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MESM Group Project Proposal 2026-2027

# Valuing the Societal Benefits of River Restoration: A Socioeconomic and Ecosystem Services Assessment of the Santa Margarita River Bridge Project

Credit: One Flight Away 2024


**Proposer:**
Rachel Frost | MESM 2027
rfrost@bren.ucsb.edu

**Contributor**
Ariel Bohr | MESM 2027
bohr@bren.ucsb.edu


**Clients:**
California Department of Fish & Wildlife
Contact: Tim Chorey | Fisheries Restoration Grant Program Statewide Coordinator
timothy.chorey@wildlife.ca.gov

California Trout (CalTrout)
Contacts: Sandra Jacobson Ph.D | South Coast Regional Director
sjacobson@caltrout.org

**Objectives:**

Restoration of river ecosystems has cascading impacts for environmental benefit, native species, and local economies. However, river restoration projects are often evaluated primarily through biological metrics, such as habitat acres restored or miles of river reopened. While the ecological advantages of restoration are often acknowledged, the full scope of social and economic benefits of these projects are often underrepresented and difficult to communicate. This has contributed to the narrative that environmental protection and economic development are in opposition to one other. Quantifying ecosystem services challenges that perspective by examining restoration as a multifaceted investment that simultaneously advances environmental integrity, economic resilience, and community well-being. Rather than decentering human outcomes, this project seeks to explicitly link ecosystem services to socioeconomic and public health benefits, emphasizing the interconnectedness of environmental and human systems. This valuation will be performed using the Santa Margarita River Bridge Project (SMRP) as a case-study and serve as a template to inform river restoration return-on-investment assessments.

The objectives of this project are to:

1. Quantify short and long-term socioeconomic benefits associated with the SMRP, including job creation, economic activity, public safety, and community resilience. *(Direct benefits)*

2. Assess ecosystem service benefits generated by restoring fish passage and river connectivity, such as flood risk reduction, sediment transport, recreation, and human health benefits. *(Indirect benefits)*

3. Develop a transferable valuation framework that can be applied to other Fisheries Restoration Grant Program projects to better communicate return on public investment.

4. Produce accessible communication tools that support CDFW and CalTrout in demonstrating the value of restoration to policymakers, funders, and the public.

**Implications**

The SMRP is a restoration effort in northern San Diego County that will replace the Sandia Creek Drive crossing, a bridge that blocks the passage of endangered Southern California Steelhead. It is funded by the California Department of Fish and Wildlife's (CDFW) Fisheries Restoration Grant Program.The completion of this project will reconnect approximately 12 miles of upstream habitat by removing the final fish passage barrier on the Santa Margarita River's mainstem.[1] Beyond ecological benefits, the project addresses one of the county's most persistent flood hotspots.[1,2] The new bridge is designed to withstand a 100-year storm event without overtopping, improving evacuation reliability and emergency response access for the communities of Temecula and Fallbrook, regional commuters, and Camp Pendleton personnel.[1] Restoration of natural river morphology and sediment transport further supports downstream estuarine function and coastal resilience.[3] As one of the few transportation linkages between Temecula and Fallbrook, flooding at this crossing currently places both public safety and emergency service access at significant risk.

River restoration projects have historically emphasized ecological performance and only quantified short-term economic metrics while underrepresenting long-term, system-wide benefits to communities and regional economies. This project addresses that gap by synthesizing ecological outcomes with economic, public safety, and social impacts into a comprehensive valuation framework. Results will inform CDFW and CalTrout grant reporting, strengthen restoration outreach, and support broader policy discussions on restoration as a climate-resilient community investment.

Quantifying ecosystem services provides a powerful mechanism for communicating impact and return on public investment. Previous analyses suggest that every dollar invested in ecosystem restoration can yield $7–$30 in economic benefits, underscoring the importance of robust valuation in restoration decision-making.[4] Translating benefits such as groundwater recharge, flood risk reduction, recreational access, and property value protection into economic terms can improve funding justification to incentivize future restoration investments and bolster public support.[5]

**Equity**

The Santa Margarita River corridor holds cultural and historical significance for Indigenous communities, including the Pechanga tribal nation, who maintain long standing cultural ties to the landscape.[1] The bridge replacement and associated restoration efforts have incorporated Tribal consultation and engagement, including project realignment in response to culturally sensitive findings identified in collaboration with the Pechanga tribal nation.[7] The SMRP project reflects an ongoing commitment to respectful partnership, cultural resource protection, and inclusion of Tribal perspectives in restoration planning. The benefits of collaboration can not be valuated in the same way as ecosystem services but nonetheless are a metric of success for restoration efforts. SMRP is an appropriate template because it exemplifies the benefit of working with tribal communities to incorporate an indigenous perspective and ameliorate jurisdictional and cultural conflicts.

