the fire likely to recover and how long will this take?



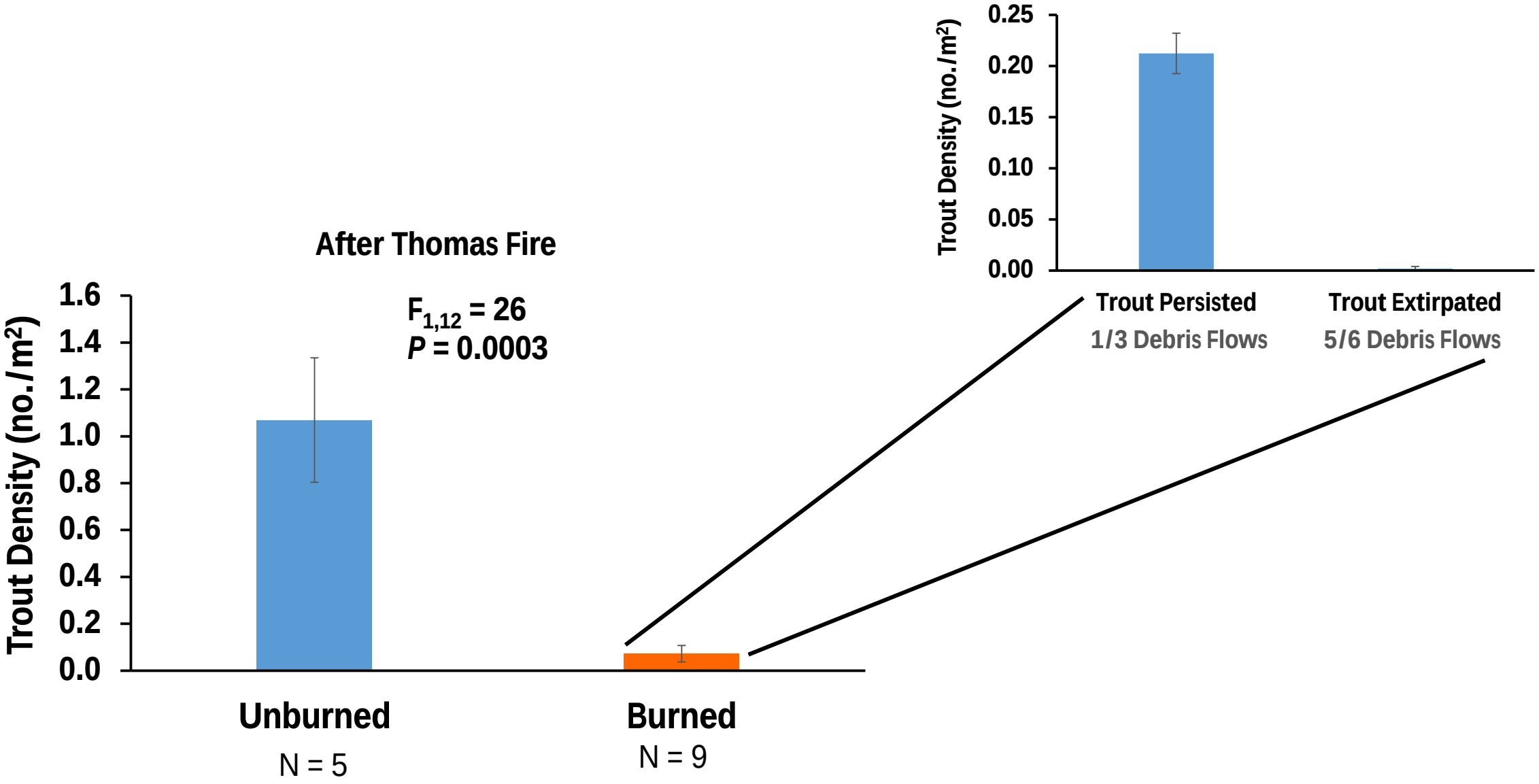
Stream Monitoring Locations – Summer 2018

Approach

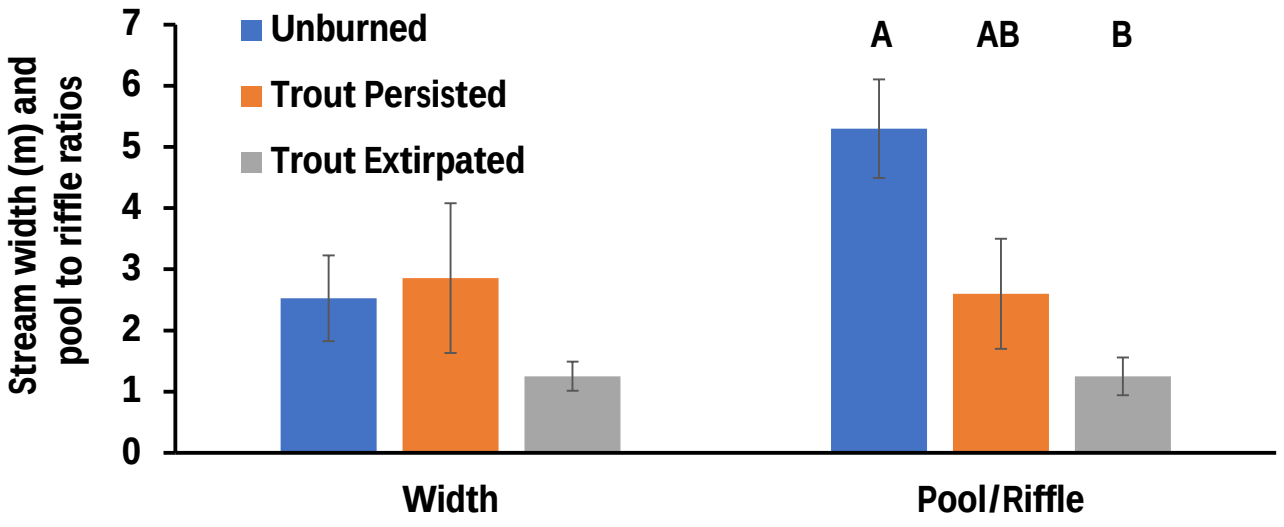
- Surveyed physical, chemical, and biological parameters at 10 burned (Thomas Fire) and 9 unburned stream sites of the Los Padres NF using SWAMP protocols
  - Established 10 cross-stream transects over 100-m reach
  - Physical measurements (i.e., depth, substratum type, canopy cover, current speed) collected at three equally spaced locations along each cross-stream transect (n = 30 samples per site)
  - Determined benthic and floating algae biomass at each of 30 sampled points/reach
  - DO, specific conductance, pH, and water temperature were measured at the bottom and top of each reach
  - Water samples for NH_4, NO_3, NO_2, and PO_4 concentrations were collected at the top of each reach
- Snorkel surveys were performed in pools for fish abundance and size structure

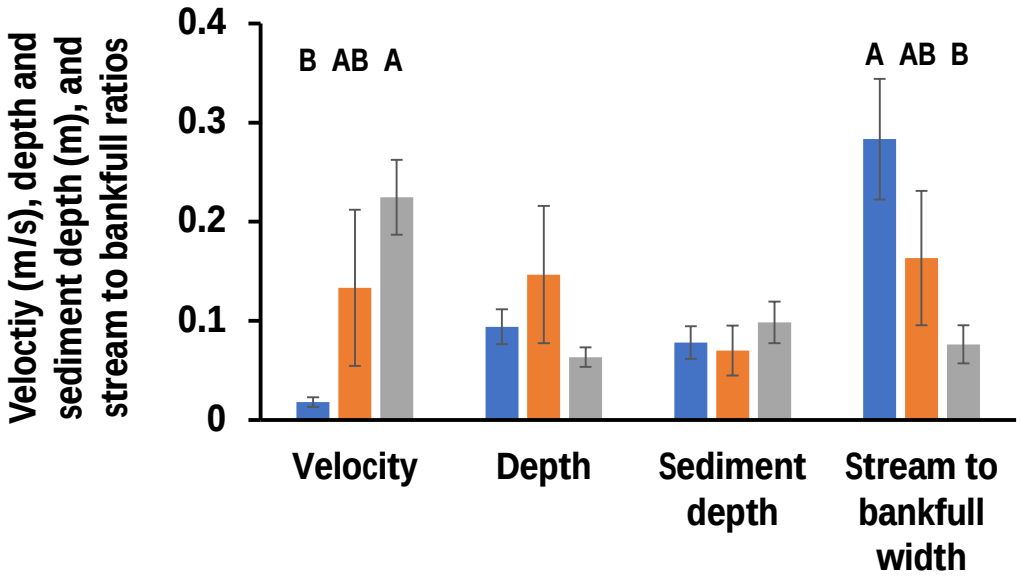


Results – Thomas Fire and Debris Flow Effects on Trout

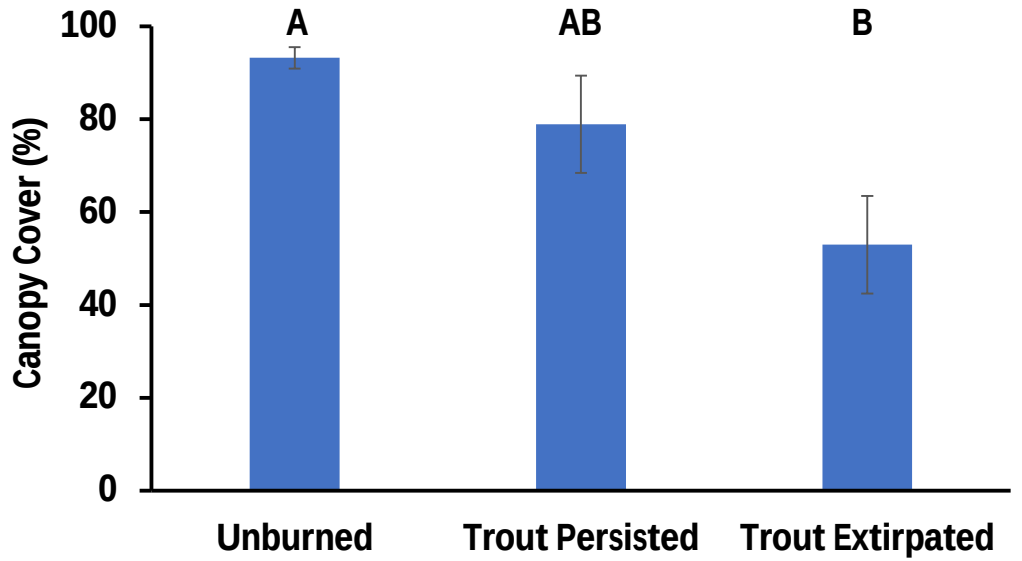


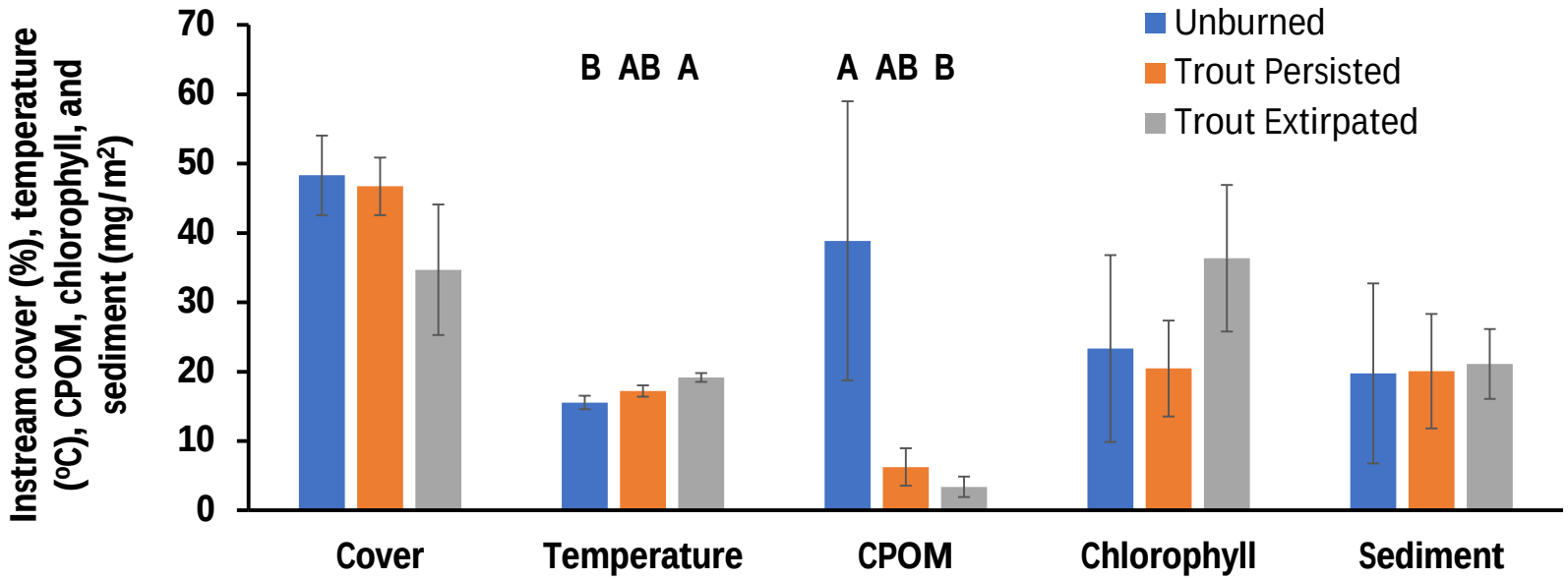
Results – Possible Environmental Drivers of Trout Abundance



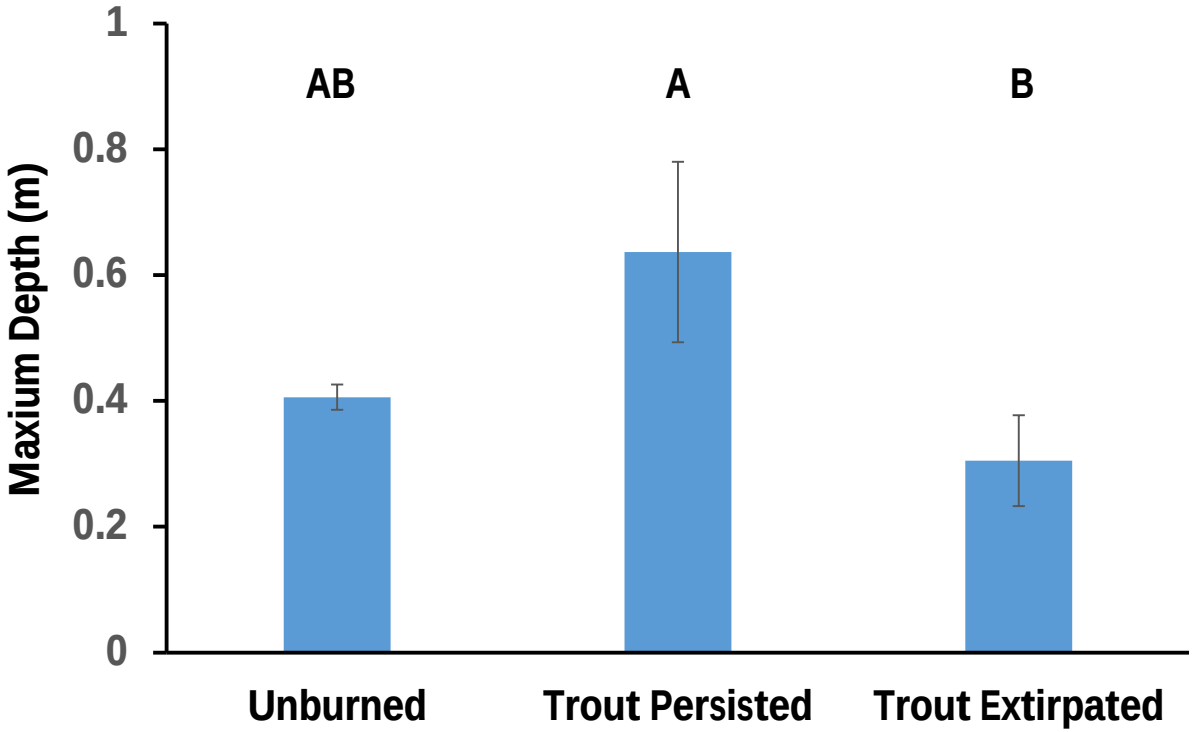


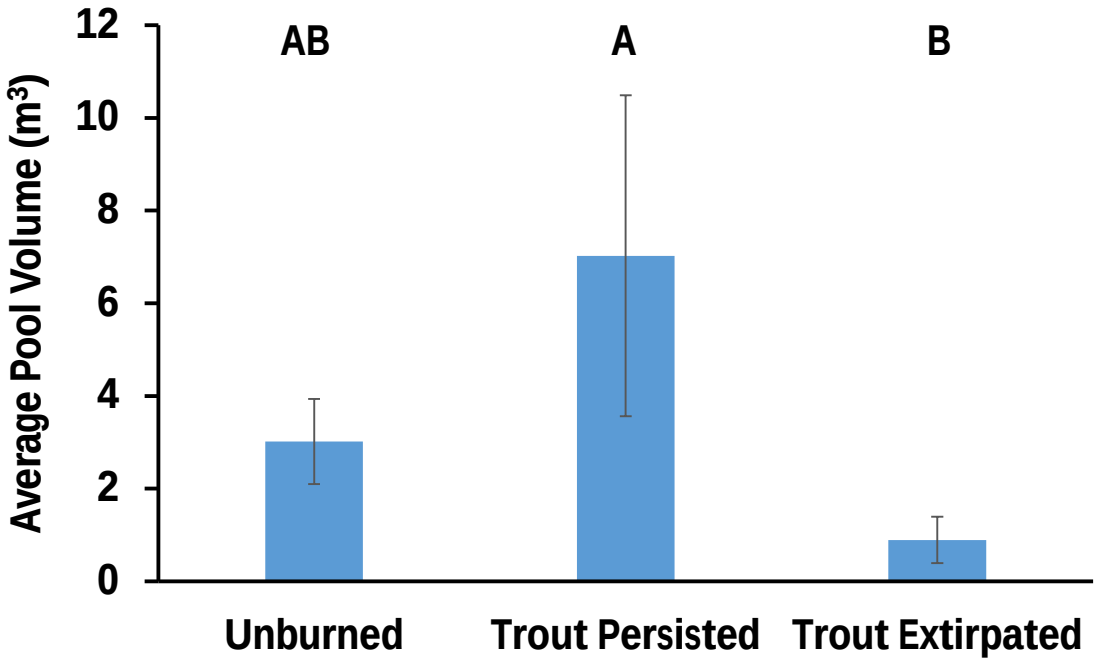
Results – Fire Effects on Riparian Vegetation and Associated Variables



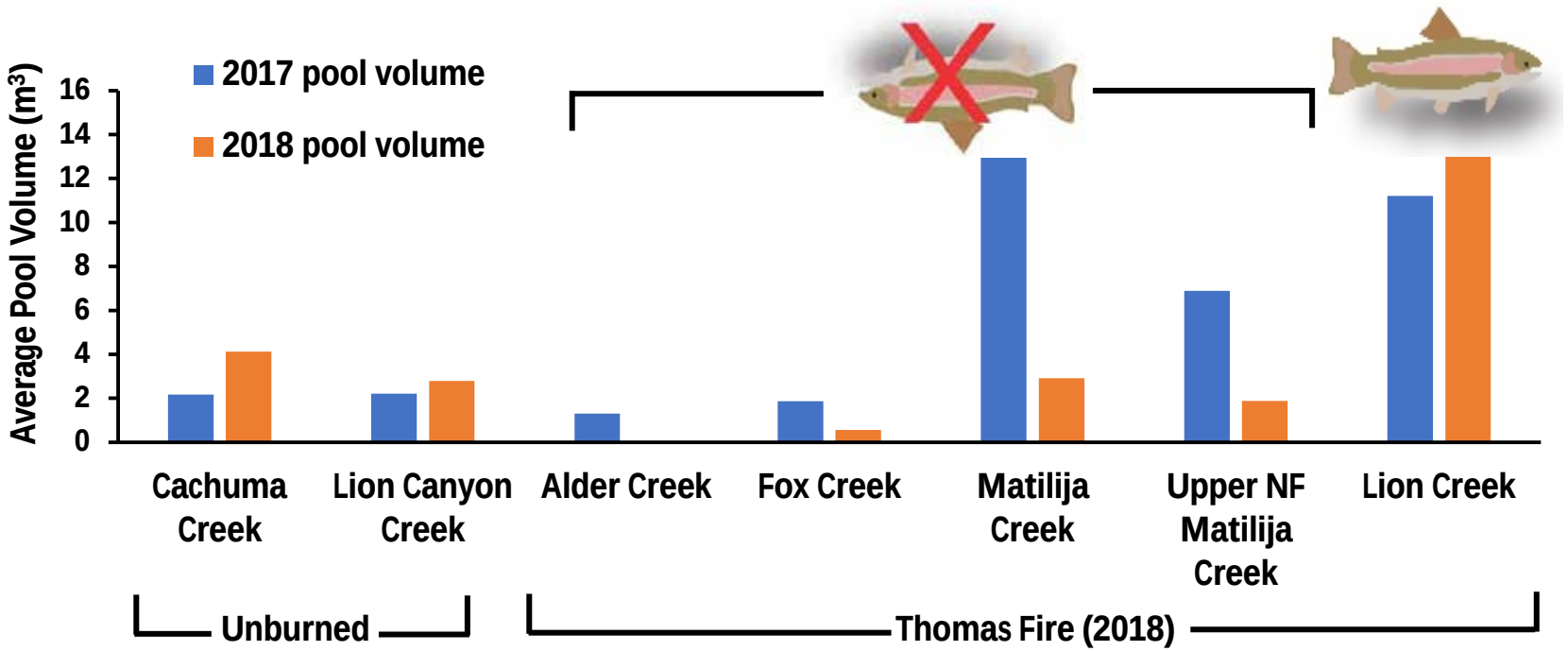


Results – Variable Thomas Fire Effects on Trout Populations





Results – Trout Populations Before and After Thomas Fire



Conclusions and Implications

Are trout populations reduced by the fire likely to recover and how long will this take?

- Stream surveys in Los Padres National Forest in 2016 and 2017
  - Unburned basins: 7 of 9 streams contained trout (average abundance = $0.4 \pm 0.13/m^2$)
  - Burned basins: 0 of 7 streams contained trout
    (including 5 primarily affected by Zaca Fire (10 yrs. before), 1 by Rey Fire (1 yr. before), and 1 by Whittier Fire (1 mo. before); trout occurred in all but one of these streams historically)

- Many burned basin results are confounded by drought, because streams in burned basins often dried seasonally

- Finally, trout returning to streams where extirpated will depend on recovery of riparian vegetation and pool geomorphology, as well as trout access to burned sites (i.e., no migration barriers; sufficient instream flows)

Acknowledgements

Laboratory support:

UCSB Marine Science Institute (MSI) Analytical Lab – George Paradis and Ken Marchus

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Terra Dressler, Janine Fischer, Morgan Rieck, Trent Rubio, Lance Takata, and Jason White (GIS)

Graphical support:

Sheila Wiseman

Project collaborators:

UCSB Department of Ecology, Evolution and Marine Biology – Drs. Scott Cooper and Erika Eliason

Funding provided by:

Joint Challenge Cost Share Agreement between UCSB – Marine Science Institute and Los Padres National Forest, *Evaluating O. mykiss populations and habitat conditions on the LPNF* (16-CS-11050700-007)

Contact information:
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Los Padres National Forest
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PUBLIC VENTURA COUNTY WORKS

Balancing Habitat and Public Safety for Future Conditions:

Matilija Dam Ecosystem Restoration Project

matilijadam.org

3rd Steelhead Summit

Pam Lindsey
Ventura County Watershed Protection District

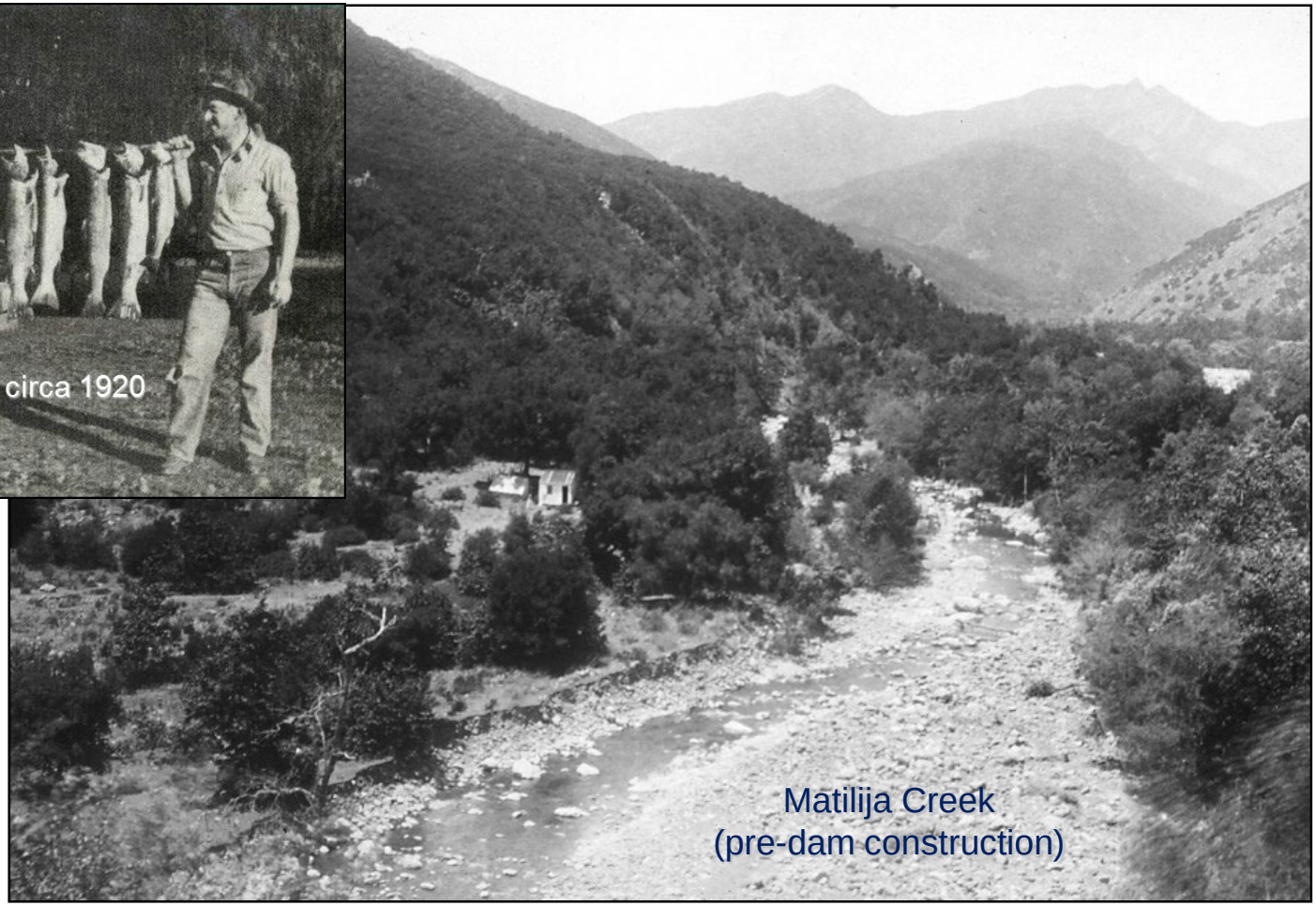
Presentation Outline

- Ventura River Setting
- Future Condition: Dam Removal
  - River Benefits and Public Safety
- Matilija Dam Ecosystem Restoration Components
  - Completed to Date
  - Remaining
- Next Steps
  - Final Designs
  - Environmental Analyses
  - Find Funding

Ventura River Watershed Overview


MATILIJA DAM

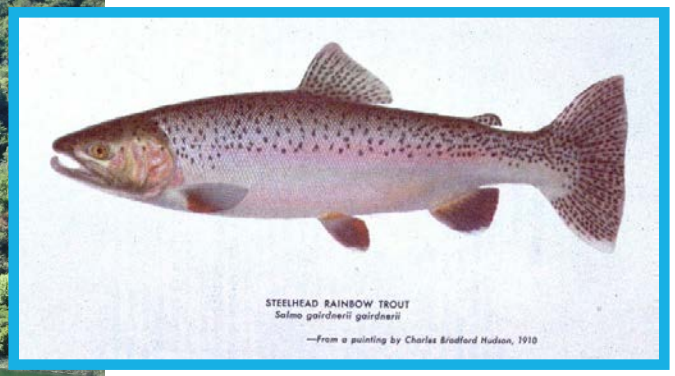
Matilija Dam Built 1947



Where's the lake?

- ~ 8 million cubic yards trapped behind dam
- only 5% of reservoir capacity remains

Image Courtesy of Ventura County Museum of History & Art.
Original Postcard:Matilija Dam - Popular fishing boating, & water sports area. Near Wheeler Springs & Ojai, CA. Easily accessible from the coast through Ventura. Color Photo by J. R. Horn. Date Unknown



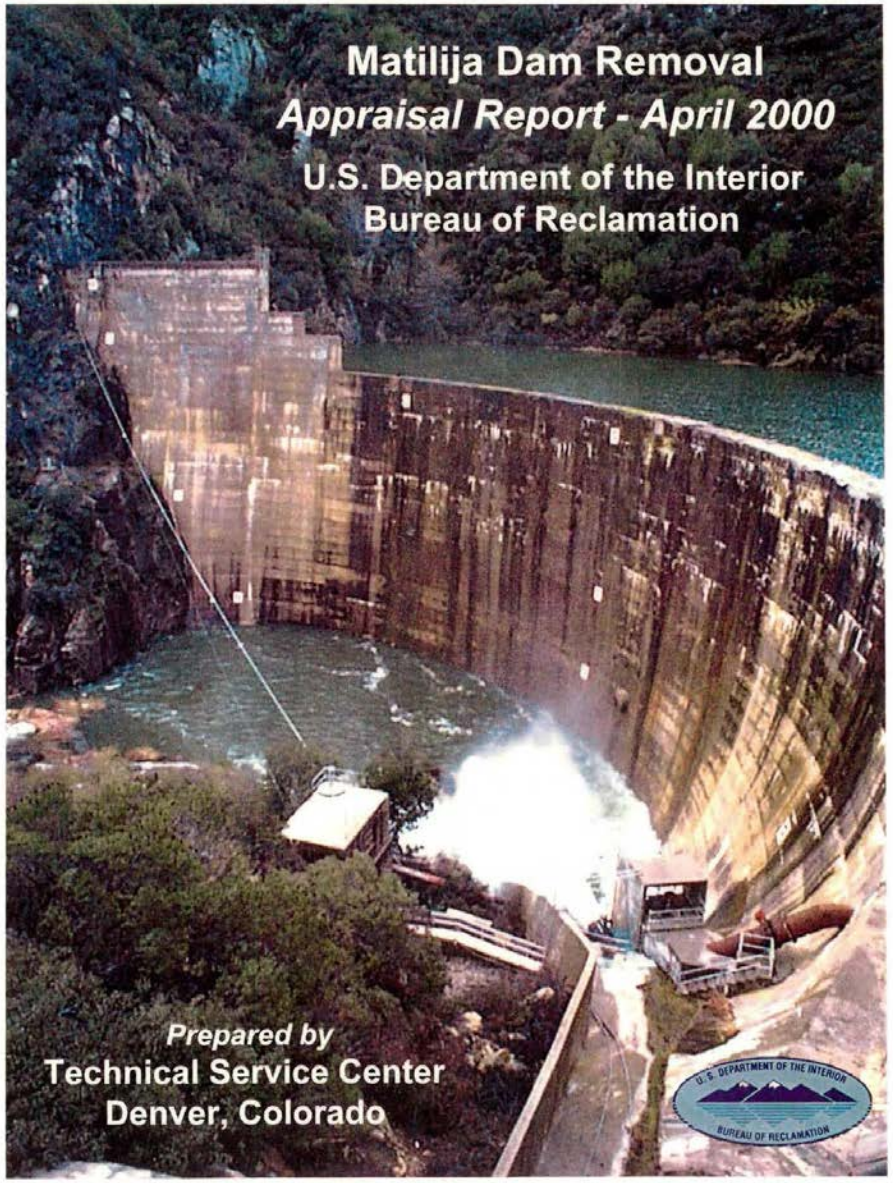
- Matilija Dam serves no useful function.
- Removal is complex and expensive, but attainable.

