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Elk River Estuary (Planning Area 1) Restoration Project Vegetation and Aquatic Resources Monitoring Plan

PREPARED FOR

California Trout
1380 9th Street
Arcata, CA 95521

PREPARED BY

Stillwater Sciences
850 G Street, Suite K
Arcata, CA 95521

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Cover photos: Clockwise from upper left: *Angelica lucida*, *Salicornia pacifica*, coastal grassland habitat, and *Chamerion angustifolium*, Eel River Estuary, July 2021.

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1 INTRODUCTION

1.1 Project Overview and Project Area

The Elk River watershed is the largest tributary to Humboldt Bay, located on the north coast of California south of Eureka, California (Figure 1-1). This watershed has been extensively altered over the past 170 years and has been transformed from a mosaic of forest, wetland, and aquatic ecosystems to a mix of managed timberlands, agricultural and grazing lands, and residential properties. The Elk River watershed is currently the focus of a basin-wide effort to restore beneficial uses of water in the Elk River, improve water quality conditions, reduce nuisance flooding, rehabilitate habitat for focal fish species, expand riparian habitat, and improve overall ecosystem health in the Elk River.

The Elk River Estuary (Planning Area 1) Restoration Project (Project) is one part of a watershed-scale effort focusing on restoring natural tidal and fluvial drainage patterns in the lower part of the watershed. The Project Area encompasses 5.3 miles of channel length, including Elk River and Swain Slough, and spans 857 acres (Figure 1-1). The northwestern edge of the Project area is bordered by Highway 101. The Project Area is generally bounded to the west and east by hillslopes, and Elk River to the south up to Showers Road. The Elk River – Swain Slough confluence is at the very downstream end of the Project Area, just upstream of Highway 101.

Detailed Project elements were formulated with the Elk River community as part of the Elk River Watershed Stewardship Program (Stewardship Program) and are described in the *Elk River Estuary (Planning Area 1) Restoration Project: Project Description* (California Trout et al. 2025) (hereinafter Project Description) and summarized below.

