

**UPPER GUADALUPE RIVER
FLOOD RISK MANAGEMENT PROJECT
San José, California**

Monitoring and Adaptive Management Plan

Appendix G

**DRAFT INTEGRATED
GENERAL REEVALUATION REPORT
& SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT**

November 2022



**US Army Corps
of Engineers®**
San Francisco District



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Upper Guadalupe River Project Monitoring and Adaptive Management Plan

1 INTRODUCTION

The Upper Guadalupe River Flood Risk Management Project General Reevaluation Study (Upper Guadalupe) is recommending the Combination Plan as the Tentatively Selected Plan (TSP). The Combination Plan is the NED as well as the Comprehensive Benefits Plan and includes several natural or nature-based features (NNBFs) and Engineering With Nature (EWN) measures for flood risk management (FRM).

Section 1161 of the Water Resources Development Act (WRDA) of 2016 and Section 2039 of WRDA 2007, as amended, require all feasibility studies for ecosystem restoration projects (or components of a project) to include a plan for monitoring the success of ecosystem restoration features. Although not an ecosystem restoration project, the Project will implement a monitoring and adaptive management plan (MAMP) that will mirror the requirements laid out in Section 1161 of WRDA 2016 for NNBFs and EWN measures. The MAMP will be a cost-shared activity that occurs concurrently with OMRR&R. The team has included \$1 million as a placeholder for total monitoring cost.

The objective of this Monitoring and Adaptive Management Plan (MAMP) is to describe the monitoring and adaptive management that will be implemented, in accordance with US Army Corps of Engineers (USACE) policy. This MAMP also sets forth predicted outcomes (performance targets) and criteria upon which to assess success of NNBFs and other EWN measures and adaptive management decisions for the resulting project.

The MAMP is intended to assess and ensure functional effectiveness of nature-based FRM measures. The mitigation and associated monitoring for the already constructed reaches is addressed under separate cover.¹ If the Combination Plan results in a need for further compensatory mitigation beyond that already constructed, that mitigation will fall under the Mitigation and Monitoring Plan (MMP) process that the project has been following for the already constructed reaches. This MAMP is incorporating lessons learned from the MMP process, but deviates from that process.

The plan will monitor for vegetation success and restored geomorphic processes, as well as lateral and bed stability. Potential adaptive management actions may include replanting, supplemental irrigation, supplemental biotechnical bank stabilization, additional gravel augmentation, among others.

This plan may be further refined and developed in the Preconstruction Engineering and Design (PED) phase. As the project design concept is refined in future phases, the U.S. Army Corps of Engineers San Francisco District will continue to coordinate with resource agencies on design decisions. Thus, detailed

¹ Reach 10b was constructed by the USACE in order to advance the mitigation for the authorized Bypass Plan. Reach 12 was constructed in 2015 in order to advance mitigation for the project.

plans and specifications are not part of the MAMP. The plan still needs to be further refined in coordination with Valley Water and the resource agencies.

2 PROJECT DESCRIPTION

The tentatively selected plan a combination of Engineering with Nature and Traditional FRM Plan (Combination Plan). The Combination Plan is the NED and the Comprehensive Benefit Plan and reduces 95% of damages across all flood events modeled. It has a total project cost of \$145.8 million, with \$16.3 million in net benefits and a benefit-cost ratio of 4.14. The proposed channel modifications are expected to introduce and/or recover some degree of the Guadalupe River's natural function and self-sustaining physical and biological attributes. Proposed channel modifications are expected to create floodplain and other backwater areas that provide lower water velocity refugia for fish holding under storm flow conditions.

It is important to note that this is not an ecosystem restoration project and the team did not formulate for ecosystem restoration, but rather for flood risk management. Thus, there are further opportunities to restore the riparian ecosystem in this system which were not evaluated because they were not associated with FRM.