The SMRP also directly serves severely disadvantaged communities (SDAC) in Fallbrook and Temecula, that experience disproportionate flood risk, limited evacuation routes, and barriers to safe access to public open space.[1] Restoration outcomes such as improved flood safety, expanded recreational access, and workforce development opportunities, all advance environmental justice by delivering tangible benefits to historically underserved populations. This project will explicitly evaluate and communicate these equity outcomes by linking restoration actions to measurable improvements in public safety, access, and employment opportunities. Broader valuation frameworks can shed light on the benefit of restoration projects to SDACs and underrepresented communities, serving to incentivize further financial investment into these areas.

**Available Data**

| Data Type | Source | Relevance |
|---|---|---|
| Workforce data/anticipated jobs from CalTrout | SMR Bridge Replacement and Fish Passage Project California Trout | Quantify economic activity and employment benefits |
| Flood Data | USGS Flood Data Santa Margarita | Assess avoided flood damages and public safety benefits |
| Project cost and construction data | CalTrout, CDFW | Cost-benefit and return-on-investment analysis; *data to be provided upon proposal selection* |
| Ecosystem Services Models | EPA Storm Water Management Model<br><br>EPA EnviroAtlas | Estimate benefits and current state of stormwater runoff, city planning, human health relating to air quality, natural hazards, etc. |

| | | |
|---|---|---|
| Recreation and visitation data | California Coastal Conservancy | Inform welfare analysis regarding increased access and subsequent health benefits |

**Possible Approach**.

- Conduct literature review of previous ecosystem evaluation studies and reports including: Massachusetts Estimates of Ecosystem Values, NOAA Ecosystem Services, TNC Evaluating Ecosystem Services.
- Objective 1-2: SMRP Analysis:
    - Combine economic and biological metrics using EPA models and/or Stream Ecosystem Services and Biodiversity Index (SESBI)[8]
    - Conduct a **welfare analysis** for SMRP. This is a tool used to assess whether a community is better or worse off after a project or policy change.[9]
    - Conduct a **cost-benefit and avoided-damage analysis** to estimate defined areas of improvement such as flood risk reduction, increased recreational opportunities, and public safety advantages associated with bridge replacement. [10]
- Objective 3: Valuation framework
    - Compile transferable findings into a framework report that could apply to other CDFW and CalTrout river restoration projects.
- Objective 4: Communication:
    - Develop public-facing visualization(s) (e.g. storymap) to communicate benefits such as climate resilience and increased open space access.

**Deliverables**

In addition to the Bren GP deliverables, this project will produce:

- A final written report evaluating the ecosystem service values from the ecological restoration of the SMRP Project.
- Supporting materials for CalTrout's State of Salmon report, as an infographic/short report.
- Public Communication Materials - Infographic, poster, etc.
- A transferable valuation framework applicable to other CDFW's Fisheries Restoration Grant Program projects and CalTrout restoration projects across the state of California.

**Internship**

California Trout has expressed interest in hosting **one summer internship** and is currently seeking federal approval to reallocate grant funds to support continued project work.

**Budget and Justification**

This project is expected to be completed within the standard Bren GP budget of $1,000.

