MITIGATION AND MONITORING PLAN FOR IMPACTS TO WATERS OF THE UNITED STATES for the NEWHALL RANCH RESOURCE MANAGEMENT AND DEVELOPMENT PLAN SANTA CLARA RIVER AND TRIBUTARIES, UNINCORPORATED LOS ANGELES COUNTY, CALIFORNIA Army Corps Permit No. 2003-01264-AOA

Prepared for:

Newhall Land
25124 Springfield Court, 3rd Floor
Valencia, California 91355-1088
Contact: Matt Carpenter

Prepared by:

DUDEK

25124 Springfield Court, Suite 210
Valencia, California 91355
Contact: Michael Sweesy or Andrew Thomson
760.942.5147

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Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

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1.0 DESCRIPTION OF THE PROJECT/IMPACT SITE

1.1 Responsible Parties

1.1.1 Permittee Responsibilities

The Newhall Land and Farming Company (Newhall Land) is the permittee for the Newhall Ranch Resource Management and Development Plan (RMDP) (Project) under Army Corps of Engineers Permit No. 2003-01264-AOA (Corps Permit). The contact person for Newhall Land is Matt Carpenter. Newhall Land or its designee is financially responsible for all costs associated with the implementation, monitoring, maintenance, and long-term management and protection of the mitigation areas, as defined in this document and the *Final Newhall Ranch Resource Management and Development Plan and Spineflower Conservation Plan Joint Environmental Impact Statement and Environmental Impact Report* (Final EIS/EIR; Corps and CDFG 2010) and Corps Permit. However, if Newhall Land transfers ownership of all or part of the RMDP area to another entity, the Corps may agree to substitute the purchaser for Newhall Land as the entity financially responsible for specific mitigation areas. The permittee or its designee is responsible for preparation of site-specific mitigation plans for each development component of the RMDP, and for construction documents. The permittee shall select a qualified biological consultant that possesses the minimum qualifications defined in **Subsection 1.1.2** to implement the mitigation program.

1.1.2 Project Biologist Qualifications and Responsibilities

The permittee shall use a qualified project biologist(s) to implement the mitigation program. The project biologist will possess specific knowledge and project-level experience with wetlands restoration and enhancement projects. The project biologist must demonstrate an understanding of local plant community ecology, habitat restoration, and weed control and have expertise in plant and wildlife identification. The project biologist will possess at least 5 years of wetlands restoration experience in southern California.

In coordination with the permittee, the project biologist will perform or oversee the performance of the following items:

- Prepare site-specific mitigation plans as part of construction notifications to the Corps, and sub-notification submittal to California Department of Fish and Game (CDFG), that specifically address the impacts of individual development components of the RMDP (Dudek, December, 2010);

- Review subsequent development plans for compliance with the Corps Permit;
- Review grading plans for mitigation areas;
- During development construction, monitor approved development impact limits, site-clearing activities, and salvaging of topsoil and native vegetation to be used in the restoration process;
- During installation and maintenance, the project biologist will have the authority to stop work in situations in which biological resources not permitted to be impacted are in imminent danger of impacts;
- Monitor and report on mitigation installation activities to promote compliance with plans, specifications, the approved mitigation plan, and permits;
- Perform 5-year biological monitoring and reporting on each mitigation area consistent with the approved site-specific mitigation plan;
- Review installation and maintenance restoration contractor qualifications;
- Inform project personnel, prior to implementation of individual development components of the RMDP, of on-site environmental restrictions specific to each individual project site;
- Inform project personnel of the presence or potential presence of special-status species and vegetation communities within or adjacent to the mitigation project areas, as well as known biology-related dangers on site (e.g., rattlesnakes, beehives, stinging nettle);
- Verify access and staging areas are established outside of environmentally sensitive areas;
- Document in an observation report construction activities relating to the mitigation plan, including any project deficiencies;
- Prepare annual reports and summary progress reports for submittal to the Corps and the permittee.

1.1.3 Restoration Contractor Qualifications and Responsibilities

Restoration installation and maintenance shall be provided by a qualified contractor who has previous experience with habitat restoration in southern California and can demonstrate successful completion of wetland mitigation projects of similar size and vegetation community types. The restoration contractor hired for the 5-year period of mitigation maintenance may be separate from the installation contractor.

During the implementation phase, the restoration contractor will be responsible for project installation in accordance with the construction documents, the approved mitigation plan, and resource agency permits. Contractor responsibilities will include, but not be limited to, initial weed treatment(s) and biomass removal; irrigation installation, hook-up, and system start-up; seed mix installation; container plant installation; mulch installation; erosion control; grading/contouring; soil amending and preparation; and other tasks as required by the site-specific mitigation plan, construction documents, and resource agency permits. During the 5-year monitoring phase, the restoration contractor or other designated entity will be responsible for maintenance and operation of the irrigation system, weed control, erosion control, trash removal, access control, remedial actions (such as replanting) as deemed necessary to project success by the project biologist, and other tasks as directed by the project biologist and as described in construction documents. The restoration contractor's responsibility will continue until success criteria have been met, pursuant to resource agency permits and the site-specific mitigation plan.

1.2 Location of Project

The RMDP area is located in the Santa Clara River Valley in unincorporated northwestern Los Angeles County (County) and northeastern Ventura County (Figure 1, Regional Location, and Figure 2, Project Vicinity). The RMDP area lies west of Interstate 5 (I-5) and largely southwest of the junction of I-5 and State Route 126 (SR-126), with portions of the RMDP area located in San Martinez Grande and Chiquito canyons north of SR-126. Site elevations range from 825 feet above mean sea level in the Santa Clara River bottom at the Ventura County/Los Angeles County line to approximately 3,200 feet above mean sea level on the ridgeline of the Santa Susana Mountains along the southern boundary (Figure 2).

The RMDP encompasses the area covered by the previously approved Newhall Ranch Specific Plan, additional traffic/utility infrastructure related to the Specific Plan, and the Salt Creek area in Ventura County, adjacent to the Specific Plan area. The RMDP is depicted on Figure 3, along with proposed open space designations and development areas. The sensitive biological areas within this study area encompass the Specific Plan's River Corridor Special Management Area/Significant Ecological Area (SMA/SEA) 23, High Country SMA/SEA 20, Salt Creek area, Open Area,[1] and oak resources.

[1] Open Area is a land use designation, which includes a total of approximately 3,420 acres outside of the SMAs, including 1,921 acres that would be preserved to protect significant resources. The Open Area designation includes community parks, prominent ridges, bluffs, slopes, creek beds, and utility and trail system easements and will often function as a transition between development areas and the SMAs. Within the RMDP, the Open Area includes portions of Potrero Canyon, Humble Canyon, Lion Canyon, San Martinez Canyon, and Chiquito Canyon, as well as

1.3 Summary of Overall Project

The RMDP is a conservation, mitigation, and permitting plan for the long-term management of special-status biological resources within the 13,651-acre RMDP area. It also directs development in the RMDP, which would consist of infrastructure in or adjacent to the Santa Clara River and tributaries that are needed to implement the Specific Plan approved by Los Angeles County in May 2003. The RMDP infrastructure includes various flood control features, bridges/road crossings, stream bank stabilization, drainage facilities, roads, building pads, utility corridors, pipeline and utility river crossings, nature trails, the discharge outfall for the previously approved Newhall Ranch Water Reclamation Plant (WRP), and drainage facility maintenance activities.

The permanent impacts from the development of the Newhall Ranch Specific Plan have been reduced to 47.9 acres (7.2%) of waters of the United States of which 5.1 acres are wetlands (1.8% of total wetlands). The Mitigation Plan is a comprehensive program of preservation, enhancement, restoration and establishment that will result in a net increase of functions and values and acres of waters of the United States within the project area and will ensure that these values will be maintained in perpetuity. The mitigation areas will provide functions and services that equal or exceed the functions and services provided by the impacted jurisdictional waters, as measured by the Hybrid Assessment of Riparian Condition (HARC) average-weighted (AW) scores for the impacted areas and mitigation areas. See section 1.5.1 for a discussion of HARC methodology.

1.3.1 Mitigation Program Elements

As compensation for impacts to waters of the United States, the Project will:

A. Preserve and protect in perpetuity, 612.2 acres of waters that are not permanently impacted, including 271.8 acres of wetlands. These areas will be protected by a conservation easement or deed restriction and will be managed under an endowed long-term management plan. The ratio of preserved acres to permanently impacted waters is **12.8 to 1,** and **53.3 to 1** for impacted wetlands.

B. Enhance, restore and create 132.2 acres of waters of the United States, including 94.3 non-wetland acres in tributaries to the Santa Clara River and 35.2 acres of wetlands in the River and its tributary drainages. The 113.6 acres of enhanced, restored and created tributaries will be distributed in Salt Canyon (38.2 acres – 19.7 enhanced only), Long Canyon (23.4 acres), San Martinez Grande Canyon (6.8 acres), Chiquito Canyon (9.8

areas adjacent to Potrero Mesa, Grapevine Mesa, and Airport Mesa. These areas are known to support a variety of special-status species.

acres), Potrero Canyon (14 acres) and Lion Canyon (2.1 acres) as shown below. Of the 35.2 acres of wetlands establishment, 18.6 acres will be adjacent to the Santa Clara River and 19.3 acres will be adjacent to Potrero Creek. Overall, impacts to tributaries in acres will be mitigated at a **2.74 to 1** ratio and impacts to site-wide wetlands will be mitigated at a **6.9 to 1** ratio in acres. Functions and values will exceed pre-project conditions.

C. Protect all mitigation areas in perpetuity by conservation easements or deed restrictions, including maintenance under a long term management plan supported by an endowment.

D. Restore all temporary impacts by revegetating those areas with appropriate native vegetation after completion of construction in the area.

Other Considerations

A. Mitigation will be coordinated with Fish and Game, and Corps jurisdiction will be conterminous with or buffered by additional CDFG riparian areas.

B. Project will employ advanced LID measures which will be selected and sized to retain the volume of stormwater runoff produced from a 0.75 inch storm event to reduce the percentage of Effective Impervious Area (EIA) to 5 percent or less of the total project area within each vesting tentative map project and associated off-site project improvements. Runoff from all EIA shall be treated with treatment control measures that are selected to address the pollutants of concern and are sized to capture and treat 80 percent of the average annual runoff volume.

C. Mitigation created in excess of these requirements for impacts of the project will be available for other Permittee-responsible activities in accordance with Corps regulations.

Five tentative maps are planned to be submitted over a period of time as part of the Project: Landmark Village, Mission Village, Homestead Village North, Homestead Village South, and Potrero Village. Numerous infrastructure components may be proposed as part of tentative map submittals or as individual projects. Likewise, the tentative map areas may be subdivided into phases and submitted separately.

Under this Mitigation Plan, Newhall is to implement 54.9 acres of mitigation prior to any permanent impacts to waters of the United States. Additional mitigation is to be implemented concurrently with construction of project phases (i.e., prior to or within two years of impacts). Overall, the mitigation will substantially increase the acreage, and functions and services, from areas lost to unavoidable impacts.

Initiation of a Corps advanced mitigation site is defined as: 1) completion of site preparation; 2) installation of temporary irrigation; and 3) seeding and/or planting of the mitigation site. Table 1

summarizes the tentative maps and infrastructure components that make up the project, and the associated mitigation projects. The tentative maps may be submitted in any sequence. Mitigation for temporary impacts will be implemented within two years of impacts, unless precluded by ongoing project construction.

Table 1
Development Projects and Associated Mitigation

Project Description	Mitigation Acres	Mitigation Location
Advanced Mitigation	15.9	Santa Clara River: Mayo Crossing (River)
Advanced Mitigation	19.3	Lower Potrero Canyon/Lower Potrero Cismontane Alkali Marsh (Tributary)
Advanced Mitigation	19.7	Salt Creek Livestock Exclusion/Enhancement: Portions of Mid- and Upper Salt Creek (Tributary)
Advanced Mitigation subtotal	*54.9*	
Landmark Village	2.7	Santa Clara River
Mission Village	20.6	Lion (Tributary) Lower-Middle Salt Canyon (Tributary)
WRP/Utility Corridor	—	
Homestead South	23.4	Long Canyon (Tributary)
Homestead North	16.6	Chiquito (9.8) and San Martinez Grande (6.8) (Tributary)
Potrero Valley	14.0	Potrero Canyon (Tributary)
Mitigation Total	**132.2**	

FIGURE 1

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Regional Location

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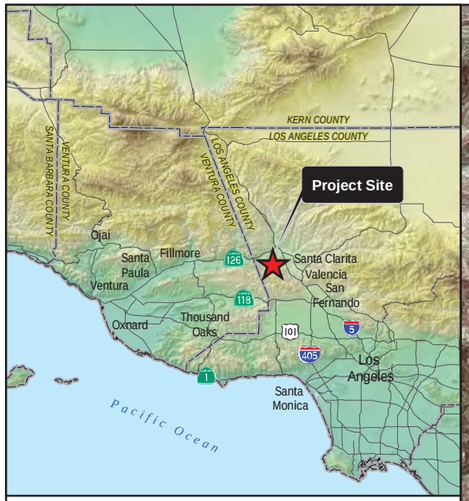

Legend

- RMDP Boundary
- County Boundary
- CDFG/Corps Jurisdictional Areas (RMDP)

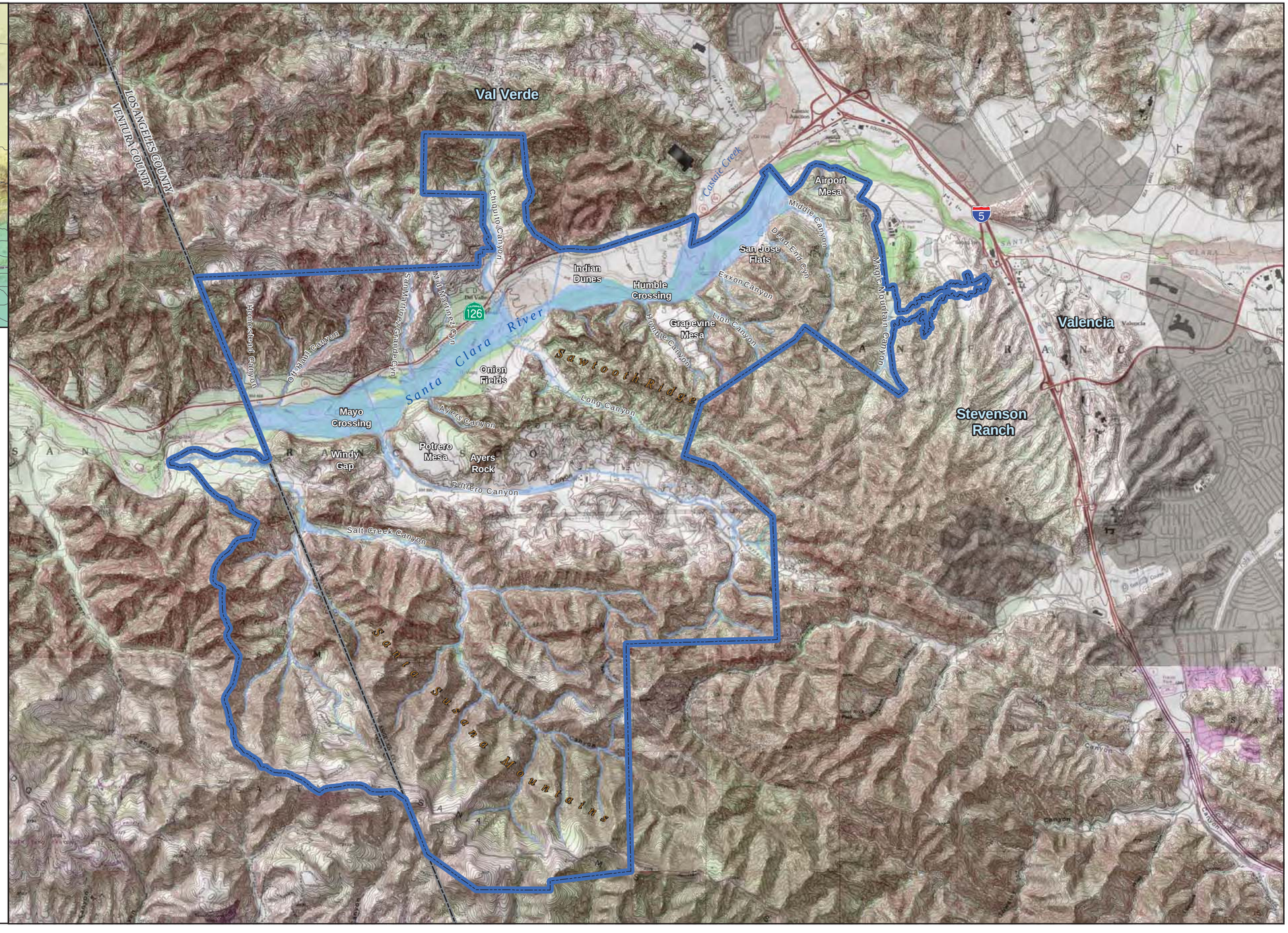

FIGURE 2

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Project Vicinity

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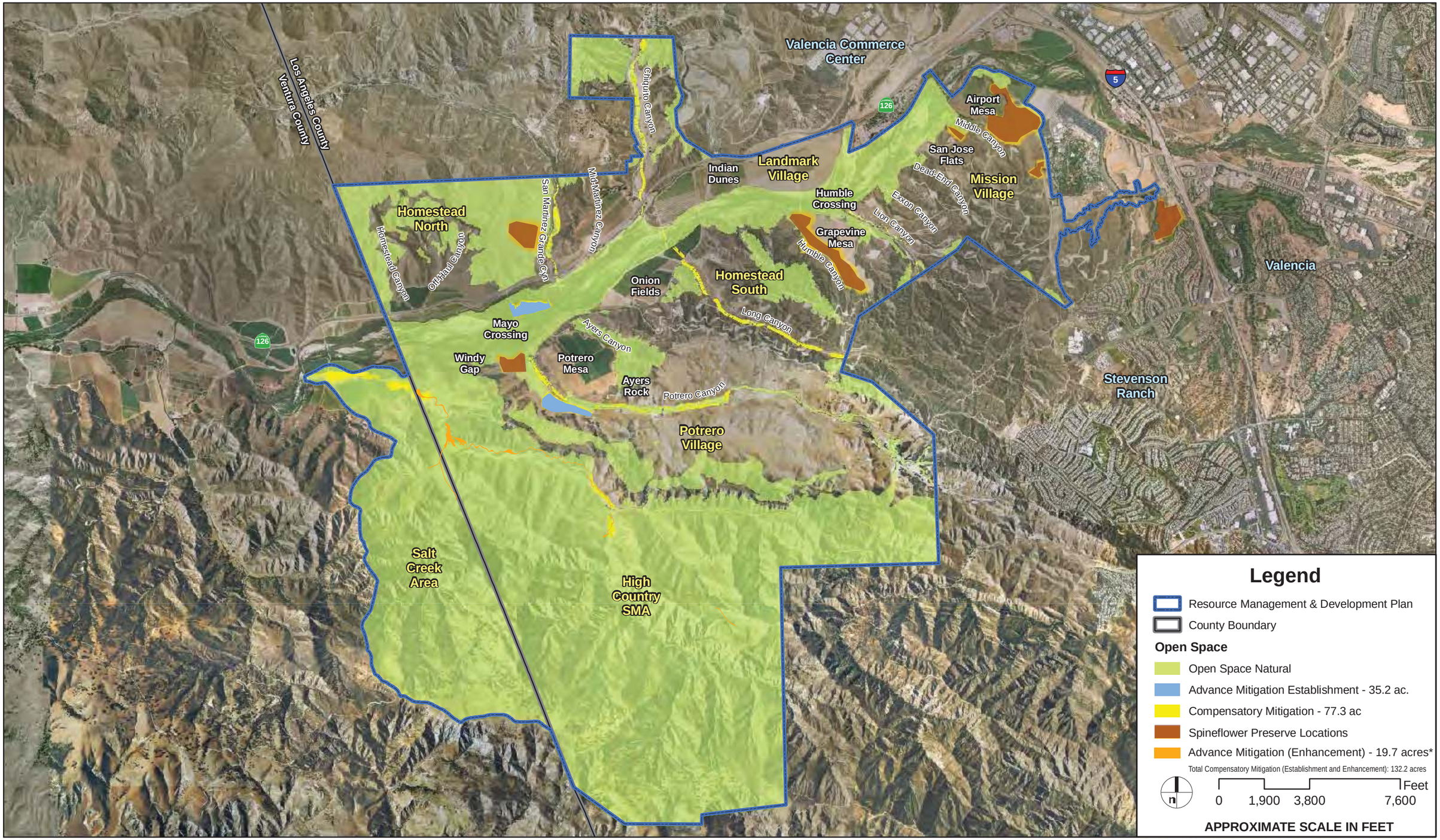

SOURCE: HUNSAKER 2010/PACE 2010

FIGURE 3

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

RMDP Study Area

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1.3.2 Mitigation Documents and Approval Process

This Mitigation Plan provides a program of compensatory mitigation for permanent and temporary impacts to jurisdictional waters of the United States authorized by the Corps Permit. The Corps information requirements and approval process will include the following steps:

A. Newhall will provide written notification to the Corps ("Construction Notification") for each phase of RMDP development, prior to initiation of grading and project construction in waters of the United States.

B. The Construction Notification will include the following:

1. An updated preliminary or approved jurisdictional delineation of waters of the United States and a site-specific mitigation plan as specified in Special Condition XX of the Corps Permit and in this Mitigation Plan. Based on the updated jurisdictional delineation, the acreages and locations of all impacts to waters of the United States, as well as the acreage and location of the recalculated compensatory mitigation, shall be included in the required notification;
2. Written description for all the proposed structures (including RMDP Project Name), a description of the permanent and temporary impacts in waters of the United States, maps showing project location, impact acreages and drawings for all proposed structures, written documentation regarding compliance with all applicable special conditions of the Corps Permit and a description of all measures to avoid and minimize impacts to waters of the United States;
3. Name and address of contractor performing the work, an onsite point of contact and the size and type of equipment that shall be performing the work;
4. For projects located in the Potrero Canyon watershed, a written description documenting compliance with the required design criteria for grade control structures (Special Condition XX) and road crossings (Special Condition XX);
5. Schedule for beginning and ending the project; and
6. Summary of all temporary and permanent impacts to waters of the United States that have been completed as part of previous project phases as well as a summary of all the initiated and completed compensatory mitigation areas for previous project phases.

Individual construction notification requests shall include applicable site-specific mitigation plans, which shall include the information specified in 33 CFR section 332.4(c)(2)-(14) and shall comply with the provisions of Special Condition XX of the Corps Permit. The site-specific mitigation plans shall be consistent with this Plan and largely follow the Corps Guidelines for Mitigation and Monitoring Plans in structure and content (Corps 2004). The site-specific mitigation plan shall incorporate the approved development plan impacts and detailed information that describes the mitigation approach to the specific mitigation site. Site-specific mitigation plans shall provide assurance that the proposed mitigation design and target functions and values are justified based on anticipated post-project site conditions and hydrology.

The Corps will verify the delineation and determine whether the avoidance, minimization, and compensation measures identified in the construction notification request comply with the terms and conditions of the Corps Permit. If the Corps determines that the proposed activity complies with the terms and conditions of the Corps Permit, the Corps will issue a notice to proceed to the permittee.

1.4 Existing Conditions

The existing conditions within the RMDP are described in detail within the Final EIS/EIR (Corps and CDFG 2010). Figures 4A through 4G in this Plan, Existing Conditions of RMDP Site, depict the existing vegetation communities.

1.4.1 Field Reconnaissance

Vegetation maps of the RMDP area were used in the field to identify potential mitigation areas, opportunities, and constraints. Only areas within the proposed open space/preserve boundaries were evaluated. In general, areas supporting special-status plant species were not considered suitable for mitigation in order to avoid impacts to special-status plants. Dudek habitat restoration specialists Doug Gettinger, Marc Doalson, Scott Boczkiewicz, and Andy Thomson conducted the mitigation potential surveys in the Newhall Ranch High Country SMA and the Salt Creek area on November 7–10, November 14–18, and December 19–21, 2005. In the remaining Specific Plan area, Dudek habitat restoration specialists Doug Gettinger, Jeremy Sison, Mike Sweesy, and Andy Thomson conducted the mitigation potential surveys on August 15–16, 2006.

A list of plant species observed within the Specific Plan area from 2002 to 2006 is presented in Appendix A.

1.4.2 Existing Plant Communities and Land Covers

Vegetation community and land cover classifications used in the Final EIS/EIR generally follow the Vegetation Classification and Mapping Program "List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database" system (CDFG 2003, updated in October 2007 (CDFG 2007)). The vegetation community types, along with their floristic alliances and associations, and human-dominated land cover types are described below. Where vegetation types observed on site do not conform to the CDFG (2003) vegetation community classification system, they are defined for this Plan based on the dominant plant species. Communities that are recovering from burns were mapped as "burned" associations, and native communities that contain 20% to 50% native species by percent cover were mapped as "disturbed" associations. Areas where native species cover was visually estimated to be less than 20% were mapped as disturbed land. Areas mapped as "agriculture" have been cultivated or are in cultivation. Areas mapped as "developed" represent paved roads, structures, and other hardscape features. Where a grassland vegetation community was visually estimated to contain 10% or more absolute cover of native perennial grasses (e.g., *Nassella pulchra*), the area was mapped as a native grassland. The 10% threshold is an industry standard for identifying perennial native grasslands (Keeler-Wolf *et al.* 2007). Oak woodland is defined as areas with 20% to 50% cover by oak trees. Oak/grass includes areas where oak trees comprise less than 20% of the total cover.

Fourteen general vegetation community types and three human-dominated land cover types (i.e., active and inactive agriculture, disturbed land, and developed land) were identified in the project area during the field investigations. The descriptions in Table 2 are organized by general vegetation community type, floristic alliance (as applicable), and association (as applicable).

