Southern Sonoma County Water Quality Improvement and Wetlands Restoration Project Workplan

Project Summary

This project supports a growing partnership between Sonoma County's Permit and Resource Management Department, Transportation and Public Works, and Regional Parks, along with non-profits Sonoma Ecology Center and Laguna Foundation to implement Total Maximum Daily Loads in Sonoma Creek and the Petaluma River to improve water quality and aquatic/riparian habitat in these southern Sonoma County watersheds. The project will make measurable improvements to water quality and wetland habitat through: (1) assessment, prioritization and remediation of County road-related sediment sources to reduce sediment inputs to water courses, (2) pathogen load reduced through increased identification of sources and support of new Onsite Wastewater Treatment Systems policy, (3) removal or reduction of five point sources of pathogen loading into the Petaluma River, (4) prevention of 2,500 CY of sediment loading to upper Sonoma Creek and associated steelhead habitat restoration, (5) restoration of 3.5 acres of vernal pool and other restoration work at County Regional Parks, and (6) improved assessments of wetland resources, and design development for restoration of Sonoma Creek and freshwater wetland restoration in the Kenwood area.

Project Goals and Objectives

This project will be implemented in the Sonoma Creek and Petaluma River watersheds, which drain to San Pablo Bay and are largely rural, with significant viticultural and grazing land use. Both support steelhead, unlisted Chinook salmon, and California freshwater shrimp, all of which are limited in their range and population by excess sediment, poor chemical and biological water quality, hydro modification, and lack of riparian vegetation. Sonoma Creek has TMDLs for sediment and pathogens. Petaluma River has a TMDL for urban pesticide toxicity and pathogens and is 303(d) listed for sediment. This project addresses these problems by implementing actions put forth in both the Petaluma River and Sonoma Creek TMDL action plans.

Problematic, road-spanning culverts, specifically those intersecting streambanks, are a major source of sediment entering streams. TPW has a significant backlog of culvert repairs and replacements that began to be addressed during our prior SFBWQIF grant. Here we propose to build on this success by continuing to fund culvert repair and replacements to benefit water quality.

Pathogens continue to be a cause of impairment for creeks in San Francisco Bay watersheds. Utilizing advances in bacteroides analysis as well as enhanced study designs to pinpoint the locations and causes of pathogens in Bay watersheds will allow administering agencies to have increased evidence to pursue enforcement and structural changes to improve water quality.

The *Limiting Factors Analysis for Steelhead in Sonoma Creek Watershed (2006)* concluded that fine sediment reduces habitat quality for steelhead and is a major factor in decline of beneficial uses. Sonoma Creek's *Sediment Source Analysis (2006)* found that 79% of the suspended and bed load in Sonoma Valley streams is from the beds and banks of stream channels, implicating rapid runoff from outfalls, ditches, and bare or gullied streambanks. This proposal includes a Sonoma Creek habitat restoration demonstration project, which will remove eroding sediment from the streambank and enhance the riparian

corridor by lowering the inset floodplain. Also included are erosion control efforts in Sonoma County Regional Parks and restoration through invasive species control and revegetation with native species. We will also advance designs for future restoration projects including over 25 acres of wetland habitat.

Task 1. Water Quality Improvements Task 1.1 Road Crossing and Outfall Sediment Source Analysis

In our previous, Clean Streams of Southern Sonoma County (CS3C) project (completion report attached), we used the Road Rapid Assessment Method (RoadRAM) to evaluate over 400 road/stream and road/ditch culvert sites in the Sonoma Valley and develop a prioritized list of sites for Sonoma County's Permit Sonoma and TPW to consider for culvert repair and/or replacement. The RoadRAM method considers multiple aspects of a culvert's condition and landscape context and assigns several categorical scores and an overall score that inform the risk of sediment delivery to the creek by future culvert failure. This prioritization, based on protection of water quality, will be blended together with TPW's existing list of prioritized sites, which is based on public safety and infrastructure protection as well as the PWA DIRT evaluation criteria.

This addition will guide their work in a more environmentally proactive approach. Our previous CS3C work resulted in repair, replacement, and BMP installation at over 40 compromised culvert sites across Sonoma Valley, preventing more than 1,500 CY of sediment from entering Sonoma Creek and its tributaries. We now propose to extend this approach to the Petaluma River valley and apply an updated assessment methodology to evaluate 150 to 200 culvert sites spread across that watershed but focusing on the Lichau, Willow Brook, and Washington Creeks due to the high natural sediment production rates in those sub watersheds. Following these assessments, we will develop a prioritized list of compromised culvert sites for actions to improve water quality protection in Petaluma valley.

