Adaptive Management in a Dynamic Floodplain: Over a Decade of Giant Reed (*Arundo donax*) Control and Riparian Restoration in the Santa Clara River

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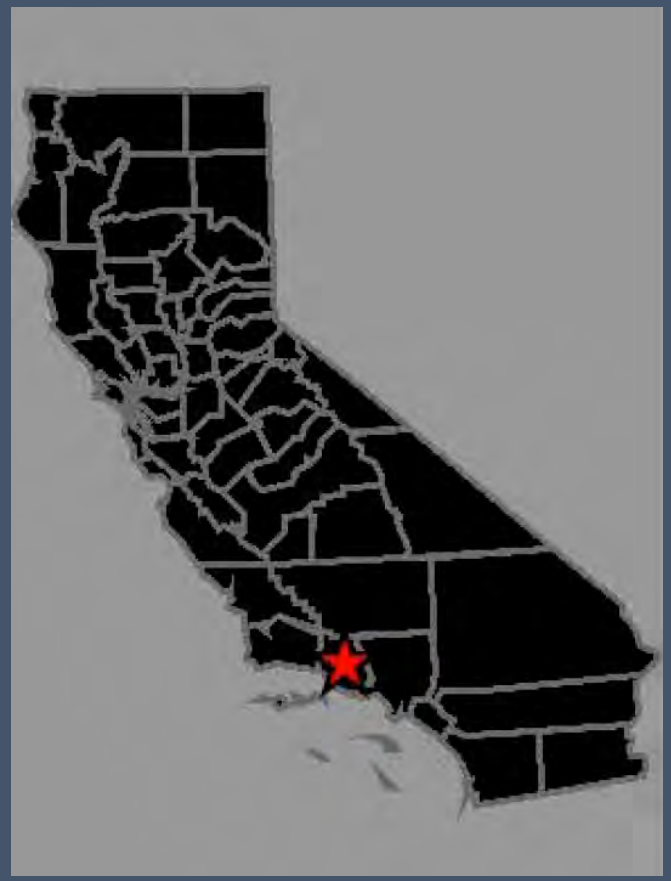
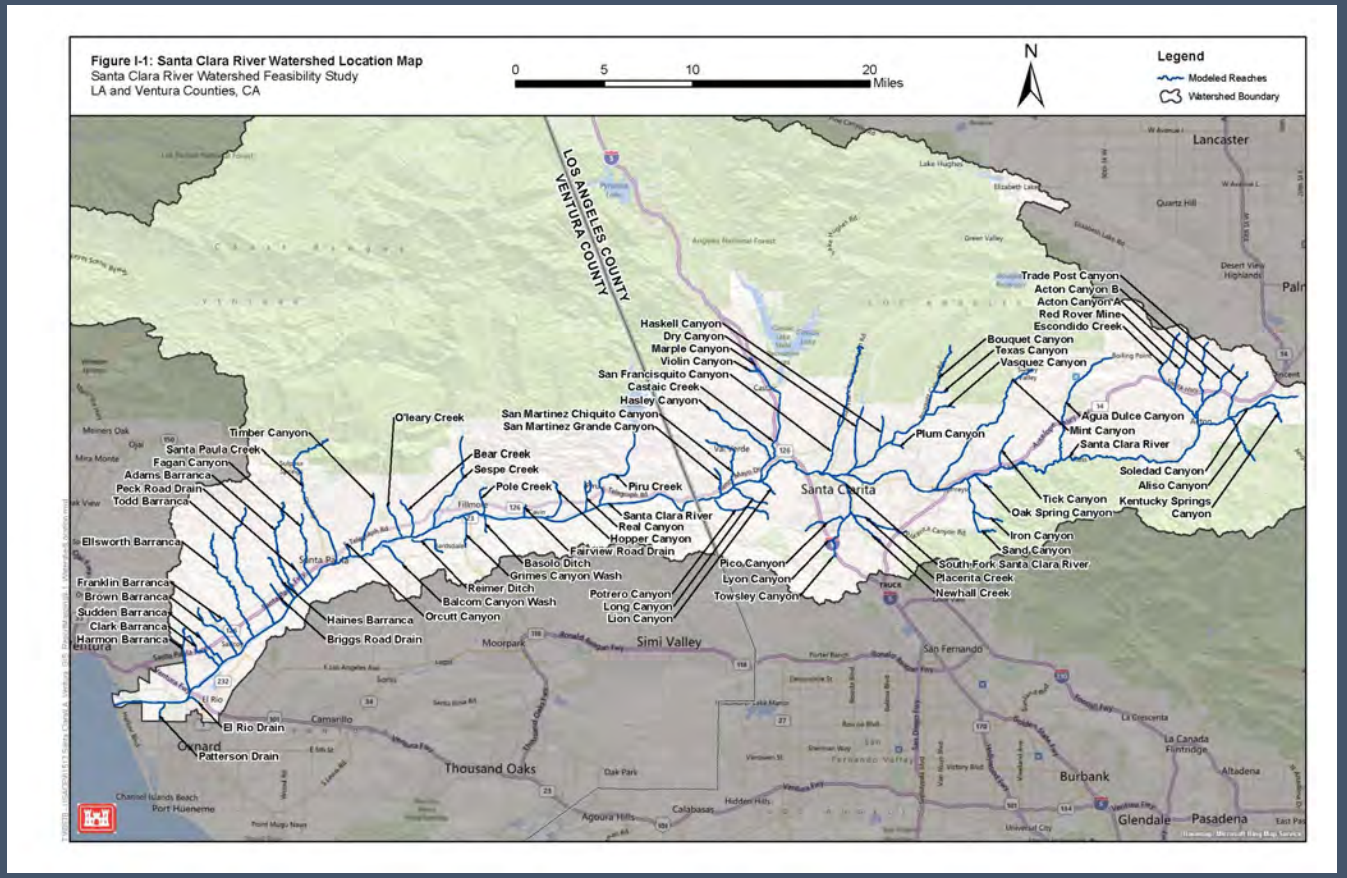
Santa Clara River (SCR) Watershed