Matilija Dam 2007

Future Condition

1998-2000 Appraisal Study

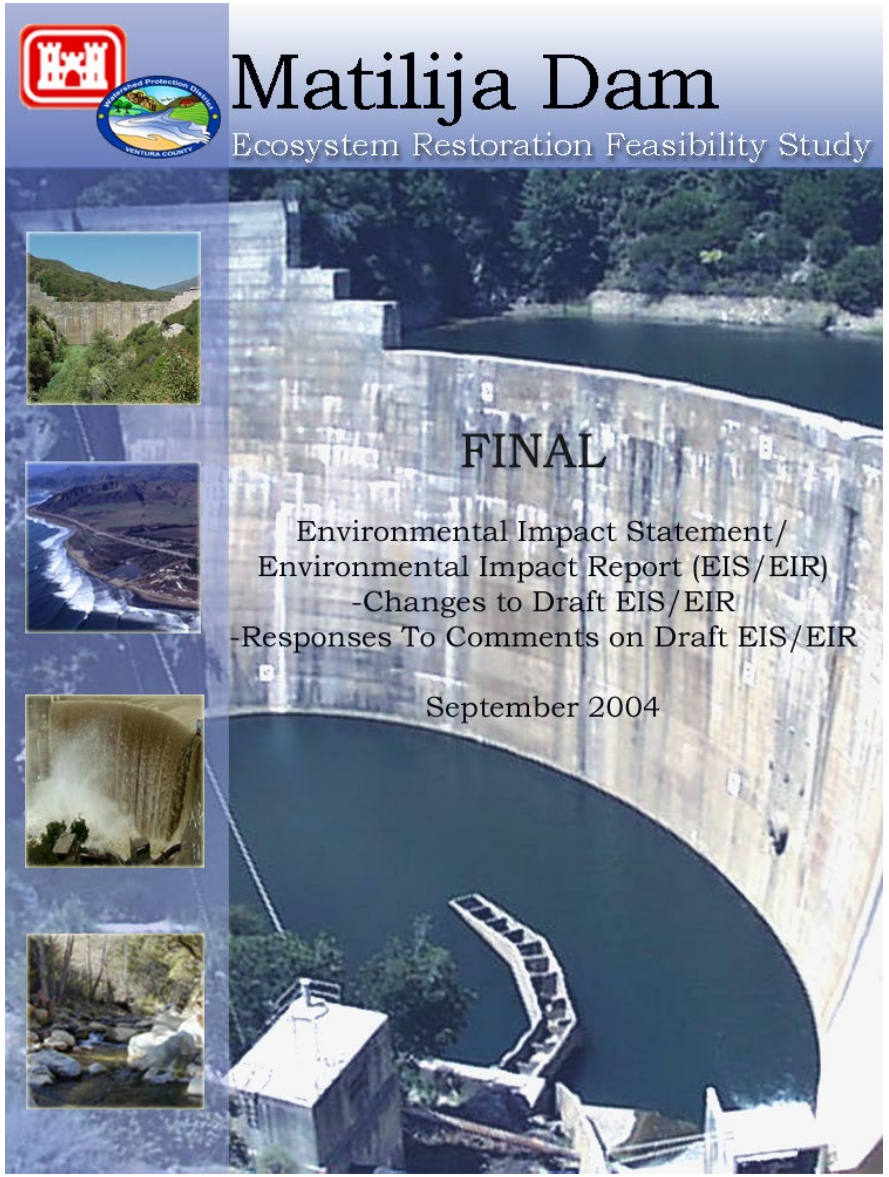
- 1997 Steelhead listed as endangered
- Board of Supervisors directs District to study dam removal



2004 Feasibility Study

Project Objectives:

- Improve Native Habitat
- Restore Sediment Transport
- Improve Recreation



Matilija Dam Ecosystem Restoration Project

Matilija Dam Today

Artist rendition of Matilija Creek after Dam removal

PROJECT OBJECTIVES

- Improve Aquatic and Terrestrial Habitat Along Matilija Creek and Ventura River
- Restore Natural Processes to Support Beach Replenishment
- Enhance Recreational Opportunities
- Restore Fish Passage

Recover Endangered Steelhead

Dam removal will restore steelhead access to over 20 miles of perennial habitat in the Matilija Creek watershed.

Removal of Matilija Dam

will first require modifications to the downstream infrastructure as shown. Then reservoir sediment will be flushed through two 12-foot diameter outlets so that the dam can be safely removed

approx location of low level outlets

1 Habitat Restoration

Over 270 acres of invasive Arundo donax "giant reed" have already been removed from the watershed to restore riparian habitat

2 Camino Cielo Bridge

New bridge will accomodate increased sediment flow

Existing Robles Diversion Dam & Fish Ladder

Robles Canal

Ojai

3 Robles Diversion Modification

High flow bypass will restore natural transport of sand, gravel, and cobble through the diversion and improve steelhead migration

Live Oak Levee

Reconstruction will bring levee up to FEMA flood control standards

Casitas Reservoir

4 Meiners Oaks Protection

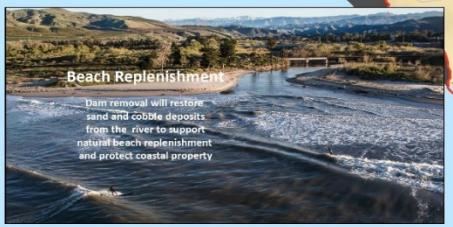
A new structure will protect residential community from flooding

Santa Ana Bridge

Replacement bridge will widen floodplain to accommodate increased sediment flow

7 Casitas Springs Levee

Improvements will bring levee up to FEMA flood control standards



Beach Replenishment

Dam removal will restore sand and cobble deposits from the river to support natural beach replenishment and protect coastal property

Ventura

photo credits: Jim Martin, Raymond Powers, Matt Stoecker
design and GIS: Cynthia Hartley 2017

Habitat Evaluation Procedure

Calculated steelhead, riparian, and natural processes values for with and without project for years 0, 5, 20, and 50 years in the future.

- Dam removal improves natural processes for steelhead habitat downstream of the dam.
- Dam removal opens 17 miles of spawning and rearing habitat to steelhead.
- Habitat values gained by dam removal were cancelled out by giant reed as it spreads in the future.

(Matilija Dam Ecosystem Restoration Project Draft EIS/EIR Appendix E)

Giant Reed: The Root of All Evil

Very Thirsty

Consumes up to three times as much water as other riparian plants.

Reduces biodiversity to dense mono cultures

Invasive

Flood Impacts

Biomass clogs and block drainage infrastructure

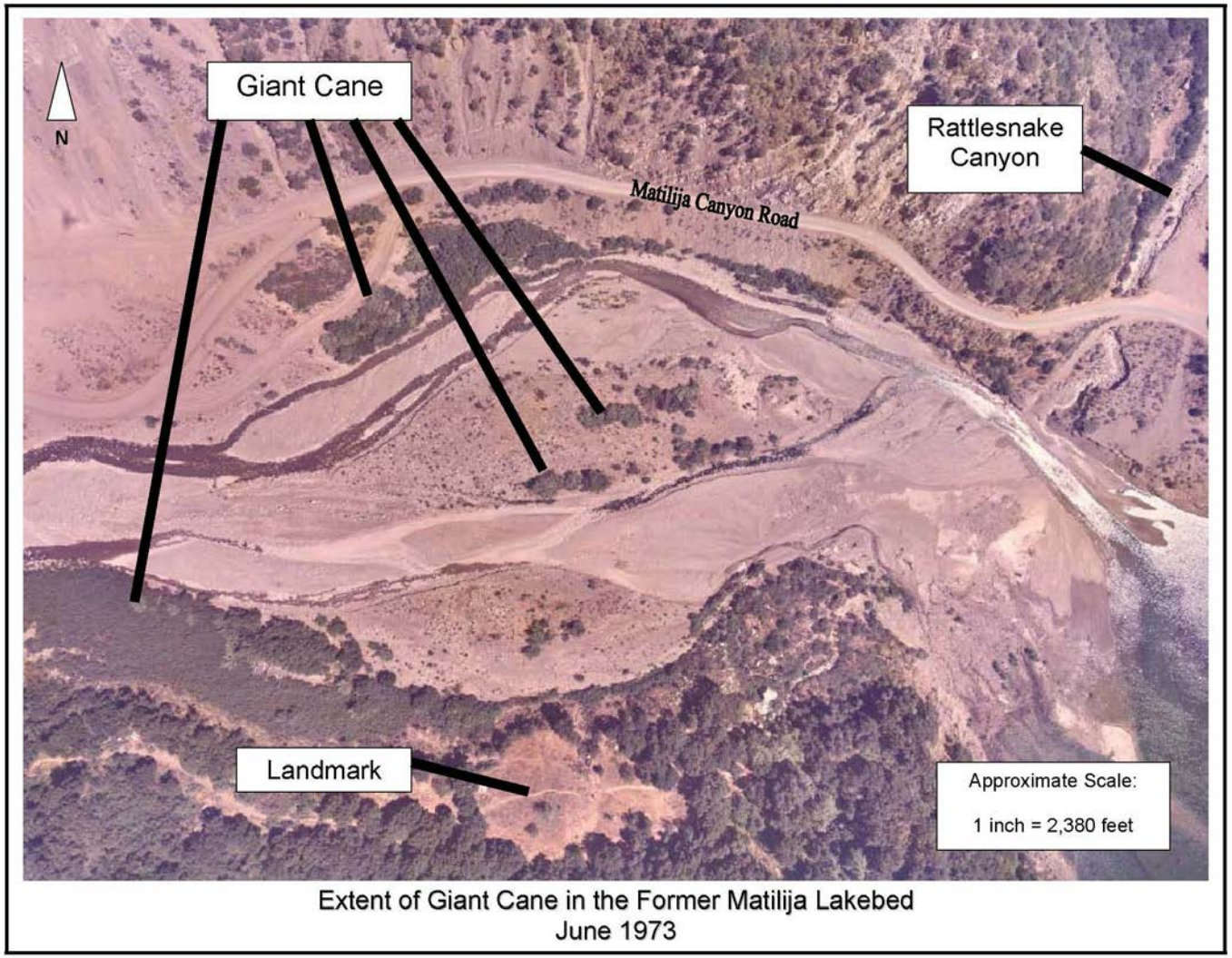
Requires hard labor and persistence to eradicate

Expensive

Fire Hazard

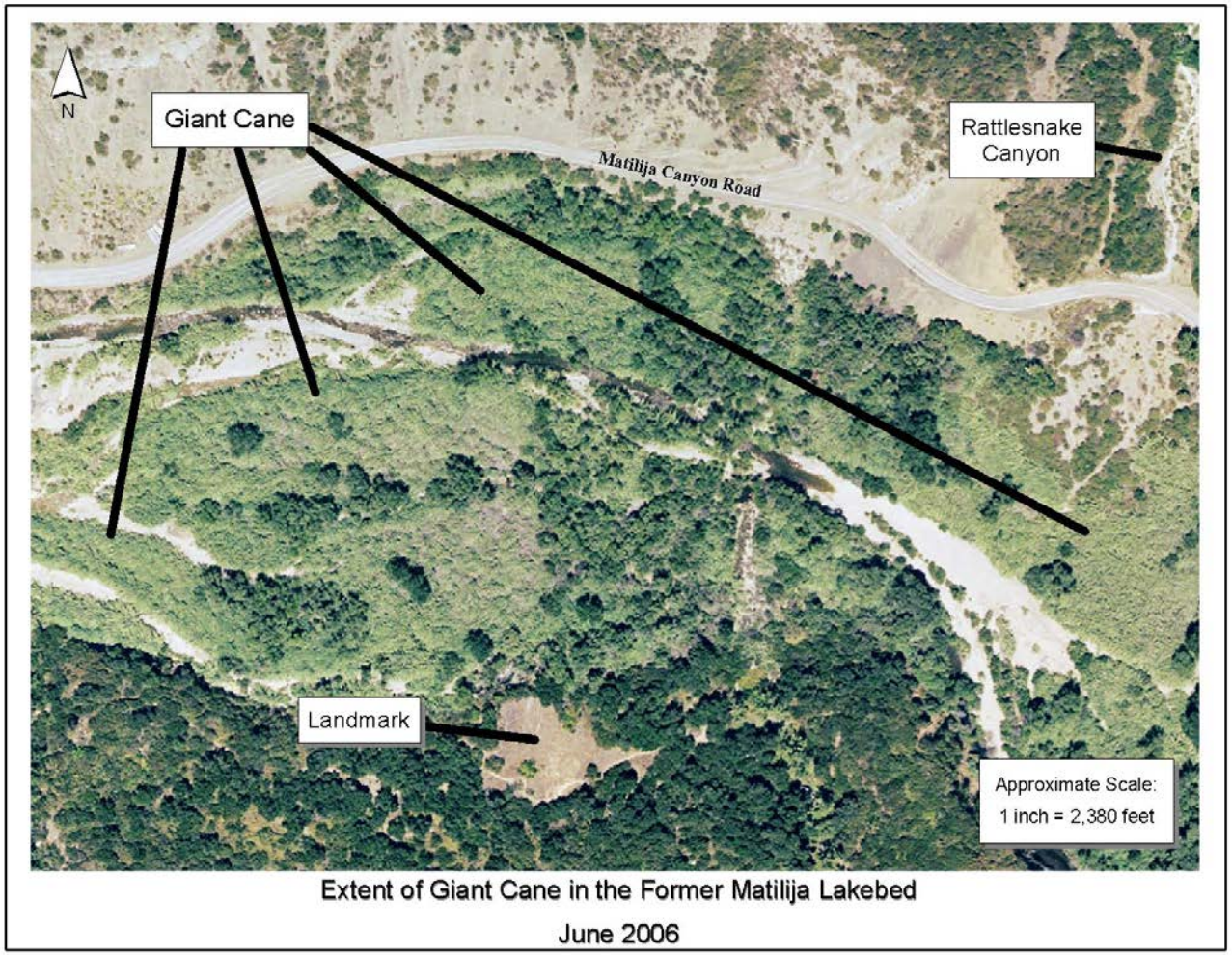
Carries fires quickly across river bottoms

Giant Reed U/S of Matilija Dam 1973



Extent of Giant Cane in the Former Matilija Lakebed
June 1973

Giant Reed U/S of Matilija Dam 2006



Extent of Giant Cane in the Former Matilija Lakebed

June 2006

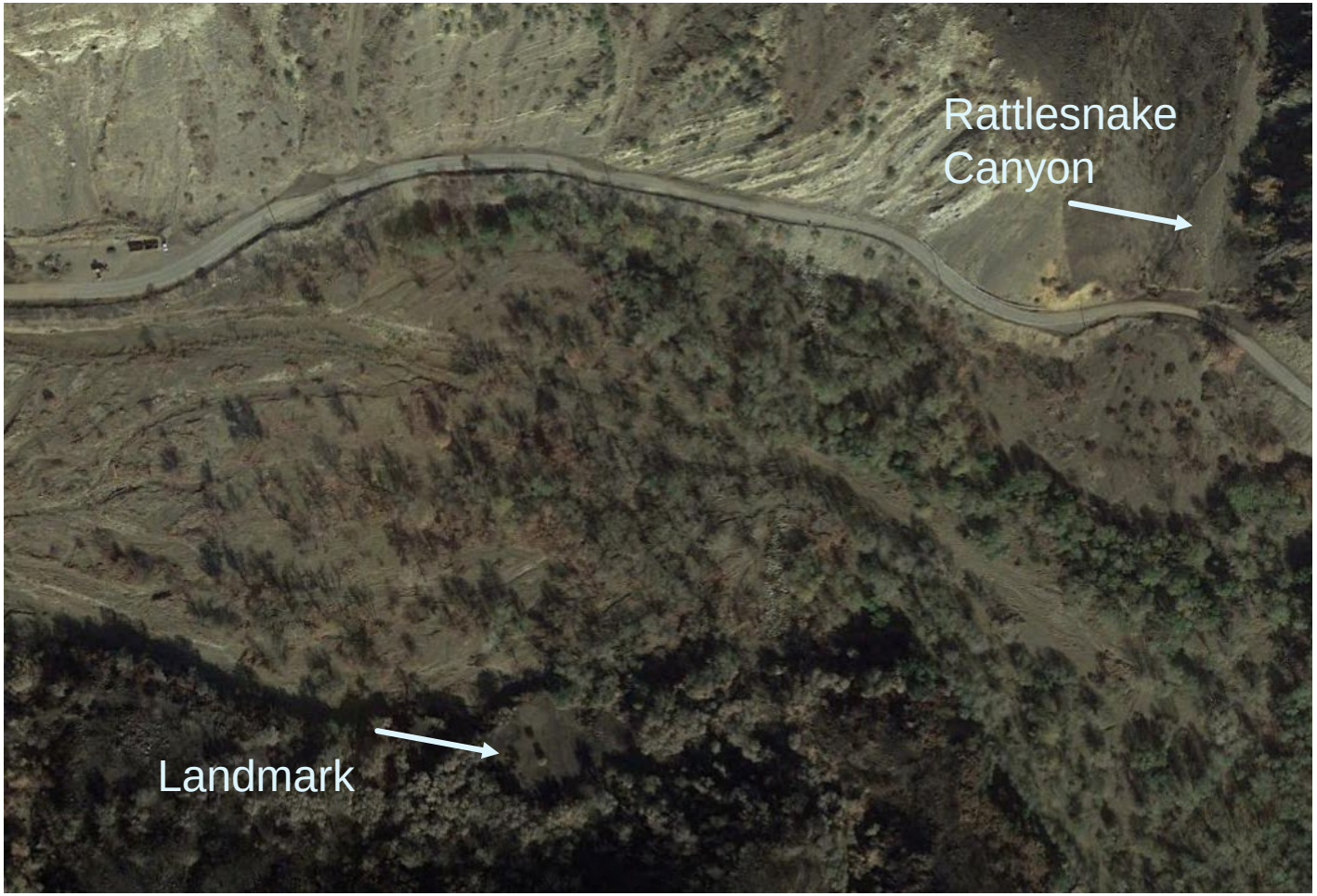
Fall 2007: Began Giant Reed Removal on 1,200 acres with $3.5m Proposition 40 Consolidated Grant

2018: Not dead yet!

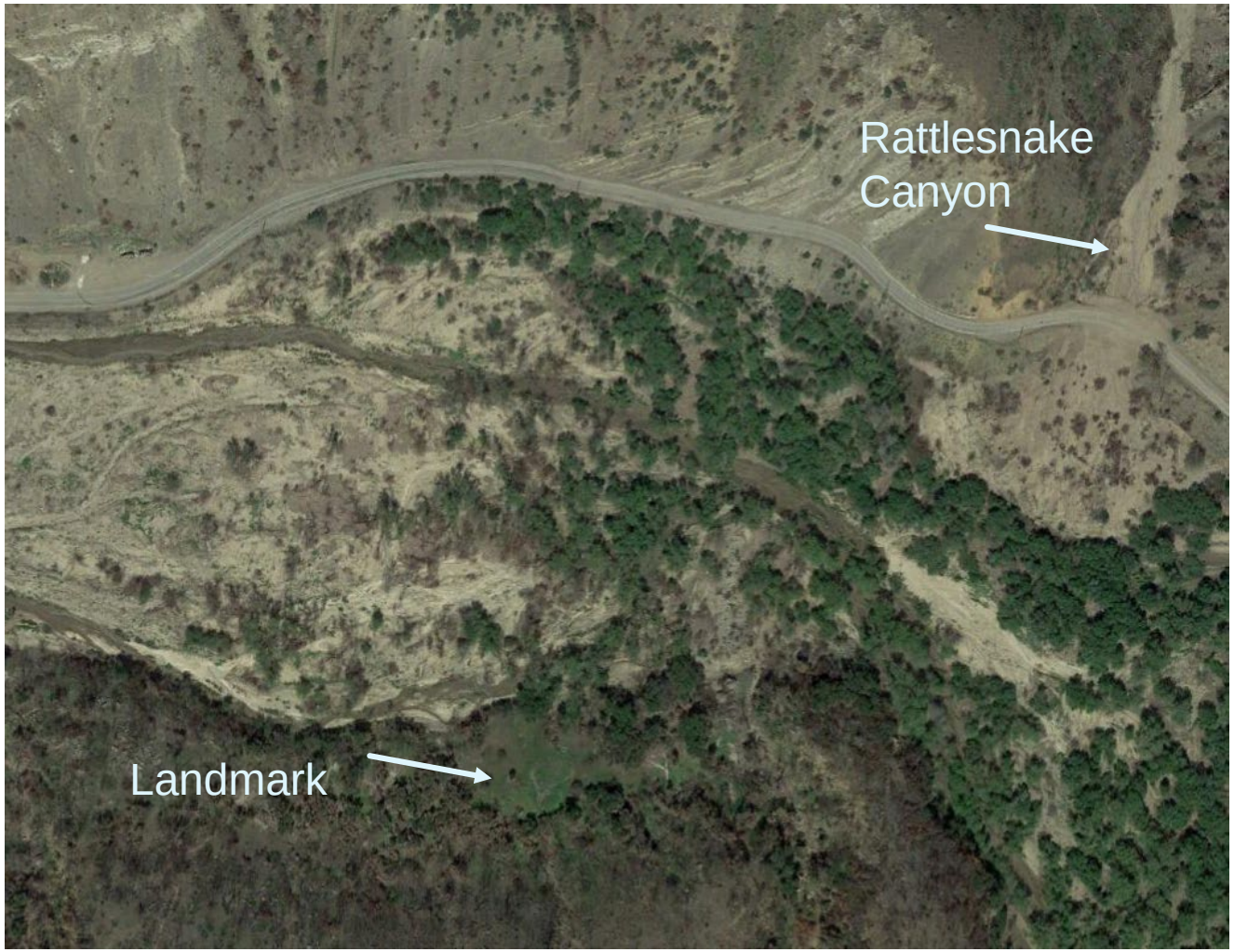
- 16 retreatments since 2007
- Reduced to fraction of original cover
- Reduced fire impacts in canyon
- Giant reed removal annually through 2025

Giant Reed U/S of Matilija Dam 2017

January 2018



April 2018



Wells at Foster Park 2009-2010

- $1.5m Prop 40 Consolidated Grant
- 2 wells installed and tested
- City of Ventura to operate them in the future

Casitas Springs Levee Improvements

2008
Raised levee 4 feet

Current design study for toe down

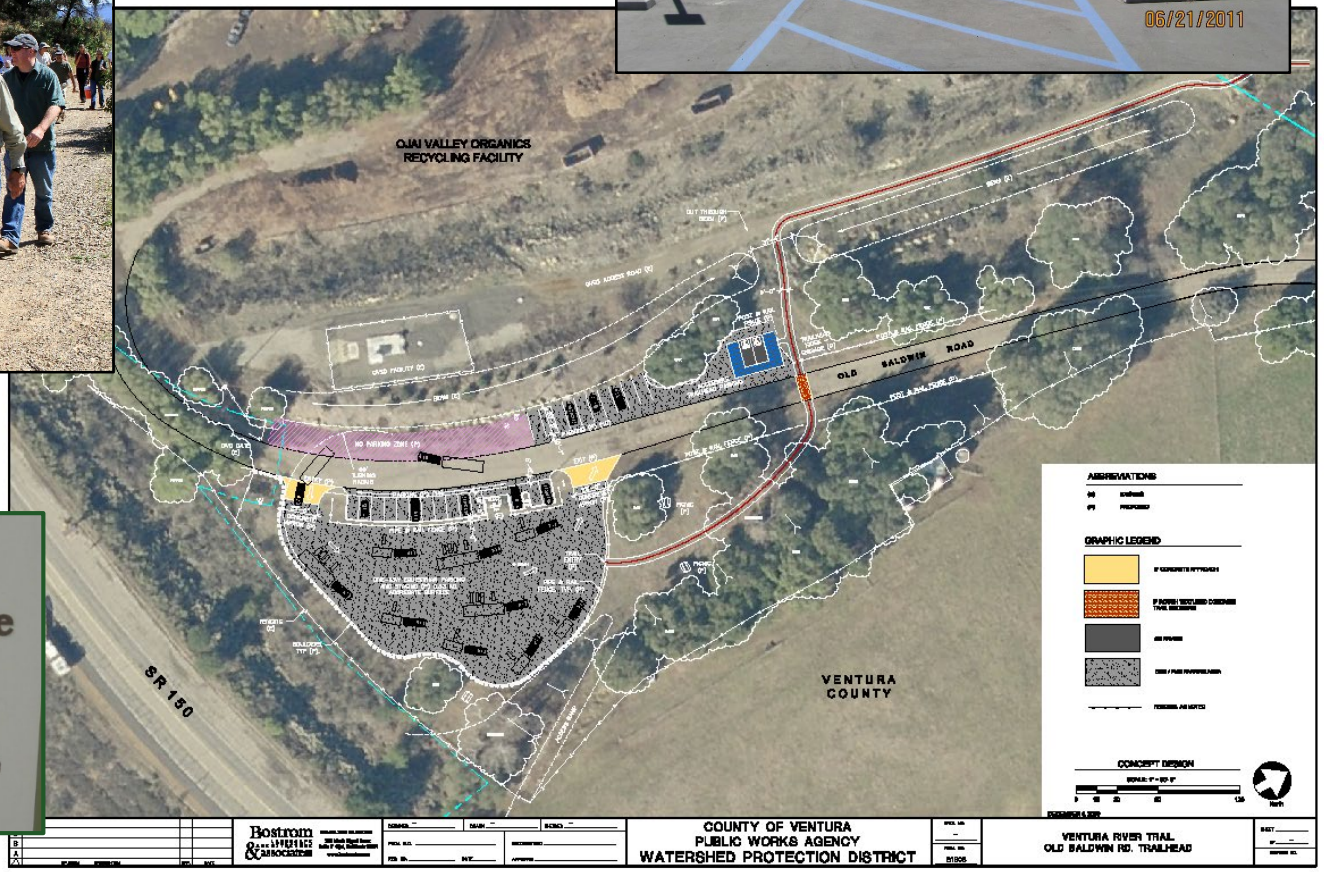
Property Acquisition 2009

- Properties Impacted by Dam Removal
  - Aggradation
  - Infrastructure
- Purchased Hot Springs with Coastal Conservancy Funds

Trailhead at Highway 150

$1.2m River Parkways Grant for trailhead, trails, and Giant Reed Removal

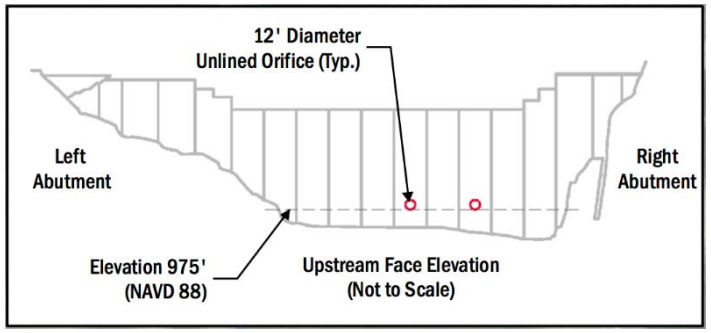
5/19/2011



2008-2016 Studies

- What to do with all that sediment?
  - Slurry, Stack, Sequester…
  - Upstream, Downstream…
- Where will construction water come from?
- Will sediment ruin water supply wells?
- How long will the sediment affect water quality?

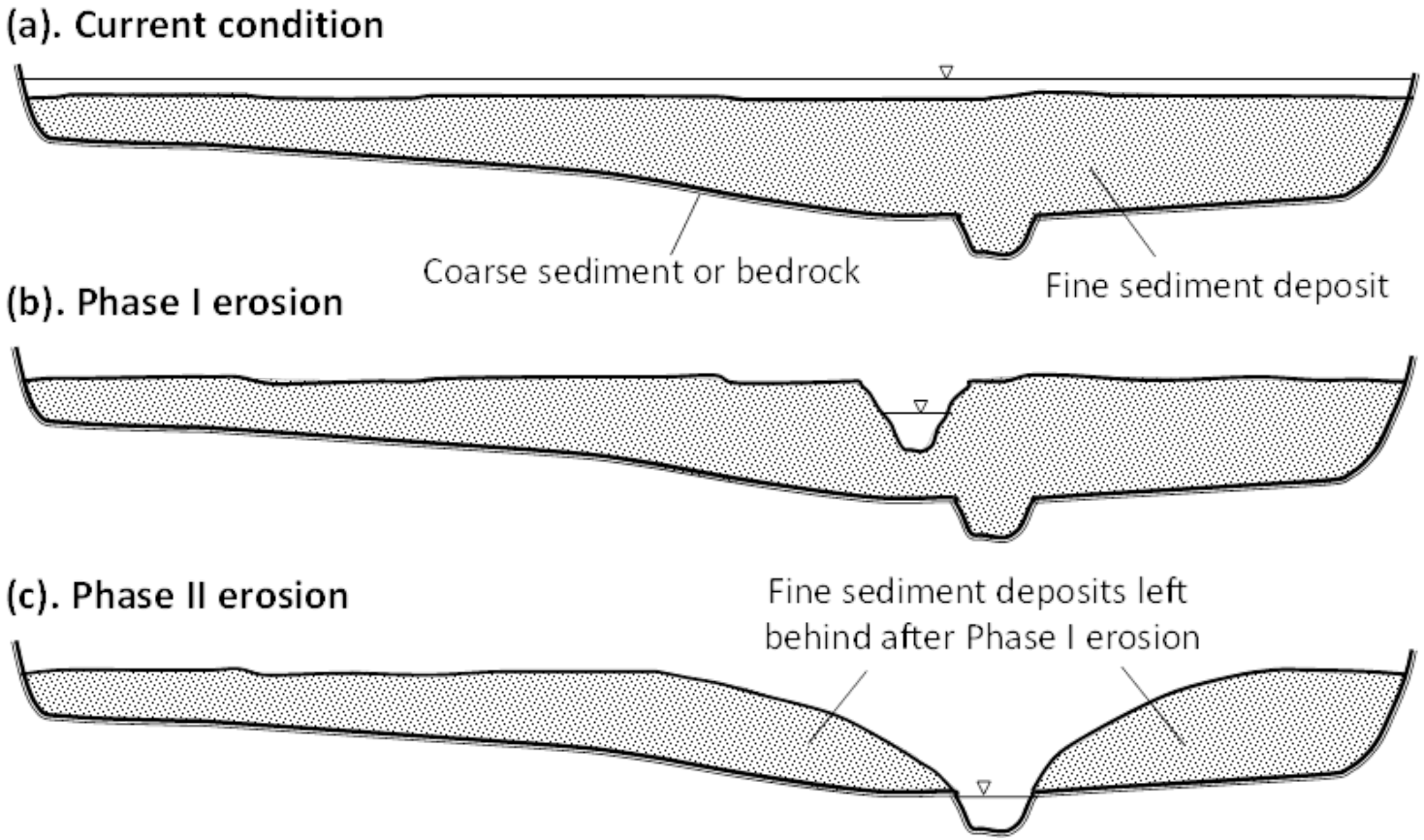
Stakeholder Consensus Project 2016



- Controlled Natural Sediment Transport
- Timely Implementation
- Cost Effective
- Proven to Work

Condit Dam
White Salmon River, WA

Sediment Transport Solved



New Project Design Questions

- Dam Removal Design Details?
- Downstream Public Safety Components
  - Which are still needed?
  - Design Details?
  - Environmental Impacts?
- Where is the funding?
- Who is in Charge?