Following are the planned deliverables and milestones with their anticipated completion dates:

Assessment protocol (SEC & PRMD)	June 2021
Assessments of up to 200 road/stream and road/ditch crossings in Petaluma watershed (SEC & PRMD)	December 2021
Prioritization results (SEC & PRMD)	April 2022

Task 1.2 Maintain, Repair, and Replace High-priority Culverts, Ditches, and Roads

Based on the outputs of Task 1.1, we will implement culvert repair and/or replacement projects at a minimum of 20 high priority culvert sites in the Petaluma River watershed in order to protect compromised road/stream or road/ditch crossings from mass failure during future storms and prevent the eroded materials from entering aquatic systems. As part of this task, TPW will incorporate the results of the assessments conducted in Task 1.1 into their existing prioritizations for culvert repair and replacement projects and develop a new prioritized list of projects meant to protect water quality as well as public safety and infrastructure integrity. TPW will conduct planning, permitting, and implementation activities for select priority culvert sites. We will also continue working through the priority culvert list for the Sonoma Creek watershed and will implement an additional 5-10 high priority culvert repair and replacement projects.

These planned deliverables and milestones and their anticipated completion dates are as follows:

Environmental Visits and Permitting (PRMD)	December 2022
Replaced, repaired, or maintained ditches, culverts, and crossings on Petaluma River and Sonoma Creek Watersheds-Up to 10 culvert repairs. (TPW & PRMD)	September 2024

Task 1.3 TMDL Implementation in Petaluma River and Sonoma Creek Watersheds

In 2019, the San Francisco Bay Regional Water Board adopted the Petaluma River Bacteria TMDL putting forth that the Petaluma River is severely impaired with indicated bacteria. In studies leading up to that plan, elevated pathogens levels were found at many sites across the watershed, however no clear conclusions could be discerned due to the spatial and temporal variability of the data. The Implementation Plan for this TMDL requires Sonoma County to submit a bacteria water quality-monitoring plan to address this variability, identify areas in the watershed that seem to be hot spots, including seasonality, and identify potential sources for fecal indicator bacteria (FIB).

In this task we will develop and implement a monitoring plan that will identify 8-12 pathogen monitoring sites distributed across the Petaluma watershed to be sampled using a 5-week geomean sampling approach 4-6 times during wet and dry seasons for two 2-3 years. The exact number of sampling events will depend upon how quickly patterns emerge. Once recurring hot spot areas are identified, 2-3 high-resolution samples will be collected in those hot spot areas to focus on specific pathogen loading reaches. This will be combined with microbial source tracking (MST) sampling and analysis to clarify potential FIB sources. This approach follows from the successes of our existing CS3C grant where we implemented a pathogens monitoring program for Sonoma Creek and were able to obtain high-resolution data on FIB hot spots and sources. An updated QAPP will be developed for this effort, based upon the existing Sonoma Creek monitoring QAPP. Depending on the resources available, some amount of further sampling may occur in Sonoma Creek to supplement existing data.

Also within this task, Sonoma County will implement an action plan to correct identified sources of bacteria within these County watersheds. If sources identified can be remediated using structural or non-structural BMP at identified locations under County MS4 jurisdiction, then implementation actions will be conducted. In instances where the County has limited authority to address the discharge, we will identify and disseminate recommended interventions: i.e. escalated enforcement, referral to Water Board, homeless encampment clean-up, structural BMP, etc. Resampling of priority and/or intensive sites will then determine effectiveness and whether a combination of sources is at play, requiring further source identification.

Additionally, as part of this task, SEC will monitor and report on priority ambient water quality and stream integrity parameters toward TMDL and watershed health targets using standard protocols. Parameters included here include standard water quality metrics (temperature, pH, conductivity, total dissolved solids, dissolved oxygen), and turbidity as well as streamflow, streambed and fish habitat characteristics and other measures to the extent practicable. Most of this monitoring would co-occur alongside the pathogen sampling, and in compliance with the aforementioned, updated QAPP. Some additional sampling may occur independently in Sonoma Creek and its tributaries to continue the

monitoring record we have been developing in that watershed. Where appropriate, data will be uploaded to CEDEN and/or shared on other public, online data platforms.

Deliverables and Milestones for this task and their anticipated completion dates are:

Develop QAPP and Study Design for Petaluma River Monitoring (SEC, PRMD, City of Petaluma, & MCSTOPPP)	July 2021
Conduct at least two years of pathogen sampling wet/dry season in the Petaluma River. (SEC)	August 2022
Investigate up to 5 site locations determined through Monitoring to be potential sources of pathogens. (PRMD)	August 2023
Monitoring Report - Petaluma River (SEC & PRMD)	August 2023
Monitoring results made available in CEDEN (SEC)	December 2023

Task 2. Wetland and Riparian Restoration Task 2.1 Stream Restoration Demonstration Project at Morton's Warm Springs