**Works Cited**

[1] SMR Bridge Replacement and Fish Passage Project - CalTrout (2025)

[2] First Street Foundation. (n.d.). *Santa Margarita, CA flood risk.* https://firststreet.org/city/santa-margarita-ca/669182_fsid/flood

[3] U.S. Geological Survey, Pacific Coastal and Marine Science Center. (2021, November 15). *The role of sediment in coastal resiliency.* https://www.usgs.gov/centers/pcmsc/news/role-sediment-coastal-resiliency

[4] World Resources Institute. (2017, December 19). *Restoration: One of the most overlooked opportunities for economic growth.* https://www.wri.org/insights/restoration-one-most-overlooked-opportunities-economic-growth

[5] European Centre for River Restoration. (2019). *The economics of river restoration.* https://www.ecrr.org/River-Restoration/Economics

[6] U.S. Environmental Protection Agency. (2017). *Pechanga Tribe water quality assessment 2017–6–20* [PDF] .https://www.epa.gov/sites/default/files/2017-09/documents/pechanga_tribe_2017-6-20.pdf

[7] Michael-Bitton, G., Zemah-Shamir, S., & Portnov, B. (2025, July). *Managing stream restoration: Framing and assessing the stream ecosystem services and biodiversity index (SESBI). Journal of Environmental Management.* https://www.sciencedirect.com/science/article/pii/S0301479725019140

U.S. Environmental Protection Agency. (2017). *Pechanga Tribe water quality assessment 2017–6–20* [PDF] .https://www.epa.gov/sites/default/files/2017-09/documents/pechanga_tribe_2017-6-20.pdf

[8] Schuster, E., & Doerr, P. (2015). *A guide for incorporating ecosystem service valuation into coastal restoration projects*. The Nature Conservancy, New Jersey Chapter. https://www.nature.org/media/oceansandcoasts/ecosystem-service-valuation-coastal-restoration.pdf

[9] NOAA Office for Coastal Management. (2019). *Measuring the value of ecosystem services: Coastal restoration.* https://coast.noaa.gov/data/digitalcoast/pdf/measuring-value-ecosystem-services.pdf

To: Bren School MESM Group Project Committee
From: Sandra Jacobson, Ph.D. Director, South Coast – California Trout

January 19, 2026

Re: Letter of Support for Bren MSEM Student Rachel Frost Proposal for Socio-Economic Analysis

Dear Group Project Committee:
California Trout enthusiastically supports the proposed Bren MESM project, proposed in collaboration with graduate student Rachel Frost and colleagues, to perform a Socio-Economic Analysis on a major fish passage restoration project that CalTrout is leading in San Diego. The Santa Margarita River (SMR) fish passage project is funded by California Department of Fish and Wildlife (CDFW), and other state and federal agencies. California Trout and CDFW are excited about the possibility of advancing a long-standing goal of devising and applying a systematic framework for assessing "success" of restoration projects that have multiple benefits including ecological, social, economic, environmental justice, public safety and recreation. This is an ideal match as the SMR Project has a diverse set of facets in which to develop this comprehensive value framework. The BREN school has a strong history of students successfully tackling complex analyses. California Trout and CDFW will maintain close communication with the BREN students throughout the project, and provide information, data and strategizing as a foundation for its success as the $21M bridge construction project begins implementation this spring.

The Santa Margarita River Bridge Replacement and Fish Passage Project addresses one of the most significant fish passage barriers to endangered Southern California steelhead. This project in northern San Diego County will replace the Sandia Creek Drive river crossing with a new bridge in the middle of a key wildlife corridor and recreational trail system. The new bridge will provide steelhead access to 12 miles of habitat in the river headwaters. The project incorporates forward planning for coastal community resilience, as it is designed to withstand a 100-year storm event without overtopping, and will improve evacuation reliability and emergency response access for residents.

River restoration projects have historically emphasized ecological performance and only quantified short-term economic metrics while underrepresenting long-term, system-wide benefits to communities and regional economies. This project addresses that gap by synthesizing ecological outcomes with economic, public safety, and social impacts into a comprehensive valuation framework. Results will inform the public about how restoration dollars are spent and the return on investment. This public outreach and education effort will also inform CDFW and CalTrout grant reporting, strengthen restoration outreach, and support broader policy discussions on restoration as a climate-resilient community investment. Translating benefits such as groundwater recharge, flood risk reduction, recreational access, and property value protection into economic terms can improve funding justification to incentivize future restoration investments and bolster public support.

