Thursday, October 17, 2019

# California Fish Passage Forum

| | |
|---|---|
| **Project Name** | Santa Margarita River Fish Passage and Bridge Replacement |
| **Contact Name** | Sandra Jacobson |
| **Lead Organization** | CalTrout |
| **Contact Email** | sjacobson@caltrout.org |
| **Phone Number** | (858) 414-1518 |
| **Date** | Thursday, October 17, 2019 |

## PROJECT INFORMATION

**1. Location of Project**

Latitude: 33.413908N Longitude: -117.241300W

**2. Attach a map of your project**

pdf SMR Fish Passage Project Map - CalTrout.pdf

**3. Describe your project and include the deliverables and outcomes you seek to achieve. Please clearly describe which portion of the project Forum funding would be applied to, and the specific deliverables and outcomes expected to result from this funding.**

This fish passage project on the Santa Margarita River in San Diego County addresses a principal threat to endangered Southern California steelhead by removing a low-flow river crossing that is a fish passage barrier and replacing it with a new bridge.

The Santa Margarita River is a high priority river designated in the NMFS (2012) Southern Steelhead Recovery Plan; and fish passage barrier removal is one of the highest priority tasks for recovery. Bridge replacement at Sandia Creek Drive near Fallbrook CA will open up 12 miles of upstream habitat to prime spawning and rearing areas. It will leverage recently completed downstream fish passage work on Camp Pendleton that remediated the only other barrier on the mainstem of the river. Replacement of Sandia Creek Drive bridge will provide unimpeded passage for steelhead to historic habitat to the current limit of anadromy 30 miles

inland at the headwaters.

The goals of this project are to: 1) Provide fish passage to endangered steelhead; 2) Restore riverine ecosystem processes by building a bridge that restores natural river hydrology and improves >1 acre of riparian habitat for multiple species including endangered least bell's vireo, southwestern willow flycatcher and arroyo toad; 3) Increase resiliency to climate change by protecting the public from the hazardous flood impacts of the existing bridge and enhancing a regionally important wildlife migration corridor; and 4) provide educational and recreational opportunities through improved access to the Santa Margarita Trail Preserve.

California Department of Fish and Wildlife has invested $165,000 and the State Coastal Conservancy has invested $507,000 in design of the new Sandia Creek Drive bridge to advance the structural/civil design and position it for implementation. The draft 65% design was completed in March 2018 but needed geotechnical borings analysis to finalize design. Based on geotechnical work completed in June 2019, the two-span single pier design approved by CDFW is being revised. The MSE walls will be replaced with steel bridge sections to provide structural stability during strong ground shaking, decrease scour during large storm events and minimize environmental footprint. It shares with the original design the ability to pass 100-year flood flows with one-foot freeboard and provide fish passage for juvenile and adult steelhead. The bridge will be 616 ft long, with a maximum of three piers and four sections. The design maintains similar pier locations for which hydraulic analysis has already been performed.

This proposal is to support engineering structural design to 100% level for the final bridge design. This will be completed within a 12-month period. The amount requested in this proposal is $47,410 with CalTrout and agency cost share of $47,980. The deliverables are interim and final structural design for the bridge. The total project cost for design is $1,176,060 and for construction is $16M including 30% contingency. The finalized 65% design, CEQA permitting and early civil and structural 100% design are either currently funded or will be covered by cost share from other organizations. The revised design to 90% level will be finalized by December 2019. The 100% design for submittal to San Diego County engineering will be completed by June 2020. Construction is expected to begin in the fall of 2021.

**4. List all partner organizations.**

State Coastal Conservancy: Funded SMR fish passage design of this project through 90% design; and in a watershed-scale vision funded The Wildlands Conservancy acquisition of 1400 acre parcel in 2018 to conserve the Santa Margarita Trail Preserve including >18 miles of pristine land along Santa Margarita River visited by >100,000 people/year.

San Diego County (Planning and Development Services and Engineering Division): CEQA Lead agency for Santa Margarita River fish passage and bridge replacement project, directing the timing, rigor and cost of CEQA process for this project. Project team has collaborated with SD County engineering and department leads throughout bridge design process. County Board of Supervisors – Sup. Desmond (5th).

The Wildlands Conservancy: Landowner for bridge replacement and collaborator on implementation, long-term monitoring, public education and signage.

California Department of Fish and Wildlife: Funded SMR bridge design in part to 65% design and reviewed/approved engineering design; State Coastal Conservancy funds completed 65% and covers through 90%.

U.S. Fish and Wildlife Service: Informal consultation/approval for geotechnical work at project site.

Fallbrook Public Utility District: Former landowner for bridge project site. FPUD Board active in Fallbrook community interests, particularly those relating to water/river usage and have hosted community review of bridge design.

Fallbrook Trails Council: Stakeholder in Santa Margarita Trail Preserve and bridge alignment, proponent of trail safety, public crossings for equestrians.

California Trout: Project Manager (Jacobson) for SMR fish passage and bridge design project. Leading implementation campaign. Collaborates with TU and Project Team KPFF (structural/civil), River Focus (hydraulic) and Leighton (geotech) on design and grant management.

Trout Unlimited: Grantee/Project Administration (Bob Blankenship) for SCC Grant for 90% design

**5. Does the barrier(s) being addressed through this project have a Passage Assessment Database (PAD) database identification number(s)?**

YES

**If you answered "yes" to question 5, please provide the PAD ID number(s).**

758615

**6. Describe the barrier(s) under "average" conditions, if it is a complete, temporal, or partial barrier, how often passage is provided for both adult and juvenile anadromous fish, and if the information is available (e.g., meets fish passage criteria for adults 45% of the time and 0% of the**

This barrier is a Leap barrier. It prevents fish passage under migratory flow conditions due to Sandia Creek Bridge design comprising 10 concrete box culverts

**which species you are referring to when describing barrier status.**

leap entry of >1 ft under passage conditions, and long shallow interior on the boxes.

**7. Indicate how you determined that this barrier is a high priority project. (Please check all that apply.)**

- Barrier is listed in a key restoration plan for the region (see question 8 below)
- Endorsed by an agency
- Local knowledge/conversation with local representatives

**8. Include the name(s) of the recovery plans and the specific task that name this barrier(s) as a high priority, the agency that endorsed this project, or the local representative that names this project as a priority.**

1) National Marine Fisheries Service 2012, Southern Steelhead Recovery Plan, NMFS Southwest Regional Office, Long Beach, CA. Task Identification: SMR-SCS-3.1 Develop and implement plan to remove or modify fish passage barriers within the watershed.

2) CardoENTRIX 2013, Santa Margarita Steelhead Habitat Assessment and Enhancement Plan, prepared by CardoENTRIX for Trout Unlimited for CDFW. This SMR barrier is top ranked barrier for removal in the SMR watershed.

3) This project implements a main goal of the CDFW Steelhead Restoration/Management Plan (1996) to “Halt declines and increase populations of Southern steelhead by removing and/or modifying barriers to migration” and to realize the good recovery potential in the Santa Margarita River (Higgins 1991, SRMP (p. 210)).

4) Barrier remediation on the Southern California Wetlands Recovery Project Work Plan at https://scwrp.org/projects/santa-margarita-river-fish-passage-project/

5) CDFW and State Coastal Conservancy have funded Santa Margarita River fish passage remediation at Sandia Creek to 90% design. Now transitioning into implementation funding.

**9. The California Fish Passage Forum (Forum) has seven (7) overall objectives. Please check each objective your project will help to address. (check all that apply)**

- 1. Remediate barriers to effective fish migration.
- 2. Facilitate coordination and communication among agencies, agency staff, and other entities that may propose, review, or promulgate fish passage criterial within California.
- 3. Coordinate funding mechanisms to remove fish passage barriers.
- 4. Promote state and federal permit coordination and streamlining.
- 5. Facilitate plans to monitor and evaluate fish passage restoration effectiveness to ensure accountability.

6. Promote state and national policy and actions that support fish passage improvement in California.

7. Implement education and outreach activities, targeting both the general public and fish passage practitioners.

**10. Provide a brief explanation of how your project addresses all of the checked boxes in question 9.**

1. The proposed fish passage project addresses one of the most significant threats to endangered steelhead recovery in Southern California. The proposed fish passage barrier remediation project Santa Margarita River is the most tractable opportunity in Southern California to provide passage for steelhead from the ocean to quality headwater habitat within 5 years. It will open up access to 12 miles of upstream spawning and rearing habitat.

#2. The Project Team will continue to work with California Department of Fish & Wildlife, National Marine Fisheries Service, U.S. Fish & Wildlife Service, U.S. Army Corps Engineers during design review stages; with landowner The Wildlands Conservancy; and with community partners including Camp Pendleton, Fallbrook Trails Council, Santa Margarita Ecological Reserve staff, Trout Unlimited, San Diego County staff, and Fallbrook Public Utility District and others to successfully complete this project. Implementation will span two years to complete construction, demolition and restoration.

3. Ten different grant funding opportunities have been applied to by CalTrout for this $16M project of state, federal and foundations, including CDFW FRGP and Prop 1/68, Coastal Conservancy, WCB, DOT BUILD, San Diego IRWM, CNRA, NFWF, FWS. Bridge design is funded by CDFW and State Coastal Conservancy.

4. Geotechnical and project planning/permitting work has engaged San Diego County Planning and Development Services (CEQA lead agency), CDFW (LSA), Army Corps (404), RWQCB (401) and regional general permit under FRGP.

5. The Santa Margarita River – Sandia Creek Fish Passage Restoration Monitoring Plan is designed to monitor passage of steelhead trout through the Project site once the fish passage barrier created by the Sandia Creek Drive bridge is replaced with a new two-span concrete bridge to remediate this impediment. This monitoring program will also assess abundance of steelhead upstream in Santa Margarita River mainstem and tributary locations; and assess status and trends of a subset of threatened and endangered species and associated habitat and vegetation communities over the 23-acre Project site. CalTrout will work in collaboration with landowner The Wildlands Conservancy to implement a vision consistent with the TWC draft Integrated Resource Management Plan (2017) and with the bridge owner San

Diego County to incorporate their O&M needs into the Plan. This multi-benefit project has remarkable potential to bring together many resources agencies to manage this jewel of Southern California including California Department of Fish and Game, National Marine Fisheries Service, U.S. Fish & Wildlife Service, County of Riverside and County of San Diego HCP Habitat Conservation and Monitoring Plans, Camp Pendleton Environmental Department, and San Diego County Public Works O&M operations.

6. This fish passage project implements one of the high priority actions in the California State Steelhead Restoration Plan (CDFW) and the federal Southern Steelhead Recovery Plan (NMFS).

7. Construction of the proposed bridge on the Santa Margarita River provides increased access for severe DAC status communities in Fallbrook and Temecula (see attached DAC map). The new bridge will increase access to the trails system and promote education by The Wildlands Conservancy about the value of riverine open space, and how to preserve and enhance recreational, natural and cultural resources. During the design process, the project team gave presentations at the Fallbrook Community Planning Group meeting and Fallbrook Community Forum to hear people's concerns and answer questions on design and implementation. Newspaper articles were published by CalTrout and Trout Unlimited in the Fallbrook newspaper in 2018 and in February 2019 describing the project to residents and the positive impact to community, endangered species and recreation.

**11. Identify the anadromous fish species that will benefit from your project (select multiple if applicable).**

Steelhead/rainbow trout

**12. How many miles of stream will be opened and/or acres of habitat restored as a result of implementing your project?**

12 miles of stream will be opened up; at least 1 acre restored at project site.

**13. Provide the location and distance in stream miles to downstream river structures, and whether each structure represents an insignificant, partial, or total barrier to fish passage.**

. The only other total fish passage barrier on the Santa Margarita River was on Camp Pendleton, 10 miles downstream. This barrier was remediated in 2018 by constructing a fish ladder around the Lake O'Neill inflatable weir, making the SMR bridge the only remaining passage barrier between the ocean and headwaters spawning and rearing area.

**14. Provide the location and distance in stream miles to upstream river structures, and whether each structure represents an insignificant, partial, or total barrier to fish passage.**

The SMR headwaters is the limit of anadromy and is 30 miles inland. Remediation of the Sandia Creek Drive fish passage barrier will provide access to this location.

**15. Select each of the Forum's priority habitats that will have improved access available as a result of your project.**

Spawning habitat | Rearing habitat

**16. Has the owner and/or responsible organization/agency of the barrier(s) proposed for removal and/or remediation been identified, notified, and given permission for this project to proceed as proposed?**

YES

**If YES, please provide the name of the entity that owns/is responsible, and describe how consent to proceed was obtained/documented, and their role (if any) in any monitoring.**

The Wildlands Conservancy: Landowner for bridge replacement and collaborator on implementation, long-term monitoring, public education and signage. The Santa Margarita River is unique in its largely protected status from headwaters to ocean, with the lower third being owned by U.S. Marine Corps Camp Pendleton, the middle section owned by The Wildlands Conservancy, and the upper third being owned by San Diego State University and operated as the Santa Margarita Ecological Reserve. The Santa Margarita River Trail Preserve, recently created by Prop 68 funds to The Wildlands Conservancy, is an essential wildlife and migration corridor for many sensitive and endangered species. The bridge design and implementation project team will continue to work with new land owner The Wildlands Conservancy to cooperatively enhance resources as TWC implements their Integrated Resource Management Plan.

**17. Attach a copy of your monitoring plan**, (if available) and indicate the person and/or organization that will be responsible for implementing.**

pdf SMR draft Long Term Monitoring Plan - CalTr...

***The Forum recommends, as a bare minimum, applicants use the NOAA Restoration Center's Fish Passage Barrier Removal Performance Measures and Monitoring Worksheet, and one year minimum pre- and post-project monitoring.*

**18. Will your project be implemented within 12-18 months?**

YES

**19. Attach a document that provides a description of the project's timeline (including permits), as well as implementation and monitoring dates. Please describe any issues that exist,**

pdf Project Timeline.pdf

**20. Attach any designs of your project as well as any photos.**


Santa Margarita River - Project Summary - Ph...

**21. If you have already submitted an application to the Fisheries Restoration Grant Program (FRGP) for this project, please copy and paste information from the "Project Objective" Form of that FRGP application below.**

The objectives of the proposed project are to: Provide juvenile and adult steelhead access to 12 miles of upstream habitat; Provide over one acre of improved habitat through riparian restoration; Restore natural river channel morphology that favors native fish; Allow residents and recreationists to utilize the bridge even during flood conditions; and Provide increased and safer access to the Santa Margarita River Trail Preserve for visitors.

# PROJECT BUDGET

**22. All projects seeking Forum funding are required to submit a budget that includes the following:**

- Total cost of project
- Total funding request from the Forum, how those funds will be spent, what will be accomplished, and what deliverables are expected.
- Any seed or other funding that exists to support project implementation.
- Other funding committed or pending, and what those funds will support.
- Amounts and names of partners contributing matching support (dollars and in-kind)
- Monitoring costs
- Indicated whether or not project will be fully funded if funding being requested from the Forum is recieved.

If you do not have a detailed budget for your project, you can find a template and other resources on the Funding page of the Forum's website.

**Attach a project budget, including a narrative that describes the overall project budget and a detailed budget breakdown. (Word, .pdf, or .xls)**


Budget Santa Margarita River Fish Passage B...

**23. Total dollar amount being requested from the Forum.**

47410

**24. Total cost of project.**

17333683

# PROJECT TEAM CAPABILITIES

**25. Describe the experience and capabilities of up to three of the project leaders relative to their ability to implement this project. Please also include any other Forum-supported projects project leaders have been involved with.**

Dr. Jacobson oversees CalTrout regional offices in San Diego and Ventura and manages strategic planning and implementation of restoration projects for the benefit of endangered Southern California steelhead trout. Based in San Diego, she is project manager for several fish passage and steelhead habitat enhancement projects, including the I-5 Trabuco Creek fish passage design project in Orange County, and the Santa Margarita River- Sandia Creek fish passage design project in Fallbrook. Dr. Jacobson received

her Ph.D. in Molecular Genetics from the University of Colorado and has worked in academia and led R&D teams in industrial R&D in the biofuels sector.

Mr. Jose Hernandez is with KPFF Special Project Division in Long Beach and has nearly 20 years of professional engineering and project management experience. He was the lead engineer for the design phase of the Santa Margarita River - Sandia Creek bridge replacement fish passage project. He has significant management experience for projects of varying degrees of complexity from small roadway widening projects to large infrastructure projects. His background includes general infrastructure and public works improvement projects including planning, cost estimates, feasibility studies, and design of roadway improvement. His design experience also includes hydrology, storm drains, and domestic water and wastewater conveyance facilities. Mr. Hernandez has a B.S. in Civil Engineering from California Polytechnic University at Pomona, and an MBA from CSU-Long Beach.

Ms. Shelah Riggs is a Senior Regulatory Specialist/Project Manager with Dudek. She has over 18-yearsexperience in preparing CEQA and NEPA documents and regulatory compliance documents under the CWA Sections 404 and 401, ESA Sections 7 and 10, California Coastal Act; California CESA and Cal F&G Code Sections 1600-1616. She maintains an excellent rapport with resource agency staff and has successfully negotiated and assisted in implementing favorable mitigation conditions for a variety of public and private projects located within environmentally sensitive areas.