SEC and Environmental Science Associates (ESA) are developing a restoration vision for habitat restoration for upper Sonoma Creek where it is severely incised and largely disconnected from its historical floodplains. Bank erosion and incision have contributed high volumes of fine sediment to Sonoma Creek and this, along with channel degradation has resulted in poor spawning, rearing, and refugia habitat conditions for ESA-listed steelhead and other aquatic species. The restoration vision includes 16 conceptual designs showing a variety of restoration actions including widening the riparian corridor, lowering inset floodplains, expanding high flow floodplains, biotechnical bank stabilization, restoring confluences, and restoring seasonal wetlands. The vision aims to slow and retain water in the upper watershed, improve water quality, reduce bank erosion, and improve instream and riparian habitat. From this effort, the flagship project, selected to serve as a demonstration project to inspire future restoration efforts on private lands, is a creek, bank and riparian restoration project at Morton’s Warm Springs Resort (Morton’s).

With roots in the 1800s, Morton’s developed into a popular summertime destination for picnicking, barbecue, recreation, and swimming in spring-fed geothermal pools throughout the 1900s. Areas along the creek were filled and leveled in the 1950s to create a wide, creekside picnic area utilizing retaining walls that are now eroding. This stream habitat restoration project will remove 2,500 CY of this fill and other material to lower and widen the inset floodplain and provide more frequently inundated floodplain habitat that is lacking in Sonoma Creek. These actions, including the installment of eight large wood structures, will expand and improve the condition of Steelhead rearing habitat during winter base flows, and provide high-velocity refugia across peak-flows. Widening the corridor will also reduce velocities to allow gravels to naturally deposit on the creek bed, improving future spawning, and rearing habitat conditions. New gently sloped, revegetated banks and associated riparian areas will reduce erosion and fine sediment input into Sonoma Creek, improving the quality of channel bed conditions for salmonid spawning and rearing downstream. This restoration will result in 0.5 acres of riparian habitat and 400 linear feet of stream and bank habitat. Outreach to landowners in upper Sonoma Creek to educate and encourage participation of landowners in the Upper Sonoma Creek Restoration Vision will also be part of this as a demonstration project. CDFW is funding 65% designs for this project through Proposition 1 funds, and we have applied for 100% designs, bid documents, and permits to be funded through the CDFW FRGP program. EPA funds will support geotechnical assessments and restoration implementation.

Deliverables and Milestones for this task and their anticipated completion dates are:

Complete 65% Design	December 2020
Finalize Design and Project Permitting (SEC)	March 2022
Construction of Morton's Warm Springs Creek Restoration Demonstration Project (SEC)	November 2023
Demonstration and Landowner outreach at Morton's (SEC)	October 2024

Task 2.2 Vernal Pool Wetland Restoration and Erosion Management at Sonoma County Regional Parks in Southern Sonoma

It is commonly estimated that over 90% of California's wetlands have been lost through land development and conversion. Vernal pools are ephemeral wetlands that historically were a common component of California's oak woodlands but are now among the wetland habitats most threatened. Vernal pools fill with winter rainwater, then slowly drain over the spring and early summer, becoming completely dry in late summer and fall. This seasonal hydrology makes them relatively harsh environments for most plants and they typically consist of rare and highly niche specific native wildflowers and grasses. The rarity of vernal pool habitats in general means that those native species that occur in these habitats are of special concern. In Sonoma County, three endangered vernal pool plants are endemic to the area. Sonoma sunshine, Burke's goldfields, and Sebastopol meadowfoam are all listed species and plans for recovery of all three species are detailed in the *Santa Rosa Plain Recovery Plan (2016)*.

Sonoma Valley Regional Park (SVRP) is a 200-acre site of predominantly oak woodland habitat. The site contains remnant vernal pool wetland features in low-lying areas that support a significant population of Sonoma sunshine (*Blennosperma bakeri*). The SVRP population of this endangered plant has been well documented by the Laguna de Santa Rosa Foundation for over ten years, and plans for its recovery are already well understood. Laguna Foundation and Regional Parks have engaged in similar efforts toward recovery of Sebastopol meadowfoam from 2018-2020, which has proven successful so far.

This project will restore 3.5 acres of degraded vernal pool and associated habitat at SVRP. This work will involve exclusionary fencing for park visitors and animals along with invasive species control, and native plant restoration. Specific actions toward the recovery of Sonoma sunshine will include permitted seed collection, propagation, and replanting of the endangered plant along with success monitoring. These actions will assist with recovery and conservation of this critical species.

Additionally as part of this task, Regional Parks will conduct management actions to reduce erosion of fine sediments and improve water quality, removal of invasive plant species, installation of BMPs and planting of native species in riparian areas in SVRP and other County Parks in the Sonoma Creek and Petaluma River watersheds. Management actions to improve water quality will be conducted in the following Parks: Tolay Lake Regional Park, Sonoma Valley Regional Park, Helen Putnam Regional Park, and Maxwell Farms Regional Park. See attached map of park locations.

