Benefits of Restoration and Land Preservation as Nature-Based Solutions to Water Quality and Water Supply

Scientific Studies Program

Fiscal Year 2026-2027

Santa Clara River Watershed

Council for Watershed Health
Jason Casanova (CWH) | Jeff Parsons (Herrera)

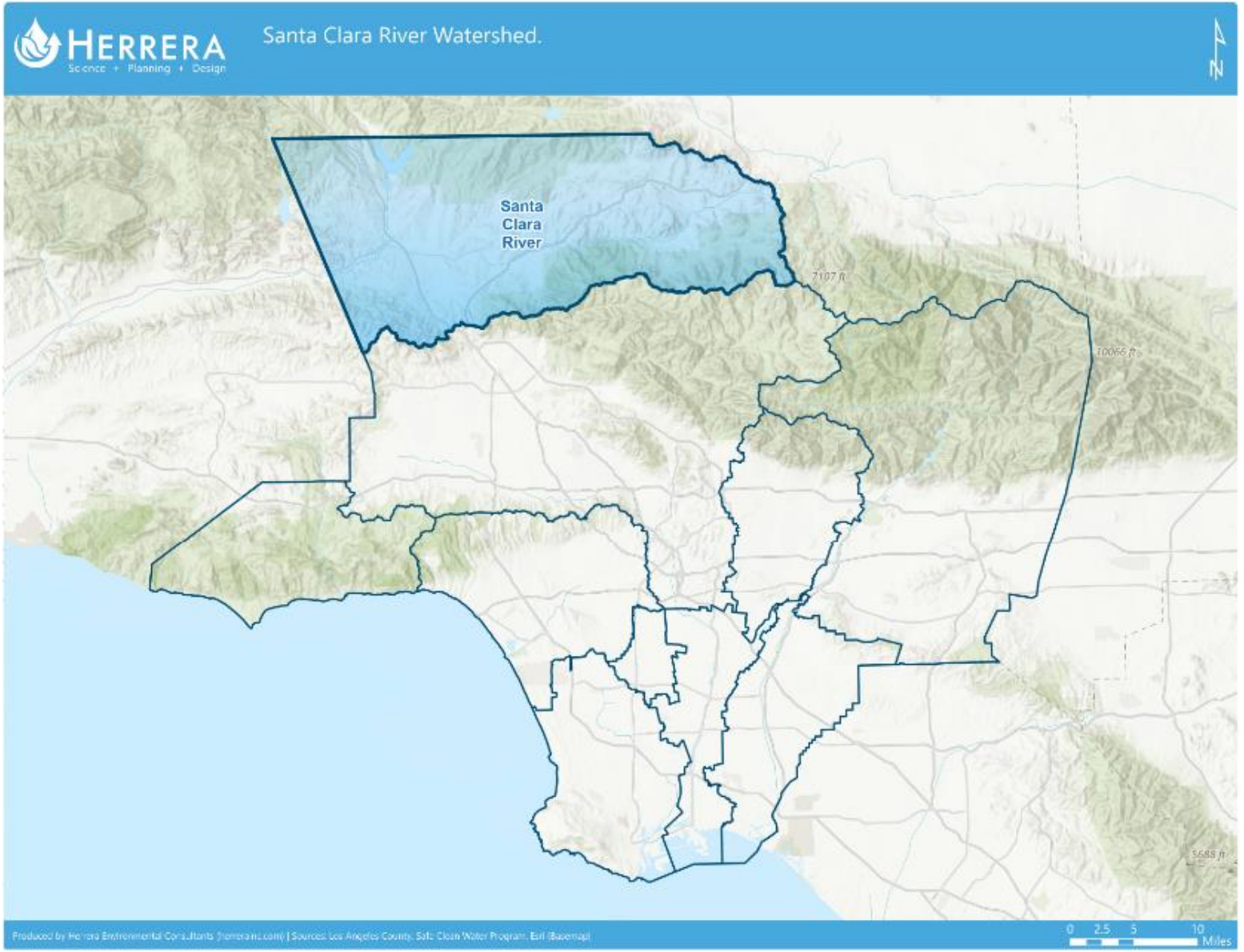
Study Overview

The study will review and assess the scientific basis for determining the water quality and water supply benefits of creek restoration and/or preservation, perform field monitoring to quantify these benefits locally, and look at restoration opportunity areas in the Santa Clara River watershed.