# OUTREACH

**26. Does your project have a public and/or community outreach component? If so, please describe (e.g., social media, website, press release, newsletter, volunteers, schools, etc.)**

Outreach, education and public engagement by the South Coast Steelhead Coalition are key strategies to successfully recovering steelhead in Southern California. This is a priority project for the Coalition. The Coalition's Public Outreach and Education Plan calls for the following activities:
4a. Engage in steelhead information outreach events with booths, presentations and education events, presentations to local fly-fishing group, environmental groups, watershed stakeholders and landowners;

4b. Participate and present at professional conferences. Dr. Jacobson will present results of Coalition operation at professional conferences as in previous years including the Salmonid Restoration Federation annual meeting, Steelhead Summit, Restore America's Estuaries national meeting, and California Fish Passage;

4d. Create brochures/fact sheets for general public, student, professional audiences;

4e. Maintain website/Facebook/web pages within the California Trout website.
CalTrout hosts the coalition's website at: https://caltrout.org/regions/southern-california-region/ Coalition documents are shared with stakeholders in their respective folders at: https://californiatroutinc.app.box.com/s/zk05my3nnoxphhyo4kdd1telkbnnrbc5

The Coalition is represented on Twitter: @SouthCoastSteelhead; and on Facebook at facebook.com/SouthCoastSteelhead

The Coalition will leverage CalTrout's in-house marketing expertise to post tweets and videos relating to Coalition activities and use social media to promote upcoming events and share pertinent info with the public.

4f. Produce media outreach materials including press releases and OpEds
The Coalition will produce media posts on recent events and projects; 1 video of project.
See existing video on South Coast steelhead recovery and Santa Margarita River – fish passage project at https://vimeo.com/351329559/5258c1e32c

# ALIGNMENT WITH NATIONAL PRIORITIES

**27. Which National Fish Habitat Partnership (NFHP) National Conservation Strategies will be addressed by your project? (select all that apply)**

1. Protect intact and healthy waters.
2. Restore hydrologic conditions for fish.
3. Reconnect fragmented fish habitats.
4. Restore water quality.

Review the *NFHP National Conservation Strategies*.

**28. What U.S. Fish & Wildlife Service (USFWS) Climate Change Strategies will be addressed by your project? (select all that apply)**

3.1 Take conservation action for climate-vulnerable species.
3.2 Promote habitat connectivity and integrity.
3.3 Reduce non-climate change ecosystem stressors.
3.5 Conserve coastal and marine resources.

Review the *USFWS: Rising to the Urgent Challenge – Strategic Plan for Responding to Accelerating Climate Change*.

**29. Provide specific information about how your project addresses the climate change strategy you checked**

3.1 Endangered steelhead are climate vulnerable species. Their precariously low numbers will be further threatened by

habitat fragmentation and access unless fish passage barrier remediation is completed in the near term.

3.2 Removal of the Santa Margarita River fish passage barrier will reconnect steelhead to their historic habitat.

3.3 Construction of the new bridge will reduce flooding in the area which is a stressor for sensitive species in the riparian areas in the project area including Least Bell's Vireo and Southwestern Willow Flycatcher. This part of the SMR watershed is also an important wildlife corridor.

3.5 This fish passage project supports a variety of coastal and marine resources, particularly those that are anadromous and whose life history is sensitive to barriers to migration.

**30. Would an existing commercial, recreational, or subsistence fishery be enhanced as a result of the project? If yes, please describe. If not, is there a future fishery that would potentially be restored through increased habitat as a result of this project? If so, describe.**

No

***Thank you for your interest in the Forum, and for taking the time to submit this proposal. You will be contacted by the Forum to discuss the outcome of this funding process.***

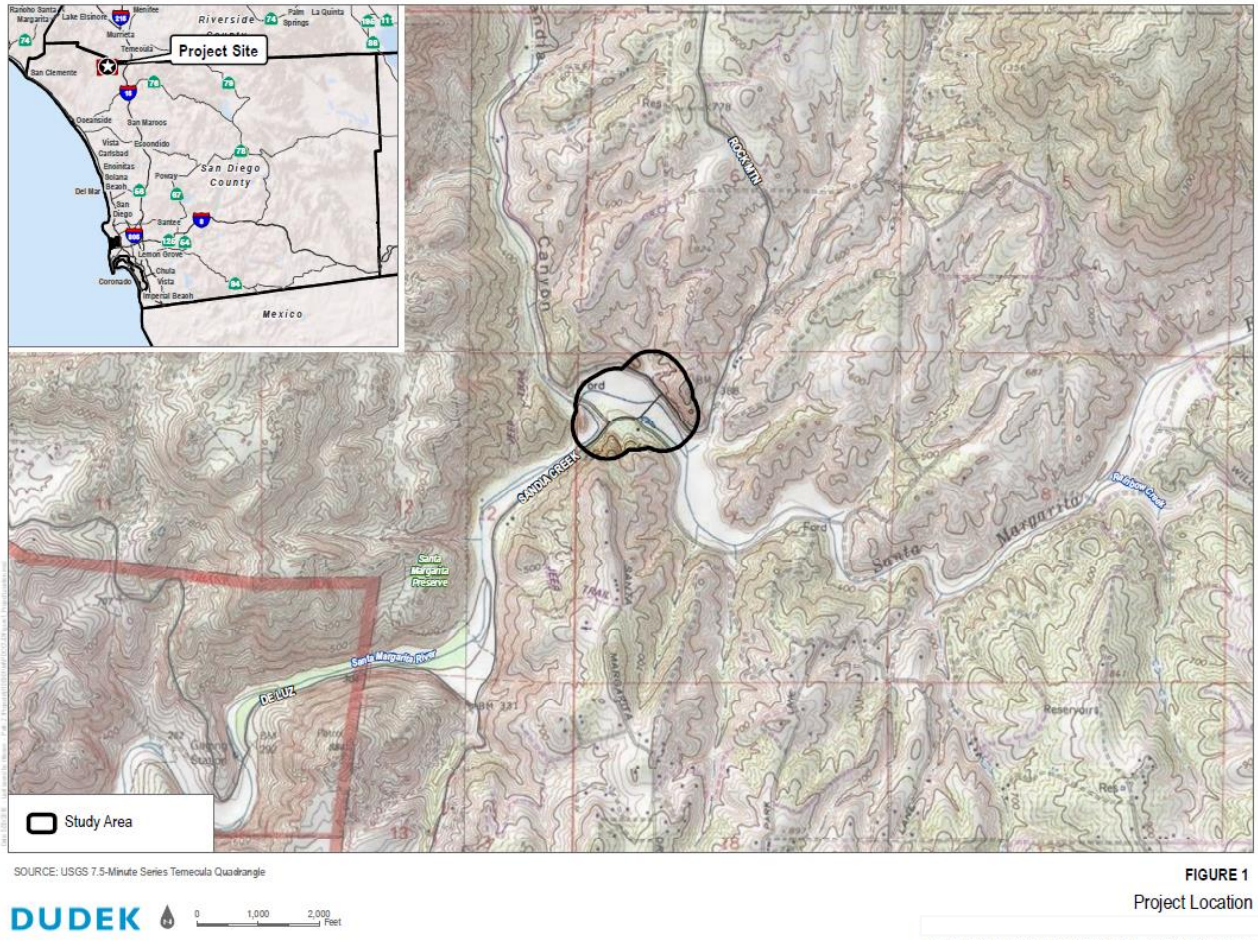



**Figure 1.** Regional Location Map for Project Site (Black Outline)

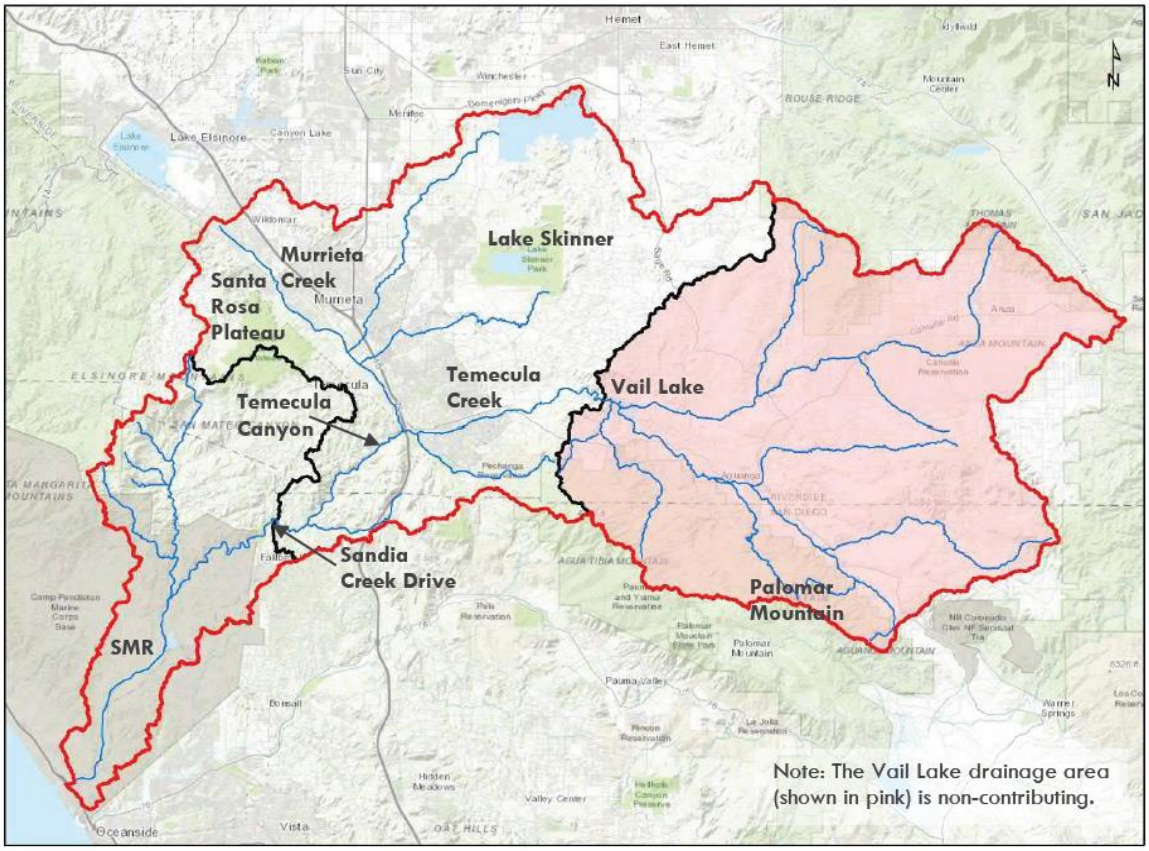



**Figure 2.** Santa Margarita River Watershed Map - Sandia Creek Drive project location (arrow).

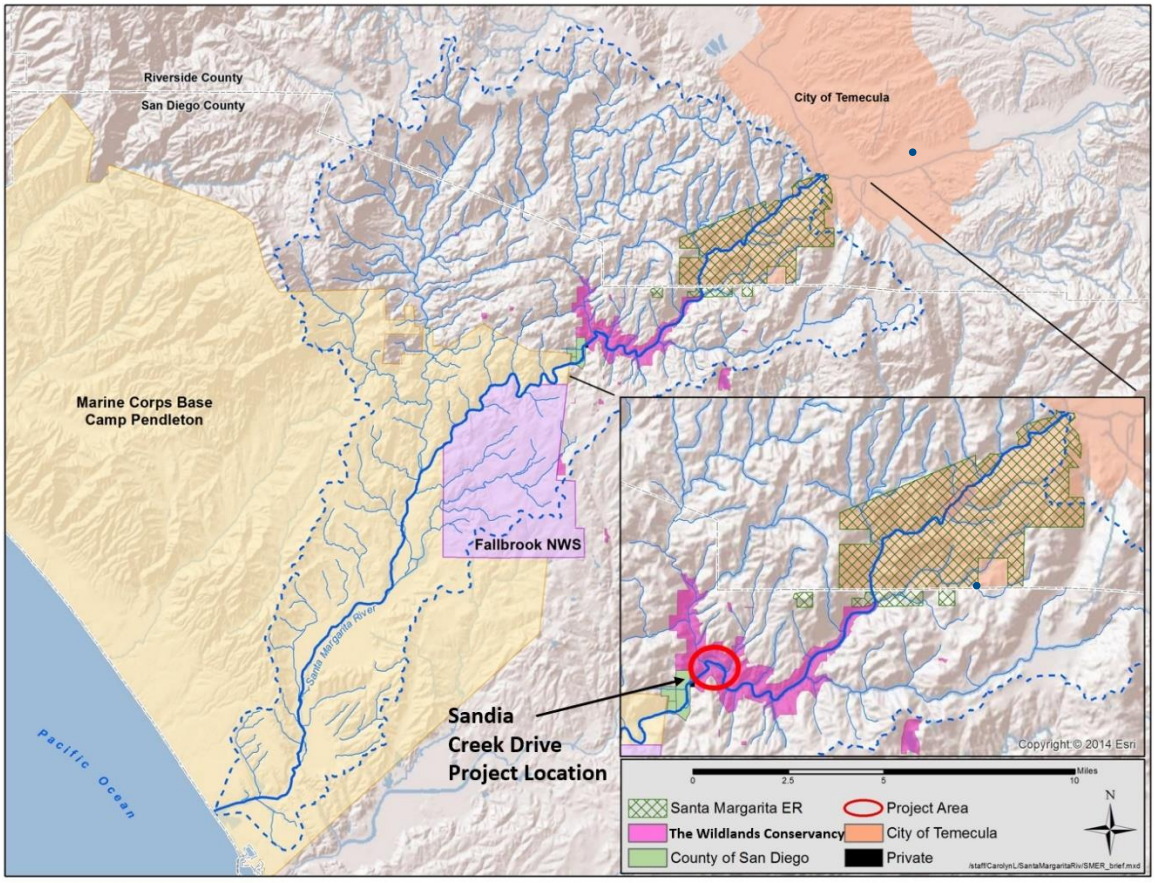



**Figure 3.** Project location in relation to land ownership in lower Santa Margarita River watershed (base map courtesy of U.S. FWS).

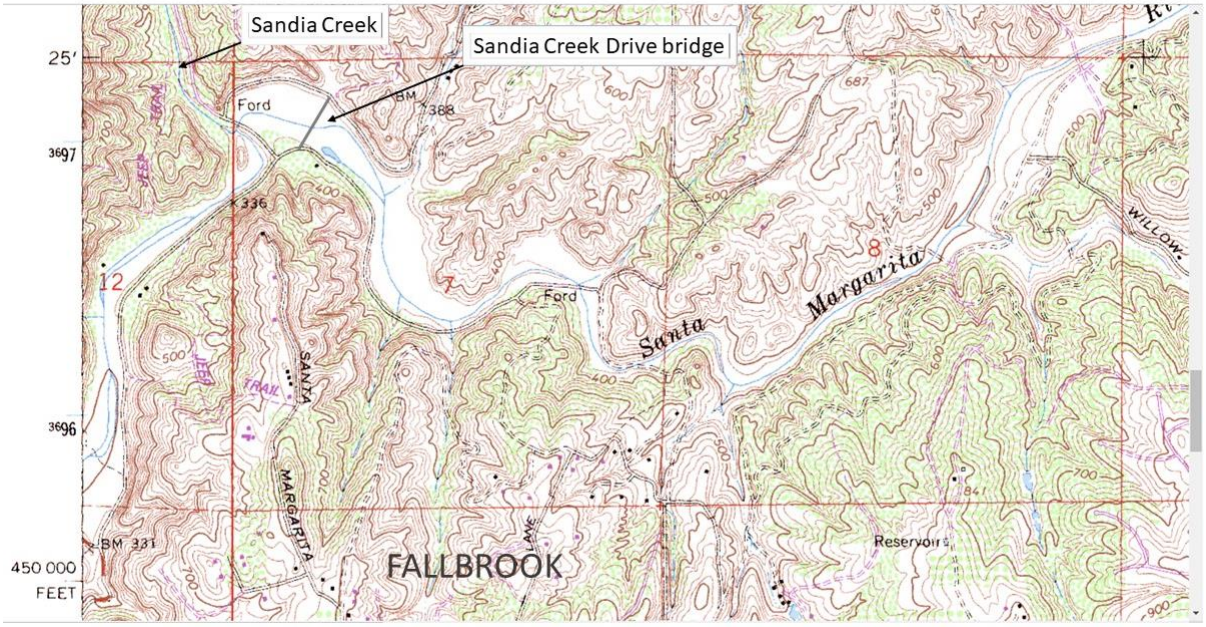



**Figure 4.** Topo Map – Project Site at Sandia Creek Drive bridge

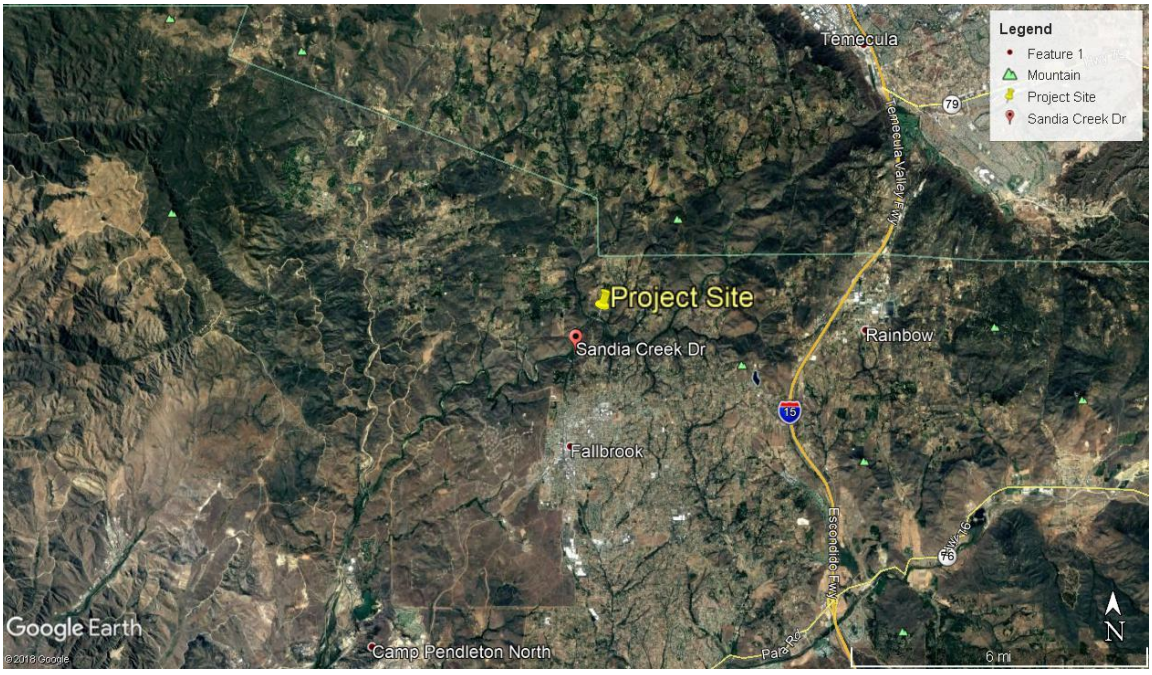



**Figure 5.** Google Earth Map – Project Site at Sandia Creek Drive bridge

**Santa Margarita River – Sandia Creek Fish Passage Restoration Monitoring Program**
**Long Term Monitoring Plan Outline (Jacobson, CalTrout v1 12-15-2018)**
**San Diego, California**

**TABLE OF CONTENTS**

## 1.0 INTRODUCTION

The Santa Margarita River – Sandia Creek Fish Passage Restoration Monitoring Program (SMR-FP Monitoring Program) is designed primarily to monitor passage of steelhead trout (*Oncorhynchus mykiss*) through the Project site in which a fish passage barrier created by the Sandia Creek Drive bridge was replaced with a new two-span concrete bridge to remediate this impediment. This monitoring program will also assess abundance of steelhead upstream in Santa Margarita River mainstem and tributary locations; and assess status and trends of a subset of threatened and endangered species and associated habitat and vegetation communities over the 23-acre Project site.