Deliverables and Milestones for this task and their anticipated completion dates are:

Develop Planting Plan (Laguna Foundation, Regional Parks, & PRMD)	April 2021
Seed Propagation and Site Preparation (Laguna Foundation & Regional Parks)	September 2022
Planting Sonoma Valley Regional Park - 3.5 ac (Laguna Foundation & Regional Parks)	December 2022
Restoration and Erosion control (Regional Parks)	September 2024
Restoration Report	September 2024

Task 2.3 Habitat Assessment, Planning, and Design for Wetland and Riparian Restoration

Task 2.3.1. Rapid Assessment Training and Use for Sonoma County

The California Rapid Assessment Method (CRAM) has been utilized in various jurisdictions to collect data on baseline conditions, assessment, and planning for protection and restoration, and has been identified by Permit Sonoma as a preferred method for these purposes. Project lead John Mack developed the Ohio Rapid Assessment Method (ORAM), which CRAM was based upon. Project partner Steven Lee (SEC) was involved in the early development of CRAM and used the method extensively in the past. Sonoma County would benefit from consistent, widespread data on the quality of riparian and wetland areas in order to plan for improved protection and restoration efforts, and CRAM could help fill this data gap.

This approach will be to implement CRAM in the County by bringing in a trainer to hold 5-day, no cost training events for up to 25 staff from multiple partner organizations. In this task, PRMD and SEC will organize CRAM training for local nonprofit and government entities conducted by experienced CRAM trainers from San Francisco Estuary Institute (SFEI). We will organize SFEI to conduct one, full 5-day CRAM certification training. Proposed activities include the cost of SFEI CRAM trainer(s) and all associated costs associated with the 5-day training, the costs for up to three SEC staff to help organize logistics and carry out the events.

Deliverables and Milestones for this task and their anticipated completion dates are:

(1)	CRAM Training up to 25 local professionals (SEC & PRMD)	December 2022

2.3.2 Monitoring for Stream Health and Habitat Restoration Planning

As part of the previous, SFBWQIF/CS3C grant (Task 5.4 Continue Stream Health Monitoring), SEC carried out a review of the monitoring record for the Sonoma Creek watershed and convened a meeting of technical advisors, consisting of local scientists and natural resource managers, to gain input as to monitoring and research priorities for the watershed over the next 5-10 years. A take home message from that meeting was that there is a need for more data collected about the distribution and abundance of steelhead and freshwater shrimp species in Sonoma Creek along with priority parameters for water and habitat quality. SEC needs to obtain scientific research permits and/or collaborate with other organizations that already have them (such as Napa RCD). Through this task, SEC will pursue partnerships and permitting to collect fisheries data in Sonoma Creek in the most cost effective way possible, for example starting with pursuing low cost approaches to collecting fisheries-related data in Sonoma Creek. These include wet/dry mapping and snorkel surveys within critical steelhead rearing

reaches, better data on seasonal water temperature fluctuations and potential refuge zones, continued data collection regarding dry season streamflow, and rearing habitat quality via cobble/grain size and bed depth analysis. While there was planned support in the previous grant for a head start on these identified monitoring priorities, project delays and unforeseen circumstances stemming from the 2017 wildfires prevented most of this from occurring. Here we would complete that unrealized objective. This fishery and water quality data will inform our strategy and prioritization for future habitat restoration projects.

Deliverables and Milestones for this task and their anticipated completion dates are:

(1) Stream Health Monitoring Database (SEC) October 2024

2.3.3 Project Design for Wetland and Riparian Restoration Projects

In this task, SEC staff will conduct outreach to landowners and conduct site analysis to further develop conceptual designs for restoration implementation projects that will address fine sediment and reduce pathogen pollution in the Sonoma Creek watershed. 16 conceptual designs have been developed through our Upper Sonoma Creek Habitat Restoration planning work funded by CDFW, with one (the Morton's project) being advanced as a demonstration project. Funding from this task will support prioritization and further development of at least three of these draft designs into 30% designs that are fully supported by landowners to move into final design and implementation. The most notable of these is the restoration of approximately 15 acres of critical wetland habitat in the historic Kenwood Marsh. This project has been sought after by SEC, USFWS and other natural resource agencies for decades. We have made important inroads of late with five key landowners, but need to develop more detailed designs as a collaborative planning process with these landowners in order to make this project ready for implementation. Other projects include the Geib Family horse pasture/alluvial fan restoration and Alder Park riparian and wetland restoration both of which are adjacent to Sonoma Creek in Kenwood, and several other viable creekside restoration projects on public and private lands elsewhere in upper Sonoma Creek. Ongoing landowner outreach is critical to getting these projects off the ground and ready for inclusion in future funding proposals for restoration implementation. See attached conceptual designs for potential sites to advance.