Agriculture and development in the Santa Clara Valley have eliminated most of the riparian forest in the region. The riparian forest along the Guadalupe River and nearby creeks constitutes the last remaining areas of significant riparian forest in the valley. Along the upper Guadalupe River where this project takes place, the remaining riparian habitat has been reduced and degraded by channelization, gravel mining, and development along the banks of the river. This project converts parking lots and pavement to riparian forests and reestablishes a floodplain which had been developed upon. Riparian forests are considered to be among the most productive habitats for wildlife in California and these habitats support the most dense and diverse wildlife communities in the Santa Clara Valley. Biodiversity is generally highest in riparian forests. Thus, the Environmental Quality (EQ) benefits that this FRM project delivers are significant.

The following planning objectives were developed for the Guadalupe River Reformulation study area over the 50-year period of analysis from 2026 to 2076.

- Reduce flood risk and associated damages to central San José neighborhoods due to flooding from the upper Guadalupe River and its tributaries, Canoas Creek and Ross Creek.
- Reduce life safety risk to the central San José neighborhoods, specifically Canoas Garden, from flooding.
- Within the scope of reducing flood risk, realize environmental quality benefits and improve ecological succession patterns in the channel and the riparian corridor.
- Reduce channel maintenance requirements in incised reaches 7 and 8 of the Guadalupe River mainstem between Caltrain/UPRR crossing and Willow Glen Way.
- Increase access to the riparian corridor for recreational opportunities, particularly where they can connect to existing trails, parks, or other significant destinations, or offer recreational opportunities that are unique to the area.

Table 1. Summary of natural or nature-based features (NNBFs) or Engineering with Nature (EWN) measures proposed under the Combination Plan, and preliminary monitoring approaches.

REACH	NNBF or EWN Feature Recommended for Monitoring	What are we going to monitor	Ideas for monitoring approach
REACHES 7&8	A 50 to 100-ft wide floodplain bench including riparian vegetation along the low-flow channel.	<ul style="list-style-type: none"> • Areal extent of the floodplain bench • Topographic change (areas of erosion or deposition) 	<ul style="list-style-type: none"> • Lidar and Topographic Change Analysis to track how this feature evolves over time. • Aerial photos • Thalweg mapping • Cross-sections
		<ul style="list-style-type: none"> • Vegetation establishment 	<ul style="list-style-type: none"> • Lidar and Topographic Change Analysis of the vegetation to track vegetation growth. • Canopy coverage over wetted channel • Back calculations of roughness • Aerial photos
	Islands left in place to preserve some of the existing vegetation on the right bank.	<ul style="list-style-type: none"> • Geomorphic stability 	<ul style="list-style-type: none"> • Qualitative assessment of physical integrity • Topographic Change Analysis
		<ul style="list-style-type: none"> • Tree health 	<ul style="list-style-type: none"> • Qualitative assessments of tree health
	Biotechnical bank stabilization along the existing channel left bank to help reduce erosion and scour	<ul style="list-style-type: none"> • Areas of channel degradation 	<ul style="list-style-type: none"> • Qualitative assessment of physical integrity • Topographic Change Analysis
		<ul style="list-style-type: none"> • Vegetation establishment 	<ul style="list-style-type: none"> • Vegetative coverage • Qualitative assessments of tree health
	Gravel augmentation to provide spawning substrate for migratory fish	<ul style="list-style-type: none"> • Changes in channel alignment • Document channel evolution • Habitat quality • Gravel movement 	<ul style="list-style-type: none"> • Lidar and Topographic Change Analysis to detect hot spots of areas of change; calculate sediment volume • Facies mapping and pebbles counts to document changes in extent and texture of substrate • Embeddedness • Permeability sampling • Habitat area mapping

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REACH	NNBF or EWN Feature Recommended for Monitoring	What are we going to monitor	Ideas for monitoring approach
			<ul style="list-style-type: none"> • Tracer rocks • Scour chains • Thalweg mapping
	Channel sideslopes (2H:1V) stabilized by natural plantings.	<ul style="list-style-type: none"> • Vegetative coverage • Bank stability indicators 	<ul style="list-style-type: none"> • Visual assessments of areas of instability • Ground cover • Aerial photos
Canoas Creek	<i>No NNBFs or EWN features</i>		
Ross Creek	<i>No NNBFs or EWN features</i>		