This document outlines 2. Project site location, 3. monitoring goals, 4. Project site-specific conditions, 5. existing monitoring data, 6. steelhead biology and anadromy, hydraulic conditions for fish passage, 7. monitoring approaches and protocols with 10-yr monitoring plan, 8. collaboration with other monitoring groups (Camp Pendleton, The Wildlands Conservancy, Riverside County Habitat Conservation Agency implementing the MSHCP Monitoring Program, and San Diego State University (landowner and operating the Santa Margarita Ecological Reserve), and 9. data management, reporting and sharing.

The Santa Margarita River is designated a high priority Core 1 population in the National Marine Fisheries Service (NMFS, 2012) Southern California Steelhead Recovery Plan, and is unique in coastal southern California for its undeveloped state and perennial flow. Southern California steelhead are federally listed as endangered from the Santa Maria River in the north to the Tijuana River in the south. Being an anadromous trout, steelhead are particularly sensitive to fish passage barriers which block migration between freshwater spawning sites and the ocean.

The fish passage barrier remediation project that removes the Sandia Creek Drive bridge fish passage barrier and replaces it with a new bridge addresses one of the most significant threats to southern California steelhead recovery and leverages downstream fish passage enhancement at the Lake O'Neill diversion on U.S. Marine Corps Base – Camp Pendleton.

## 2.0 LOCATION

The Project is located where Sandia Creek Drive crosses the Santa Margarita River in the lower Santa Margarita River watershed (Figure 2-1), and is located about two miles north of Fallbrook in San Diego County (Figure 2-2). The Project site comprises the existing Sandia Creek Drive bridge, which is a fish passage barrier that will be replaced by a new bridge downstream. The Project site lies within Township 9 South, Range 3 West, Section 7 of the U.S. Geological Survey (USGS) 7.5-minute Temecula quadrangle map (Figure 2-3). The new bridge will be constructed 160-feet downstream of the existing Sandia Creek Drive bridge, which will be demolished after new construction is completed. Sandia Creek Drive is an active residential, recreational and commuter route and the bridge is in the heart of the newly designated Santa Margarita River Trail Preserve (Figure 2-4). The Preserve was created upon recent acquisition by The Wildlands Conservancy (TWC) of a 1400-acre parcel spanning Santa Margarita River and Sandia Creek tributary from Fallbrook Public Utility District. TWC will manage the Preserve as a public open space for recreation, education and conservation benefits in perpetuity.

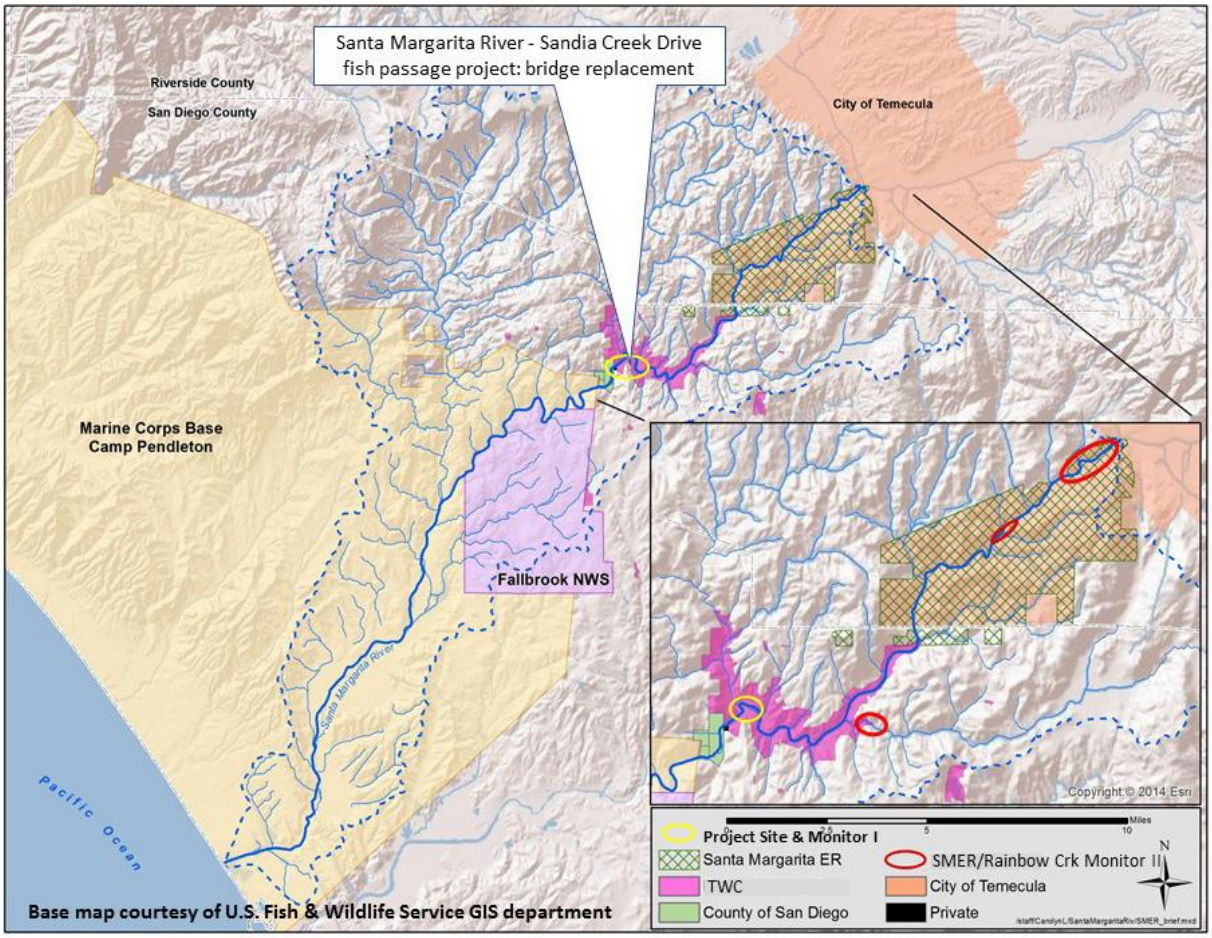



**Figure 2-1. Santa Margarita River Watershed Showing Key Landmarks**


**Figure 2-2. Project Site at Sandia Creek Drive bridge**

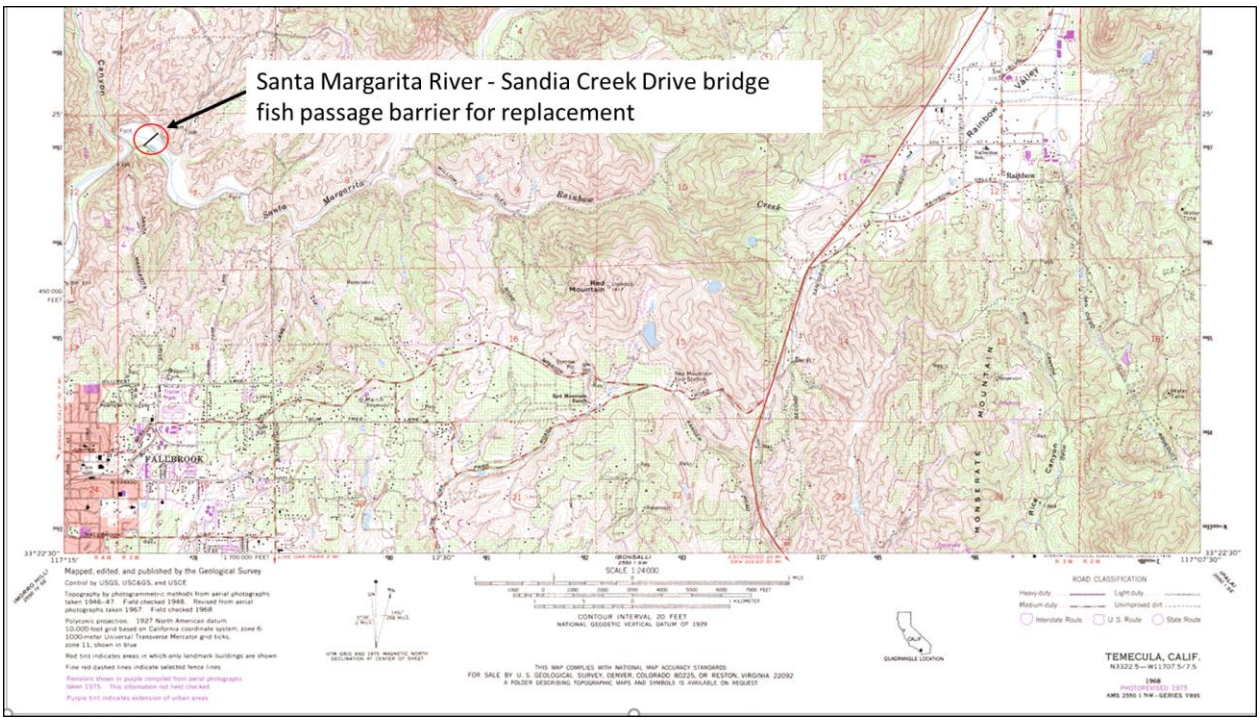



**Figure 2-3. Project Site at Sandia Creek Drive bridge –Temecula Quad topo map**


**Figure 2-4. Project Site at Sandia Creek Drive – existing condition and future bridge**

The Monitoring Area for the project comprises 23 acres surrounding the Sandia Creek Drive bridge and downstream abandoned concrete ford, which was the original river crossing and will also be removed.

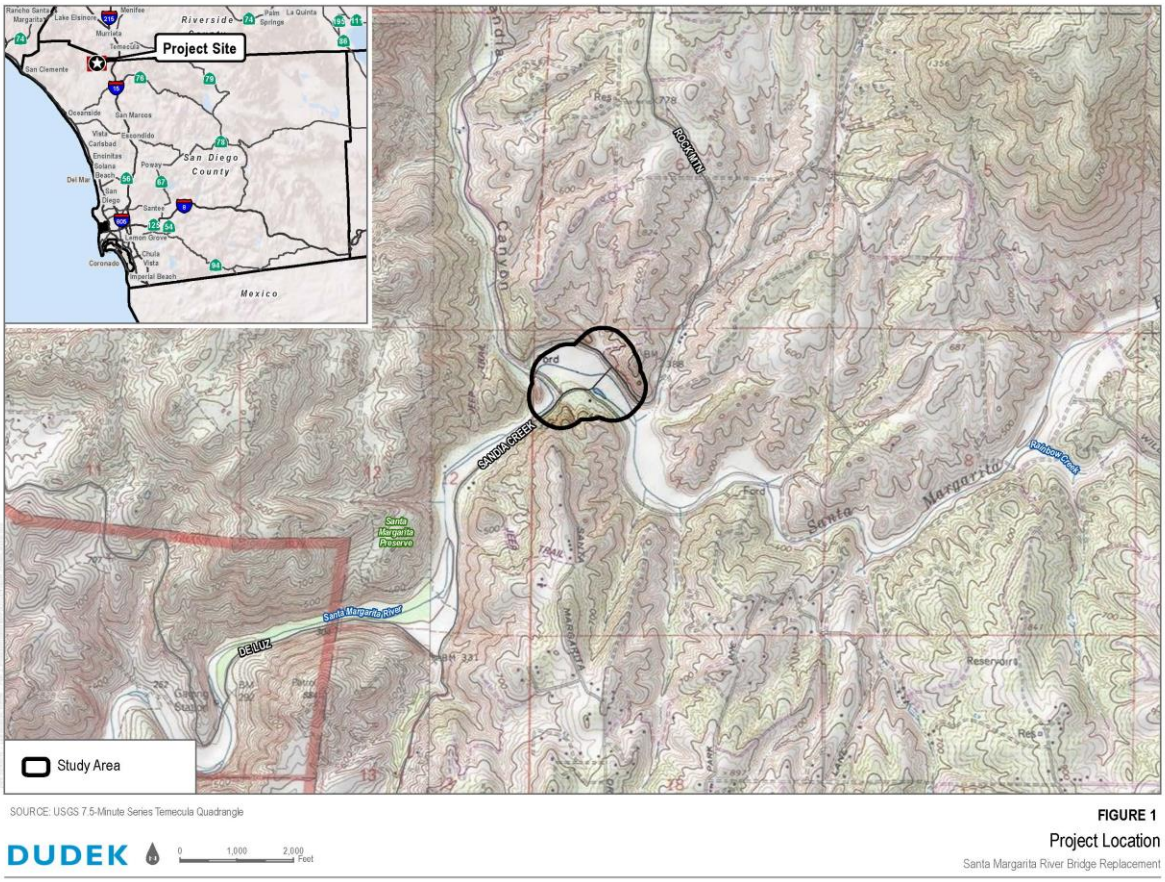



**Figure 2-5. Project Area for bridge replacement project and future monitoring area**

## 3.0 MONITORING GOALS

The main goal of the proposed Sandia Creek Drive bridge replacement project is to re-establish a steelhead population in the Santa Margarita River. Removal of this fish passage barrier will increase steelhead access to 12 miles of upstream spawning and rearing habitat. Restoration of the Project site will improve riparian habitat for multiple species, some of which are threatened and endangered species by state and/or federal listing.

The main goal of the SMR-FP Monitoring Program is to detect juvenile and adult steelhead migrating through the Project Area after removal of the fish passage barrier at Sandia Creek Drive and replacement with a new bridge approximately 160 feet downstream. Prioritized monitoring goals, objectives and performance measures are as follows:

Goal 1: Assess impact of removing fish passage barrier at Sandia Creek Drive on juvenile and adult steelhead migration upstream and smolt migration downstream.

Objective: Perform visual surveys, snorkel surveys, seine (netting), electrofishing, PIT antennae

and underwater videography via tech-enhanced robotics.
Performance Metric: Number of fish observed

Goal 2: Assess accuracy of monitoring steelhead occurrence through Project area in turbid water conditions and high flow.

Objective: Utilize multiple monitoring approaches and new technology to improve detection and validate methodologies.

Performance metric: Comparative number of fish observed under different conditions and abundance surveys.

Goal 3: Detect PIT-tagged migrating steelhead from other watersheds

Objective: Place two PIT antennae upstream of the new bridge to monitor presence of steelhead that have been PIT tagged in other river systems. This would be the first unambiguous demonstration of anadromy in this southernmost part of the ESA listing area.

Performance Metric: Functional PIT array that detects PIT-tagged trout

Goal 4: Increase species monitoring efficiency and coordination in the Santa Margarita River watershed.

Objective 1: Coordinate with The Wildlands Conservancy to monitor species in the Project Area using same protocols and share data.

Objective 2: Incorporate other listed species in Project Area monitoring effort

Objective 3: Coordinate with Camp Pendleton and SWRC MSHCP biologists that have robust monitoring programs.

Performance Metrics: library of survey protocols and reporting documents aligned with other monitoring groups; data compilation and map identifying species presence/abundance and movement;

Goal 5: High quality data collection and management, reporting and sharing.

Objective: Integrated GIS mapping of plant and animal species for a holistic view of presence through time and habitat connectivity.

Performance Metrics: number and quality of GIS maps, data uploaded state and federal web portals, data shared with state and federal agencies and presented at regional meetings.