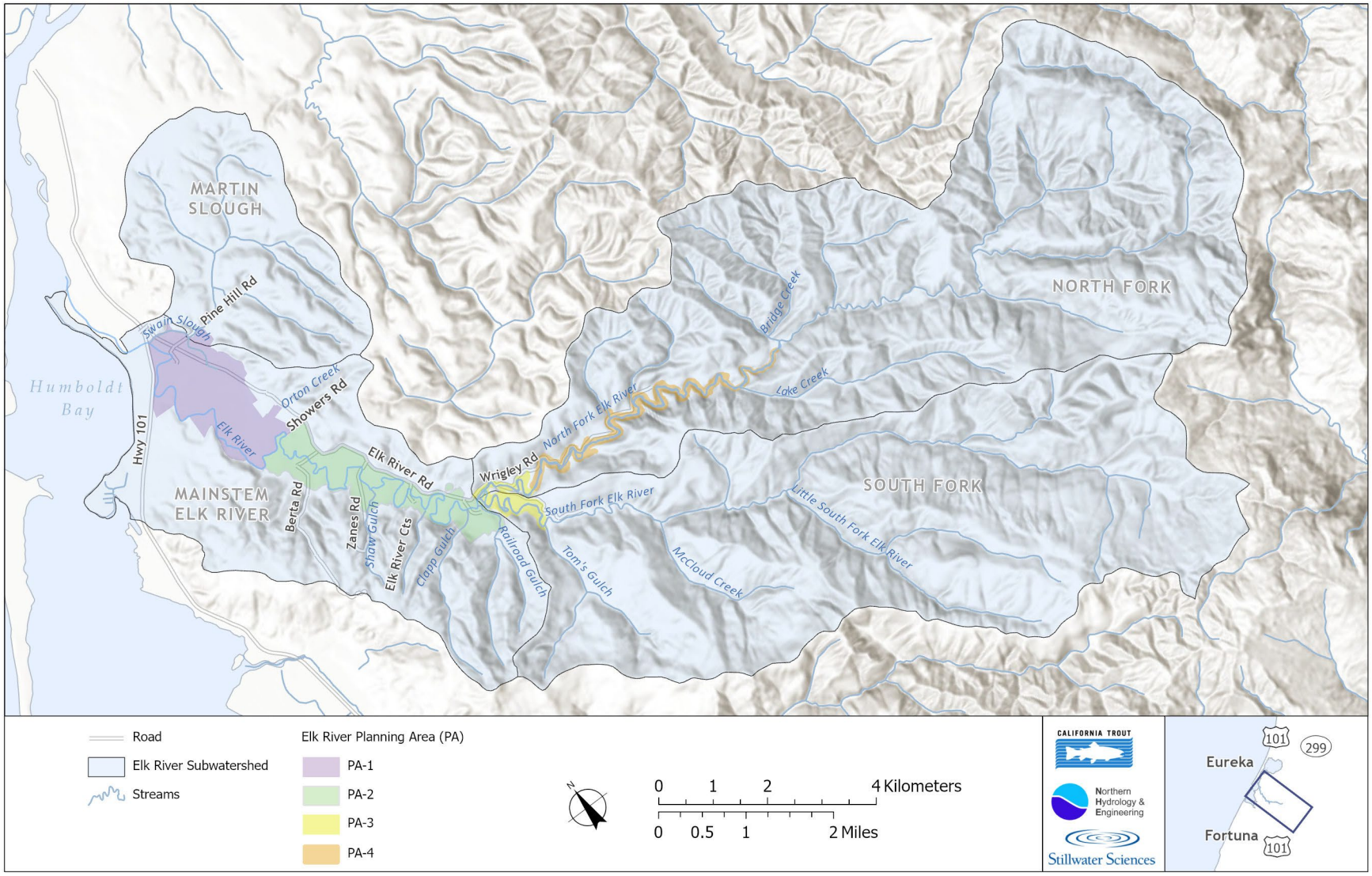

Figure 1-1. Vicinity map of Elk River Planning Area 1 (Project Area).

1.2 Project Elements

The Project restoration scope includes the following elements:

1. remove and/or upgrade drainage infrastructure;
2. reduce or remove levees;
3. breach an abandoned railroad grade;
4. restore tidal sloughs and tidal creek channels and their connectivity to mainstem channels;
5. create backwater features for seasonal waterfowl and winter salmonid rearing habitat (primarily for federally-listed coho salmon);
6. manage invasive vegetation;
7. expand native plant communities; and
8. recontour portions of the floodplain to guide winter flood-flows across the floodplain and back into the slough channel network toward suitable aquatic habitat.

Additional details about the restoration scope elements can be found in the Project Description.

The Project Area is divided into 11 subareas that will include various restoration elements (Figure 1-2). Infrastructure removal and replacement and vegetation enhancement and management will take place within the entire Project Area. Tidal marsh enhancement in the Elk River Wildlife Area (ERWA) South, ERWA North, Confluence, and Chwanuchguk subareas will remove infrastructure that inhibits tidal exchange, restore a full tidal prism, and create spatially complex topography and spatially and temporally complex water quality conditions. Off-channel habitat enhancements in the Upper Spruce, Lower Spruce, Relic Swain, and Lower Swain subareas will expand and enhance freshwater marsh and wetland and mixed riparian forest types by retrofitting tide gates to allow a muted tidal prism into the enhancements, protecting springs with cattle exclusion fencing and reconnecting freshwater water springs to the Elk River and Swain Slough. Mainstem corridor enhancements will take place in the Upper Mainstem of the Elk River. These enhancements include the removal of earthen dikes confining the channel, removing or thinning vegetation along the bank, reconnecting freshwater sources to the mainstem, expanding the riparian corridor to develop a multi-tiered riparian structure, and constructing alcove habitats and augmenting large wood to provide deeper pools, more complex escape cover, and velocity refugia to benefit focal fish species. Floodplain corridor enhancement in Orton Creek (combined Lower, Mid, and Upper Orton subareas) will restore more natural patterns of inundation and flow direction by reconnecting and maintaining stream and tidal inundation onto floodplains and marsh plains.

Beneficial sediment reuse will take place to support restoration in several subareas as detailed in the Project Description. Sediment will be reused in tidal marshes and riparian wetlands to increase topographic complexity, which supports more diverse aquatic and terrestrial habitats. Sediment will be repurposed to build eco-levees, enabling the restoration of full tidal prism on lands that are adjacent to agricultural fields, as well as natural shorelines, which provide transitional habitats and gentle gradients to roads.