Current Prop 1 CDFW Grant Tasks $3.3m State Funds 6/2017-5/2020

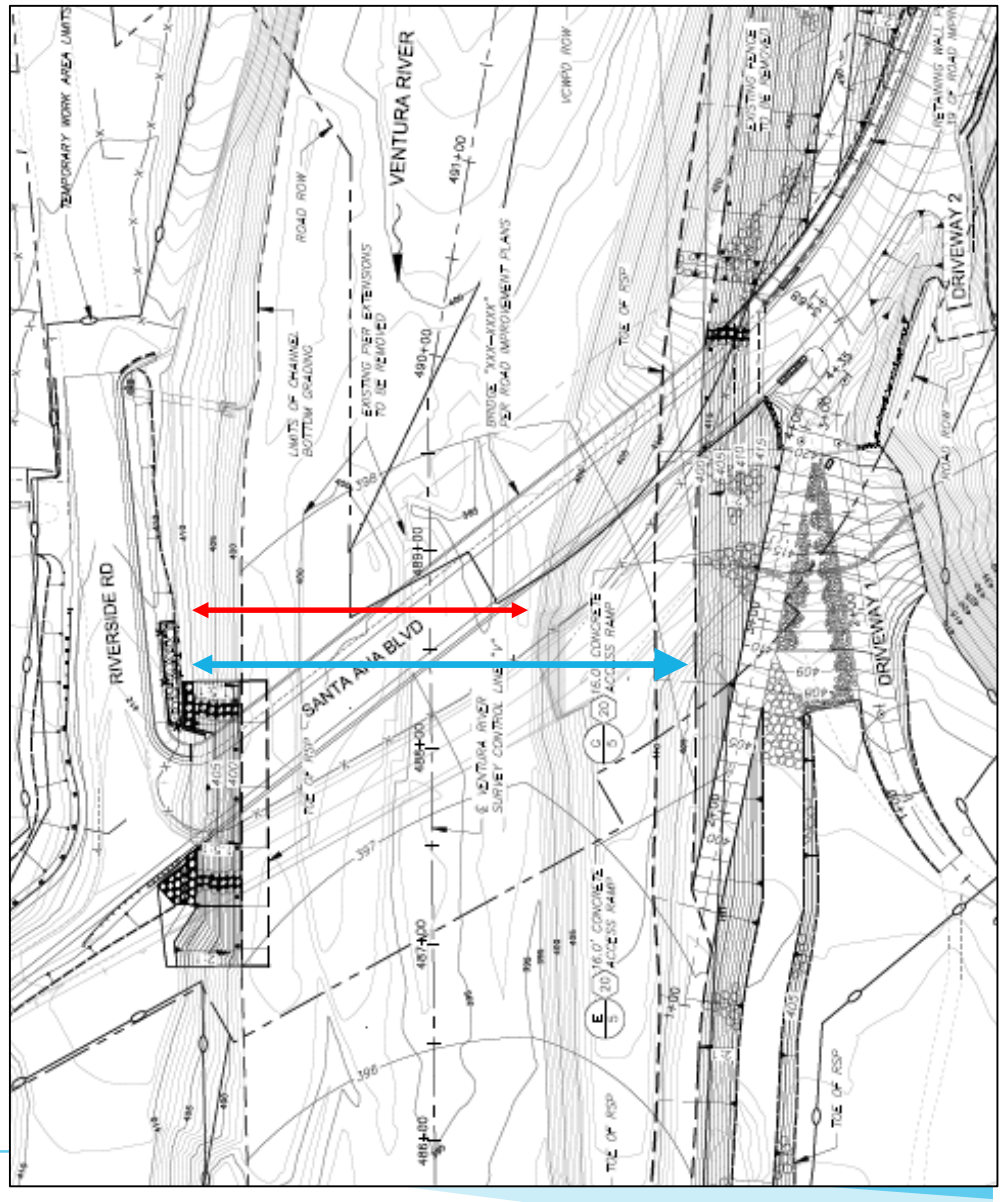
- Technical Studies:
  - Concrete and Sediment Field Tests
  - Dam Structural Evaluation
  - Hydraulic Studies to Determine 100 year flows
  - Re-evaluate Downstream Project Components
  - Predictability Assessment of Flushing Storm Event

- 65% Dam Removal Design Plans
- Levee Design Plans
- Real Estate Plan
- Project Permitting Plan
- Update the CEQA/NEPA Document

+Estuarine and Coastal Modeling (NFWF Funded)

Santa Ana Bridge/ River Widening

- Widen river 150 ft to 230 ft
- Improve fish and sediment passage
- Pending Application to CDFW Prop 1 Restoration Grant (Dec. 2018)



Camino Cielo Bridge

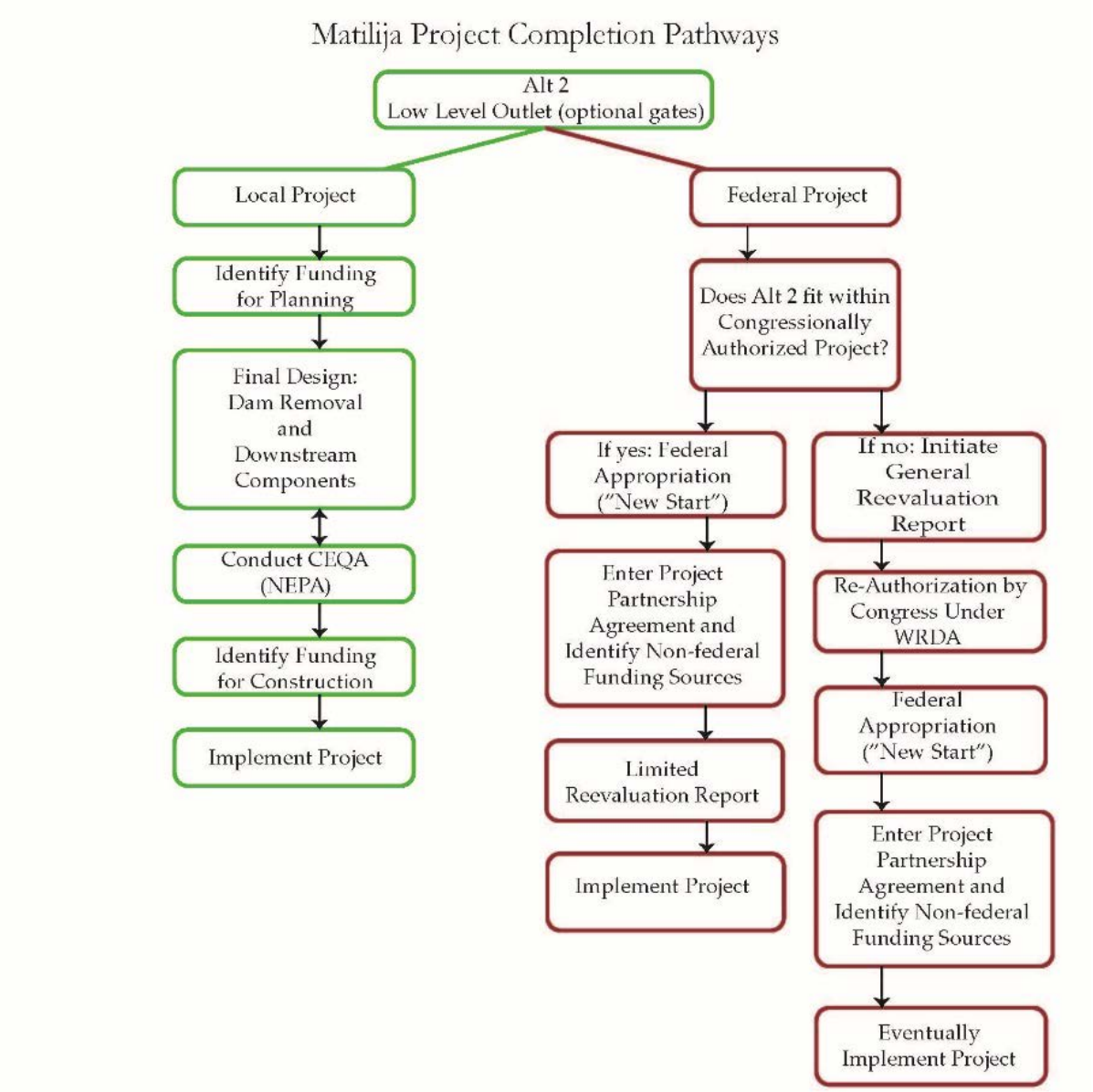
- Still in early design stages
- New location downstream not yet identified

Meiners Oaks and Live Oak Levees

Upgrade Live Oak Levee

New levee downstream of Robles Diversion to protect floodplain residences.

Robles Diversion Modification


Matilija Project Completion Pathways
Alt 2
Low Level Outlet (optional gates)
Local Project
Identify Funding for Planning
Final Design: Dam Removal and Downstream Components
Conduct CEQA (NEPA)
Identify Funding for Construction
Implement Project
Federal Project
Does Alt 2 fit within Congressionally Authorized Project?
If yes: Federal Appropriation ("New Start")
Enter Project Partnership Agreement and Identify Non-federal Funding Sources
Limited Reevaluation Report
Implement Project
If no: Initiate General Reevaluation Report
Re-Authorization by Congress Under WRDA
Federal Appropriation ("New Start")
Enter Project Partnership Agreement and Identify Non-federal Funding Sources
Eventually Implement Project

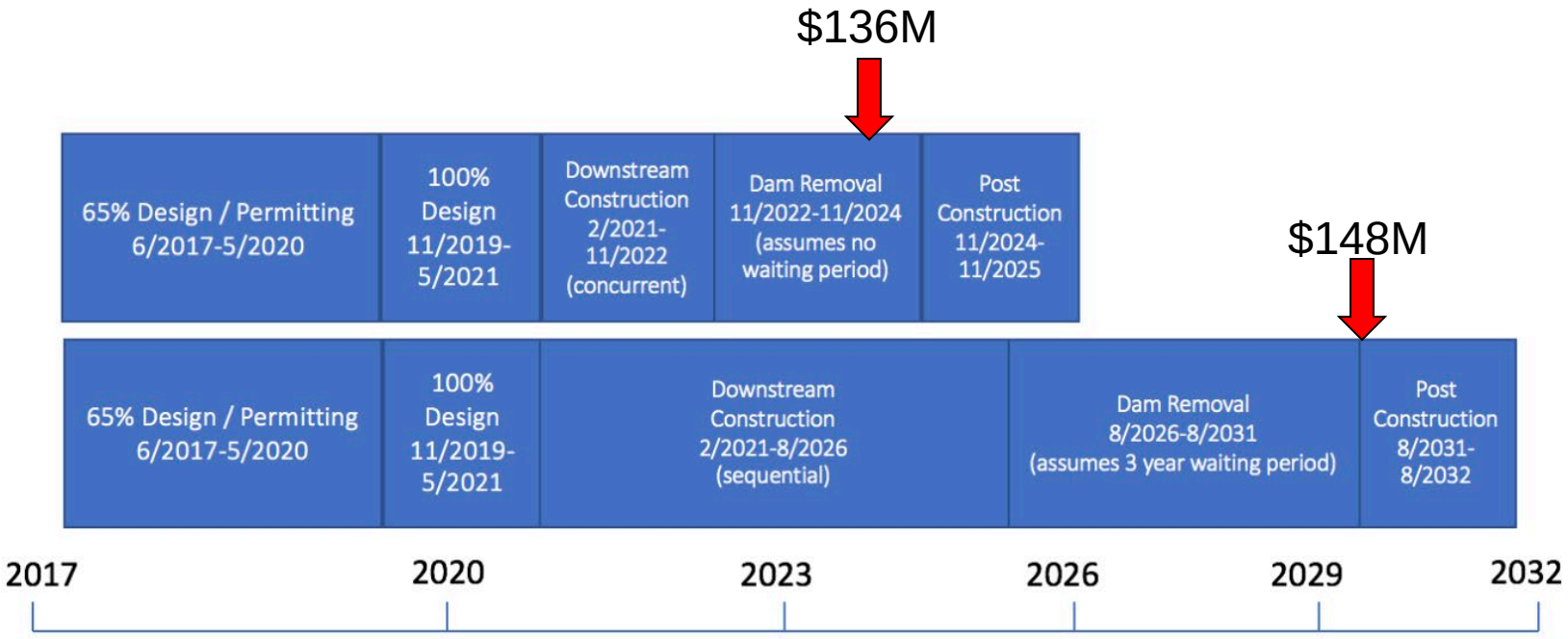
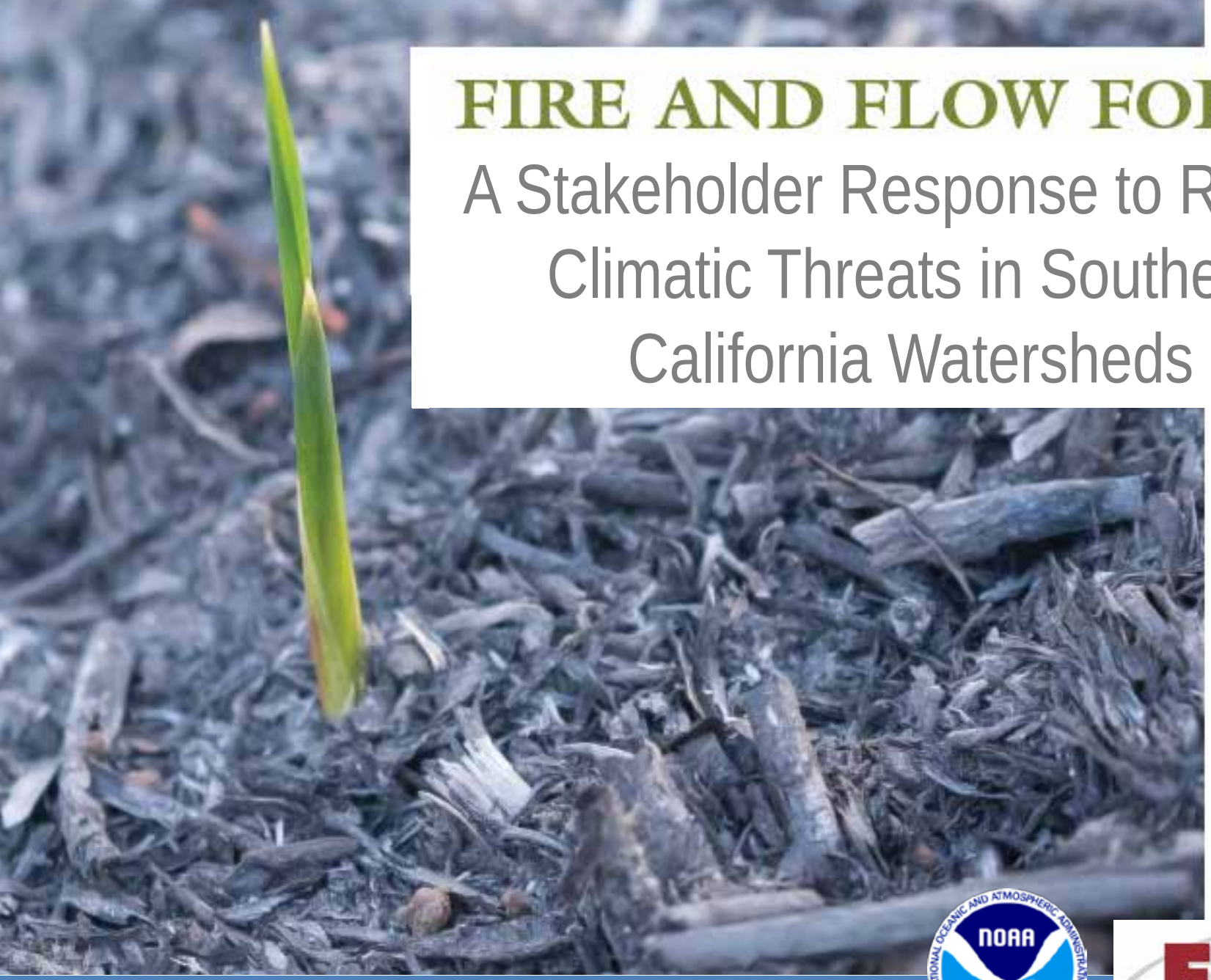


Figure 3: Sequential and Concurrent Implementation Schedules

Questions?



FIRE AND FLOW FORUM

A Stakeholder Response to Rise of Climatic Threats in Southern California Watersheds

Stacie Fejtek Smith, D.Env.

Why do we need another plan ?

Who is the Fire and Flow Forum?

What is the Fire and Flow Forum Strategic Plan?

Where does this plan apply? Where should we focus?

When will the plan be available? When should we use the plan?

How did we create this plan? How do we use the plan?

Why do we need another plan ?

- Guide watershed recovery and resiliency building in southern California
- To motivate new projects, support ongoing projects and assist in securing funding by communicating regionally significant priority watershed actions to funders and decision makers
- Compliment/update/inform larger plans with regional focus and regional expertise
- It's been a while since the region developed a stakeholder derived/vetted strategic plan to guide watershed restoration – South Coast Prioritization 2001, NMFS Recovery Plan 2012
- Respond to recent events not captured in previous plans –Thomas and Whittier Fires subsequent debris flows and NOW WOOSLEY

Fire

- Thomas Fire alone 281,893 acres in Santa Barbara and Ventura counties
- 97k acres from Woosley Fire in Los Angeles county (almost entire BPG)
- Thomas Fire already surpassed as largest fire

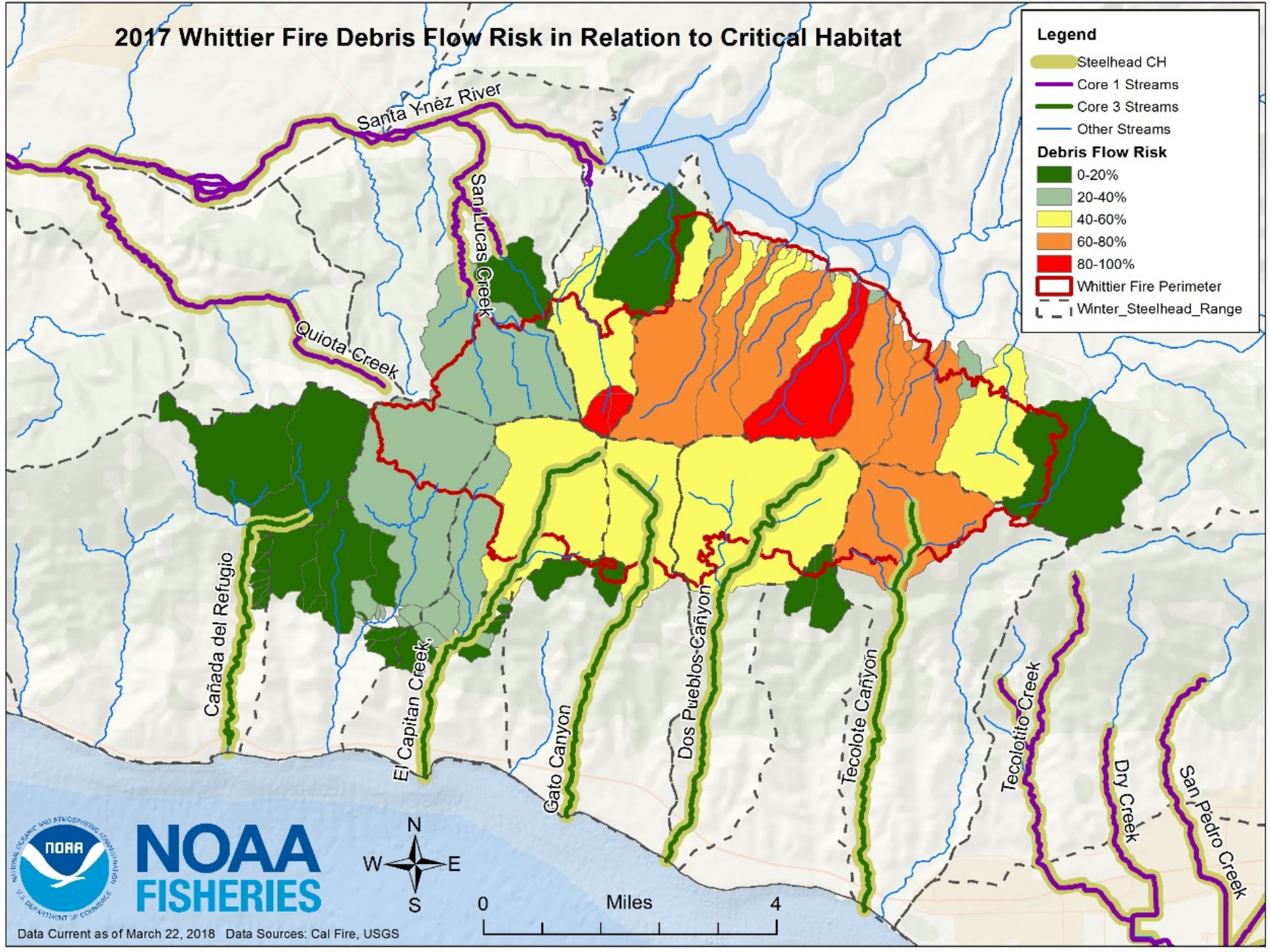
Debris Flows

- Deadly Montecito debris flow kills 23 people
- 101 Freeway closed for 2 weeks
- Large amount of sediment and debris

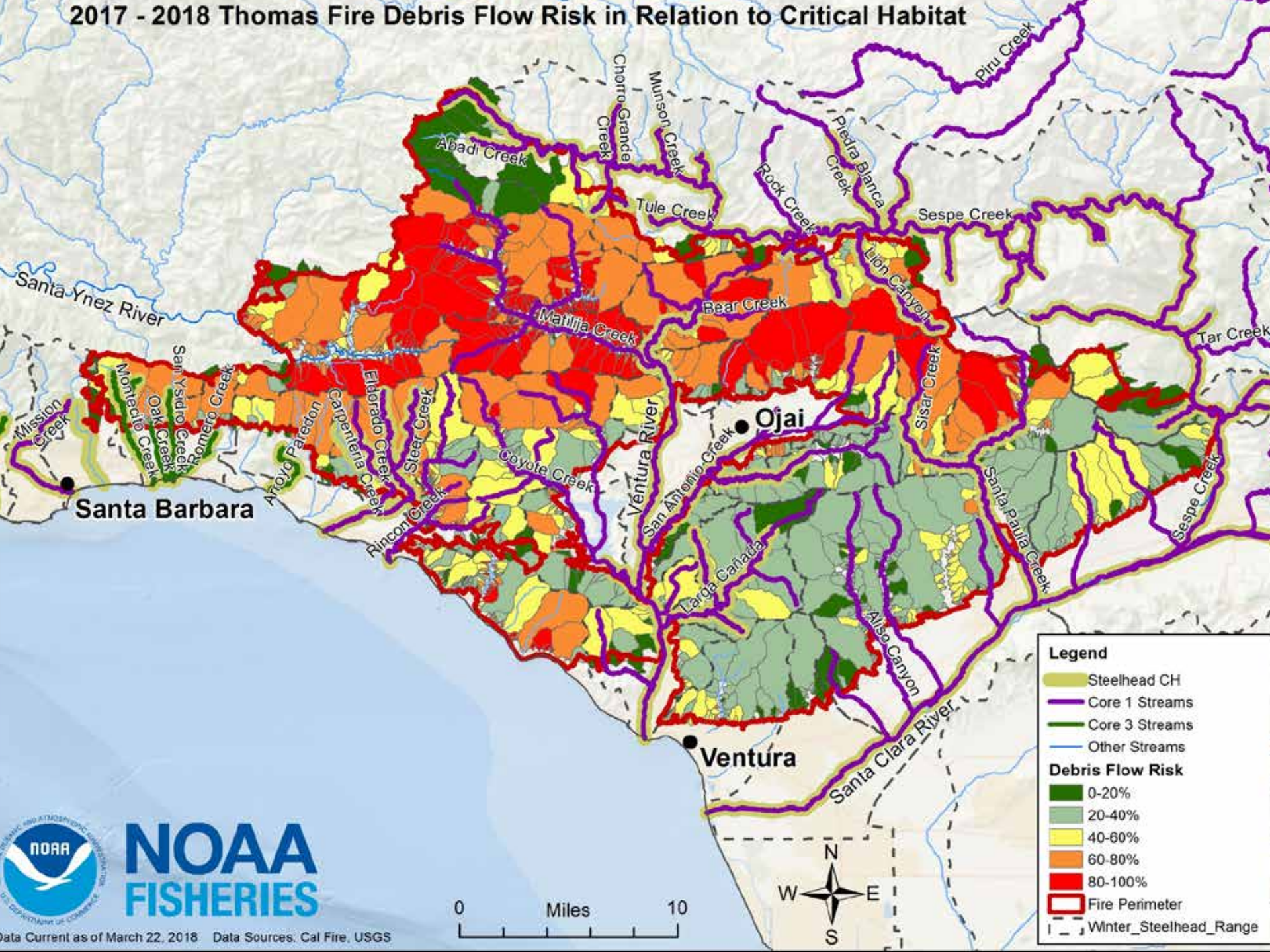
Impacts to Carpinteria Salt Marsh

Drone imagery from
18 January 2018

Slide Andrew Brooks UCNRS, Drone imagery Tom Bell (UCSB/UCLA)


2017 Whittier Fire Debris Flow Risk in Relation to Critical Habitat
Legend
Steelhead CH
Core 1 Streams
Core 3 Streams
Other Streams
Debris Flow Risk
0-20%
20-40%
40-60%
60-80%
80-100%
Whittier Fire Perimeter
Winter_Steelhead_Range
Santa Ynez River
San Lucas Creek
Quiota Creek
Cañada del Refugio
El Capitan Creek
Gato Canyon
Dos Pueblos Canyon
Tecolote Canyon
Tecolotito Creek
Dry Creek
San Pedro Creek
NOAA
FISHERIES
N
W
E
S
0
Miles
4
Data Current as of March 22, 2018 Data Sources: Cal Fire, USGS

2017 - 2018 Thomas Fire Debris Flow Risk in Relation to Critical Habitat



NOAA FISHERIES

Data Current as of March 22, 2018 Data Sources: Cal Fire, USGS


2013


2016


Jan 2018


April 2018

Why do we need another plan ?

- Sensitivity of timing
- Large geographic area
- Varying jurisdictions
- Lots of stakeholders
- Lots to do
- Little time and $ to do it
- Need to communicate
- Need to prioritize

Why do we need another plan ?

- Capitalize on unique energy from recent events that allows for collaboration across traditional boundaries to provide avenues toward recovery, relief, and resiliency
- Wildfires in Southern California are becoming more severe and frequent due to shifting climatic conditions
- New normal? 7/10 of California's most destructive wildfires took place in the last four years
- More significant wildfires and extreme rainfall (California's Fourth Climate Change Assessment, 2018).
- Preparedness for inevitable future events

Who is the Fire and Flow Forum?

- Forum is not an organization, non-profit, or government entity
- No one excluded
- Those who participated had their interests incorporated
- 150+ regional experts representing 50+ organizations

- Local/state/federal gov.,academics, non-profits, local residents, and private interests
- Led by South Coast Habitat Restoration and NOAA Restoration Center

- American Geosciences Institute
- BEACON
- Blue Tomorrow
- Cachuma Operation and Management Board
- Cachuma Resource Conservation District
- Cal Poly San Luis Obispo
- California Conservation Corps California Conservation Corps
- California Department of Fish and Wildlife
- California Department of Transportation
- California Sea GrantCalifornia State Parks
- California State University Channel Islands
- Earth Resources Technology
- Goleta Slough
- Hicks Law
- Kear Groundwater
- La Casa de Maria
- Land Trust Santa Barbara County
- Legacy Works Group, Devin
- Los Padres Forest Association
- National Fish and Wildlife Foundation
- National Marine Fisheries Service
- NOAA/CCC Fisheries Veterans Corps
- NOAA Restoration Center
- Northstar Engineering
- Ojai Valley Lands Conservancy
- Patagonia
- Resource Conservation District Santa Monica Mountains
- Santa Barbara Channelkeeper
- Santa Barbara County Flood Control
- Santa Barbara County Public Works
- Santa Barbara Zoo
- Sierra Watershed Progressive
- South Coast Habitat Restoration
- State Coastal Conservancy
- Stillwater Sciences
- Surfrider
- The Nature Conservancy
- Two Trumpets Communications
- United States Fish and Wildlife Service
- United States Forest Service
- United Water
- University California Davis - Center for Watersed Science
- University of California Santa Barbara
- University of California Cooperative Extensions
- University California Natural Reserve System
- Urban Creeks Council
- Ventura Land Trust
- Ventura Watershed Council
- Ventura Watershed Protection District
- Watershed Coalition of Ventura County
- Watershed Environmental
- Watershed Stewards Program
- Wildlife Conservation Board

Who is the Fire and Flow Forum?

The Forum participants all share a unified…

MISSION to coordinate and develop environmentally minded priorities that address and prepare for rising climate hazards to take advantage of funding and restoration opportunities.

VISION to redefine environmental mindset and coordination effectiveness to maximize restoration and planning in southern California.

What is the Fire and Flow Forum Strategic Plan?

- 1 Regionally derived/vetted strategic plan to guide watershed restoration
- 9 month stakeholder driven strategic planning effort in response to 2017/2018 Thomas fire and Montecito debris flows
- 4 Meetings – Feb-Nov 2018 in Santa Barbara and Ventura Counties
- 1 Unified Mission and Vision
- 10 Focus watersheds for Santa Barbara, Ventura, an Los Angeles County
- 5 Priority Focus Areas
- 17 Goals
- 100 SMART objectives (Specific, Measurable, Attainable, Relevant, Timely)
- 24 High priority objectives
- 10 Focus watersheds for Santa Barbara, Ventura, an Los Angeles County
- 150+ participants representing 50+ organizations

What is the Fire and Flow Forum Strategic Plan?

Purpose:

- Guide watershed recovery and resiliency building in southern California

- To motivate new projects, support ongoing projects and assist in securing funding by communicating regionally significant priority watershed actions to funders and decision makers

- Its broad scope was designed to allow for application by public and private groups with wide-ranging missions, while its specificity provides for practical application

What is the Fire and Flow Forum Strategic Plan?

PRIORITY FOCUS AREAS:

Restoration and Infrastructure
4 Goals/ 28 Objectives/6 High Priority Objectives

Research and Monitoring
3 Goals/ 14 Objectives/ 6 High Priority Objectives

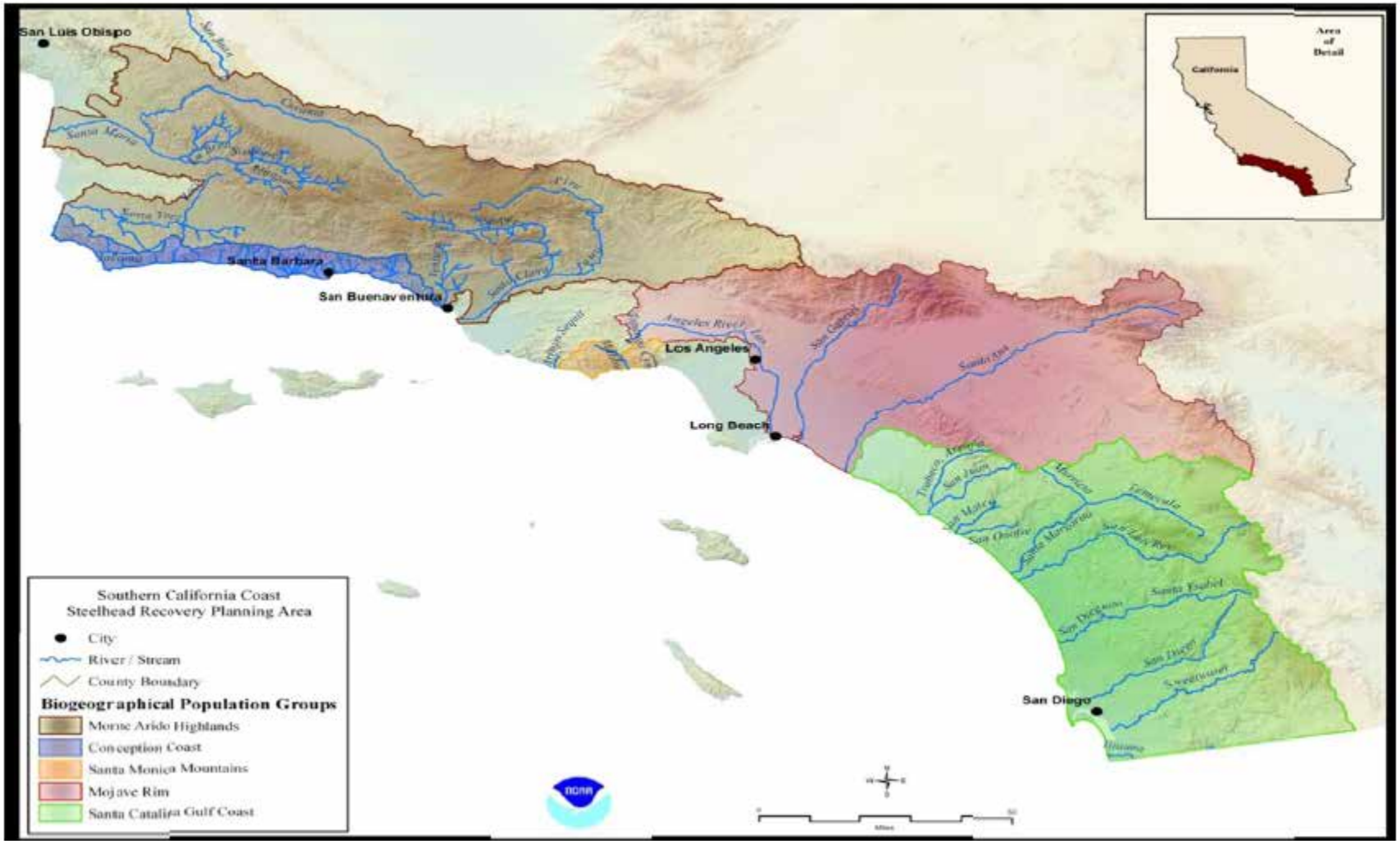
Community Science and Outreach
3 Goals/ 18 Objectives/ 4 High Priority Objectives

Future Management, Preparedness, Resiliency
3 Goals/ 23 Objectives/ 4 High Priority Objectives

Coordination & Prioritization
4 Goals/ 17 Objectives/ 4 High Priority Objectives

Where does this plan apply? Where should we focus?