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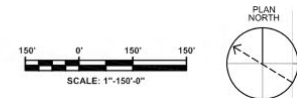
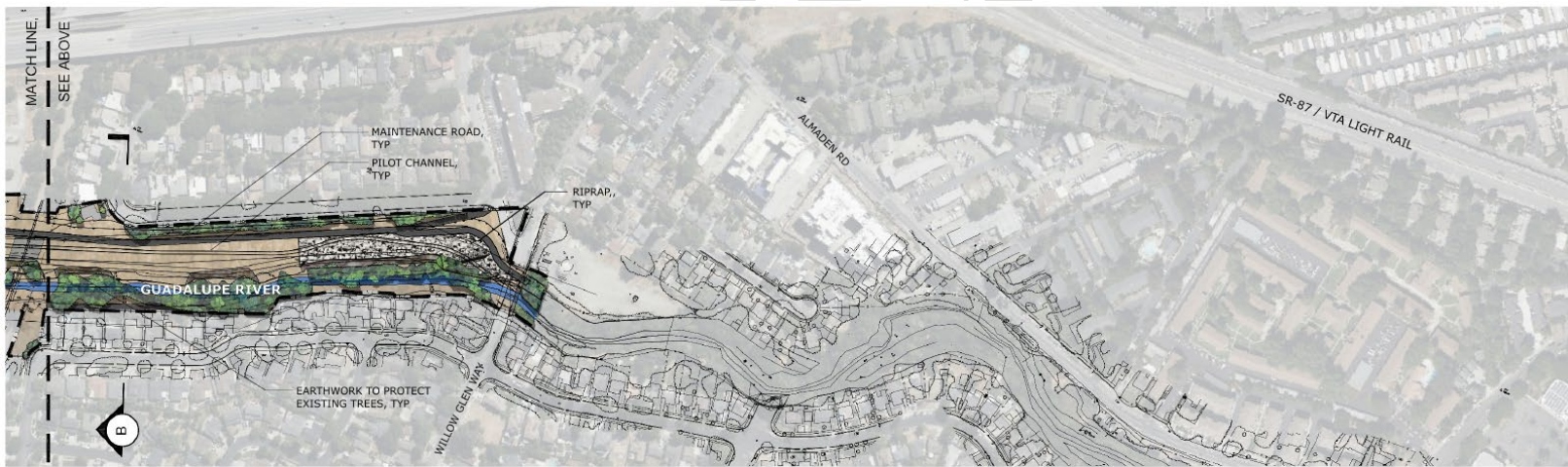
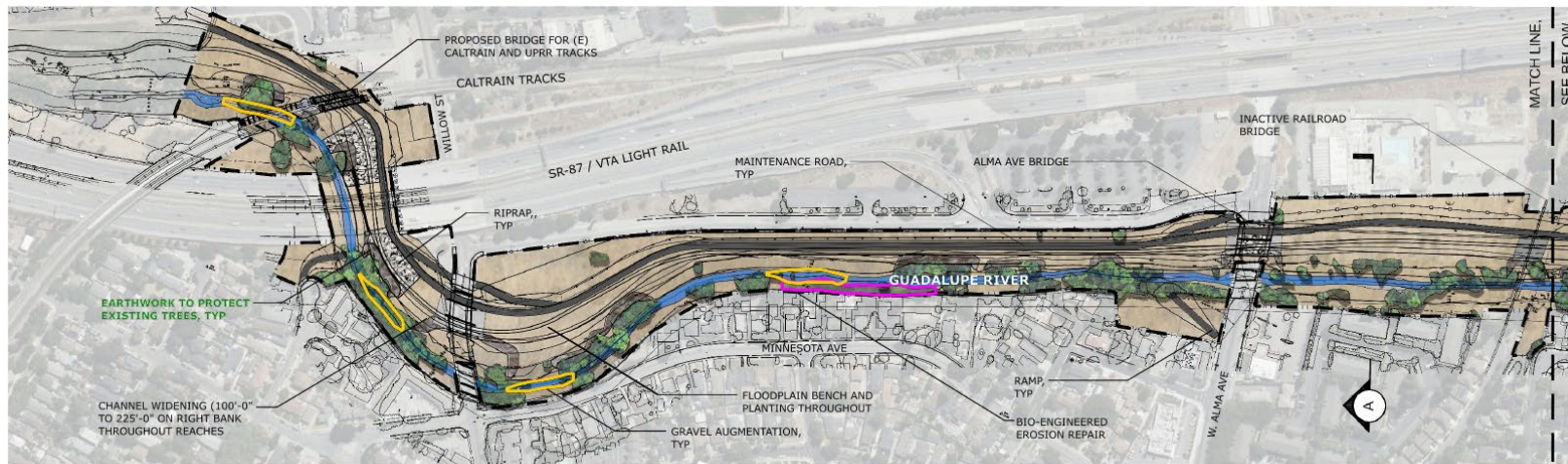