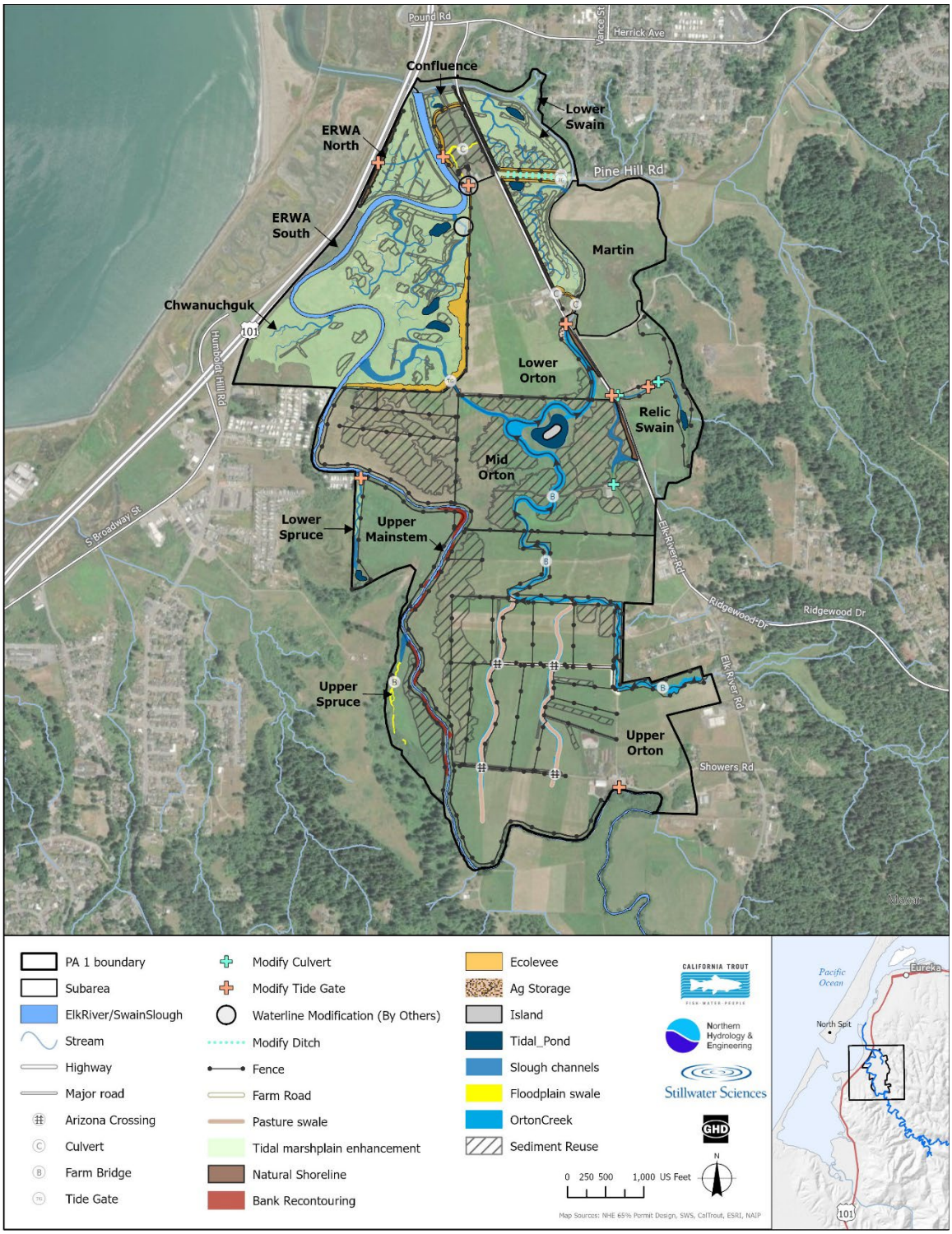

Figure 1-2. Overview of enhancement actions within the Project Area (PA 1 boundary), including subareas, based on 65% design.

Public access enhancements within the Project Area will support nature study, Project performance and regulatory monitoring, and California Department of Fish and Wildlife's (CDFW's) operation and maintenance within the ERWA. Public access trail systems located on new or existing berms around the newly restored tidal marsh areas will provide elevated and designated areas for site visitors to enjoy passive recreation and wildlife viewing and non-motorized boat launches in Swains Slough and the mainstem Elk River will allow the public to access the area from the water.