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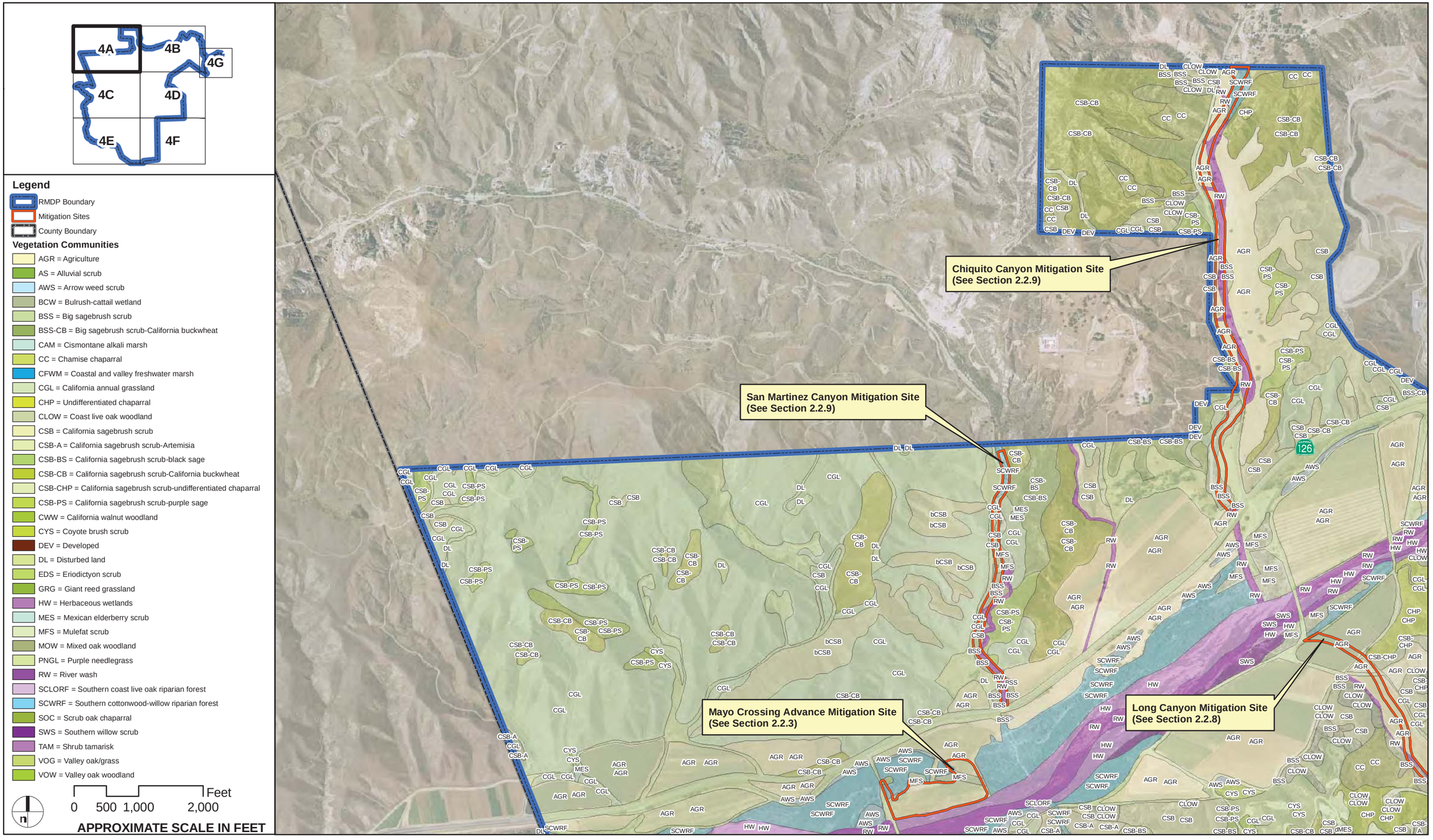

FIGURE 4A

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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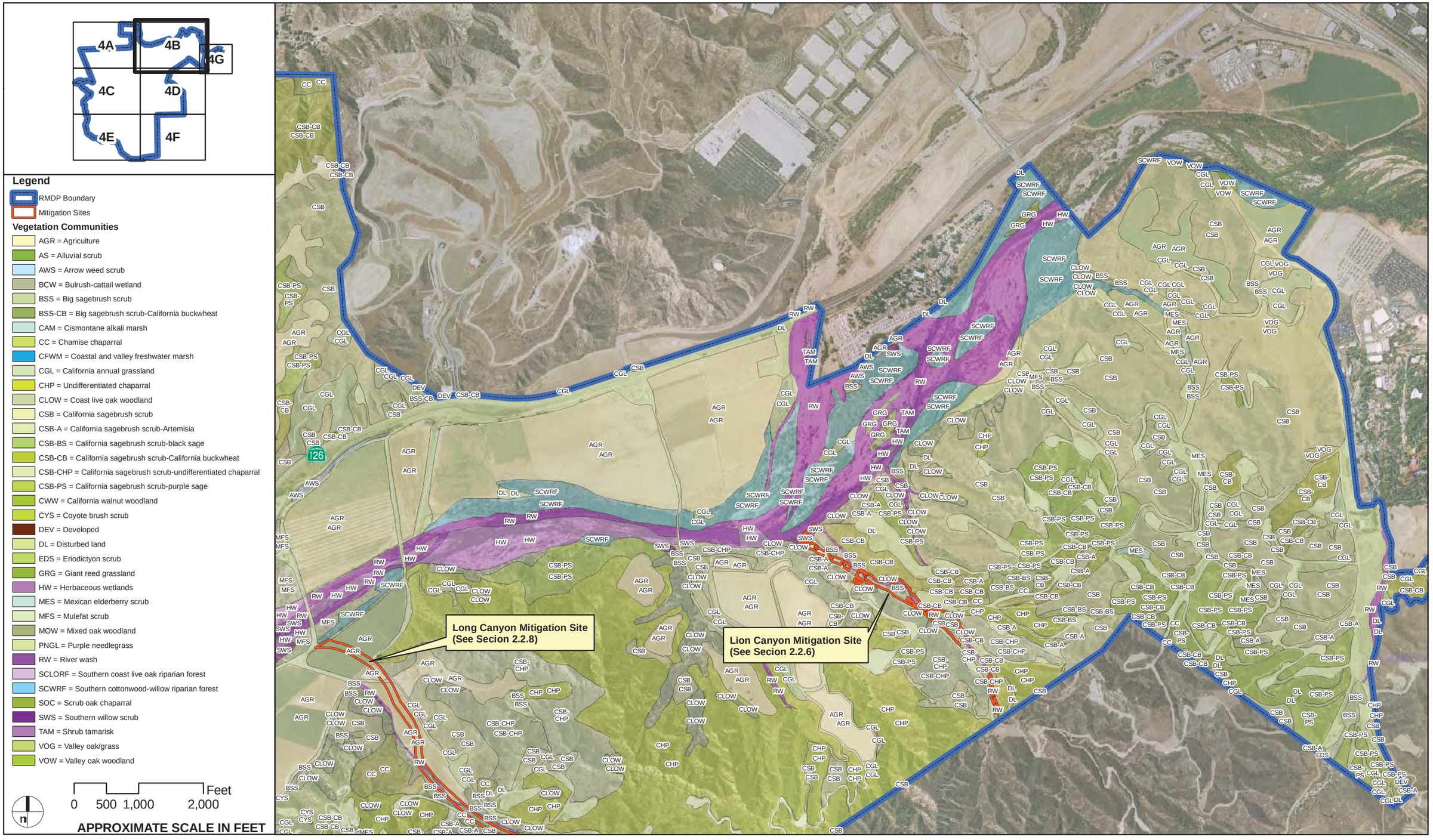

FIGURE 4B

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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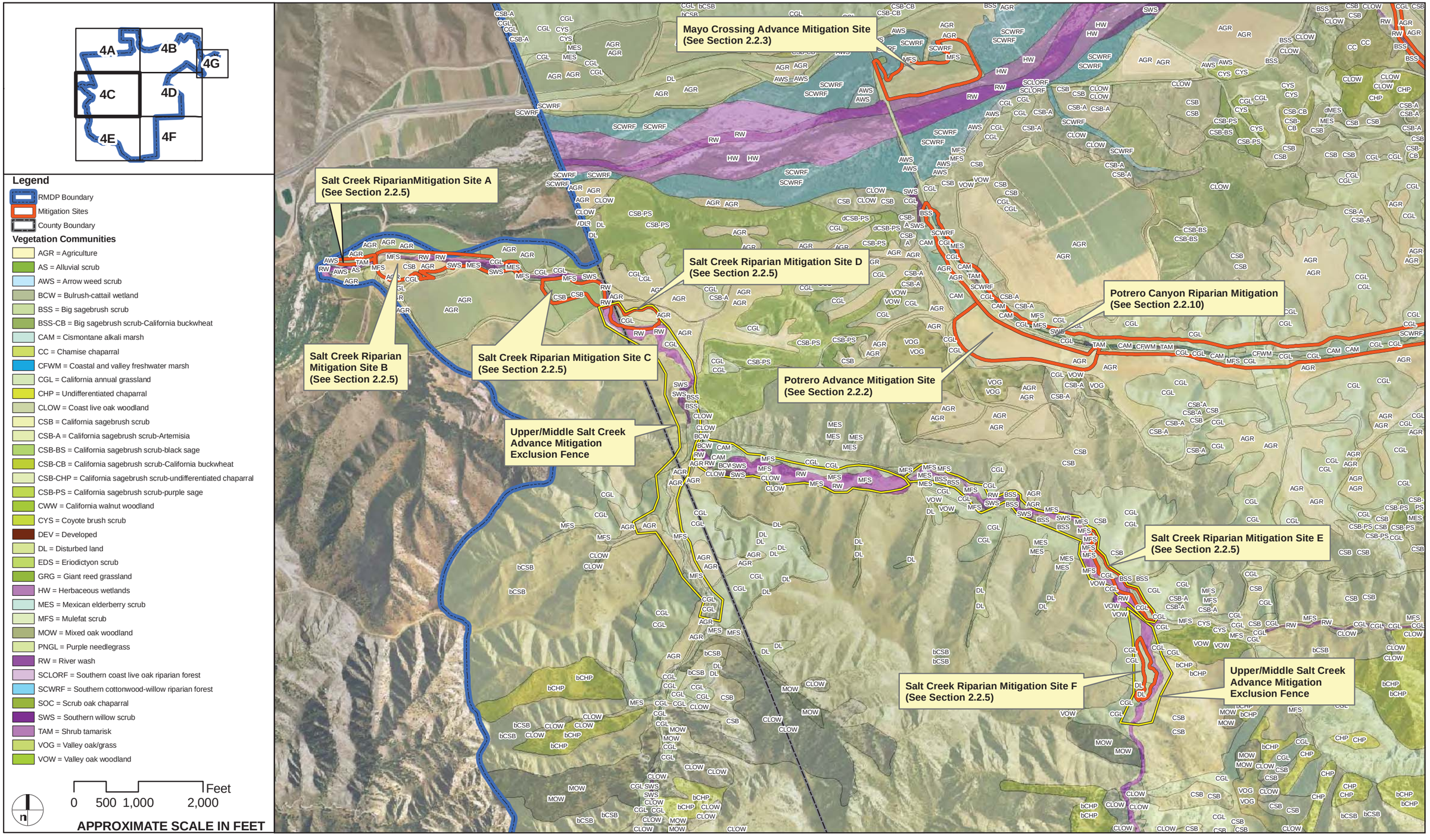

FIGURE 4C

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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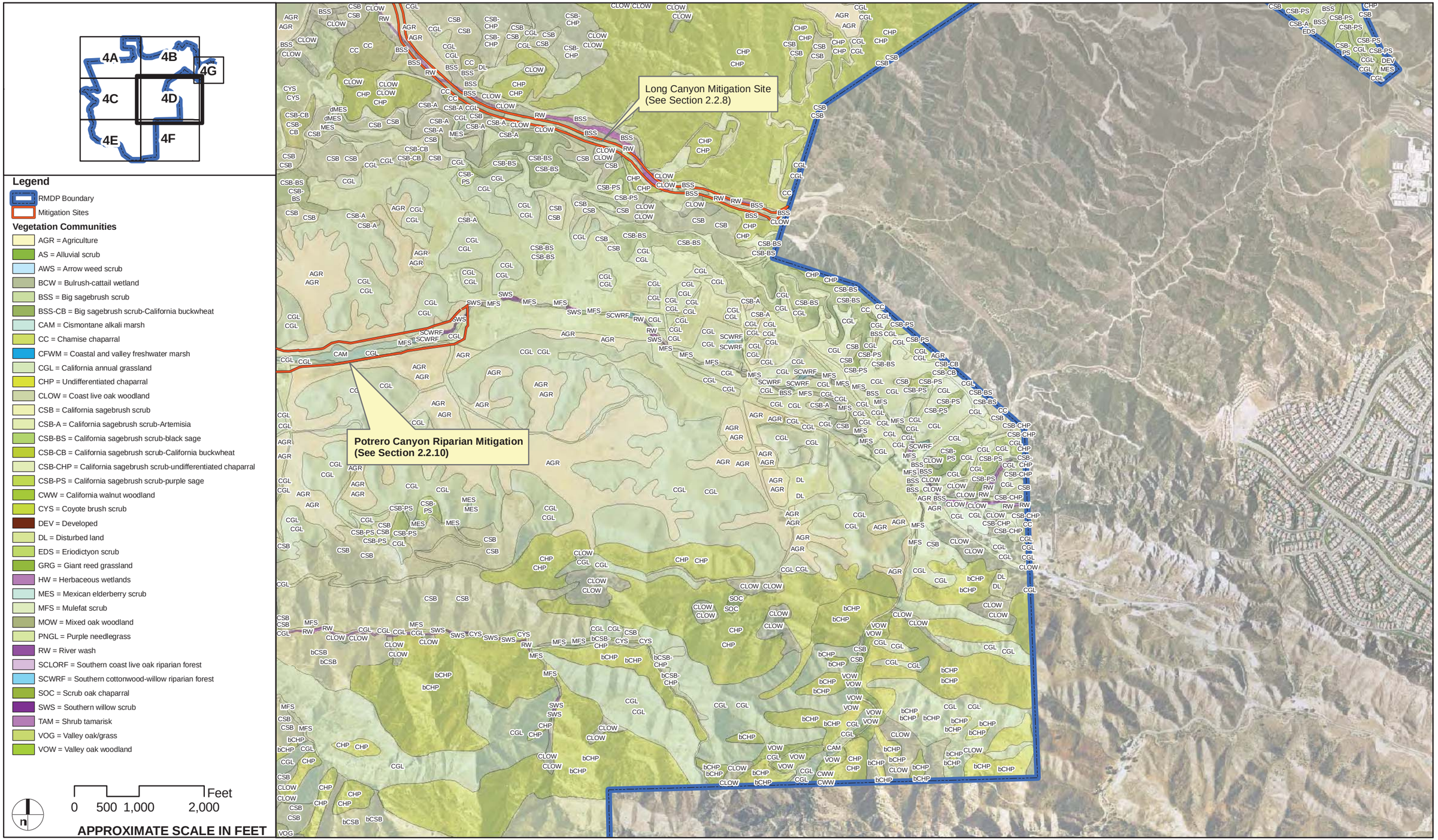

FIGURE 4D

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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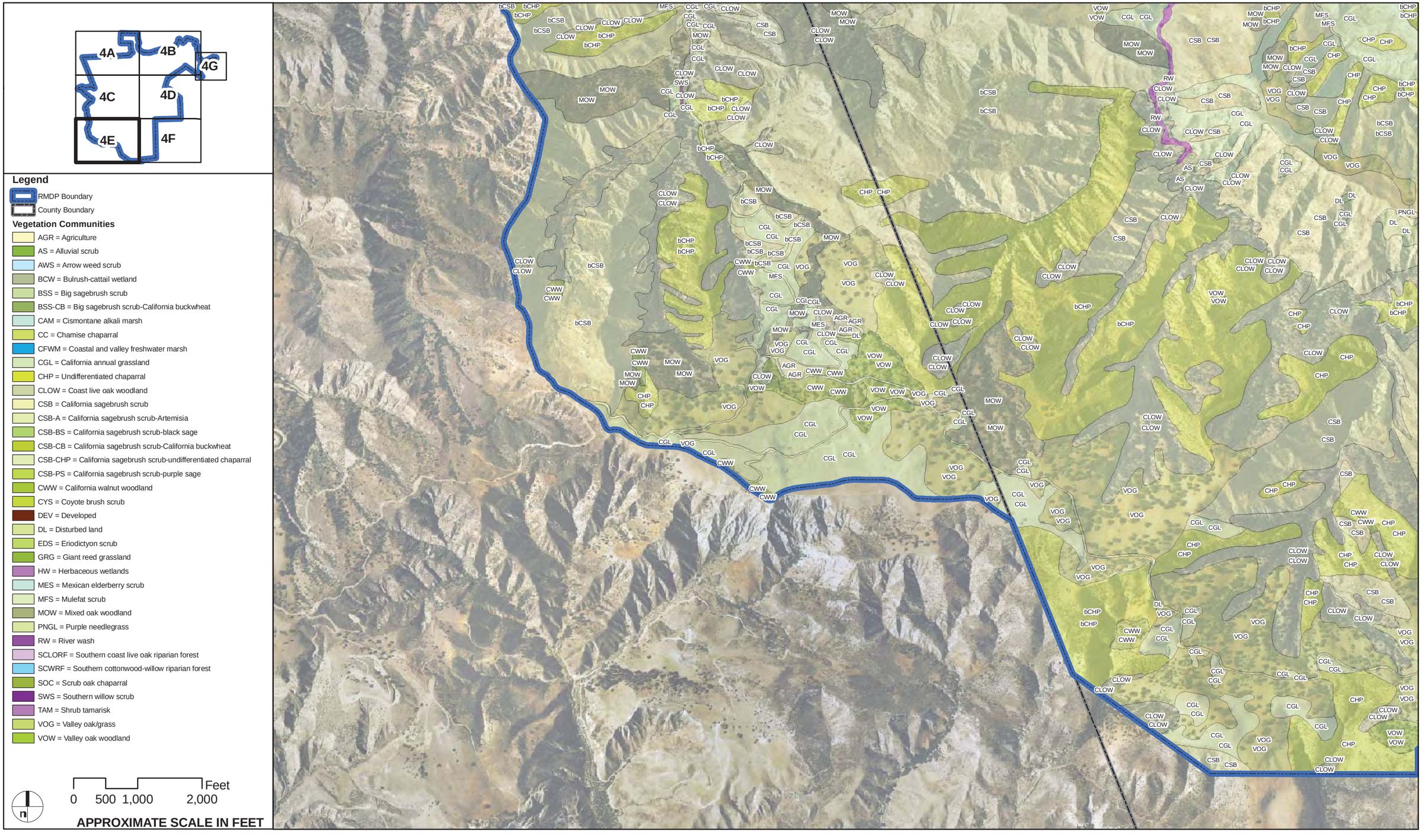

FIGURE 4E

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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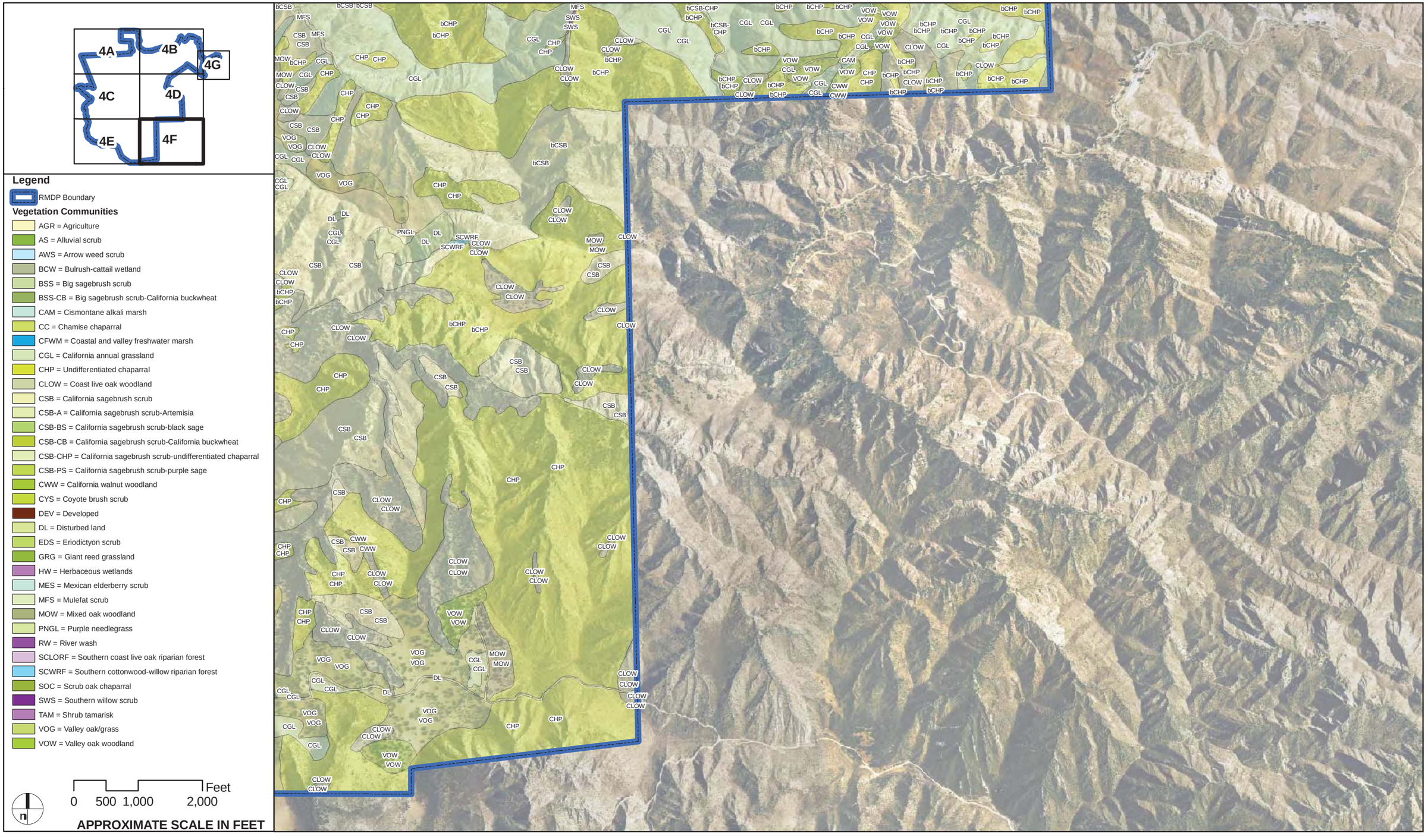

FIGURE 4F

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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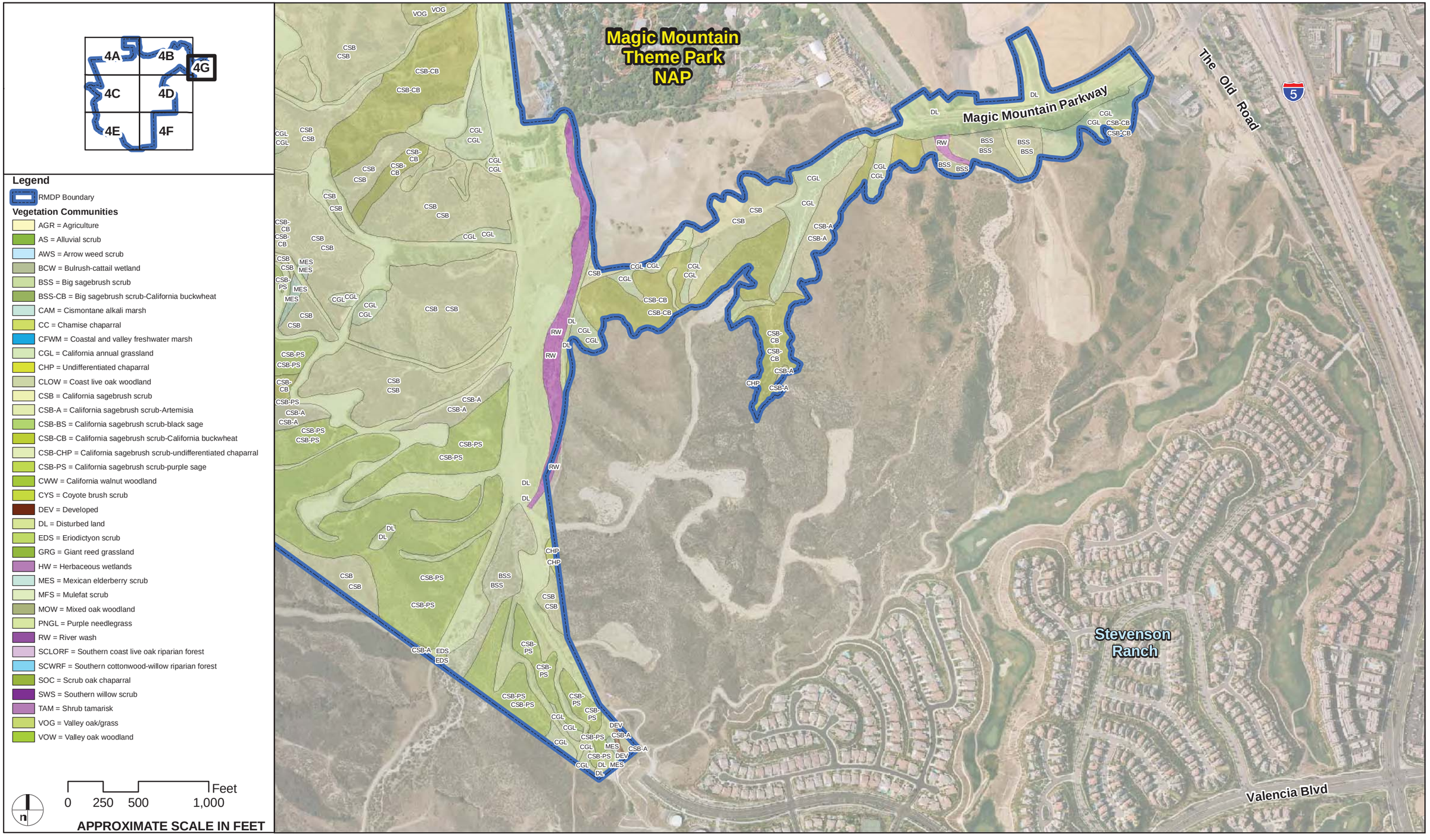

FIGURE 4G

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Existing Conditions of RMDP Site

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Table 2

Existing Vegetation Communities, Floristic Alliances and Associations, and Land Cover Types in Project Area

General Physiognomic and Physical Location	General Habitat Type	Floristic Alliance	Association	RMDP Acreage
Grass and Herb Dominated Communities	Non-Native Grassland	California annual grassland	Not mapped to association level	2,175.5
	Native Grassland	Purple needlegrass	Not mapped to association level	0.6
Scrub and Chaparral	Coastal Scrub	California sagebrush scrub	Not mapped to association level	1,529.3
			Burned California sagebrush scrub	1,469.3
			California sagebrush–*Artemisia californica*	82.5
			California sagebrush–purple sage	393.5
			Disturbed California sagebrush–purple sage	4.5
		California sagebrush–black sage scrub	California sagebrush–black sage	196.3
		California sagebrush–California buckwheat scrub	Not mapped to association level	310.0
		California sagebrush scrub–undifferentiated chaparral	Not mapped to association level	135.0
			Burned California sagebrush scrub–undifferentiated chaparral	5.2
		Coyote brush scrub	Not mapped to association level	9.2
	Undifferentiated Chaparral Scrubs	Not mapped to alliance level	Not mapped to association level	1,106.9
			Burned undifferentiated chaparral	957.2
	Chaparral with Chamise	Chamise chaparral	Not mapped to association level	55.7
			Burned chamise chaparral	0
	Chaparral with Oak	Scrub oak chaparral	Not mapped to association level	1.5
	Other Scrubs	Eriodictyon scrub	Not mapped to association level	0.2
Broad Leafed Upland Tree Dominated	Upland Walnut Woodland and Forest	California walnut woodland and forest	California walnut woodland	27.2
	Oak Woodland and Forest	Coast live oak forest and woodland	Coast live oak woodland	757.8
		Mixed oak woodland and forest	Not mapped to association level	168.9
		Valley oak forest and woodland	Valley oak woodland	79.4
			Valley oak/grass	461.4
Bog and Marsh	Marsh	Bulrush–cattail wetland	Not mapped to association level	1.4
		Cismontane alkali marsh	Not mapped to association level	18.6
		Fresh–brackish water marsh	Coastal and valley freshwater marsh	2.0
Riparian and Bottomland	Other Riparian/Wetland	Herbaceous wetland	Not mapped to association level	183.1

Table 2

Existing Vegetation Communities, Floristic Alliances and Associations, and Land Cover Types in Project Area

General Physiognomic and Physical Location	General Habitat Type	Floristic Alliance	Association	RMDP Acreage
Habitat		River wash	Not mapped to association level	290.0
		Alluvial scrub	Not mapped to association level	1.0
		Big sagebrush scrub	Not mapped to association level	76.5
		Big sagebrush scrub	Big sagebrush-California buckwheat	0.5
		Giant reed	Not mapped to association level	5.6
	Low to High Elevation Riparian Scrub	Arrow weed scrub	Not mapped to association level	18.7
		Mexican elderberry	Not mapped to association level	12.8
		Mexican elderberry	Disturbed Mexican elderberry	0.3
		Mulefat scrub	Not mapped to association level	71.5
	Riparian Forest and Woodland	Southern willow scrub	Not mapped to association level	22.7
		Tamarisk scrub and woodland	Shrub tamarisk	2.8
		Coast live oak forest and woodland	Southern coast live oak riparian forest	0.7
		Fremont cottonwood riparian forest and woodland	Southern cottonwood–willow riparian	358.3
Man-Made Land Cover Types		Agriculture	NA	1,576.4
		Developed land	NA	0.5
		Disturbed land	NA	1,080.6
			Total	**13,651.1**

1.4.3 Soils

Soils present on the RMDP site include:

- Anacapa sandy loam, 2% to 9% slopes
- Badland
- Castaic–Balcom complex, 30% to 50% slopes, eroded
- Castaic–Balcom complex, 50% to 65% slopes, eroded
- Castaic and Saugus soils, 30% to 75% slopes, eroded
- Castaic–Balcom silty clay loams, 9% to 15% slopes
- Castaic–Balcom silty clay loams, 15% to 30% slopes
- Castaic–Balcom silty clay loams, 30% to 50% slopes
- Castaic–Balcom silty clay loams, 30% to 50% slopes
- Castaic–Balcom silty clay loams, 50% to 65% slopes
- Castaic and Saugus soils, 30% to 65% slopes, severely
- Chino loam
- Cortina sandy loam, 0% to 2% slopes
- Garretson loam, 2% to 9% slopes
- Gaviota rocky sandy loam, 15% to 30% slopes, eroded
- Gaviota rocky sandy loam, 30% to 50% slopes, eroded
- Garretson gravelly loam, 2% to 9% slopes
- Gazos clay loam, 30% to 50% slopes
- Gaviota rocky sandy loam, 15% to 50% slopes
- Gazos silty clay loam, 30% to 50% slopes
- Hanford sandy loam, 0% to 2% slopes
- Hanford sandy loam, 2% to 9% slopes
- Landslides
- Metz loamy sand, 0% to 2% slopes

- Metz loamy sand, 2% to 9% slopes
- Metz loam, 2% to 5% slopes
- Mocho loam, 0% to 2% slopes
- Mocho loam, 2% to 9% slopes
- River wash
- Sandy alluvial land
- Saugus loam, 30% to 50% slopes
- Saugus loam, 30% to 50% slopes, eroded
- Sorrento loam, 0% to 2% slopes
- Sorrento loam, 2% to 5% slopes
- Sorrento loam, 2% to 9% slopes
- Terrace escarpments
- Yolo loam, 0% to 2% slopes
- Yolo loam, 2% to 9% slopes
- Zamora loam, 2% to 9% slopes
- Zamora loam, 9% to 15% slopes
- Yolo loam, 0% to 2% slopes.