Figure 1. Conceptual schematic of the Combination Plan, Reaches 7 and 8.

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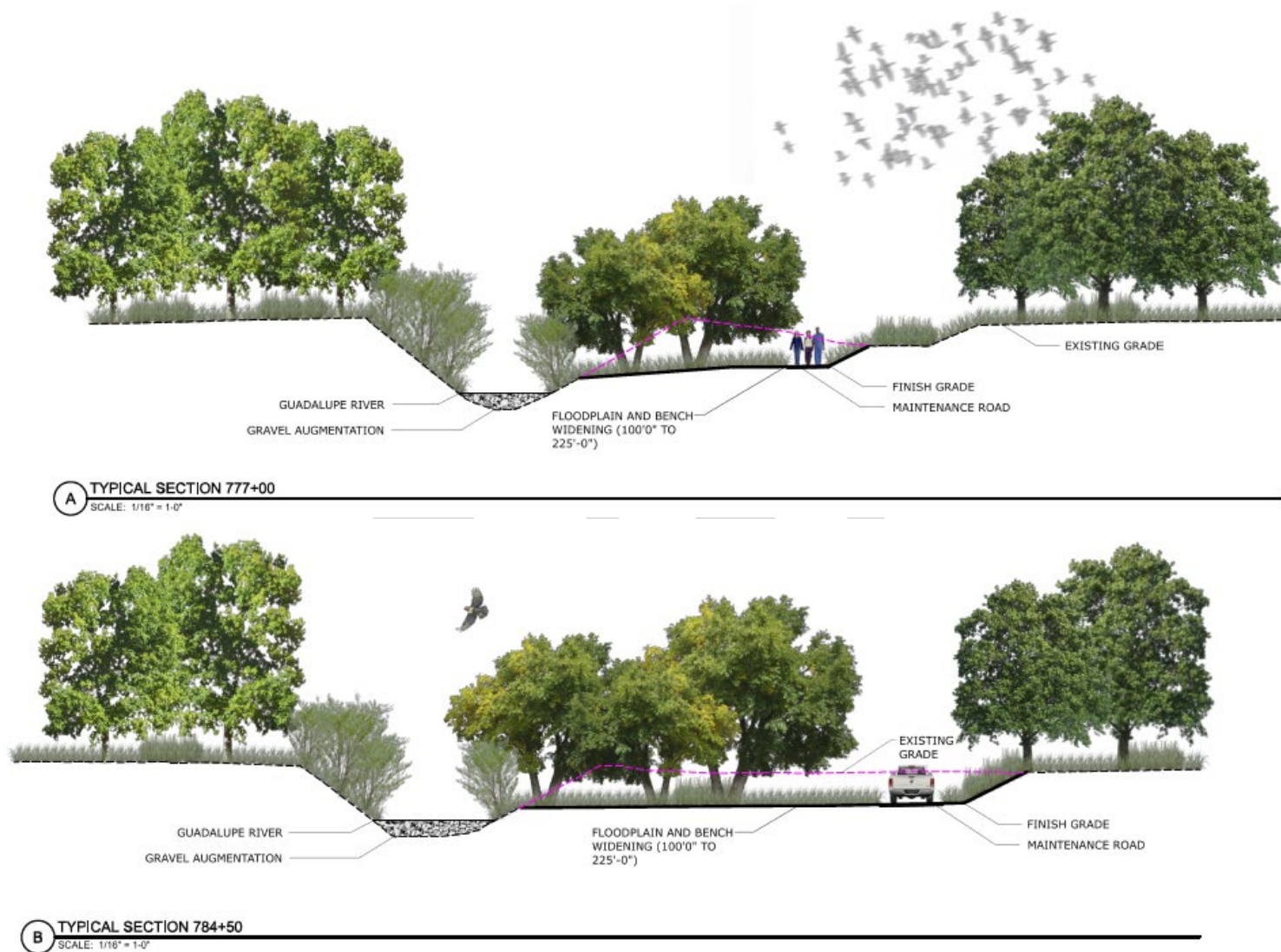


Figure 2. Conceptual cross-section of the Combination Plan, Reaches 7 and 8.