1.3 Regulatory Authorizations

California Environmental Quality Act (CEQA) review will be completed through CDFW's Statutory Exemption for Restoration Projects (SERP) process. The Project Description lists additional permits and regulatory requirements that are applicable to the Project.

1.4 Environmental Setting

Existing vegetation communities in the Project Area include coastal and agricultural grasslands, coastal scrub, intertidal coastal salt marsh, brackish marsh, and riparian forests. The *Biological Resources Evaluation for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025a) provides a detailed description of the existing conditions including sensitive natural communities and special-status plant populations.

The Project Area contains a mosaic of wetland habitat types under the jurisdiction of United States Army Corps of Engineers (USACE), the State Water Resources Control Board (SWRCB) or CDFW (hereinafter collectively called State), and/or the California Coastal Commission (CCC). A detailed description of the aquatic resource features in the Project Area is in the *Preliminary Aquatic Resources Delineation Report for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025b).

1.5 Project Impacts and Proposed Enhancement and Creation

1.5.1 Aquatic resources

The restoration is intended to achieve the Project elements defined in Section 1.2 and the design for each subarea will have no net loss of wetland habitat under either USACE- or State-jurisdiction. Restoration Project impacts are defined as either permanent, creation, temporary with enhancement, and temporary with no creation or enhancement. Permanent impacts predominantly result from conversion from one habitat type to another. Examples of Project actions that are considered *permanent impacts or conversion* include, but are not limited to:

- Conversion of streambed or three parameter-wetland to upland habitat (e.g., eco-levees, public access trails, roads, parking, boat access, etc.).

In the California Coastal Zone, there will be no net loss of aquatic coastal resources. Permanent impacts on one habitat type that will be offset by the creation of a different habitat type are described as type-conversion. Examples of Project actions that are considered *permanent impacts or conversion* include, but are not limited to:

- Conversion of one-parameter wetland to three-parameter wetland or streambed;
- Conversion of three-parameter wetland or streambed to one-parameter wetland; and

- Conversion of upland Environmentally Significant Habitat Area (ESHA) to one-parameter wetland.

Examples of Project actions that are considered *creation* include, but are not limited to:

- Conversion of upland habitat to three-parameter wetland or streambed;
- Conversion of State-jurisdictional wetlands to three-parameter wetland or streambed;
- Conversion of upland habitat to one-parameter wetlands; and
- Conversion of upland habitat to upland ESHA.

Examples of temporary Project impacts that are considered *enhancement* include, but are not limited to:

- Conversion of streambed to three-parameter wetland;
- Conversion of three-parameter wetland to streambed;
- Revegetation to recover native vegetation communities and recover wetland pasture in sediment reuse areas; and
- Preservation of intact, native vegetation communities within restoration areas.

Examples of temporary Project actions that are not considered creation or enhancement include, but are not limited to:

- Contractor use areas and active pasture areas revegetated with existing habitat vegetation.

The intent of the restoration is to enhance and expand native vegetation communities and aquatic resources throughout the Project Area. These communities are naturally dynamic and will shift over time in response to environmental conditions.

1.5.2 Eelgrass

No direct impacts on eelgrass (*Zostera marina*) are anticipated from Project activities as there will be no construction within the main channel of the Elk River where eelgrass was previously identified (Stillwater Sciences 2025a). Minimization and avoidance measures identified in the *Biological Resources Evaluation for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025a) will be implemented to reduce and potential indirect impacts on eelgrass adjacent to the Project area. The Project is anticipated to have a net benefit to eelgrass by expanding the tidal channel network in the Elk River and Swains Slough and increasing the total available eelgrass habitat in the Project Area.

1.6 Purpose of the Vegetation and Aquatic Resources Monitoring Plan

The Project will result in short-term impacts to the channel bed and banks, wetland and riparian habitat, listed salmonids, and agricultural lands. Compliance with CEQA, National Environmental Policy Act, Endangered Species Act, and other applicable federal, state, and local regulatory statutes will require reporting of short-term impacts to these resources (see California Trout et al. 2025). The purpose of this Vegetation and Aquatic Resources Monitoring Plan (Monitoring Plan) is to identify performance standards and describe the monitoring methods that will be used to assess if those performance standards have been met. This Monitoring Plan presents the anticipated regulatory monitoring and reporting obligations as a condition of agency approvals.