## 4.0 PROJECT SITE-SPECIFIC CONDITIONS

From The Wildlands Conservancy Santa Margarita River Trails Preserve Resource Conservation Plan: Over a dozen distinct vegetation communities exist on the property, harboring unique habitat for a variety of associated wildlife species. These vegetation communities include streams (open water, scoured bedrock, sand bars, and freshwater marsh) southern cottonwood-willow riparian forest, southern riparian woodland, southern coast live oak riparian forest, southern willow scrub, southern riparian scrub, coast live oak woodland, mule fat scrub, Diegan coastal sage scrub, cottonwood scrub oak chaparral, southern mixed chaparral, chamise chaparral, coastal sage-chaparral, eucalyptus woodland, and non-native grassland. Many of these habitats are designated as sensitive (Table 1) and

are shown in Appendix B.

Of the vegetation types observed in the larger 1400 acre parcel, Project site vegetation is characterized in the following survey map conducted by Dudek in 2018. Willow predominates on the north side of the river, while scrub oak and live oak predominate on the south side. There is sagebrush mixed in with the ephemeral drainages, and open water flowing through the middle of the Project area since the river has perennial flow of about 5 cfs.

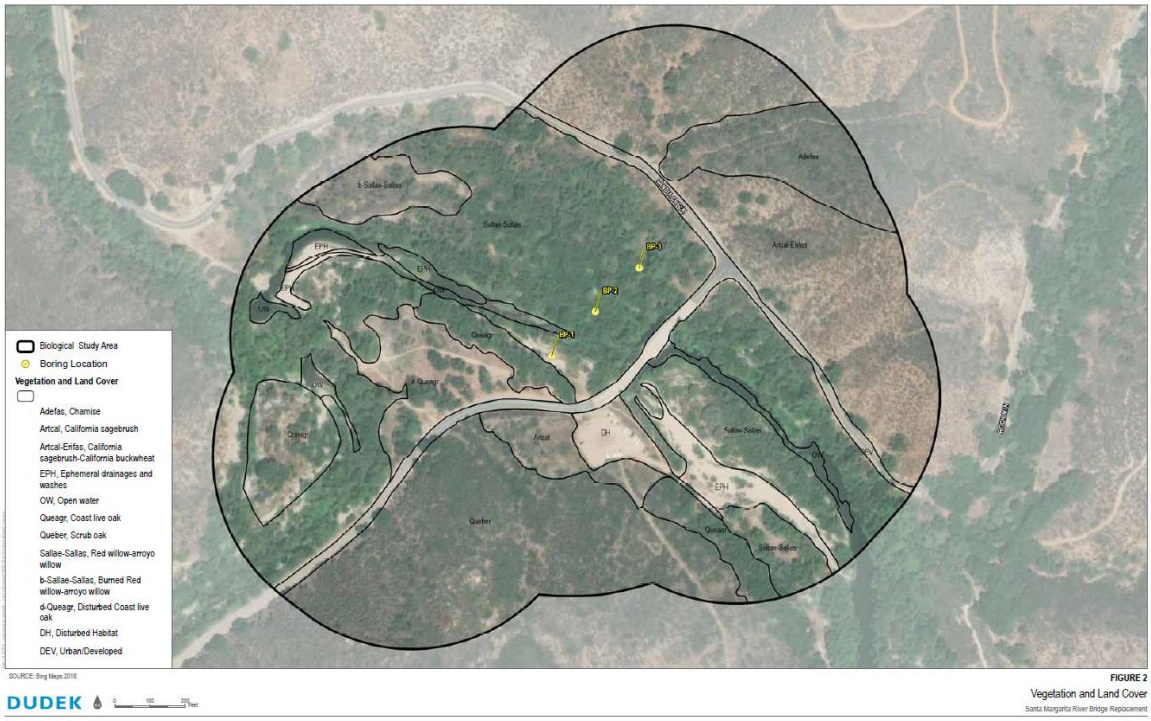



**Figure 4-1. Project Area vegetation distribution**

As noted in the TWC Management Plan, The Santa Margarita River Preserve is a key wildlife corridor for many sensitive and endangered species. Stewarding the natural resources of this vital wildlife corridor is an important component of preserving the ecology of the Palomar-Santa Ana mountain region of the South Coast Ecoregion of California. The availability of year-round water provides a vital resource that supports an array of important wildlife habitats and is utilized by an abundance of associated wildlife species. In addition, the upland ecosystems are home to a wide variety of unique wildlife species and sensitive natural communities that make the property rich in biodiversity. Moreover, several federal and state threatened and/ or endangered species inhabit the land encompassing the Santa Margarita River Preserve. The survival of these natural communities and the individual threatened species depends largely upon the long-term existence of a wildlife corridor throughout the Santa Margarita River Valley. One critical function of the proposed preserve is to protect the wildlife habitat and ensure that the natural communities and wildlife species are given room to expand over time.

A listing of the special status animals and plants that may occur in the Project area are shown in Table 2.

**Tables 4-1 list the special status animals with Potential to Occur in Project Area**

| Animal | Species | Federal/State Listing* | Habitat |
|---|---|---|---|
| Least Bell's Vireo | *Vireo bellii pusillus* | FE/SE | Riparian |
| Southwestern Willow Flycatcher | *Epidonax traillii extimus* | FE | Riparian |
| Coastal California gnatcatcher | *Polioptila californica californica* | FE/CSSC | Riparian |
| Arroyo chub | *Gila orcutti* | CSSC | Aquatic |
| Arroyo toad | *Anaxyrus californicus* | FE | Wetland/Aquatic |

*FE = Federally Endangered; SE = California State Endangered; CSSC = CA State Species of Special Concern

**Table 4-2. Special Status Plants with Potential to Occur in Project Area**

| Plant | Species | Federal/State Listing | Habitat |
|---|---|---|---|
| Thread-leaved brodiaea | *Brodiaea filifolia* | FT/SE | Riparian |

## 5.0 STEELHEAD BIOLOGY

Understanding the biology of steelhead and their anadromous life history is central to generating an effective Monitoring Plan. Two key points are that 1) they are anadromous and typically migrate seasonally during winter storms between the ocean and freshwater, and 2) they spawn and rear in freshwater areas particularly in upper watershed reaches that have sufficient water quality and spawning gravels. The following is an excerpt from the SOSII: Fish In Hot Water report published by CalTrout and UC- Davis (2017) that summarizes steelhead biology. Steelhead have distinctive life history patterns due to the variable environment in which they evolved and to their opportunistic life history strategies. Southern steelhead are distinct from salmon in that they can repeat the migration several times. *O. mykiss* that do not go to the ocean and stay in freshwater their entire lives are known as rainbow trout.

Southern steelhead are dependent on winter rains to provide upstream passage through seasonally opened estuaries and mainstem river flows providing hydrologic connectivity to upstream tributaries. The reliance on rainstorms for permitting passage through lower portions of watersheds suggests a restricted spawning period for steelhead, with considerable flexibility in timing. Peak migration occurs between December to May. Spawning typically occurs between January and May, with a peak in February through mid-April (NMFS 2012), although variation may occur across diverse geographies.

Three predominant life history patterns are: fluvial anadromous, freshwater resident, and lagoon-anadromous. Juvenile steelhead usually remain in freshwater for one to three years before emigrating to the ocean. In fluvial anadromous life history, southern steelhead outmigration is dictated by the

breaching of lagoon sandbars (physical barriers of sand at the mouth of lagoons), typically between January and June, with a peak from late March through mid-May (NMFS 2012). Ocean swells and high tides can lead to temporary bar breaching during the summer and fall, draining lagoons and allowing juvenile trout to emigrate to the ocean. Freshwater residents that don't migrate to the ocean are known as rainbow trout. A combination of genetic, environmental and physical factors determine whether rainbow trout will remain in freshwater or migrate to the ocean. Lagoon anadromous steelhead migrate from freshwater to the lagoon and reside for some time, and then return to upper watershed freshwater areas without going into the ocean.

Persistence of Southern steelhead in Southern California depends on their ability to reside in high quality spawning and rearing habitat in river systems. Southern steelhead require cool, clear, well-oxygenated water with sufficient food, but they have adapted to living under highly variable environmental conditions. Thus, their physiological tolerances may be broader than other steelhead. In general, southern steelhead seem to tolerate warmer water temperatures than their northern counterparts. Their body temperature and metabolic rate fluctuate with the temperature of the surrounding environment. As temperature increases, their metabolic and feeding rate increases until the temperature approaches an upper threshold of about 25˚C where they stop feeding and/or move to a refuge area, but this response depends on proximity of refuge areas, cover and food availability (Boughton, et al. 2015, Sloat and Osterback 2013, Sloat and Reeves 2013).

Important aquatic environmental factors for steelhead include temperature, dissolved oxygen, salinity and water depth. Temperature and dissolved oxygen levels are two critical parameters which can vary diurnally and seasonally to a significant degree. Estimation of ranges for these parameters (Figure 5-1) comes from studies in the Santa Monica Mountains (Bell et al. 2011, Bell et al. 2012, Dagit et al. 2015), the Santa Clara River in Ventura County (Sloat and Osterback 2013), Moyle et al. 2008, Myrick and Cech 2000; and others cited below. The ranges have uncertainty because they are based on synthesis of data from diverse studies where upper limits of temperature and dissolved oxygen vary with age, food availability, thermal acclimation status, available refuge areas, and waterbody type.

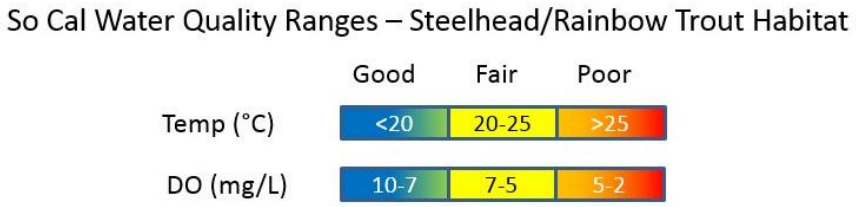



**Figure 5-1.** Southern California steelhead/ rainbow trout water quality tolerance range estimates.

Preferred temperatures of juvenile steelhead are reported as 10-17ºC, but southern steelhead seem to persist in environments that regularly reach temperatures outside this range up to 25°C. As fish maintain higher body temperatures, they actively foraged during the day, presumably as a means to support their higher metabolic rates, and sought refuge areas of cooler water. Dissolved oxygen levels above 5 mg/L are generally regarded as sufficient for survival, and the incipient lethal level of dissolved oxygen for adult and juvenile rainbow trout is approximately 3 $mg \cdot L^{-1}$ (Matthews and Berg 1997).

Droughts have significant impact on steelhead biology in which a) sand berms don't breach thus forcing trout to stay as fresh-water residents or reside in the estuary; b) water amount decreases in their habitat and can cause stranding; c) water temperature increase which can cause lethality; and d) lower DO and warmer water temperature favor growth of non-native species such as bass, bullhead and crayfish which can take over a weakened population; d) moisture content of habitat vegetation lowers and becomes susceptible to wildland fire which can burn out a population or wash it out in subsequent rains.. Therefore, the ability to migrate to new habitat patches is key to the species survival, and removal of fish passage barriers and dams in Southern California is a high priority for conservation.

Fish Passage flows for steelhead are defined by upper and lower limits. CDFW and NOAA Fisheries recommend that if adequate streamgage data is available, the exceedance flow method should be used to calculate the fish passage flows (Caltrans, 2007). For adult anadromous salmonids— in this case, adult steelhead—CDFW and NOAA define the upper fish passage flow limit to be the 1-percent annual exceedance flow and the lower fish passage flow limit to be the 50- percent exceedance flow. Juvenile upper and lower fish passage flow limits are defined as the 10-percent annual exceedance and the 95-percent annual exceedance flows, respectively.

**Table 5-1. Santa Margarita River Upper and Lower Fish Passage Flows (WEST, 2016)**

| Species / Life Stage | Upper Fish Passage Limit | Lower Fish Passage Limit* |
|---|---|---|
| Adult Steelhead | 1% Exceedance Flow: 584 cfs | 50% Exceedance Flow: 7 cfs |
| Juvenile Steelhead | 10% Exceedance Flow: 27 cfs | 95% Exceedance Flow: 3 cfs |

**Table 5-2. Hydraulic Criteria for Stream Crossings (CDFW, 2010)**

| Species / Life Stage | Maximum Water Velocity | Maximum Water Depth | Maximum Outlet Drop |
|---|---|---|---|
| Adult Anadromous Salmonids | 6 ft/s* | 1 ft | 1 ft |
| Juvenile Salmonids | 1.0 ft/s | 0.5 ft | 0.5 ft |

## 6.0 MONITORING APPROACHES, MONITORING PLAN AND PROTOCOLS

### 6.1 Objectives

Goal 1 Objective: Perform visual surveys, snorkel surveys, seine (netting), electrofishing, PIT antennae and underwater videography via tech-enhanced robotics. Performance Metric: Number of fish observed

Goal 2 Objective: Utilize multiple monitoring approaches and new technology to improve detection and validate methodologies. Performance metric: Comparative number of fish observed under different conditions and abundance surveys.

Goal 3 Objective: Place two PIT antennae upstream of the new bridge to monitor presence of steelhead that have been PIT tagged in other river systems. Performance Metric: Functional PIT array that detects PIT-tagged trout

Goal 4 Objective 1: Coordinate with The Wildlands Conservancy to monitor species in the Project Area using same protocols and share data. Objective 2: Incorporate other listed species in Project Area monitoring effort  Objective 3: Coordinate with Camp Pendleton and SWRC MSHCP biologists that have robust monitoring programs. Performance Metrics: library of survey protocols and reporting documents aligned with other monitoring groups; data compilation and map identifying species presence/abundance and movement;

Goal 5 Objective: Integrated GIS mapping of plant and animal species for a holistic view of presence through time and habitat connectivity. Performance Metrics: number and quality of GIS maps, data uploaded state and federal web portals, data shared with state and federal agencies and presented at regional meetings.

6.2 Key Monitoring Personnel: Roles and Responsibilities

**Table 6-1 Key Personnel**

| Organization | Contact | Role | Email |
|---|---|---|---|
| Dudek (Contractor) | Shelah Riggs | Field work | sriggs@dudek.com |
| CalTrout – Program Mgr | TBD | Management | tbd@caltrout.org |
| CalTrout - Director | Sandra Jacobson | Oversight | sjacobson@caltrout.org |
| California Department of Fish and Wildlife | Mary Larson | Approval | mary.larson@wildlife.ca.gov |

6.3 Monitoring Approaches:

Abundance:

- visual survey,
- snorkel survey;
- seine (netting)
- PIT antennae;
- underwater videography ROV

Productivity:

- redds

Genetic lineage:

- opportunistic collection of fin clips for genetic analysis and lineage assessment

The Cardno-ENTRIX/Trout Unlimited Steelhead Habitat and Enhancement Study (2013) provides detailed survey information on habitat classification and barrier characterization per CDFW procedures as basis of where to monitor. Extensive steelhead habitat improvement by CalTrout in partnership with U.S. FWS has been on-going in the upper Santa Margarita River in the Ecological Reserve in anticipation of the barriers being removed.

The monitoring approach presented in this monitoring plan is drawn from methods found in the following California Department of Fish and Game (CDFW) manuals:

- Monitoring the Effectiveness of Culvert Fish Passage Restoration (March 2005b)
- Photographic Monitoring of Salmonid Habitat Restoration Projects(March 2005c)
- Fish Bulletin 180: California Coastal Salmonid Population Monitoring (2011)
- California Salmonid Stream Habitat Restoration Manual Part IV (Fish Observation) (2003)
- California Salmonid Stream Habitat Restoration Manual Part V (Working With Data) (2003)
- California Salmonid Stream Habitat Restoration Manual Part IX (Fish Passage Evaluation Crossings)

**6.4 Monitoring Plan – Typical year for steelhead surveys**

**Table 6-2 Monitoring Outline**

| Location | Visual | Snorkel | Seine | PIT antennae | UW Robot | Redd Count |
|---|---|---|---|---|---|---|
| 1. DS of Bridge at Sandia Creek confluence | 48, 72, 96 hrs after >100 cfs and berm breach (Dec-Apr) | 48, 72, 96 hrs after >100 cfs and berm breach (Dec-Apr) | | | 96 hrs after >100 cfs and berm breach | |
| 2.US of Bridge 0.5-1 mi | 48, 72, 96 hrs after >100 cfs and berm breach | 48, 72, 96 hrs after >100 cfs and berm breach | | | | |
| 3.Rainbow Creek below Waterfall barrier at 2 mi US of confluence | 96 hrs after >100 cfs and berm breach | | 96 hrs after >100 cfs and berm breach | | 96 hrs after >100 cfs and berm breach | Spring annually |
| SMER– South Entrance ~4 mi US of bridge - no public access | | | | Monitor; Check monthly for function | | Spring annually Reach 4 gravels |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4.SMER – Headwaters Pool (max extent of anadromy) | 96 hrs after >100 cfs and berm breach (Dec-Apr) | 96 hrs after >100 cfs and berm breach (Dec-Apr) | | | Dec, Feb, Apr, Sep annually | Spring annually DS of Pool in riffles |

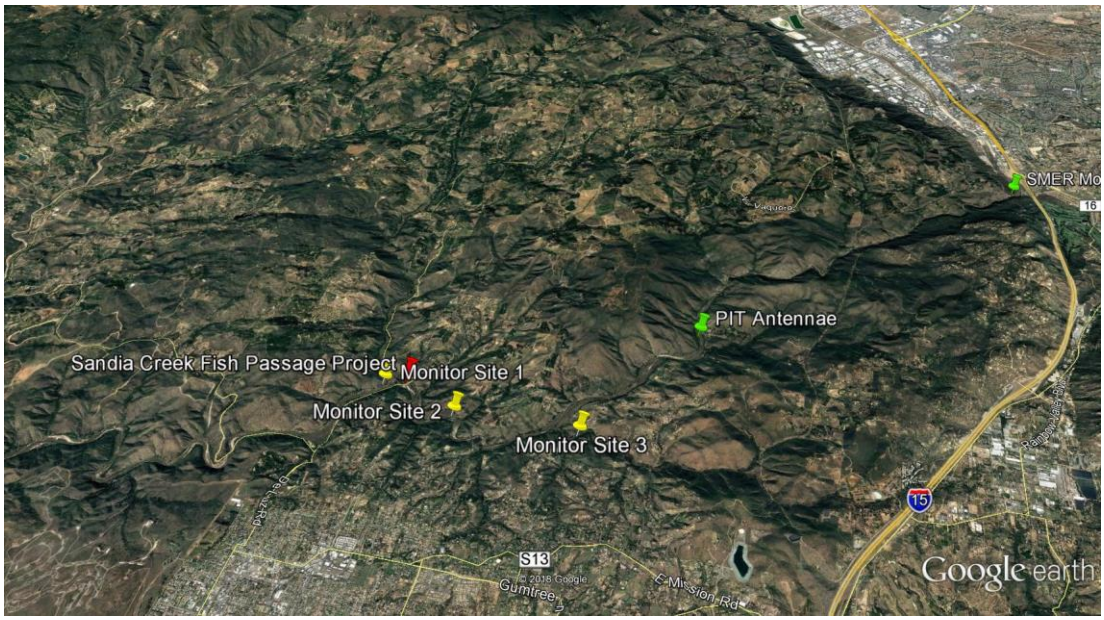


Figure 6.1 Candidate monitoring sites in Santa Margarita River watershed.