Plan specific to southern California endangered southern steelhead DPS

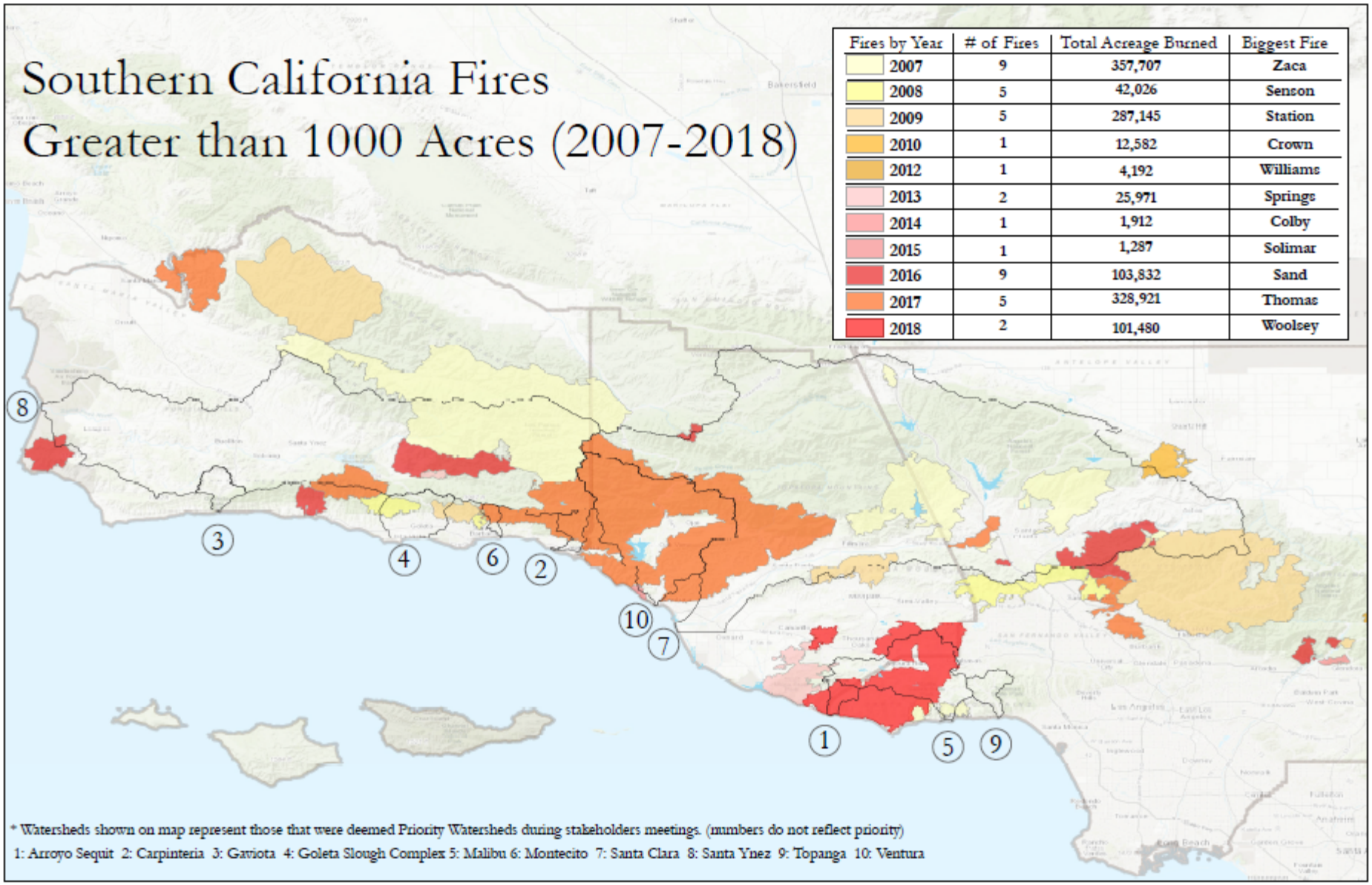


Transferable throughout California to landscapes facing climate threats

Where does this plan apply? Where should we focus?

- Any watershed impacted or threatened by climatic hazards
- Identified where to prioritize funding and efforts first based on regional expertise and resource knowledge
- Prioritization only included Santa Barbara, Ventura, and Los Angeles County Streams, but includes all or portions of 4/5 southern steelhead BPGs

Where does this plan apply? Where should we focus?



Fires by Year	# of Fires	Total Acreage Burned	Biggest Fire
2007	9	357,707	Zaca
2008	5	42,026	Sesnon
2009	5	287,145	Station
2010	1	12,582	Crown
2012	1	4,192	Williams
2013	2	25,971	Springs
2014	1	1,912	Colby
2015	1	1,287	Solimar
2016	9	103,832	Sand
2017	5	328,921	Thomas
2018	2	101,480	Woolsey

When will the plan be available? When should we use it?

- Plan is available at http://schabitatrestoration.org/projects/fire-and-flow

- Use the plan immediately for grant submission
  - CDFW Prop 1/68 due 12/18/18
  - NOAA Restoration Center
    Community-based Restoration Program
    Info webinar 12/6 and Pre Proposals due 1/14/19

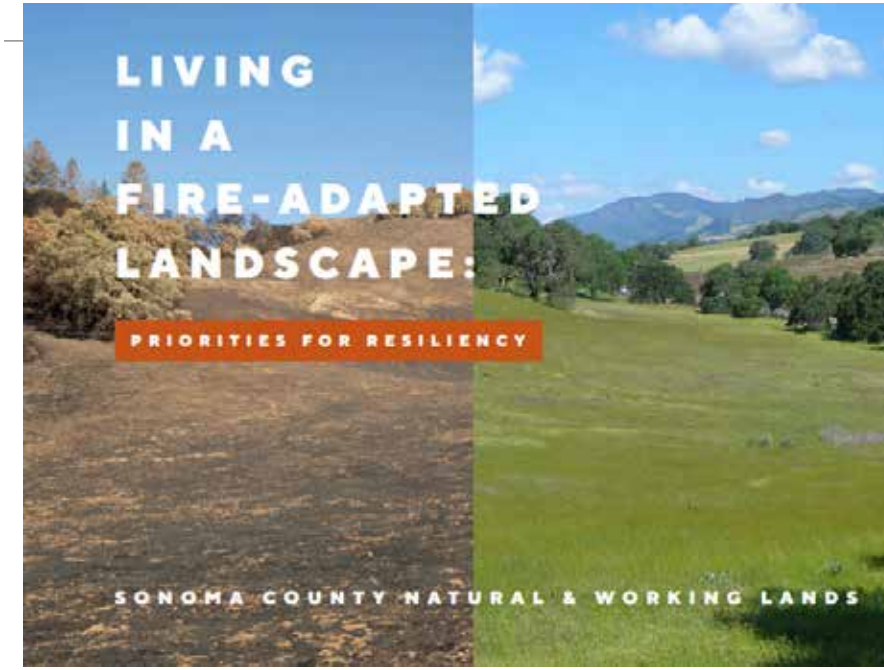
- Use the plan immediately for project development to work with granting organization before proposal period opens
  - CDFW Fisheries Restoration Grant Program – Before February
  - Coastal Conservancy Prop 1
  - Wildlife Conservation Board Prop 1

How did we create this plan?

Working from Examples:

- GOAL developing a list of tasks which they felt were critical to the health and resiliency of watersheds

- Actions identified reflect a wide variety of sometimes differing opinions and expertise



- The report was the product of a rapid assessment process that engaged many people during an unprecedented, challenging time and, therefore, is a STARTING point for further robust planning

How did we create this plan?

Successful Strategic Planning

1) Unified Vision and Mission

2) Goal Setting – Show up, provide input, and represent interests with willingness to collaborate

3) Develop SMART objectives – identify HOW you can meet your goals

4) Prioritize – WHERE and WHEN to focus limited resources to implement your plan

5) Carry out the plan – progressing SMART objectives after the meetings ends

*Learn as you go and be adaptive to your stakeholder needs throughout the process

Fire and Flow Forum 1.0

- 75+ people representing local/state/federal gov., academics, non-profits, local residents, and private interests
- Shared photos, current and developing monitoring
- Attempted to go through each watershed impacted by Thomas and Whittier Fire
- Asked “What is YOUR #1 TOP watershed concern as a response to fires and flows”

Learning and Adapting the Process

What Didn't Work:

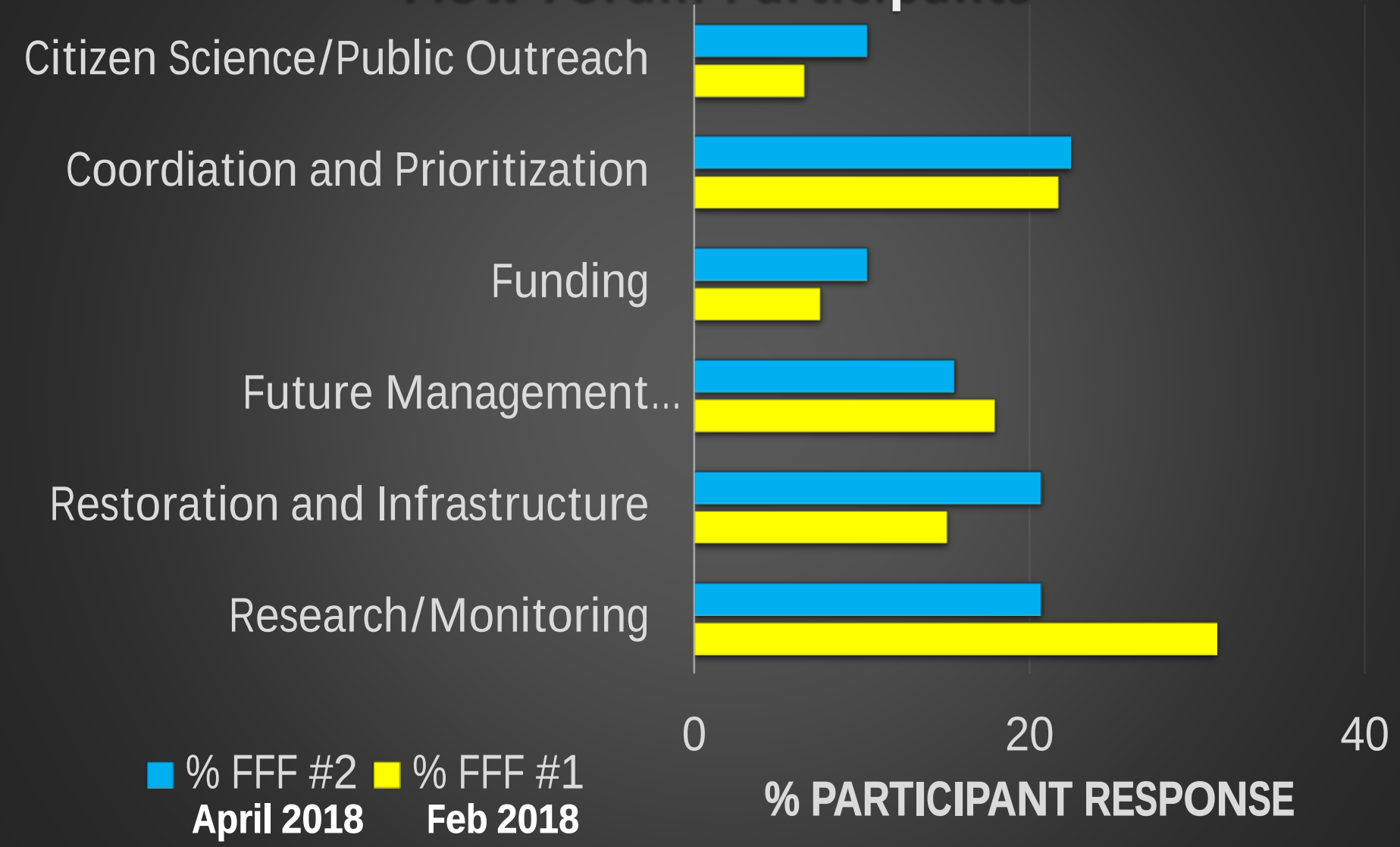
- Attempted to go through watershed by watershed to discuss impacts – very time consuming, not enough information yet

- Trying to solicit priority project list – not ready/willing

What Worked:

- People showed up
- People participated and provided their top priorities
- Developed focus areas

Priority Watershed Concerns of Fire and Flow Forum Participants



1. Unified Vision and Mission

Developed mission and vision statements at FFF 2.0

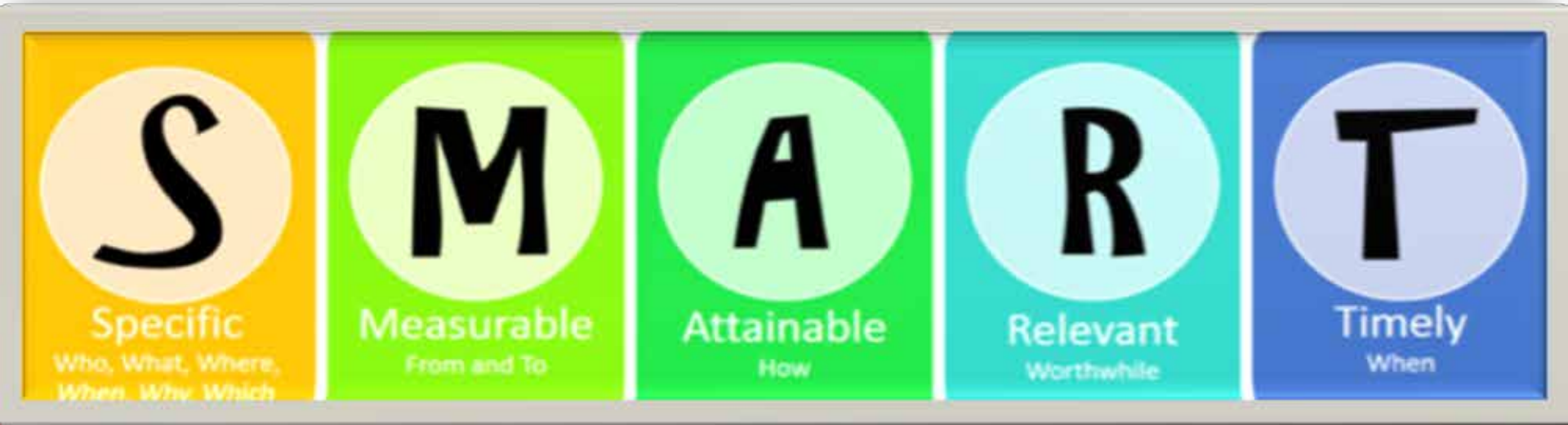
- Mission - short, clear and powerful.
- Vision - define your organization's purpose, but they focus on its goals and aspirations.
- Mission statement describes WHAT we want to do NOW, a vision statement outlines WHAT we want to be in the FUTURE.
- Address the commitment the group has to its key stakeholders, communities, partners, and agencies
- Communicate the message in clear, simple and precise language
- Develop buy-in and support internally and externally

2. Goal Setting – Show up, provide input, and represent interests with willingness to collaborate

- Used focus areas to guide goal development
- Funding internalized into all focus areas
- 4 meetings (Feb-Nov 2018), google docs, and working group calls
- Goals are where you want to be
- Goals are broad and generally long-term

3) Develop SMART objectives – Identify HOW you can meet your goals

- Objectives are how you achieve your goals – short-term
- Meeting #2 and #3 focused on goal and objective development
- Utilized google doc and working group calls to allow additional objective development (June – August)
- 5 Focus Areas > 22 Goals >> 139 “SMART” Objectives
- Meeting #4 further refinement: 5 Focus Areas > 17 Goals >> 100 “SMART” Objectives>>> 24 High Priorities



4. Prioritize – WHERE and WHEN to focus limited resources to implement your plan

WHERE: Sticker Dot Prioritization:

Pick the 6 watersheds you are most interested in

Green = Top Priority = Immediate Need

Orange = 2nd Priority = Need to get done soon

Pink = 3rd Priority = Get to it next/eventually

>>> 10 Priority Watersheds

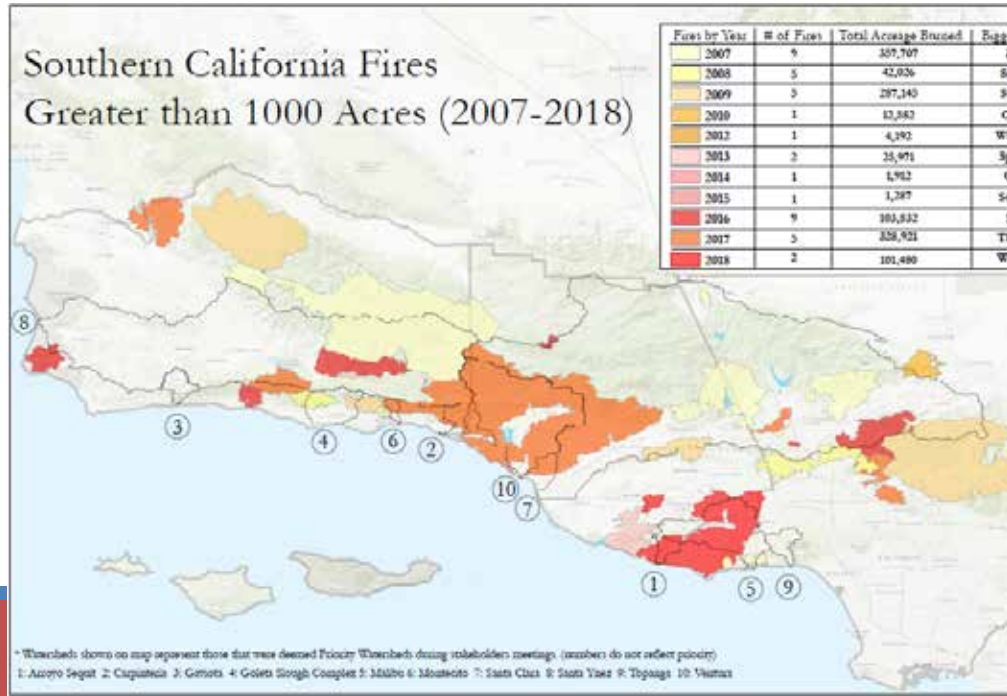
WHEN: Highlighter + Workbook:

- Independent review

- Group discussion

- Long-term vs. Short-term

>>> 24 High Priority Objectives



How did we create this plan?

Successful Strategic Planning

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2) Goal Setting – Show up, provide input, and represent interests with willingness to collaborate

3) Develop SMART objectives – identify HOW you can meet your goals

4) Prioritize – WHERE and WHEN to focus limited resources to implement your plan

5) Carry out the plan – progressing SMART objectives after the meetings ends

*Learn as you go and be adaptive to your stakeholder needs throughout the process

HOW TO USE THIS PLAN:

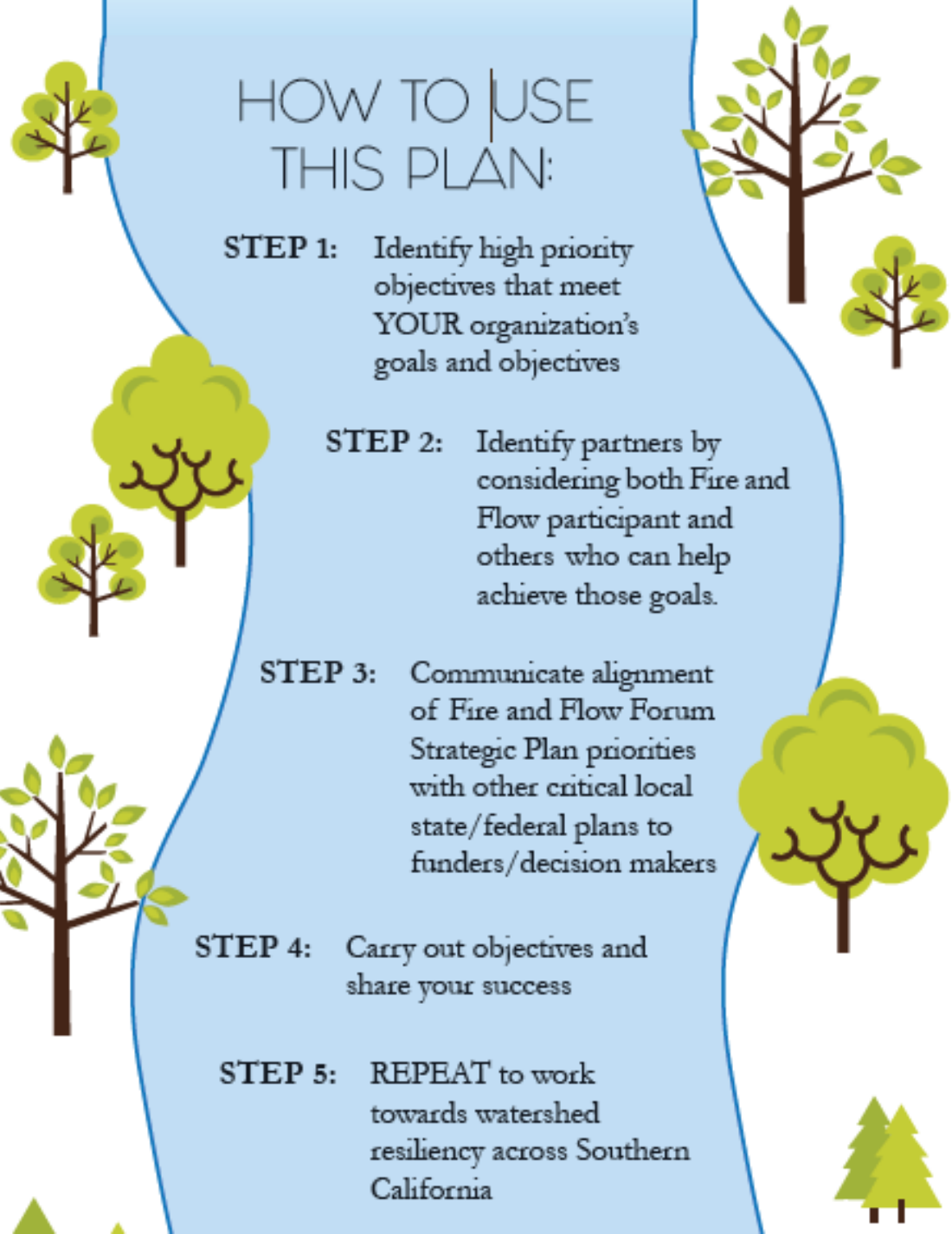
STEP 1: Identify high priority objectives that meet YOUR organization's goals and objectives

STEP 2: Identify partners by considering both Fire and Flow participant and others who can help achieve those goals.

STEP 3: Communicate alignment of Fire and Flow Forum Strategic Plan priorities with other critical local state/federal plans to funders/decision makers

STEP 4: Carry out objectives and share your success

STEP 5: REPEAT to work towards watershed resiliency across Southern California



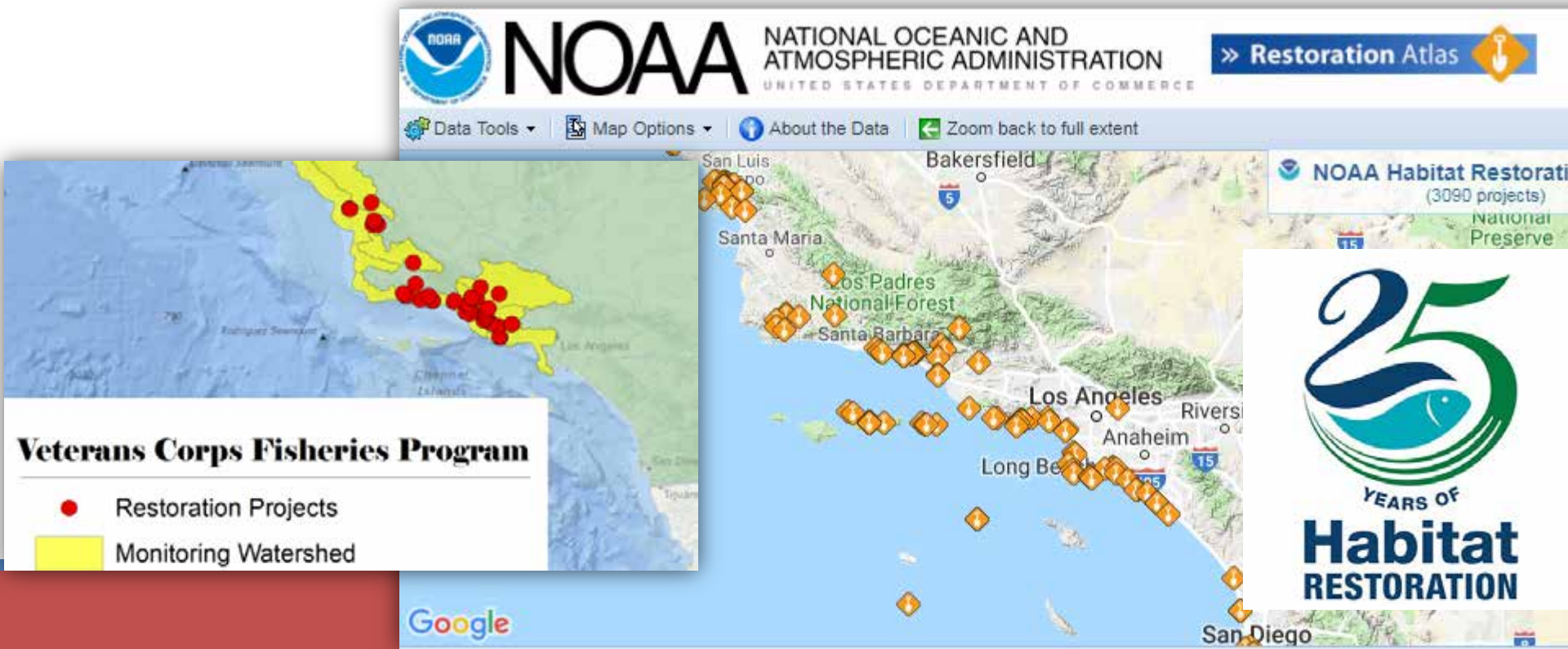
How do we use the plan?

- Introduce Fire and Flow Forum Strategic Plan to your email lists
- Include the Strategic Plan in your next meeting presentation
- Share “YOUR” objective with others– COLLABORATE
- Consider currently open and upcoming annual funding opportunities
- Connect through other meeting opportunities and group to continue to move objectives forward
- Need help? Reach out to Forum participants

NOAA Restoration Center – Enhancing Ecosystem, Community, and Economic Resilience

Contact Stacie Smith – stacie.smith@noaa.gov, (562)400-3456

- S. CA Programmatic Biological Opinion 12-23-2015
- Consistency Determination with California Coastal Commission (Coastal Zone Development Permit) – 2016
- NOAA/CCC Fisheries VetCorps – Camarillo and Los Padres since 2014



From Washington Post

Environmental Engagement in Groundwater Sustainability Agencies to Protect Groundwater Dependent Ecosystems & Steelhead as Beneficial Users

SRF's 3rd Steelhead Summit

Conservation Strategies for Steelhead Recovery

Ventura, CA

December 3, 2018

Friends of the Santa Clara River

Established in 1993, Friends of the Santa Clara River is a nonprofit organization whose mission is to protect and preserve the cultural and biological resources of the Santa Clara River Watershed.

We achieve this goal by balancing the needs of people and the environment through outreach and education, wildlife and habitat restoration, and protection through advocacy and litigation.

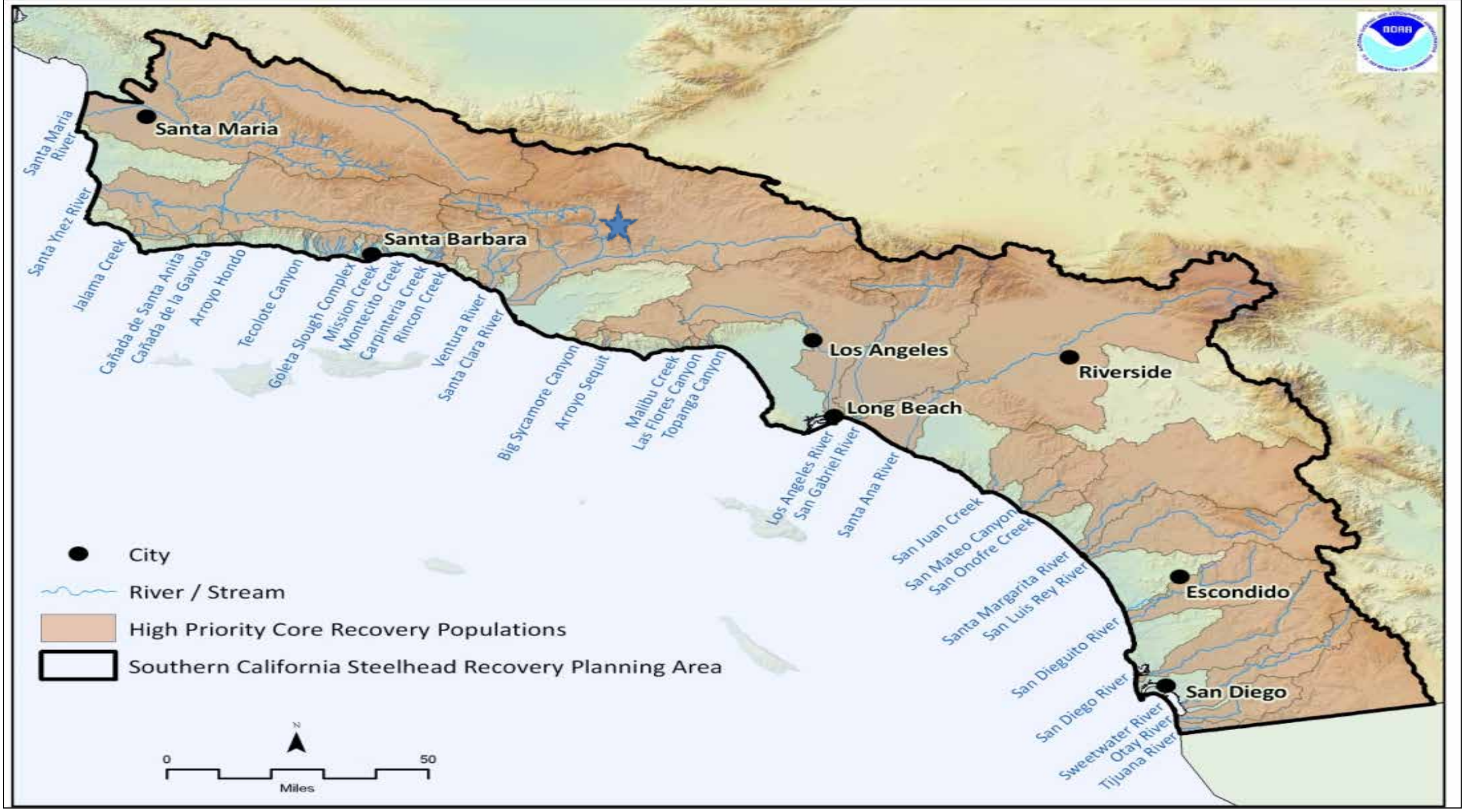
Southern California steelhead

- 100 years ago, Southern California was famous for its steelhead runs

- Santa Ynez River - ~ 11,000 adult fish
- Santa Clara River -~ 9,000 adult fish
- Ventura River - ~ 5,000 adult fish

- Steelhead fishing in the region was enormously popular with men, women and children

- **Annual steelhead runs in Southern California have declined precipitously from 32,000-46,000 returning adults to less than ~500.**


Santa Maria
Santa Barbara
Los Angeles
Riverside
Long Beach
Escondido
San Diego
Santa Maria River
Santa Ynez River
Jalama Creek
Cañada de Santa Anita
Cañada de la Gaviota
Arroyo Hondo
Tecolote Canyon
Goleta Slough Complex
Mission Creek
Montecito Creek
Carpinteria Creek
Rincon Creek
Ventura River
Santa Clara River
Big Sycamore Canyon
Arroyo Sequit
Malibu Creek
Las Flores Canyon
Topanga Canyon
Los Angeles River
San Gabriel River
Santa Ana River
San Juan Creek
San Mateo Canyon
San Onofre Creek
Santa Margarita River
San Luis Rey River
San Dieguito River
San Diego River
Sweetwater River
Otay River
Tijuana River
City
River / Stream
High Priority Core Recovery Populations
Southern California Steelhead Recovery Planning Area
N
0
50
Miles

Santa Clara River Steelhead Coalition

Founder Member of the Santa Clara River Steelhead Coalition

The Coalition is focused on endangered Southern California steelhead recovery in the Santa Clara River Watershed, which straddles Ventura and Los Angeles Counties.