In general, soils on the RMDP site are characterized by moderately deep to very deep soils that are moderately well drained to excessively well drained. Parent material consists of sedimentary rocks (e.g., sandstone, shale, and mudstone), granite, and alluvium. Two soil types are defined as farmland of statewide importance: Cortina sandy loam and Sorrento loam; and eleven soil types are defined as prime farmland, if irrigated: Anacapa sandy loam, Chino loam, Garretson loam, Garretson gravelly loam, Hanford sandy loam, Metz loamy sand, Metz loam, Mocho loam, Sorrento loam, Yolo loam, and Zamora loam (2% to 9% slopes). Prime farmland ranges from 0% to 9% slopes throughout the RMDP area. Slopes range from 0% to 75% throughout the RMDP area. In low-lying areas, the erosion hazard is slight to moderate, and the runoff rate is slow to medium. On the steeper slopes, the erosion hazard is moderate to very high, largely dependent on slope steepness (USDA 1969).

1.4.4 Geomorphic Conditions and Riparian Resources of the Santa Clara River

As described in **Section 4.1**, Surface Water Hydrology and Flood Control of the Final EIS/EIR, the Project area is located within the Santa Clara River watershed, which drains an area of approximately 1,624 square miles in the Transverse Mountain Ranges of southern California. Elevations within the watershed range from sea level at the river mouth to 8,800 feet at the summit of Mount Pinos in the northwest corner of the watershed. The Santa Clara River flows generally from east to west from its headwaters near Acton to the Pacific Ocean near the City of Ventura, approximately 40 miles downstream of the Newhall Ranch Specific Plan subregion. The Santa Clara River transects the northern portion of the Project area from east to west.

The Santa Clara River is perennial from the existing Valencia WRP, downstream to approximately 3.5 miles downstream of the Los Angeles County/Ventura County line (western limit of the Project boundary) near Rancho Camulos. Flows in the Santa Clara River also can be affected by groundwater dewatering operations or by diversions for agriculture or groundwater recharge. Throughout the Santa Clara River channel, complex surface water/groundwater interactions lead to areas of alternating gaining and losing river segments (PWA 2008).

The existing floodplain generally consists of a natural alluvial river system and has multiple channels (braided channels) within and adjacent to the Newhall Ranch Specific Plan area. Bed material in the Santa Clara River is mostly composed of non-cohesive sands and gravels. Bank erosion is due to flow impinging upon the banks. This kind of system is characterized by high sediment loads, high bank erodibility, and intense and intermittent runoff conditions. Combined with the relatively flat gradient of the river through the Project area (average slopes range from 5% to 0.5%), it has a high potential to aggrade (deposit sediment) at low velocities.

The diversity of habitat conditions in the Santa Clara River at any one time supports a variety of aquatic invertebrates, aquatic plants, and fishes. The density, biomass, and location of vegetation in relation to the channel bottom are directly dependent upon the frequency of disturbance by flood flows. Successional mulefat scrub occupies the active channel and is disturbed annually by flows. Channel-bottom habitat also includes all aquatic features, such as pools and flowing water, as well as most of the emergent wetlands in the River corridor, because of the presence of water. In contrast, mature riparian forests are located above the active river channel and are only flooded during infrequent storm events, allowing large trees to become established between events.

Stands of vegetation are eroded by high flows, and newly vegetated areas are created where vegetation becomes established by seeds or buried stems. Often during high flows, new sandbars are formed and old ones are destroyed. High flows can also change the alignment of the low-

flow channel as well as the number and location of aquatic habitats of the river. In high-flow years, wetland vegetation along the margins of the low-flow channel and pools may increase. In high-flow years, this vegetation would be removed but would likely become reestablished during the spring and summer by natural colonization processes (PWA 2008).

1.4.5 Geomorphic Conditions and Riparian Resources of the Tributary Drainages

PWA (2008) conducted an assessment of existing geomorphic conditions and riparian resources to characterize channel conditions of five primary tributary basins within the Project area. Overall, the three tributaries on the south side of the Santa Clara have certain common characteristics, as do those on the north side:

- South side tributaries (Lion, Long, and Potrero) are characterized by small watershed areas (1.5 to 5 square miles); steep channel slopes (2% to 5%); very high watershed sediment supply (resulting in channel aggradation, even with steep slopes); and unstable channels (with actively migrating headcuts). The Project would impact most of the watershed areas in these tributaries.
- The north side tributaries (Chiquito and San Martinez Grande) have somewhat larger watersheds (3 to 5 square miles) with a majority being upstream of the Project area boundary. They are more deeply incised in the lower reaches, convey large amounts of sand, and discharge as alluvial fans on the Santa Clara River floodplain. Flows from these drainages are conveyed under SR-126 to confluence with the Santa Clara River immediately downstream. The Project would impact only the lower reaches and a smaller percentage of the total watershed area in these tributary drainages.

In general, the tributaries are ephemeral or highly intermittent in nature and do not support perennial flows. Perennial tributary drainages include lower Potrero Canyon and portions of Salt Creek Canyon. Discharge from the Middle Canyon spring is also perennial and supports riparian habitat along the southern bank of the Santa Clara River, just downstream from the confluence with Middle Canyon.

According to PWA (2008), the geomorphology of the active tributaries to the Santa Clara River within the Project area are generally characterized as highly variable and sinuous alignments reflective of the influence of the physical and topographic features. There is also a high degree of variation of the active channel geometry (i.e., width and depth) along these relatively short channel reaches. In general, the active portions of the creeks are more deeply incised below the canyon valley floors. The floodplains are generally entirely contained within the active creek

banks, and there is little over-bank flow. The changes in creek geometry and form may indicate influences from the upper watersheds that affect the sediment delivery. The change in channel geometry is also reflected in coincidental variations of the streambed slopes (i.e., the slope variations are generally higher in the contractions of the channel geometry and flatter in the expansion areas, upstream and downstream) (PWA 2008). The following excerpts are taken from the geomorphology study prepared by PWA to describe the specific conditions of the tributary channels (PWA 2008):

> **Chiquito Canyon.** Chiquito Canyon has a watershed area of 4.9 square miles at the downstream project limit and drains south into the north bank of the Santa Clara River. The watershed is currently used for a combination of cattle grazing, and residential and commercial land uses within the community of Val Verde located immediately upstream of the Project area. Chiquito Canyon enters the project area in a confined reach with very high, unstable banks[2]. Further downstream it exits its confined canyon and enters a long reach that is dominated by a series of large alluvial fans on the east bank. These fans are supplying abundant sand to the creek and the channel has formed low banks in the toe of the fan that have little erosion resistance, in part due to the arable land use and lack of woody vegetation. As a result this reach is aggrading and widening. Further downstream the channel becomes slightly incised as it cuts through the alluvial fans, leaving abandoned terraces on the banks that are actively eroded on outside bends. Towards the downstream end of the canyon, the channel remains slightly confined and has been modified by a series of bridges and culverts. In places these appear to cause local backwaters and sediment deposition (Final EIS/EIR, **Appendix 4.2**).
>
> The portion of the Chiquito Canyon drainage within the RMDP site follows a mildly sinuous pattern within long, linear meanders reflecting the influences of the physiographic features along the valley floor. The active channel is incised in the lower 2,500 feet upstream from the SR-126 roadway crossing, while the remainder has developed a shallower active channel and wider drainage area. The hydraulics along this portion of the stream area also are influenced by two different existing roadway crossing locations within the RMDP area that include SR-126, a local access roadway arch crossing, and the Chiquito Canyon Road crossing. Detailed hydraulic modeling of the existing floodplain was performed by PACE. The modeling indicated that a major portion of the Chiquito Canyon floodplain was hydraulically "steep" (Froude numbers greater than a value of 1.0

[2] Confinement refers to the valley/canyon width. If the valley width is narrow (confined), then lateral migration of the channel is limited and the channels are typically less-sinuous with limited floodplain area. If the valleys are wide (unconfined), then there is typically greater lateral migration, sinuousity, and potentially braiding.

which indicates supercritical flow conditions) with an average streambed slope of the channel of approximately 2.39 percent. (PACE, 2008B; see **Appendix 4.1**.)

San Martinez Grande Canyon. San Martinez Grande Canyon has a watershed area of 3.6 square miles and drains south into the north bank of the Santa Clara River. The watershed is currently used for a combination of cattle grazing, rural residential, and industrial (oil and gas) land uses. San Martinez Grande Canyon combines a series of reaches alternating between unconfined stable reaches with small inset floodplains and aggradational conditions with actively eroding outside bends. The upper reach has a well-defined and relatively stable bankfull channel that contains the 5-year flow adjacent to a small inset floodplain. Downstream the channel is wider and many outside bends are actively eroding into relict raised floodplain terraces, creating failing banks. Downstream of this reach the valley widens and the channel becomes more stable with small floodplains[3] that persist towards the downstream end of the channel.

Detailed hydraulic modeling of the existing floodplain was performed by PACE (2008B). The modeling indicated that approximately 50 percent of the lower reach of the San Martinez Grande Canyon floodplain was hydraulically "steep," (Froude numbers greater than a value of 1.0 which indicates supercritical flow conditions) while the remainder of the canyon, primarily the upper portion to the RMDP boundary, was hydraulically a "mild" channel (Froude numbers less than a value of 1.0 which indicates subcritical flow conditions). The channel bed slopes range from eight percent in the narrower areas to 0.5 percent in wider, depositional areas. (PACE, 2008B; see Final EIS/EIR, **Appendix 4.1**.).

Lion Canyon. Lion Canyon has a watershed area of 0.8 square mile and drains westerly into the bank of the Santa Clara River. The watershed is currently used for a combination of cattle grazing and oil production. Lion Canyon has steep headwaters (above the project boundary) that supply large amounts of sediment into the aggrading upper reach, producing an undersized, transport-limited channel. Aggradation continues downstream producing a well-connected and vegetated floodplain. There is a short stable reach with mature oaks upstream of another aggradational reach which terminates at an existing culverted road crossing. There is a very sharp transition from aggrading to eroding conditions downstream of the road crossing, which acts as a grade control protecting the upper reaches from headcutting and incision. Downstream of the grade control is a 12-foot high knickpoint

[3] A floodplain is the area adjacent to a stream channel that consists of sediments deposited during the present hydrologic regime and is inundated with water when the stream overflows its banks. Floodplain connection describes the relationship between the stream and the adjacent floodplain that influences the ability of water to flow into or out of the wetland or to inundate adjacent uplands during high-water periods.

(bedrock outcrop) and a reach of deeply incised channel with some failing banks. This reach opens up into a wider section that historically incised material derived from the right hillside (identified by the geotechnical assessment as a former quarry spoil deposit). This material constrained the channel and deflected it to the left bank where it is actively eroding and causing slab failures. Despite the longer-term appearance of incision, the bed shows recent signs of aggradation. Downstream the channel remains historically incised with erosion on the outside bends, local bed aggradation, and the formation of a small new floodplain on the inner bends. The right valley side looking downstream is undercut by the creek, creating a high unstable slope. This reach terminates in an 8-foot-high knickpoint suggesting that the channel is currently eroding the bed sediment deposited in the 2004–05 floods (Final EIS/EIR, **Appendix 4.2**).

The lower portion of the Lion Canyon channel is heavily eroded and the floodplain is disconnected and eroded. Upstream, the channel is relatively stable and well vegetated. The channel is maintaining a relatively steep gradient for a watershed of this size and with a sand bed. One reason for this is the high sediment delivery rate. The principal sediment source appears to be bed and bank erosion of the channel in the lower reaches, and a combination of channel and headwall erosion in the upper reaches. The eroding gullies that extend up into the canyon walls in many locations are an additional source of sediment. Generally, the existing geomorphic conditions in Lion Canyon are unstable and channel degradation is ongoing due to excessive erosion and headcutting below existing road crossings.

The modeling of the existing floodplain performed by PACE (2008B) indicated that approximately 50 percent of the lower reach of the Lion Canyon floodplain was hydraulically "steep," (Froude numbers greater than a value of 1.0 which indicates supercritical flow conditions) while the remainder of the canyon, primarily the upper portion of the RMDP area boundary, was a hydraulically "mild" channel (Froude numbers less than a value of 1.0 which indicates subcritical flow conditions). The average overall mean slope of the channel from the upper head waters to the canyon mouth is 4.6 percent. (PACE, 2007)

Long Canyon. Long Canyon has a watershed area of 2.0 square miles at the downstream project limit and drains westerly into the south bank of the Santa Clara River. The watershed is currently used for a combination of cattle grazing and oil production. Long Canyon is characterized by a very steep, unstable headwaters reach (outside the Project area) that becomes aggradational downstream. Most of the canyon is then moderately aggradational to moderately stable with some sections of wide floodplain, before passing

through a culvert and into a constructed earth channel (agricultural ditch) that conveys it to the Santa Clara River. The upstream headwaters reaches are deeply incised and highly unstable, with actively eroding channels and very high rates of sediment delivery. Downstream the channel gradient flattens and the excess sediment (presumed to be from the 2004–05 winter flows) has partially filled the channel. As the channel moves downstream, there are longer reaches of incision, but the most recent events filled in the low-flow channel and bed. The channel passes through a slightly incised reach with recent aggradation before entering a highly aggrading section. The channel then enters a confined reach indicating long-term channel incision but again with local bed aggradation and actively eroding relict terraces on the outside bend before emerging into another aggrading, unconfined reach with an extensive active floodplain. Downstream the channel is aggrading causing lateral migration into the dirt road creating access to a low floodplain on the opposite side. Further downstream the channel continues to aggrade with eroding outside bends adjacent to relict terraces. The channel passes through a short, relatively stable reach before widening and aggrading. Downstream the channel becomes slightly confined with a higher floodplain on one bank but evidence of aggradation from the proximity to the other floodplain level. Below this point the channel enters a constructed trapezoidal flood channel that conveys it to the Santa Clara River (Final EIS/EIR, **Appendix 4.2**). Generally, the existing geomorphic conditions in Long Canyon are unstable due to active erosion downstream of road crossings and lateral scour caused by inadequate channel capacity to transport heavy sediment loads.

The modeling of the existing floodplain performed by PACE (2008B) indicated that approximately 80 percent of the lower reach of the Long Canyon floodplain was hydraulically "steep," (Froude numbers greater than a value of 1.0 which indicates supercritical flow conditions) while the remainder of the canyon, primarily the upper portion of the Newhall Ranch boundary, was a hydraulically "mild" channel (Froude numbers less than a value of 1.0 which indicates subcritical flow conditions). The average overall slope of the channel from the upper headwaters to the canyon mouth is 3.0 percent. (PACE, 2008B; see **Appendix 4.1**.).

Potrero Canyon. Potrero Canyon has a watershed area of 4.7 square miles and drains westerly into the south bank of the Santa Clara River. The watershed is currently used for a combination of cultivated agriculture, cattle grazing and oil production. Potrero Canyon has steep headwaters with incised, erosive channels that deliver an abundance of relatively coarse sediment to a downstream braided reach. The upper canyon immediately downstream of the steep headwaters appears to be aggradational, as sediment delivery

exceeds transport capacity and the surplus sediment is stored in the channel. Downstream there is a short reach where the channel is confined against the valley side and is deeply incised with highly unstable banks. The channel downstream shows signs of previous incision, but there are indications of recent aggradation, partially filling the low flow channel with sediment, which is now being re-eroded and reworked; overall, this creates a highly complex pattern. Downstream, the channel has a long and unusual reach of cismontane alkali marsh much of which takes the form of a swale rather than a well-defined channel. Towards the downstream end, the channel becomes increasingly well defined, culminating in an unstable knickpoint that is migrating upstream. The channel transitions sharply into a steep, incised section with several knickpoints before emptying into the Santa Clara River. (Final EIS/EIR, **Appendix 4.2**). Generally, geomorphic conditions with Potrero Canyon are relatively unstable due to historic activities (channel re-alignment for agriculture, road crossings). In particular, the channel in the lower canyon is actively eroding and has become deeply incised. Heavy sediment loads in the upper reaches have resulted in lateral channel migration and bank scour. The active channel has limited hydraulic capacity, particularly in the lower portion of the canyon, which results in overtopping and the creation of a secondary sheet flow on the southern side of the canyon, supporting a large meadow area. The engineered portions of the active channel follow the canyon floor. The canyon floor is characterized by a very large and flat width in the valley compared to the other tributary canyon watersheds. The drainage characteristics and trends also reflect a wide, stable valley system, with little tendency to deeply incise beyond the minor active channel.

The modeling performed by PACE (2008B) indicated that approximately 40 percent of the lower reach of the existing Potrero Canyon floodplain was hydraulically "steep," (Froude numbers greater than a value of 1.0 which indicates supercritical flow conditions) while the remainder of the canyon, primarily the upper portion of the RMDP area boundary was a hydraulically "mild" channel (Froude numbers less than a value of 1.0 which indicates subcritical flow conditions). The average overall slope of the channel from the upper headwaters to the canyon mouth is approximately 3.1 percent. (PACE, 2008B; see Final EIS/EIR, **Appendix 4.1**.).

1.5 Jurisdictional Areas to be Filled

Based on the most recent data and field work available, the RMDP project area includes a total of 660.1 acres of waters of the United States, of which 276.9 acres are wetlands and 383.2 acres are non-wetland waters of the United States. The jurisdictional acreages are shown on Table 3, along with the acreage distribution for the largest drainages. Of the total Corps-jurisdictional

waters on the site, 471.2 acres (71%) comprise the Santa Clara River corridor, and the remaining portion represents tributaries to the Santa Clara River. The smallest, ephemeral drainages on site have been combined into a single heading ("Other Drainages within RMDP site") and have jurisdictional area totaling 34.4 acres (5% of total Corps-jurisdiction on the RMDP site). A preliminary jurisdictional determination also has been prepared and is included in **Appendix F4.6** of the Final EIS/EIR. The extent of Corps jurisdiction will be verified at the time a construction notification is submitted for a permitted activity.

Table 3
Area of Waters of the United States, Including Wetlands within the Project Area by Drainage

Drainage	Waters of the United States (excluding Wetlands) (acres)	Corps Wetlands (acres)	Total Waters of the United States (including Wetlands) (acres)
Santa Clara River	212.5[1]	258.8	471.2
Salt Creek	79.7	8.7	88.5
Potrero Canyon	31.4	7.3	38.7
San Martinez Grande Canyon	2.6	0.0	2.6
Chiquito Canyon	12.2	0.0	12.2
Long Canyon	5.7	0.0	5.7
Lion Canyon	6.9	0.0	6.9
Other Drainages Within RMDP site	32.3	2.1	34.4
Subtotal RMDP Site	**383.2**	**276.9**	**660.1**

[1] Data presented herein reflects geographic information system source data with very high data resolution. To facilitate the reader, values are rounded to the nearest 1/10 of an acre. Values reported as 0.0 may represent up to 0.0444 acre.
Source: URS (RMDP Waters/Streams 2004, RMDP Wetlands 2009; VCC Streams 2008, River Wetlands 2010); Glenn Lukos Associates (as revised September 15, 2008) (see **Appendix F4.6** of the Final EIS/EIR).

The extent of wetlands within the RMDP site was determined through a combination of fieldwork and analysis of high-resolution (6-inch pixels) aerial photography. On portions of the RMDP site not associated with the Santa Clara River main stem, field delineation techniques consistent with the Corps' Wetland Delineation Manual (Corps 1987) were used. Within the river main stem, where the extent of vegetated areas varies from year to year due to storm flows shaping the channel, Corps' 1987 field methods were employed only in the vicinity of proposed bridge crossings. In the remaining portions of the river main stem, delineation was performed based on aerial photography. A conservative approach was taken where aerial photography was used, and all vegetated areas within and adjacent to the active river channel were mapped as wetlands. This conservative approach, combined with the high resolution of the air photos used, ensured that small wetlands did not go undetected and that the extent of wetlands present was not underestimated.

Wetlands were identified within the Santa Clara River corridor and in the Potrero Canyon and Salt Creek tributaries, as well as in a spring near the mouth of Middle Canyon (identified in the Hybrid Assessment of Riparian Condition (HARC) as reach MI-6). In total, 276.9 acres of wetlands were mapped within the RMDP site. The vast majority of this total consisted of vegetated areas within the river floodplain. Although these areas met the Corps' criteria for jurisdictional wetlands, it is important to note that the river is a highly dynamic system, and the location and extent of vegetated areas that may constitute wetlands varies from year to year as seasonal flood events scour and shape the channel. The wetlands observed in Salt Creek, Potrero Canyon, and at the Middle Canyon spring complex are in areas with greater morphological stability and likely experience much more subtle changes in boundaries from year to year.

1.5.1 Hybrid Assessment of Riparian Condition (HARC)

The HARC method is a quantitative tool used to evaluate and characterize the functional quality of non-wetland waters of the United States, and riparian vegetation communities within the project site. The methodology was developed by URS Corporation (2007), in cooperation with the Corps, for the Santa Clara River basin. The HARC methodology adapts and combines elements from three widely used functional assessment methodologies: the California Rapid Assessment Methodology (Collins *et al.* 2008), the Hydrogeomorphic Classification (Smith *et al.* 1995), and the Landscape Level Functional Assessment (Smith 2000). The metric scores reflect the overall habitat, hydrologic, and biogeochemical functions of the riverine systems within the project area. The HARC method was developed specifically for the assessment of large sites within the Santa Clara River. The assessment methodology is explained in detail in **Section 4.2** of the Final EIS/EIR (Corps and CDFG 2010). Existing HARC scores for waters of the United States within the RMDP area are shown on Figure 5, Existing HARC Scores, and average-weighted (AW) HARC scores are summarized in Table 4. Pre-construction AW HARC scores will form the basis for determination of no net loss of functions and values through the evaluation process defined in **Section 7.0.**

Table 4
HARC Summary

Drainage	Corps' Jurisdiction Total Acreage	Total HARC AW Units	Avg. HARC Score
Santa Clara River Main Stem			
Santa Clara River	471.2	*364.8*	0.77
Tributaries			
Lion Canyon	6.9	*5.4*	0.79
Long Canyon	5.7	*3.6*	0.62

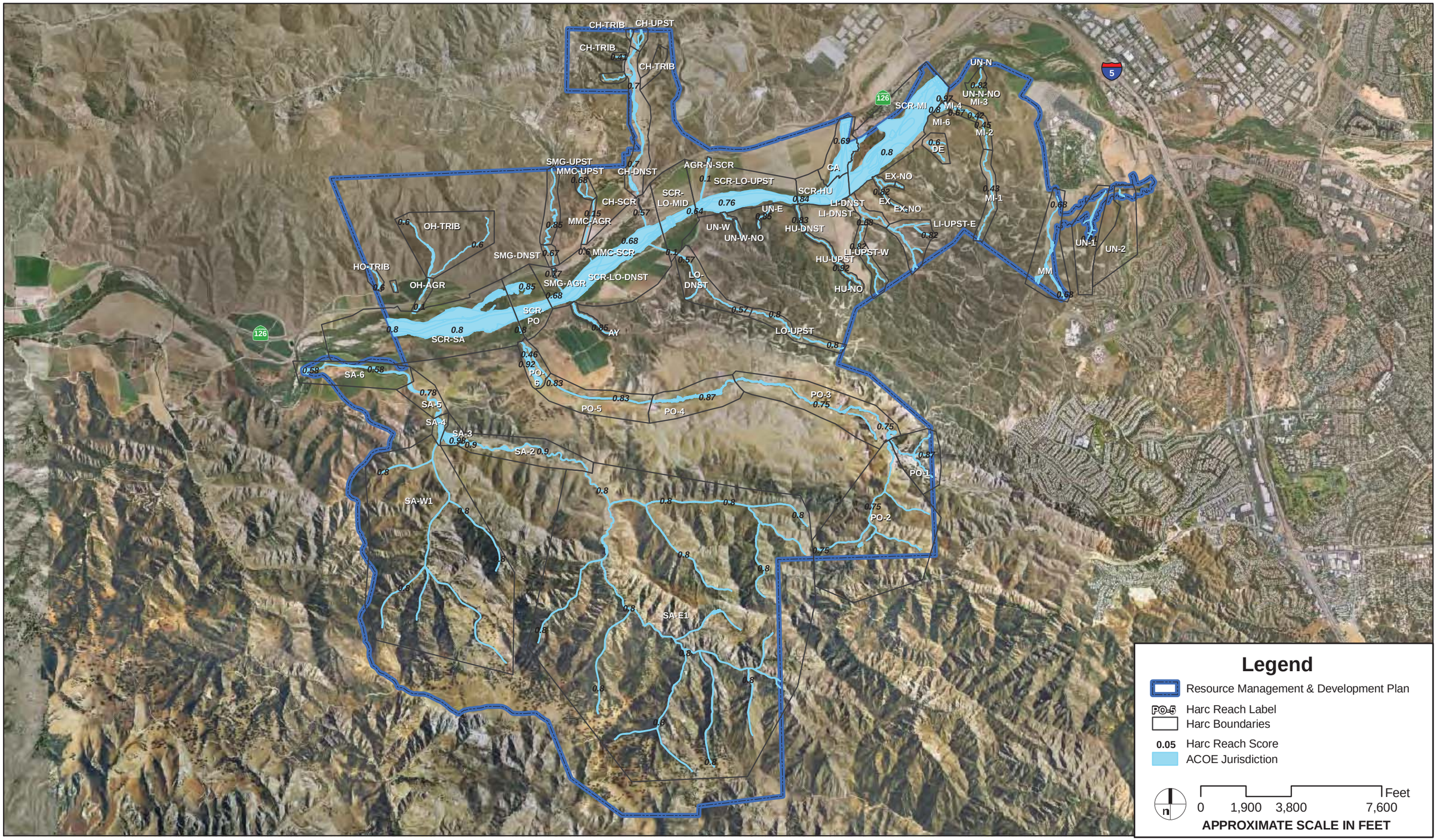
Table 4
HARC Summary

Drainage	Corps' Jurisdiction Total Acreage	Total HARC AW Units	Avg. HARC Score
Chiquito Canyon	12.2	*8.2*	0.67
Potrero Canyon	38.7	*31.6*	0.82
Salt Creek Canyon	88.5	*71.9*	0.81
San Martinez Grande Canyon	2.6	*2.1*	0.82
Agricultural Ditch	1.6	*0.2*	0.10
Ayers Canyon	2.6	*2.2*	0.85
Dead-End Canyon	1.3	*0.8*	0.60
Exxon Canyon	1.2	*1.0*	0.82
Homestead Canyon	0.2	*0.1*	0.59
Humble Canyon	1.9	*1.7*	0.90
Magic Mountain Canyon	6.4	*4.4*	0.68
Middle Canyon	5.7	*3.2*	0.56
Middle Canyon Spring Complex	2.1	*2.1*	1.00
Mid-Martinez Canyon	2.0	*0.9*	0.47
Off Haul Canyon	5.8	*2.7*	0.47
Unnamed Canyon 1	0.3	*0.1*	0.42
Unnamed Canyon 2	0.3	*0.1*	0.39
Unnamed Canyon A	0.8	*0.5*	0.60
Unnamed Canyon B	0.7	*0.6*	0.85
Unnamed Canyon C	0.7	*0.6*	0.85
Unnamed Canyon D	0.8	*0.7*	0.82
Tributary Totals	**188.9**	***144.6***	**0.77**
RMDP Project Area Total	**660.1**	***509.4***	**0.77**

Source: Final EIS/EIR (May 2010) **Appendix 4.6**. HARC scores are averaged for each reach of the entire length of each drainage within the RMDP.

