Russian River Telemetry Study

Study Description

Introduction

This document briefly describes the Russian River Telemetry Study (Study, RRT Study), proposed by the Telemetry Research Unit, an arm of the State Water Resources Control Board's (Water Board's) Division of Water Rights. It contains the following information.

- Background on the purpose and intent of the Study
- Study goals and objectives
- An overview of the activities proposed under the Study
- A summary of the regulatory requirements applicable to the Study and the approach taken to address them, including both CEQA compliance and resource agency permitting
- Information on the avoidance and minimization measures (AMMs) incorporated into the Study to streamline environmental reviews and compliance while ensuring resource protection
- A description of the process used to screen stations and determine how AMMs should be applied
- A list of references cited in the text

Please note that this PDF file is bookmarked for easier navigation.

Background

As public records, Division of Water Rights (WR) water monitoring data are expected to meet "FAIR" data principles, meaning that they satisfy the following standards, which are aimed at increasing data accessibility and usability (GO FAIR *n.d.*).

- Findable by both humans and computers
- Accessible using a standardized communications protocol
- Interoperable, meaning that they can be integrated with other data and can be interoperated for analysis, storage, and processing
- Reusable

WR currently faces multiple challenges on this front. These include a lack of data controls, measurement files that are largely unstandardized, limited availability of GIS-based data, and reporting that can be delayed as much as 18 months following data collection. The Telemetry Research Unit (hereafter, TRU) is charged with evaluating the potential utility of telemetry in addressing these issues. This includes

- studying water monitoring and data reporting in order to characterize logistical, cost, technical, and informational barriers to the use of telemetry
- conducting field studies to evaluate real-world conditions related to telemetry equipment and telemetered data transmission
- recommending data collection and data governance updates to simplify data reporting and improve the quality and usability of monitoring data

The Study is a 3-year initiative that will use sites within the Russian River watershed as a case study for the evaluation of telemetry. The Study is non-regulatory and non-enforcement in nature and is designed to learn from on-the-ground conditions and community participation.

Study Goals & Objectives

The overarching goal of the Study is to modernize WR's water measurement and reporting processes while improving the availability and usability of water resources data.

Specific objectives include the following.

(1) Installing telemetered water monitoring equipment at up to 125 sites within the Russian River watershed

(2) Evaluating the cost and effectiveness of monitoring and transmission equipment

(3) Refining the technical tools WR uses to assess water diversions and flows

(4) Testing the logistics of connecting data streams from diverse equipment to a single data system; assessing data accuracy

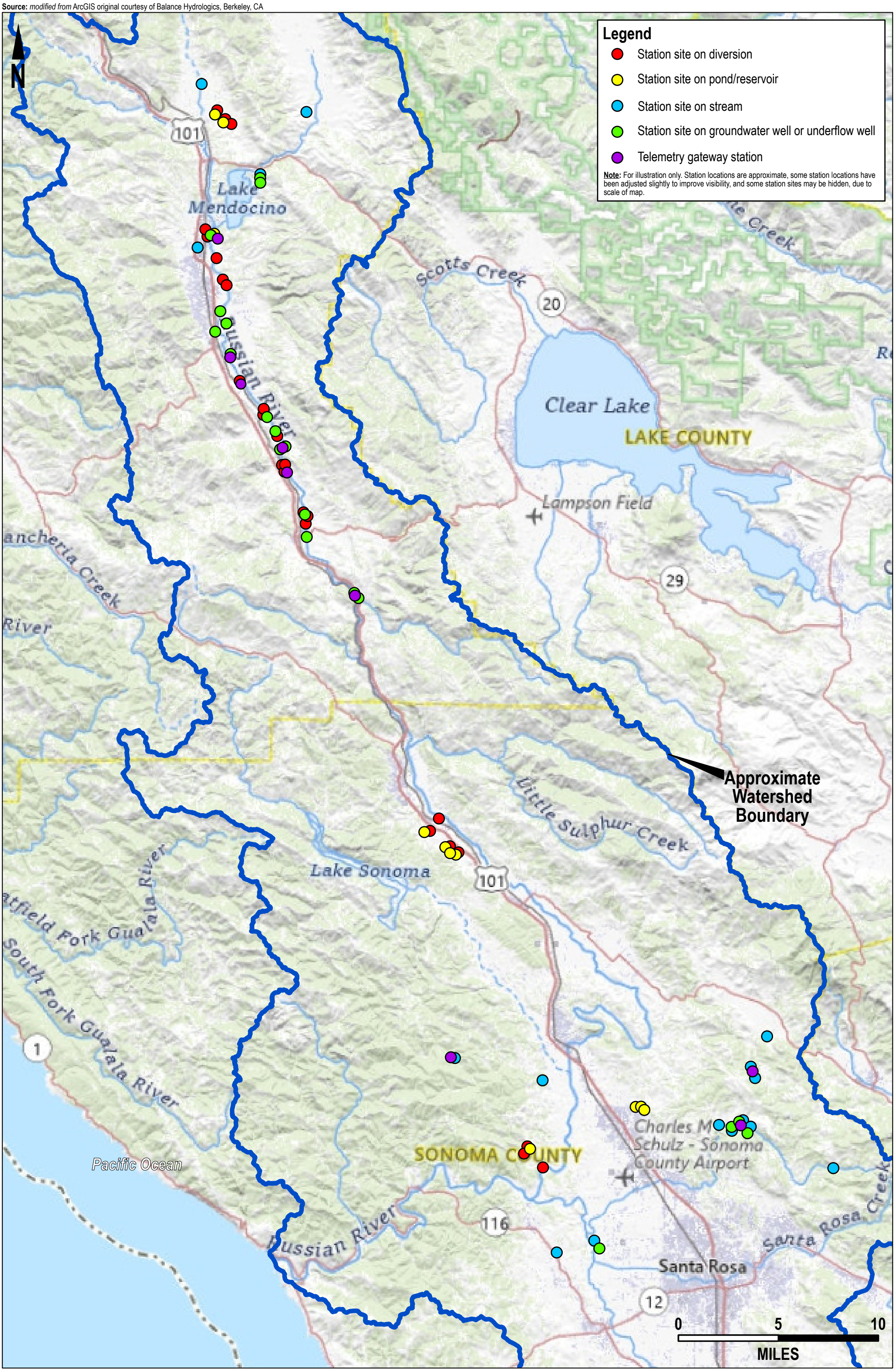
(5) Advising the Water Board on simplifying reporting, supporting monitoring efforts, and potential regulation updates.

Study Overview

As identified above, the Study will entail installation of up to 125 telemetered water resource gaging stations at instream, storage (pond/reservoir), diversion, and well sites throughout the Russian River watershed in both Sonoma and Mendocino Counties (Figure 1). It will also include installation of telemetry "gateways" to amplify transmission of telemetered data. Telemetry will transmit monitoring data to a centralized water data management platform, where QA/QC will be performed.

Figures 2 and 3 show typical sensors and telemetry units at instream installations on prior similar projects; note that while the sensor itself is within the water body, the telemetry unit is placed in uplands outside the riparian corridor. Figure 4 shows an alternate approach to instream monitoring, where components are mounted to an existing bridge. Figures 5 and 6, respectively, show typical diversion and well station installations.