Members include:

CALIFORNIA TROUT
FISH · WATER · PEOPLE

Wishtoyo

VENTURA COASTKEEPER

The Nature Conservancy
Protecting nature. Preserving life.™

STOECKER ECOLOGICAL

UCSB

msi

Santa Clara River
Steelhead Coalition

Coalition Participants include:

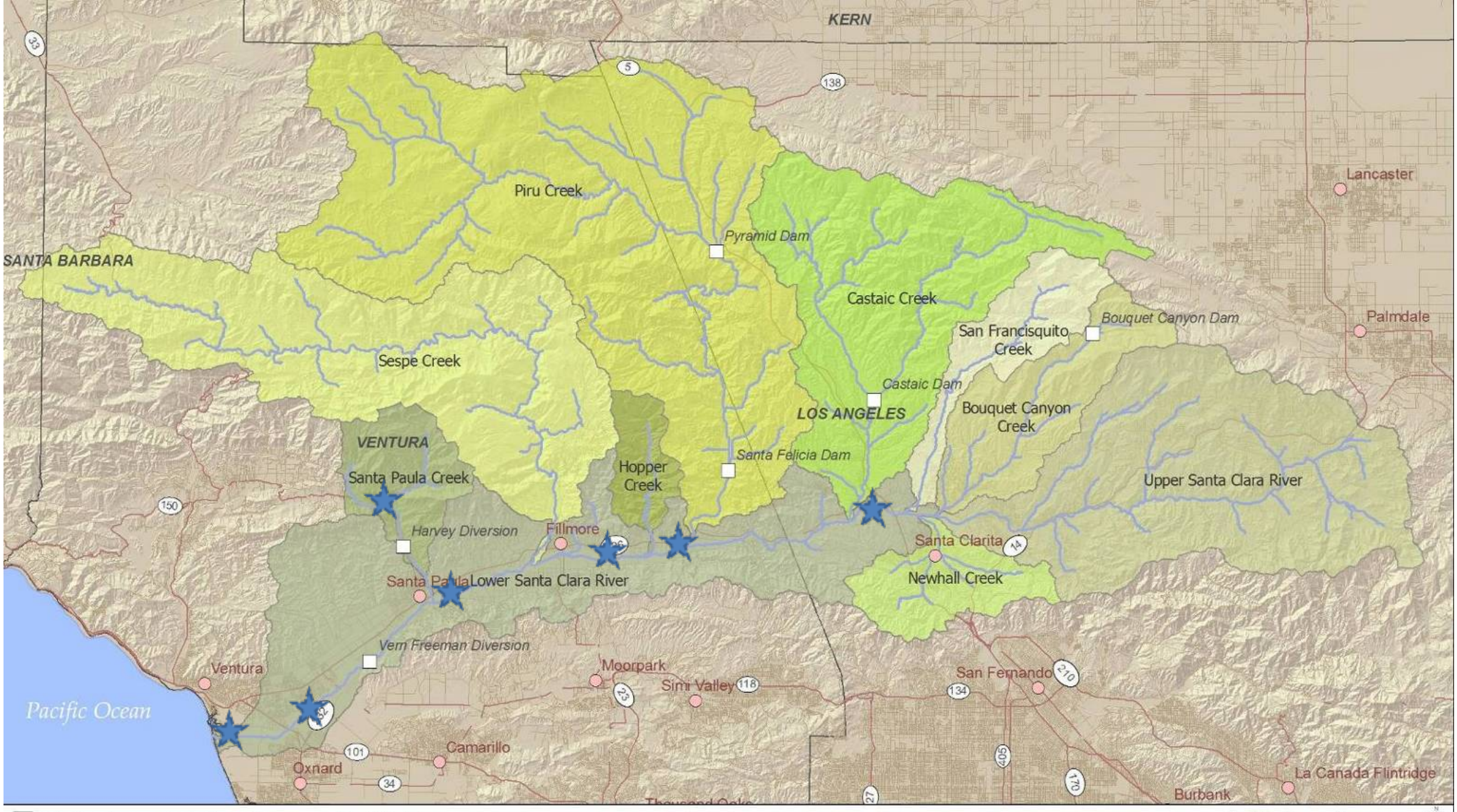
CALIFORNIA
DEPARTMENT OF
FISH &
WILDLIFE

Coastal
Conservancy

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

Stillwater Sciences

Santa Clara River
Watershed
Conservancy


KERN
SANTA BARBARA
VENTURA
LOS ANGELES
Piru Creek
Pyramid Dam
Castaic Creek
Bouquet Canyon Dam
San Francisquito Creek
Palmdale
Lancaster
Sespe Creek
Castaic Dam
Bouquet Canyon Creek
Santa Felicia Dam
Hopper Creek
Upper Santa Clara River
Santa Paula Creek
Harvey Diversion
Fillmore
Santa Clarita
Newhall Creek
Santa Paula
Lower Santa Clara River
Vern Freeman Diversion
Ventura
Moorpark
Simi Valley
San Fernando
Pacific Ocean
Camarillo
Oxnard
La Canada Flintridge
Burbank
Major dams and diversions
City/Town
0 2.5 5 10
Kilometers

The Sustainable Groundwater Management Act (2014)

- Goal of SGMA is bringing California's medium and high priority groundwater basins into sustainability
- Authorizes management to local agencies. 265 GSAs formed across the state
- Tasked with developing GSP's by 2020/2022
- GSPs roadmap to groundwater sustainability within 20 years of implementation
- Recognizing groundwater management is best accomplished locally, supported by a stakeholder driven process
- To avoid the following undesirable results:

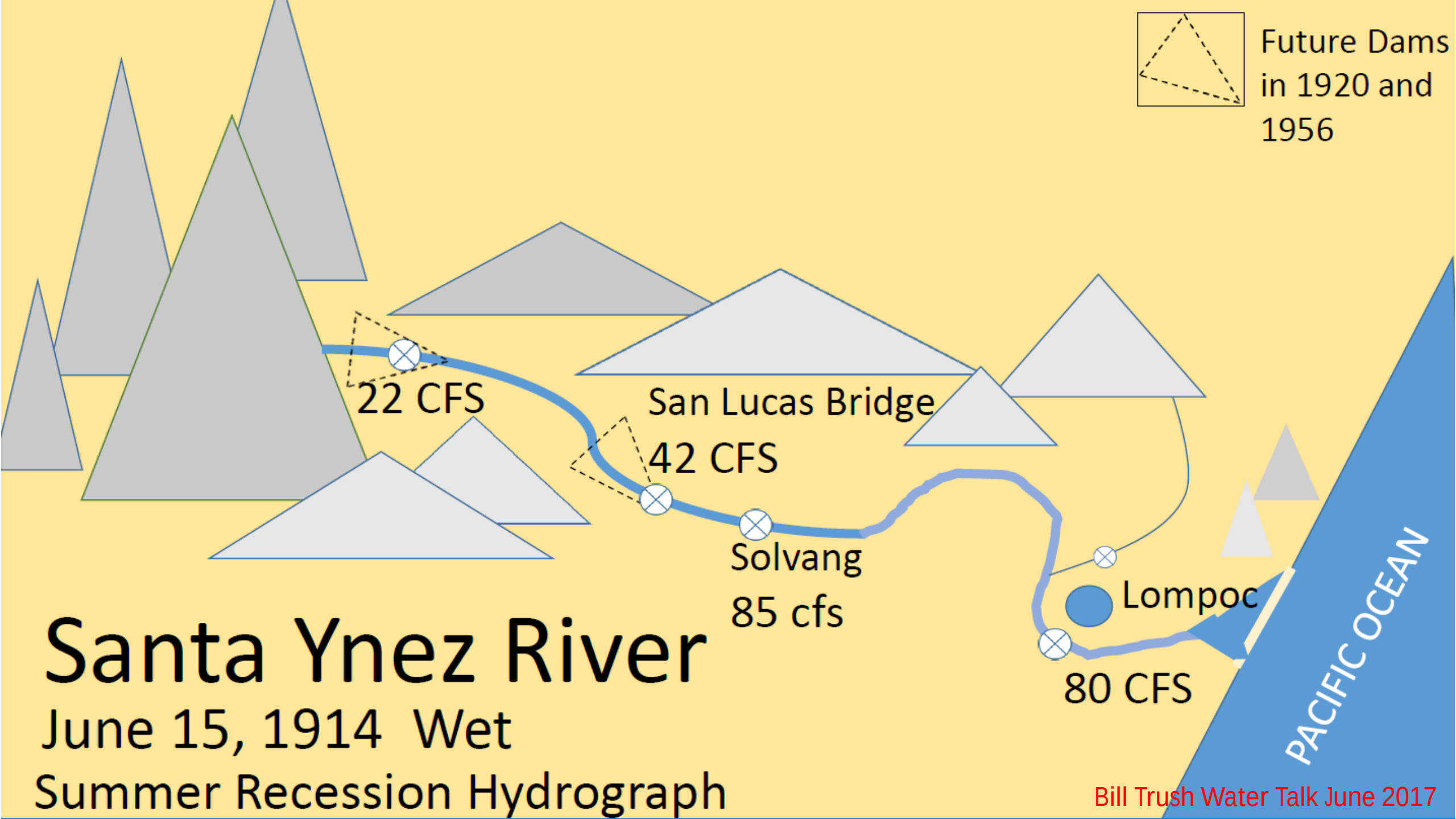
- Groundwater Resources Association of California hosted the first annual Western Groundwater Congress in Sacramento on September 25-27, 2018
- Topics on funding groundwater improvement, lessons learnt in the groundwater management across the western states, water quality, data collection, recharge strategies, SGMA planning, identifying groundwater dependent ecosystems under SGMA, groundwater law, and modeling.
- The Non-Governmental Organizations Groundwater Collaborative's annual Groundwater Convening on October 17-18, 2018.
- The NGO Groundwater Collaborative is a group of non-governmental organizations, tribes and individuals that share information and resources to aid NGO participation in the development and implementation of groundwater sustainability plans around the state.
- **A concern raised by participants at both forums was one of representative stakeholder engagement – particularly for disadvantaged communities, small family farmers, and environmental interests**.

Groundwater Dependent Ecosystem
Groundwater dependent ecosystems are plants, animals, and ecological communities that are dependent on groundwater emerging from aquifers or on groundwater occurring near the ground surface

Interconnected Surface Water
Surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted

Ensuring species and environmental communities are identified as beneficial users in the basin.

- Southern California steelhead
- Tidewater Goby
- Santa Ana Sucker
- Least Bell's Vireo
- Southwestern Willow Flycatcher
- Pacific Lamprey
- Western Pond Turtle
- Two-striped Garter Snake
- Yellow Warbler
- Western Yellow-Billed Cuckoo
- Yellow-breasted chat

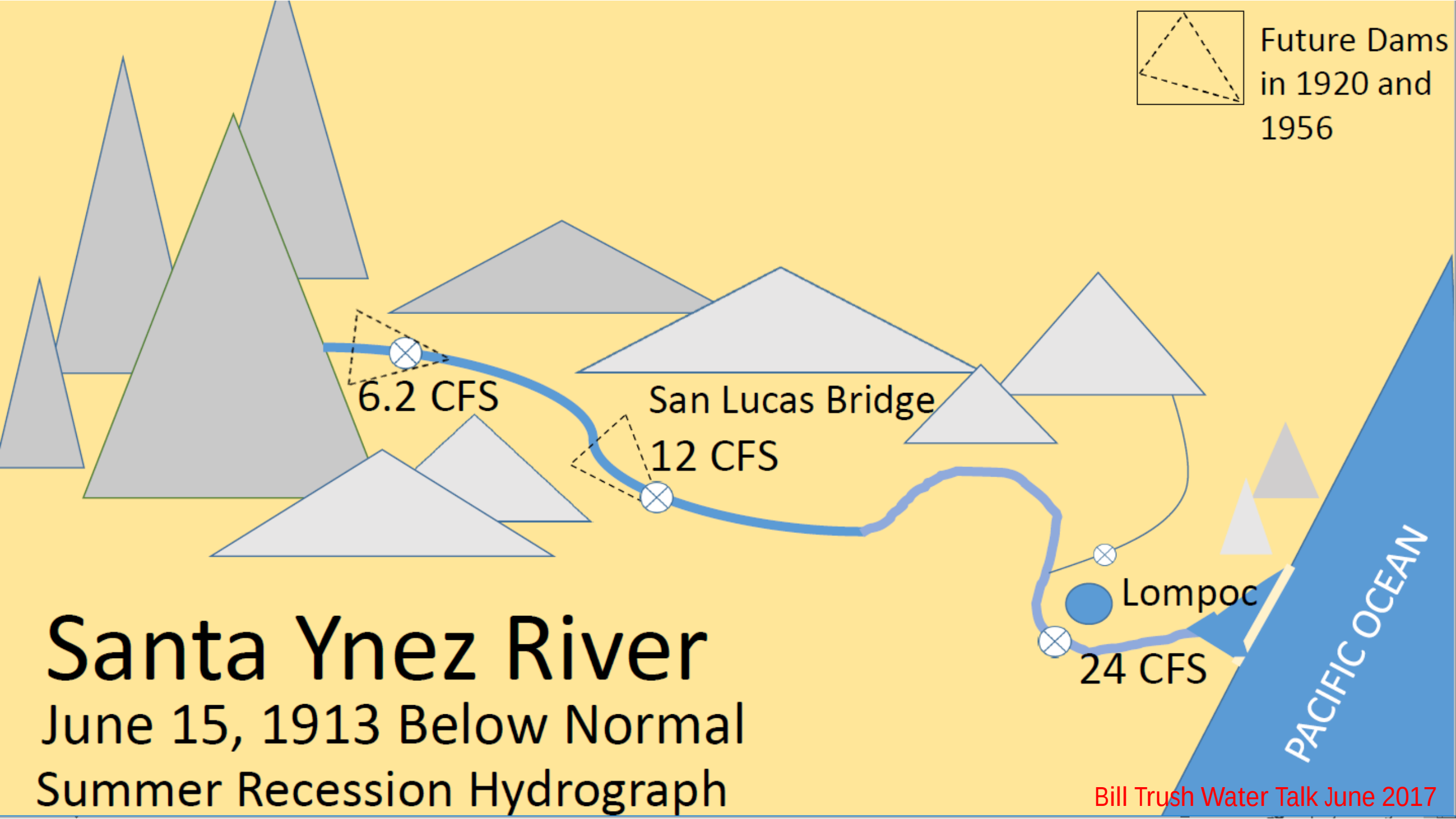


Santa Ynez River

June 15, 1914 Wet

Summer Recession Hydrograph

Bill Trush Water Talk June 2017



Santa Ynez River

June 15, 1913 Below Normal

Summer Recession Hydrograph

Bill Trush Water Talk June 2017

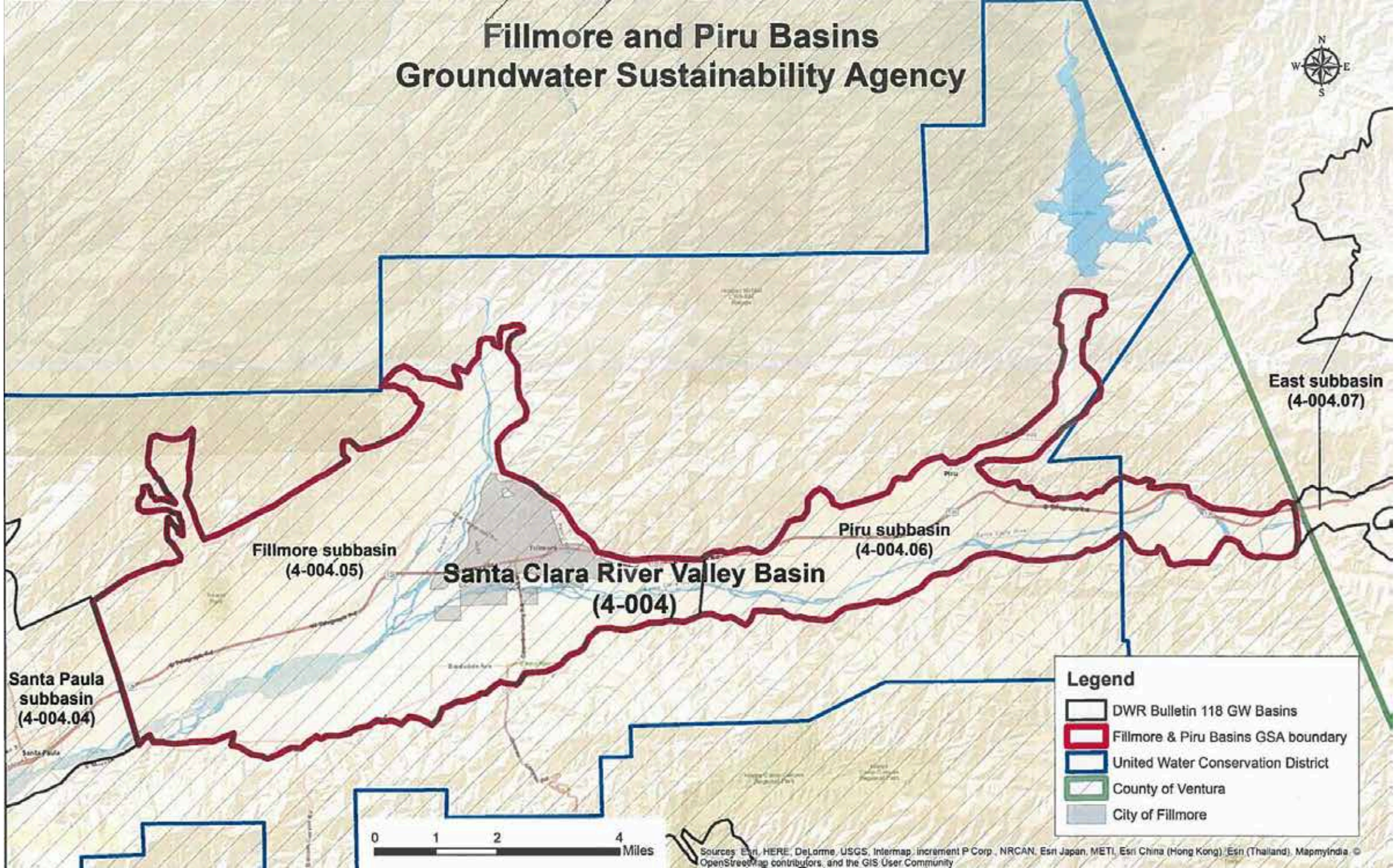
Formed the Santa Clara River Environmental Groundwater Committee in Apr 2017

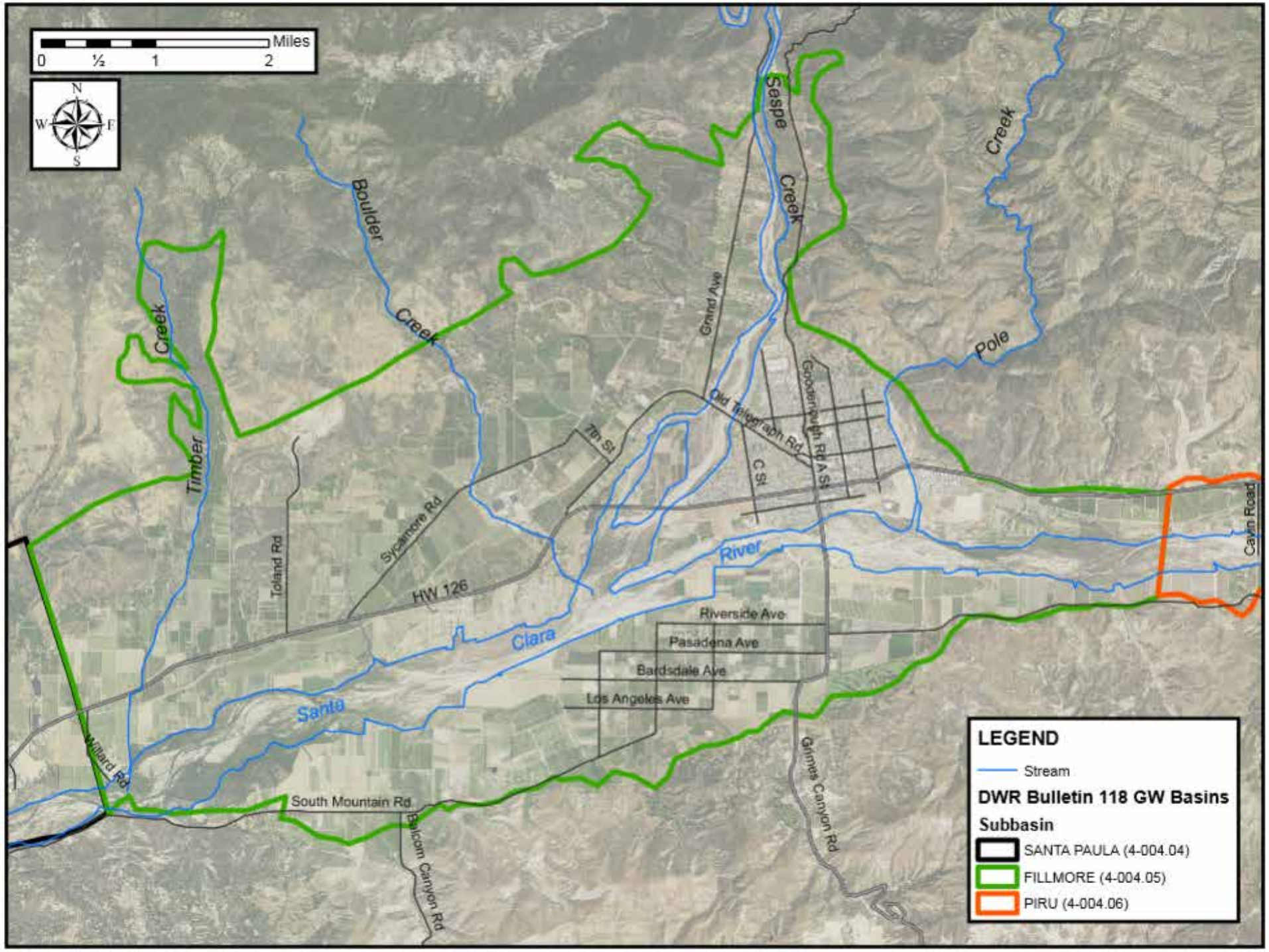
The purpose of this organizational structure is to ensure that groundwater dependent ecosystems, their beneficial uses and users are adequately considered in the GSP planning process.

Members include:

Fillmore and Piru Basins
Groundwater Sustainability Agency

- Fillmore Basin Pumpers Association
- Piru Basin Pumpers Association
- Santa Clara River Environmental Groundwater Committee


Fillmore and Piru Basins
Groundwater Sustainability Agency
N
W
E
S
East subbasin
(4-004.07)
Piru subbasin
(4-004.06)
Fillmore subbasin
(4-004.05)
Santa Clara River Valley Basin
(4-004)
Santa Paula
subbasin
(4-004.04)
Legend
DWR Bulletin 118 GW Basins
Fillmore & Piru Basins GSA boundary
United Water Conservation District
County of Ventura
City of Fillmore
0
1
2
4
Miles
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), Mapmyindia, © OpenStreetMap contributors, and the GIS User Community


Miles
0 ½ 1 2
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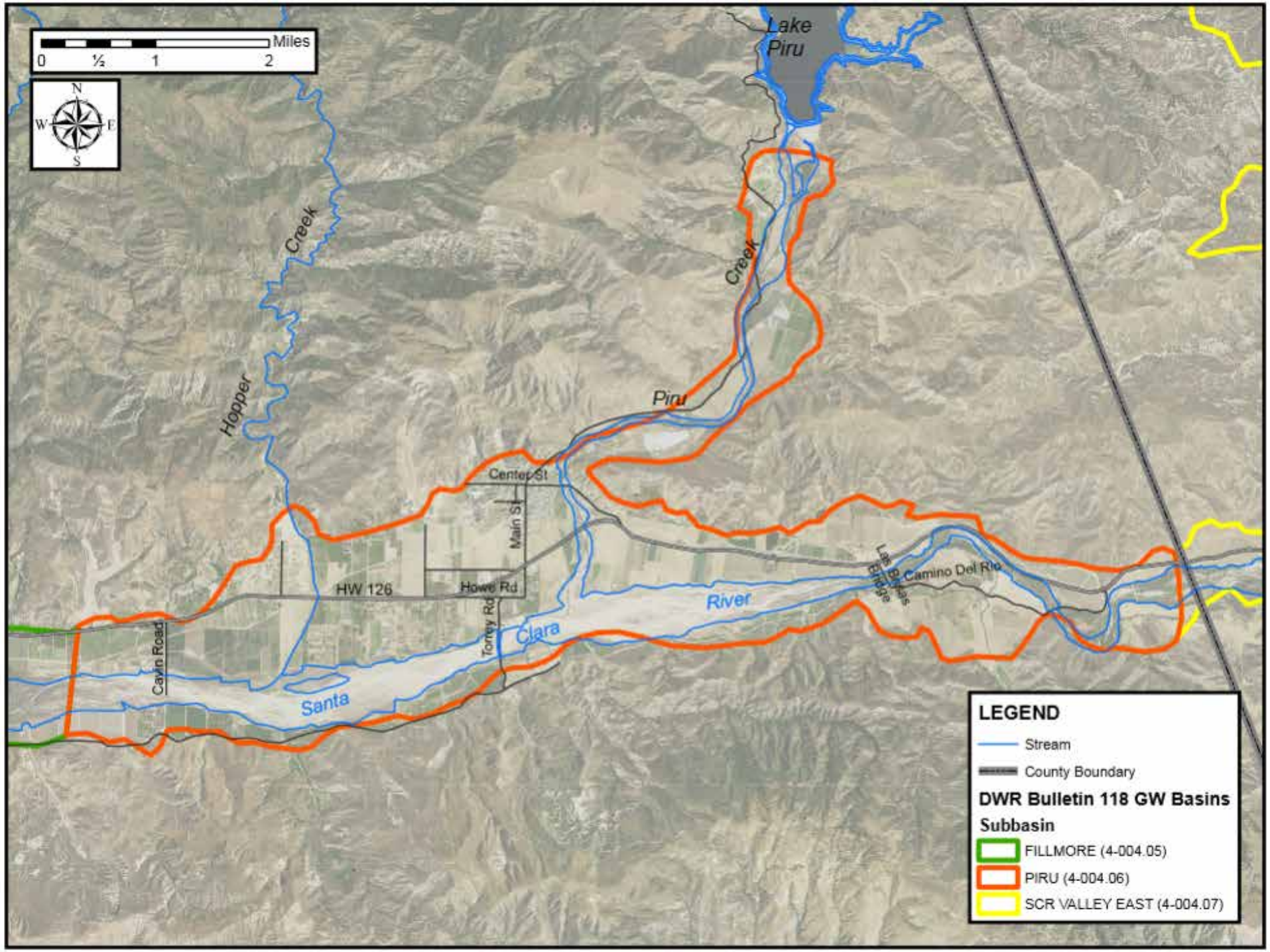
Boulder Creek
Timber Creek
Pole Creek
Grand Ave
Old Telegraph Rd
Goodenough Rd
A St
C St
7th St
Sycamore Rd
Toland Rd
HW 126
Santa Clara River
Riverside Ave
Pasadena Ave
Bardsdale Ave
Los Angeles Ave
Grimes Canyon Rd
Balcom Canyon Rd
South Mountain Rd
Millard Rd
Cavin Road
LEGEND
Stream
DWR Bulletin 118 GW Basins
Subbasin
SANTA PAULA (4-004.04)
FILLMORE (4-004.05)
PIRU (4-004.06)


Miles
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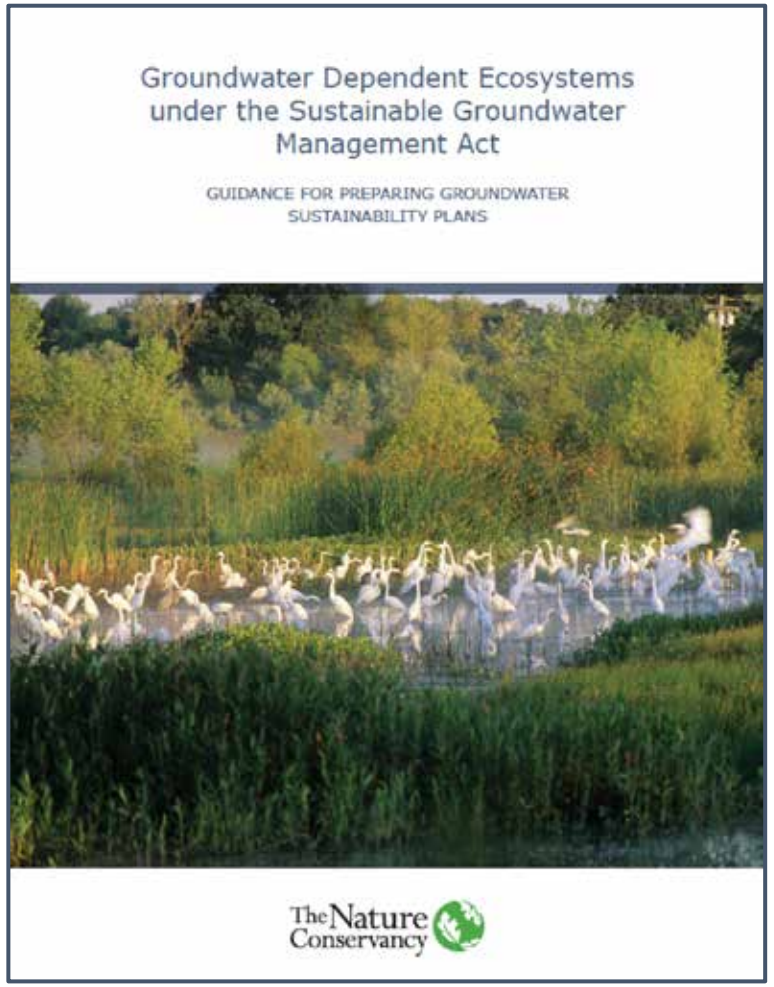
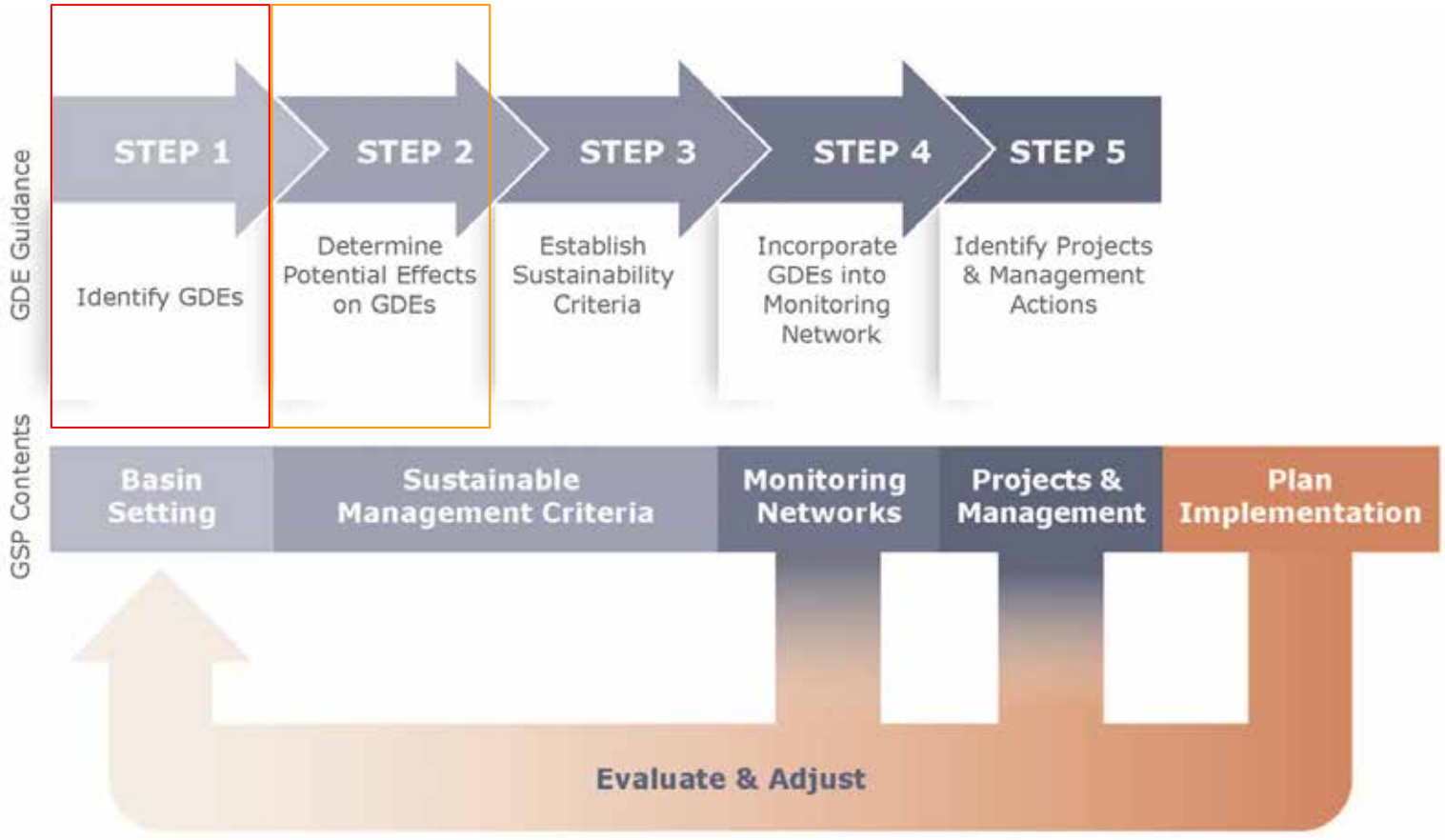
Hopper Creek
Piru Creek
Piru
Center St
Main St
HW 126
Howe Rd
Torrey Rd
Las Posas Bridge
Camino Del Rio
Santa Clara River
Cavin Road
LEGEND
Stream
County Boundary
DWR Bulletin 118 GW Basins
Subbasin
FILLMORE (4-004.05)
PIRU (4-004.06)
SCR VALLEY EAST (4-004.07)

Identifying and Considering GDEs under SGMA



Where are GDEs?