1.5.2 Impacts to Waters of the United States

Implementation of the Project would result in permanent and temporary impacts to waters of the United States. Table 5 provides a summary of total acres of temporary and permanent impacts to Corps-jurisdictional area for all RMDP development projects. There are a total of 660.1 acres of Corps-jurisdictional area within the RMDP footprint (Figure 6, Waters of the United States within the RMDP Site; Figure 7, Proposed Land Uses and Jurisdictional Impacts.). The Project would result in permanent impacts to 5.1 acres of wetland waters of the United States and 42.8 acres of non-wetland waters of the United States (total 47.9 acres). The Project would result in temporary impacts to 11.8 acres of wetland waters of the United States and 23.5 acres of non-wetland waters of the United States (total 35.3 acres). Figure 8 depicts locations of modified, converted and preserved tributary drainages.



SOURCE: HUNSAKER 2010/PACE 2010

FIGURE 5

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

EXISTING HARC SCORES

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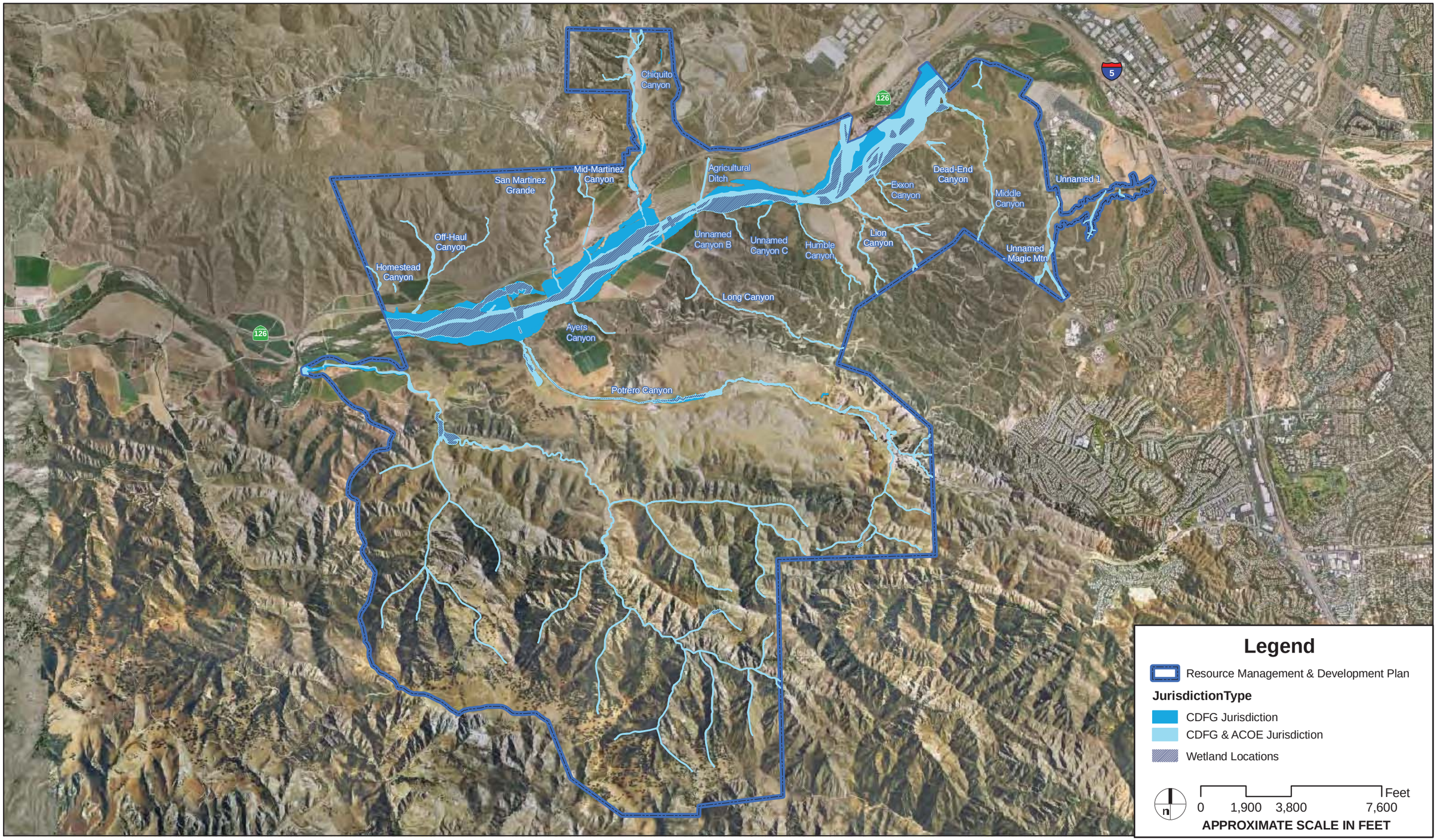

SOURCE: HUNSAKER 2010/PACE 2010

FIGURE 6

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

Waters of the United States within the RMDP Site

P:\8238E\GIS\mxds\LEDPA\ReportFigures_20100223\8238E_FIGURE-6_WatersofUSWithinRMDPPC1_20100223.mxd

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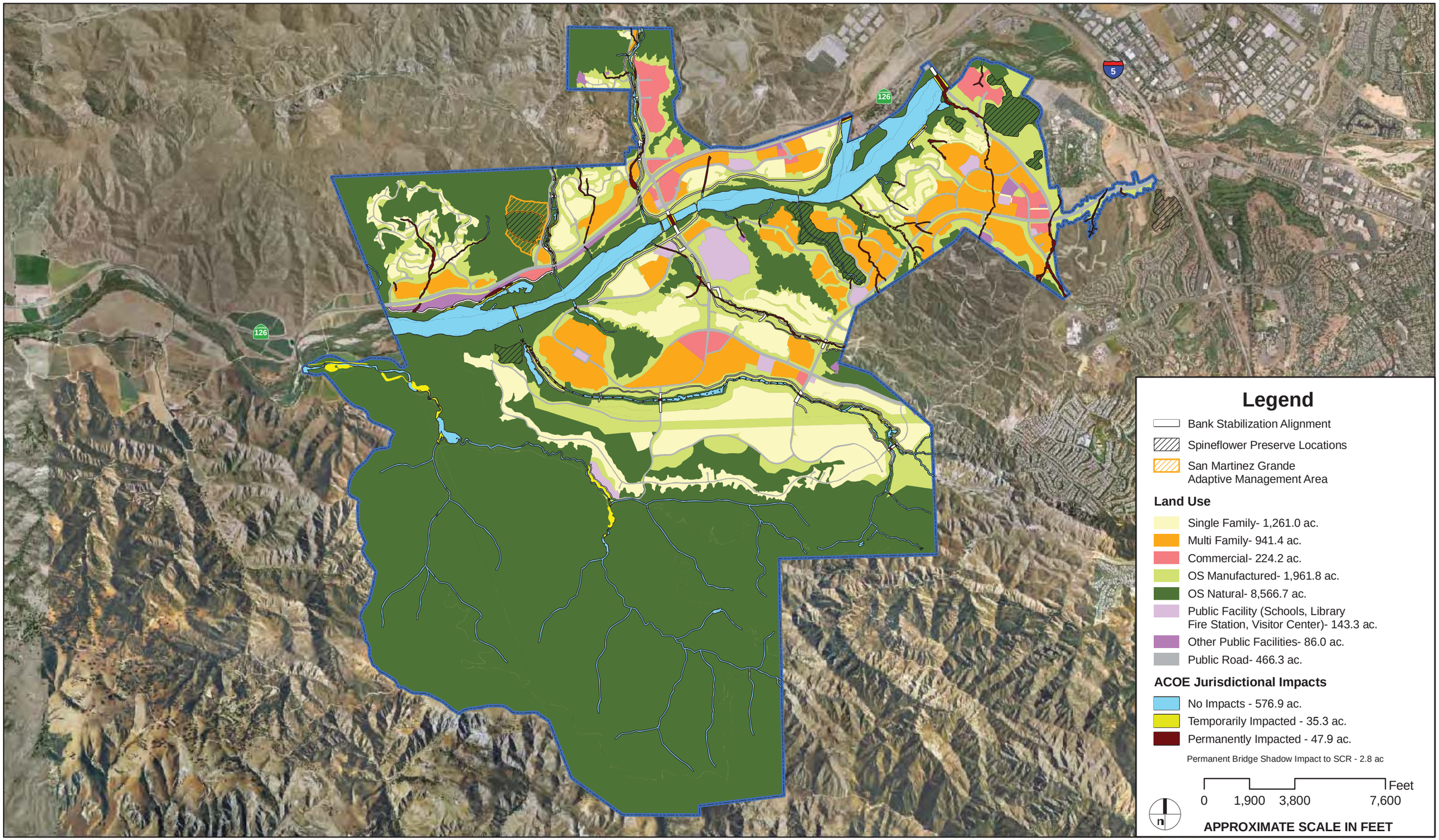

SOURCE: HUNSAKER 2010/PACE 2010

FIGURE 7

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

Proposed Land Uses and Jurisdictional Impacts

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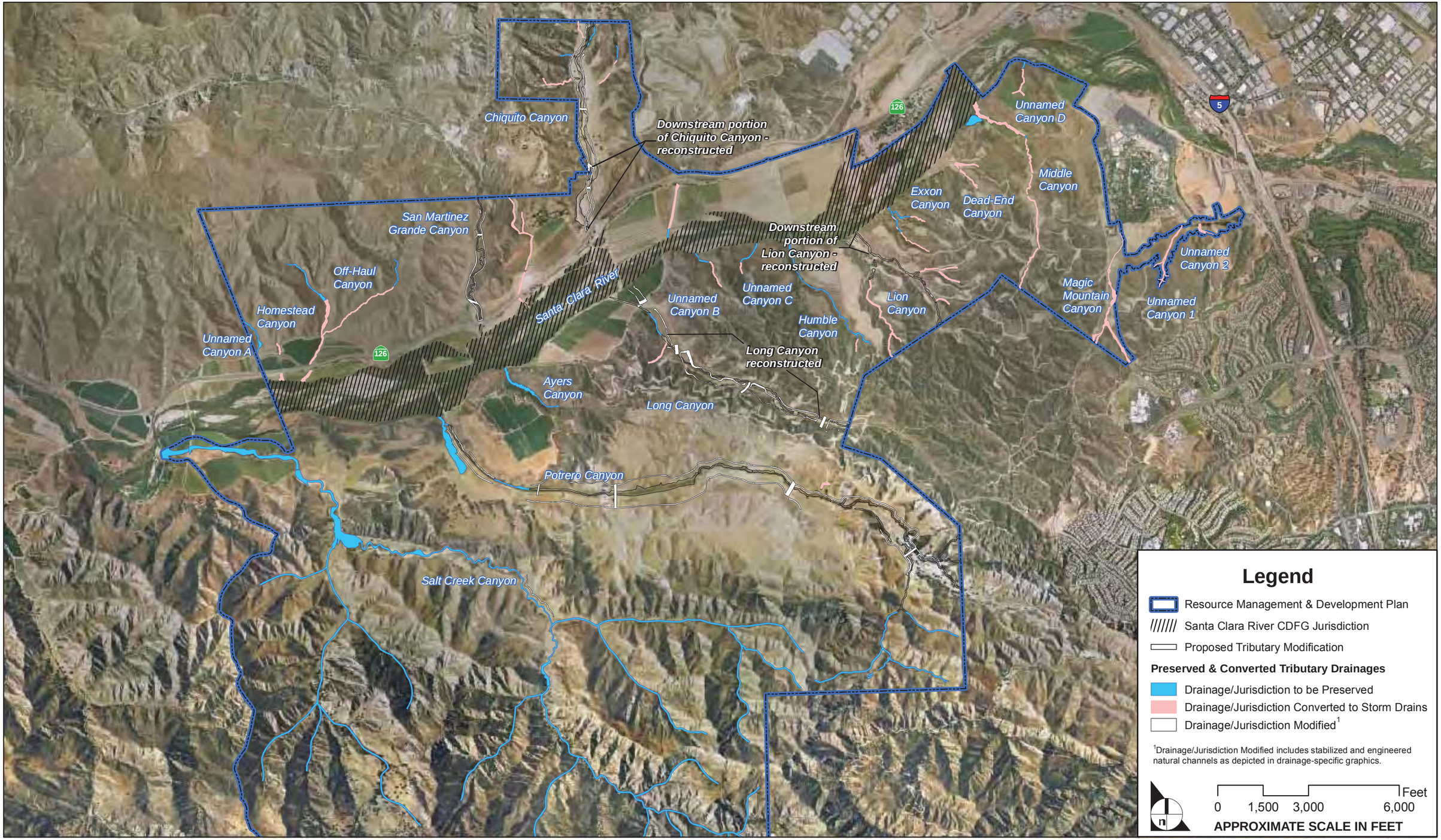

SOURCE: PACE - 2010

FIGURE 8

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

Modified, Converted, and Preserved Tributary Drainages

P:\8238E\GIS\mxds\LEDPA\404B1_20101103\8238E_FIGURE-3_ModifiedConvertedPreservedTributaryDrainageTreatments_PC1_20110330.mxd

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Table 5
Summary of Corps Impacts by Jurisdictional Feature

Jurisdiction Name	Type of Impact	Waters of the U.S. (excluding Wetlands) (acres)	Wetlands (acres)	Total Waters of the U.S. (including wetlands) (acres)	Total Jurisdictional Area (acres)
Agriculture Ditch	Waters Avoided	0.2	0.0	0.2	1.6
	Temporary Impact	0.1	0.0	0.1	—
	Permanent Impact	1.4	0.0	1.4	—
Ayres Canyon	Waters Avoided	2.4	0.0	2.4	2.6
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.2	0.0	0.2	—
Chiquito Canyon	Waters Avoided	4.2	0.0	4.2	12.2
	Temporary Impact	3.4	0.0	3.4	—
	Permanent Impact	4.7	0.0	4.7	—
Dead-End Canyon	Waters Avoided	0.0	0.0	0.0	1.3
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	1.3	0.0	1.3	—
Exxon Canyon	Waters Avoided	0.8	0.0	0.8	1.2
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.4	0.0	0.4	—
Homestead Canyon	Waters Avoided	0.0	0.0	0.0	0.2
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.2	0.0	0.2	—
Humble Canyon	Waters Avoided	1.8	0.0	1.8	1.9
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.1	0.0	0.1	—
Lion Canyon	Waters Avoided	0.0	0.0	0.0	6.9
	Temporary Impact	2.2	0.0	2.2	—
	Permanent Impact	4.7	0.0	4.7	—
Long Canyon	Waters Avoided	0.5	0.0	0.5	5.7
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	5.2	0.0	5.2	—
Magic Mountain Canyon	Waters Avoided	0.0	0.0	0.0	6.4
	Temporary Impact	0.0	0.0	0.0	—

Table 5
Summary of Corps Impacts by Jurisdictional Feature

Jurisdiction Name	Type of Impact	Waters of the U.S. (excluding Wetlands) (acres)	Wetlands (acres)	Total Waters of the U.S. (including wetlands) (acres)	Total Jurisdictional Area (acres)
	Permanent Impact	6.4	0.0	6.4	—
Middle Canyon	Waters Avoided	0.1	2.1	2.2	7.8
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	5.6	0.0	5.6	—
Mid-Martinez Canyon	Waters Avoided	0.0	0.0	0.0	2.0
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	2.0	0.0	2.0	—
Off-Haul Canyon	Waters Avoided	0.3	0.0	0.3	5.8
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	5.5	0.0	5.5	—
Potrero Canyon	Waters Avoided	25.8	5.2	31.0	38.7
	Temporary Impact	4.1	1.6	5.7	—
	Permanent Impact	1.6	0.5	2.1	—
Salt Creek Canyon	Waters Avoided	73.4	7.6	81.0	88.5
	Temporary Impact	6.1	1.1	7.3	—
	Permanent Impact	0.2	0.0	0.2	—
San Martinez Canyon	Waters Avoided	1.3	0.0	1.3	2.6
	Temporary Impact	1.1	0.0	1.1	—
	Permanent Impact	0.2	0.0	0.2	—
Santa Clara River	Waters Avoided	204.6	245.1	449.7	471.2
	Temporary Impact	6.7	9.0	15.7	—
	Permanent Impact	1.2	4.6	5.8	—
Unnamed Drainage A	Waters Avoided	0.8	0.0	0.8	0.8
(Homestead East)	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.0	0.0	0.0	—
Unnamed Drainage B	Waters Avoided	0.3	0.0	0.3	0.7
(Homestead Village West)	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.5	0.0	0.5	—
Unnamed Drainage C	Waters Avoided	0.5	0.0	0.5	0.7

Table 5
Summary of Corps Impacts by Jurisdictional Feature

Jurisdiction Name	Type of Impact	Waters of the U.S. (excluding Wetlands)	Wetlands	Total Waters of the U.S. (including wetlands)	Total Jurisdictional Area
		(acres)	*(acres)*	*(acres)*	*(acres)*
(Homestead Village West)	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.2	0.0	0.2	—
Unnamed Drainage D	Waters Avoided	0.1	0.0	0.1	0.8
(Mission Village)	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.7	0.0	0.7	—
Unnamed Drainage 1	Waters Avoided	0.0	0.0	0.0	0.3
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.3	0.0	0.3	—
Unnamed Drainage 2	Waters Avoided	0.0	0.0	0.0	0.3
	Temporary Impact	0.0	0.0	0.0	—
	Permanent Impact	0.3	0.0	0.3	—
Total Waters Avoided	**—**	**317.6**	**259.3**	**576.9**	**660.1**
Total Temporary Impact	**—**	**23.5**	**11.8**	**35.3**	**—**
Total Permanent Impact	**—**	**42.8**	**5.1**	**47.9**	**—**
Combined Totals	**—**	**384.0**	**276.2**	**660.1**	**—**

Note: Totals may not add due to rounding.

1.5.3 Functions and Services Impacts

HARC units have been calculated for each jurisdictional area to be impacted on the river and tributaries based on average-weighted HARC values for each jurisdictional area (Table 6). The eliminated HARC units establish the minimum mitigation goal of the overall mitigation program proposed for the RMDP through Construction Notification packages.

Table 6
HARC Unit Impacts

Jurisdiction Name	Permanent Impact Acres	HARC AW Units Eliminated
Santa Clara River	5.79	4.41
Chiquito Canyon	4.70	3.04
Lion Canyon	4.69	3.75

Table 6
HARC Unit Impacts

Jurisdiction Name	Permanent Impact Acres	HARC AW Units Eliminated
Long Canyon	5.24	3.29
San Martinez Canyon	0.22	0.17
Potrero Canyon	2.06	1.55
Salt Creek Canyon	0.23	0.18
Agriculture Ditch	1.37	0.13
Ayers Canyon	0.16	0.13
Dead-End Canyon	1.30	0.78
Exxon Canyon	0.44	0.36
Homestead Canyon	0.22	0.13
Humble Canyon	0.14	0.13
Magic Mountain Canyon	6.37	4.47
Middle Canyon	5.60	3.15
Mid-Martinez Canyon	1.96	0.93
Off-Haul Canyon	5.46	2.53
Unnamed Creek B	0.45	0.38
Unnamed Creek C	0.18	0.15
Unnamed Creek D	0.69	0.57
Unnamed-1	0.33	0.14
Unnamed-2	0.33	0.13
Total Permanent Impact – Tributaries	**42.1**	**26.1**
Total Permanent Impact – Combined River and Tributary	**47.9**	**30.5**

1.5.4 Impacts to Vegetation Communities

Implementation of the Project would result in permanent and temporary impacts as depicted in Figure 7, Proposed Land Uses and Jurisdictional Impacts. The Project would result in temporary and permanent impacts to Corps-jurisdictional areas that support southern cottonwood–willow riparian forest, herbaceous wetlands (freshwater marsh and bulrush-cattail wetland), arrow weed scrub, mulefat scrub, river wash, alluvial scrub, big sagebrush scrub, cismontane alkali marsh, southern coast live oak riparian forest, southern willow scrub, tamarisk scrub, and Mexican elderberry scrub.

1.6 Type(s), Functions, and Values of the Jurisdictional Areas to be Directly and Indirectly Impacted

Existing functions and values of jurisdictional features throughout the project area were quantitatively evaluated using the HARC methodology. The HARC assessment methodology was described briefly in **Subsection 1.5.1**, and HARC scores for jurisdictional features within the project area are represented on Figure 5.

Existing functions and values of the planned locations for the compensatory mitigation sites vary considerably depending on location. In general, the existing functions and values of the planned mitigation sites associated with the Santa Clara River (e.g., Mayo Crossing and Landmark Village establishment areas) are very limited due to the existing intensive agricultural land use that occurs there. Due to the repeated and frequent land disturbance practices associated with intensive agricultural use, the areas lack functions and values that would benefit the Santa Clara River riparian system, such as native buffers, floodplain connectivity, and surface water persistence and recharge.

The tributary canyons currently provide some of the functions and values typical of intermittent and ephemeral drainages, such as riparian corridor connectivity, a natural water source, a natural flood-prone area, and biogeochemical processing. However, many of the canyon drainage channels are excessively incised due to instable substrate, limiting floodplain connectivity. Many of the tributary drainages also have poor buffer conditions in the lower reaches due to intensive agricultural use along the Santa Clara River corridor.

1.6.1 Vegetation Communities

Vegetation communities impacted by Project construction range from disturbed vegetation communities dominated by weedy herbaceous vegetation containing vegetation with low existing functions and values to vegetation communities exhibiting high existing functions and values that include mature native vegetation with developed vertical structure and diversity of plant species. Many of the vegetated jurisdictional communities that would be impacted by the Project have been subject to some disturbance from grazing activities, agricultural activities, and oil extraction activities; however, these jurisdictional vegetated communities generally support the functions and values typical of natural vegetated wetland and riparian communities, such as dissipation of energy, cycling of nutrients, uptake of elements and compounds, retention of particulates, export of organic carbon, and maintenance of plant and animal communities (e.g., nesting, feeding, and breeding opportunities for various aquatic, terrestrial, and avian animals).

An overview of the vegetation communities within Corps' jurisdiction that would be impacted by the Project is provided below.

Southern Cottonwood-Willow Riparian Forest

The southern cottonwood–willow riparian forest within Corps' jurisdiction that would be impacted has a well-developed canopy layer composed of cottonwood trees. The community contains willow saplings and developed understory. The understory is dominated by exotic annual grasses, but native vegetation occurs, including mugwort (*Artemisia douglasiana*), California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), golden currant (*Ribes aureum*), and wild cucumber (*Marah macrocarpus*). In all strata, understory through canopy, native vegetation covers almost 70% of the vegetation community.

The southern cottonwood–willow riparian forest vegetation community is found primarily in patches along the margins of the Santa Clara River in locations where there is adequate surface and subsurface water year-round. There are a few patches of this vegetation community in some of the lower (downstream) reaches of the tributary canyons (e.g., Middle Canyon). The functions of the southern cottonwood–willow riparian forest include enhanced water-holding capacity, filtration ability, and soil stability. The southern cottonwood–willow riparian forest provides breeding, feeding, and nesting habitat for avian, aquatic, and terrestrial animal species.

Mulefat Scrub

The mulefat scrub vegetation community within Corps' jurisdiction that would be impacted contains patchy riparian vegetation consisting mainly of mulefat. The understory is poorly developed and often bare. The understory vegetation is mostly composed of exotic species. There are sometimes a few riparian trees growing above the shrub layer. Other native species occur, but the variety and quantity are typically poor.

The mulefat vegetation community commonly occurs throughout the Project area along stream margins and floodplains. Mulefat scrub provides some breeding, feeding, and nesting habitat for avian, aquatic, and terrestrial animal species.

Arrow Weed Scrub

The arrow weed scrub community within Corps' jurisdiction is dominated by shrubs and understory species. There is no vegetation reaching into the canopy layer. Predominant non-native species include mustard and annual grasses, contributing to approximately 25% of the vegetated cover within the community. The arrow weed scrub is dominated by a small number of

species, mainly arrow weed (*Pluchea sericea*), California sagebrush (*Artemisia californica*), and mustard. Arrow weed scrub provides some breeding, feeding, and nesting habitat for avian, aquatic, and terrestrial animal species.

River Wash

The river wash community within Corps' jurisdiction is predominantly flat and homogeneous. There are some microtopographic features, including meanders, bars, terraces, pits, ponds, and hummocks. On average, this community supports less than 5% vegetative cover. The vegetation surrounding the river wash is often diverse, containing both native and exotic plant vegetation. The river wash community provides area for river movement and meander; space for flood waters; and some habitat for avian, aquatic, and terrestrial animal species.

Cismontane Alkali Marsh

The cismontane alkali marsh within Corps' jurisdiction that would be impacted is predominantly flat and homogeneous. Cismontane alkali marsh is an herbaceous community dominated by salt grass (*Distichlis spicata*); the higher elevations and edges support native plants (e.g., yerba mansa (*Anemopsis californica*), western ragweed (*Ambrosia psilostachya*), and spearscale (*Atriplex triangularis*)) and non-native plants (e.g., sourclover (*Melilotus indica*), five-hooked bassia (*Bassia hyssopifolia*), and peppergrass (*Lepidium latifolium*)). Where water is actually flowing in small rills at the surface, winged three-square (*Scirpus americanus*) and Mexican rush (*Juncus mexicanus*) also occur. Cismontane alkali marsh provides foraging habitat for avian, aquatic, and terrestrial animal species.

Herbaceous Wetlands

The herbaceous wetlands that would be impacted include freshwater marsh and bulrush-cattail wetlands. The herbaceous wetlands on site occupy depressional areas where sufficient groundwater exists. These areas are in association with stream channels and ditches. Vegetation consists of occasional native shrubs, including mulefat, narrow-leaved willow (*Salix exigua*) arrow weed; native herbaceous species, such as broad-leaved cattail (*Typha latifolia),* sedges (*Carex* spp.), cocklebur (*Xanthium strumarium*), California cottonweed (*Epilobium ciliatum*), and bulrush (*Scirpus* ssp.); and non-native plants, including whorled dock (*Rumex conglomerates*), curly dock (*Rumex crispus*), and pepperweed. Herbaceous wetlands provide habitat for aquatic invertebrates (when sufficient surface water is present), insects, as well as foraging and feeding habitat for terrestrial and avian species.