Source: *modified from* ArcGIS original courtesy of Balance Hydrologics, Berkeley, CA



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Source: all photos courtesy of Balance Hydrologics, Berkeley, CA



A. Staff plate and crest gage in stream



B. Staff plates on bank (right side of photo); pressure transducer in conduit secured to stream bed (left side of photo



C. Pressure transducer and cable conduit on bank



D. Above-grade cable conduit on bank above staff gage

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Figure 2. Typical Sensors and Cables
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: all photos courtesy of Balance Hydrologics, Berkeley, CA



A. Telemetry unit and solar panel mounted on two poles driven into substrate



B. Telemetry unit mounted on two driven poles and stabilized against existing chainlink fence



C. Telemetry unit mounted on poles set in concrete within augered holes, adjacent to existing concrete pad; arrows show extent of new concrete

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Figure 3. Typical Telemetry Units
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: all photos courtesy of Balance Hydrologics, Berkeley, CA



A. "All-in-one" installation with radar, solar panel, and telemetry unit mounted on side of bridge



B. Radar unit mounted on pole attached to bridge guardrails; telemetry unit on bank, out of photo

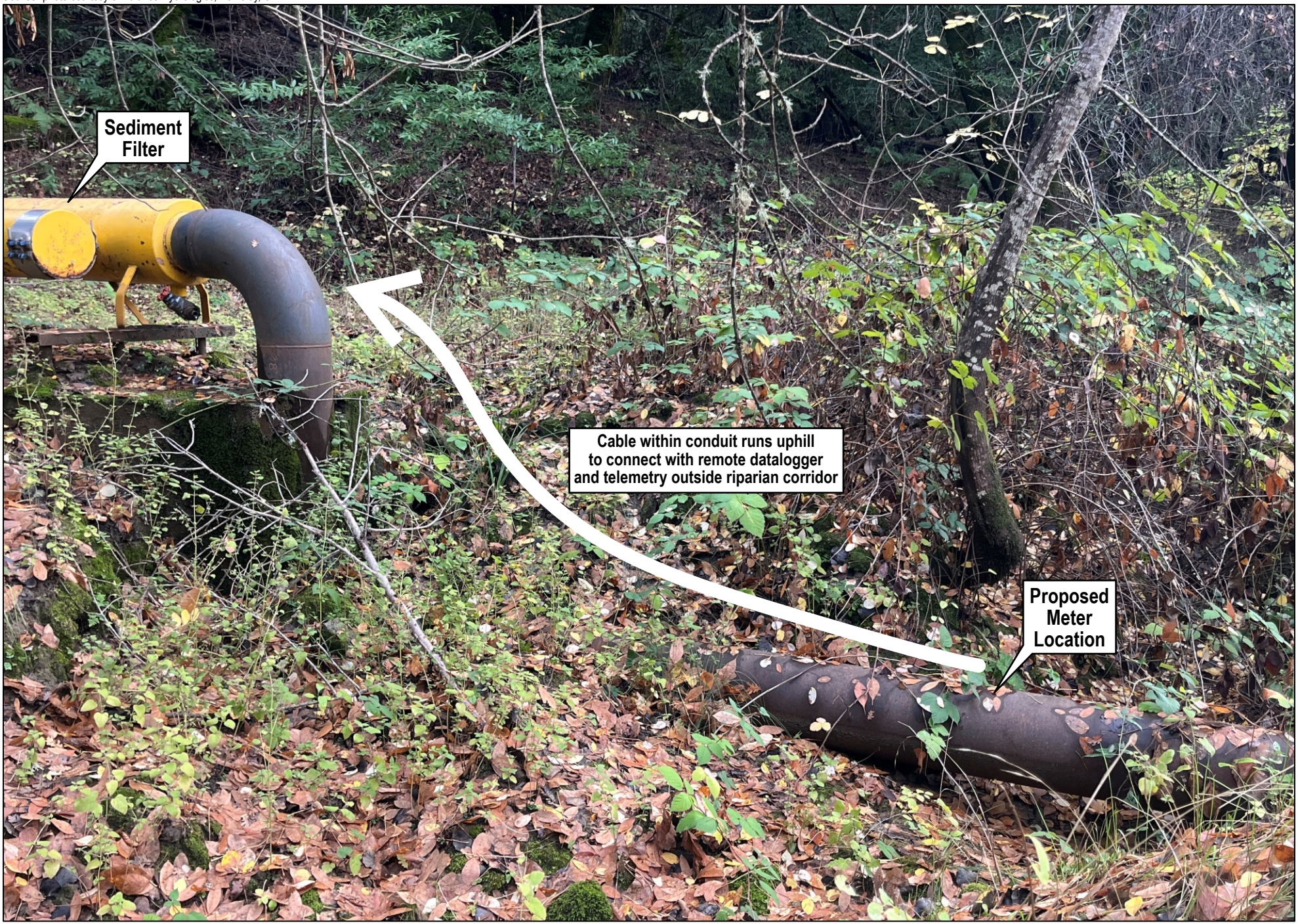


C. Radar mounted on pole frame driven into substrate; telemetry unit on bank, out of photo

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Figure 4. Examples of Radar Installations
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: photo courtesy of Balance Hydrologics, Berkeley, CA



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Figure 5. Example Diversion Site
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: photos courtesy of Balance Hydrologics, Berkeley, CA





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Figure 6. Example Well Sites
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Station sites for the Study have been identified on a volunteer basis, and include locations on both public and privately owned lands. Landowners enter into an access agreement with the Water Board to enroll in the Study, enabling entry for site reconnaissance, station installation, operations and maintenance (O&M), and, ultimately, decommissioning and removal of any stations the landowners do not wish to retain. Figure 1 shows the station locations that are under contract as of the end of June 2026. Most of the stations are expected to need both gage and telemetry installation, although some may require only the addition of telemetry to existing gaging equipment or the installation of telemetry gateway equipment.

The Study also includes mitigation for the minor long-term impacts (a maximum loss of 133.281 square feet of inwater habitat and 382 square feet of riparian habitat) associated with station installation and operations. By agreement with the North Coast Regional Water Quality Control Board (RWQCB), this will be accomplished by funding a Sonoma County Regional Parks (County Parks) effort to remove trash and debris from a headwaters drainage in Mark West Regional Park and Open Space Preserve northeast of Santa Rosa. The channel will then be stabilized using a combination of gully stuffing/brush packing and log check structures to prevent further headcutting. The mitigation site is located on a small headwaters tributary to Mill Creek, which in turn is a tributary of Mark West Creek. Figures 7, 8, and 9 show the location of the mitigation site, its condition as of spring 2026, and the planned mitigation concept, which has been approved by the North Coast Regional Water Quality Control Board (RWQCB). The total extent of the clean-up and restoration area is on the order of 2,000 square feet (0.046 acre).

Regulatory Constraints & Approach

As a discretionary activity undertaken by a state agency, the Study is subject to requirements of the California Environmental Quality Act (CEQA).

Study-related activities within jurisdictional waters and the adjacent riparian corridor were also identified as having the potential to require the following resource agency authorizations.