A detailed 10-year Monitoring Plan will be generated as a deliverable for this project. The fundamentals are outline in the goals/objectives and schedule table above, and the Work Scope described below and in the proposal.

Monitoring (10-yr) Timeline: starting March 2020 before bridge removal through March 2029 approximately seven years after barrier removal.

1. Wet-season monitoring will occur in the Project area by trained biologists to identify steelhead by multiple methods as outlined in the above table – visual, snorkel and underwater robotic. This is expected to require 16 hrs/month during the winter season December – May, and occur at locations 1 and 2 flanking the new bridge, as shown in the above map.

2. Wet-season monitoring will occur in Santa Margarita River at upstream locations in the Santa Margarita Ecological Reserve (location 4) and Rainbow Creek (location 3) tributary to identify steelhead by multiple methods as outlined in the above table. These locations are at limits of anadromy and fish can be more readily observed. This is expected to require 48 hrs/year.

3. PIT antennae installation.

Two Passive Integrated Transponder antennae will be placed upstream of the new bridge to track

incoming juvenile and adult steelhead tagged from other So Cal rivers. Two antennae are used to detect directional movement. Once placed, volunteers will be utilized to monitor function of the antennae and download data for analysis. The preferred location of antennae is at the south end of the Santa Margarita Ecological Reserve, where loss due to theft is minimal and access is easy. These antennae will also be positioned to detect tagged rainbow trout from neighboring Pauma Creek on Palomar Mountain. There are over 6000 rainbow trout in the upper watershed who are residents that are not listed as endangered due to their location behind a total barrier at Highway 76 crossing Pauma Creek. Hundreds of these trout can be PIT tagged and then monitored for movement into the Santa Margarita River to unambiguously demonstrate anadromy of *O. mykiss* between watersheds in So Cal. This would be a major milestone in endangered steelhead recovery.

4. Productivity will be monitored by redd counts at two locations in the Santa Margarita Ecological Reserve and in Rainbow Creek. This is expected to require 48 hrs/year and will be coordinated with observation surveys.

6. Annual monitoring for Threatened and Endangered species listed in Table 1 will be performed in the spring and fall in the Project Area in coordination with The Wildlands Conservancy and their long-term Management Plan. This is expected to require CRAM survey protocols and wildlife surveys two times/year for three days for 10 years.

**6.5 Protocols**

**Visual survey:** Stream bank observation will be performed according to CDFW Salmonid Habitat Restoration Manual Part IV Fish Sampling Methods. The data collected by these methods are intended for useful descriptions of fish presence, relative abundance and habitat utilization in the context of planning restoration or enhancement projects. They are not intended to produce statistically based population estimates of adults, juveniles, or smolt productivity. Fixed point photography, walking bank looking for steelhead.

Opportunities for observation are usually best in pools and runs where visibility is better than in riffles. Habitats to be observed should be approached slowly and quietly from downstream; most fish orient themselves heading upstream when feeding. Patience is required to adjust the observer's eyes to the light conditions and to allow the fish to recover from any fright response caused by the observer's approach.

**Snorkel survey:** Underwater observation by experienced snorkel divers will be performed according to CDFW Salmonid Habitat Restoration Manual Part IV Fish Sampling Methods. One or more divers, equipped with a mask, snorkel, and wet or dry suit, enter a habitat unit at the downstream end and swim or crawl to the upstream end, counting, identifying, and recording all the fish they see. In small streams or habitat units, a single, experienced diver can effectively count and identify all fish in a single pass. In larger streams or complex habitat units, a combination of divers working together systematically may be necessary to determine fish numbers.

**Seining:** Twenty five foot nets will be deployed according to CDFW standard protocols to

physically collected steelhead at a fixed point location spanning about 15 meters with a predominant run/pool flow regime. It is assumed that NMFS and CDFW will not allow electrofishing upon removal of the barriers downstream.

**PIT Antennae:** Assess spatial distribution by PIT (Passive Integrative Transponder) technology. A stationary submersible PIT antennae set will be placed in the downstream section of Santa Margarita Ecological Reserve to detect upstream migrating PIT tagged steelhead from other watersheds. The location will include two arrays so that direction of migration can be recorded (upstream or downstream). They will be placed in lower Santa Margarita Ecological Reserve in habitat that has been determined as "Good" by CardnoENTRIX in their Steelhead Habitat Assessment and Enhancement Study (2013) and is out of public right-of-way to avoid vandalism. Fixed antennae have been shown to be generally as effective as multi-pass electrofishing surveys for estimating habitat unit scale fish populations. An advantage of using PIT antennas is that they allow fish abundance estimation without fish recapture and frequent sampling can occur without subjecting study animals to excessive handling stress or mortality.

Two Biomark IS1001 Transceivers (readers) synchronized and mounted into a small waterproof enclosure will be used as passive transceivers. Data is stored on a single removable flash (USB) drives connected to the readers. The readers will be mounted to a post or tree nearby to the stream but out of the impact of winter flows or debris. The antennas will be a 'cord' type that is flexible and can be affixed to the streambed in either pass-through or pass-over arrangement depending on the site characteristics. The 'cord' antennas are housed in a flexible watertight conduit are a robust. They can be up to 30' across depending on the site characteristics. Power will be supplied by a pair of 280 watt solar panels connected to a charge controller. Power storage will be two 12v 245ah 8D AGM batteries or four 12v 105ah Group 31 AGM batteries. The 8D size batteries are recommended, each with a weight of approximately 125 pounds. The Group 31 batteries each weigh approximately 75lbs. Batteries will not be changed at the detection sites as the distance and weight is too great. We believe we can realistically have >90% uptime with the specified solar setup. Data will be manually collected on a planned interval while also assessing the physical condition of the detection array. Two West Fork Environmental experts will install all antennae, and will be available for maintenance as appropriate. CalTrout-recruited volunteers will be trained to make minor adjustments to antenna, to maintain battery power, and to download data loggers.

**Underwater robotics**: The Open Source Trident underwater robotic has been successfully used in lakes and rivers such as the Santa Margarita River by collaborators to visualize subsurface fish such as bass and trout. The robotic streams live video from a high-resolution camera that can be observed by the operator who controls the sub movement by joy-stick. This hand sized robotic can measure water temperature, and is under tech development to carry water chemistry probes, water collection vials and have embedded Object Identification software for enhanced functionality and variety of applications.

**Redd count** for *O. mykiss* productivity will be performed as in Gallagher (1997). As per Gallagher, surveys will begin prior to the onset of spawning of the species of interest and continue at least biweekly until spawning is complete. They recommend weekly to biweekly surveys in a rotating panel or stratified random design beginning prior to the onset of spawning of the species of interest and continuing until spawning is complete. During redd count surveys, individual redds should be counted, marked, and

uniquely labeled on data forms and in the field to avoid double counting and to allow estimation of observer efficiency. At a minimum, the date each redd was first observed, fish species, unique identifier number, and location should be recorded on the data form. Redds can be marked in the field by tying survey flagging securely to the nearest solid object near or above each redd. For each redd, the unique identification number, date first observed, location relative to the flag (distance and compass direction), and species should be recorded on the flag and on the data form. Redd locations should also be marked on topographic maps or otherwise georeferenced.

## 7. COLLABORATION WITH OTHER MONITORING GROUPS

The Sandia Creek fish passage Project team will seek to collaborate with The Wildlands Conservancy to help their monitoring efforts in the Project Area for steelhead and multiple species; and with Camp Pendleton and Riverside MSHCP monitoring group on protocols, best practices, data management and reporting.

## 8. DATA MANAGEMENT

### Types of data

The project will yield biological data and reports and maps illustrating Project site and monitoring sites. Data will be stored in a centralized project database. There will be a mixture of data assembled and analyzed from external sources, analysis and reports relating to the project. Data will be in the form of raw data (e.g. spreadsheets), tables and figures, charts, maps, diagrams, photographs, videos, word docs, and powerpoint presentations. All forms of data will follow a standard naming convention, be part of a searchable database, be subject to QA/QC standards and version control, and have specified access and read/write permissions. The data management plan and centralized project database will be overseen by the CalTrout Project Manager in collaboration with project personnel.

### Data and metadata standards

Data and documents added to the centralized project database will conform to a naming convention and be inserted into the appropriate Level File Type. Once entered, the file will automatically be added to the File Index. Each document will identify the generator, date and version. The database will be searchable by file name and terms.

Metadata will include data sheets and transcribed field notes, photos, videos, date/time of collection or report generation, location (latitude, longitude in decimal degrees NAD83), goals, description (e.g. type of sample). The metadata will allow users to identify the location and collection history of samples and provide the tools to map them.

As noted in the annual reports from the Riverside MS HCP biomonitoring: All of the data collected by the Monitoring Program must be carefully managed. Prior to field work, data forms are developed and survey locations are mapped. Field data are collected both on paper datasheets and on digital data collection devices. As data return from the field, they are entered into a database, checked for accuracy, and certified

by the Data Manager. After data are certified, they are analyzed and interpreted and a report is written describing survey results. The results monitoring efforts will be provided in annual reports and the final report. The Monitoring Program is overseen by CalTrout Project Manager, in coordination with Environmental Contractor Biologist.

**Data access and sharing**

Environmental data and information collected be made visible, accessible, and understandable to general users, free of charge or at minimal cost, in a timely manner except where limited by law, regulation, policy or security requirements. Data assembled from other sources and generated during this study will be entered into the centralized project database. A file report will be run monthly to evaluate whether data entry is up to date based on project schedule, and conforms to entry standards. Access and read/write permissions will be mutually agreed upon by project personnel and overseen by Prime Contractor.

Data will be shared with California Department of Fish and Wildlife, National Marine Fisheries Service, Western Riverside County Regional Conservation Authority, Camp Pendleton Environmental Division, Santa Margarita Ecological Reserve staff, San Diego County Planning and Development Services, CalTrout and South Coast Steelhead Coalition partners and with the public upon request.

Data will generally be shared electronically on CD or email, but may also be prepared in hard copy. Data will be preferentially archived using open, non-proprietary formats such as text-based formats (e.g., ASCII), HDF and NetCDF and multimedia formats such as JPG, KMZ, TIF and PNG. Final data products from this project may be published in peer-reviewed scientific papers by project personnel. Project Administrator has experience in publishing original research manuscripts, managing large technical databases and using Sharepoint. Preliminary results will be presented at relevant national and international meetings as posters and/or talks. Data will be distributed to a variety of databases including CalFish PAD, Ecoatlas Project Tracker, California Natural Diversity Database, http://datadryad.org; http://dataverse.org , and others as appropriate.

APPENDIX A. Biological Surveys on Santa Margarita River near Project Site.

1. Camp Pendleton Public Review Draft Integrated Natural Resources Management Plan. 2017. Marine Corps Base and Marine Corps Air Station Camp Pendleton, California. Prepared for U.S.M.C.B.C.P by Department of Navy, Naval Facilities Engineering command Southwest Division.
Table 3-10 Special Management Seasons of Federally Listed Wildlife Species Found on Camp Pendleton,

2. San Diego County Water Authority Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). 2010. Prepared for U.S. Fish and Wildlife Service and California Department of Fish and Game. Prepared by San Diego County Water Authority and RECON Environmental, Inc. 1180 pp. http://www.sdcwa.org/sites/default/files/files/NCCP-HCP-merged.pdf
_SDCWA NCCP-HCP Survey SMR with Attachment B1, Section 3 (pg. 745) showing Santa Margarita River survey from Temecula to SW part of Santa Margarita Ecological Reserve near Rainbow Creek.

3. CDFW BIOS database search for TE Species with Possible Occurrence at Santa Margarita River near project site from https://www.wildlife.ca.gov/data/BIOS
Project Impacts TE Species BIOS Maps with screenshots showing species occurrence on Santa Margarita River including Arroyo toad direct observation and predicted habitat, SW willow flycatcher critical habitat, Western Riverside NSHCP Biomonitoring Observations for animals in relation to project site.

4. Santa Margarita River Steelhead Habitat Assessment and Enhancement Plan. 2013. Prepared for California Department of Fish and Wildlife. Prepared by CardnoENTRIX and Trout Unlimited.
Project Impacts SMR Steelhead Habitat Enhancement Plan Table 13 that shows habitat ranking at various stretches of Santa Margarita River for steelhead.

5. Critical Habitat Listing for Arroyo Toad by USFWS. 50 CFR 17 Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Arroyo Southwestern Toad; Proposed Rule.

6. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Biological Monitoring Program. Annual reports on their website; Arroyo chub (Gila orcutti) Survey Report. 2010.

7. Arroyo Toad Species Report. 2014. Prepared by U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, Ventura, CA.

8. Warburton, M.L., Swift, C.C. and R.N. Fisher. 2000. Status and Distribution of fishes in the Santa Margarita River Drainage. Prepared by the U.S. Geological Survey. Prepared for The Nature Conservancy. Santa Margarita River species surveys contracted by Fallbrook Public Utility District and included in the draft Santa Margarita River Preserve Integrated Resource Management Plan. 2016. Prepared by The Wildlands Conservancy. Project Site covered in the 1400 Acre parcel for land transfer.

9. Helix Environmental Planning (HEP). 2015. Fallbrook Public Utility District. La Mesa, CA.

10. Zych, A. 2015. Southwestern Willow Flycatcher Survey 45-day Report for Fallbrook Public Utility District Open Space Management Zone; Fallbrook, San Diego County, California.

11. Davenport, A. 2008. Wildlife Survey Report, Santa Margarita River Conjunctive Use Project; Open Space Management Zone, Fallbrook Public Utility District, California. Prepared by Davenport Biological

Services. Prepared for TEC, Inc.