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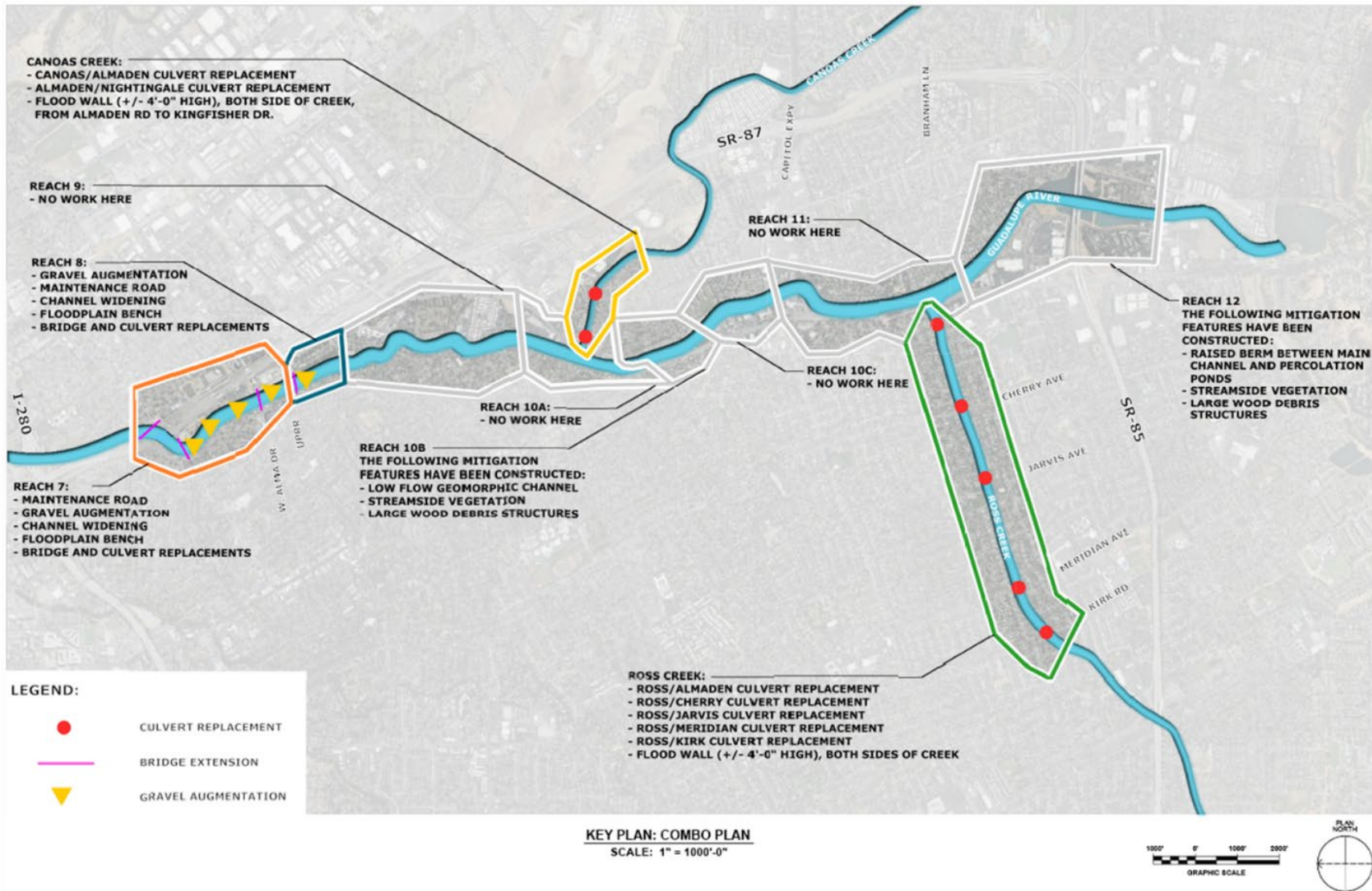


Figure 3. Summary of the key components of the Combination Plan.