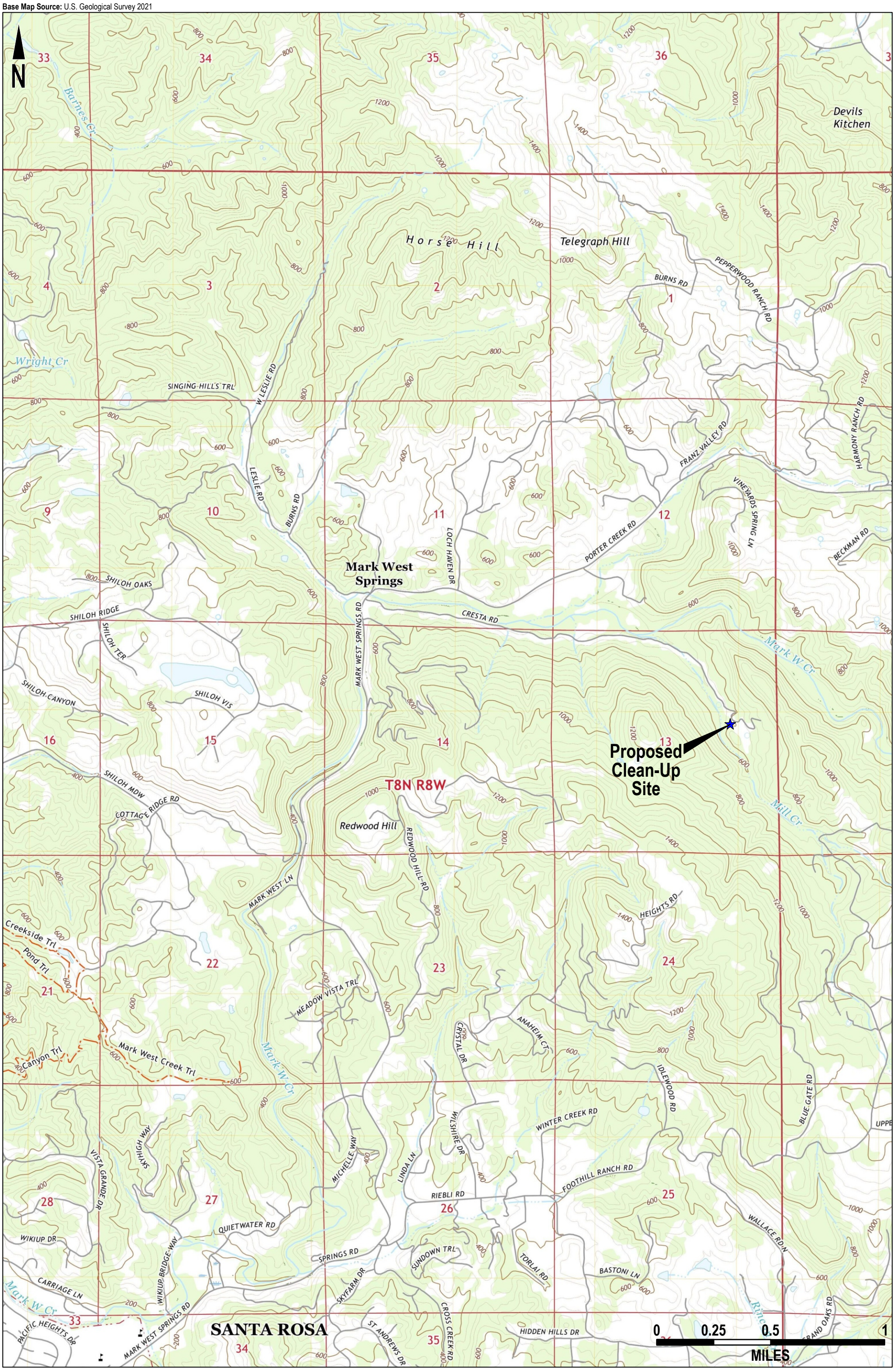
- Clean Water Act (CWA) Section 404 and/or Rivers and Harbors Act (RHA) Section 10 authorization from the U.S. Army Corps of Engineers (Corps)
- CWA Section 401 Water Quality Certification (WQC), Waste Discharge Requirements (WDRs), or a Waiver of WDRs from the North Coast Regional Water Quality Control Board (RWQCB)
- A Lake or Streambed Alteration Agreement (LSAA) with the California Department of Fish and Wildlife (CDFW)

In addition, due to the richness and diversity of biological resources in the Russian River watershed, some (minor) potential for take of state- and/or federally listed species and effects on designated critical habitat was also identified as possible, which would require take authorization from CDFW, the U.S. Fish and Wildlife Service (USFWS), and/or the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries).

To streamline and simplify environmental clearances for the study while still providing for full compliance with all applicable regulations, it was identified as desirable to

- qualify station installations for exemption from CEQA environmental review
- avoid aquatic resources permit triggers where possible

Base Map Source: U.S. Geological Survey 2021



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Figure 7. Location of Mitigation Site
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: photos courtesy of Balance Hydrologics, Berkeley, CA



View approximately northeast across uppermost ephemeral portion of channel, meadow in rearground; redwood tree stabilizing headcut in approximate center of photo



Main body of debris accumulation; note large pieces of concrete in foreground



View approximately northeast, showing drop in channel at headcut and main body of debris accumulation



View downstream over debris accumulation; transition from ephemeral to intermittent channel is beneath debris pile to left of photo center

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Figure 8. Representative Views of Mitigation Site, Spring 2026
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: photos courtesy of Balance Hydrologics, Berkeley, CA except where noted otherwise



Truck chassis within debris accumulation



Himalayan blackberry and poison-oak growth within channel



Smaller materials within debris accumulation in channel invert



Silver wattle growth on slope above clean-up site

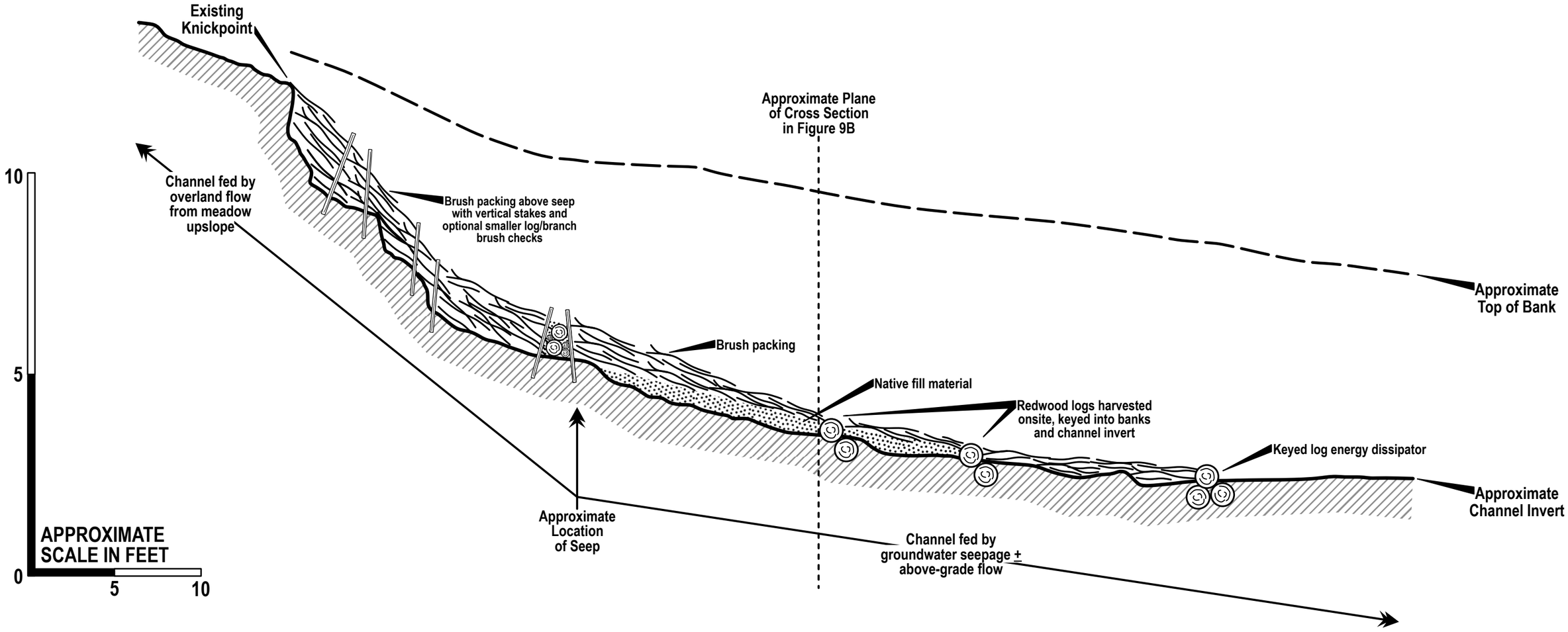
Photograph courtesy of Vollmar Natural Lands Consulting, Santa Rosa, CA