This Monitoring Plan serves as a companion document to other permit support documents developed for the Project including:

- *Elk River Planning Area 1 Project Description* (California Trout et al. 2025)
- *Biological Resources Evaluation for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025a)
- *Preliminary Aquatic Resources Delineation Report for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025b)
- *Elk River Planning Area 1 65% Revegetation Design Plans* (Stillwater Sciences 2025c)
- *Elk River Estuary (Planning Area 1) Restoration Project: Invasive Plant Management Plan* (Stillwater Sciences 2025d)

2 MONITORING PROGRAM

The Project Area includes multiple landowners with varying land use and management goals. The monitoring program is focused on the restored native vegetation communities within the impacted areas and does not include lands actively managed for agricultural use (i.e., recovered wetland pasture in sediment reuse areas). Vegetation and aquatic resources within the Project Area will be monitored for 3 years to determine if the performance standards have been met and whether adaptive management is necessary. Results of monitoring will be summarized in Vegetation and Aquatic Resources Monitoring Reports (hereinafter referred to as Monitoring Report) (see Section 2.6).

2.1 Performance Standards

The Monitoring Plan follows the ecological and vegetation-focused objectives of the Elk River Stewardship Program described in the Project Description. Performance standards (Table 2-1) were derived from the revegetation design targets for ecological uplift and the estuary's wetland and riparian recovery goals and represent early conditions of fully established restored habitat. There are no interim goals established for this Project; annual qualitative monitoring will direct adaptive management strategies and track progression towards final performance standards. The performance standards are only applicable to the restored native vegetation communities within the impacted areas and not to actively managed for agricultural lands.

Table 2-1. Project parameters, performance standards, and monitoring methods for Project subareas.

Parameters	Performance standards	Monitoring method
Native vegetation communities[1]	There will be a net increase in the total areal extent of native vegetation communities[1] within the Project Area compared with pre-project conditions[2] by Year 3.	Landscape-level assessment CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé Photographic Monitoring
Vegetative cover[3]	Vegetative cover within restored native vegetation communities will be 60% cover compared to pre-project conditions at the Project site or at least 60% cover compared to an intact, local reference site[4] by Year 3.	Landscape-level assessment CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé
Aquatic resource conditions	There will be an increase in overall California Rapid Assessment Methodology (CRAM) scores by Year 3 as compared with pre-project scores.	California Rapid Assessment Methodology (CRAM) Photographic Monitoring
Target invasive plants[5] within restored native vegetation communities	Absolute cover by any target invasive plant[5] will not exceed 10% for each species by Year 3.	Target invasive plant cover sampling

[1] Native vegetation communities will be defined using Manual of California Vegetation (MCV) (CNPS 2025) membership rules for each community.
[2] Vegetation community pre-project conditions are provided in the *Biological Resources Evaluation for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025a).
[3] Vegetative cover performance standards are in accordance with VDHR-5 of the Programmatic Biological and Conference Opinion California Statewide Restoration Programmatic Consultation (USFWS 2025).
[4] Reference sites will be identified prior to implementation.
[5] Target invasive plants are described in the *Elk River Estuary (Planning Area 1) Restoration Project: Invasive Plant Management Plan* (Stillwater Sciences 2025d). Additional target species may be included if any are found to be detrimental to the successful establishment of seed mixes and plantings.

2.2 Monitoring Framework

The Monitoring Plan incorporates the three-tiered monitoring structure developed by the State Wetland and Riparian Monitoring Plan (WRAMP) (https://www.sfei.org/programs/rl/habitat-assessment/wramp). This will provide consistency with regional and statewide efforts to use standardized methods to monitor wetlands. In the WRAMP Level 1-2-3 framework, Level 1 monitoring includes a broad landscape-level assessment, Level 2 incorporates rapid assessment methods to answer questions regarding general wetland health, and Level 3 monitoring includes intensive site assessments to validate wetland conditions described from Level 1 and 2 assessments and address specific regulatory requirements.

Level 1 landscape-level assessment will utilize an Unmanned Aerial Vehicle (UAV) to capture a comprehensive view of the completed Project Area. UAV imagery will be used to assess vegetation community development and inform on the enhancement and recovery progress.