- Largest and least altered river in southern California
  - 1,600 square miles
  - 38 special status listed species
  - identified as a critically endangered river by American Rivers in 2005





UCSB Restoration Program

- Restoration
  - completed Arundo removal and restoration on more than 1000 acres of riparian habitat
  - currently working on weed maintenance and revegetation on 325 acres of property owned by CDFW and TNC
- Research
  - invasive species management
  - plant-herbivore interactions
  - biological control
  - climate change effects on riparian zones

Project Goals

- Reduce non-native invasive plant cover
- Re-establish riparian vegetation communities
- Restore ecological functions
- Research to educate restoration

Importance of Restoring Healthy Riparian Habitat

- Support water dependent flora and fauna
- Hotspots of biomass and biodiversity
- Nesting, foraging and migration refugia for birds

Major threats to the SCR

- Climate change: heat and drought
- Urbanization: development and habitat loss
- Non-native invasive plants!

Giant reed (*Arundo donax*)

- High water use
- Increased wildfire risk
- Wildlife habitat degradation
- Outcompetes native vegetation
- Rhizome fragments spread during flood

Large-scale restoration in a high disturbance system faces many challenges…

- Floods, droughts, wind, wildfire
- Negative perception of herbicides
- Work limitations during bird breeding season
- Water management
- 3-5 year project period

Restoration Approaches

- Invasive plant removal and retreatments (3-5 years)
- Natural or “passive” regeneration
- Active revegetation (3 years)
- Establish monitoring plan to gauge restoration progress and success

2019

2022

2025

Alternative Methods for Weed Management

- Weed management by competitive displacement/exclusion

- First establish native species with useful characteristics:
  - Rapid growth
  - Broad canopy or ground cover
  - Prolific seeders
  - Add in diversity later

- Focus on increasing drought tolerance of re-established plant community
  - Increase relative composition of drought tolerant species
  - Increase genetic diversity/assisted migration

November 2019

August 2021

June 2023

July 2024

August 2025

Restoration isn’t always that straight forward!

- Restoration plan must be able to adapt in a dynamic floodplain
  - Flood
  - Fire
  - Water availability

September 2019

June 2020

March 2022

March 2023

April 2025

Following Disturbance

- rapid response treatment of weeds to prevent reinvasion
- allow for natural regeneration
- regular follow-up weed maintenance

Successful restoration in large disturbance prone systems is possible!

- Requirements
  - Investment $$$
  - Infrastructure
  - Implementation
  - Adaptation

Thank you to all of our partners and collaborators!!

- Wildlife Conservation Board
- Santa Clara River Conservancy
- The Nature Conservancy
- California Department of Fish and Wildlife
- Friends of the Santa Clara River
- Channel Islands Restoration
- Western Foundation for Vertebrate Zoology
- anyone else I forgot <3