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Figure 8. Representative Views of Proposed Clean-Up Site
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: *modified from* Spye Conservation, Inc. 2026

9A. Longitudinal Profile



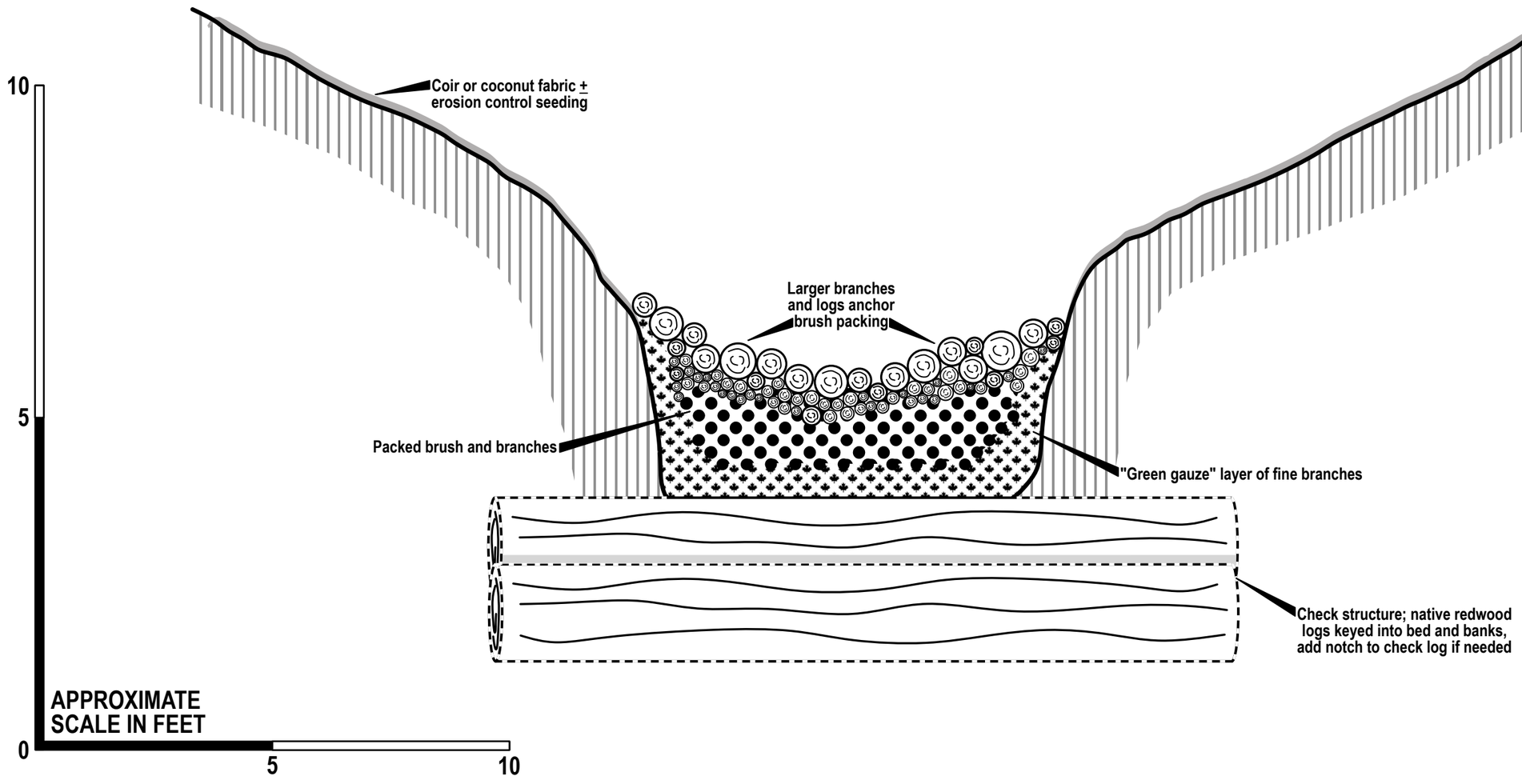
Note: Final configuration will depend on field fit to channel geometry following debris removal.

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Figure 9. Mitigation Concept
Russian River Telemetry Study
SWRCB Telemetry Research Unit

Source: *modified from* Spye Conservation, Inc. 2026

9B. Cross Section, View Upstream



Note: Final configuration will depend on field fit to channel geometry following debris removal.

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Figure 9. Mitigation Concept
Russian River Telemetry Study
SWRCB Telemetry Research Unit

- avoid take of state- and federally listed species, avoid adverse effects on designated critical habitat, and ensure consistency with other regulations protecting wildlife such as the federal Bald and Golden Eagle Protection Act, federal Migratory Bird Treaty Act, and state Fish and Game Code protections for nesting birds

The approach taken to accomplish this is discussed further in the sections that follow.

CEQA Compliance

Since the Study would entail multiple separate installations at discrete sites, the fundamental question guiding CEQA compliance was whether the Study must be evaluated as a whole, or could be treated on a site-by-site basis without engaging in piecemealing, which is explicitly prohibited by Section 21159.27 of the CEQA statute.

Each of the stations serves a separate purpose (collection of data at a particular, discrete location), and each station has logical termini (the physical limits of the individual installation).[1] Moreover, each station installation is expected to yield useful data that is not duplicated by data from other stations; each station would thus be worth installing as a step toward achievement of Study objectives even if no other stations were to move forward. The same is true in essence of the Study's mitigation component—it is a stand-alone undertaking that had been identified as a priority for watershed benefit prior to discussions between County Parks and TRU (e.g., Sonoma Resource Conservation District 2025), and has logical geographic limits: the boundaries of the trash accumulation and adversely affected stream channel. As such, both the individual stations and the mitigation component should qualify stand-alone projects for CEQA purposes and the Study can properly be viewed as a program comprising multiple small projects. For simplicity and thoroughness, the following discussion takes this approach, addressing station installation/operations first, followed by the mitigation component.[2]

Gage/Telemetry Stations

Several categorical exemptions were identified as potentially applicable to station installation and operations under the Study. These include.

- Class 1 ("Existing Facilities"), for "operation, repair, maintenance … or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use (*CEQA Guidelines* 15301)
- Class 2 ("Replacement or Reconstruction"), for "[r]eplacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced (*CEQA Guidelines* 15302)
- Class 6 ("Information Collection"), for "basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource" (*CEQA Guidelines* 15306)

Simple addition of telemetry to existing gage stations should qualify for Class 1 categorical exemption; any replacements of existing gages with a new telemetered gage should qualify for Class 2 categorical exemption;

[1] The concepts of *separate and independent utility* and *logical termini* are federally defined but are nonetheless useful in assessing whether activities potentially subject to CEQA can be evaluated separately or must be considered as part of a single larger project.