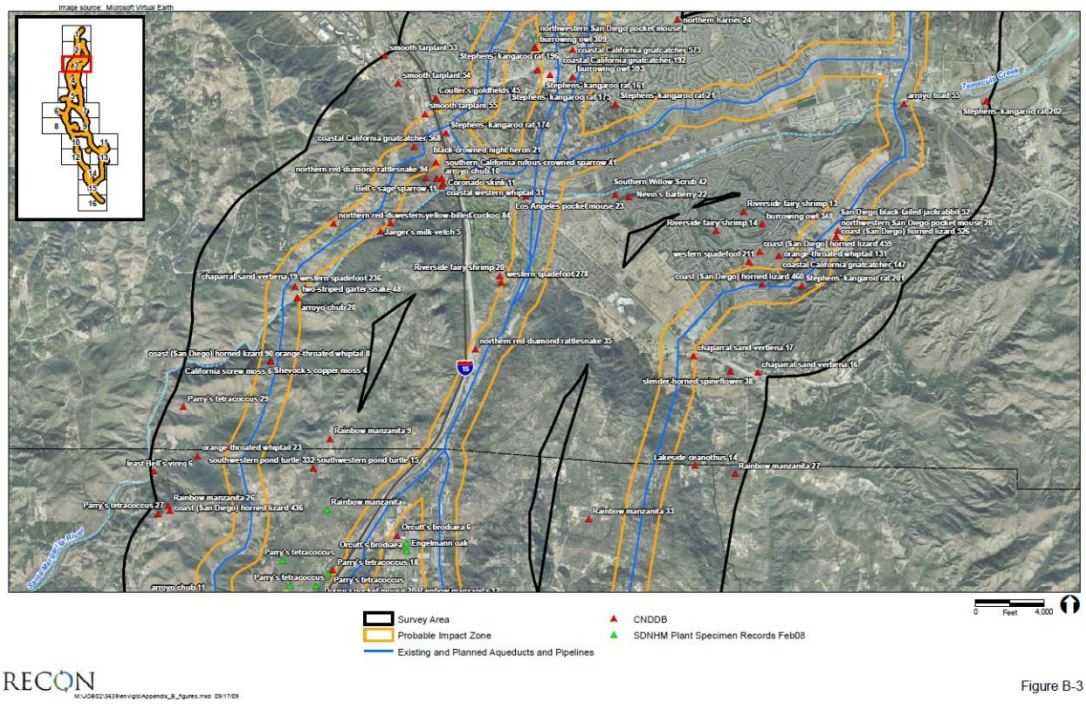
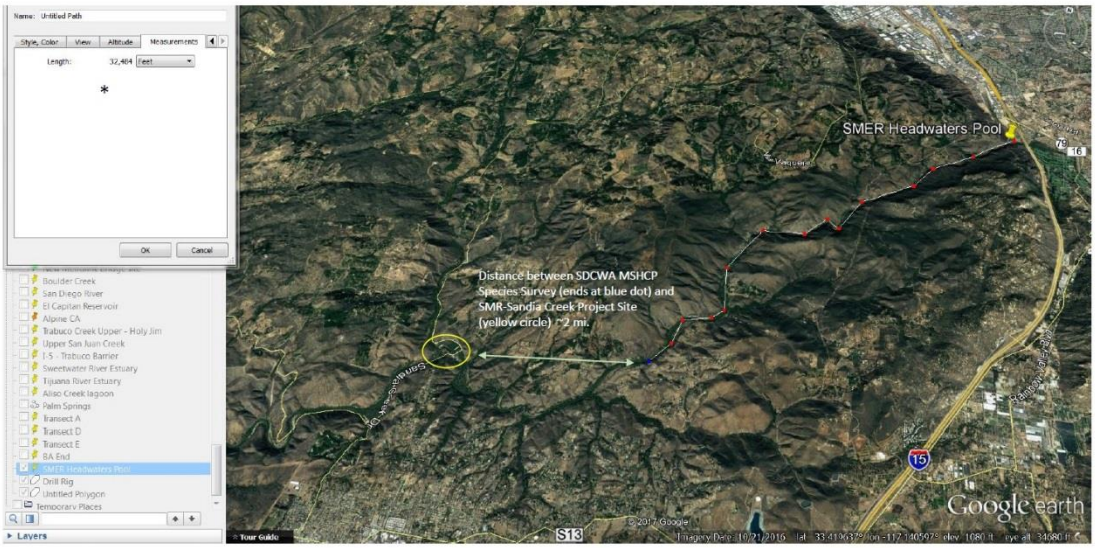



**Figure A.1. SW Riverside County MSHCP wildlife distribution summary (RECON)**

The map below shows the approximate distance between the SWRCA MSHCP Biological Monitoring southwest end near Rainbow Creek and the Project site (~2 miles). With the monitoring data from Camp Pendleton downstream and to the west, and the monitoring upstream and to the east, the river can be assessed for plant/animal species throughout.

GE Map showing distance between San Diego County Water Authority MSHCP survey area and SMR-Sandia Crk project site




*Distance above shows feet surveyed along SMR from headwaters at Temecula near I-15, corresponds to HCP Map of length surveyed

**Figure A.2. Map showing distance of Project (yellow) to MSHCP Monitoring (line w/ red dots)**

**APPENDIX B** Habitat and Vegetation Communities in TWC 1400-Acre Parcel that contains Project Area.

From The Wildlands Conservancy (2017) Santa Margarita River Trails Preserve Resource Management Plan.

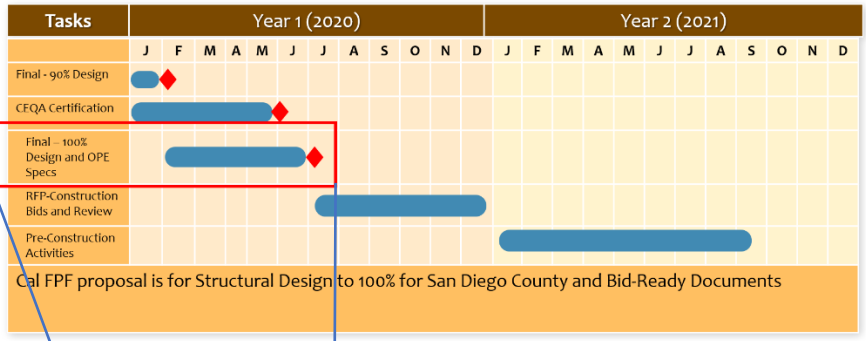
**Table 1**
**HABITAT/ VEGETATION COMMUNITIES**

| Type* | Acre(s) |
|---|---|
| Southern Cottonwood-Willow Riparian Forest (61300) | 209.1 |
| Southern Riparian Woodlands- including disturbed (62000) | 4.0 |
| Southern Coast Live Oak Riparian Forest (61310) | 82.5 |
| Mule Fat Scrub (63310) | 4.3 |
| Riparian Scrub (63000) | 1.6 |
| Stream (64140; includes Freshwater Marsh [52400]) | 20.5 |
| Coast Live Oak Woodland (71160) | 71.4 |
| Diegan Coastal Sage Scrub- including disturbed (32500) | 64.0 |
| Coastal sage- Chaparral Transition (37G00) | 18.1 |
| Scrub Oak Chaparral (37900) | 5.9 |
| Southern Mixed Chaparral (37121) | 811.8 |
| Chamise Chaparral (37200) | 24.0 |
| Eucalyptus Woodland (79100) | 1.0 |
| Non-native Grassland (42200) | 17.2 |
| Agriculture (18000) | 6.4 |
| Disturbed Habitat (11300) | 24.2 |
| Developed Land (12000) | 13.1 |
| **Total** | 1,379.5 |

*Holland vegetation codes are provided parentheses (Oberbauer, et. al. 2008)

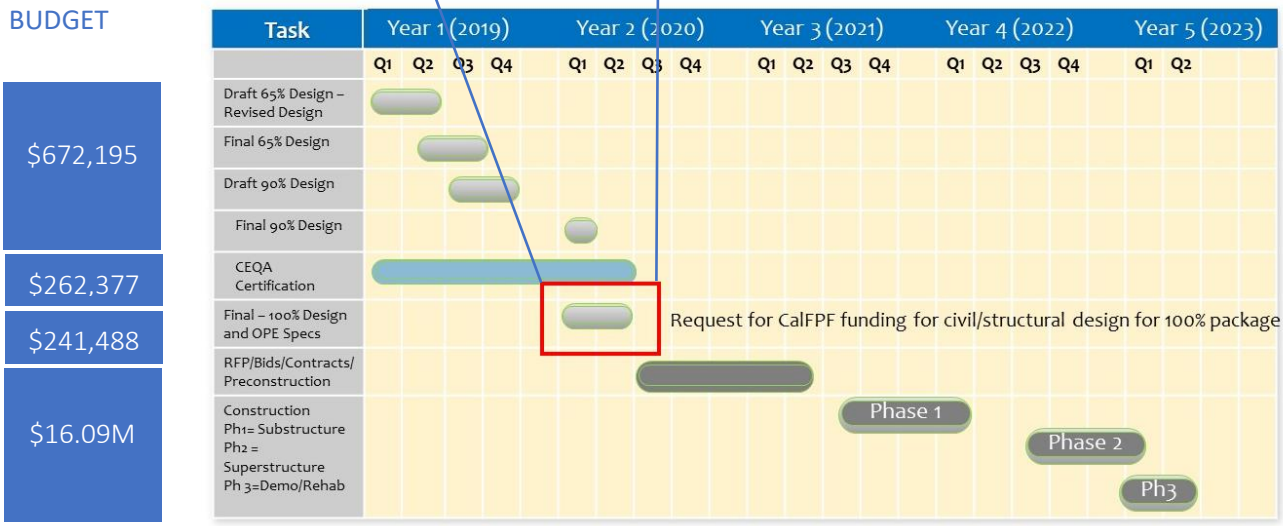
Project Title: Santa Margarita River Fish Passage and Bridge Replacement
Applicant: California Trout  Funding Opp: FY2020 Cal Fish Passage Forum

Santa Margarita River Bridge Final Design and PreCon Timeline



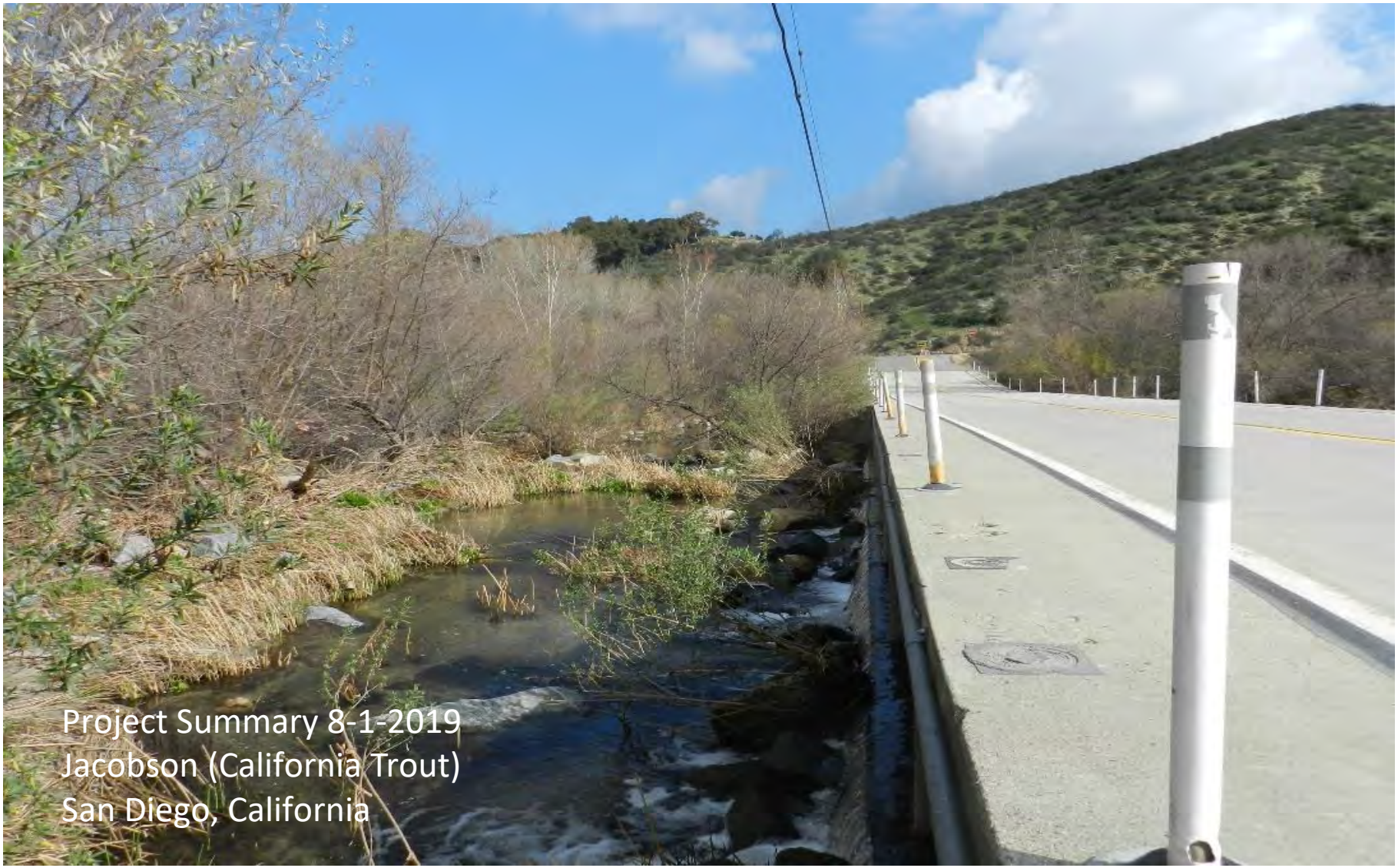

Timeline Overview Design and Implementation:
Santa Margarita River bridge construction

BUDGET




10-Year monitoring plan starts in Q2 2023

# Multi-benefit Bridge Replacement Project at Sandia Creek Drive on the Santa Margarita River



# Sandia Creek Drive Bridge Replacement Overview

This bridge construction project will replace problematic Sandia Creek Drive Bridge which crosses the Santa Margarita River 2 miles north of Fallbrook.

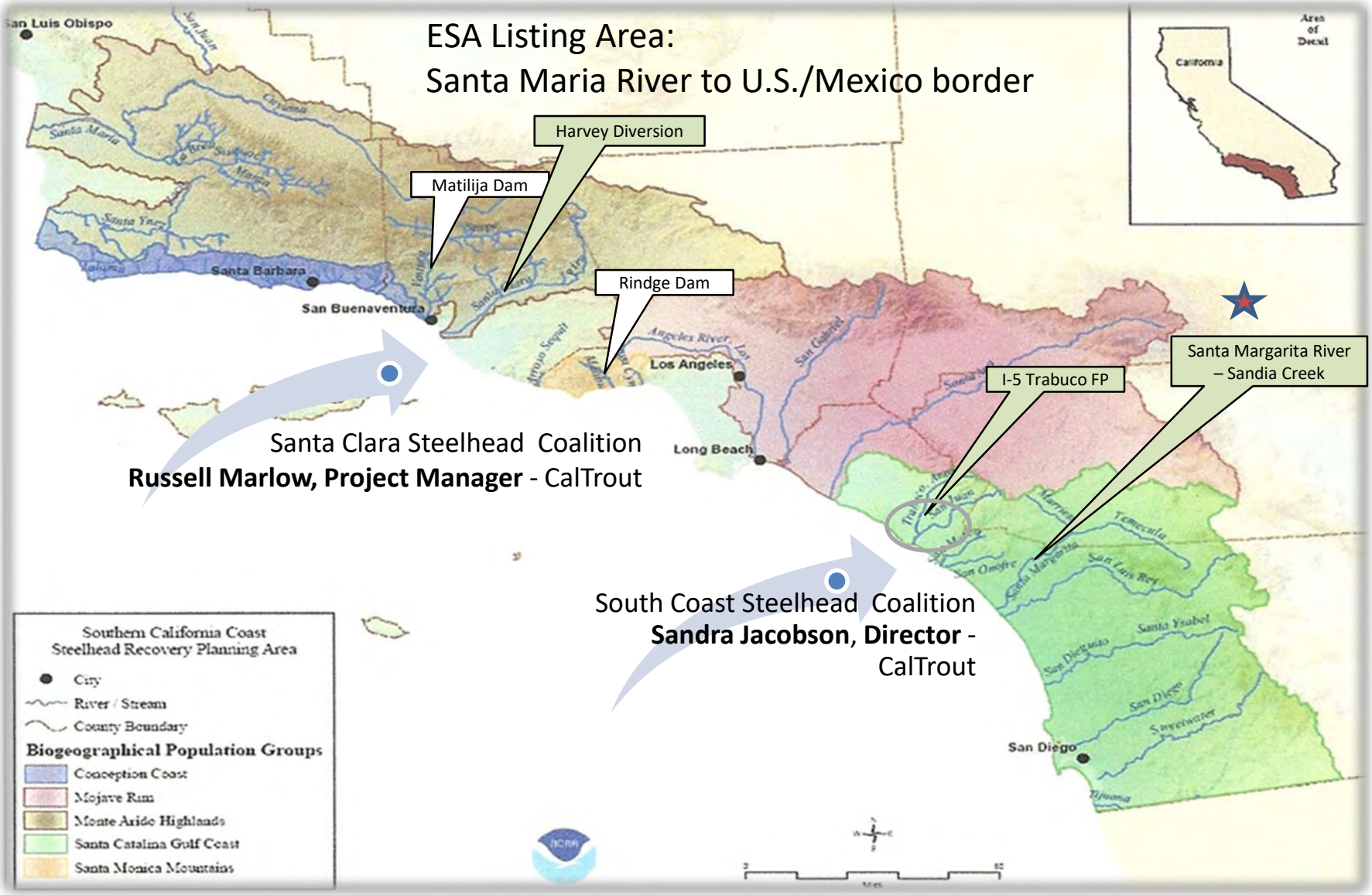
This is a multi-benefit project that:

- removes a high priority barrier to migration of endangered steelhead;
- protects public life and property from flood impacts;
- improves safety for trail users;
- provides back-country emergency response during strong storms;
- alleviates traffic congestion in highly used commuter corridor;
- increases access of Disadvantaged Communities (DAC) to trail system;
- enhances quality of riparian and river habitat for multiple species.

• Proposed bridge construction project is in the heart of the newly created Santa Margarita River Trail Preserve parkway visited by >100,000 people each year.

• Construction of this bridge at $16M during 2021-2023 will provide improved public safety, traffic flow and flood management; and enhance the unique biological and recreational values of the river.

# Southern California Steelhead – Endangered




Adapted from NMFS Southern California Steelhead Recovery Plan (2012). Coalition Funded by CDFW.

# Southern California Steelhead Recovery

Steelhead are the anadromous form of rainbow trout that migrate between ocean and freshwater.

Their population declined in mid 1900s due to habitat loss and barriers that block access to upstream spawning and rearing areas.

There are critically few steelhead left in Southern California and they get special protection.