Alluvial Scrub

The alluvial scrub within Corps' jurisdiction that would be impacted occurs along stream channels on terraced benches of varying elevations above the channel bottom, which receive less frequent inundation. Vegetation is dominated by California buckwheat, yerba santa, scale broom (*Lepidospartum squamatum*), and cudweed aster (*Lessingia* sp.). This vegetation community is adapted to flash floods, erosion, and dry summer periods. Its footprint has been greatly reduced over time in southern California due to sand mining and urbanization. Alluvial scrub provides foraging habitat for avian and terrestrial animal species and flood retention.

Big Sagebrush Scrub

The big sagebrush scrub within Corps' jurisdiction that would be impacted includes native shrubs (e.g., Great Basin sagebrush, yerba santa, and California sagebrush); herbaceous species, including native plants (e.g., California aster (*Lessingia filaginifolia*), wild cucumber, shrubby phacelia (*Phacelia ramosissima*), and common owl's clover (*Castilleja exserta*)); and non-native herbs (e.g., red-stemmed filaree (*Erodium cicutarium*), tree tobacco (*Nicotiana glauca*), milk thistle (*Silybum marianum*), and horehound (*Marrubium vulgare*)). This vegetation community can occur in a variety of site conditions ranging from rocky, well-drained soils to fine, sandy soils with a higher water table. It can tolerate a variety of temperature ranges and elevations. Big sagebrush scrub provides breeding, feeding, and foraging habitat for terrestrial and avian wildlife species.

Southern Willow Scrub

The southern willow scrub within Corps' jurisdiction that would be impacted includes red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), and Goodding's black willow (*Salix gooddingii*) trees; native shrubs, including mulefat, narrow-leaved willow, and arrow weed; native herbaceous species, including western ragweed, arroyo lupine (*Lupinus succulentus*), yellow fiddleneck (*Amsinckia menziesii* var. *intermedia; Amsinckia menziesii* var. *intermedia*) , and caterpillar phacelia (*Phacelia cicutaria* var. *hispida*); and non-native plants (white sweet-clover (*Melilotus alba*), tumble mustard (*Sisymbrium altissimum*), hedge mustard (*Sisymbrium officinale*), and milk thistle). Southern willow scrub occurs in depositional areas of floodplains and along stream channels with a shallow water table, where repeated flooding occurs. Willow species form thick canopies, with an increasingly sparse understory as canopy densities increase. Southern willow scrub provides breeding, feeding, nesting, and foraging habitat to aquatic (when surface water is present), amphibian, insect, avian, and terrestrial wildlife species. Song birds utilize the willow canopy for roosting and nesting habitat.

Southern Coast Live Oak Riparian Forest

The southern coast live oak riparian forest that would be impacted within Corps' jurisdiction impacted is dominated by coast live oak (*Quercus agrifolia*) with sparse understory of forbes and non-native grasses. It occurs in bottomlands, canyons, and outer floodplains along larger streams, on fine-grained, rich alluvium. Southern coast live oak riparian forest provides nesting, feeding, breeding, and foraging habitat for avian and terrestrial wildlife species.

Mexican Elderberry Scrub

The Mexican elderberry scrub within Corps' jurisdiction that would be impacted is dominated by Mexican elderberry (*Sambucus mexicana*), California sagebrush, bush monkeyflower (*Mimulus aurantiacus*), shrubby phacelia, golden currant, caterpillar phacelia, and wild cucumber. It occurs on north-facing slopes, sometimes along drainage channels. Mexican elderberry scrub provides nesting, feeding, breeding, and foraging habitat for avian and terrestrial wildlife species.

1.6.2 Hydrologic Regime

The vegetated and unvegetated stream channels that are associated with tributary drainages typically convey stormwater flow only during precipitation events and for a short period after (usually less than 24 hours). They are generally composed of a coarse sandy, alluvial bottom, often with steep side banks. These tributary stream channels provide storm flow conveyance, surface water storage, subsurface water storage, and moderation of groundwater flow or discharge. However, because the channels are mostly unvegetated, they provide very minimal biotic functions and values for plants and wildlife.

In some instances, tributary channels are incised, hydraulically isolating the drainage channel from the historic valley floodplain. Channel incisement can be generally attributed to past land uses such as oil extraction access road crossings, agriculture, and grazing that alter flow gradients to erosive velocities, causing bed instability and degradation. These conditions reduce hydraulic functions such as groundwater recharge, soil moisture replenishment, and vegetation support. Vegetation recruitment is limited by high-velocity flow that scours streambeds, removing fine bedload materials that have higher moisture-retaining properties. Coarse-grained bed material has high porosity and percolation causing soil surfaces to quickly dry, thereby limiting seed germination opportunities.

Within the Santa Clara River, hydraulic effects of high-velocity flow are more localized within the broader floodway. This allows migration of season flow channels within the larger floodway, resulting in a greater diversity of bed grain size distribution. Fluvial features such as sandbars,

cut banks, and multiple-year secondary channels result in a variety of soil and moisture conditions that express equally diverse vegetation communities.

1.6.3 Topographic Complexity

Topographic diversity in tributary drainages can be very subtle and diverse, as observed in Potrero Canyon jurisdictional areas, or limited where incised channels or pastureland grazing are present. Along the Santa Clara River, high topographic diversity that is created by the hydrologic regime, as described above, affects moisture regimes, and frequency of flood scour that give rise to different vegetation community types.

1.6.4 Biochemical Processes

In areas where incised channels are present, biochemical processes in the tributary drainages are limited by a general lack of vegetation cover, woody debris, leaf litter, or detritus. The cause of this condition is described above and generally relates to the combined effects of hydrology, bed material, and lack of topographic complexity. In channel sections without scour, biochemical functions still remain low due to land uses that have reduced adjacent uplands and riparian vegetation either through direct removal (pastureland/grazing) or through hydraulic modifications. This limits the availability of woody materials that persist in channel areas. Conversely, grasses degrade rapidly and degrade water quality, unlike woody materials that decompose slowly and promote beneficial biochemical functions.

Biochemical function in the Santa Clara River is relatively high compared to tributary drainages. Vegetation diversity, hydrologic regime, and topographic complexity combine to trap and retain woody debris, leaf litter, and debris within the floodway. These materials promote beneficial biochemical processes and provide diverse resources for invertebrate populations.

2.0 GOALS OF THE COMPENSATORY MITIGATION PROJECT

This Plan provides a framework mitigation document that guides mitigation planning and implementation through all RMDP phases. The primary goal of the mitigation project is to ensure that there is no net loss of acreage or functions/values from implementation of the RMDP. The permanent removal of existing habitats in Corps-jurisdictional areas in the Santa Clara River and tributaries will be replaced by enhancing, creating and restoring Corps-jurisdictional habitats of similar functions and values. Temporary impacts to Corps-jurisdictional areas will be mitigated by restoring the affected areas to the habitat type present prior to impacts.

As individual Project components are proposed for construction, consistent with the construction notification process, quantities of mitigation acreage required for impacts to Corps-jurisdictional areas will be calculated in accordance with the requirements outlined in this Plan. Assuming full build out, Newhall will create at least 132.2 acres of compensatory mitigation, of which at least 35.2 acres would be wetlands. In addition, Newhall will restore 35.3 acres of temporarily impacted waters of the United States, including 11.8 acres of wetlands.

The design intent will be to enhance/create/replace vegetation communities in Corps-jurisdictional areas that are consistent with adjacent existing riparian vegetation communities and compatible with the fluvial morphology and hydrology of the stream channel corridor. The design will also focus on restoring the floodplain functions and services/values lost during project construction. The restoration approach will be to create vegetation communities that are self-sustaining and functional beyond the maintenance and monitoring period.

2.1 Mitigation Requirements

Consistent with Corps Guidance, including Regulatory Guidance Letter No. 02-2 (Dec. 24, 2002) and the Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (Feb. 6, 1990), the mitigation requirements in this Plan are designed to compensate for the loss of jurisdictional areas authorized under the Corps Permit so as to ensure no net loss of acreage and of functions and services. The primary mechanisms for mitigating the loss of jurisdictional areas are establishment, restoration and enhancement. For purposes of this Plan, "establishment" is defined as conversion of existing upland areas to Corps' jurisdiction (either ordinary high water mark or wetlands). "Restoration" is defined as the managed replacement of degraded stream and wetland habitats (either from natural geomorphic process or more anthropogenic effects) to their prior undisturbed and/or stable condition, usually through recontouring of banks, control of streambed geomorphological processes, and

establishment of appropriate native habitats. "Enhancement" is defined as the removal of invasive plant species from existing jurisdictional areas and/or the establishment of native habitats where non-native species have colonized.

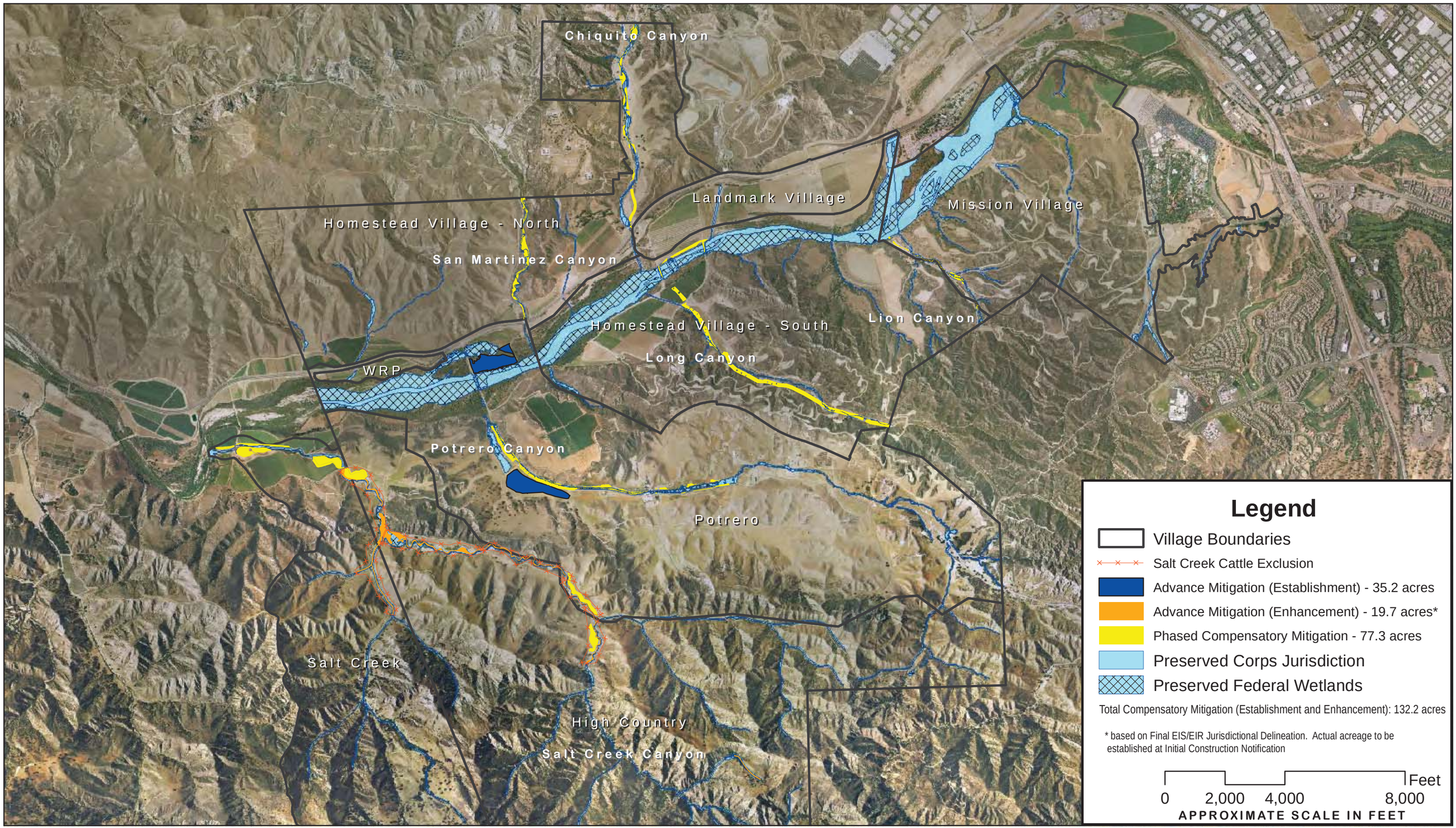
As compensation for RMDP impacts, the Project will:

A. Preserve and protect in perpetuity 612.2 acres of waters that are not permanently impacted, including 271.8 acres of wetlands. These areas will be protected by a conservation easement or deed restriction and will be managed under an endowed long-term management plan. The ratio of preserved acres to permanently impacted waters is **12.8 to 1,** and **53.3 to 1** for impacted wetlands.

B. Enhance, restore and create 132.2 acres of waters of the United States, including 94.3 non-wetland acres in tributaries to the Santa Clara River and 35.2 acres of wetlands at Mayo Crossing (river) and at Potrero Canyon (tributary) (Figure 9). The 94.3 acres of enhanced, restored and created tributaries will be distributed in Salt Canyon (38.2 acres – 19.7 enhanced only), Long Canyon (23.4 acres), San Martinez Grande Canyon (6.8 acres), Chiquito Canyon (9.8 acres), Potrero Canyon (14 acres) and Lion Canyon (2.1 acres) as shown below. Of the 35.2 acres of jurisdictional establishment, 18.6 acres will be adjacent to the Santa Clara River and 19.3 acres will be adjacent to Potrero Creek. Overall, non-wetland impacts to tributaries will be mitigated at a **2.26 to 1** ratio in acres (excluding wetland mitigation) and impacts to site-wide wetlands will be mitigated at a **6.9 to 1** ratio in acres. Overall functions and values will exceed pre-project conditions.

C. Protect all mitigation areas in perpetuity by conservation easements or deed restrictions, including maintenance under a long term management plan supported by an endowment.

D. Restore all temporary impacts by restoring those areas with appropriate native vegetation after construction is complete in the area.



SOURCE: Newhall Land, 2011

FIGURE 9

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Establishment and Enhancement Mitigation Sites

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To verify that impacted functions and services will be adequately replaced, HARC units have been calculated for RMDP impacts (Table 6). The anticipated project wide impacts on a HARC unit basis is 30.5 average-weighted (AW) units. HARC AW units for each of the proposed mitigation sites have been estimated based on anticipated conditions related to HARC metrics (Table 7). Upon completion of all mitigation sites, there is anticipated to be 74.6 HARC AW units provided by the cumulative mitigation program. On a functions and services basis, project impacts will be mitigated at a 2.45:1 ratio. Verification of compensatory mitigation on a functions and services basis will be provided when all mitigation sites are complete (Section 7.0).

Table 7
Summary of Mitigation Sites

Mitigation Site	Description / Location	Mitigation Acreage	Mitigation Site Estimated HARC Total Score	HARC AW Units (Estimated)	Timing
Mayo Crossing	Ag field conversion to wetlands and riparian habitats along Santa Clara River	15.9	0.8	12.7	Implemented prior to RMDP Jurisdictional Impacts
Potrero Canyon CAM	Ag field conversion to wetlands, upstream of existing lower Potrero CAM	19.3	0.8	15.2	Implemented prior to RMDP Jurisdictional Impacts
Salt Creek Cattle Exclusion/Enhancement	Cattle exclusion (fencing) and enhancement (stabilization, exotic / invasive species control, revegetation)of existing jurisdiction	19.7	0.1	2.0	Implemented prior to RMDP Jurisdictional Impacts
Santa Clara River at Long Canyon Bridge	Santa Clara River WOUS/Wetlands Establishment along the banks upstream and downstream of the Long Canyon Bridge north abutment	2.7	0.8	2.2	Implemented at the completion of the Long Canyon Bridge construction
Salt Creek Enhancement/ Establishment	Corps jurisdiction establishment thru grading, geomorphic controls, enhancement, and revegetation along existing Salt Creek jurisdiction	18.5	0.4	7.5	Implemented prior to, or concurrent with, Mission Village Tract Map jurisdictional impacts
Lion Canyon	Corps jurisdiction establishment thru grading, geomorphic controls, enhancement, and, revegetation along, or near, existing Lion	2.1	0.6	1.3	Implemented at the completion of Mission Village Tract Map grading in

Table 7
Summary of Mitigation Sites

Mitigation Site	Description / Location	Mitigation Acreage	Mitigation Site Estimated HARC Total Score	HARC AW Units (Estimated)	Timing
	Canyon jurisdiction				Lion Canyon
Long Canyon	Reconstruction / Restored Long Canyon Drainage	23.4	0.6	14.0	Implemented at the completion of Homestead South Village Tract Map grading in Long Canyon
Chiquito Canyon	Corps jurisdiction establishment thru grading, geomorphic controls, enhancement, and, revegetation along existing Chiquito Canyon jurisdiction	9.8	0.6	5.9	Implemented at the completion of Homestead North Village Tract Map grading in Chiquito Canyon
San Martinez Grande	Corps jurisdiction establishment thru grading, geomorphic controls, enhancement, and, revegetation along existing San Martinez Grande Canyon jurisdiction	6.8	0.6	4.1	Implemented at the completion of Homestead North Village Tract Map grading in San Martinez Grande Canyon
Potrero Canyon	Corps jurisdiction establishment thru grading, geomorphic controls, enhancement, and, revegetation along existing Potrero Canyon jurisdiction	14	0.7	9.8	Implemented at the completion of Potrero Village Tract Map grading in Potrero Canyon
	Totals Mitigation Acreage	**132.2**	**0.6**	**74.6**	

2.2 Functions and Services of Proposed Mitigation

As explained above, mitigation areas are required to replace the functions and values of the Corps-jurisdictional areas that are permanently and temporarily impacted. Mitigation sites will be designed to develop vegetation composition and structure that would be expected to be supported by different jurisdictional areas on the river and tributaries.

Mitigation for jurisdictional areas permanently impacted by the RMDP would generally be designed to include a traditional establishment approach involving grading and site preparation, seeding, container plant installation, and installation of a temporary irrigation system. Vegetation communities temporarily impacted by the RMDP would be restored through a combination of passive restoration and varying levels of active restoration, depending on the site conditions. If the project biologist determines that observed passive restoration on a restoration area is insufficient to eventually reach performance goals after the first year, recommendations will be made to approach the restoration in accordance with the methods designed for permanent impacts (i.e., seeding, container plants, and/or a temporary irrigation system may be recommended). Areas temporarily disturbed by construction activities shall also be maintained annually, as needed, for 5 years following construction. These areas shall be monitored annually for 5 years after construction in order to document functions and services establishment.

There is a potential loss of jurisdictional functionality where restoration sites are located in close proximity to future development. This potential loss is almost completely related to loss of buffer quality and functions. In such cases, excess HARC AW units generated on other restoration (temporary impact) areas are anticipated to mitigate these losses. Appendix C provides a canyon by canyon analysis of HARC AW units associated with functional loss due to development for avoided wetlands, temporarily, and permanent impacts. These AW unit losses are compared with AW units anticipated to be generated by restoration of the temporary impact sites. This analysis demonstrates how jurisdictional functions and services will be adequately mitigated for the RMDP.

2.2.1 Santa Clara River

Within the Santa Clara River mainstem channel, mitigation will be implemented through jurisdictional establishment, restoration of temporary impacts, and enhancement of existing degraded riparian vegetation communities.

Establishment mitigation is planned at the Mayo Crossing where an agricultural field will be graded to river floodway elevations to expand the jurisdictional area. The functional lift created by the project will provide beneficial effects for hydrology, soils, and vegetation functions and

services. The HARC units generated by this project (Table 7) will be used to mitigate permanent jurisdictional impacts (Table 6) on a functions and services basis.

Temporary impact areas will be restored to provide similar functions and services as those impacted. Post-construction recontouring will re-establish pre-construction topography and hydraulic functions to support the vegetation communities that were impacted. Restoration areas are surrounded by undisturbed riparian vegetation communities that will support restoration projects through seed and propagules dispersal into the mitigation area, thus increasing native recruitment.

Enhancement areas are intended to remove dense stands of non-native, invasive species and re-establish native riparian vegetation. Enhancement mitigation will benefit all existing riparian communities and mitigation projects in the RMDP through removal of source exotic vegetation that would otherwise recruit into and diminish the functions and services of the native riparian vegetation. These enhancement efforts will increase functions and services of existing riparian vegetation communities. HARC AW units have not been estimated for enhancement activities, but will further mitigate function and services impacts on the river.

2.2.2 Tributary Drainages

Within the tributary drainages in the RMDP, certain drainages would remain undisturbed, while other drainage areas would be graded, reconstructed to a soft-bottom drainage channel with buried bank stabilization along each side of the drainage, or converted to a buried storm drain. Reconstructed drainage areas would integrate flood control, grade-stabilizing measures (i.e., a combination of drop structures/grade stabilizers and bank stabilization), and appropriate native vegetation communities to maintain sediment equilibrium and protect the channel bed and banks from hydromodification impacts. Other functions and services such as floodplain connection, surface water storage, floodprone area, and topographic complexity are expected to increase with the proposed channel design.

This design methodology is intended to create stable drainage channels that would support in-channel native vegetation communities following construction. The approach focuses on developing channel width, depth, slope, and other parameters based on the future flow and sediment regime of each drainage, using an integrated approach that predicts stable characteristics and that uses structures and other measures only in those drainage locations where erosional forces would exceed the natural stability of the drainage channel. All such structures (i.e., bank and channel bed stabilization) are designed to mimic natural features and use a combination of structural and vegetative methods to provide drainage channels that are stable and visually aesthetic, and that provide for the desired habitat (i.e., riparian, wetland, and upland) with minimal

maintenance required after project implementation. Road-crossing culverts and bridges would cross various drainages, but only where necessary to accommodate the approved Specific Plan circulation system. Modified drainage/jurisdiction includes existing stabilized and engineered tributary drainages that are enhanced, and areas where new drainage/jurisdiction are being created.

Restoration strategies for temporary and permanent impacts to tributary drainages will be designed to reintroduce and establish self-sustaining vegetation communities commensurate with the level of disturbance or loss within each canyon. The individual site designs will provide a response to post-construction hydrology, channel morphology, and other environmental factors that may be altered by development.

The drainages within these canyons are primarily intermittent and ephemeral. The vegetation communities supported by the tributaries typically include big sagebrush scrub, alluvial scrub, mulefat scrub, arrow weed scrub, and southern willow scrub. These vegetation communities tend to occur at low densities, except for arrow weed scrub, which can develop dense monotypic stands. Small isolated patches of southern cottonwood–willow riparian forest and coast live oak riparian woodland are present where the soil substrate and hydraulic support are appropriate. Occasional individual cottonwoods and oaks are also found along these drainages.

Intermittent drainages may concentrate sufficient runoff to support the presence of mesic wetland vegetation communities such as southern willow scrub and southern cottonwood–willow riparian forest. Ephemeral drainages generally lack sufficient runoff to support mesic wetland vegetation and are more likely to support vegetation communities that reflect drier conditions. Along this hydraulic gradient are found, in order of wetter to drier, mulefat scrub, arrow weed scrub, big sagebrush scrub, and alluvial scrub. River wash is present in the driest conditions, especially where soil substrates have high permeability.

Restoration Strategies

Development within each canyon would result in various degrees of impact to the canyon environment, including (1) complete fill of the stream channel, (2) stream channel stabilization, and (3) newly created stream channel. Each of these post-construction scenarios is addressed in terms of opportunities and constraints to maximize functions and services within the post-construction context. It is anticipated that the entire channel widths as designed may not result in Corps-jurisdictional area, but that the Corps-jurisdictional drainage feature would result in a braided or serpentine primary channel that can meander within the larger constructed drainage complex. Within any given rain season, the active flow channel may locate within any portion of the broader tributary floodplain. At the current design level, the channel designs do not specify

where and how wide the primary channels within the drainage feature would be. It is anticipated that this will be an aspect of the final designs for each individual, site-specific final mitigation plan.

Advance mitigation projects are planned for river and tributary locations and will be implemented prior to RMDP impacts. Advanced mitigation projects are the Potrero Canyon CAM wetland creation (Section 2.2.2), Mayo Crossing (Section 2.2.3), and Middle and Upper Salt Creek enhancement (Section 2.2.4). Other mitigation projects will be implemented concurrent with or within two years of impacts from the RMDP project with which they are associated unless precluded by ongoing project construction. These projects include restoration of temporary impacts and habitat creation, restoration and enhancement. These projects include Lower Salt Creek Riparian Mitigation (Section 2.2.5), Lion Canyon (Section 2.2.6), Santa Clara River mitigation at the Water Treatment Plant Utility Corridor (Section 2.2.7), Long Canyon (Section 2.2.8), Chiquito and San Martinez Grande Canyons (Section 2.2.9), and Potrero Canyon Riparian mitigation (Section 2.2.10). Two additional general categories of RMDP mitigation include restoration of temporary jurisdictional impacts on tributaries (Section 2.2.11) and the River (Section 2.2.12). Mitigation for temporary impacts will be implemented within two years of impacts unless precluded by ongoing project construction. A brief description of mitigation implementation components is provided in Section 2.2.13).

Channel Stabilization

The means to stabilize tributary channels present opportunities to establish a greater diversity of vegetation communities, because stabilization features often have a secondary effect of capturing and concentrating runoff at specific locations. The resident time of water behind these structures may be sufficient to support more mesic hydrophytic vegetation, such as southern willow scrub, and individual trees, such as cottonwood. The mitigation design will take full advantage of these conditions to maximize functions and values by planning for a variety of vegetation communities that reflect the hydrology that is associated with these stabilized channels.

Establishment would include selected container plantings and cuttings of wetland species. A native seed mix of appropriate species that are common to the various vegetation communities would be applied to these sites in accordance with the environmental tolerances and natural distribution of the vegetation community. Other features such as wattled live cuttings may be employed in association with channel stabilization features, such as grade control devices and basins, or as stand-alone stabilization features, depending upon anticipated flow velocities.

A temporary irrigation system would be utilized to provide early establishment of native vegetation and as a hedge against winter drought. The irrigation system may be attached to a

potable water system that is associated with new development or operated with a water truck hook-up. Maintenance and monitoring would be conducted over a 5-year period to guide the emerging vegetation toward established performance criteria.

Complete Fill of Channels and Newly Created Channels

Some tributary drainages (Long Canyon and portions of Lion and Chiquito Canyons) would be relocated horizontally and/or vertically from the existing drainage alignment in order to accommodate construction techniques that are necessary to stabilize a particular development area. In these cases, the mitigation would be designed in tandem with the recreated drainage channel. The design process would allow for the creation of a variety of channel features that can support diverse wetland vegetation communities that replace impacted functions and values. Channel design can recreate a variety of flow gradients that support various vegetation communities. Channel features such as creek terraces can isolate mitigation areas where net evaporation is needed to support hypersaline conditions. The control of soil substrate would allow for the installation of buried low permeable layers that perch groundwater to create localized wetland areas. Soil salvage may be used when on-site soils are unique and conducive to the establishment of specific vegetation types.

A variety of installation techniques may be used to establish vegetation communities, depending upon the most successful propagules of each species. These may take the form of container plants, live cuttings (individual and wattled), and seeds.

A temporary irrigation system would be utilized to provide early establishment of native vegetation and as a hedge against winter drought. The irrigation system may be attached to a potable system that is associated with new development or operated with a water truck hook-up. Maintenance and monitoring would be conducted over a 5-year period to guide the emerging vegetation toward established performance criteria. These criteria will be based on the quality of vegetation impacted.