[2] Note however that even if all installations and the mitigation component were evaluated together, the categorical exemptions found to apply to individual stations and the mitigation component (see *Study Screening Process & Results* below) would still apply, due to the incorporation of AMMs and SSMs and the combination of selective siting and design.

both of these activities would also qualify for Class 6 categorical exemption, as would full installations including both a new gage and new telemetry equipment.

In order to qualify for exemption, work under the Study would need to avoid triggering the exceptions identified in *CEQA Guidelines* 15300.2. Specifically, none of the categorical exemptions may be used if:

- the project may result in damage to scenic resources associated with a state-designated scenic highway (*CEQA Guidelines* 15300.2[d])
- the project would be located on a site that is included on any list compiled pursuant to Section 65962.5 of the California Government Code—that is, a site with known hazardous materials contamination (*CEQA Guidelines* 15300.2[e])
- the project may cause a substantial adverse change in the significance of a historical resource (*CEQA Guidelines* 15300.2[f])
- there is a reasonable possibility that the project would have a significant environmental effect due to unusual circumstances (*CEQA Guidelin*es 15300.2[c])
- the cumulative impact of successive projects of the same type in the same place over time would be significant (*CEQA Guidelines* 15300.2[b])

Additionally, use of the Class 6 categorical exemption is prohibited for projects with the potential to affect environmental resources "of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies" (*CEQA Guidelines* 15300.2[a]). This is typically interpreted as including designated critical and essential habitat for special-status species, which is an important consideration for the Study because the majority of the Russian River mainstem and many of the tributary drainages within the watershed are within designated critical habitat for one or more species of salmonids, and designated critical habitat for terrestrial species is present elsewhere in the watershed.

The exceptions identified in *Guidelines* 15300.2[d], 15300.2[e], 15300.2[f], 15300.2[c], and 15300.2[a] are being addressed through the adoption of AMMs, discussed further below. The exception for significant cumulative impacts related to successive projects (*CEQA Guidelines* 15300.2[b]) does not apply to installations under the Study, since

(1) the Study provides for installation, operation, and maintenance of a single station at each site; repeated installations are outside the scope of the Study, and

(2) the mitigation component, inclusive of monitoring and any needed corrective action, is also a one-time effort that once complete will not need to be repeated

Mitigation

The mitigation component of the Study qualifies for exemption from CEQA review per *CEQA Guidelines* 20180.56 (statutory exemption for restoration projects, or SERP). Specifically, among other benefits, it would contribute to

- habitat restoration, protection, and enhancement in the Mark West Creek watershed, assisting in the recovery of California native fish and wildlife and the habitat upon which they depend, and would
- result in an overall long-term net benefit to climate resiliency, biodiversity, and sensitive species recovery

Concurrence with SERP exemption was issued by CDFW on December 8, 2025 (California Department of Fish and Wildlife, Director's Office 2025).

As a localized clean-up and restoration effort that would rely on bioengineering techniques, the mitigation component would also qualify for categorical exemption per *CEQA Guidelines* 15333 ("Small Habitat Restoration Projects"), since it will be subject to all relevant AMMs adopted for the larger study, which will ensure that none of the exceptions to the use of categorical exemptions (*CEQA Guidelines* 15300.2) are triggered.

Regulatory Permitting

Gage/Telemetry Stations

CDFW Region 1 (Northern Region, including Mendocino County) and Region 3 (Bay-Delta Region, including Sonoma County) both confirmed during early consultation that the extent of disturbance associated with typical station installations does not rise to the level requiring Notification under Fish and Game Code Section 1602 and that no LSAA(s) would be required for installations under the Study (Liebenberg pers. comm., Hansen pers. comm.). CDFW did request that appropriate erosion control be used for ground disturbance with the potential to result in sediment delivery to streams and that concrete should not be used within bed, banks, or channel (Liebenberg pers. comm.). This direction is being addressed through a combination of AMMs and station design.

During early agency consultation, U.S. Army Corps of Engineers (Corps) staff similarly confirmed that posts pounded into the substrate are construed as pilings, which are not regulated under Section 404 of the Clean Water Act although there is no such exemption under Rivers and Harbors Act Section 10. Consequently, station installations do not require Corps authorization, as long as

(1) station installations within Waters of the United States are outside Traditionally Navigable Waters subject to Rivers and Harbors Act Section 10

(2) there is no excavation or fill below the Ordinary High Water Mark (OHWM), and

(3) there are no corollary impacts on adjacent wetlands (Connor pers. comm.[a], pers. comm.[b])

These requirements are also being addressed through AMMs and station design.

The Study was required to obtain a Waiver of Waste Discharge Requirements from the RWQCB. The Notice of Applicability for Coverage under the Conditional Waiver of WDRs for Specific Categories of Low-Threat Discharge in the North Coast Region (R1-2022-0031) was received in April 2026 (North Coast Regional Water Quality Control Board 2026).

In addition, as identified briefly above, some activities required under the Study were identified as having the potential to affect state- and/or federally listed plant, fish, or species, which would require incidental take permitting from CDFW, USFWS, and/or NOAA Fisheries. There is also some potential for the presence of species that are designated as Fully Protected under the California Fish and Game Code (FGC); take of these species cannot legally be permitted and must therefore be avoided in full. Other potentially relevant regulations include the federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, as well as additional sections of the Fish and Game Code, including those that protect nesting birds, their nests, eggs, and young. The Russian River watershed also supports extensive tracts of designated critical habitat for listed species, including both aquatic and upland areas, as well as the potential for presence of numerous plant, fish, and wildlife species protected under multiple regulations. In this context, avoidance and minimization of impacts on

listed species and their habitat became a key focus; this was addressed through the development and adoption of AMMs, discussed in more detail below.

Mitigation

The mitigation component of the Study was included in the Study as authorized by the RWQCB (North Coast Regional Water Quality Control Board 2026). In addition, it will require entry into an LSAA with CDFW, and the Notification process is in progress as of this filing. Authorization from the Corps under CWA Section 404 will also be required; this is expected to proceed under Nationwide Permit (NWP) 27 ("Aquatic Ecosystem Restoration, Enhancement, and Establishment Activities"), which is a non-reporting permit with no preconstruction notification required under the most recent (2026) reissuance of the NWPs. The mitigation component is not expected to affect listed species or their habitat, but will be subject to all relevant AMMs adopted for the Study as a whole.

Avoidance & Minimization Measures

The Study has adopted a suite of AMMs (Table 1), each of which focuses on

- ensuring that none of the exceptions to the use of categorical exemptions are triggered
- avoiding a particular permit trigger, such as activities within Traditionally Navigable Waters regulated under Rivers and Harbors Act Section 10
- avoiding a particular impact, such as water quality degradation or damage to riparian vegetation, or
- protecting a specific resource (e.g., nesting birds, individual listed species, or their habitat)

The AMMs are organized into 3 tiers that roughly reflect implementation order, as follows.