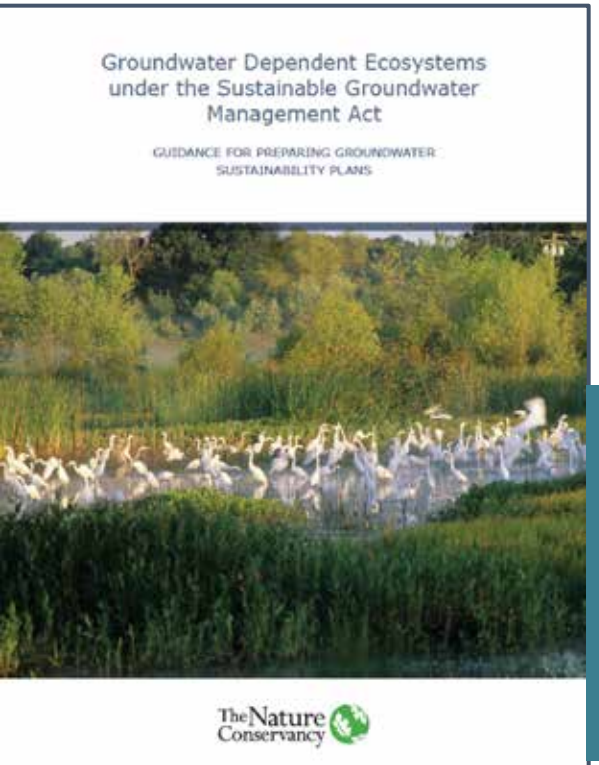
Are GDEs being impacted by current groundwater conditions, and could they be impacted by future groundwater conditions?

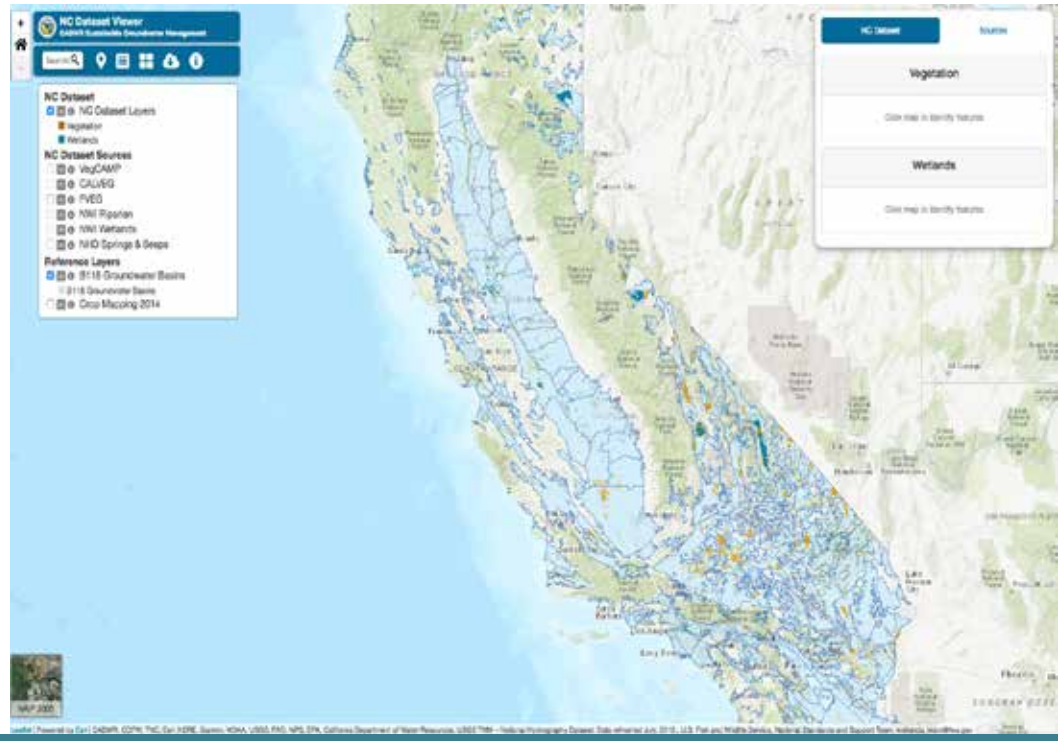


GDE Mapping and Guidance Tools

- DWR's SGMA website https://sgma.water.ca.gov/portal/

- NGO Groundwater Collaborative http://cagroundwater.org/
- Maven's Notebook www.groundwaterexchange.org





Groundwater Exchange

Sharing ideas and resources for successful implementation of the Sustainable Groundwater Management Act.

Thank You!

Candice Meneghin

Friends of the Santa Clara River

(805) 628-2250 or (310) 890-2834

contact@fscr.org

@FriendsOfTheSCR

Friends of the Santa Clara River

Friends_of_Santa_Clara_River

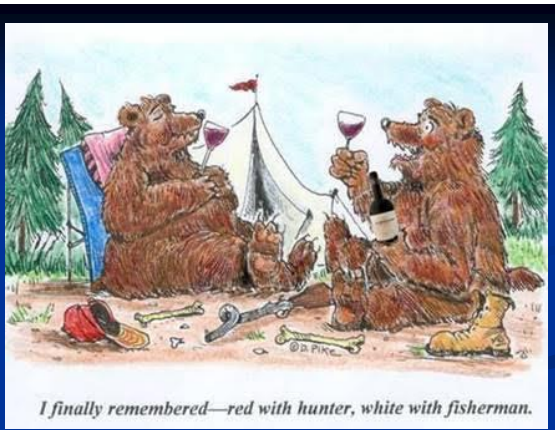
www.fscr.org

Water Bond Prop One
WCB Projects that Enhance Stream Flow

2018 SRF Steelhead Summit
December 3-5, 2018
Ventura, California

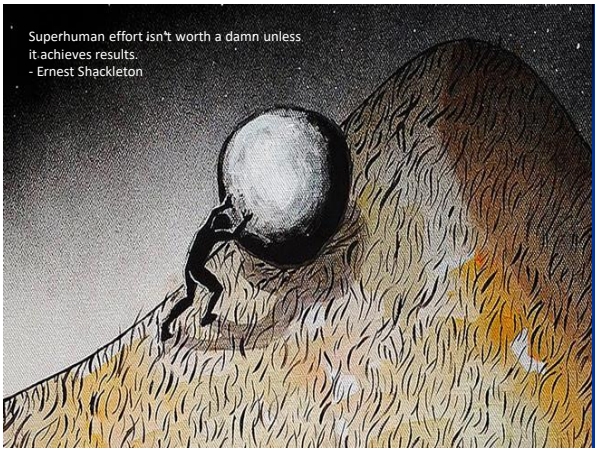
Salmonid Restoration Federation

TOM HICKS ATTORNEY AT LAW



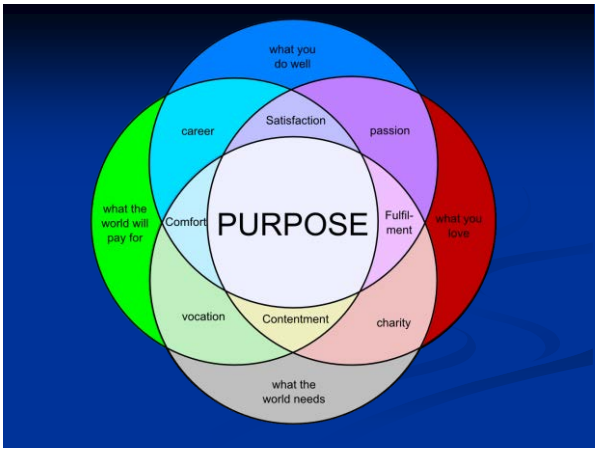
Who is in the Audience?

- Land and water conservation professionals?
- Land owners? Ranch managers?
- Conservation attorneys?
- Board members?
- State or federal agencies?
- Concerned citizens?
- Others?

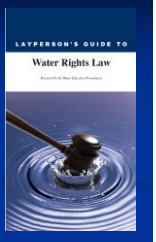


Project Partners

RIVER PARTNERS
Tuolumne River Trust
WCB State of California Wildlife Conservation Board
PROP 1
SCHR
SIERRA WATERSHED PROGRESSIVE
THACHER
CALIFORNIA FISH & WILDLIFE
CITY OF SAN LUIS OBISPO
ITRC moving water in new directions
LOS PADRES FORESTWATCH
FOREST SERVICE USDA
CAL FIRE
CALIFORNIA RANGELAND Trust
NORTHSTAR Designing Solutions
SISKIYOU LAND TRUST
TROUT UNLIMITED
Salmonid Restoration Federation
Stillwater Sciences



Author, Layperson's Guide to Water Rights Law

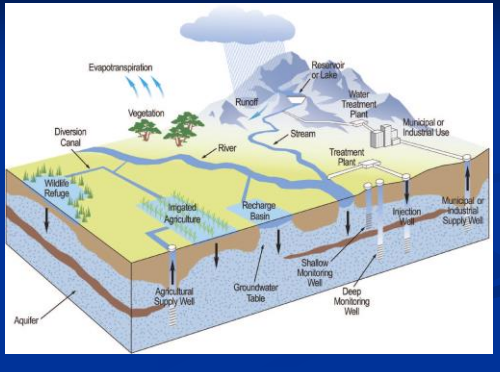


- The 28-page, recognized as the most thorough explanation of California water rights law available to non-lawyers, traces the authority for water flowing in a stream or reservoir, from a faucet or into an irrigation ditch through the complex web of California water rights.
- It includes historical information on the development of water rights law, sections on surface water rights and groundwater rights, a description of the different agencies involve in water rights, and a section on the issues not only shaped by water rights decisions but that are also driving changes in water rights. Includes chronology of landmark cases and legislation and an extensive glossary.
- http://www.watereducation.org/publication/laypersons-guide-water-rights-law

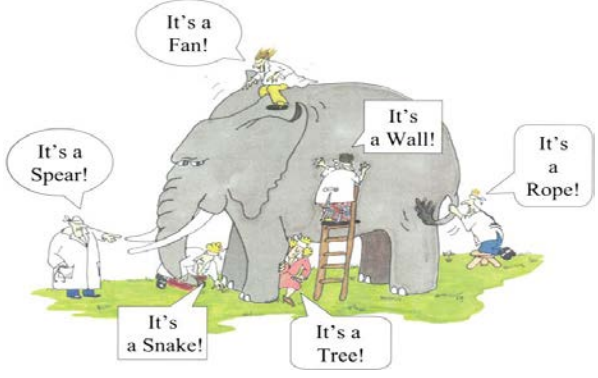
California Water Law

- Many Legal Definitions & Issues:
  - Appropriative water rights
  - Riparian water rights
  - Groundwater rights
  - Beneficial use
  - Public Trust Doctrine
  - Property rights
  - Environmental law
  - Federal water law authorities
  - Hydropower development
- Disclaimer: More than can be covered in 20 minutes!

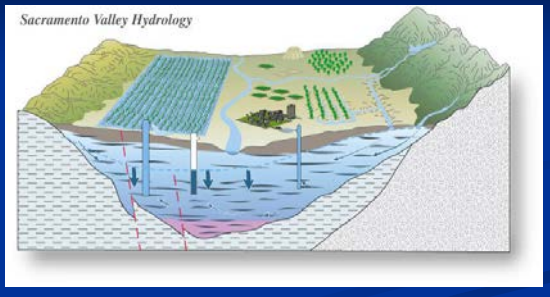
Water Law in the Watershed



California Water Law



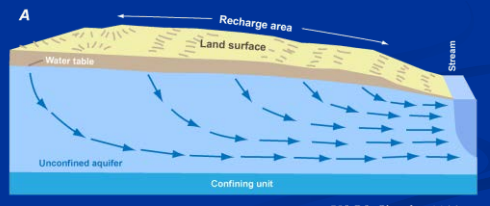
California Groundwater



USGS

Integrated Surface-Groundwater

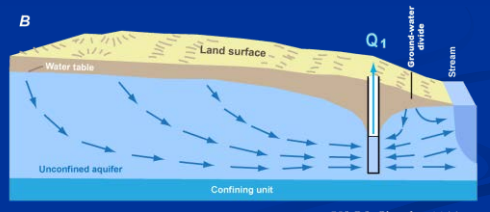
- Normal Groundwater Flow
  - No groundwater pumping



USGS Circular 1139

Integrated Surface-Groundwater

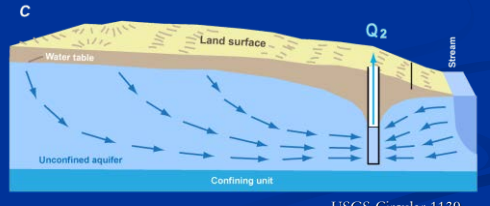
- Groundwater Flow
- With low groundwater pumping



USGS Circular 1139

Integrated Surface-Groundwater

- Groundwater Flow
  - With high groundwater pumping

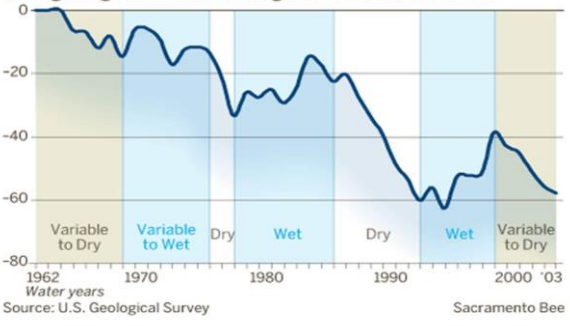


USGS Circular 1139

GROUNDWATER LOSS

Groundwater levels in the Central Valley from 1962 to 2003 during wet and dry years.

Change in groundwater storage, in millions of acre-feet



Source: U.S. Geological Survey

Sacramento Bee

HICKS LAW PROP ONE PROJECTS

1. 2018 Wildlife Conservation Board (WCB) Prop One: Marshall Ranch Flow Enhancement Design
2. 2018 WCB Lower Battle Creek Scoping Study
3. 2018 WCB Santa Rosa Creek Flow Enhancement Pilot Project
4. 2018 WCB San Luis Obispo Creek Flow Enhancement
5. 2017 WCB Integrated Water Strategies to Enhance Flows in Santa Barbara and Ventura Counties
6. 2017 WCB San Ysidro Flow Enhancement and Water Conservation
7. 2016 WCB Dos Rios Section 1707 Project
8. 2016 WCB The Thacher School Instream Flow Resiliency and Dormitory Conservation Project
9. 2016 WCB Baseflow Monitoring for Stream Flow Enhancement Project Planning and Evaluation in San Luis Obispo County
10. 2016 WCB Spencer Ranch Permanent Instream Water Dedication and Conservation Easement

Hicks Law Conservation Easement Projects

1. **2017 DFW Prop One (Water Bond) Watershed Restoration Grant Program: Marshall Ranch Conservation Easement – 2016**
2. **2018 Department of Conservation, Strategic Growth Council Sustainable Agricultural Lands Conservation Program ("SALC Program"): Marshall Ranch Conservation Easement**
3. **2018 California Department of Forestry and Fire Protection (CALFIRE), California Climate Investments - Forest Health Grant Program: Marshall Ranch Conservation Easement**

Tuolumne River Trust Dos Rios Section 1707 Project

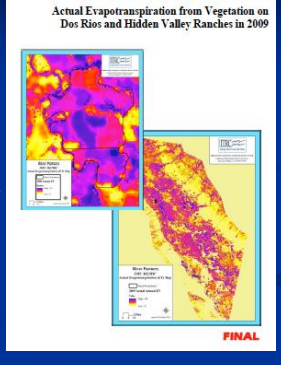
Dos Rios and Hidden Valley Ranches

Location of Dos Rios Ranch and former Hidden Valley Dairy, Stanislaus County, CA.

Floodplain Expansion and Ecosystem Restoration at Dos Rios Ranch
River Partners

Consumptive Use Report

River Partners hired Irrigation Training and Research Center (California Polytechnic State University) to produce a consumptive use report for Dos Rios and Hidden Valley Ranches to determine riparian water rights (completed: January, 2016).



The study used an ITRC Mapping EvapoTranspiration process to collect data from the LandSAT 5, 7, and 8 missions to compute 2009 evapotranspiration from vegetation (consumptive use).

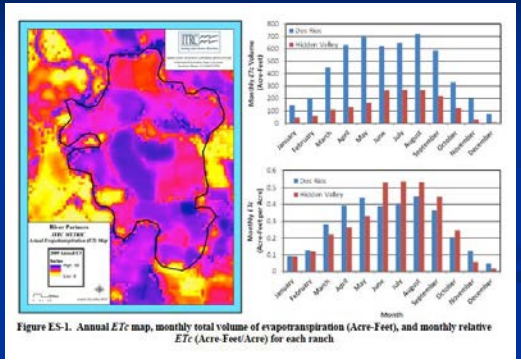
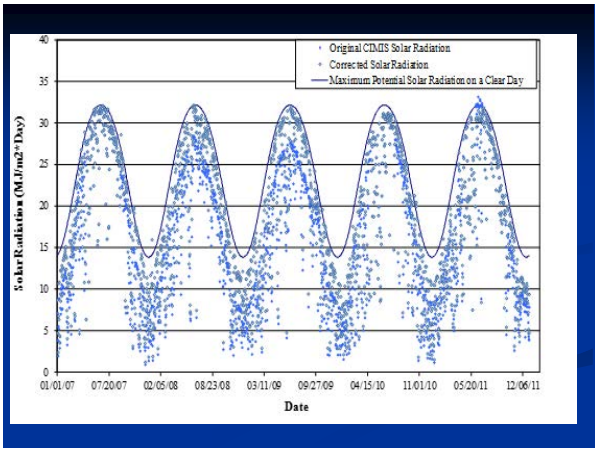


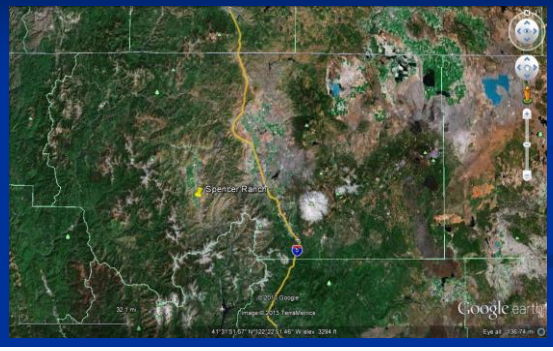
Figure ES-1. Annual *ETc* map, monthly total volume of evapotranspiration (Acre-Feet), and monthly relative *ETc* (Acre-Feet/Acre) for each ranch


Original CIMIS Solar Radiation
Corrected Solar Radiation
Maximum Potential Solar Radiation on a Clear Day
Solar Radiation (MJ/m2*Day)
Date
01/01/07
07/20/07
02/05/08
08/23/08
03/11/09
09/27/09
04/15/10
11/01/10
05/20/11
12/06/11


Lower Battle Creek Stream Flow Enhancement
& Habitat Restoration Scoping Study
Figure 1 - Project Map
RIVER PARTNERS


State of Jefferson

Spencer Ranch Conservation Project
Siskiyou County



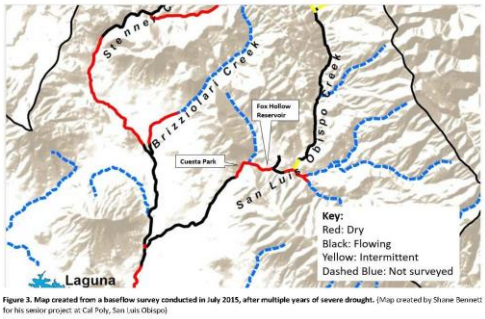


Figure 3. Map created from a baseflow survey conducted in July 2015, after multiple years of severe drought. (Map created by Shane Bennett for his senior project at Cal Poly, San Luis Obispo)

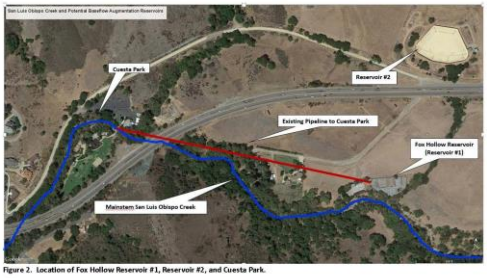
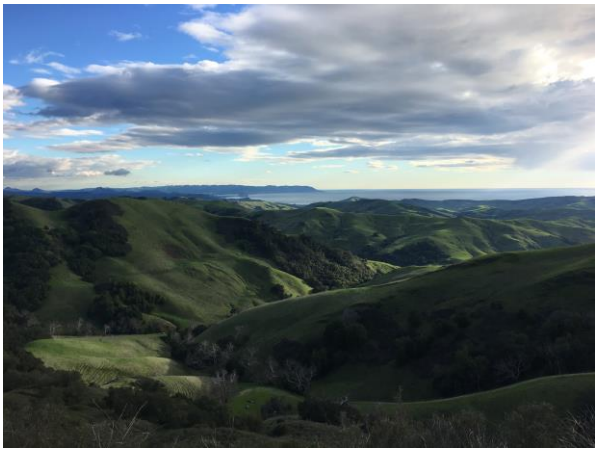
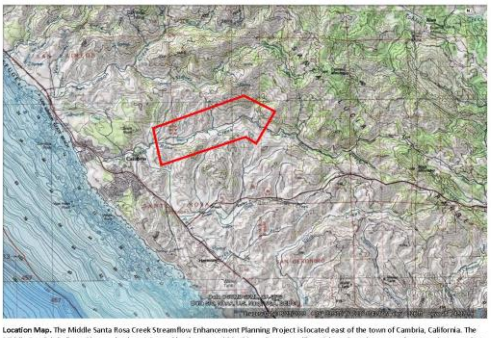


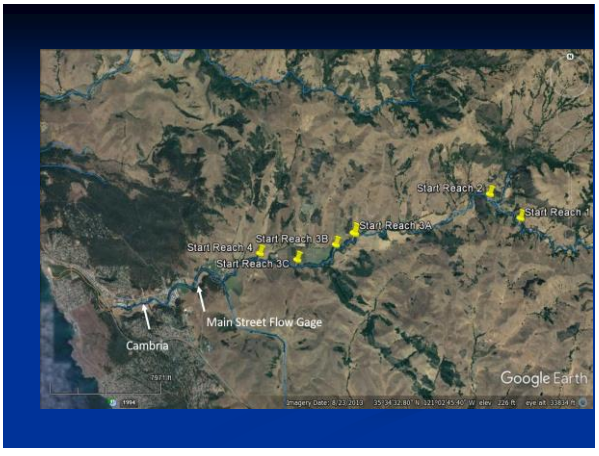
Figure 2. Location of Fox Hollow Reservoir #1, Reservoir #2, and Cuesta Park.

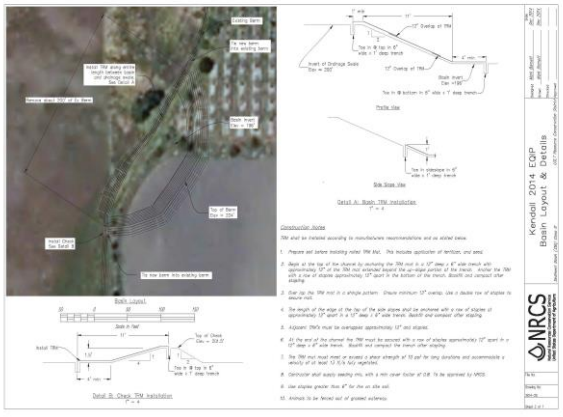
View inside cistern owned by the City of San Luis Obispo. Estimated capacity of 2,000,000 gallons winter storage



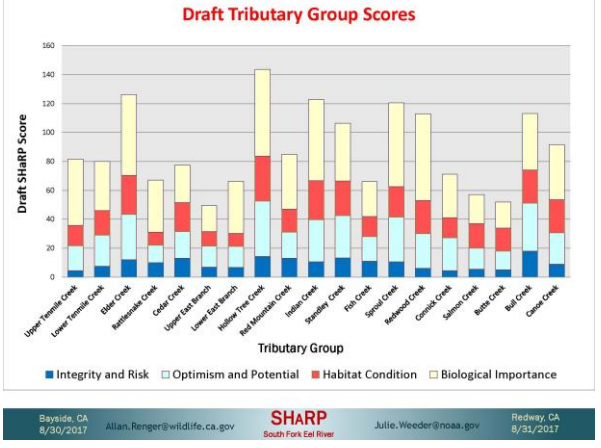


Location Map. The Middle Santa Rosa Creek Streamflow Enhancement Planning Project is located east of the town of Cambria, California. The Middle Reach is indicated by a red polygon. Several landowners within this project area will participate in various groundwater recharge project in key percolation zones.

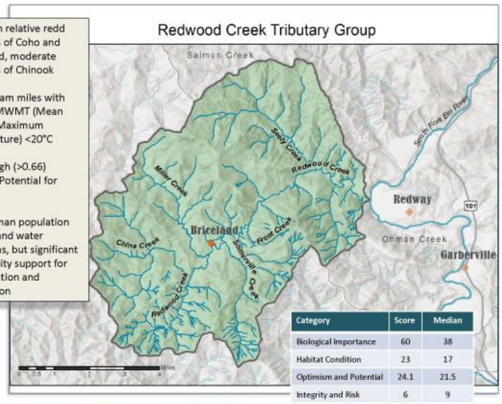




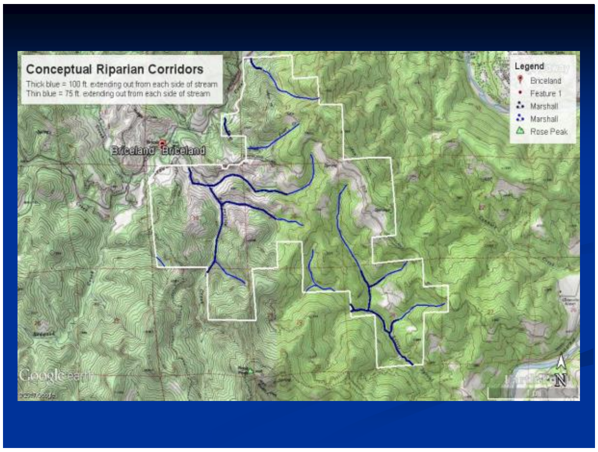
Photograph of a recharge basin after construction on a property adjacent to Santa Rosa Creek. This pilot project was completed in 2015 and is an example of one of the types of successful groundwater recharge projects that would be incorporated in the Middle Santa Rosa Creek Streamflow Enhancement Planning Project.