2.2.3 Advance Mitigation at Potrero Canyon

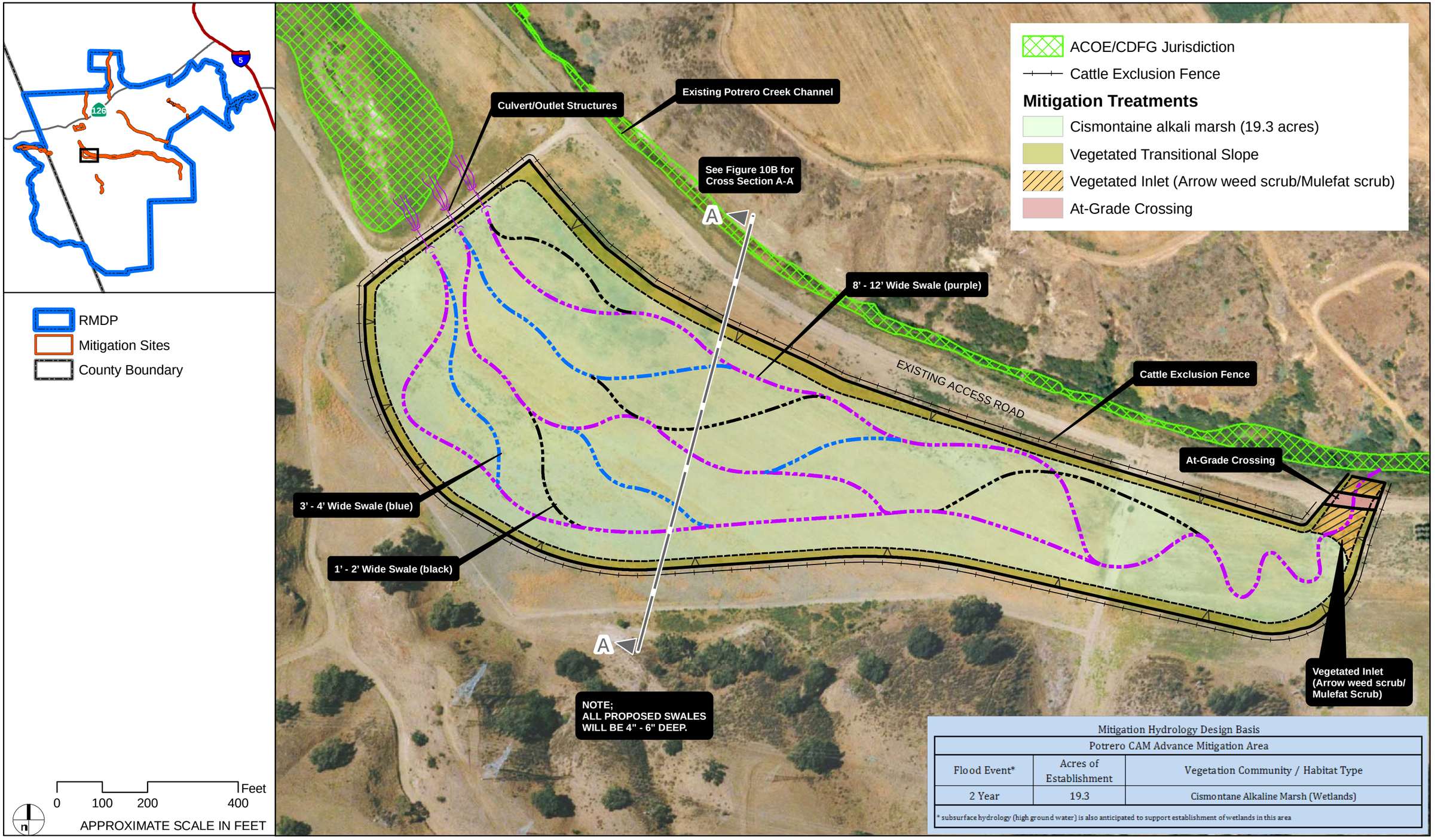
Advance mitigation will be implemented within the Potrero Canyon drainage at the cismontane alkali marsh (CAM) site. This mitigation will be implemented prior to any permanent impacts to waters of the United States (Figure 10). There are four goals for this project:

- **Goal 1:** Establish 19.3 acres of Corps-jurisdictional area to compensate for impacts to jurisdictional drainages from implementation of the RMDP (primarily small to large tributary drainages to the Santa Clara River).

- Objectives:
  1. Implement micro-topographical grading to convert an agricultural field and pastureland to Corps-jurisdictional area
  2. Establish appropriate hydrological connectivity to existing drainage channel and subsurface groundwater sources
  3. Exclude grazing activities and control exotic species.

- **Goal 2:** Establish self-sustaining cismontane alkali marsh (CAM) at site
  - Objectives:
    1. Develop hydrologic connections to upstream surface flows and subsurface groundwater through initiating grade modifications and subsurface drain corrections
    2. Design and establish site topography to distribute and retain low intensity-low volume overland surface flows that promote the establishment of CAM vegetation
    3. Install outlet drain feature that allows for surface water retention, yet allows post-construction modification to fine-tune water retention lag times
    4. Plant species appropriate for CAM establishment using native propagules
    5. Allow development of freshwater marsh and mule fat scrub vegetation as minor components of the overall habitat complex. It is anticipated that pockets of freshwater vegetation communities will develop where hydrologic conditions favor these species (e.g., areas with regular freshwater flushing and/or standing water). A diverse vegetation community mosaic is expected and preferred; however, the design of the site will be to develop primarily CAM vegetation.

- **Goal 3:** Replace wetlands functions and services of proposed impacts prior to project impacts
  - Objectives:
    1. Initiate implementation of site in advance of project impacts, including installing exclusionary fencing to protect area from grazing pressure and agricultural operations, developing hydrology that supports establishment of CAM vegetation, and promoting CAM establishment through appropriate restoration and management actions
    2. Verify establishment of target functions and services through implementation of functional assessment protocol.



Mitigation Hydrology Design Basis

Potrero CAM Advance Mitigation Area		
Flood Event*	Acres of Establishment	Vegetation Community / Habitat Type
2 Year	19.3	Cismontane Alkaline Marsh (Wetlands)

* subsurface hydrology (high ground water) is also anticipated to support establishment of wetlands in this area

FIGURE 10

Draft Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

Potrero Advance Mitigation

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- **Goal 4:** Develop wetlands functions and services at a level comparable to existing functions and services of areas supporting CAM vegetation in Potrero Valley.
    - Objectives:
        1. Design the site with features that mimic existing sites supporting CAM vegetation in Potrero Valley, including sinuous swales, shallow gradients, and vegetated hummocks
        2. Measure the success of achieving comparable functions and services through conducting functional assessments of the mitigation area and a reference site.

Existing conditions at the mitigation site are shown on Figure 10A.

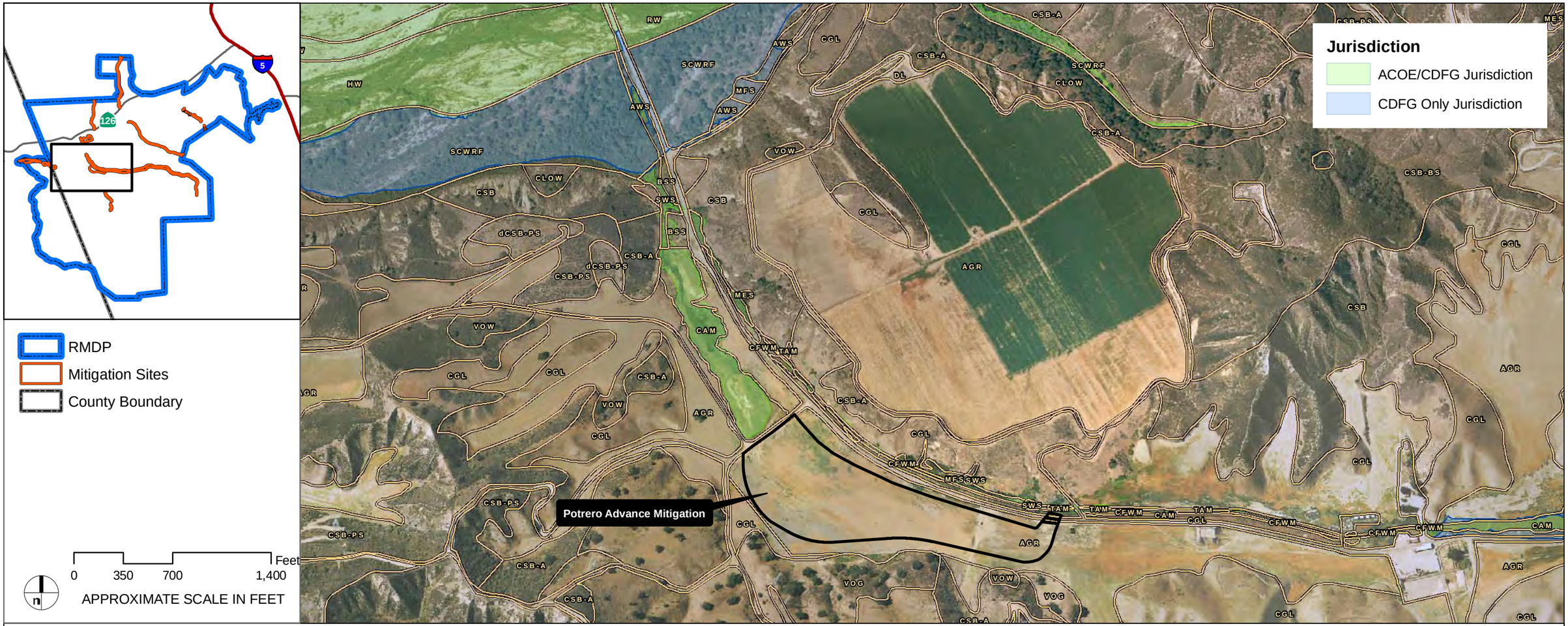
Existing vegetation, hydrology, topography, soil conditions, and watershed context are described below.

- **Vegetation:** The site is currently a pasture used for grazing or other agricultural uses. The vegetation is composed of predominantly non-native plant species, including milk thistle (*Silibum marianum*), wild oat (*Avena* spp.), brome grasses (*Bromus* spp.), filaree (*Erodium* spp.), and mustard (*Hirshfeldia incana*). No special-status species are known from the site. The land is disked annually to manage weeds, and provides very limited habitat value. Surrounding the site is a mosaic of valley oak/grass, California annual grassland, California sagebrush scrub and additional agricultural land.
- **Hydrology:** There are no jurisdictional areas within the proposed site. To the north of the site is Potrero Creek, which runs parallel to the dirt access road that passes through Potrero Valley. Potrero Creek is an incised channel that is not hydraulically connected to the mitigation site. To the northwest of the site there is an existing depressional area that supports CAM, but is disconnected from the site due to an elevated dirt road. This area of CAM drains toward the north and eventually develops into a channel that conveys flow into the Santa Clara River.
- **Topography:** The topography of the site is a very gently sloping concave surface in the low point of the east-west trending Potrero Valley. It slopes gently toward the northwest at a gradient of between 2–5%. There are no significant physical features on the site.
- **Soils:** The soils on site are fine-textured silty and loamy soils.
- **Watershed Context:** Currently, the site does not contain surface hydrology that is connected to existing jurisdictional resources. However, upon establishment of the site, a connection to both the upstream Potrero Creek channel, and the downstream existing

CAM area, and beyond that the Santa Clara River, would be created. At the upstream connection, the site would be designed to receive only secondary flows during high flow events. The existing low flow of the Potrero Creek channel would not be affected. At the downstream connection, the site would be designed to outlet flows underneath the existing dirt access road and into the existing lower CAM area to the northwest.

Rationale for Success

- Site soils present similar textural and chemical characteristics as found in areas currently supporting CAM vegetation in Potrero Canyon. These factors include fine-textured silty soils and hypersalinity. Hypersalinity at the CAM mitigation site is a key component of CAM ecology that excludes other freshwater and brackish marsh species from establishing within CAM-occupied sites.
- Subsurface hydrology appears to be similar to areas supporting CAM vegetation. Groundwater depth and movement is similar to CAM-occupied sites within Potrero Canyon. In existing CAM areas, groundwater depth was measured from December 2006 through December 2007. Groundwater depth ranged from 1.99 to a maximum of 7.13 feet below land surface during this period. Within the planned CAM mitigation site, groundwater was measured at a maximum depth of 7.9 feet below land surface (data on groundwater was collected by Dudek hydrologists). It is anticipated that the CAM vegetation will be primarily supported by groundwater, with occasional inputs of surface water during the rainy season from connectivity with Potrero Creek upstream of the site.
- CAM is present immediately downstream of the planned CAM mitigation site in a shallow drainage swale that is physically similar to what is anticipated for the planned CAM mitigation site. This proximity and physical similarity suggests hydrology and soils are present that would support CAM vegetation with implementation of proposed mitigation design.
- The planned CAM mitigation site will retain a significant watershed area that will provide overland flow across the site during winter rain events. The low intensity–low volume, prolonged-duration overland flow is characteristic of CAM sites throughout the valley. Overland flow is expected to provide winter soil saturation at the ground surface and slowly dry through spring months. This dry down period likely protects CAM sites from leaching salinity from the soil



Vegetation Types

- AGR = Agriculture
- AS = Alluvial scrub
- AWS = Arrow weed scrub
- BCW = Bulrush-cattail wetland
- BDDS = Brittlebush drought deciduous scrub
- BSS = Big sagebrush scrub
- BSS-CB = Big sagebrush scrub-California buckwheat
- CAM = Cismontane alkali marsh
- CC = Chamise chaparral
- CC-HCC = Chamise-hoaryleaf ceanothus chaparral
- CFWM = Coastal and valley freshwater marsh
- CGL = California annual grassland
- CHP = Undifferentiated chaparral
- CHP-HCC = Undifferentiated chaparral-hoaryleaf ceanothus chapparal
- CLOW = Coast live oak woodland
- CSB = California sagebrush scrub
- CSB-A = California sagebrush scrub-Artemisia
- CSB-BS = California sagebrush scrub-black sage
- CSB-CB = California sagebrush scrub-California buckwheat
- CSB-CHP = California sagebrush scrub-undifferentiated chapparal
- CSB-DW = California sagebrush scrub-deerweed
- CSB-PS = California sagebrush scrub-purple sage
- CWW = California walnut woodland
- CYS = Coyote brush scrub
- DEV = Developed
- DL = Disturbed land
- EDS = Eriodictyon scrub
- EUC = Eucalyptus
- GRG = Giant reed grassland
- HCC = Hoaryleaf ceanothus chaparral
- HW = Herbaceous wetlands
- MES = Mexican elderberry scrub
- MEW = Mexican elderberry woodland
- MFS = Mulefat scrub
- MOW = Mixed oak woodland
- NAP = Not a part
- OC (DEV) = Open channel (developed)
- OC = Open channel
- ORN = Ornamental
- OW = Open water
- PNGL = Purple needlegrass
- RW = River wash
- SCLORF = Southern coast live oak riparian forest
- SCWRF = Southern cottonwood-willow riparian forest
- SOC = Scrub oak chaparral
- SWS = Southern willow scrub
- TAM = Shrub tamarisk
- VOG = Valley oak/grass
- VOW = Valley oak woodland
- bCC = Burned chamise chaparral
- bCHP = Burned undifferentiated chaparral
- bCSB = Burned California sagebrush scrub
- bCSB-CHP = Burned California sagebrush scrub-undifferentiated chaparral
- dCSB = Disturbed California sagebrush scrub
- dCSB-PS = Disturbed California sagebrush scrub-purple sage
- dMES = Disturbed Mexican elderberry scrub
- dMFS = Disturbed Mulefat
- dRS = Disturbed riparian scrub
- dSCWRF = Disturbed southern cottonwood-willow riparian forest
- dSWS = Disturbed southern willow scrub

FIGURE 10A

Draft Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

Potrero Advance Mitigation Existing Conditions

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- The combination of surface water and groundwater will benefit the mitigation site and help to even out potentially inconsistent (shallow) groundwater resources. Surface water can replenish local and "perched" groundwater in soil lenses. This water will evaporate through capillary action in dry summer months raising soil salinity at the surface through capillary action, depositing salts at the soil surface and thereby mimicking the existing hydraulic condition that allows CAM to persist in the absence of more freshwater loving vegetation.
- The existing unpaved road and culvert drainage structure that is present at the downstream edge of the mitigation site will be modified to allow for minor impounding of surface flows and regulation of flow to the existing lower CAM. The drainage control will enable the site to retain hydrologic inputs within the site to a specified level and release water above a designed elevation. The hydraulic system will promote the desired annual soil wetting/dry-down cycle that sustains hypersaline soils that support CAM vegetation in Potrero Canyon.

The mitigation approach is designed to support successful establishment of self-sustaining CAM vegetation and ecological functions and services. The following features of the mitigation approach are designed to support mitigation success:

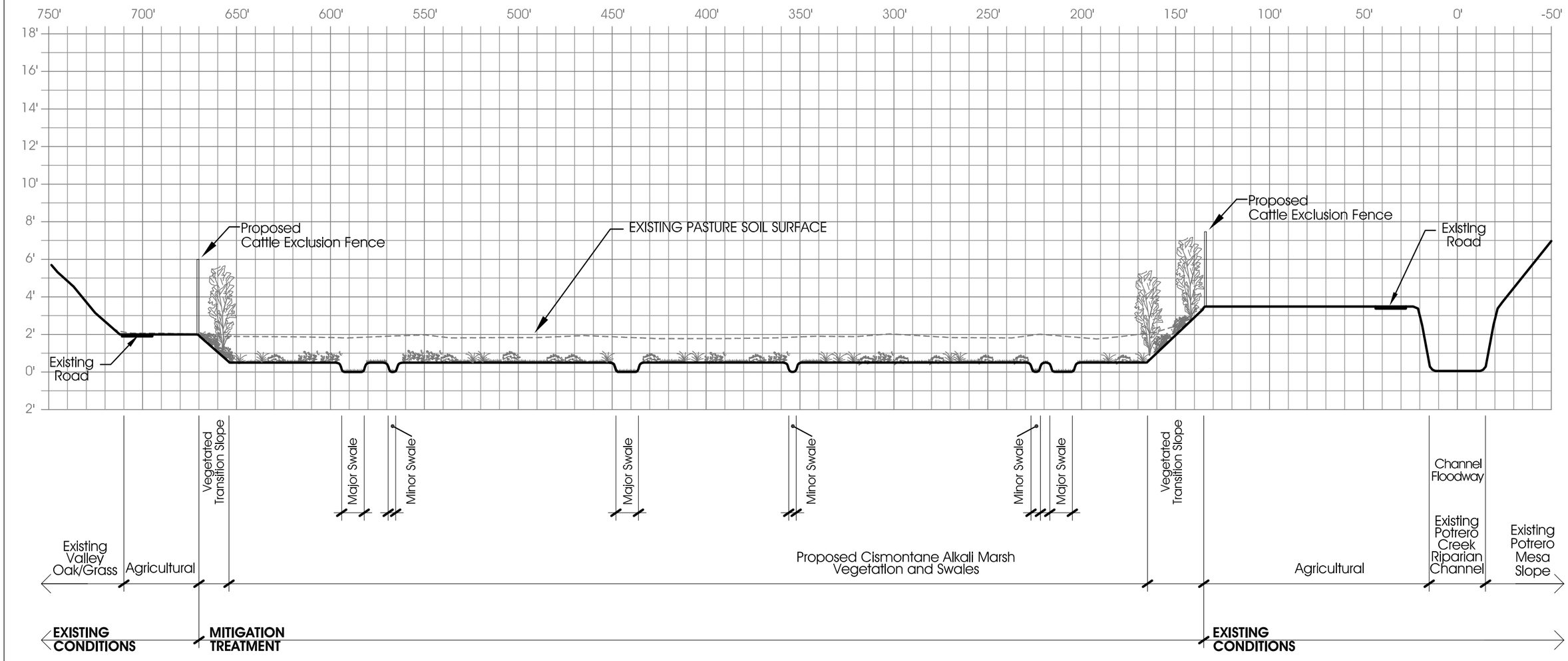
- The existing unpaved road and culvert drainage structure that is present at the downstream edge of the mitigation site will be modified to augment down-canyon flow from the mitigation site to the existing CAM vegetation. Similarly, the unpaved road south of the planned mitigation site will be modified to augment surface hydrology connects to the upland watershed south of the mitigation area. These land alterations are intended to create appropriate sheet flow, soil saturation, and local groundwater replenishment during winter months. The restored hydraulic system will promote the desired annual soil wetting/dry-down cycle that sustains hypersaline soils that support CAM vegetation in Potrero Canyon.
- Seed collection from CAM species throughout Potrero Canyon will be conducted prior to CAM impacts to build a substantial supply of local genetic native seed that will be used to establish CAM vegetation at the planned mitigation site. Seed supplies will be held in storage to provide a ready supply of seed should remedial actions be required to supplement underperforming areas of the mitigation site during the CAM vegetation establishment period.
- Appropriate vegetation performance criteria will be established through measurement of CAM reference sites prior to project impacts. These criteria will be used to inform mitigation site evaluations during the CAM establishment period and will drive adaptive

management and remedial actions to maintain the vegetation establishment trajectory toward achievement of ultimate performance criteria.

The following implementation components are anticipated to establish CAM on the agricultural fields.

- **Site Grading**. Grading and contouring will be implemented to create appropriate hydraulic relationships to the subsurface groundwater and adjacent drainage channel. Site grading is anticipated to have approximately 0.5–4.0-foot cut depths (appropriate hydraulic relationship will be validated through detailed topographic survey and hydrology studies; see attached Figure 12). The grading depth is anticipated to be relatively shallow (0.5–1.0 foot) through much of the site, and then increase to a maximum of approximately 3–4 feet towards the outer edges where the existing elevation rises in order to create a relatively level CAM area in cross section (Figure 10B). Surface flow will be directed through shallow (4–6 feet deep) braided swales designed to widely distribute seasonal surface water across the site to maximize percolation and replicate surface soil salinity cycles that are assumed present in existing CAM.
- **Surface Water Inlet**. A graded soft-bottom inlet will allow overbank flow from Potrero Creek into the mitigation site. The inlet will be graded to an elevation that allows flow from a 2-year or greater flood event to enter the site at low velocity. Velocity will be controlled by vegetation established in the inlet. A stabilized at-grade access road crossing will be constructed across the inlet.
- **Surface Water Outlet**. Culvert pipes will be installed at the downstream end of the site to convey surface water to the lower CAM area. Pipes will be sized to drain the site over a short time to minimize long term ponding.

Initial seed and plant installation using appropriate species. Target vegetation communities will be established using appropriate species plant palettes (Section 4.6). Plant materials used to implement the planting plan will include seed, stolons and container plants. Container plants will generally include liners and 1-gallon container stock propagated from on-site seed collections. Specific locations for installation will be designated on planting plans or marked on site temporarily with pin flags by the project biologist. Seed and stolons (for salt grass) will be collected from the vicinity of the site.



VERTICAL SCALE 10x HORIZONTAL SCALE
SCALE IS ESTIMATED AND WILL BE
VERIFIED UPON RECEIVING FINAL TOPO

NOTE:
This cross section is for illustrative purposes only, and not for construction.

FIGURE 10B

Draft Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

Potrero Advance Mitigation Crossing Section A-A

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2.2.4 Advance Mitigation at Mayo Crossing

Mitigation will be implemented within an area adjacent to the Santa Clara River at Mayo Crossing in advance of development impacts (Figure 11). The planned mitigation site at Mayo Crossing includes an area along the northern margin of the Santa Clara River that is in agricultural use. The site is surrounded by wetland and riparian habitat associated with the Santa Clara River, with the main river channel to the south and a secondary river channel to the north. Due to its location within the floodplain of the Santa Clara River, the site is an ideal location to establish Corps-jurisdictional area. The entire area is planned as Corps-jurisdiction. Goals and objectives of this tributary mitigation site are summarized below.

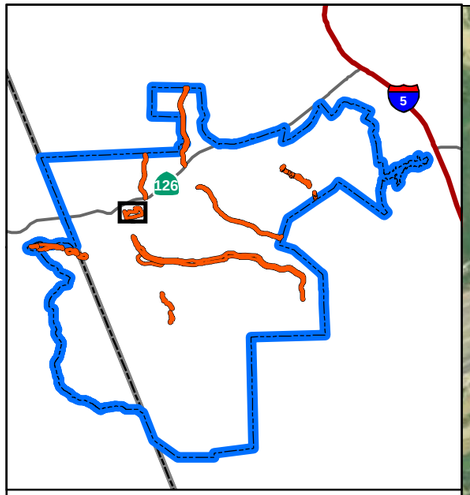
- **Goal 1:** Create approximately 15.9-acre of Corps-jurisdictional area to compensate for impacts to jurisdictional drainages from implementation of the RMDP (Santa Clara River and small to large tributary drainages to the Santa Clara River).
    - Objectives:
        1. Establishment of appropriate hydrology and floodplain functions that benefit the RMDP area.
        2. Establishment of riparian vegetation that is consistent with the Santa Clara River floodplain that will remain in dynamic equilibrium.
        3. Design mitigation site to blend naturally with surrounding topography and vegetation communities.
        4. Maximize site context to develop contiguity to adjacent habitat.
- **Goal 2:** Establish self-sustaining southern cottonwood-willow riparian forest (SCWRF), herbaceous wetlands (HW), mule fat scrub (MFS), arrowweed scrub (AWS), and Riverwash.
    - Objectives:
        1. Develop hydrologic connections to upstream surface flows and subsurface groundwater through grade modifications that allow 5-year storm events to enter the mitigation site.
        2. Design and establish site topography to distribute and retain low intensity-low volume overland surface flows that maximize local groundwater replenishment.
        3. Create connections to existing floodplain features that creates flow-through design and drainage.

4. Plant species appropriate for target riparian vegetation community establishment using native seed, cuttings, and container plants.
5. Control exotic species.
6. Provide long term management through monitoring and adaptive management actions

- **Goal 3:** Replace wetlands functions and services of proposed impacts prior to project impacts.
  - Objectives:
    1. Initiate implementation of site in advance of project impacts, including grading to establish hydrology that supports establishment of target riparian vegetation communities.
    2. Verify establishment of target functions and services through implementation of functional assessment protocol.
    3. Leverage natural recruitment through appropriate restoration and management actions.
    4. Perform long term management that promotes ongoing native recruitment and establishment.

The site is currently active agricultural land use that involves frequent and routine plowing, planting and crop harvesting; therefore, there is no natural vegetation within the proposed mitigation area (Figure 11A). Unpaved access roads are present on three sides of the proposed mitigation area. Site topography is very flat due to agricultural activities. There are no significant physical features on the site. Existing utility poles are present along the western edge of the site.

The proposed site is not hydraulically connected to any of the adjacent drainages. A shallow drainage is present north of the mitigation site. The active channel of the Santa Clara River is present along the southern side of the mitigation site. The active low flow channel of the Santa Clara River is located 100-200 feet to the south of the mitigation site. A secondary flow channel is present within natural vegetation communities along the southern edge of the agricultural field.



RMDP
Mitigation Sites
County Boundary

ACOE/CDFG Jurisdiction
CDFG only Jurisdiction
Mitigation Treatment Area (15.9 acres Wetlands Establishment)
Arrow weed scrub
Mulefat scrub
Southern cottonwood-willow riparian forest

See Figure 3 for Cross Section A-A
Existing Flow Line
Daylight at Existing Wetlands Elevation
3' - 4' Wide Swale (blue)
Daylight at Existing Secondary Channel
Existing Secondary Channel
Existing Santa Clara River Low Flow Channel
MFS
AWS
SCWRF
RIVER FLOW
A

Mitigation Hydrology Design Basis

Mayo Crossing Advance Mitigation Area		
Flood Event*	Acres of Establishment	Vegetation Community / Habitat Type
5 Year	15.9	Arrow Weed / Mulefat Scrub, Cottonwood-willow Riparian Forest**

* subsurface hydrology (high ground water) is also anticipated to support establishment of wetlands in this area

** Precise boundaries of each vegetation community to be established is dependent upon further ground water modeling in and adjacent to the site.