- **Tier 1 AMMs** address fundamental issues related to station siting and design; as such they function to guide station selection and screening of stations for station-specific environmental constraints. In some cases, they also dictate follow-up actions where a particular condition exists at a station site. The Tier 1 AMMs are further subdivided as follows
  - Tier 1A AMMs are specifically aimed at avoidance of CWA Section 404 and RHA Section 10 permit triggers, consistent with the resource agency guidance discussed above
  - Tier 1B AMMs are screening tools that focus on avoiding the exceptions to the use of categorical exemptions from CEQA detailed in *CEQA Guidelines* 15300.2. They also include provisions to enable station installations to avoid triggering the need for incidental take authorization from CDFW, the USFWS, and NOAA Fisheries

  To ensure that the AMMs do not become an impedance to the Study schedule, some of the Tier 1B screening AMMs provide for further planning-phase environmental review and, where appropriate, development of Station-Specific Measures (SSMs) to protect particular resources at an individual station or stations. The intent of SSMs is to allow the field crews more flexibility in planning and implementing installations, major operations and maintenance (major O&M), and removals at those locations, while still ensuring robust protection of resources
- **Tier 2 AMMs** are Best Management Practices (BMPs) that apply to all stations. They reduce the potential for impacts on biological and jurisdictional resources and support avoidance of the "unusual

Table 1. Russian River Telemetry Study – Avoidance and Minimization Measures

Tier 1 AMMs

Tier 1A

PURPOSE OF TIER 1A AMMs

- *Avoid Clean Water Act Section 404 and Rivers & Harbors Act Section 10 permit triggers*

AMM-1. Restricted Activities Below OHWM

Trigger: Applies to all stations.

Requirements: No trenching (e.g., to bury cable housed in conduit), digging, excavation, boring, or augering will occur below the Ordinary High Water Mark. Sensors will be placed in-stream only if laid on top of the substrate; if anchoring to the ground surface is used, it will be of a type that qualifies as a pile (i.e., driven into substrate—posts, stakes, U-bars, etc.).

AMM-2. Avoidance of Adjacent Wetlands

Trigger: Applies to all stations.

Requirements: Telemetry equipment will be located outside adjacent wetlands. If adjacent wetlands are associated with the water body to be gaged, telemetry and cable/conduit will be set back from wetland margins, to provide a protective buffer and avoid accidental incursions into wetlands during O&M. If, for any reason, this criterion cannot be satisfied, the station has the potential to require permitting under Clean Water Act Section 404 and should be reevaluated.

AMM-3. Avoidance of Section 10 Waters

Trigger: Applies to all stations.

Requirements: No stations will be installed on the Russian River mainstem downstream of Vacation Beach.

Tier 1B

PURPOSE OF TIER 1B AMMs

- *Avoid exceptions to use of categorical exemption(s) from CEQA*
- *Avoid incidental take of state- and/or federally listed plant and wildlife species*

AMM-4. Selection of Exemption

Trigger: Applies to all stations.

Requirements: All stations will be screened to determine whether the Class 1 categorical exemption (Existing Facilities; *CEQA Guidelines* Section 15301), Class 2 categorical exemption (Replacement or Reconstruction; *CEQA Guidelines* Section 15302), or Class 6 categorical exemption (Information Collection; *CEQA Guidelines* Section 15306) is most appropriate. This will determine whether the exception for projects that "may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies" (*CEQA Guidelines* Section 15300.2[a]), which applies to Class 6 but not to Classes 1 and 2, is applicable.

AMM-5. Known Historical Resources

Trigger: Applies to all stations.

Requirements: No stations will be installed at sites that support known (recorded) historical resources or sites that support tribal cultural resources for which a tribe has requested avoidance. Sites within 500 feet of the mapped boundary (for polygons) or mapped location (for points) of a recorded historical resource will either be moved to a distance of 500 feet or greater from the resource, or will be subject to further evaluation by a qualified archaeologist, who may prescribe measures to ensure that the resource is not adversely affected. The archaeologist's evaluation may be desktop-only or may include non-destructive field assessment.

AMM-6. Known Hazardous Materials Contamination

Trigger: Applies to all stations.

Requirements: To the extent feasible while achieving study objectives, station installations on sites with known hazardous materials contamination will be avoided. Parcel boundaries and contaminated site location will be used as the primary screening tool, but the potential for contaminant plumes to extend beyond parcel boundaries will also be considered. If a site with known hazardous materials contamination is highly desirable for study objectives, further evaluation will be conducted, in consideration of more detailed information on the extent and depth of contamination available on the state's GeoTracker database and other resources. No station installations requiring ground disturbance will take place where there is cause to expect shallow soil or groundwater contamination.

AMM-7A. State Scenic Highway Resources

Trigger: Applies to all stations.

Requirements: No stations will be sited within the viewshed of any state scenic highway where this can be avoided while still accomplishing study objectives. AMM-7B will apply to installations potentially visible from officially designated state scenic highways.

AMM-7B: Scenic Highway Resources Protection

Trigger: Applies to stations that have one or more sightlines to a designated state scenic highway.

Requirements: Stations will be sited and designed to avoid or minimize visibility from the highway, and to minimize overall visual disruption to the viewshed. This may include, but will not necessarily be limited to, the following.

- Avoiding placement of station elements immediately adjacent to the highway right-of-way, as determined based on California Department of Transportation right-of-way mapping.
- To the extent feasible, selecting station locations that are visually buffered from the highway by topography and/or vegetation.
- Reducing the height of the telemetry module to the minimum necessary for reliable function, in consideration of surrounding topography and vegetation.
- If the station will be visible from the highway, using nonreflective finishes and colors chosen to blend with the surroundings on the above-grade portions of the station.

AMM-8. Biological Constraints Review and Guidelines

Trigger: Applies to all stations.

Requirements: To the extent feasible, stations will be sited and designed to

(1) avoid biological constraints creating unusual circumstances with the potential to result in a significant impact,

(2) avoid the potential for take of individuals of listed and candidate species,

(3) avoid adverse effects on designated critical habitat

As part of site screening, station sites will be reviewed by a qualified biologist to assess for:

- biological constraints representing unusual circumstances that could create the potential for significant biological impact,
- potential for take of listed species, and
- for stations covered under the Class 6 categorical exemption (*CEQA Guidelines* Section 15306; see also *Guidelines* 15300.2[a]), potential for adverse effects on critical habitat.

The biologist's site review may take place in the office, using aerial imagery and other resources, or may be field-based, or both, depending on the biologist's judgment.

Based on the site review, the biologist will either

- recommend site-specific measures to avoid triggering unusual circumstances, take of listed species, and/or adverse effects on designated critical habitat; or
- identify Tier 3 AMM(s) applicable to the site.

Measures recommended by the biologist will be implemented during site installation, O&M, and decommissioning/removal, as stipulated by the biologist.

Tier 2 AMMs

PURPOSE OF TIER 2 AMMs

- *Best practices that apply to all stations*
- *Support avoidance of "unusual circumstances" triggering exception to use of categorical exemption(s)*

The following AMMs apply to installation, any O&M, and decommissioning/removal of all stations, regardless of location.

AMM-9: Worker Awareness Training

All field personnel will attend training on the special-status species that may be present within the study area. A qualified biologist will deliver training and will cover species recognition, habitat requirements, and procedures in the event of a special-status species observation. Training may be delivered virtually or in person.

AMM-10. Vernal Pool Avoidance

No work will take place within vernal pools within the Santa Rosa Plain; site evaluation under AMM-8 will assess for the presence of vernal pools.