Does removing armoring, increasing channel complexity and diversity, and reconnecting floodplains **measurably** improve in-stream WQ and surface-groundwater interactions?

What **opportunities** exist in the SCR Watershed?

Study Location



Study Team - Lead

COUNCIL FOR
WATERSHED
HEALTH

Over 25 years of advancing the health and sustainability of our region's watersheds - both in natural areas and urban neighborhoods. We do this through science-based research, education, and inclusive engagement.

Eileen Alduenda
Executive Director

Jason Casanova
Director of Planning

Study Team - Partners

Miguel Luna – *Chief Administrative Officer of the Fernandeño Tataviam Band of Mission Indians, supporting tribal efforts to advance water quality, environmental equity, and culturally grounded watershed management. His work is deeply rooted in internal and external collaboration to develop innovative strategies that also honor traditional ecological knowledge.*

Melina Sempill Watts – *conservation consultant with a background in watershed coordination, project development, and grant writing. As a community facilitator, Melina forging partnerships and sourcing funding to achieve shared goals.*

Study Team - Partners

HERRERA
Science + Planning + Design

- *Expertise in channel morphology and the impacts from development, channelization, sediment transport, and channel migration.*
- *Water quality and ecological expertise evaluating the effects of floodplain reconnection on pollutant spiraling and hyporheic connectivity.*

Jeff Parsons, PhD
Principal Geomorphologist

Dylan Ahearn, PhD
Principal Scientist

Study Details – Problem Statement

- Concrete-lined channels reduce **water quality**, increase **water temperature**, reduce **ecological productivity and diversity**, and reduce/eliminate **infiltration**.

- Channel restoration can return some of these losses, but **the extent of benefits has not been measured in this region**.

- Restoration projects currently do not meet SCWP water quality or water supply eligibility criteria.

Study Details – Objectives

Objective #1: Assess the extent to which restoration has been shown to improve WQ and/or enhance streamflow and groundwater supply.

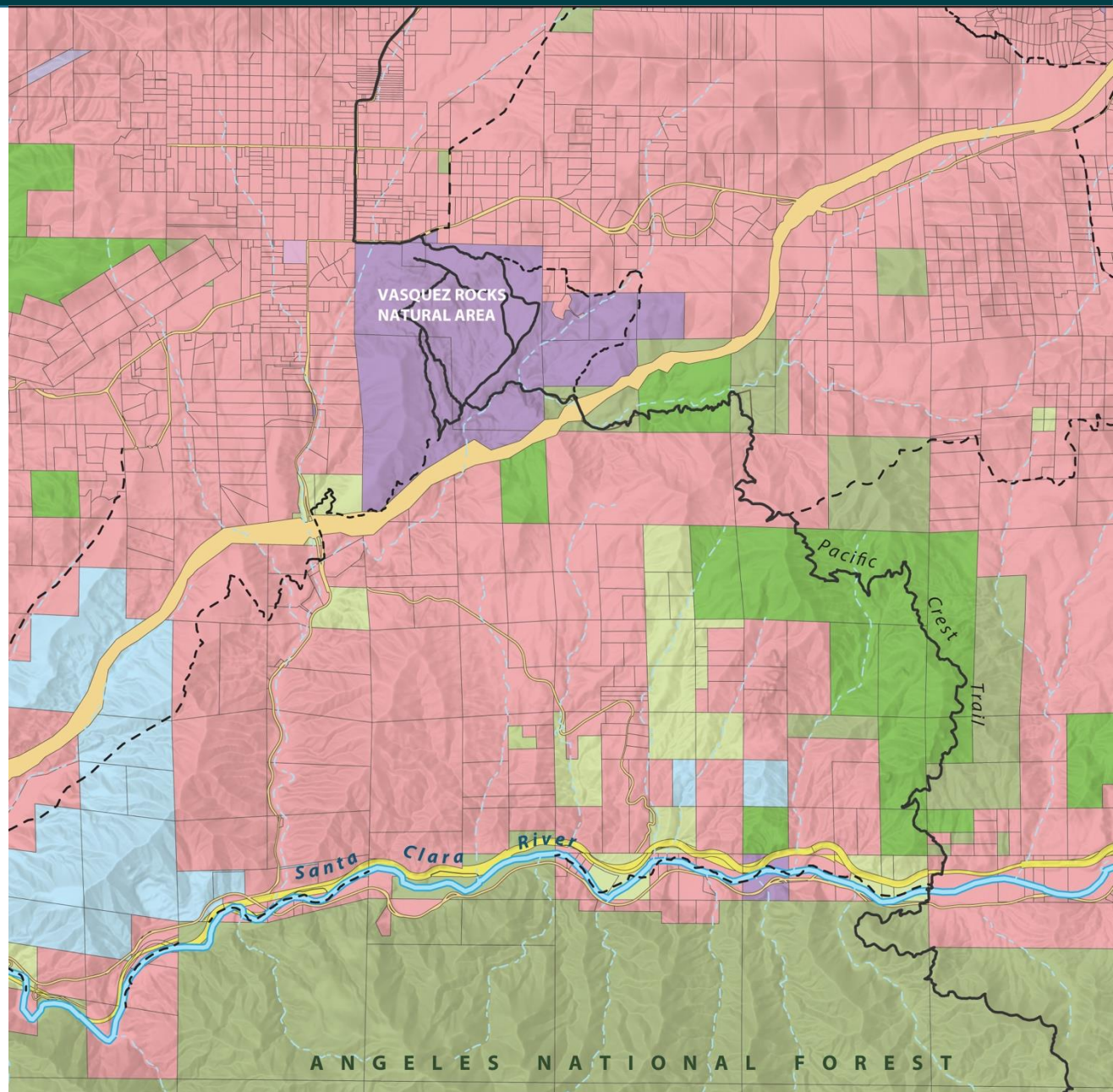
Objective #2: Perform a desktop analysis of creek protection and/or restoration opportunities within the Santa Clara River watershed area.