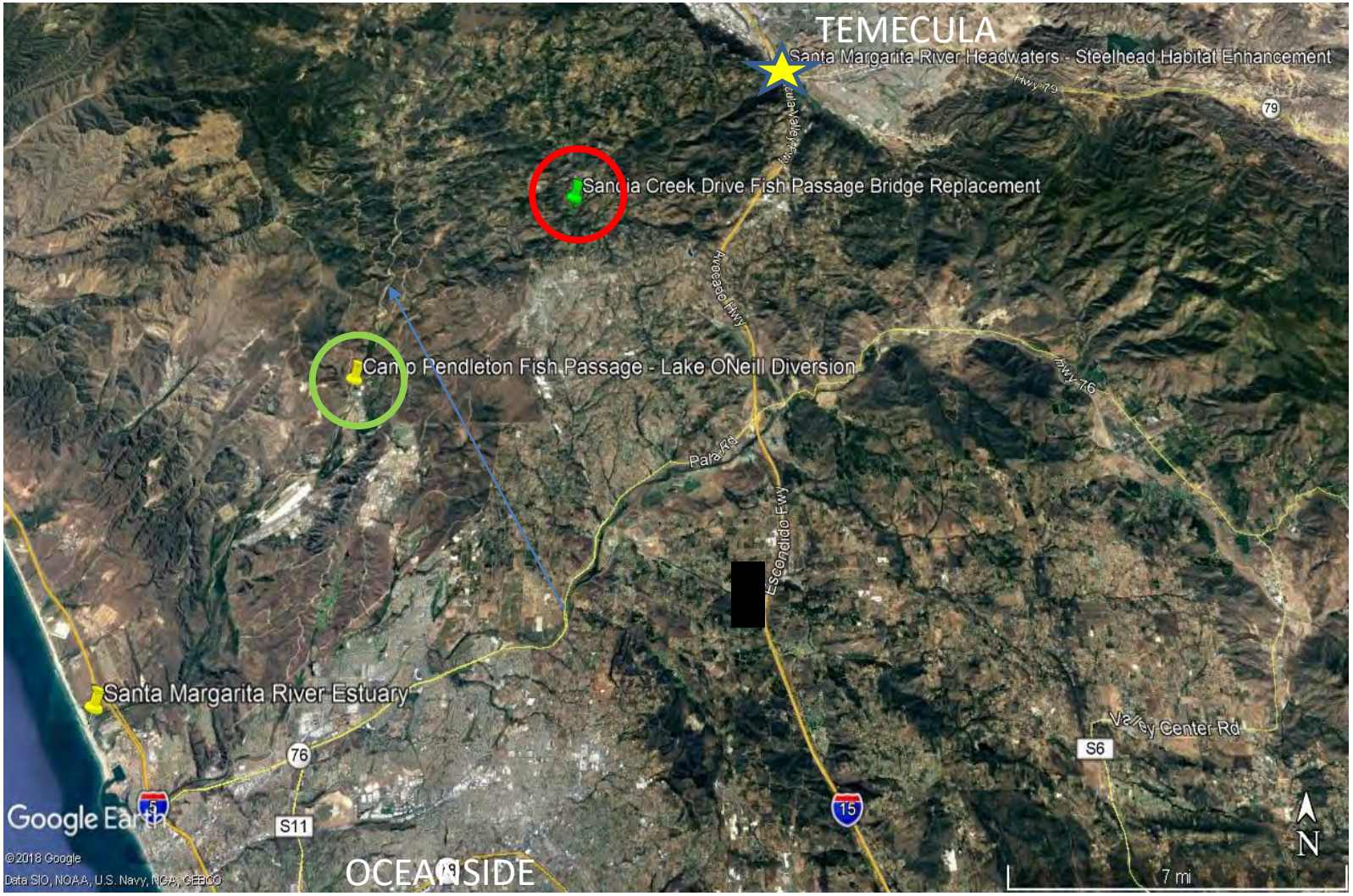
Sightings in San Diego rivers are rare.

Santa Margarita River is one of four highest priority steelhead recovery rivers in southernmost part of California, designated in the Federal recovery plan.

San Mateo Creek Steelhead – 1939.

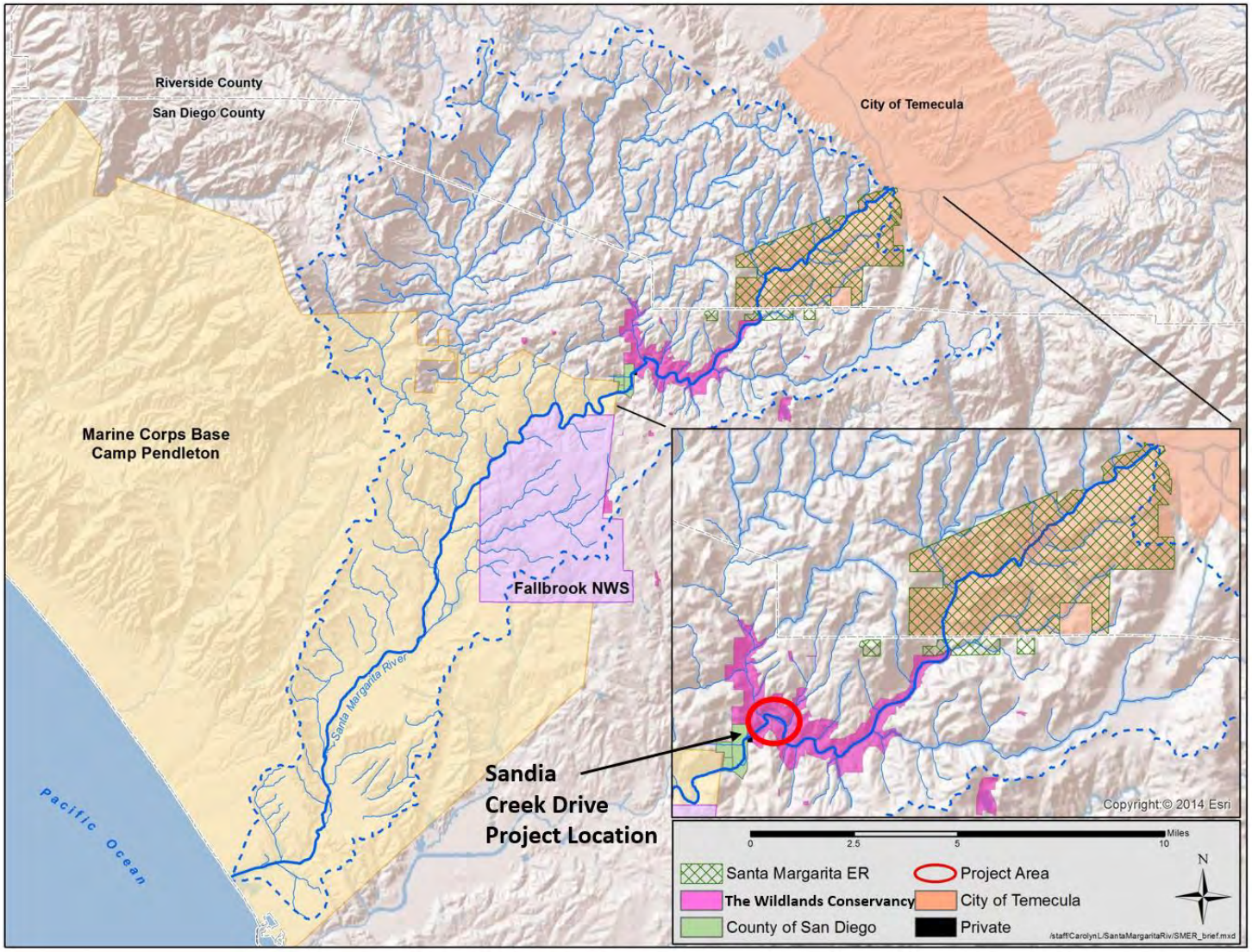
From NMFS (2012) Southern California Steelhead Recovery Plan

# Santa Margarita River – Fish Passage Map



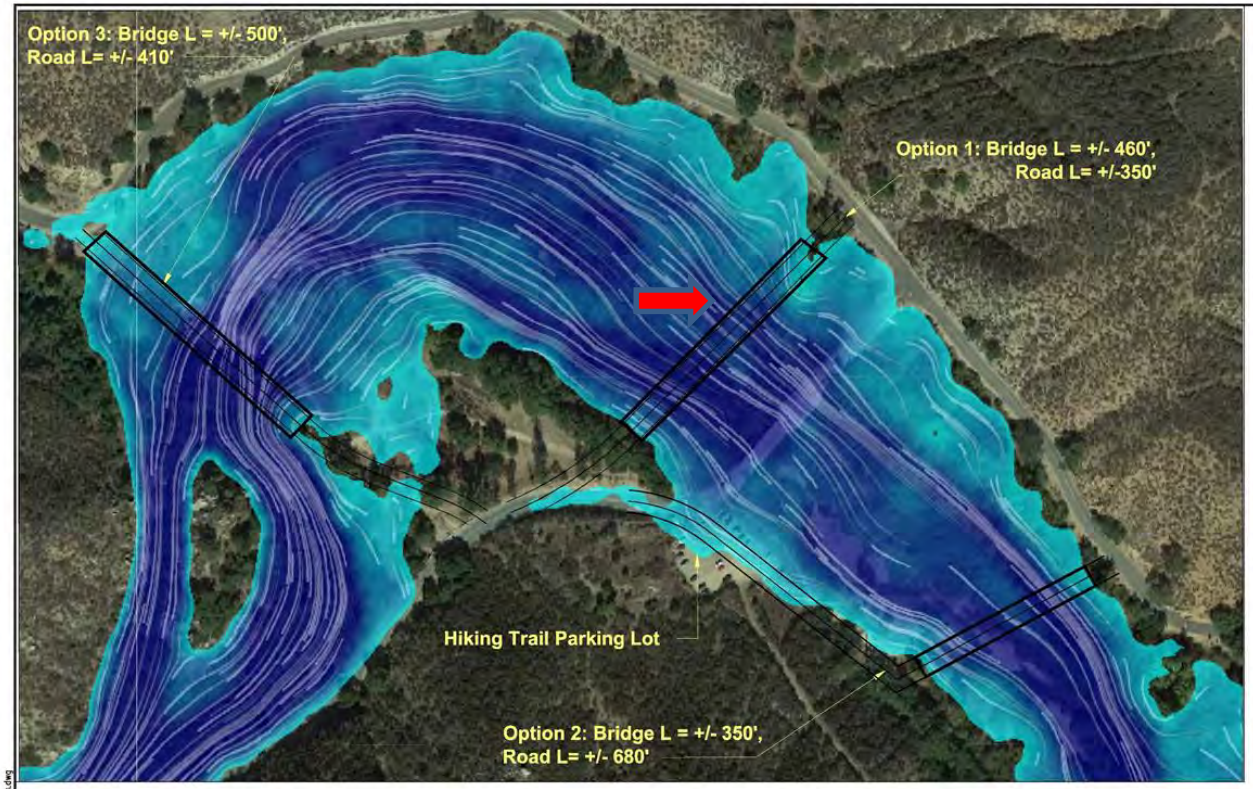

Removal of just two barriers in the Santa Margarita River restores steelhead access to historic spawning and rearing areas ★. US Marine Corps just completed remediation of barrier at Lake O'Neill diversion on Camp Pendleton ○. Now, only Sandia Creek Bridge remains ○.

# Santa Margarita River Watershed - Undeveloped

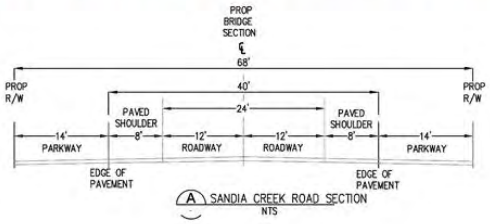


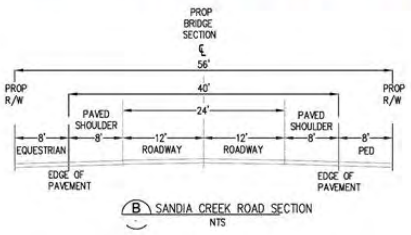

Santa Margarita River – one of few perennially flowing rivers in Southern California;
Remains in undeveloped state: Camp Pendleton, SM Trail Preserve, SM Ecological Reserve

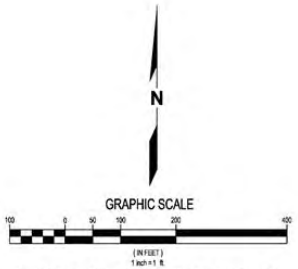
# Alternatives Analysis - Fish Passage Design For 100-Yr Flow




| Horizontal Options | | |
|---|---|---|
| Option No. | Advantages | Disadvantages |
| 1 | No impact to existing trail parking lot and utilities | Slight increase in length from option 2 |
| | Similar alignment to existing bridge | |
| | Minimal impact to Sandia Creek Dr. | |
| 2 | Shorter length | Increased impact to Sandia Creek Dr. |
| | | Increased impact to existing trail parking lot and utilities |
| | | Will experience greater scour depths due to higher flow velocities |
| 3 | Reduced southbound turning radius | Significant increase in length |
| | Using existing alignment of SMR01 | Would require additional stops to slow down traffic |
| | No impact to existing trail parking lot and utilities | Additional impact to SMR |
| | | Will experience greater scour depths due to higher flow velocities |




Full Size = 22" x 34", Half Size = 11" x 17"

Notes:

1. Per Meeting Notes, March 22, 2017: Jeff Moody (County of San Diego indicated that the right-of-way would need to be 68', as shown in Section A.

2. Per San Diego County Trails Master Plan, trail tread width for pedestrians and equestrians can be 8' (DG-1 & DG-2), as shown in Section B.

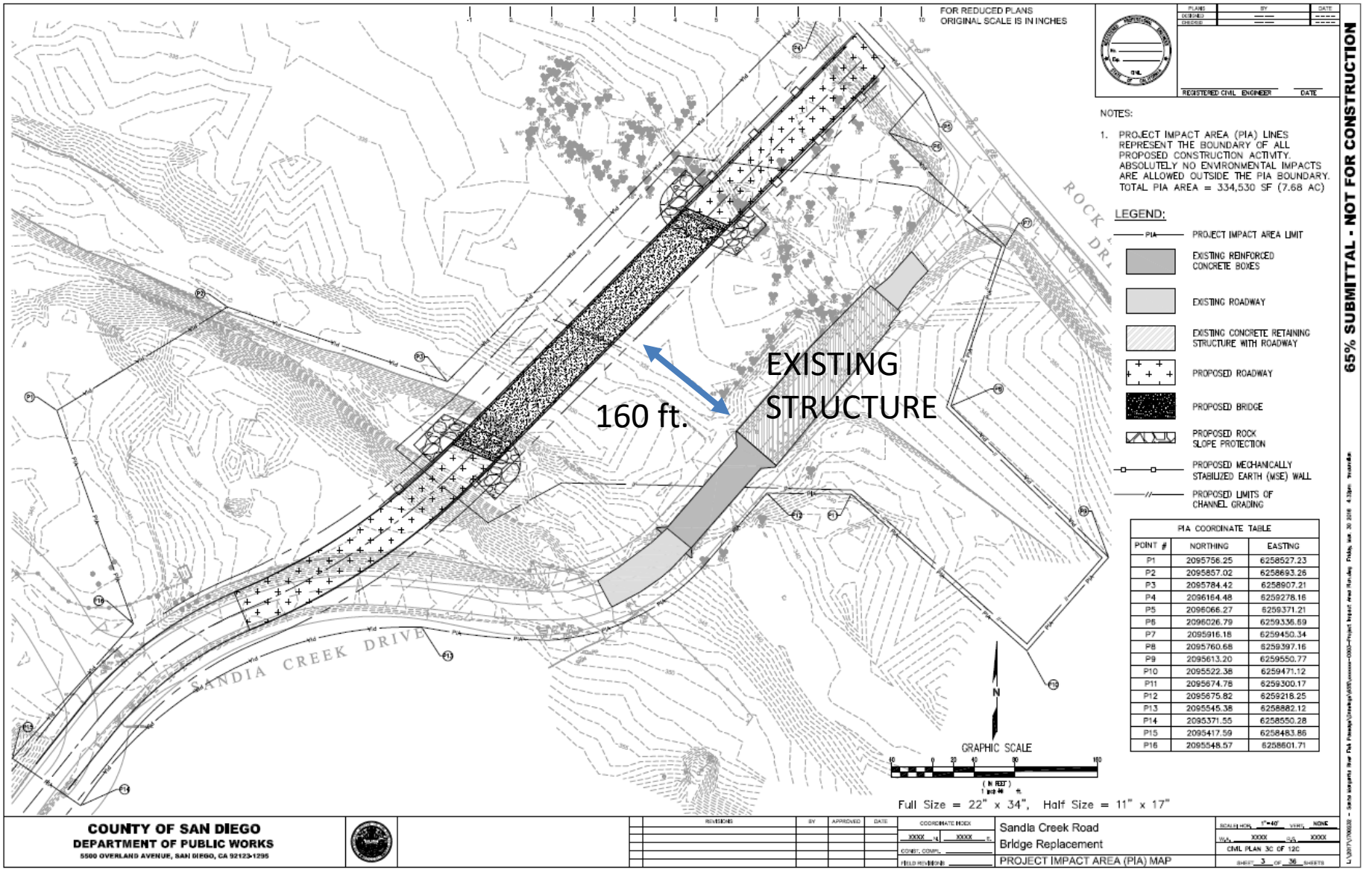
kpff Consulting Engineers
400 Oceangate, Suite 500
Long Beach, California 90802
(562) 437-9100 Fax (562) 437-9200

SANTA MARGARITA RIVER
FISH PASSAGE
HORIZONTAL OPTIONS

DATE: 2017-11-03 SCALE: 1" = 100'
DRAWN BY: JLH SHT 1 OF 1

Plotted: Nov 02, 2017 - 10:34am jhernandez Layout: Layout1
L:\2017\1700232 - Santa Margarita River Fish Passage\Design\SMR Fish Passage Options.dwg

# Proposed Sandia Creek Drive Bridge Replacment




PIA COORDINATE TABLE

| POINT # | NORTHING | EASTING |
|---|---|---|
| P1 | 2095756.25 | 6258527.23 |
| P2 | 2095857.02 | 6258693.26 |
| P3 | 2095784.42 | 6258907.21 |
| P4 | 2096164.48 | 6259278.16 |
| P5 | 2096066.27 | 6259371.21 |
| P6 | 2096026.79 | 6259336.59 |
| P7 | 2095916.18 | 6259450.34 |
| P8 | 2095760.68 | 6259397.16 |
| P9 | 2095613.20 | 6259550.77 |
| P10 | 2095522.38 | 6259471.12 |
| P11 | 2095674.78 | 6259300.17 |
| P12 | 2095675.82 | 6259218.25 |
| P13 | 2095545.38 | 6258882.12 |
| P14 | 2095371.55 | 6258550.28 |
| P15 | 2095417.59 | 6258483.86 |
| P16 | 2095548.57 | 6258601.71 |

Existing bridge to remain open during construction; then old one demolished w/ revegetation.