Additionally, as part of this task SEC will work with Prunuske Chatham, Inc. (PCI) on analysis and planning for a project on the Geib Family Ranch to eliminate channelization of a degraded drainage ditch and restore the alluvial fan functions so that winter flows slow down, spread out over a pasture area, and sink into the subsurface. SEC will conduct streamflow monitoring on several other properties in upper Sonoma Creek to support streamflow enhancement planning. This work is partially funded by the WCB Proposition 1 Streamflow Enhancement program.

Deliverables and Milestones for this task and their anticipated completion dates are:

Advance (3) Restoration Designs in Sonoma Creek to 30% December 2023

Task 3. Project management, contracting, reporting, and invoicing, as required by EPA.

Project partners will divide management responsibilities to take advantage of differing areas of expertise. PRMD will institute management controls to assure that appropriate accounting mechanisms are in place,

attend EPA's project management training with another member of the project team, and assure that submissions to EPA meet requirements.

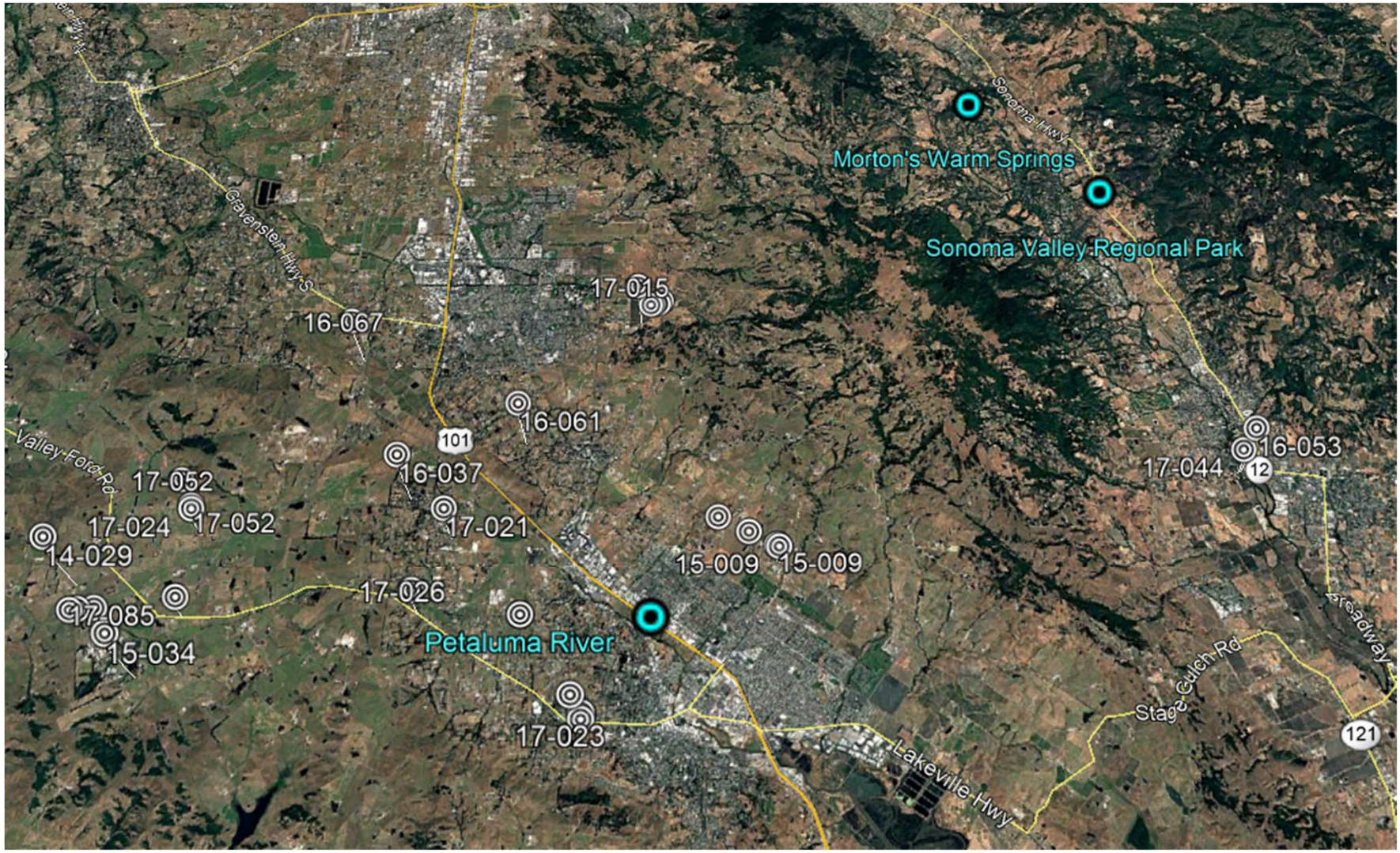
PRMD and the project partners will submit quarterly reports of the progress along with quarterly invoices. PRMD will work with the project partners to assemble task completion reports and deliverables listed in this work plan habitat benefits of managed wetlands.