Objective #3: Conduct a paired basin monitoring analysis to compare WQ and groundwater supply conditions between earthen and concrete-lined systems.

Objective #4: Make recommendations about how the SCWP (and others) can use the Study findings.

Study Details – Methodology

- **Task 1** – Project Management
- **Task 2** – White Paper
- **Task 3** – Desktop Spatial Analysis
- **Task 4** – Paired Basin Comparison Monitoring
  - Tracer injection monitoring
  - Field habitat assessment
- **Task 5** – Final Documentation



Study Details – Collaboration

Foundational and Complementary Efforts:

1. Determining Water Use by Arundo (Arundo donax) in the Upper Santa Clara River (in prep)
2. The Multiscale Effects of Stream Restoration on Water Quality (Thompson et al. 2018)
3. Nutrient Retention in Restored Streams and Rivers: A Global Review and Synthesis (Johnson et al. 2016)
4. Evaluation of Restoration and Flow Interactions on River Structure and Function: Channel Widening of the Thur River, Switzerland (Martin et al. 2018).
5. Quantifying the effects of stream channels on storm water quality in a semi-arid urban environment (Gallo et al. 2012)

Study Details – Outcomes

Outcomes:

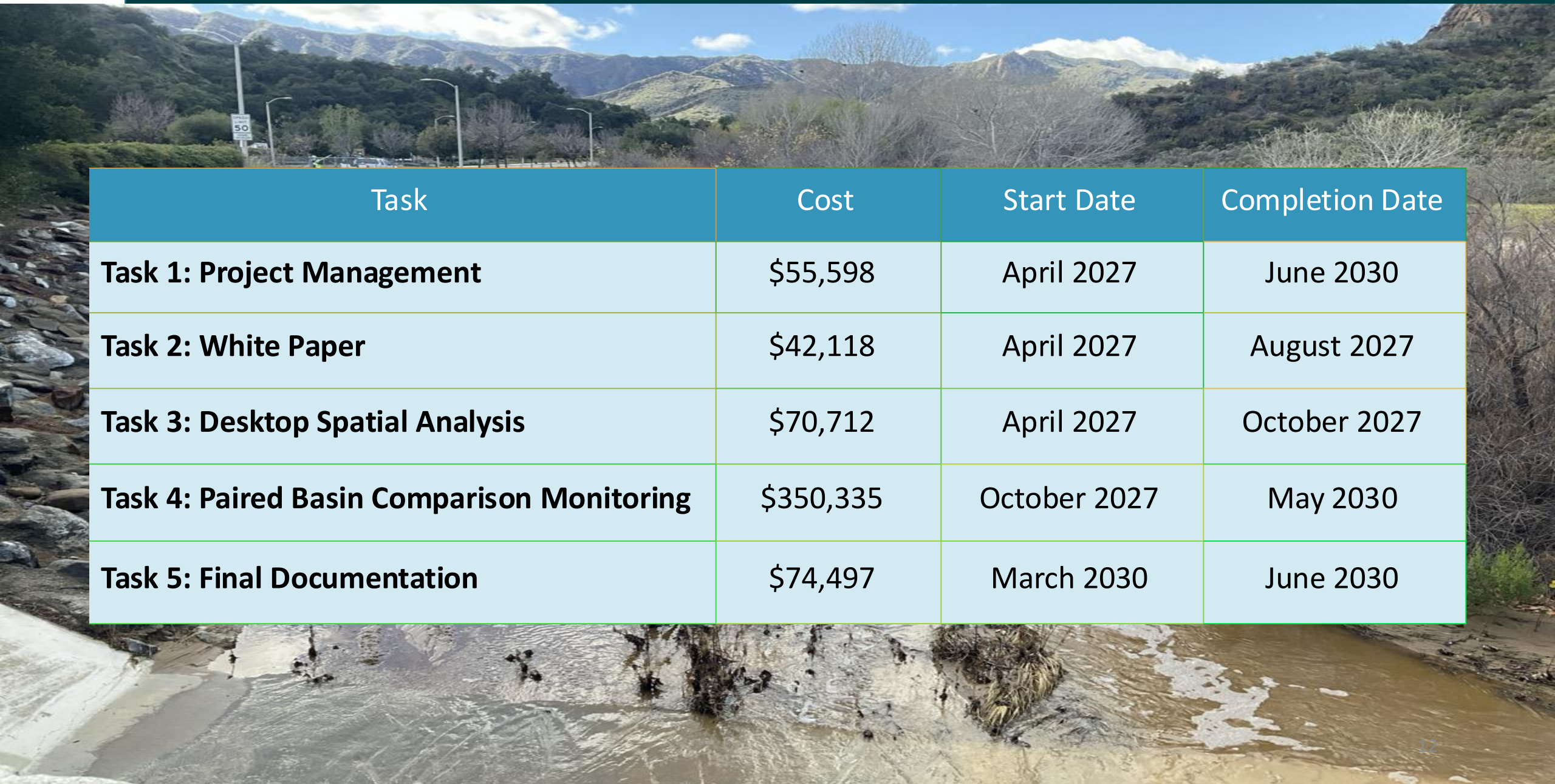
1. Established scientific basis for whether water quality and/or water supply could be measurably improved through restoration.

2. Engagement with community and Tribal youth on the science and regional implications.

3. Interactive map app and spatial layers identifying opportunities for:
   - Restoration of existing creeks
   - Protection of existing high-value/high-function creek areas
   - Land acquisition that could further support creek restoration, cultural value, and public access to open space.