3 RELATIONSHIP TO BIOLOGICAL OPINIONS

The National Marine Fisheries Service has agreed that the existing project biological opinions can be applied to the recommended plan.

3.1 National Marine Fisheries Service (NMFS) issued Biological Opinion (BO), 2000

The original BO analyzed the effects of the originally proposed Upper Guadalupe Flood Control Project on Central California Coast (CCC) steelhead. Concurrently, NMFS provided Essential Fish Habitat (EFH) Conservation recommendations pursuant to the Magnuson-Stevens Fishery Conservation and Management Act for fall-run Chinook salmon in the Guadalupe River.

3.2 Supplemental BO for Limited Reevaluation Report (LRR), 2005

The supplemental BO addressed revisions to the original project associated with the project's Waste Discharge Requirements and Water Quality Certification issued by the SF Bay Regional Water Quality Control Board. Revisions to the original project added elements such as floodplain benches, channel widening, and other actions to improve stream functions within the project area.

Based on NMFS' review of the proposed revisions and the anticipated levels of take, the supplemental BO concluded that the revisions are not likely to jeopardize the continued existence of the threatened CCC steelhead. The analysis included in the supplemental BO was intended to complement not replace the 2000 BO. However, NMFS believed the project would likely result in take of CCC steelhead and therefore included an incidental take statement (ITS). EFH Conservation Recommendations from 2000 remained in place and unchanged. The project area and the entire Guadalupe River Watershed were excluded from the proposed designations of critical habitat for two evolutionary significant units (ESUs) of Chinook salmon and five ESUs of anadromous steelhead (69 FR 71880).

4 MONITORING AND ADAPTIVE MANAGEMENT PROCESS

Monitoring includes the systematic collection and analysis of data that provides information necessary to determine if a project is meeting its objectives. The data collected via monitoring in conjunction with project performance standards can be used to evaluate when functional success has been achieved or whether adaptive management measures are necessary to ensure that the project will attain project benefits. Adaptive management involves refining or revising NNBFs and implementing different or additional measures when necessary to address changes in site conditions or other components of a restoration project that adversely affect ecological success. Monitoring associated with this Upper Guadalupe MAMP will continue until USACE determines the success criteria are met. Within a period of ten years from completion of construction, monitoring shall be a cost-shared project cost. Any additional monitoring required beyond 10 years will be part of OMRR&R requirements at 100% non-federal cost. In accordance with the implementation guidance for Section 1169 of WRDA 2016, the decision to cease monitoring (at the project's achievement of success) or execute any adaptive management action under the MAMP will be made by the USACE San Francisco District Engineer and Valley Water.

Implementation of the actual monitoring activities described below will be performed by USACE and Valley Water staff, or potentially by a contractor. Adaptive management actions will likely be performed either by a contractor under direction from Valley Water or USACE. Activities performed by Valley Water will count towards their construction cost-share balance. The details of this will be determined in the process of developing and signing the Project Partnership Agreement (PPA) prior to construction. Valley Water and USACE will prepare an annual report to document monitoring and adaptive management actions.

The monitoring parameters and success targets in this MAMP are to monitor for success in meeting the bolded project objectives above.

5 NNBF MONITORING

Table 2 below details the preliminary monitoring parameters and target ranges.

Table 2. Summary of proposed performance measures for natural or nature-based features (NNBFs) or Engineering with Nature (EWN) measures proposed under the Combination plan for Reaches 7 and 8.