Level 2 monitoring will utilize the California Rapid Assessment Method (CRAM) for wetlands developed by the California Wetland Monitoring Workgroup (CWMW 2013) to assess wetland conditions throughout the Project Area and the *Combined Vegetation Rapid Assessment and*

Relevé Field Protocol (CDFW-CNPS 2025) to determine species composition and cover estimates. Other suitable rapid assessment methodologies such as the California Riparian Rapid Assessment Method (RipRAM) may be utilized as appropriate. Additional qualitative surveys within each restored subarea will be conducted to more widely capture site conditions and inform contractor maintenance activities (see Section 3). Finally, photographic monitoring will be conducted throughout the Project Area to document plant growth and visually capture changes in wetland and plant communities over the monitoring period.

Level 3 assessments will provide high-resolution and more specific information on ecosystem function than Level 1 and 2 assessments. Level 3 assessments will include target invasive plant cover sampling to inform adaptive management recommendations and determine if the performance standards are being met.

2.3 Monitoring Schedule

Vegetation communities and aquatic resources within the Project Area will be monitored during the peak growing season (e.g., April through October) to ensure successful establishment of the desired native habitat. Table 2-2 shows the monitoring schedule for the Project. Project implementation for each subarea will begin as funding and construction phasing allows so subareas will not all be restored concurrently. Year 0 for each subarea will be determined based on the year implementation is completed. Specific monitoring assessments, their methodology, and the associated data analysis are described in the following subsections. All vegetation monitoring and assessment will be performed by qualified botanists/ecologists.

Table 2-2. Project monitoring schedule.

WRAMP framework	Monitoring method	Pre-project	Year 0	Year 1	Year 2	Year 3
Level 1	Landscape-level assessment		x[1]			x
Level 2	CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé	x[2]				x
	CRAM	x				x
	Qualitative assessment		x	x	x	x
	Photographic monitoring	x	x	x	x	x
Level 3	Target invasive plant cover sampling			x	x	x

[1] If needed, UAV imagery will be collected in Year 0 to document baseline conditions

[2] Vegetation community mapping was completed during the Project planning phase (Stillwater Sciences 2025a). CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé surveys may be conducted to capture vegetative absolute cover pre-project condition, in accordance with the Programmatic Biological and Conference Opinion California Statewide Restoration Programmatic Consultation (USFWS 2025).

2.4 Monitoring Methods

2.4.1 Landscape-level assessment

UAV imagery will be collected to generate orthorectified, natural color aerial imagery base maps for each Project subarea. Imagery will be collected and processed to produce final orthoimagery with 2-centimeter (or smaller) ground sample distance. Independent ground control points will be

measured to ensure accurate orthoimagery and spatial alignment with the topographic survey datum.

A preliminary vegetation community map will be prepared in geographic information systems (GIS) using UAV imagery. Delineation and classification of each identifiable vegetation community will follow the State of California standard procedures and vegetation classification system described in *A Manual of California Vegetation* (MCV) (CNPS 2025). The preliminary map will be field-assessed following the CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé protocol (Section 2.4.2). Information collected during this field assessment will be used to refine the vegetation map boundaries. Total areas of the resulting vegetation community map will be calculated and compared with the pre-project conditions described in *Biological Resources Evaluation for the Elk River Estuary (Planning Area 1) Restoration Project* (Stillwater Sciences 2025a), to determine if the native vegetation community and vegetative cover performance standards have been met.

2.4.2 CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé

The CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé is a field-based assessment that is intended to quickly characterize and classify vegetation communities within a sampled area. Sample areas will be determined from the preliminary vegetation community map (see landscape-level assessment, Section 2.4.1). The type of survey (rapid assessment or relevé) will be determined based on site conditions and habitat sampled. Field assessments will follow the CDFW-CNPS Protocol (CDFW-CNPS 2025) and investigators will record species composition and cover data onto *Combined Vegetation Rapid Assessment and Relevé Field Forms* (CDFW-CNPS 2024) to determine the quality and dominance of vegetation within each community type's sampled area. Results of this assessment will refine the vegetation community map, assign MCV vegetation community classifications to each delineated habitat, inform invasive plant management, and identify adaptive management strategies if an observed disturbance is believed to be detrimental to habitat recovery.

The CDFW-CNPS Combined Vegetation Rapid Assessment and Relevé survey will be used to quantify and assess absolute cover of vegetation and the extent and development of native vegetation communities to determine if the native vegetation community and vegetative cover performance standards have been met.