# Santa Margarita River Sandia Creek Fish Passage Design

| Funding Source – Design | Amount | Deliverable |
|---|---|---|
| Cal Dept Fish and Wildlife (2016 – 2018) | $165,195 | draft 65% Design |
| State Coastal Conservancy (2017 – 2019) | $507,000 | complete 65% to 100% Design |
| Total | **$672,195** | |

**Project Design Team ***

Civil and Structural Engineering: KPFF (Jose Hernandez lead, Anne Streufert, Paul Georgiff)
Hydraulic Engineering: River Focus (Jake Gusman, Darren Bertrand)
Project Applicant: Trout Unlimited (Blankenship, Sutherland)
Project Management: California Trout (Jacobson)

# San Diego County – CEQA Lead and Project Status

San Diego County Planning and Development Services - CEQA Lead Agency
Project is considered a Private Development Project. Darin Neufeld - POC.

Project is at draft 65% plans; geotechnical report under County review. Bridge plans were developed in consultation with SD County engineers Jeff Moody – lead reviewer; Ken Brazell – POC;

California Trout leading implementation funding campaign for $16M from state and federal competitive grant funding opportunities to cover construction of new bridge, demo old bridge, revegetation, monitoring.

Project Status: CalTrout held funder/partner site visit on 11/2/2018 to bring together funding agencies in common understanding of project timeline, $16M budget (includes 35% contingency), and project elements. Revised design in development for 615 ft bridge to maximize structural stability and minimize environmental footprint. Construction proposed to start fall 2020, for two years due to nesting/breeding season of sensitive bird species in area.

Draft Initial Study/Mitigated Negative Declaration documents submitted to SD County PDS for environmental review on 3/30/2019 by CalTrout. Subsequent discussions with County staff and County Work Scope letter sent 5/31/2019 indicated they required additional technical studies.

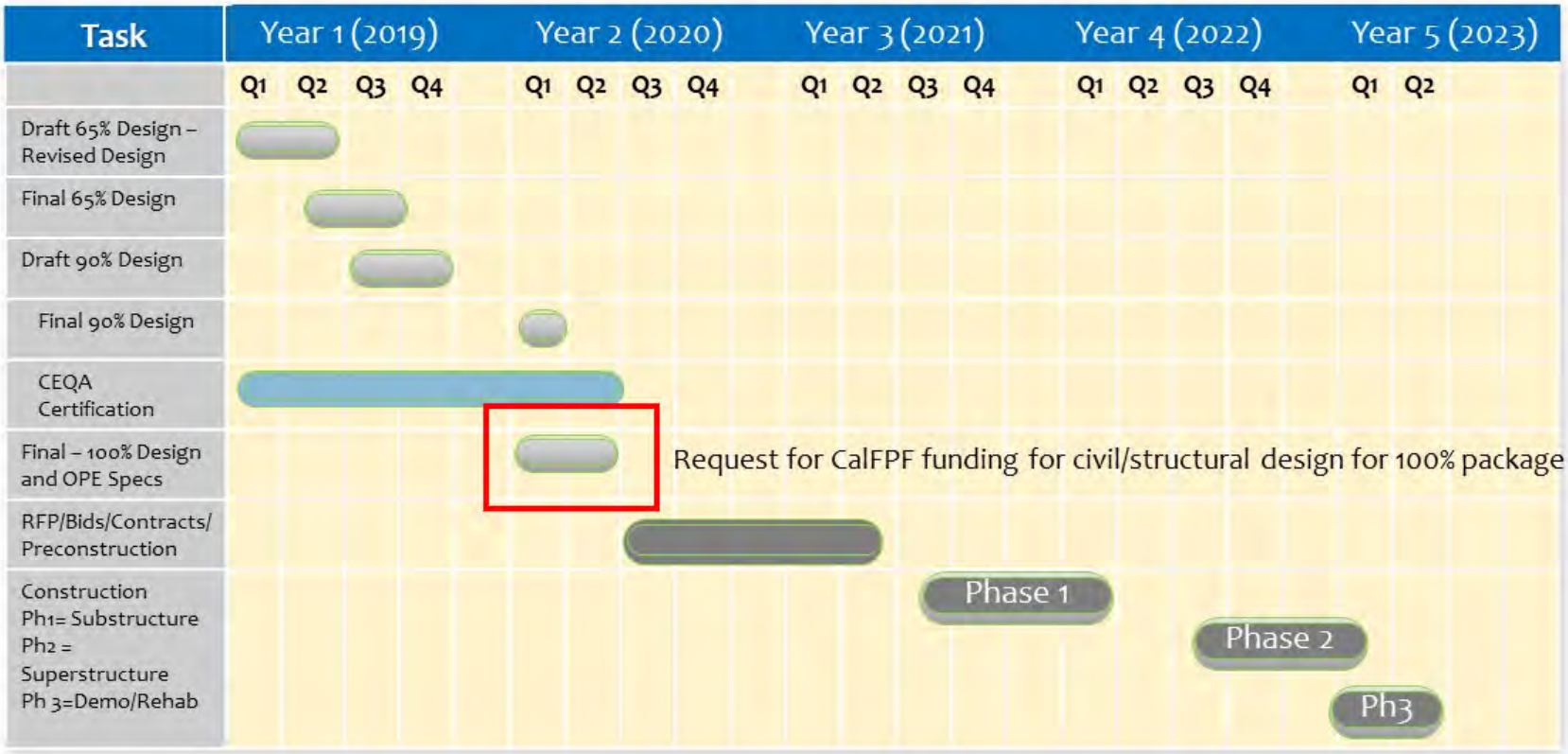
# CalTrout - Funding Campaign

| Grant proposals submitted | Date | Amt Requested | Anticipated Award Date | Anticipated Contract Date | Notes |
|---|---|---|---|---|---|
| California Dept. of Fish and Wildlife – Fisheries Restoration Grant Program** | Apr 2019 | $ 1.9M | Dec 2019 | Jun 2020 | Under review; key seed funding and streamlined permitting |
| State Coastal Conservancy | Apr 2019 | $ 2.4M | Nov 2019 | Feb 2020 | Not funded |
| DOT – Build Program | 2020 | $ 1.5M | TBD | TBD | Will seek participation in County funding package |
| Wildlife Conservation Board | Apr 2019 – invited for full proposal but deferred to 2020 due to County requirement | $ 4M | 2020 | 2020 | Deferred |
| CDFW FWS, CNRA | 2020 | $ 7M | TBD | TBD | |

TOTAL GRANT FUNDING CALTROUT IS SEEKING TO SECURE: $16.1M

# Proposed Bridge Implementation Timeline

## Timeline Overview Design and Implementation: Santa Margarita River bridge construction




San Diego County will own bridge; construction is within County ROW.

# Project Partnerships and Support

**Public Outreach by Project Team 2016-2018**

- Presentations to Fallbrook Community Planning Group (1/15/2018), Fallbrook Community Forum (3/15/2018);
- Site Visits and Conference Calls with Fallbrook Trails Council, FPUD for input.
- Articles published about project in Fallbrook Newspaper "Village News" 2018/2019
- Outreach to local residents – Sandia Creek Dr, Community Center presentations on project

**Supported by:**

- The Wildlands Conservancy – landowner draft MOU, letters of support
- State Senator Brian Jones, 38th District Letter of Support
- Coastal Conservancy outreach to 20 regional Tribal Nations for bridge design;
- Governor Brown, Joel Anderson (former Senator), Anthony Spina (NMFS Regional Director) - Letters of Support for SMR bridge

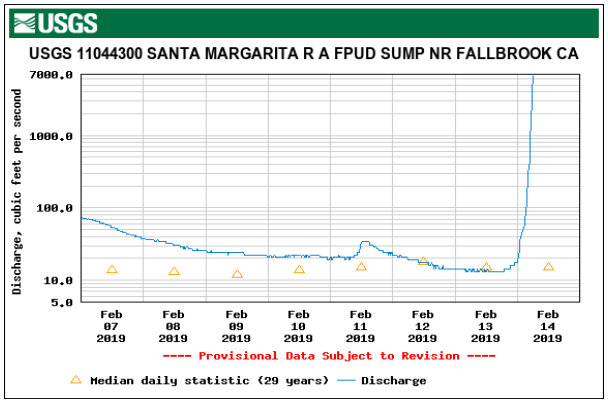
# Sandia Creek Drive Bridge Replacement

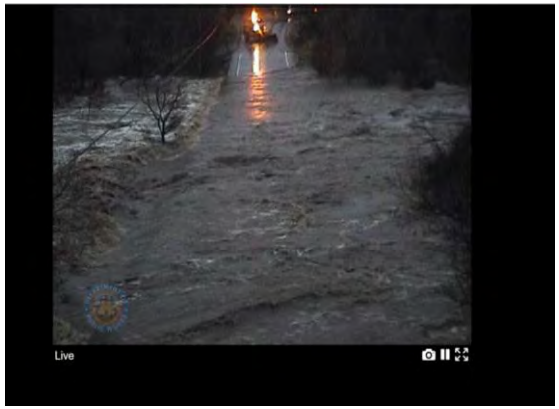

Sandia Creek Drive bridge looking south; new bridge will be in same alignment about 160 ft to the right (downstream) and designed to pass 100-yr flood with 1 ft freeboard. Existing bridge is safety issue – blind corner next to visitor parking lot, flashy floods during heavy rain.

# Existing Structure: Flood Hazard and Public Safety Risk

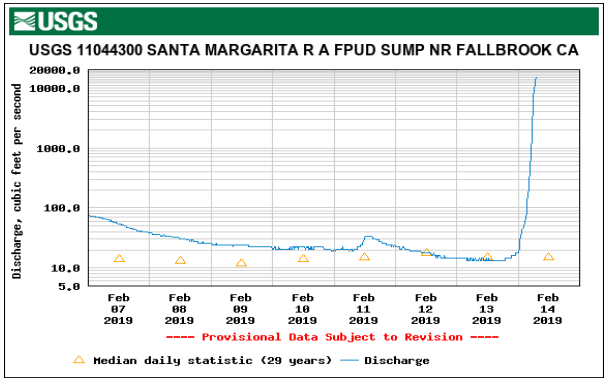
Santa Margarita River – Sandia Creek Drive High Flow Event 2-14-2019

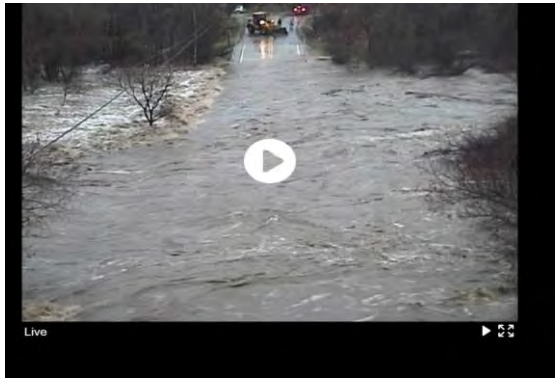
# Sandia Creek Drive Bridge at High Flow – Safety issues



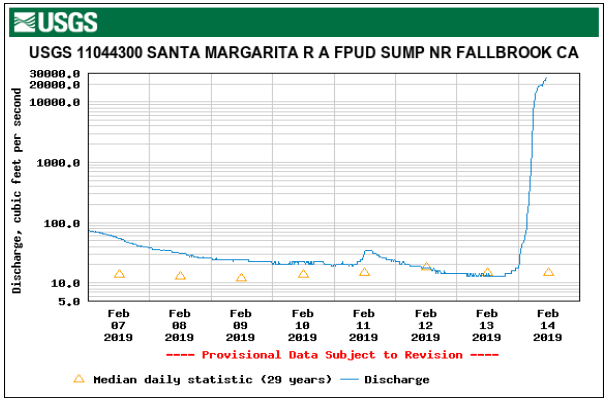




Tuesday February 14, 2019
6:40 am
SD County Webcam
Sandia Creek Drive




Tuesday February 14, 2019
7:15 am





Tuesday February 14, 2019
12 pm noon

# Seeing the Present

# Visualizing the Future

# Santa Margarita Ecological Reserve – steelhead destination

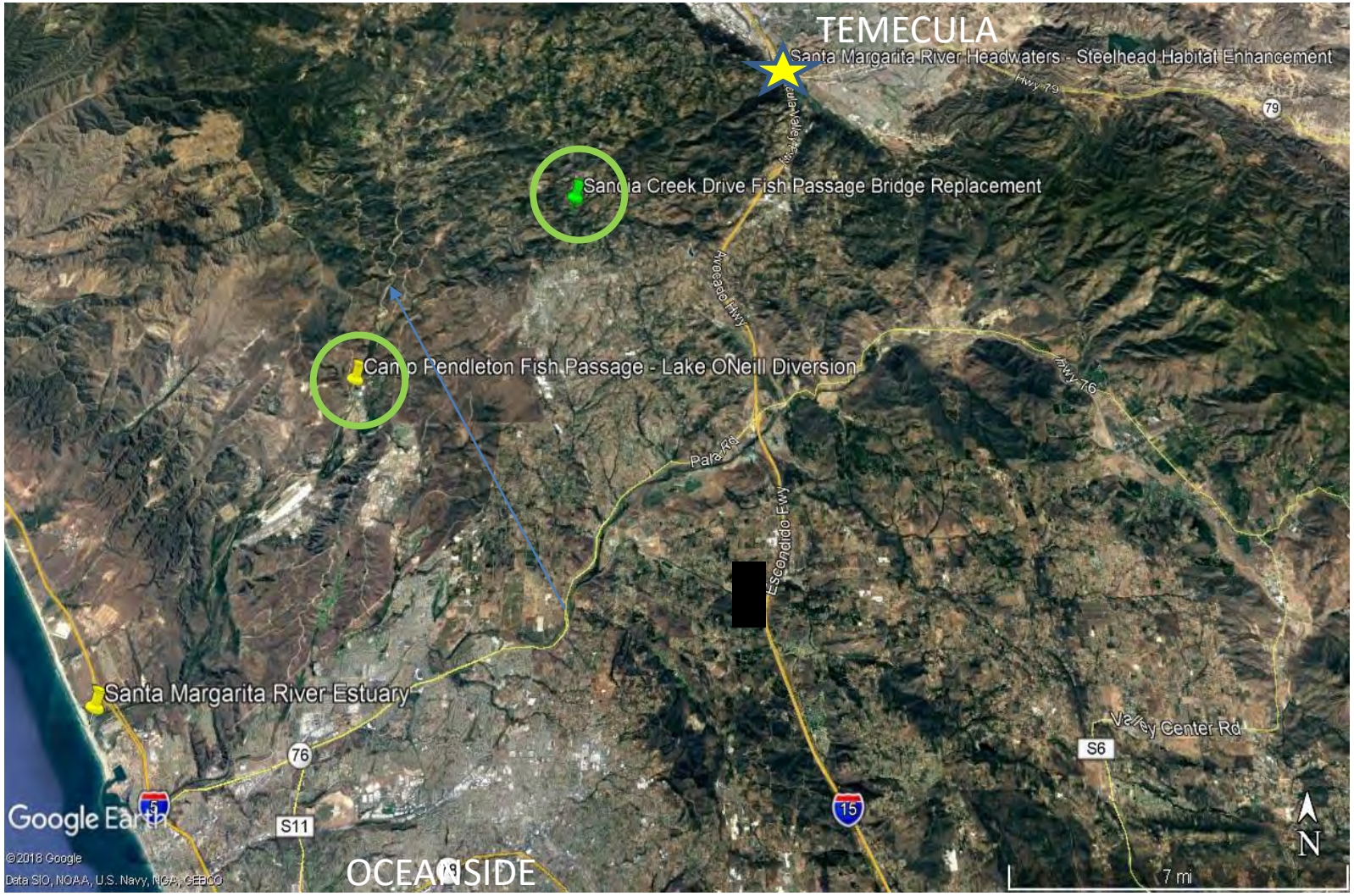
# Santa Margarita Ecological Reserve - Fisheries Habitat

Good Trout Spawning and Rearing Habitat

Water Quality Testing by Volunteers

Steelhead Habitat Improvement Ongoing by Removal of Non-native Aquatic Species and Vegetation

# Achieving safe passage in and over the Santa Margarita River




Contact:
Sandra Jacobson, Ph.D.
Caltrout, Director South Coast Region sjacobson@caltrout.org