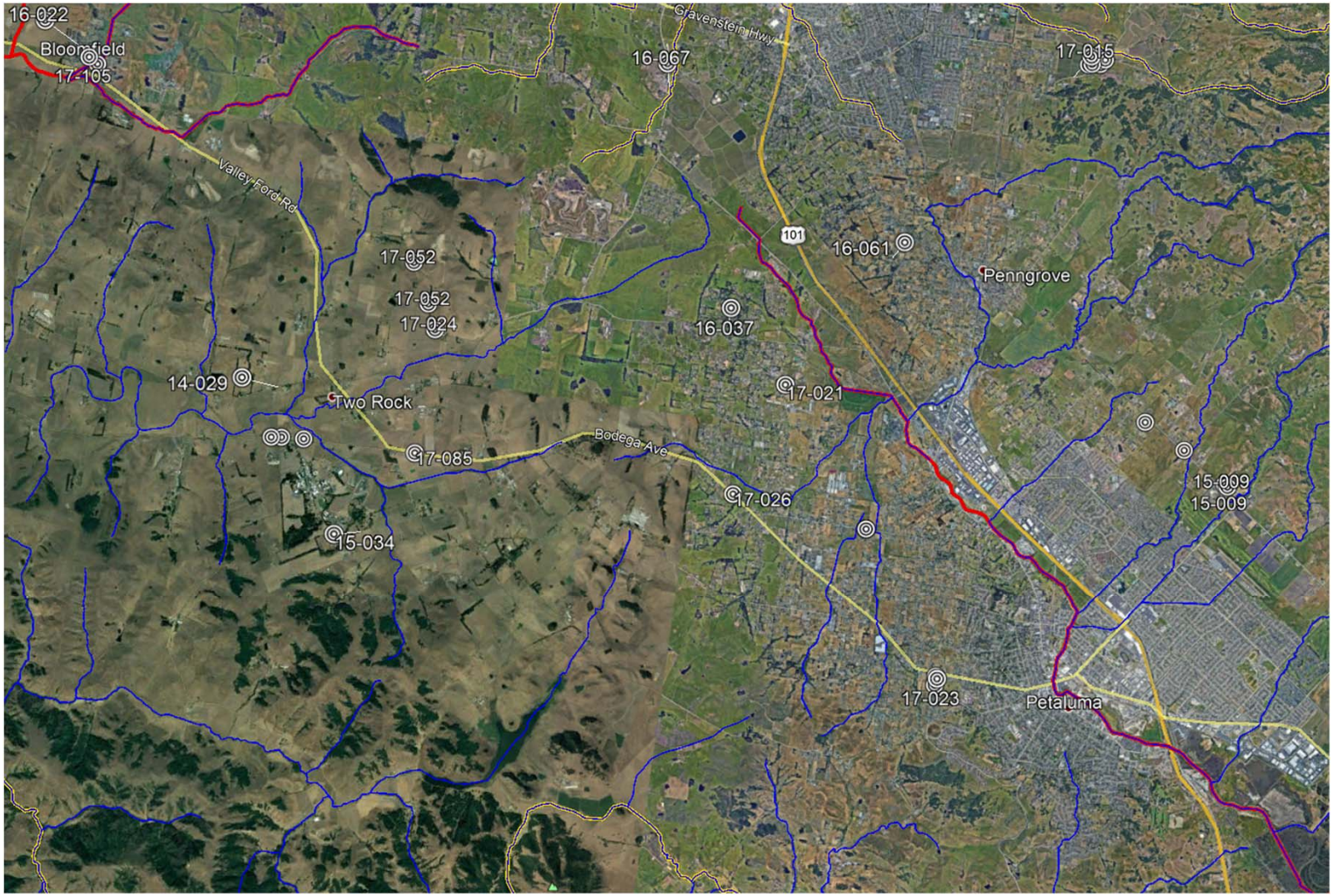
Deliverables and Milestones for this task and their anticipated completion dates are:

Quarterly Reports and Final Reports	October 2024

1.1 Road Crossing & Outfall Sediment Source Analysis	72,497	16,166	88,663
1.2 Maintain, Repair & Replace High Priority Culverts, Ditches & Roads	106,000	554,767	660,767
1.3 TMDL Implementation in Petaluma River & Sonoma Creek Watersheds	120,966	10,000	130,966
2.1 Stream Restoration Demonstration Project at Morton's Warm Springs	459,425	4,000	463,425
2.2 Vernal Pool Wetland Restoration at Sonoma Valley Regional Park	87,120	280,037	367,157
2.3 Habitat Assessment, Planning & Restoration Design	111,378	160,298	271,676
3.1 Project Management & Reporting	98,000	30,119	128,119