2.4.3 California Rapid Assessment Methodology (CRAM) for wetlands

California Rapid Assessment Methodology (CRAM) surveys will be conducted by at least one trained CRAM practitioner and used to measure buffer/landscape connectivity, hydrology, and physical structure of restored wetlands within the Project Area. CRAM assessment areas will be distributed to capture estuarine, palustrine, and/or riparian wetland types within each subarea to give a qualitative evaluation of the restored wetlands.

CRAM scores will be calculated and compared with pre-project conditions to determine if the Aquatic resources condition performance standard has been met (Table 2-1).

2.4.4 Qualitative assessment

A qualitative assessment will occur annually in restored areas during each Project subarea's active monitoring period. The purpose of this assessment is to identify and document problems that may be detrimental to achieving the Project's restoration goals and that may negatively affect

native plant establishment during each subarea's plant establishment period (up to three years post-planting). The qualitative evaluation is intended to capture aspects of the restoration area that are not measured by other assessments to inform timely adaptive management and will include the following:

- the general health and vigor of planted species;
- observed gaps in planting basins from plant mortality and potential cause (e.g., herbivory, water stress, pathogens);
- evidence of insects or browsing damage on live plants;
- condition of live-stock exclusion fencing; and
- incidental observations of target invasive plants[1] and their distribution and abundance.

Qualitative surveys will be scheduled between late spring and summer to assess typical growing season conditions in the restored areas. Results concerning plant maintenance will be communicated to the planting contractor. Target invasive plant occurrence information will be used to inform and schedule the invasive plant maintenance actions (Section 3-2).

2.4.5 Photographic monitoring

Photopoints will be established throughout each subarea to monitor site changes over time. Photopoint stationing will be identified prior to construction at points which best capture each subarea's restoration transformation. Preferably, photographs will be taken at least once each year in the same season(s). To ensure consistency, photopoint locations will be recorded using a handheld GPS receiver and all photographs will be taken with a fixed location in the background or a compass bearing of the direction the camera is facing (or the compass bearing for the start and end of a panoramic series of photographs) will be recorded so that the same views can be recorded in successive monitoring efforts. If possible, a permanent monument (capped rebar, stake, etc.) will be installed for easier resurvey. Photographs of other notable features or incidental observations will also be taken during each monitoring event.

Photographic monitoring will be used to visually document progression towards achieving performance standards (Table 2-1).

2.4.6 Target invasive plant cover sampling

Target invasive plant cover surveys will provide fine-scale, quantitative data to determine if the target invasive plant performance standard has been met (Table 2-1). Focused direct measurements will be used to quantify cover of target invasive plants within each Project subarea.

Quantitative surveys for target invasive plant cover will follow a stratified-random sampling approach for plot selection. In accordance with ecological sampling theory, sample areas will correspond to defined native vegetation community types or broader wetland classifications (i.e., estuarine wetlands, palustrine wetlands, riparian, etc.). Sampling plot size will vary based on the habitat type and the dominant stratum of the sample area. Plot size within woody planting zones will be selected based on the sample area extent and will not exceed 50 square meters to reduce collector bias in field collection of cover values and ensure an adequate number of statistically independent plots are sampled. One-square meter quadrats have proven effective in capturing

[1] Target invasive plant are defined in the *Elk River Estuary (Planning Area 1) Restoration Project: Invasive Plant Management Plan* (Stillwater Sciences 2025d).

plant community variation in herbaceous plant communities and making for more precise estimates of means (Elzinga et al. 1999, DeBerry 2018). The initial performance monitoring effort will target a sample size of 2% of the total sample area within woody dominant planting zones and five plots per acre for herbaceous planting zones. Sample adequacy of the initial Year 1 cover data will be determined by a power analysis to detect a 10% difference using 80% power with 0.05 alpha. If a sample area is not adequately represented by the initial sample, the sample size will be adjusted until an adequate sample has been reached. The boundaries of all plots will be recorded with high-resolution GPS or other methodology that ensures consistency for revisiting.

Survey methods may include line intercept transect or cover class quadrat methods, depending on the specific vegetation community. Data collection will only record cover data on the absolute cover of target invasive species. The chosen sampling design will be described in the Year 1 Monitoring Report.