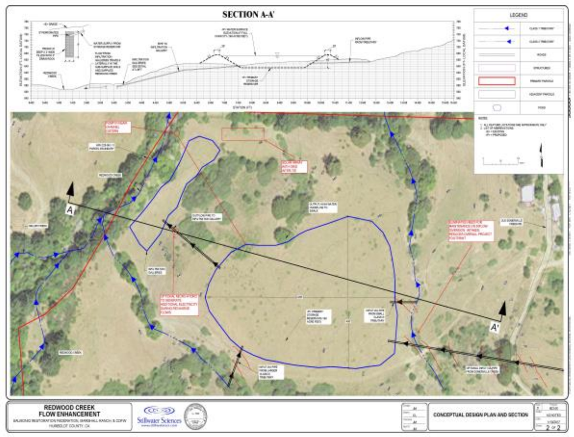


- Very high relative redd densities of Coho and steelhead, moderate densities of Chinook
- 67% stream miles with stream MWMT (Mean Weekly Maximum Temperature) <20°C
- 15 km high (>0.66) Intrinsic Potential for Coho
- High human population density and water diversions, but significant community support for conservation and restoration



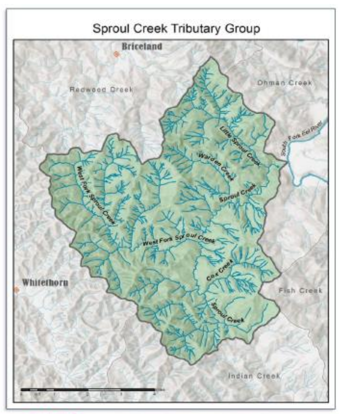
Category	Score	Median
Biological Importance	60	38
Habitat Condition	23	17
Optimism and Potential	24.1	21.5
Integrity and Risk	6	9

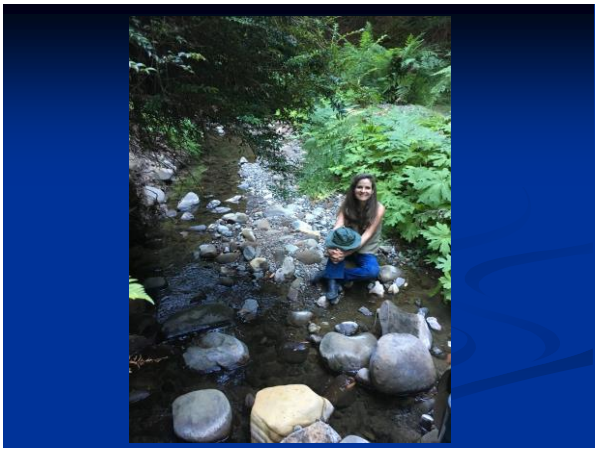


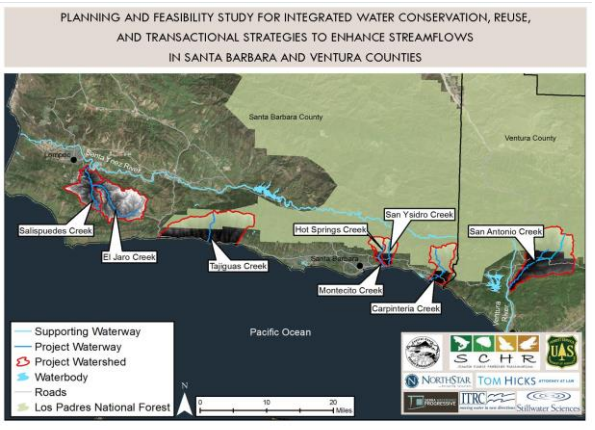


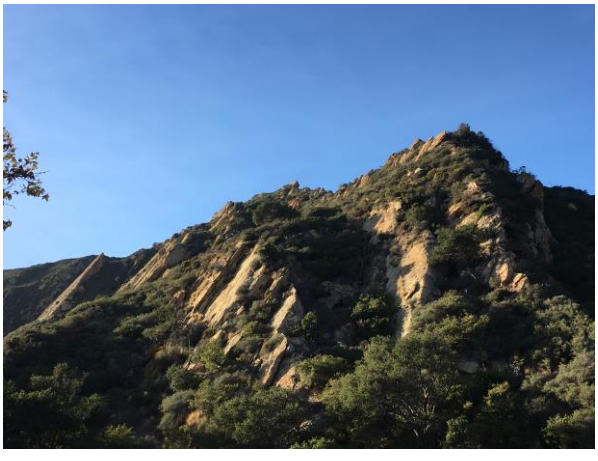
- Very high relative redd densities of all 3 species anadromous salmonids
- Cool (<17.8 C) mean August water temperatures for 42 km stream
- Moderate amount of high Intrinsic Potential stream
- Low human population density, few water diversions, but high road density and high substrate embeddedness

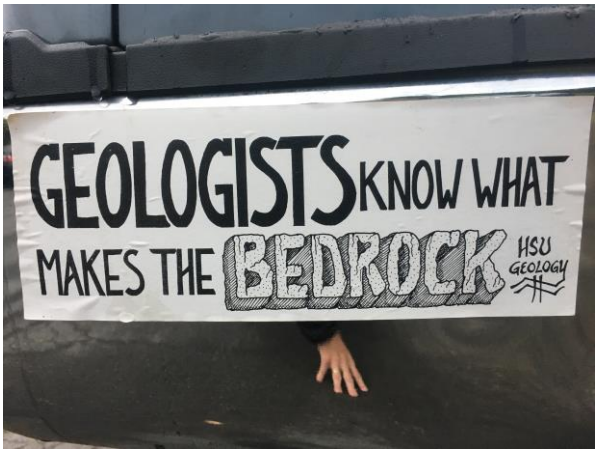
Category	Score	Median
Biological Importance	58	38
Habitat Condition	21	17
Optimism and Potential	31.1	21.5
Integrity and Risk	10.5	9





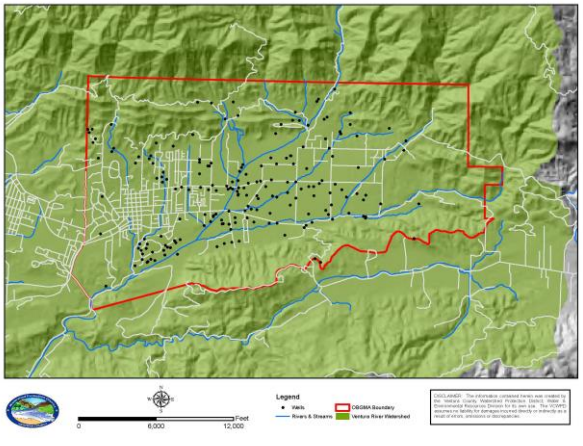


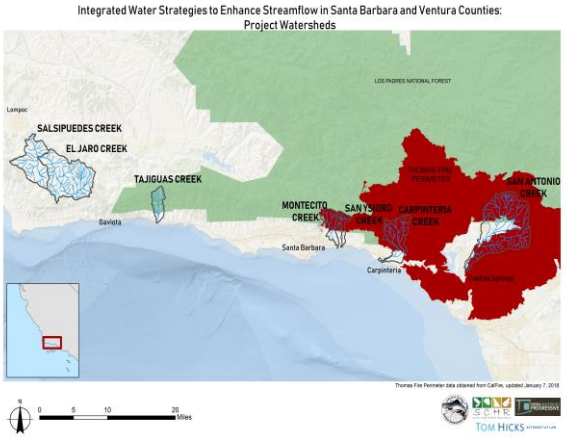


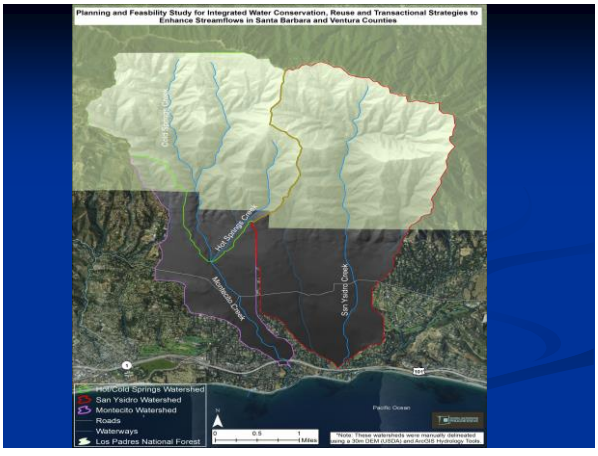


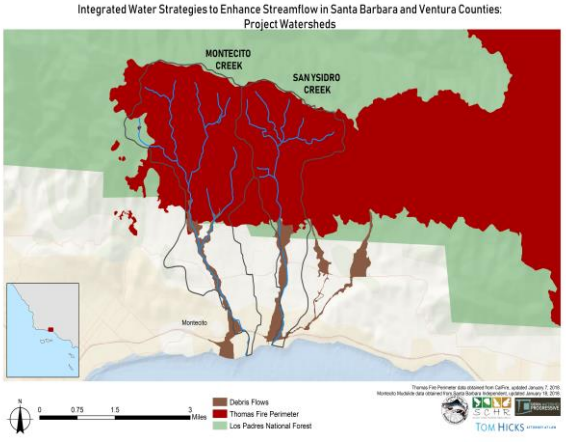
Instream Flow and Dormitory Conservation Project

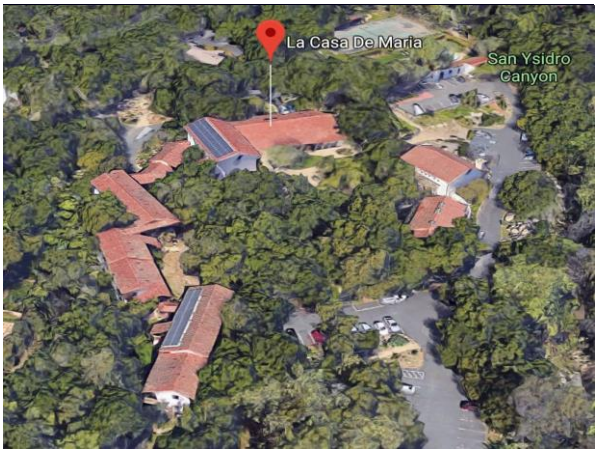
THACHER




Integrated Water Strategies to Enhance Streamflow in Santa Barbara and Ventura Counties:
Project Watersheds
LOS PADRES NATIONAL FOREST
Lompoc
SALSIPUEDES CREEK
EL JARO CREEK
TAJIGUAS CREEK
THOMAS FIRE PERIMETER
SAN ANTONIO CREEK
MONTECITO CREEK
SAN YSIDRO CREEK
CARPINTERIA CREEK
Gaviota
Santa Barbara
Carpinteria
Hot Springs Creek
Montecito Creek
San Ysidro Creek
Thomas Fire Perimeter data obtained from CalFire, updated January 7, 2018.
0 5 10 20 Miles
TOM HICKS


Planning and Feasibility Study for Integrated Water Conservation, Reuse and Transactional Strategies to Enhance Streamflows in Santa Barbara and Ventura Counties
Gold Creek
Hot Springs Creek
Montecito Creek
San Ysidro Creek
Pacific Ocean
Hot/Cold Springs Watershed
San Ysidro Watershed
Montecito Watershed
Roads
Waterways
Los Padres National Forest
0 0.5 1 Miles
*Note: These watersheds were manually delineated using a 30m DEM (USGA) and ArcGIS Hydrology Tools.

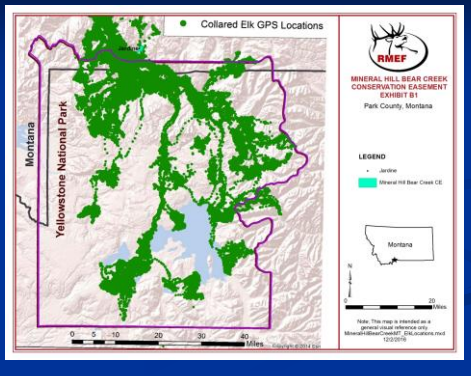

Integrated Water Strategies to Enhance Streamflow in Santa Barbara and Ventura Counties:
Project Watersheds
MONTECITO CREEK
SAN YSIDRO CREEK
Montecito
0 0.75 1.5 3 Miles
Debris Flows
Thomas Fire Perimeter
Los Padres National Forest
TOM HICKS


La Casa De Maria
San Ysidro Canyon


abc NEWS

Donated Entire Interest: National Precedent

Donated Entire Interest: National Precedent



Donated Entire Interest: National Precedent

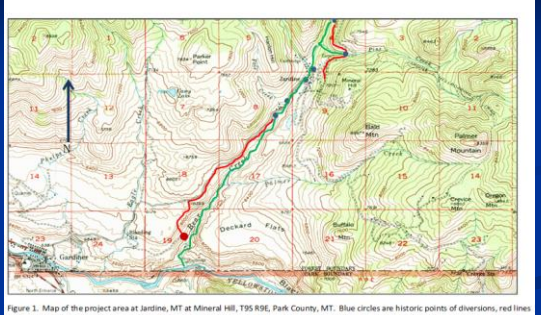
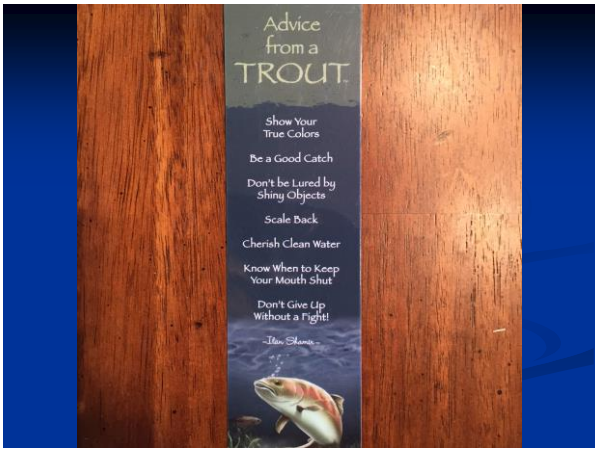


Figure 1. Map of the project area at Jardine, MT at Mineral Hill, T9S R9E, Park County, MT. Blue circles are historic points of diversions, red lines are ditch locations. The Bear Creek Ditch (Biglow Chapman Ditch) is red line west of Bear Creek, and power plant location red circle. Proposed protected reach is green line. Source: USGS Gardiner Quadrangle (1955).



Water Bond Prop One WCB Projects that Enhance Stream Flow

TOM HICKS ATTORNEY AT LAW

415.309.2098
tdh@tomhickslaw.com

Moving Into Action:
Finding Real Solutions for Communities in Ventura County

Steelhead Summit, Ventura, Ca

Regina Hirsch, Watershed Progressive

welcome

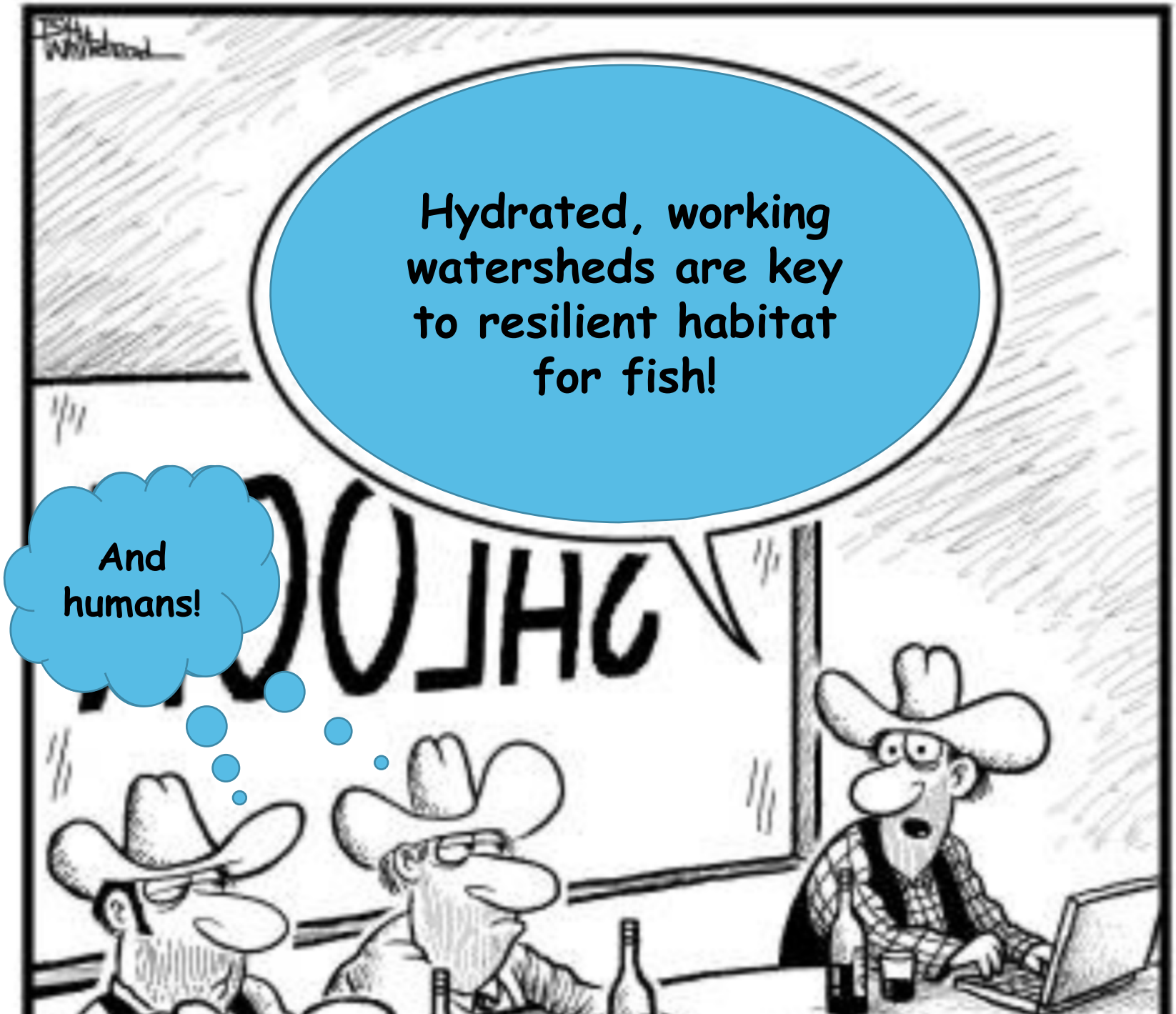
Common ground

93% of all Climate impacts are related to water

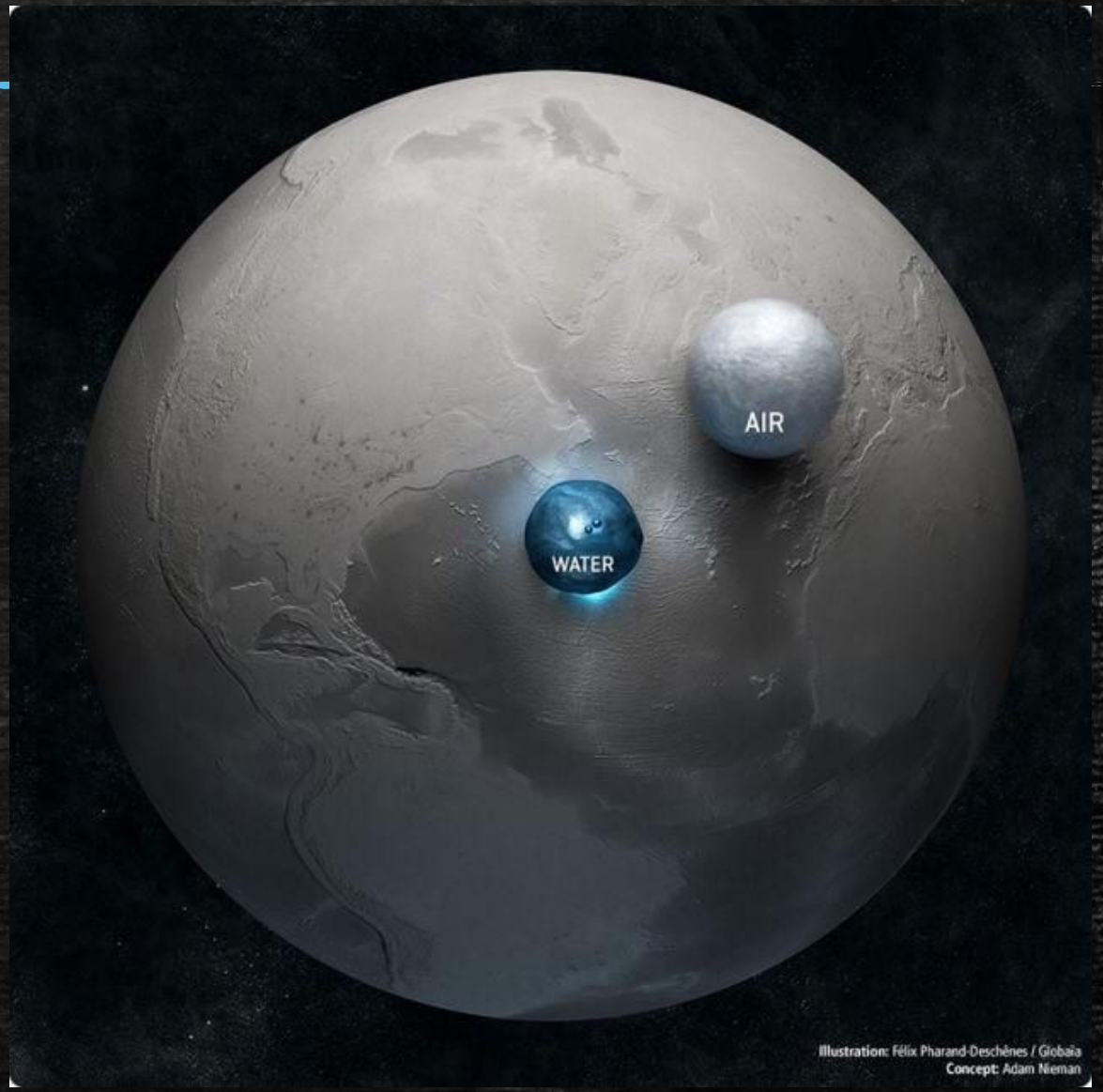
LOCALIZING CALIFORNIA WATERS

CONNECTING ONSITE WATERS
FOR RESILIENT COMMUNITIES

Common ground


Hydrated, working watersheds are key to resilient habitat for fish!
And humans!

True or False:
Humans have enough water to sustain their own habitats?



True or False:
Humans have enough water to sustain their own habitats?

HOW?

What tools will be most crucial to create watershed resiliency and water security?

https://answergarden.ch/829940 choose TOP 3

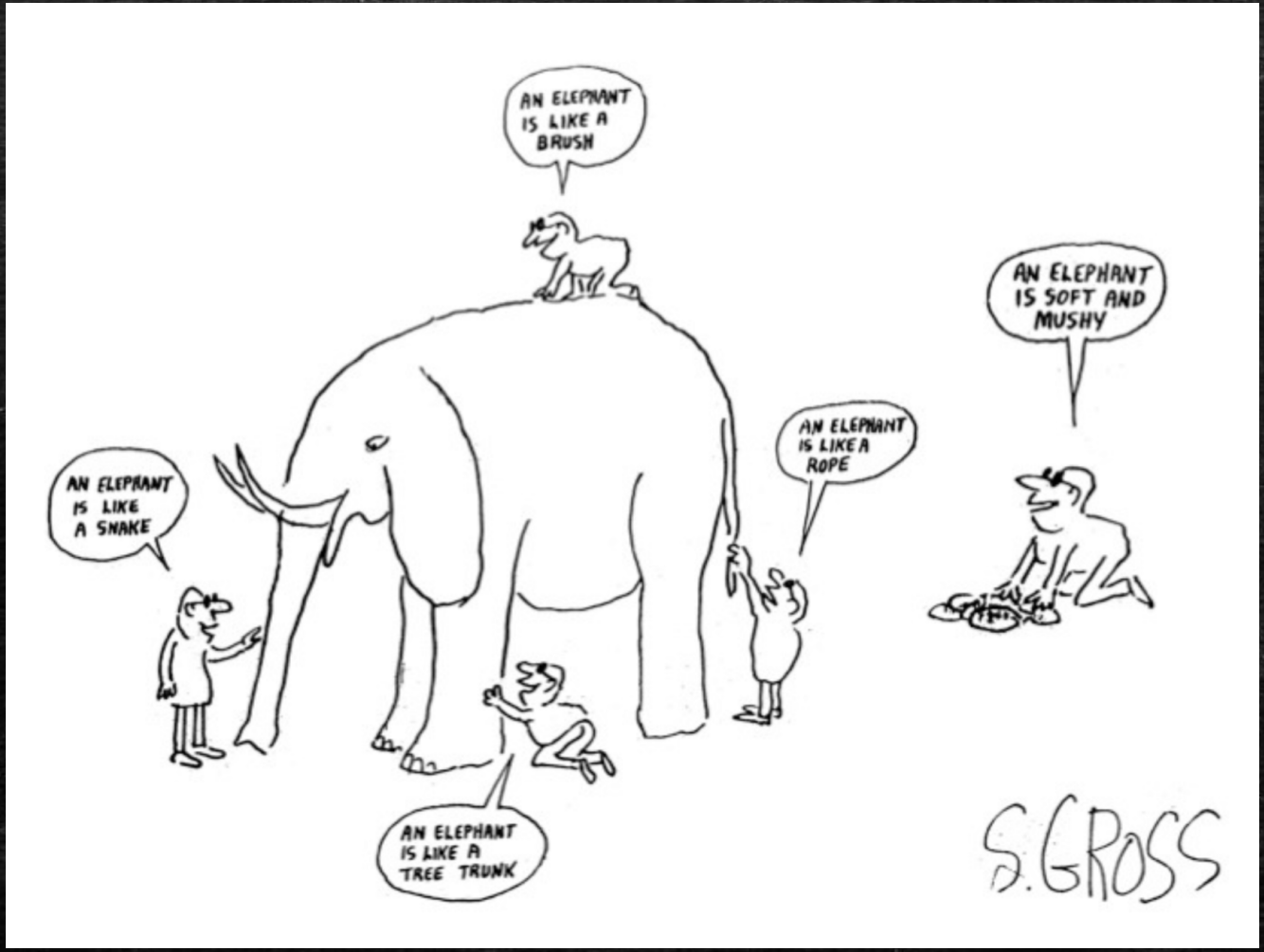
SPACE AGE TECHNOLOGY
VOLUNTARY WATER TRANSFERS
WATER POLICY CHANGES
WATERSHED EDUCATION
GROUNDWATER MANAGEMENT
LOCAL WATER BUDGETS
WATER REUSE
LOCAL MANAGEMENT
STATE MANAGEMENT
LAND USE POLICY CHANGES
TRADITIONAL METHODS
HYDROLOGICAL DATA
WATER MASTERS

CREATIVITY. AND IT TAKES PRACTICE

-Felicia Marcus

Framing: Have we failed?

CHANGING the FRAME



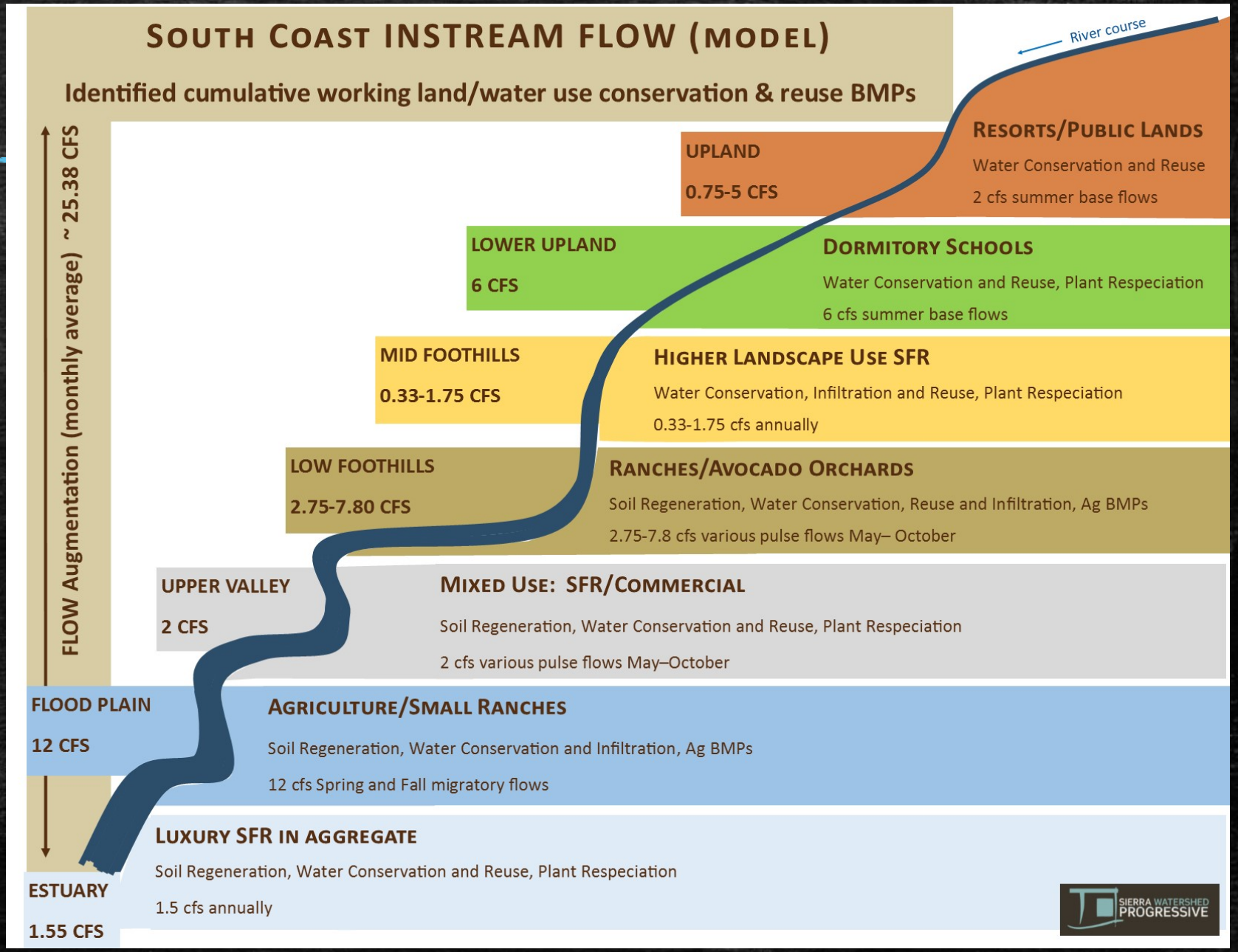
Creating the Network

Connecting toward Healthy Resilient Communities

1. Grassroots: Agency
2. Source Managers: End User
3. Decentralized: Centralized
4. Watershed Stewards: Infrastructure Managers
5. Landuse Managers: Water Managers
6. Recharge: Efficiencies
7. Traditional Methods: New BMPs

Intersecting water management and instream flow:

Diverse Portfolio of Users and Aggregated Actions



The Thacher School

SITE 8

SITE 9

SITE 10

17	2018	2019	2020	2021	2022	2023
%	8%	27%	62%	70%	76%	90%
ter Meters Rainwater Reuse	• WMP 2018 Update Draft • Banyan Water Meter • Stormwater Infiltration & Bioswales Assessment • Fire Hazard Mitigation Plan • Fire Habitat Restoration • Water Rights SDU/1707 Due Diligence • Roadside Corral Toilet to Tank • Landscape Redesign / Xeriscaping	• Landscape Irrigation Retrofits • 3D Watershed Modeling • WCB Dorm Tank to Toilet • Dorm Shower Greywater • Begin Orchard Bioswale and Water Conservation • Equestrian Unit Stormwater • Landscape Respeciation / Plant Typing / Xeriscaping • Leak Detection & Abatement	• Blackwater Reuse Enhancement Install • Peak Flow Storage Planning • Equestrian Unit Rainwater Capture & Reuse Planning • Turfgrass Respeciation & Xeriscaping • Stormwater Infiltration & Bioswales	• Wastewater Polishing & RO Unit Construction (Dining Hall Reuse) • RO Unit Permitting & Planning (Dining Hall) • Non-Dorm Rainwater Capture & Reuse Permits • Laundry to Landscape (L2L) Faculty • Mechanical Water Reuse Design	• Peak Flow Storage Permitting • Equestrian Unit Rainwater Capture & Reuse • Mechanical Water Reuse Installation • Non-Dorm Rainwater Capture & Reuse • Wildland Urban Interface Buffer Strip • Prepare for 2023 WMP Update	INTERIM MILESTONE – 90% REDUCTION IN OVERALL WATER USE

THACHER

THE THACHER SCHOOL

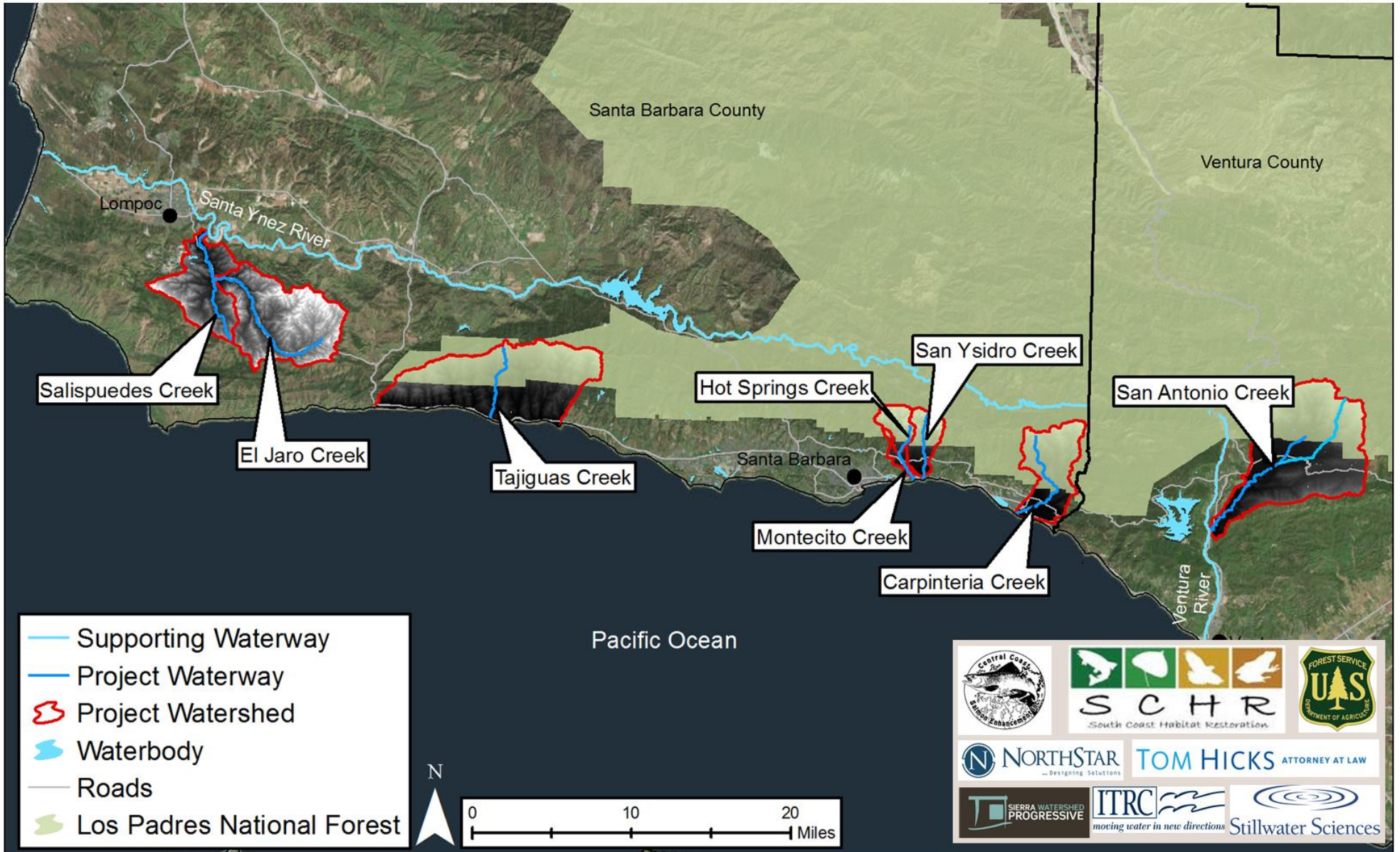
WATER RESOURCE MANAGEMENT

Phasing toward water resiliency, security and leadership

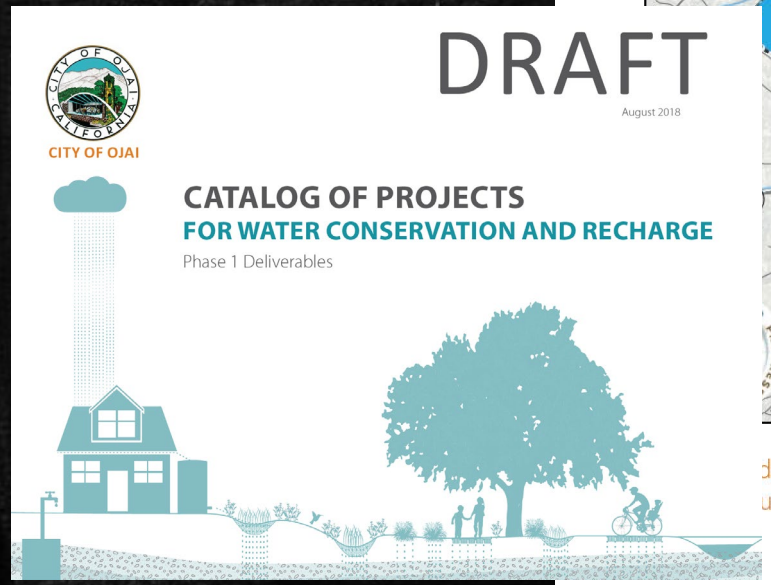
IWS

WCB Planning Grant 2017-2019

PLANNING AND FEASIBILITY STUDY FOR INTEGRATED WATER CONSERVATION, REUSE, AND TRANSACTIONAL STRATEGIES TO ENHANCE STREAMFLOWS IN SANTA BARBARA AND VENTURA COUNTIES