0 90 180 360 Feet

APPROXIMATE SCALE IN FEET

FIGURE 11

Draft Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

Mayo Crossing Advance Mitigation

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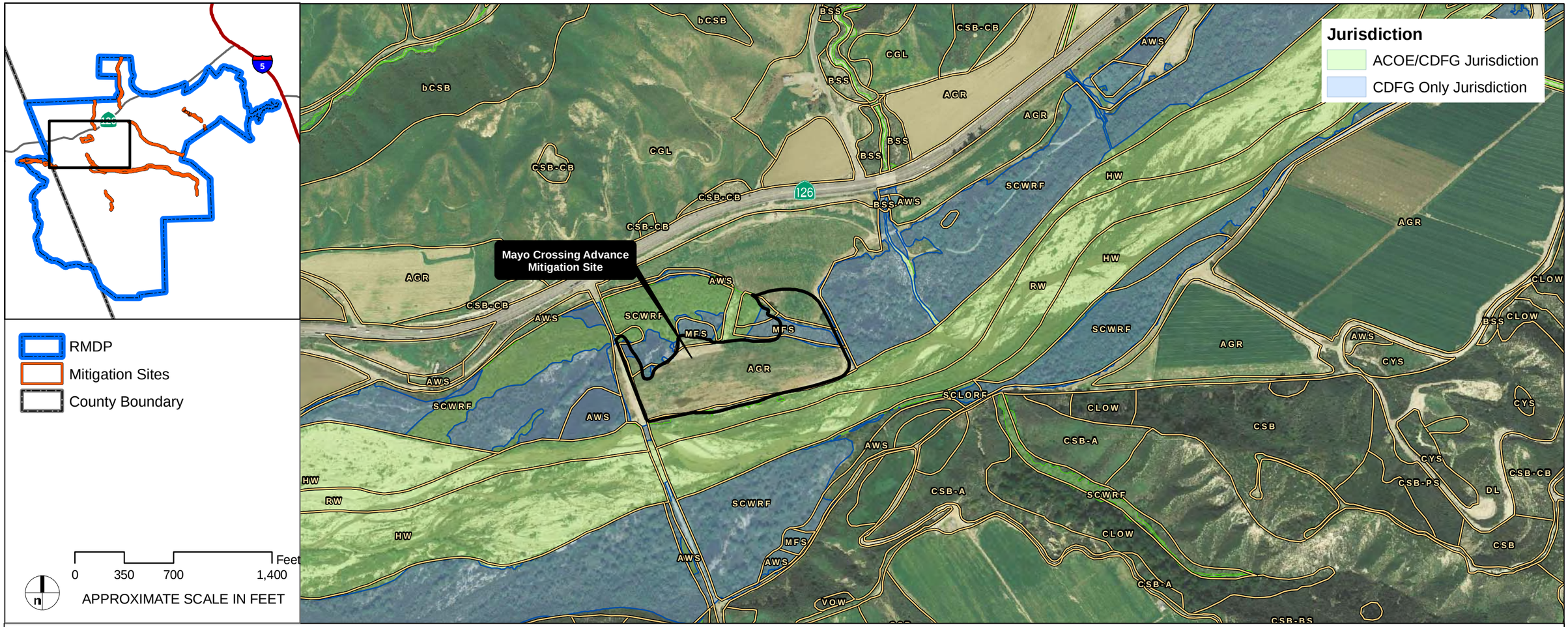

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- CC = Chamise chaparral
- CC-HCC = Chamise-hoaryleaf ceanothus chaparral
- CFWM = Coastal and valley freshwater marsh
- CGL = California annual grassland
- CHP = Undifferentiated chaparral
- CHP-HCC = Undifferentiated chaparral-hoaryleaf ceanothus chapparal
- CLOW = Coast live oak woodland
- CSB = California sagebrush scrub
- CSB-A = California sagebrush scrub-Artemisia
- CSB-BS = California sagebrush scrub-black sage
- CSB-CB = California sagebrush scrub-California buckwheat
- CSB-CHP = California sagebrush scrub-undifferentiated chapparal
- CSB-DW = California sagebrush scrub-deerweed
- CSB-PS = California sagebrush scrub-purple sage
- CWW = California walnut woodland
- CYS = Coyote brush scrub
- DEV = Developed
- DL = Disturbed land
- EDS = Eriodictyon scrub
- EUC = Eucalyptus
- GRG = Giant reed grassland
- HCC = Hoaryleaf ceanothus chaparral
- HW = Herbaceous wetlands
- MES = Mexican elderberry scrub
- MEW = Mexican elderberry woodland
- MFS = Mulefat scrub
- MOW = Mixed oak woodland
- NAP = Not a part
- OC (DEV) = Open channel (developed)
- OC = Open channel
- ORN = Ornamental
- OW = Open water
- PNGL = Purple needlegrass
- RW = River wash
- SCLORF = Southern coast live oak riparian forest
- SCWRF = Southern cottonwood-willow riparian forest
- SOC = Scrub oak chaparral
- SWS = Southern willow scrub
- TAM = Shrub tamarisk
- VOG = Valley oak/grass
- VOW = Valley oak woodland
- bCC = Burned chamise chaparral
- bCHP = Burned undifferentiated chaparral
- bCSB = Burned California sagebrush scrub
- bCSB-CHP = Burned California sagebrush scrub-undifferentiated chaparral
- dCSB = Disturbed California sagebrush scrub
- dCSB-PS = Disturbed California sagebrush scrub-purple sage
- dMES = Disturbed Mexican elderberry scrub
- dMFS = Disturbed Mulefat
- dRS = Disturbed riparian scrub
- dSCWRF = Disturbed southern cottonwood-willow riparian forest
- dSWS = Disturbed southern willow scrub

FIGURE 11A

Draft Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

Mayo Crossing Advance Mitigation Existing Conditions

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There are state-only jurisdictional areas within the proposed site with no federal jurisdiction. The site is surrounded on four sides by adjacent, off-site riparian vegetation under the jurisdiction of either the Corps and/or California Department of Fish & Game (CDFG). The river active floodway supports riverwash, early stage SCWRF, and MFS. North, west and east of the mitigation site is existing SCWRF, MFS, and AWS located on upper river terraces. MFS north of the site contains non-native grass understory.

Success of this river mitigation project is supported by the following factors.

- The mitigation site is located in the lower portion of the Santa Clara River watershed that drains approximately 1,620 square miles in Los Angeles County. Based on the location within the overall watershed, there is sufficient hydraulic flow to support the additional jurisdictional area.
- Site soils appear to be highly productive and fertile, and are similar in type to those observed in adjacent riparian areas (sandy loams).
- Subsurface hydrology is tied to the Santa Clara River. However, SCWRF located north of the mitigation site persists without apparent flow from the Santa Clara River. There is potential for floodwater to back up into the riparian areas, but more likely the area subsists on groundwater resources.
- Adjacent fluvial features of the Santa Clara River such as secondary channel flow provides an optimum condition to make a substantial hydraulic connect to the active river floodplain. This opportunity to create on-site surface hydrology will support the intended target vegetation communities. In addition, a flow-through design can be accomplished by returning water into the active secondary channel, and through surface sheet flow connection to the wetland areas north of the mitigation site.
- The planned mitigation site will be subject to flows generated from a significant watershed area that will provide overland sheet flow across the site during winter rain events.
- The presence of extensive existing riparian vegetation immediately adjacent to the mitigation site will provide a ready source of local seed and propagules.

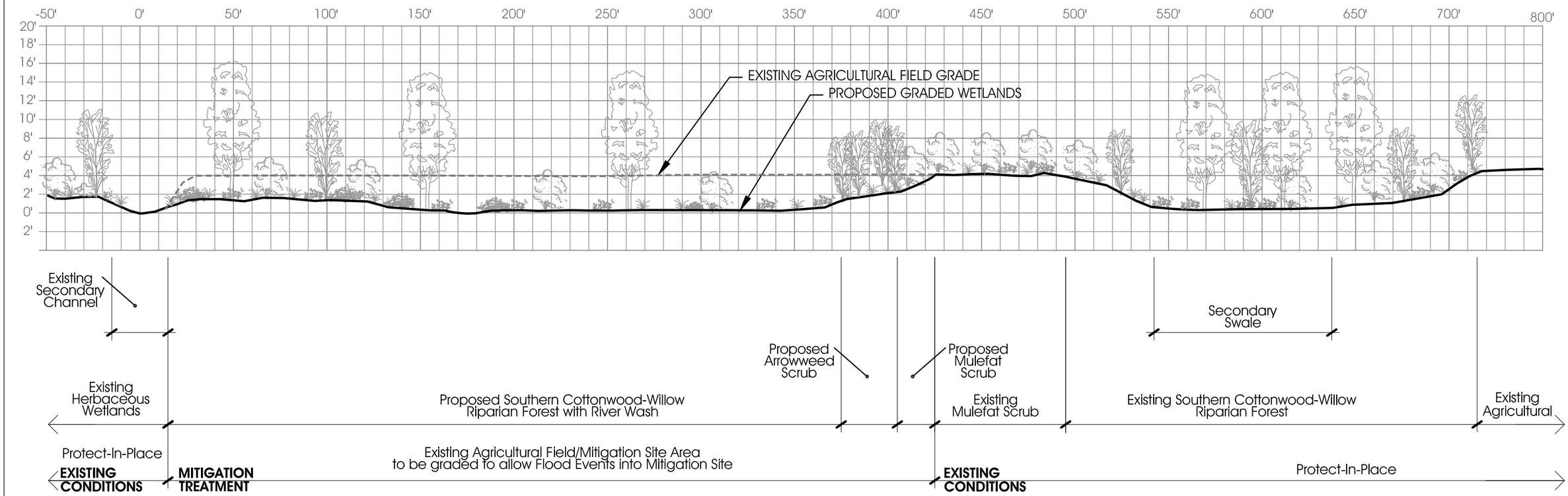
The design approach includes grade modification through soil excavation to establish elevations and contours appropriate for hydrologic influence from the Santa Clara River (Figure 11B). With the establishment of target elevations comparable to the existing elevations within the associated braided channels of the Santa Clara River, it is anticipated that hydrophytic vegetation would develop with only limited intervention. A combination of passive and active restoration with 5 years of maintenance and monitoring is planned. Vegetative communities likely to establish

include those that surround the site, such as southern cottonwood-willow riparian forest, arrow weed scrub, mulefat scrub, river wash, and/or herbaceous wetlands. The following implementation components are anticipated to establish the target vegetation communities on the agricultural fields.

- **Site Grading:** Grading and contouring will be implemented to create appropriate hydraulic relationships to the subsurface groundwater and adjacent secondary drainage channels. Site grading is anticipated to have approximately 3–5-foot cut depths to provide overbank flow onto the mitigation site (appropriate hydraulic relationship will be validated through detailed topographic survey and appropriate hydrology studies)
- **Site Preparation:** No site preparation other than grading is anticipated because the depth of cut will remove any weed seed bank that is present within the agricultural field.
- **Initial seed and plant installation using appropriate species: Target vegetation communities will be established using appropriate species plant palettes (Section 4.6).** Plant Palette tables are generalized for the vegetation community and not all species may be incorporated into the final project design. Plant materials used to implement the planting plan will include seed, cuttings, wattles, and container plants. Container plants will generally include liners and 1-gallon container stock propagated from seed and propagules collected within the RMDP area. Specific locations for installation will be designated on planting plans or marked on site temporarily with pin flags by the project biologist.

2.2.5 Advance Mitigation in Upper and Middle Salt Canyon

Mitigation opportunities within the Salt Creek drainage and High Country SMA/SEA 20 were described in the Revised Draft Newhall Mitigation Feasibility Study (Dudek 2007). Advance mitigation in the upper and middle reaches of Salt Canyon involves the installation and maintenance of cattle exclusion fence to protect and enhance existing riparian jurisdictional areas from degradation by cattle (Figure 12). The fence design will not present a barrier to wildlife movement within Salt Canyon. The fence will exclude cattle from 19.7 acres of existing jurisdictional area. The mitigation approach incorporates passive revegetation through natural recruitment combined with weed management actions. A functions and services lift is anticipated through native recruitment that is anticipated in the absence of the cattle grazing disturbance regime. A weed management component will support native recruitment by suppressing non-native vegetation establishment over time.



VERTICAL SCALE 5x HORIZONTAL SCALE
SCALE IS ESTIMATED AND WILL BE
VERIFIED UPON RECEIVING FINAL TOPO

NOTE:
This cross section is for illustrative purposes only, and not for construction.

FIGURE 11B

Draft Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch Resource Management and Development Plan

Mayo Crossing Advance Mitigation Crossing Section A-A

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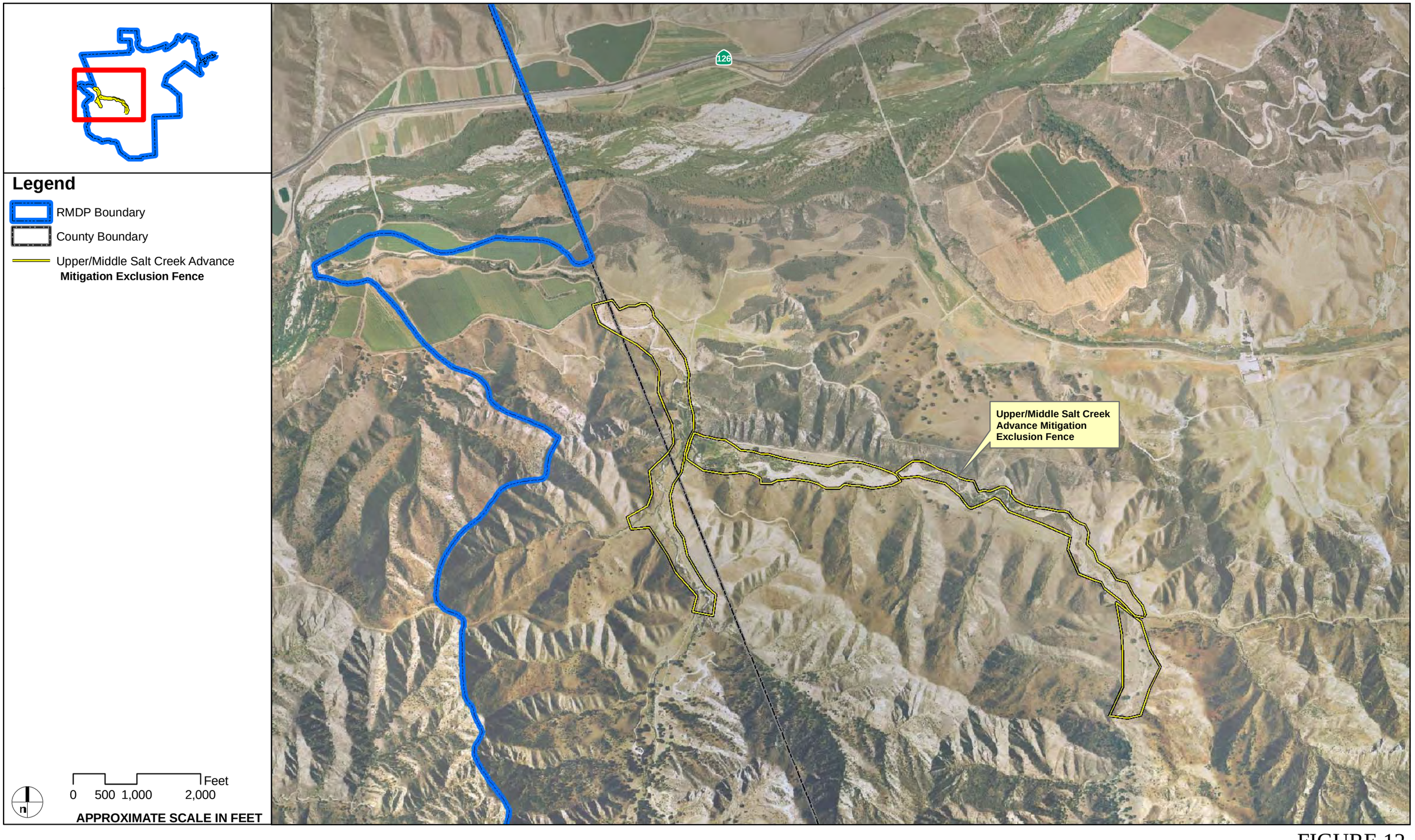

FIGURE 12

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Upper/Middle Salt Creek Advance Mitigation Exclusion Fence

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2.2.6 Salt Creek Riparian Mitigation

Design of the Lower Salt Creek riparian mitigation involved a review of previous work completed within the Resource Management and Development Plan (RMDP) area. Documents included the Newhall Ranch Feasibility Study (Dudek 2007), RMDP Draft Conceptual Mitigation Plan, and the Salt Creek hydrogeomorphic channel analysis (PWA 2006). Field reconnaissance identified six individual mitigation sites where federal and state jurisdiction can be established. One enhancement opportunity also was identified. The goals of these mitigation projects are defined below.

- **Goal 1:** Establish approximately 18.5 acres of U.S. Army Corps of Engineers (Corps)–jurisdictional area (Figure 13) to compensate for impacts to jurisdictional tributary drainages from implementation of the RMDP (primarily small to large tributary drainages to the Santa Clara River).
    - Objectives:
        1. Select only mitigation sites where creek bed is stable and establishment area can be fully connected hydraulically to Salt Creek.
        2. Avoid reaches with low creek bed stability and where existing jurisdictional and uplands vegetation communities are present.
        3. Avoid existing underground utilities (natural gas pipeline).
        4. Exclude grazing activities and control exotic species.

- **Goal 2:** Establish appropriate self-sustaining native riparian vegetation communities and/or Riverwash (RW) at each tributary mitigation site.
    - **Objectives:**
        1. Grade adjacent upland fields (agricultural and California grasslands) to create a hydraulic connection to Salt Creek that will result in braided channel flow across the mitigation sites.
        2. Enhance/modify existing ranch road culverted crossings to function as grade control to enhance upstream mitigation site hydrology and to stabilize creek bed gradient. In two locations, modified road crossings will act to redistribute downstream flows to maximize floodplain, biological, and geomorphic functions and services to the downstream mitigation site.

3. At one location, construct downstream grade structure within the existing channel utilizing bioengineering principles (e.g., no concrete structures) to enhance mitigation site (Site C) hydrology and stabilize creek bed gradient.
4. Utilize grade control structures at key locations to improve upstream hydraulic function in support of jurisdictional establishment and sustainability, and maintain sediment transport system.
5. Plant species appropriate for Southern Willow Scrub (SWS) and/or Mulefat Scrub (MFS) establishment using native propagules.

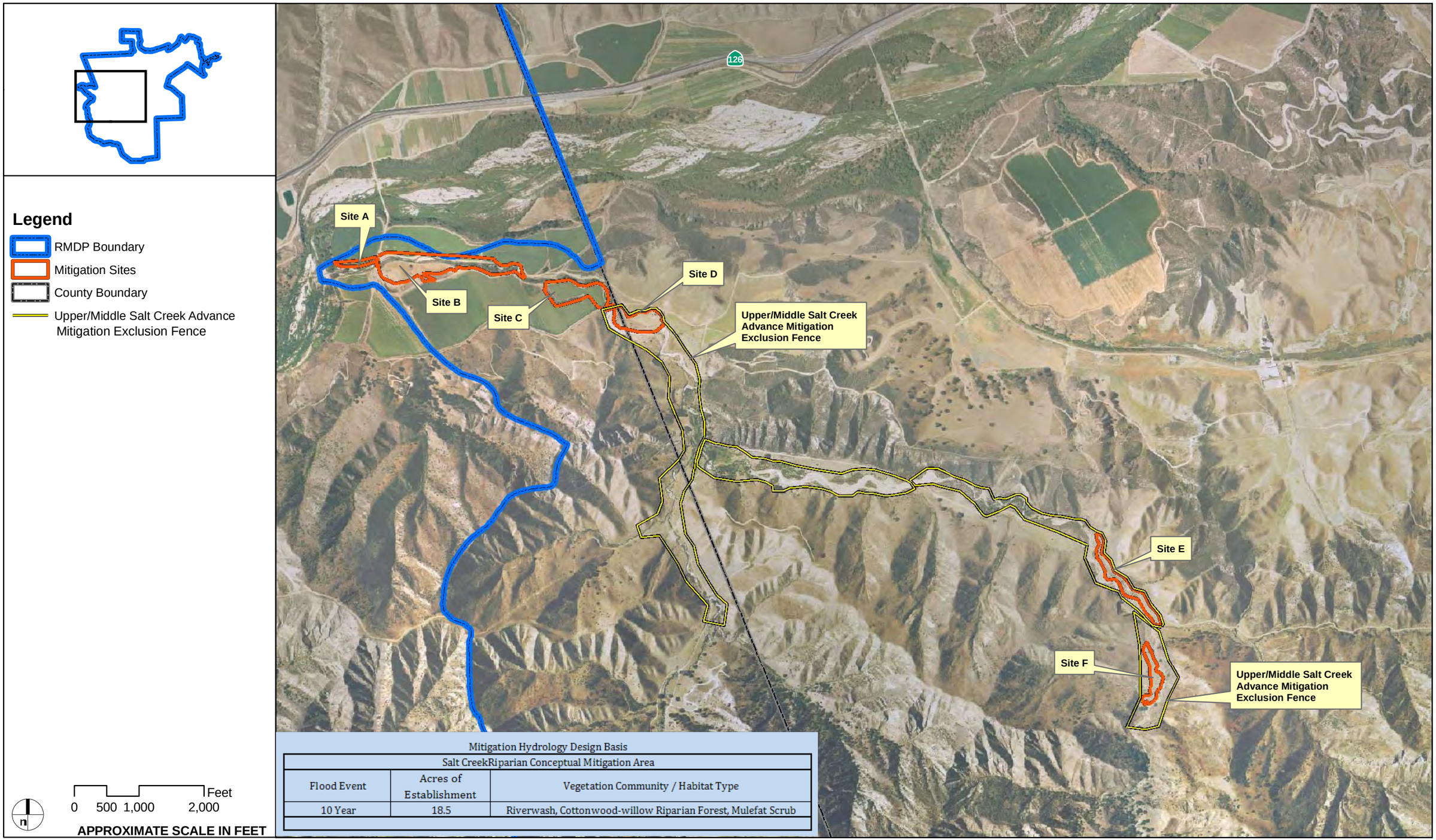
- **Goal 3:** Replace riparian vegetation community functions and services of proposed tributary impacts concurrent with project impacts resulting from implementation of the RMDP project phases.
    - **Objectives:**
        1. Initiate implementation of each site to be timed with each RMDP project phase that requires offsite mitigation for tributary impacts.
        2. Verify establishment of target functions and services through implementation of functional assessment protocol of the mitigation site(s) and a reference reach.

Mitigation Sites

The mitigation sites are variously located within the Salt Creek watershed (Figure 13). Four of the sites are located near the bottom of the watershed. All runoff developed in the watershed during rain events will pass through these sites. Two of the sites are located in the middle of the watershed, but still have a substantial watershed areas within the High Country SEA that will develop sufficient hydrology to support the intended jurisdictional resources, functions, and values.

Existing conditions at the mitigation sites are shown on Figure 4C:

- **Vegetation:** Mitigation sites in the lower watershed support agricultural crops and non-native species. In the middle watershed, the sites are open space pasturelands that are dominated by California (non-native) grasslands.
- **Land use:** The four mitigation sites in the lower watershed (Sites A–D) are currently active agricultural land or abandoned agricultural land. The active agricultural land is disked annually to manage weeds, and provides very limited habitat value. Surrounding these sites is additional agricultural land. The two mitigation sites in the middle watershed (Sites E–F) are open space pasturelands that are surrounded by similar California grasslands.



Legend

- RMDP Boundary
- Mitigation Sites
- County Boundary
- Upper/Middle Salt Creek Advance Mitigation Exclusion Fence

Mitigation Hydrology Design Basis

Salt CreekRiparian Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
10 Year	18.5	Riverwash, Cottonwood-willow Riparian Forest, Mulefat Scrub

0 500 1,000 2,000 Feet

APPROXIMATE SCALE IN FEET

FIGURE 13

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Salt Creek Riparian Mitigation Sites

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- **Hydrology:** There are no jurisdictional areas within the proposed sites. All of the sites are immediately adjacent to the existing Salt Creek channel.
- **Topography:** The topography of the sites is generally flat and gently sloping toward the creek channel. The topographic difference in elevation between existing site elevations and the creek thalweg (low point in active creek channel) is approximately 4–10 feet.
- **Soils:** The soils throughout the Salt Creek canyons are fine-textured silty and loamy soils.

Mitigation Concept

- Establish approximately 18.5 acres of federal and state jurisdictional area on six mitigation sites through site grading to match adjacent creek thalweg elevations. Where needed as indicated by hydrogeomorphic analysis, install bioengineered grade structures to distribute floodwater across the mitigation site, enhance upstream hydrology, and stabilize creek bed gradients. All structures will be located at existing farm road crossings, when feasible.
- Establish a mixture of SWS, MFS and RW vegetation communities with appropriate plantings (Section 4.6) in the lower three mitigation sites (Sites A–C). Establish riverwash in the remaining three mitigation sites (Sites D–F). Within established riverwash areas, promote passive recruitment of riverwash vegetation such as Mexican elderberry scrub, alluvial scrub, and mule fat scrub, where appropriate.
- Provide temporary irrigation, as needed, at mitigation sites A–D only.

Rationale for Success

- Site soils present similar textural and chemical characteristics as found in adjacent jurisdictional areas.
- A surface connection with the existing Salt Creek channel will be made the entire length of the mitigation sites to provide appropriate hydrology within the mitigation sites.
- Natural creek sinuosity favors the migration of braided channels into the mitigation sites.
- Bioengineered grade structures can be used to distribute creek flow across the existing channel and proposed jurisdictional establishment area site during flood events. The structures will stabilize the creek bed gradient and enhance upstream hydrology by reducing flow velocity, increasing flood water residence time, and increasing infiltration into groundwater.

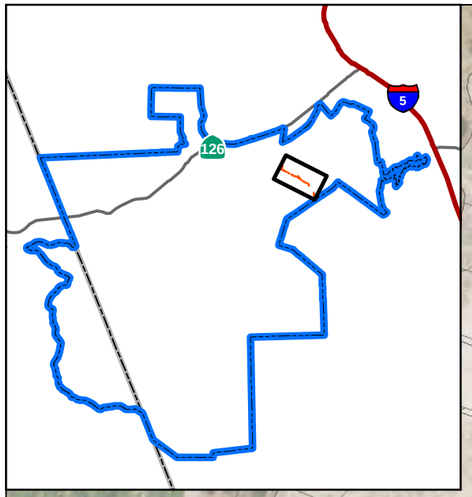
- Existing riparian habitat adjacent to the mitigation sites will increase native recruitment to establish the target vegetation communities.

2.2.7 Lion Canyon

Mitigation in Lion Canyon will include establishment, restoration and enhancement associated with the drainage channel reconfiguration. The general design concepts for the mitigation features are discussed briefly below and depicted in Figure 14. The Lion Canyon drainage would be designed to be in geomorphic equilibrium in terms of stability and delivery of sediment and water under future conditions. The channel floodplain would be designed to maximize geomorphic stability and ecological function, provide adequate flood conveyance, and avoid hydromodification to the extent possible. In addition, the design would minimize the need for maintenance activities. Overall, mitigation in Lion Canyon is expected to create approximately 2.1 acres of jurisdictional area.

Current conditions in Lion Canyon are dictated by agriculture, livestock grazing, and oil and gas operations that have heavily impacted the canyon (Figure 4B). The channels and drainages in Lion Canyon are generally deeply incised and show some headcutting associated with areas of bare ground. Past practices have heavily impacted this area, stripping much of the vegetation in the canyon. The soil in Lion Canyon varies between alluvial sand within and along the periphery of the channel; silty/sandy loam in areas dominated by big sagebrush; and organic silt/clay loam in the woodland vegetation communities. An access road adjacent to the channel compounds the erosional habit of the canyon due to the sandy soil and general lack of vegetation. Lion Canyon contains several vegetation communities including coast live oak woodland, big sagebrush scrub, southern willow scrub, and riverwash.

In accordance with mitigation measure SP-4.2-3, hydraulic modeling will be performed for the final design to assess the effects within Lion Canyon, and the design will be modified as necessary to reduce any erosion or deposition impacts. The Lion Canyon channel design incorporates the calculated post-development equilibrium slope to ensure a dynamically stable creek bed condition allowing for more or less equal amounts of erosion and deposition. The design will utilize boulder step-pool structures, biotechnical stabilization, soil cement, and turf reinforcement mat to enhance and restore the drainage. The land surrounding the channel would be revegetated with associated riparian plant communities, as well as upland plant communities, to increase the habitat-related functions and values of the drainage channel.