2.5 Data Collection and Management

Monitoring efforts will utilize electronic data collection where feasible; where not feasible monitors will record data onto paper data forms. Data forms will be used for all survey efforts to maintain clarity, efficacy, and repeatability, they will be specific to survey protocols and the most current forms available. Plant identification will follow the taxonomy and nomenclature of the *Jepson eFlora* (Jepson Flora Project 2025). If an encountered species with greater than 5% absolute cover cannot be keyed in the field, a sample will be collected, assigned a unique identifier (e.g., UNK1), placed in a marked plastic bag, and refrigerated or pressed for later identification.

Before leaving the field site, data will be reviewed by the field lead to ensure accuracy and completeness. Upon return from the field, paper forms will be digitized and archived. Data will be entered into an archival database with citations or accompanying metadata to ensure that a clear record of the authority and custody of Project data and source information is collected and maintained. Database entries will be double-checked and reviewed using graphic visualizations or other techniques to reduce the potential for errors.

2.6 Reporting

Annual Monitoring Reports will summarize findings from monitoring events, document whether Project goals and performance standards have been met and provide adaptive management recommendations as necessary. Reports will include the following sections:

- Introduction
- Maintenance Activities Performed
- Monitoring Methods
- Monitoring Results
- Achievement of Performance Standards (and suggested revisions to standards, if relevant)
- Recommendations for Adaptive Management

Annual Monitoring Reports will be distributed to relevant agencies by January 31 following each monitoring year. A final Monitoring Report will be produced upon successful completion of the three-year monitoring period.

If the Project has successfully met the expected performance standards, a letter will be submitted to the appropriate permitting agencies acknowledging the site conditions at the Project and requesting their concurrence that the performance standards have been met and monitoring is completed. If performance standards are not met, discussions will be held with the relevant agencies as necessary and adaptive management will be determined (Section 4).

3 VEGETATION MAINTENANCE

3.1 Planting Maintenance

The planting contractor will actively monitor and maintain restored areas during the monitoring period (three years post-planting) per the contractor specifications in the construction designs. The planting contractor's monitoring and maintenance will involve regular review of all planting areas (typically monthly inspections during the growing season) and associated treatments (e.g., replacement planting where plug and container stock mortality or gaps of 10 or more planting basins are evident). Activities may include, but are not limited to, watering, replanting of diseased or dead plants, litter control, weed control, fertilizing, rolling, cultivating, repair of irrigation systems, erosion control, control of diseases and pests, and the general care and nurturing of installed container plants and emergent seedlings. Maintenance of target invasive plants may include a combination of mechanical (e.g., mowing, pruning or hand removal) and cultural methods as described in the *Elk River Estuary (Planning Area 1) Restoration Project: Invasive Plant Management Plan* (Stillwater Sciences 2025d).

Any adaptive management needs noted from surveys conducted under the Project monitoring program (Section 2) will be conveyed to the planting contractor for prompt corrective action.

3.2 Target Invasive Plant Maintenance

Controlling invasive plant species will be key to successful restoration. The Project will retain a separate invasive plant maintenance contractor for management of target invasive plants. Re-emergence of target invasive plant species and recommendations for removal efforts will be reported to the invasive plant maintenance contractor shortly after each monitoring event. Removal efforts will focus on control of the target invasive plants described in *Elk River Estuary (Planning Area 1) Restoration Project: Invasive Plant Management Plan* (Stillwater Sciences 2025d). Additional target species may be included if any are found to be detrimental to the successful establishment of seed mixes and plantings. Maintenance of target invasive plants will be conducted in accordance with the *Elk River Estuary (Planning Area 1) Restoration Project: Invasive Plant Management Plan* (Stillwater Sciences 2025d).

4 ADAPTIVE MANAGEMENT

If the performance standards are not met, adaptive management will be implemented. This may include adding or replacing plantings, as necessary, using the species identified in the planting design palette (Stillwater Sciences 2025c), if those species are found to be unsuitable for the growing conditions, other native plant species determined to be locally available and suitable for the revegetation area. Supplemental plantings will be installed in accordance with *The Elk River*

Planning Area 1 65% Revegetation Design Plans (Stillwater Sciences 2025c). Additional adaptive management may include the following:

- adjusting irrigation frequency and/or duration;
- increasing weed abatement efforts; and
- installation of plant protectors, and/or repair fencing.

Additionally, if unforeseen biotic or abiotic factors (e.g., flooding) cause all or significant portions of the restoration efforts to fail, the Project team will consult with the relevant agencies to develop contingency measures.

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