Southern Sonoma County Water Quality Improvement and Wetlands Restoration Projects



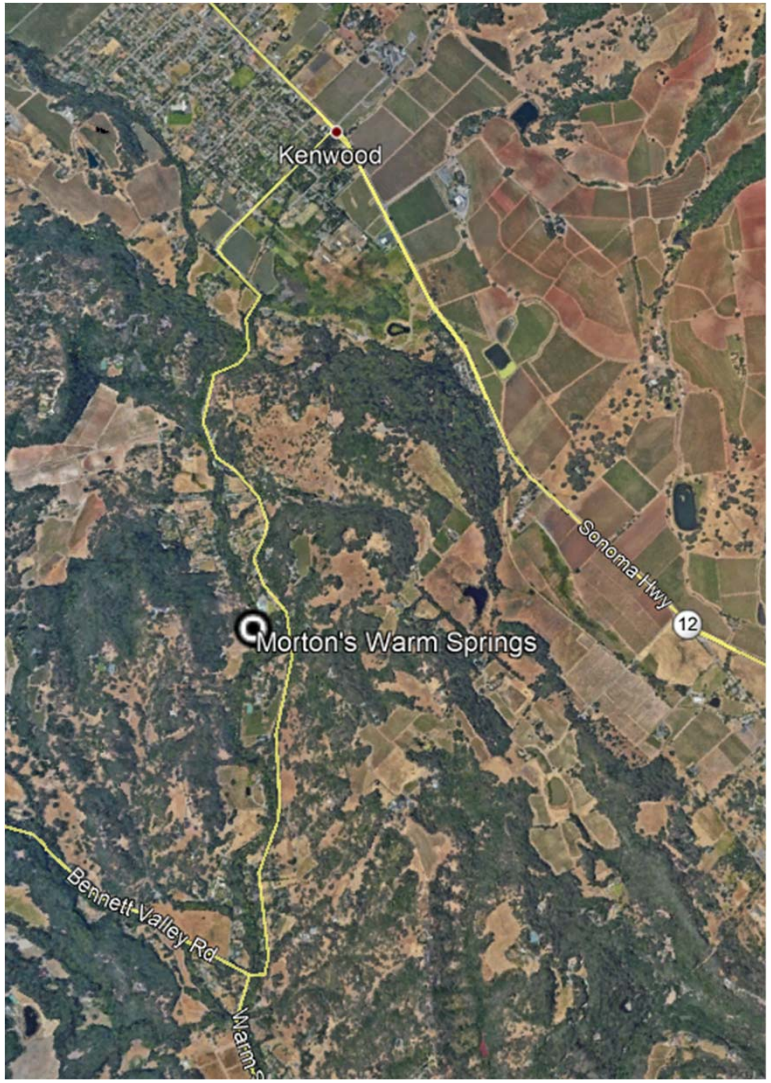


Streams

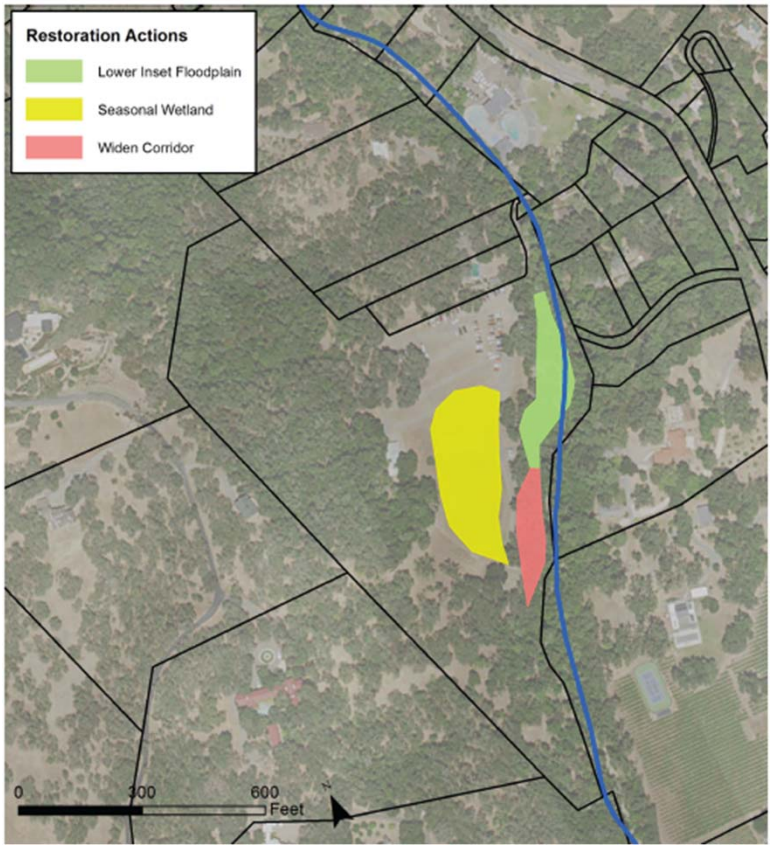
Impaired Waterbody

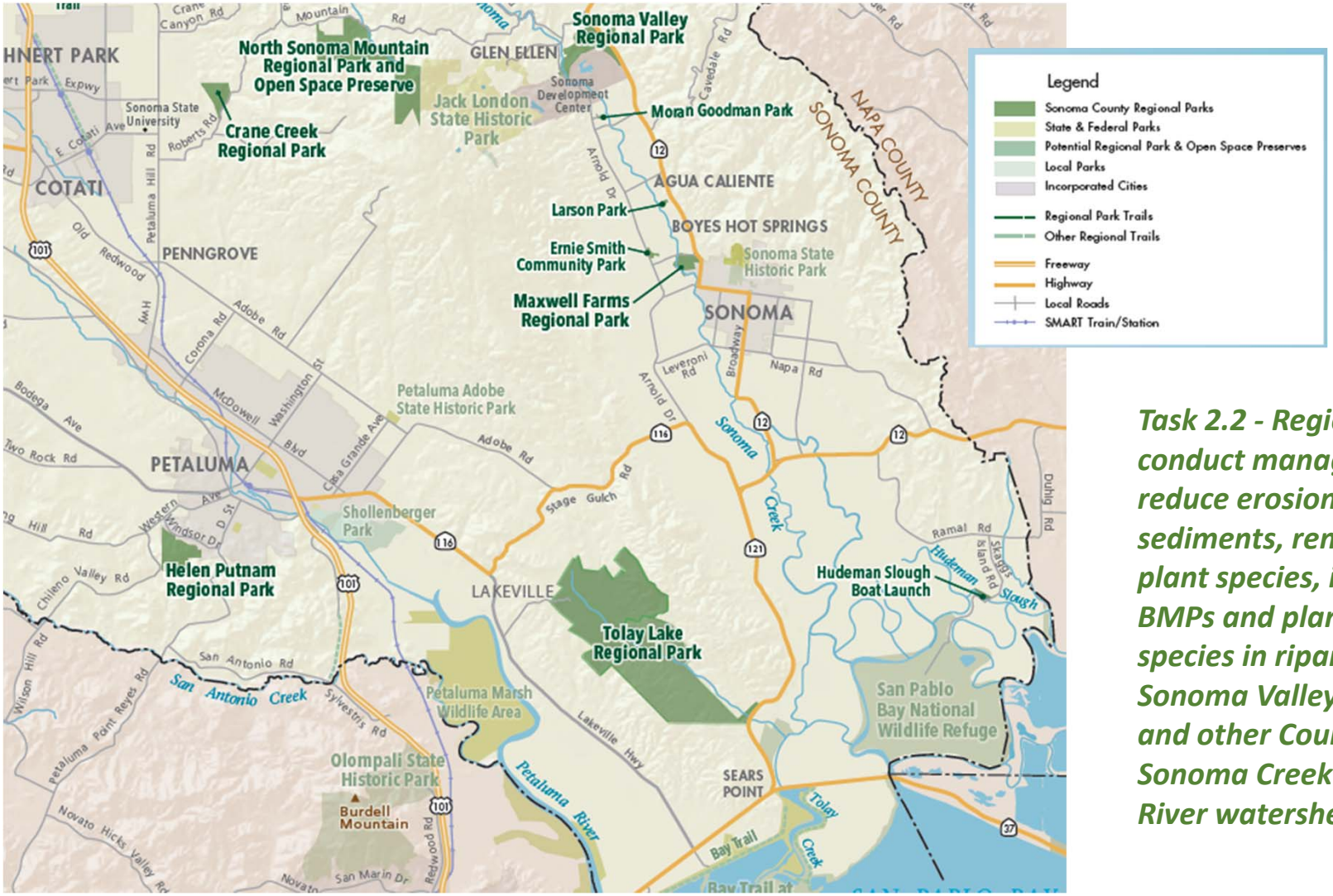
Known culverts

Task 1 – Water Quality Improvements addressing pathogen and sediment impairments in the Petaluma Watershed



Task 2.1 – Morton's Warm Springs Habitat Restoration





Task 2.2 - Regional Parks will conduct management actions to reduce erosion of fine sediments, removal of invasive plant species, installation of BMPs and planting of native species in riparian areas in Sonoma Valley Regional Park and other County Parks in the Sonoma Creek and Petaluma River watersheds

This map is for illustrative purposes only and isnot intended to be a definitive property description.

Sonoma Valley Regional Park

Proposed wetland and associated upland restoration - 3.5 acres

0 0.125 0.25 Miles

N