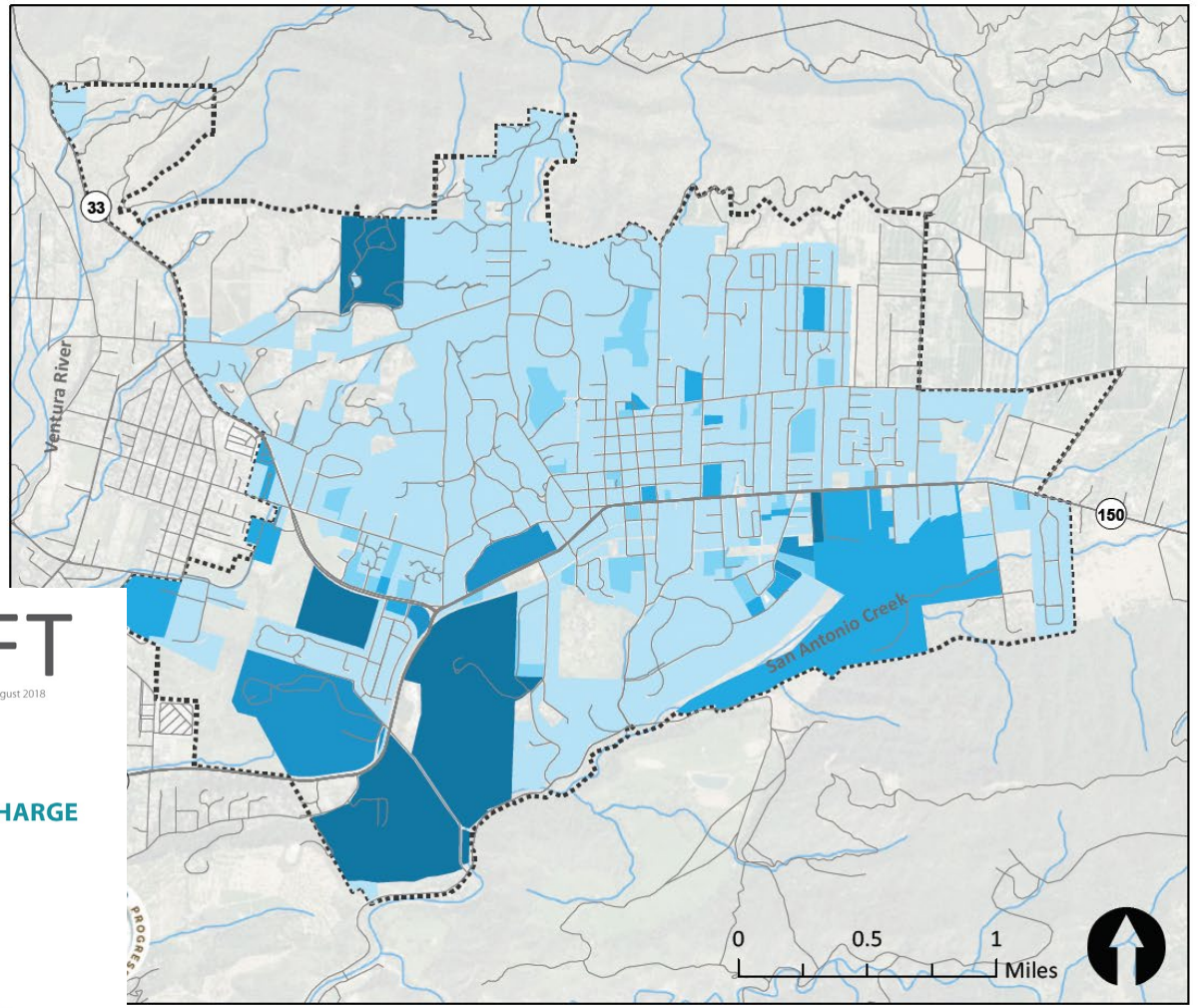


Ojai City



4. IDENTIFICATION OF OPPORTUNITIES

RAINWATER HARVESTING POTENTIAL



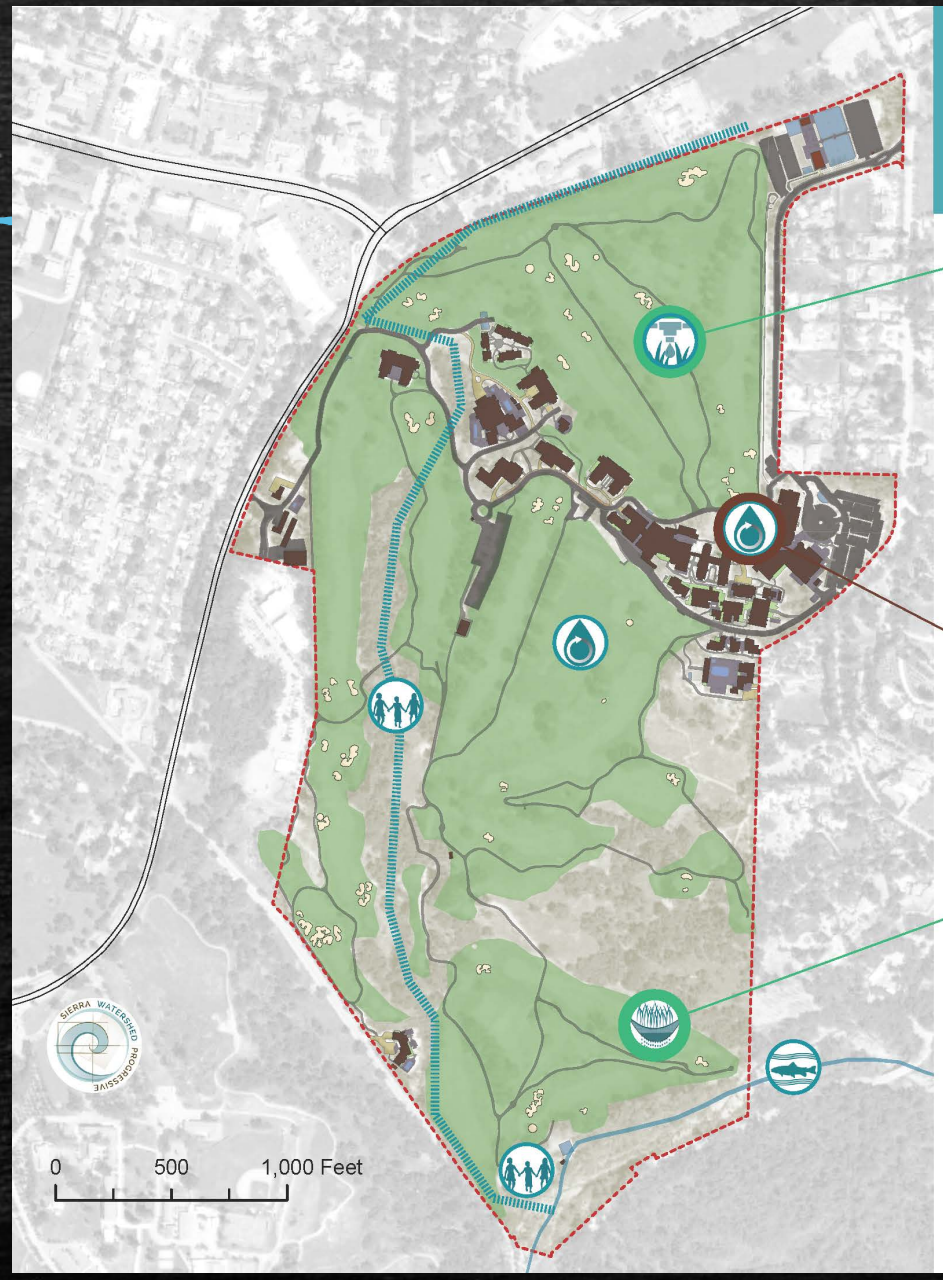
data inputs, assumptions, and the estimated potential benefit identified in the spatial opportunities under review, and additional error analysis and ground truthing of this data is expected.

LAND USE TYPE	Water Conservation Potential (acre feet per year, AFY)
Residential	350
Schools	25
Public Facilities	10
Commercial/ Industrial	70
City-Owned	2
Total	457

Water conservation and recharge estimates for rainwater harvesting in the City of Ojai are based on assumptions described in Chapter 3.

- A total of 2,912 buildings in the City of Ojai were identified for rainwater harvesting;
- 100% of the average annual rainfall (21.49") upon the identified buildings' roof area is diverted to storage and available for reuse; and
- There is no overflow from the rainwater storage cisterns.

Ojai Valley Inn



The Ojai Valley Inn's commitment to environmental stewardship is realized through developing a diverse portfolio of sustainable water supply alternatives that demonstrate innovative, energy efficient best management practices and water-conserving techniques. These measures are taken with the objective of reducing water use by 50% within 10 years; by meeting this target the Inn will become a leader in re-hydrating the local watershed to sustain a healthy environment, groundwater basin, and community in the valley for future generations.

LANDSCAPE RETROFITS

Reduced Consumptive Use
Groundwater Recharge
Enhance Instream Flows
Demonstration and Education

- Golf Course Redesign and Alternative Water Sourcing
- Landscape Enhancements and Alternative Water Sourcing
- Road / Entrance / Parking Lot Redesign
- Stormwater Capture/Detention/ Retention
- Invasive Tree Removal
- Trail /Habitat/Pollinator Corridor
- Low Impact Design (LID) Demonstration
- Educational signage and learning lab stations

ALTERNATIVE SOURCING

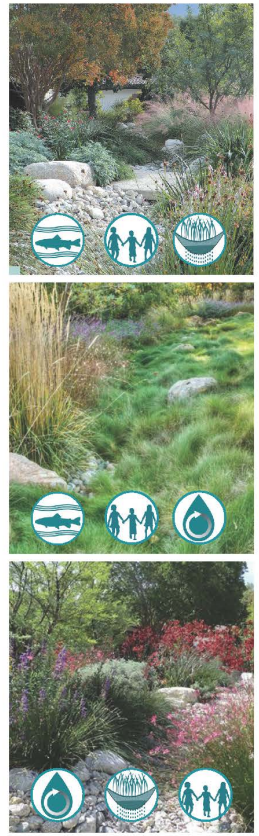
Reduced Consumptive Use
Enhance Instream Flows
Demonstration and Education

- Water Reuse: Greywater/Blackwater
- Water Reuse: Mechanical Water
- Brackish Water
- Stormwater
- Rainwater

STORMWATER/RAINWATER

Groundwater Recharge
Enhance Instream Flows
Demonstration and Education

- Capture/Detention/ Retention
- Drywells



Reduced Consumptive Use

Groundwater Recharge

Enhance Instream Flows

Demonstration and Education

Senior Canyon Mutual Water Company

WATER MANAGEMENT PLAN

2018

senior canyon mutual water company

A PATH TO WATER SUSTAINABILITY, RESILIENCY, AND LEADERSHIP

Watershed Progressive

November 2018

Ojai Unified School District

PROPOSED

Project Catalog

OUSD Stormwater LID Project

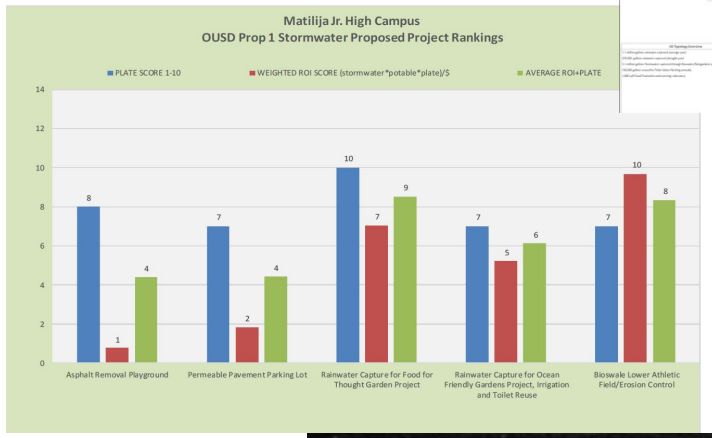
1)

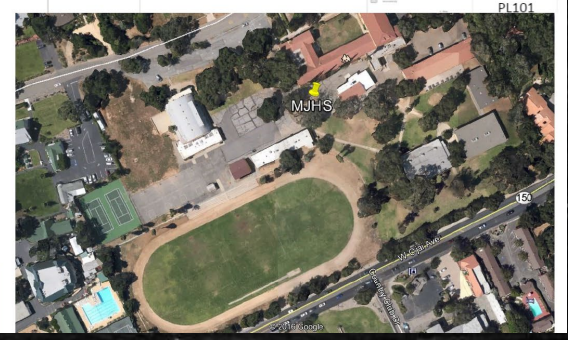
1)

Matilija Jr. High

OUSD Stormwater LID Project

1) Graphs visual ranking system, showing PLATE SCORE (count of benefits achieved 1-10), as well as simplest ROI (water savings/$). GREEN AVERAGE bars represent aggregated average of both scores.
2) This quick ranking system is to guide decision making and inform on multi-beneficial uses of implemented solutions.
3) Matilija has a myriad of flooding concerns and asphalt undercutting that can be addressed through simple measures listed here. Additionally it is a prime location for resource science-based demonstration projects.





WATER MANAGEMENT FRAMEWORK FOR INSTREAM FLOW ENHANCEMENT & WATER RESILIENCY

PRE-IDENTIFIED KEY ACTIONS READY FOR PLANNING TO 100% WCB INSTREAM FLOW GRANT 2018

This project will coalesce disconnected instream flow enhancement (IFE) and water resiliency planning initiatives throughout Ventura River Watershed (VRW) into a framework that uses best available science and stakeholder involvement to maximize connected water resources. Key water agencies and stakeholders will utilize this framework approach through identification of collaborative conjunctive use opportunities. This project will support benefits beyond instream flow by supporting recharge of three aquifers, critical to community health, hazard mitigation and water security. An outcome of developing this regional framework will extend beyond the VRW; the efforts of this project will act as a template that models instream flow targets for other watersheds.

PROJECT TASKS

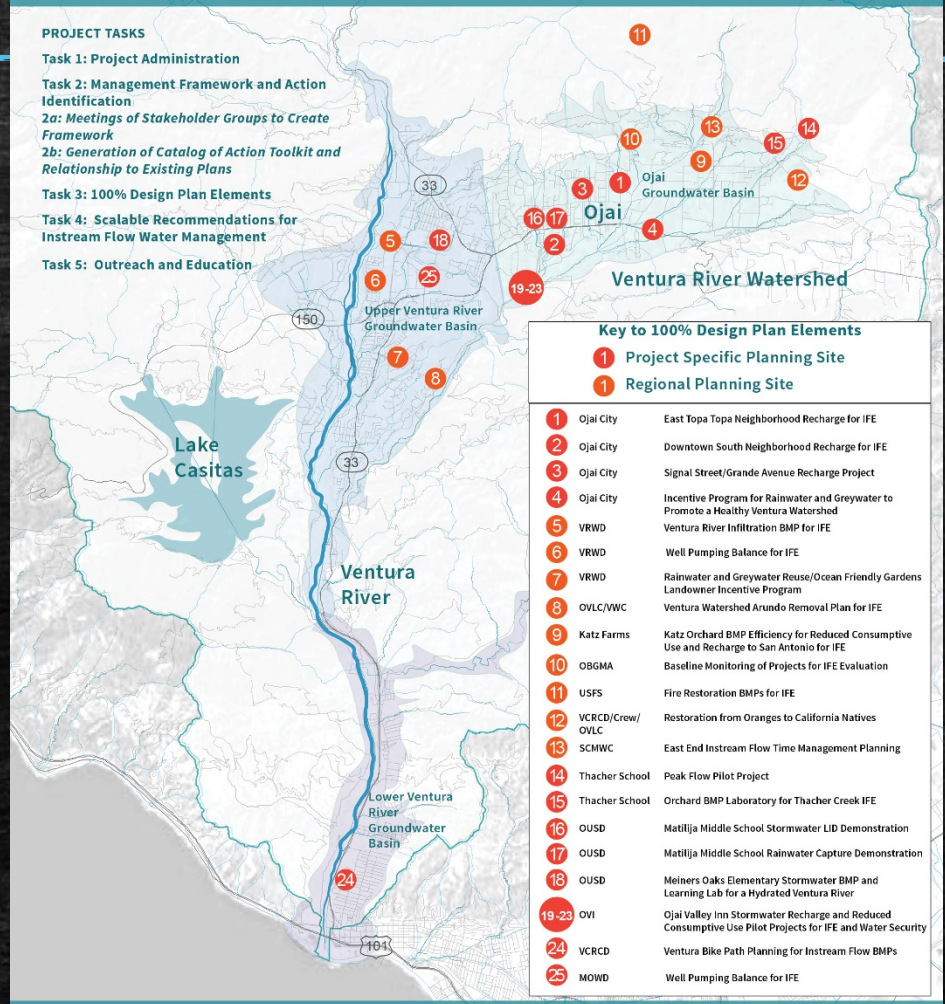
Task 1: Project Administration

Task 2: Management Framework and Action Identification
2a: Meetings of Stakeholder Groups to Create Framework
2b: Generation of Catalog of Action Toolkit and Relationship to Existing Plans

Task 3: 100% Design Plan Elements

Task 4: Scalable Recommendations for Instream Flow Water Management

Task 5: Outreach and Education

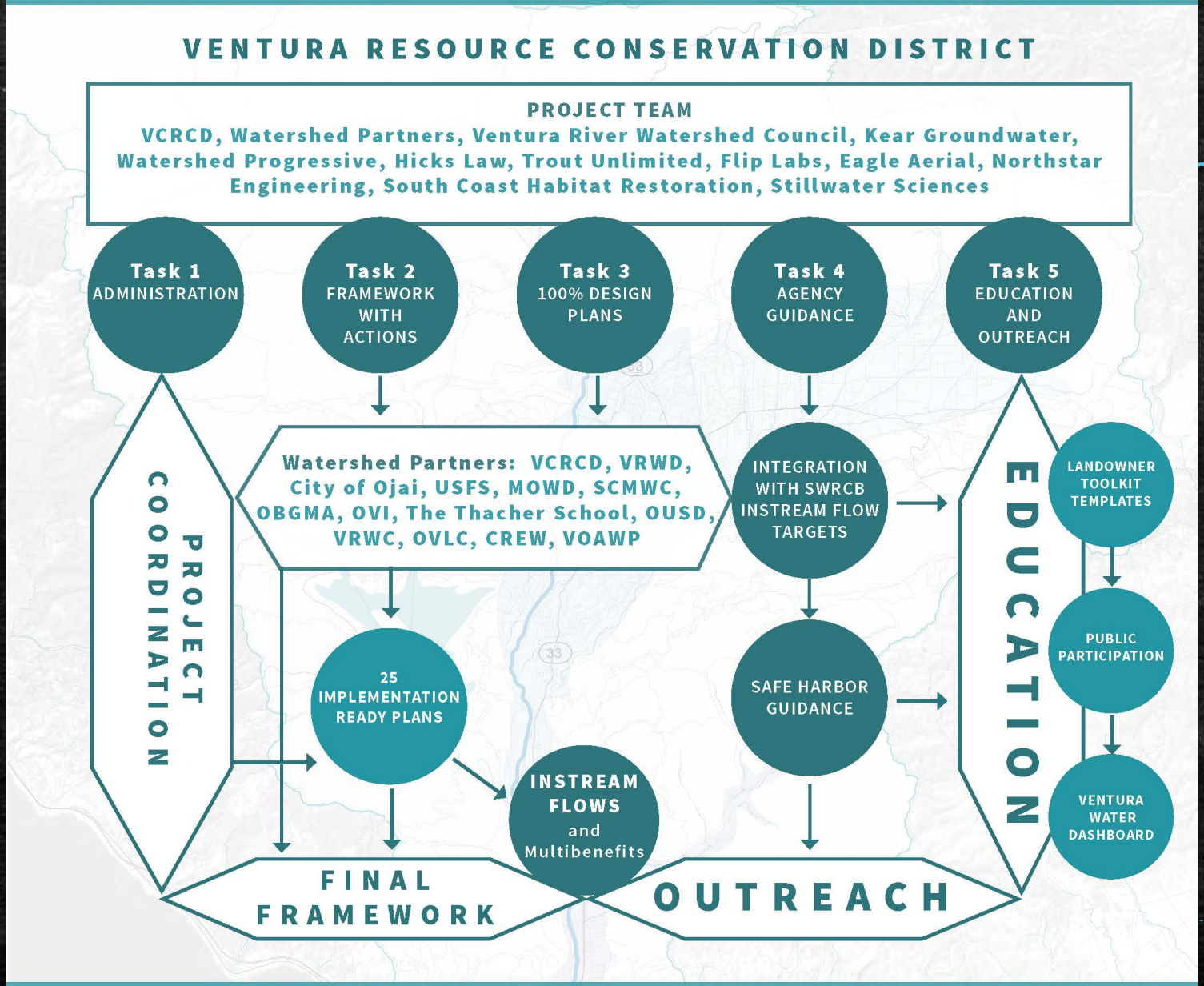


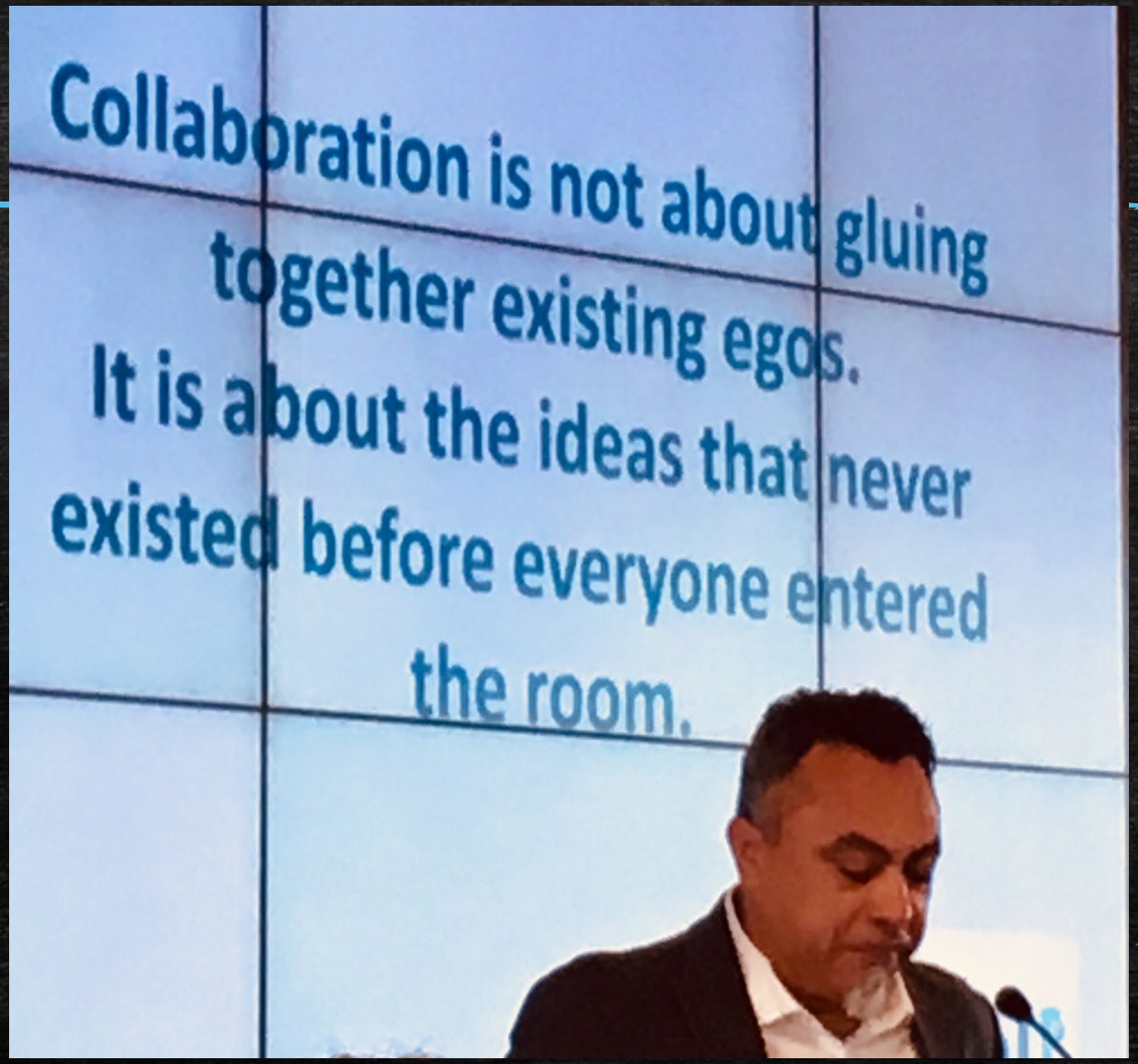
Key to 100% Design Plan Elements

1 Project Specific Planning Site
1 Regional Planning Site

1	Ojai City	East Topa Topa Neighborhood Recharge for IFE
2	Ojai City	Downtown South Neighborhood Recharge for IFE
3	Ojai City	Signal Street/Grande Avenue Recharge Project
4	Ojai City	Incentive Program for Rainwater and Greywater to Promote a Healthy Ventura Watershed
5	VRWD	Ventura River Infiltration BMP for IFE
6	VRWD	Well Pumping Balance for IFE
7	VRWD	Rainwater and Greywater Reuse/Ocean Friendly Gardens Landowner Incentive Program
8	OVLC/VWC	Ventura Watershed Arundo Removal Plan for IFE
9	Katz Farms	Katz Orchard BMP Efficiency for Reduced Consumptive Use and Recharge to San Antonio for IFE
10	OBGMA	Baseline Monitoring of Projects for IFE Evaluation
11	USFS	Fire Restoration BMPs for IFE
12	VCRCD/Crew/ OVLC	Restoration from Oranges to California Natives
13	SCMWC	East End Instream Flow Time Management Planning
14	Thacher School	Peak Flow Pilot Project
15	Thacher School	Orchard BMP Laboratory for Thacher Creek IFE
16	OUSD	Matilija Middle School Stormwater LID Demonstration
17	OUSD	Matilija Middle School Rainwater Capture Demonstration
18	OUSD	Meiners Oaks Elementary Stormwater BMP and Learning Lab for a Hydrated Ventura River
19-23	OVI	Ojai Valley Inn Stormwater Recharge and Reduced Consumptive Use Pilot Projects for IFE and Water Security
24	VCRCD	Ventura Bike Path Planning for Instream Flow BMPs
25	MOWD	Well Pumping Balance for IFE

VENTURA WATERSHED INSTREAM FLOW ENHANCEMENT AND WATER RESILIENCY REGIONAL FRAMEWORK




Collaboration is not about gluing
together existing egos.
It is about the ideas that never
existed before everyone entered
the room.

What tools will be most crucial to create watershed resiliency and water security?

https://answergarden.ch/829940 choose TOP 3

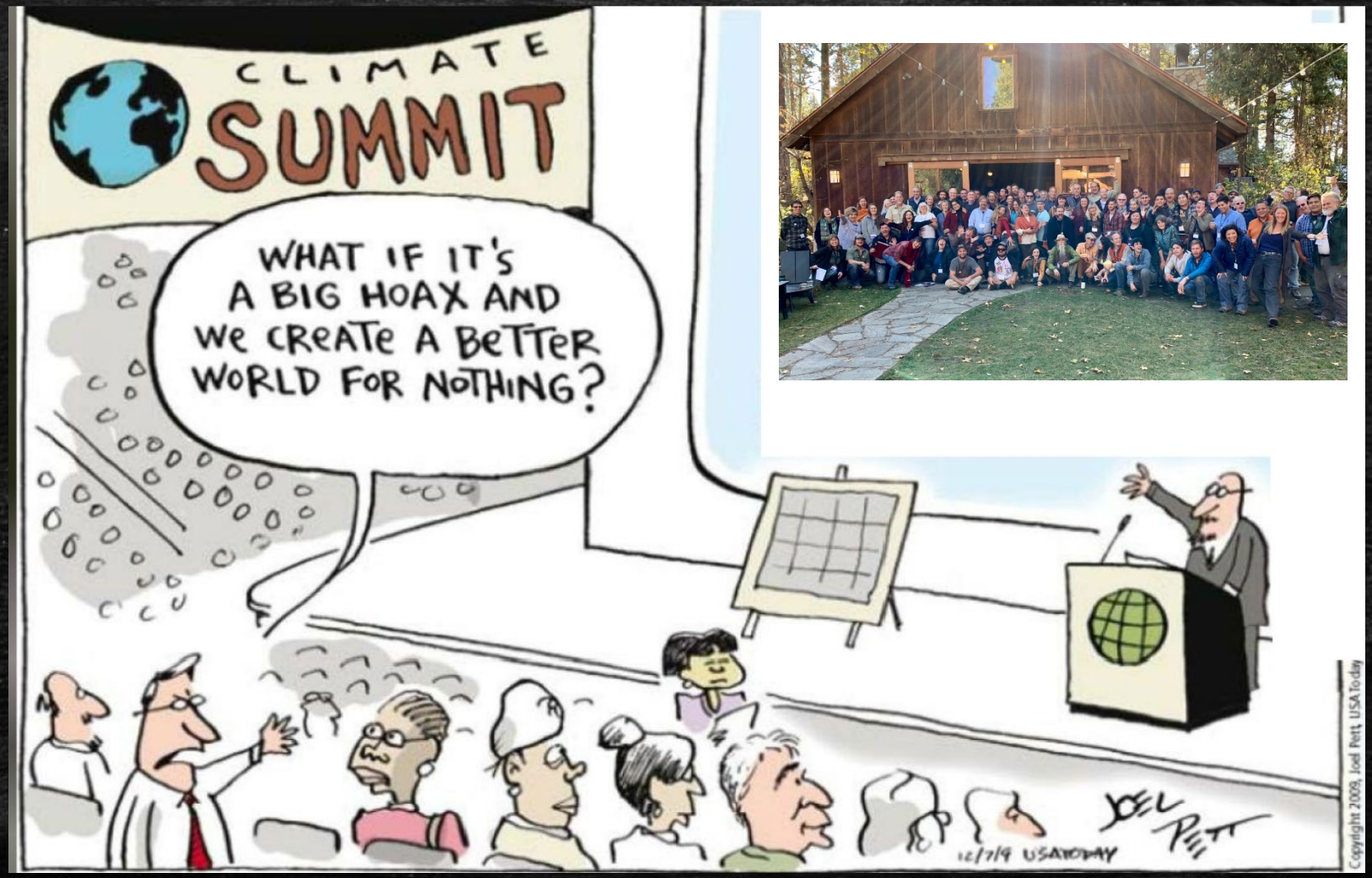
SPACE AGE TECHNOLOGY
VOLUNTARY WATER TRANSFERS
DESALINISATION
FORESTRY MANAGEMENT
WATER POLICY CHANGES
WATERSHED EDUCATION
GROUNDWATER MANAGEMENT
LOCAL WATER BUDGETS
WATER REUSE
LOCAL MANAGEMENT
STATE MANAGEMENT
LAND USE POLICY CHANGES
TRADITIONAL METHODS
HYDROLOGICAL DATA

So the answer to get past this image is?

Invite your collaborators to the river…

Have fun..

and find common ground at the same time.



Thank you

WATERSHED PROGRESSIVE

Regina Hirsch
Executive Director

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209 206 2234

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209 732 0018
www.watershedprogressive.com