4. Guidance on incorporating the Study findings into future SCWP elements.

Cost & Schedule



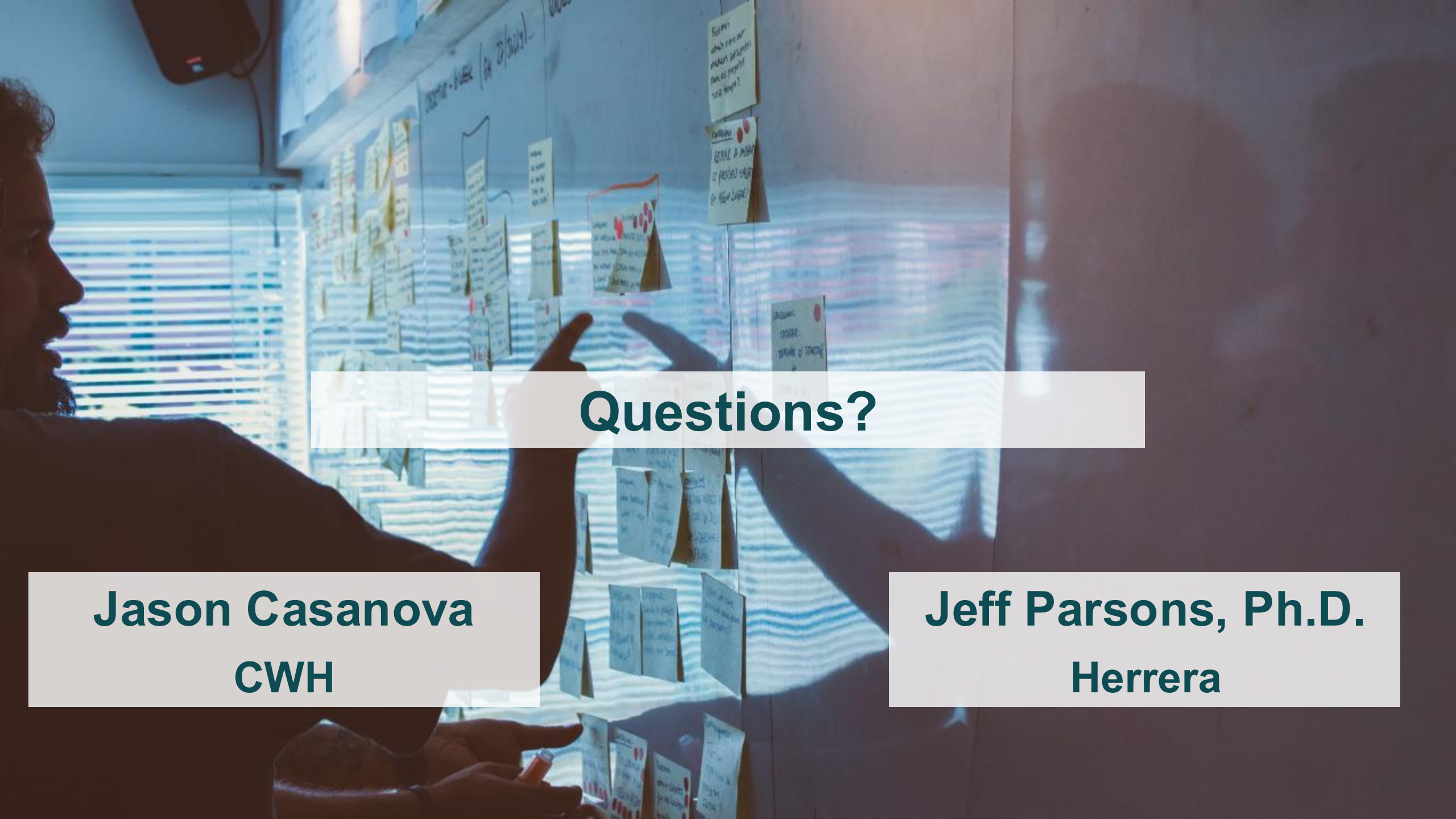
Task	Cost	Start Date	Completion Date
Task 1: Project Management	$55,598	April 2027	June 2030
Task 2: White Paper	$42,118	April 2027	August 2027
Task 3: Desktop Spatial Analysis	$70,712	April 2027	October 2027
Task 4: Paired Basin Comparison Monitoring	$350,335	October 2027	May 2030
Task 5: Final Documentation	$74,497	March 2030	June 2030

Funding Request

Funding Request Year	Watershed Area	Funding Amount Requested
2026-2027	Santa Clara River	$239,967
2027-2028	Santa Clara River	$114,875
2028-2029	Santa Clara River	$238,418
TOTAL		**$593,260**

Summary of Benefits

1. Evaluate and document the **WQ and water supply benefits** of creek protection and restoration.
2. Provide robust, site-specific data **to inform future investments in nature-based solutions**.
3. **Engage Tribal and frontline communities** in shaping the future of SCWP eligibility and investment strategies.
4. **Provide Tribal youth practical experience** on a project with significant scientific, programmatic, and community value.
5. Support **equitable, science-based decision-making** by identifying where protection or restoration efforts can deliver the greatest ecological and community benefits.



Questions?

Jason Casanova
CWH

Jeff Parsons, Ph.D.
Herrera