The Santa Margarita River corridor holds cultural and historical significance for Indigenous communities, including the Pechanga tribal nation, who maintain long standing cultural ties to the landscape. The bridge replacement and associated restoration efforts have incorporated Tribal consultation and engagement, including project realignment in response to culturally sensitive findings identified in collaboration with the Pechanga tribal nation. The SMR Project reflects an ongoing commitment to respectful partnership, cultural resource protection, and inclusion of Tribal perspectives in restoration planning. The SMR Project also directly serves severely disadvantaged communities (SDAC) in Fallbrook and Temecula, that

experience disproportionate flood risk, limited evacuation routes, and barriers to safe access to public open space. Restoration outcomes such as improved flood safety, expanded recreational access, and workforce development opportunities, all advance environmental justice by delivering tangible benefits to historically underserved populations. This project will explicitly evaluate and communicate these equity outcomes by linking restoration actions to measurable improvements in public safety, access, and employment opportunities.

The internship will have direct oversight by Sandra Jacobson, Ph.D., Director - South Coast for California Trout to ensure that objectives are well-defined, achievable, and implemented in the desired time frame. CalTrout is requesting agency approval to finance this internship in summer 2026 for up to $5,000.00 within an existing grant that aligns with the internship objectives and deliverables. The CalTrout South Coast Team is confident that sufficient resources can be secured to support this internship. For this Project we expect no additional funding needs beyond the $1,000.00 provided by the Bren School. Data will be provided to the Bren student/s under an Agreement between UCSB and California Trout, and is expected to be in the form of proposals, agency reports, financial spreadsheets, and other project communications.

We fully support this opportunity to address this long-standing goal of developing a comprehensive valuation framework for large-scale restoration projects that can be communicated effectively to the public, policy makers, agencies and restoration practitioners.

Sincerely,

**Sandra Jacobson, Ph.D.**
Director, South Coast Region
California Trout
411 Camino Del Rio South, Suite 106
San Diego, California 92108
858.414.1518 m

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Director's Office
P.O. Box 944209
Sacramento, CA 94244-2090
www.wildlife.ca.gov

***GAVIN NEWSOM, Governor***
***VALERIE TERMINI, Acting Director***

January 19, 2026

Bren School MESM Group Project Committee

Subject: Letter of Support for Bren MSEM Student Proposal for Socio-Economic Analysis

Dear Members of the Group Project Committee:

The California Department of Fish and Wildlife (CDFW) is pleased to provide this letter of support for the Bren School MESM Group Project entitled *Valuing the Societal Benefits of River Restoration*. This project directly aligns with CDFW's mission to manage California's fish, wildlife, and natural resources for their ecological value and for the benefit of present and future generations.

CDFW is the funding agency for the Santa Margarita River Bridge Replacement and Fish Passage Project through the Fisheries Restoration Grant Program (FRGP). The project addresses one of the most significant remaining barriers to migration for endangered Southern California steelhead by restoring connectivity on the Santa Margarita River mainstem and reopening approximately 12 miles of high-quality upstream habitat. Removal of this barrier will improve population resilience, support life-history diversity, and advance long-term recovery objectives for native salmonids and other aquatic species.

While the ecological importance of fish passage and river connectivity is well established, restoration projects are often evaluated using narrow biological metrics that do not fully capture their broader public value. This Group Project is important because it will quantify and communicate how ecological restoration produces cascading benefits for fish and wildlife while simultaneously improving flood safety, sediment transport, ecosystem function, recreation, and community resilience. By explicitly linking ecological outcomes to ecosystem services and socioeconomic benefits, this work will help articulate restoration as a sound public investment rather than a single-purpose environmental action.

The Santa Margarita River Bridge Project is an ideal case study. In addition to restoring fish passage, the project addresses a persistent flood hazard at a critical transportation crossing and improves emergency access for nearby communities, including Temecula, Fallbrook, and Camp Pendleton. The project also reflects CDFW's commitment to equity and inclusive planning through Tribal consultation with the Pechanga Band of Indians and by delivering tangible benefits to severely disadvantaged communities that experience disproportionate flood risk and limited evacuation routes.

CDFW looks forward to collaborating with the Bren students and project partners by providing data, technical insight, and programmatic context as needed. We appreciate the Bren School's continued role in advancing applied research that supports effective, science-based restoration and fisheries recovery.

Thank you for your consideration of this proposal.

Sincerely,

**Timothy Chorey**
Fisheries Restoration Grant Program
Statewide Coordinator
California Department of Fish and Wildlife