NNBF	Performance Measure	Collection Method	Target (s)
Floodplain Bench	Vegetation establishment	TBD	60-80% cover or minimum tree density of 20 ft on center in the planted area. Average canopy height is at least 2 m.
	Hydraulic roughness	TBD	Roughness is within design tolerance.
	Invasive species	TBD	Patches of invasive species listed as high (CalIPC) are less than 10% of cover
Bank Stabilization	Plant growth	TBD	Linear vegetative coverage is 60-80% of planted area.
	Geomorphic stability	TBD	Rock displacement is within design tolerances
Gravel Augmentation	Channel evolution	TBD	TBD
Undercut bank and/or pool forcing large wood structures	Steelhead habitat	TBD	TBD
	Water quality	TBD	TBD

Once 80% of the revegetation area has achieved stated design objectives (as measured by meeting primary performance metrics in Table 2), that area can be considered a success.

6 FREQUENCY AND DURATION OF MONITORING

Monitoring associated with this Upper Guadalupe MAMP will continue until USACE determines the success criteria are met. Within a period of ten years from completion of construction, monitoring shall be a cost-shared project cost. Any additional monitoring required beyond 10 years will be part of OMRR&R requirements at 100% non-federal cost.

The newly constructed features would be monitored immediately after construction, to set a monitoring baseline. The baseline monitoring schedule will be that it occurs in years 1, 2, 3, 5 and 10 post project construction. Additional post-construction monitoring of NNBFs will occur after geomorphically-effective flows (i.e., flow that deposits substantial sediment on the floodplain). Monitoring can be considered complete after the features have met the target for two successive monitoring episodes.

7 CONTINGENCY (ADAPTIVE MANAGEMENT)

If enough individual features in a reach or reaches in the project are not performing adequately, actions may need to be taken to correct these deficiencies. Per Implementation Guidance for Section 1161 of WRDA 2016, decisions to undertake physical modifications must be concurred with by the non-federal sponsor. These physical modifications would be considered cost-shared adaptive management.

The process-based construction approach in the dynamic system of Upper Guadalupe makes it difficult to predict how/if individual features may fail in the future. Furthermore, interannual precipitation variability makes it impossible to know exactly when a storm event could happen with the potential to disrupt NNBFs. Drastic measures listed below, such as major project realignment, will only be necessary if an event occurs that prevents the project from reaching functional success (as documented by the monitoring program).

During the monitoring period, cost-shared adaptive management and sponsor-led Operations, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) actions will happen concurrently in time and may overlap in location. Potential fixes to ensure project performance may include, but not be limited to:

- Modified planting
- Supplemental irrigation
- Supplemental biotechnical bank stabilization
- Additional gravel augmentation

The team will identify and refine costs for these potential adaptive management actions prior to release of the Final Report. Another potential adaptive management action may be the need to be change to the project success criteria.

The adaptive management actions will only be performed on an as-needed basis, meaning that the costs shown below may be significantly more than what is actually necessary to ensure project benefits. The

non-federal sponsor-led OMRR&R actions will occur as described in the OMRR&R manual issued by USACE at the conclusion of project construction. The monitoring team will focus on making sure that Reaches 7 and 8 meet the elevated geomorphic and ecological functionality (relative to baseline) goals set forth in the project objectives.

A flexible approach to adaptive management vs. OMRR&R actions is necessary because of the process-based NNBF. OMRR&R actions related to the project should be implemented following completion of construction; however, NNBF and other aspects of the project will need to also undergo monitoring and potentially adaptive management.

8 COSTS

This section (to be written prior to release of the Final Report) details the total maximum expected estimated costs for monitoring and adaptive management for 10 years following project construction. Monitoring and adaptive management would cease before 10 years if ecological success is achieved earlier. A rough order of magnitude estimate is provided in the table below.

Table 3. Estimated costs for monitoring, reporting, and adaptive management over the 10-year cost-shared period.

MONITORING	Estimated Cost
Vegetation	
Short-term survival, health, and vigor monitoring (Years 1, 2, 3)	\$264,000
Long-term cover (via line transects) and natural recruitment monitoring (Years 5, 10)	\$124,000
Topographic Surveys and Field Assessments	
Lidar/TCA	\$125,000
Topographic Field Surveys	\$100,000
Habitat/facies mapping	\$50,000
REPORTING	
Report (admin, draft, and final) and Adaptive Management Team	\$170,000
ADAPTIVE MANAGEMENT	
Adaptive management (as-needed)	\$167,000
TOTAL	\$1,000,000