AMM-11: Minimal Site Disturbance

All stations will be sited, operated, maintained, and removed in a manner that minimizes site disturbance to the extent feasible. Access and staging areas will be selected to minimize impacts to banks. Access routes will not follow the bank; rather, the path should go through upland and only enter the bank at the closest feasible access point to the work site. Trampling and other disturbances of vegetation will be minimized to the extent feasible. Unnecessary disturbance of soils and organic material on the bank will be avoided. On banks with fragile soils, tools and equipment will be placed on a temporary tarp or on a table rather than directly on the ground surface, to minimize soil disturbance. Crews will avoid unnecessary entry into the water, and time spent in water will be minimized to avoid sediment disturbance to the extent feasible.

AMM-12. Vegetation Trimming, Not Removal

No vegetation removal will occur—i.e., vegetation will not be uprooted or cut at ground level, although it may be trimmed. Trimming will be restricted to the minimum needed to accommodate the necessary work and ensure ongoing good station performance. No power tools of any kind will be used for vegetation trimming. The following additional limitations will apply.

- Trimming of riparian and emergent vegetation along streams and emergent wetland vegetation on pond margins will be avoided wherever possible.
- No woody vegetation exceeding a diameter of 1 inch will be trimmed.

AMM-13: Conduit Use and Installation

Where conduit is used, it will be routed to minimize vegetation disturbance and the need for vegetation trimming during installation.

Trenching for conduit installation will be avoided to the extent feasible. Where trenching is necessary (e.g., in high-disturbance areas such as parks with public waterway access), trenching will be kept to the minimum necessary to safeguard equipment and station function. No straight-line trenches normal to the waterline will be permitted. Once the conduit has been installed in the trench, the trench will be backfilled with hand- or foot-compacted soil and mulched with sterile, weed-free straw mulch.

AMM-14: Concrete Use

Concrete use will be minimized to the extent feasible. No concrete will be used below the top-of-bank limit.

AMM-15: Gas-Powered Equipment

If the use of gas-powered equipment, such as post drivers, is necessary, the following requirements will apply.

- Fuel will be stored at the field crew's vehicle, which will be parked a minimum of 50 feet from wetlands and waters; if refueling is necessary, it will take place at least 50 feet from wetlands and waters, and will occur over a drip pan adequate to contain any spills or splashes.
- Equipment will be visually inspected for leaks and wiped down before use; if leaks are found, the unit will not be used until it has been repaired.
- Gas-powered equipment will be stored in the vehicle when not in use.

AMM-16. Rain Event Limitations

The following requirements will apply to installations, major O&M[1], and removals.

- When rainfall ≥0.5 inch within 24 hours is forecast, a professional judgement will be made as to whether work may take place during these periods. The Go/No-Go decision on installation will depend on the type of work planned (e.g., whether soil disturbance is necessary) and the potential for work to exacerbate sediment runoff into water bodies/wetlands.
- Installations that require the burial of conduit (trenching) will not take place if it is actively raining.
- Installations, major O&M, and removals will not be scheduled during high-flow conditions, but typical O&M visits may take place during these times, as high-flow conditions are important timeframes for collecting water monitoring data.

AMM-17. Trash Removal

All trash and construction debris will be collected away from the water body during work hours and removed from the site at the end of each workday so it does not enter the water body.

AMM-18: General Special-Status Species Protection

In the event a special-status species is observed, the individual(s) will be avoided and allowed to leave the area of their own volition.

Tier 3 AMMs

PURPOSE OF TIER 3 AMMs

- *Support avoidance of "unusual circumstances" triggering exception to use of Class 6 categorical exemption*
- *Avoid take of individuals belonging to listed and candidate species, in order to avoid the need for state and/or federal take permitting*

Note that Tier 3 AMMs will be implemented based on the biologist's recommendation, and may be replaced by site-specific measures identified by the biologist per AMM-8.

AMM-19: Nesting Bird Protection

Trigger: If stipulated by the biologist per AMM-8, applies to installations, major O&M, and removals that occur during the nesting season (March 1 – September 1).

Requirements: A qualified biologist will conduct a pre-activity survey for nesting birds. The survey will take place within 2 weeks of the initiation of work. If no active nests of any native bird species are documented and no nest-building activity is observed, no further action is necessary.

If nest-building activity is observed or active nests of native species are found in areas that could be directly affected by the planned activities, or in locations where they could be disturbed by the anticipated level of activity and noise, the following measures will be implemented, at a minimum.

- No-disturbance buffer zone(s) will be established for nest protection. Buffers may be delineated in the field by or under the supervision of the biologist, using flagging or another suitable low-impact medium. Alternatively, for short-term work that will be completed within 1 day, the buffer may be defined through conversation with the field crew, if the biologist remains onsite to ensure that the buffer distance is maintained and that the nesting pair is not showing signs of disturbance. The biologist will determine the size of the buffer zone(s) based on the species involved, their behavior, the amount of vegetative and other screening between the nest and the locations(s) where potentially disturbing activities will be occurring, and, if appropriate, other site-specific factors. If a nest is found and the required buffer overlaps with the proposed station site, the biologist will work with field personnel to select an acceptable alternate site within the vicinity, if possible.
- Minimum buffer widths will be as follows: 50 feet for common native birds; 300 feet for Tricolored Blackbird (*Agelaius tricolor*); 500 feet for common raptors; and 0.5 mile for Swainson's Hawk (*Buteo swainsoni*), unless modified by the biologist based on site-specific observations. Buffers for common species may be further modified by taking into account factors such as background disturbance levels at the station site, sensitivity of the nesting species, and behaviors of the individual nesting birds.

AMM-20: California Freshwater Shrimp Protection

Trigger: If stipulated by the biologist per AMM-8, applies to station installation, major O&M, and removals at sites located within any stream reach that intersects a CNDDB polygon for California freshwater shrimp (*Syncaris pacifica*), or within a water feature that is hydrologically connected and continuous for up to 1 mile to an existing CNDDB occurrence in the same water body and habitat type.

Requirements: If a station must be installed in either of these types of locations, a qualified biologist will survey the site for habitat quality, and the station will be installed in the lowest-quality habitat possible, avoiding microhabitats such as undercut banks with extensive roots and deep pools with woody debris to the extent feasible. No woody debris will be removed from the channel at sites that may support California freshwater shrimp. The biologist's survey may be conducted during installation with the field personnel present, or before installation.

AMM-21: Special-Status Fish Protection

Trigger: If stipulated by the biologist per AMM-8, applies to installations, major O&M, and removals in (1) streams that are within designated critical habitat for one or more special-status fish species and (2) streams with CNDDB-documented occurrences of one or more special-status fish species, if the stream reach involved has been determined to have the potential to be fish-bearing (i.e., lacking passage barriers).

Requirements:

- As part of the worker awareness training provided under AMM-9, field personnel will be briefed on the life cycles and habitat/microhabitat requirements of special-status fish with potential to be present. Station sites will be selected/designed to avoid placement within spawning gravels and riffles, per the AMM-9 training. If it is necessary to cross the stream, care will be taken to avoid disturbing riffles and spawning gravels.
- For installations in pools, care will be taken to limit pool disturbance during station installation. This will include completing as much work as possible from the bank; entering pools quietly and stepping carefully to avoid disturbing sediment and any juveniles that may be present; spending 30 minutes or less in the water at a time; and preventing imported/offsite water and materials other than station elements from entering the stream.

AMM-22: General Special-Status Amphibian Protection

Trigger: If stipulated by the biologist per AMM-8, applies to installations, major O&M, and removals in habitat suitable for listed, candidate, or proposed amphibians.

Requirements:

- Work within any water body with a documented special-status amphibian occurrence within 1 mile of the station site will be monitored/overseen by a qualified biologist who has the authority to stop or redirect work.
- When possible, work in suitable and known-occupied habitat for special-status amphibians will be scheduled during the dry season (July 1 – October 15) to ensure no animals are dispersing to breed in upland areas that may be utilized for access, staging, or telemetry installations.
- If work must take place outside the dry season window, a qualified biologist will conduct a preconstruction survey of the station site (inclusive of staging and access) and the surrounding 200-foot-wide buffer within 48 hours of the start of project activities to ensure no individuals of any life stage are present. If individuals are present, they will be allowed to leave the work area of their own volition before activities commence. No in-water work will take place within 50 feet of an egg mass or where any juvenile amphibians are present.
- Work will be restricted to daylight hours (approximately 1 hour after sunrise to 1 hour before sunset).

AMM-23: California Red-Legged Frog Protection

Trigger: If stipulated by the biologist per AMM-8, applies to installations, major O&M, and removals within designated CRLF critical habitat or within habitats identified as suitable for CRLF.

Requirements: All fieldwork within designated CRLF critical habitat that offers suitable habitat for the species will be overseen by a qualified biologist, who will have the authority to stop or redirect work if the species is observed. Any CRLF individual(s) observed will be allowed to leave the work area of their own volition.

AMM-24: California Tiger Salamander Protection

Trigger: If stipulated by the biologist per AMM-8, applies to station installations, major O&M, and removals at sites within designated CTS critical habitat and upland habitat within 1.6 miles (the species' dispersal distance) of a documented CTS breeding pool.

Requirements:

- Work at sites within designated CTS critical habitat that offer suitable habitat for the species will be overseen by a qualified biologist, who will have the authority to stop or redirect work.
- Outside of designated CTS critical habitat,
  - no trenching will be conducted within 100 feet of any burrow complex suitable for CTS use, as verified by a qualified biologist, and;
  - if adult CTS are observed, project activities will pause until they leave the work area on their own volition.

AMM-25: Western Pond Turtle Protection

Trigger: If stipulated by the biologist per AMM-8, applies to installation, major O&M, and removals on streams, ponds, and reservoirs that are within 1 mile of a CNDDB occurrence polygon for western pond turtle (*Actinemys marmorata*) (WPT) and offer suitable habitat for the species, and to ground-disturbing work at diversion and well sites within 1 mile of a WPT occurrence polygon.

Requirements:

- If work takes place during the breeding or nesting season (May – July), a biologist with WPT experience will survey the proposed station site, access route, and staging area(s) for WPT within 48 hours of the start of work. If adult or juvenile turtles are observed, the survey will include an assessment for suitable upland nesting habitat (sunny, dry upland areas with sparse or low-growing vegetation, within 300 feet of aquatic habitat). Suitable nesting areas will be flagged and avoided. There will be no ground disturbance in areas of suitable nesting habitat during the breeding/nesting season.
- No basking features (e.g., logs, rocks, floating mats of vegetation) will be removed from aquatic features.
- If adult or juvenile turtles are observed during work, activities will pause until they leave the work area on their own volition

AMM-26: Special-Status Plant Protection

Trigger: If stipulated by the biologist per AMM-8, applies to all stations within or within 1 mile of a CNDDB occurrence polygon for any special-status plant species.

Requirements:

(1) These sites will be avoided if possible, unless a qualified biologist has determined that no suitable habitat for special-status plants is present at the site. If the biologist determines that no suitable habitat is present on the site, no further action with regard to special-status plants is necessary. However, if a site within or within 1 mile of a CNDDB polygon for a special-status plant species must be used for the study and is determined to offer suitable habitat for that species, Requirement (2) will be implemented.

(2) A qualified botanist will conduct a pre-activity survey and will flag any existing occurrences of the species to ensure that they are avoided during project activities. If the special-status plant species is listed, a resurvey for major O&M and for station decommissioning/removal may be required each year, because occurrence extent/locations can change from year to year.

[1] Throughout, *major O&M* refers to O&M requiring repair or replacement of significant station components such that activities are substantially similar to an installation or removal.

circumstances" exception identified in *CEQA Guidelin*es 15300.2[c] as well as avoidance of take triggers

- **Tier 3 AMMs** are default measures that focus on take avoidance for nesting birds and individual special-status species, informed by current CDFW, USFWS, and NOAA Fisheries guidance and the professional judgment of the Study biology team; in some cases, these are replaced by SSMs tailored to specific station conditions and activities

Study Screening Process & Results

Gage/Telemetry Stations

The team used ArcGIS screening tools to evaluate potential station sites for their location vis-à-vis key constraints called out in the Tier 1 AMMs. The primary screening tool includes the following map layers.

- State scenic highways, based on data from the California Department of Transportation (2025)
- Sites with known hazardous materials contamination, based on data from the Water Board's GeoTracker database (State Water Resources Control Board 2025)
- Biological constraints such as designated critical habitat and documented special-status species occurrences, based on data from the CDFW's California Natural Diversity Database (CNDDB)

A separate screening tool was used for historical/archaeological resources, based on data from a watershed-wide records search at the California Historical Resources Information System's Northwest Information Center. These data are being managed separately because of the need to maintain confidentiality.

The locations of potential station sites were added to the ArcGIS site screening tools, and the following screening actions were taken.

- Sites with documented hazardous materials contamination were planned for avoidance unless it could be shown that contamination is confined to deeper substrate materials or deeper aquifers that would not be affected by the shallow disturbance required for station installation/O&M/removal, in order to ensure that none of the stations would trigger the *CEQA Guidelines* Section 15300.2[e] exception; in practice, no stations were proposed within the documented limits of hazardous materials contamination
- Sites within the viewshed of designated state scenic highways are being avoided if this is possible while still achieving Study objectives. Where it is necessary to locate a station within a state scenic highway viewshed, an additional AMM (AMM-7B, Table 1) governing the specifics of station location and design applies to ensure that degradation of scenic resources is avoided and the *CEQA Guidelines* Section 15300.2[d] exception is not triggered
- If possible while still achieving Study objectives, station installations were planned for location a minimum of 500 feet from the recorded boundary of known archaeological sites; sites for which this is not feasible were subject to site-specific evaluation by a qualified archaeologist who developed site-specific measures to ensure that the *CEQA Guidelines* Section15300.2[f]) exception would not be triggered
- Sites impinging on tribal cultural resources for which a tribe has requested avoidance were planned for avoidance; however, no stations sites supporting such tribal cultural resources (as distinct from archaeological resources) have been identified through consultation to date

- All station sites underwent site-specific biological evaluation to assess risks to special-status species and their habitat and enable application of Tier 3 AMMs or development of SSMs to avoid (1) take of listed species, (2) deleterious effects on designated critical habitat, and (3) unusual circumstances related to impacts on special-status species and special-status species habitat

With this combination of site screening, selective siting and design, other AMMs, and SSMs in place, all stations under contract as of July 2026 have been determined to qualify for categorical exemption from CEQA and to avoid the need for Clean Water Act Section 404 and Rivers and Harbors Act Section 10 permitting. If any additional stations are brought under contract, they will be subject to the same screening and other AMM requirements and are expected to qualify in a similar manner. Any stations that are essential to the project and do not qualify for CEQA exemption will be subject to separate CEQA analysis.

Mitigation

As discussed above, the mitigation component of the Study was previously determined to qualify for the *CEQA Guidelines* 21080.56 statutory exemption (California Department of Fish and Wildlife, Director's Office 2025) and would also qualify for Class 33 categorical exemption. It will nonetheless be subject to all applicable AMMs adopted for the Study as a whole.

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