LEGEND

- JURISDICTIONAL ESTABLISHMENT: RIVERWASH (1.66 AC.)
- JURISDICTIONAL ESTABLISHMENT: MULEFAT SCRUB (0.44 AC.)
- EXISTING JURISDICTIONAL AREA
- RMDP BOUNDARY
- COUNTY BOUNDARY

N

0 130 260 520 Feet

APPROXIMATE SCALE IN FEET

Mitigation Hydrology Design Basis

Lion Canyon Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
5 Year	1.66	Riverwash
10 Year	0.44	Mulefat Scrub

FIGURE 14

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

On-Site Tributary Mitigation at Lion Canyon

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Existing creek bed material found in riverwash areas, consisting of sand, gravel and cobbles, will be salvaged prior to grading impacts. Creek bed material will be placed into creek establishment areas to provide the same bed grain size within the new channel that is at equilibrium with current and future flood regime (flow velocity). Grading in Lion Canyon will establish new areas channel bottom while enhancing preserved sections of channel. Grading of the drainage will allow for the addition of the proposed boulder step-pools, turf reinforcement mats, and soil cement that will assist in the stabilization of the restored drainage. Grading areas in the channel will also allow plantings to be placed on areas that are currently deeply incised and devoid of vegetation.

In addition, native vegetation within temporary and permanent impact areas will be mulched and stockpiled for replacement within establishment and enhancement areas. A clay liner or other impervious layer (geotechnical material) will be buried upstream of selected boulder step-pool structures to perch local groundwater within the root zone of riparian species such as mule fat and willows. The perched groundwater will help to sustain riparian vegetation and will provide vegetation community diversity along the reconstructed channel.

A temporary above ground irrigation system will be installed to promote plant survival and vegetation establishment. Plant palettes for mule fat scrub, big sagebrush scrub, and southern willow scrub will conform to Section 4.6.

2.2.8 River Mitigation at Long Canyon Bridge

The planned mitigation located at the proposed Long Canyon Bridge would include restoration of temporary impacts in the Agriculture Ditch and the Santa Clara River and establishment along the edge of the river (Figure 15). Mitigation would include establishment of 2.7 acres of Corps jurisdictional area adjacent to the proposed Landmark Village project area.

Jurisdictional establishment will be achieved through grading existing agricultural field down to elevations that are consistent with the Santa Clara River floodplain. Successful grading would reestablish the hydrologic connections and/or groundwater relationship that existed prior to construction.

A detailed, site-specific mitigation design will be developed during the design phase, allowing for the creation of a variety of channel features to support diverse vegetation communities to replace impacted functions and values. The establishment approach may rely on the use of a temporary irrigation system and plant materials (seed and container plants) to establish vegetation.

The mitigation design would incorporate enhancement of existing wetland vegetation communities to improve functions and values of the mitigation site. Enhancement would include

control of non-native invasive species and establishment of native species. Non-native invasive species that are prevalent within portions of the Landmark Village site include giant reed (*Arundo donax*), salt cedar, and tree tobacco. Appropriate control methods for the targeted invasive species would be implemented and then, once controlled, followed up with a combination of passive and active restoration techniques (seeding/planting). Grading and the installation of temporary irrigation systems are not anticipated for wetland enhancement areas. No specific enhancement areas have been identified for use as mitigation at this time.

2.2.9 Long Canyon

The design approach for Long Canyon is a general treatment of impacts to the Long Canyon tributary drainage. (Figure 16). The restoration strategies for the Long Canyon drainage channel include (1) complete fill of the stream channel, (2) reconstruction of the stream channel on compacted soil fill, (3) incorporation of stream channel stabilization, and 4) newly created stream channel. Overall, mitigation area is expected to create approximately 23.4 acres of jurisdictional area in upper Long Canyon and restore 1.0 acre of jurisdictional area as mitigation for temporary impacts to tributary drainages.

The proposed project design for Long Canyon would combine soil cement bank stabilization along with a soft-bottom channel. The bank stabilization, consisting of soil cement, would be emplaced according to the requirements established by the County Department of Public Works and Regional Planning (DPW). The basis of design for Long Canyon is such that any increase in flow velocities and shear stress would not exceed the performance specifications of the bank stabilization. However, the soft bottom of the channel is vulnerable to down-cutting and scour. To decrease the channel velocities, the Project design includes grade stabilizer structures. Placement of grade stabilizer structures would allow the channel to reach equilibrium, defined as the condition where the amount of sediment deposited is equivalent to the sediment eroded.

Nearly the entire reach of Long Canyon Drainage within the RMDP will be filled and a new channel constructed at a new elevation. In accordance with the geomorphic basis of design, the final design approach is to preserve the existing channel as a back channel habitat area while creating an additional new channel sized to accommodate the changes in sediment and water delivery due to the build-out of the Newhall Ranch Specific Plan, except for a small portion of the drainage that will be preserved as a back channel habitat adjacent to the new channel at the existing channel grade.

SANTA CLARA RIVER

LARA CANYON

Mitigation Hydrology Design Basis

Santa Clara River at Long Canyon Bridge Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
2 Year	2.7	Riverwash, Arrowweed / Mulefat Scrub

Legend

- Santa Clara River Establishment (2.7 acres)
- Preserved Corps Jurisdiction*
- Preserved Federal Wetlands*
- Temporary Impact to Corps Jurisdiction
- Permanent Impact Corps Jurisdiction
- Bridge Crossing
- Bank Stabilization
- Proposed Grading
- Public Road

* based on Final EIS/EIR Jurisdictional Delineation. Actual acreage to be established at Initial Construction Notification

0 200 400 800 Feet

APPROXIMATE SCALE IN FEET

SOURCE: Newhall Land, 2011

FIGURE 15

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Santa Clara River Conceptual Mitigation Plan (at Long Canyon Bridge)

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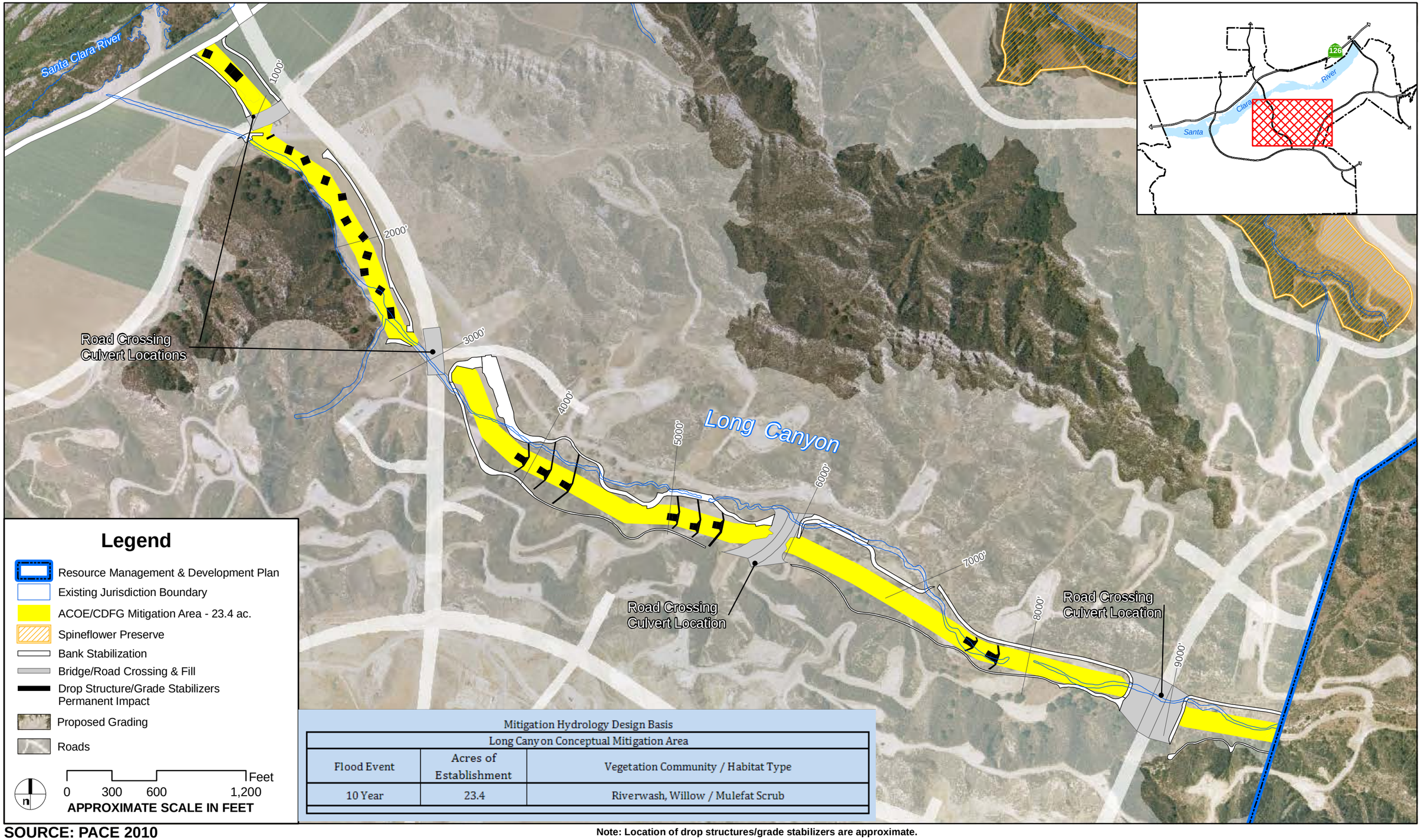

Legend

- Resource Management & Development Plan
- Existing Jurisdiction Boundary
- ACOE/CDFG Mitigation Area - 23.4 ac.
- Spineflower Preserve
- Bank Stabilization
- Bridge/Road Crossing & Fill
- Drop Structure/Grade Stabilizers Permanent Impact
- Proposed Grading
- Roads

0 300 600 1,200 Feet

APPROXIMATE SCALE IN FEET

Mitigation Hydrology Design Basis

Long Canyon Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
10 Year	23.4	Riverwash, Willow / Mulefat Scrub

SOURCE: PACE 2010

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 16

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

LONG CANYON CONCEPTUAL MITIGATION PLAN

P:\8238E\GIS\mxds\LEDPA\MitigationPlanPhasing_20100211\Alt14\8238E_FIGURE-16_LongCanyonLedpaPostProject_PC1_20110523.mxd

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The recommended approach for designing the reaches where valley grading is proposed involves breaking the valley into alternating long reaches that are at equilibrium grade and short reaches that are much steeper. This approach involves creating reaches of between 100 and 300 feet length where elevation drops of 10 to 30 feet occur (10% gradient). Concentrating the drop in these reaches using sequences of step-pools that will create a naturally functioning channel between the drops and reduce the number and aerial extent of rock structures. The Long Canyon channel design incorporates the calculated post-development equilibrium slope to ensure a dynamically stable condition allowing for more or less equal amounts of erosion and deposition.

The channel will be designed to support a similar complex of native vegetation communities as those that currently occur. Detailed, site-specific mitigation designs will be developed during the design phase, allowing for the creation of a variety of channel features to support diverse vegetation communities to replace impacted functions and values. The restoration approach would rely on the use of a temporary irrigation system and plant materials (seed and container plants) to establish vegetation. The construction of the channel uses standard engineering techniques to achieve a stable design and will provide suitable soils and hydrology for target plant communities.

Temporary Corps jurisdictional impacts would be mitigated through restoration of vegetation communities at the temporary impact site that is equivalent to the impacted vegetation. The intent of restoration of temporary impact areas is to restore the aquatic functions and services that were present prior to impacts (although in some instances, the values attributable to adjacent uplands will necessarily change. The critical design feature for achievement of this goal is post-construction recontouring to ensure that the temporary impact areas are restored to pre-impact elevations and contours. Successful recontouring following construction would reestablish the hydrologic connections and/or groundwater relationship that existed prior to construction.

2.2.10 Chiquito Canyon and San Martinez Grande Canyon

The design approach for mitigation in Chiquito and San Martinez Grande canyons is a general treatment of on-site impacts to tributary drainages. Tributary drainages that would be impacted and reestablished include Chiquito Canyon and San Martinez Grande Canyon. Portions of these drainage channels must be filled to facilitate the proposed design strategy for the RMDP. The mitigation design is expected to create approximately 9.8 acres of jurisdictional area in Upper and Lower Chiquito Canyon (Figure 17) and 6.8 acres in San Martinez Grande Canyon (Figure 18).

The Project would be designed to reduce Project effects to the geomorphic stability (i.e., erosion and deposition) within Chiquito and San Martinez Grande canyons. Specifically, where the

channels are not degraded and less extensive development would take place in the watershed, grade control structures would be used to maintain the existing slope. The reengineered channels would be designed to meet the specified basis of design criteria using the following approach:

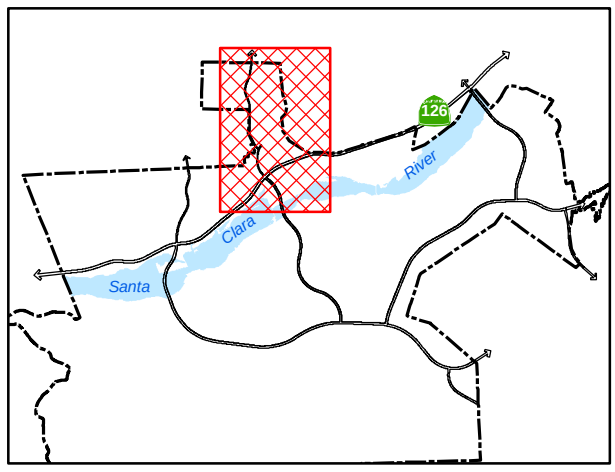
- Develop existing condition floodplain and creek hydraulic characteristics using a hydraulic model such as HEC-RAS.
- Minimize impacts to existing condition floodplain. As a result of reducing the development impacts to the floodplain, the amount of environmental and hydraulic impacts (e.g., substantial erosion or sediment deposition) from the proposed RMDP would be minimized.
- Creek bank flood protection (e.g., soil cement, rip rap, or other suitable method) would be located to provide for bank erosion protection and flood protection from the DPW Capital design flood event. In most cases, the bank protection would be buried with soil at a 3:1 slope over the hard bank protection. The soil backfill slope would vary from flatter to steeper and may be totally eliminated in some areas where necessary, such as at structures, storm drain outlets, or other pinch points.
- The tributary canyons would not include a re-grading of the creek invert, although the Erosion Potential of the proposed condition would be validated during the final design phase. For both tributary canyons, the invert stabilization method would be as follows:
- Creek bed grade control structures at 200- to 400-foot spacing along the creek corridor would be included.
- These grade control structures would be designed to be located at points along the creek where proposed project grading impacts will already be disturbing the creek bed and banks.
- The grade control structures would be constructed with soil cement, rip rap, or other grade stabilization methods acceptable to DPW.
- The grade control structures would be at grade or below the existing grade and invert of the creek bed.
- The grade control structures would be designed to function as a drop structure in the event the creek bed slope flattens over time.
- The top and toe elevation would be established based upon DPW standards.

Legend

- Resource Management & Development Plan
- Existing Jurisdiction Boundary
- Preserved CDFG & ACOE Jurisdiction - 7.8 ac.
- ACOE/CDFG Mitigation Area - 9.8 ac.
- Bank Stabilization
- Drop Structure/Grade Stabilizers Permanent Impact
- Proposed Grading
- Roads

0 300 600 1,200 Feet

APPROXIMATE SCALE IN FEET



8000'
7000'
6000'
5000'
4000'
3000'
2000'
1000'

Bridge Impact to Jurisdiciton: 0.11 Acres

Road Impacts to Jurisdiction: 0.15 Acres

Road Impacts to Jurisdiction: 0.08 Acres

SR-126 Bridge Widening

CALIFORNIA 126

SANTA CLARA RIVER

Mitigation Hydrology Design Basis

Chiquito Canyon Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
10 Year	9.8	Riverwash, Willow / Mulefat Scrub, Big Basin Sage Scrub

SOURCE: PACE 2010

FIGURE 17

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

CHIQUITO CANYON CONCEPTUAL MITIGATION PLAN

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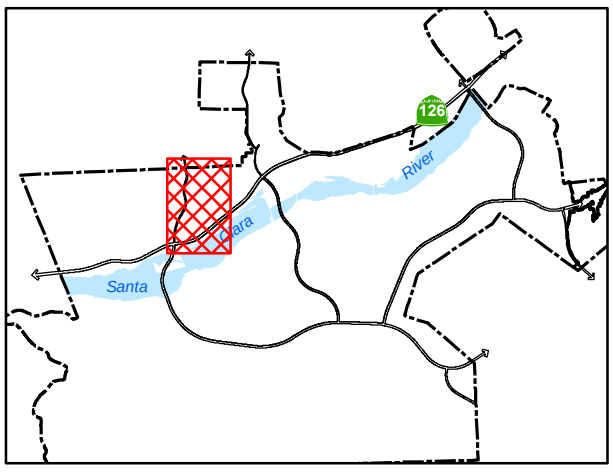
Legend

- Resource Management & Development Plan
- Existing Jurisdiction Boundary
- Preserved CDFG & ACOE Jurisdiction - 2.4 ac.
- ACOE/CDFG Mitigation Area - 6.8 ac.
- Spineflower Preserve
- Bank Stabilization
- Drop Structure/Grade Stabilizers Permanent Impact
- Proposed Grading
- Roads

0 175 350 700 Feet

APPROXIMATE SCALE IN FEET



5000'

4000'

3000'

2000'

1000'

San Martinez Grande Canyon

Bridge Impacts to Jurisdiction: 0.03 Acres

San Martinez Grande Spineflower Preserve

Road Impacts to Jurisdiction: 0.06 Acres

126 Bridge Widening

126

SANTA CLARA RIVER

Mitigation Hydrology Design Basis

San Martinez Grande Canyon Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
10 Year	6.8	Riverwash, Willow / Mulefat Scrub, Big Basin Sage Scrub

SOURCE: PACE 2010

Note: Location of drop structures/grade stabilizers are approximate.

FIGURE 18

Mitigation and Monitoring Plan For Impacts to Waters of the United States for the Newhall Ranch RMDP

SAN MARTINEZ GRANDE CANYON CONCEPTUAL MITIGATION PLAN

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The overall design approach would allow the tributaries to naturally fluctuate between the stabilized existing condition and estimated equilibrium slope while providing suitable erosion and flood protection for public safety. The channel confluences with the Santa Clara River would largely be controlled by the aggradation or degradation in the Santa Clara River, as well as episodic river hydraulic events in the form of backwater effects. The influence of the Santa Clara River on long-term bed stability at the creek channel outlets is expected to exceed that of the Project channel modifications. In both tributaries, the upstream channel inlets (near the beginning of the defined channels) are generally in a natural state, and no improvements would be made in the upstream portions of the channels.

The channels will be designed to support a similar complex of native vegetation communities as those that currently occur. Detailed, site-specific mitigation designs will be developed during the design phase, allowing for the creation of a variety of channel features to support diverse vegetation communities to replace impacted functions and values. The restoration approach would rely on the use of a temporary irrigation system and plant materials (seed and container plants) to establish vegetation.

Temporary Corps-jurisdictional impacts would be mitigated through restoration of vegetation communities at the temporary impact site that is equivalent to the impacted vegetation. The intent of restoration of temporary impact areas is to restore the areas to support the same vegetation communities that were there prior to impacts. The critical design feature for achievement of this goal is post-construction recontouring to ensure that the temporary impact areas are restored to pre-impact elevations and contours. Successful recontouring following construction would reestablish the hydrologic connections and/or groundwater relationship that existed prior to construction.

2.2.11 Potrero Canyon Riparian Mitigation

Riparian mitigation within Potrero Canyon includes a restoration of temporary impacts and establishment of new jurisdictional areas (Figure 19). The Potrero canyon riparian mitigation area is expected to create approximately 14 acres of jurisdictional area.

In accordance with mitigation measure SP-4.2-3, hydraulic modeling will be performed for the final design to assess the effects within Potrero Canyon, and the design will be modified as necessary to reduce any erosion or deposition impacts. The Potrero Canyon channel design incorporates the calculated post-development equilibrium slope to ensure a dynamically stable creek bed condition allowing for more or less equal amounts of erosion and deposition. The design will utilize boulder step-pool structures, and biotechnical stabilization to enhance and

restore the drainage. The land surrounding the channel would be revegetated with associated riparian plant communities, as well as upland plant communities, to increase the habitat-related functions and values of the drainage channel.

Varying creek stabilization approaches will be taken in the reaches because of differences in existing channel condition as described in the EIR/EIS. Reach 1 (most downstream reach) is deeply incised because it was realigned and straightened from its original location since 1940. In this reach the southwest bank will be regraded to restore a floodplain bench adjacent to the channel (see cross section Sta 20+41). Reach 1 will require the greatest number of step-pool structures due to its incised condition, steeper existing gradient and the fact that as the most downstream reach it will experience the greatest effects of watershed change. In Reach 2 the emphasis will be on minimizing impacts to the existing CAM by making the step-pool structures as small as possible. In Reaches 3 and 4 the goal will be to maximize the conveyance of naturally-generated sediment from the watershed so as to maintain a gradient as close as possible to existing levels.

Approximately 60 structures with an average height not to exceed 4 feet and a maximum height not to exceed 5 feet will be required. The most common structure will be a 3 foot high step-pool structure constructed of nongrouted boulders and containing some form of subsurface seepage control such as a buried vinyl sheet pile to prevent internal piping of soil through the boulders.

Creek crossings in Potrero Canyon will be constructed using at-grade, arch culverts with soft bottoms. Each crossing will have a boulder step-pool located immediately upstream and downstream to allow a stable channel gradient to form beneath the culverts (these will likely be grouted boulder step-pool structures due to the need to protect the culvert footings).

The restoration of temporary impacts would include reestablishing the drainage channel in Potrero Canyon after implementation of stabilization measures where the channel bed is unstable in its current configuration. A detailed, site-specific mitigation design would be developed during the design phase, allowing for the creation of a variety of channel features to support diverse vegetation communities to replace impacted functions and values. Channel design can recreate a variety of flow gradients that support various vegetation communities. The control of soil substrate would allow for the installation of low permeable layers that perch groundwater to create localized wetland areas. Soil salvage may be used when on-site soils are unique and conducive to the establishment of specific vegetation types.

Mitigation Hydrology Design Basis

Potrero Canyon Riparian Conceptual Mitigation Area		
Flood Event	Acres of Establishment	Vegetation Community / Habitat Type
10 Year	14.0	Riverwash, Cottonwood-willow Riparian Forest, Mulefat Scrub

Ayers Canyon

Potrero Canyon

Golf Course Bridge

Legend

- Potrero Riparian Mitigation - 14.0 acres
- Advance Mitigation (Potrero CAM)
- Preserved Corps Jurisdiction*
- Preserved Federal Wetlands*
- Temporary Impact to Corps Jurisdiction
- Permanent Impact to Corps Jurisdiction
- Proposed Grading
- Bank Stabilization
- Culverted Road Crossing
- Public Road
- Drop Structure
- Golf Course Bridge

* based on Final EIS/EIR Jurisdictional Delineation.
Actual acreage to be established at Initial Construction Notification

0 500 1,000 2,000 Feet

APPROXIMATE SCALE IN FEET

SOURCE: Newhall Land, 2011

FIGURE 19

Mitigation and Monitoring Plan for Impacts to Waters of the United States for the Newhall Ranch RMDP

Potrero Canyon (Riparian) Conceptual Mitigation Plan

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2.2.12 Implementation Components

The following site design components are common to each mitigation site except as noted.

- **Site Grading**. Grading and contouring will be implemented to create appropriate hydraulic relationships to the subsurface groundwater and adjacent drainage channel. Site grading is anticipated to have approximately 4–10-foot cut depths (appropriate hydraulic relationship will be validated through detailed topographic survey and hydrology studies).
- **Grade Control Structure**. Grade control structures will be used for selected jurisdictional areas mitigation sites including Lion, Long, Potrero, and Salt Creek. These structures serve multiple purposes. The upstream effect of the structure is intended to maintain a grade stable creek bed that is not subject to head cutting, even if downstream channel incision is present. Structures can also increase resident time and water percolation. The downstream objective of these structures is to more evenly distribute and direct creek flow across a mitigation site.

  In general, the structures will be constructed at existing natural grade so that the crest is flush with the existing ground surface and the toe is buried below grade. Once constructed the pools, toes and protective toe ramps will be reburied under native soils and planted with native vegetation, with a channel that matches existing dimensions cut through the native soil to form a pilot channel above the pool and toe.

  To prevent the creek from avulsing around steps and downcutting, the structures will typically have at-grade non-grouted buried boulder wings that extend up the channel banks tie them into a point on the valley floodplain where erosive stresses are adequately low to be non-erosive during the Capital Flood. These wing walls will also be covered with soil, and revegetated using native vegetation baffles to provide floodplain roughness (willows or shrubs aligned perpendicular to flow across the floodplain).
- **Surface Water Inlet**. Where no grade structures are present, surface water inlets and outlets will be allowed to occur in dynamic equilibrium with the existing Creek channel.
- **Boundary Fencing**. Mitigation includes installation of permanent exclusion fence around existing and proposed jurisdictional areas to exclude grazing animals and prevent undesired agricultural or ranching activity.
- **Initial, interim and long term weed management program**. A combination of weed control methods will be employed, including chemical, mechanical and manual control, as appropriate. The site will be subject to an aggressive site preparation weed treatment program prior to planting to address the extensive weed seed bank.

- **Initial seed and plant installation using appropriate species** (Tables 9–19). Plant materials used to implement the planting plan will include seed, live cuttings, bio-engineered materials such as willow wattles, and container plants. Container plants will generally include liners and 1-gallon container stock propagated from Salt Creek seed collections. Specific locations for installation will be designated on planting plans or marked on site temporarily with pin flags by the project biologist. Seed will be collected from the RMDP area.
- **Temporary Irrigation System.** Selective temporary irrigation will be installed to support initial seed and plant establishment, as needed. The irrigation system will be an on-grade, overhead spray design.
- **Interim monitoring and maintenance program with appropriate remedial actions.** A mitigation monitoring program will be developed to support collection of appropriate botanical, vegetation, and hydrology data that directly relate to mitigation performance metrics. Monitoring data and observations will provide essential feedback for effective adaptive management decisions to be made and implemented during the 5-year vegetation establishment and success criteria monitoring period for each site.
- **Ecological Performance Metrics.** Appropriate ecological performance metrics will be established through measurement of a reference reach in each canyon. Similar pre-impact ecological functional measurements were made within tributary impact areas using HARC methods. The performance metrics will be based on comparative functional assessment protocols as defined in the HARC methodology (Appendix B). The metrics will be used to inform mitigation site evaluations adaptive management and remedial actions to maintain the vegetation establishment trajectory toward achievement of ultimate performance criteria.
- **Long term management with monitoring component and management actions.** The mitigation sites will become part of the RMDP preserve through the establishment of a conservation easement to CDFG and transfer of fee ownership to Center for Natural Lands Management for perpetual land stewardship. The mitigation site will be managed in accordance with the RMDP.

2.3 Time Lapse between Jurisdictional Impacts and Expected Compensatory Mitigation Success

This mitigation program is designed to minimize temporal loss associated with RMDP impacts through advance mitigation and concurrent mitigation projects. Advance mitigation will be implemented prior to permanent RMDP jurisdictional impacts. Subsequent mitigation projects

will be implemented concurrently or within 2 years of impacts from the RMDP project with which they are associated.

2.4 Special Aquatic Habitats, Other Waters of the United States, and Non-Jurisdictional Areas Proposed as Compensatory Mitigation

The areas of the tributary canyons that are designated for the establishment of Corps-jurisdictional areas will be designed to be located within a riparian corridor that will also include vegetation communities established as mitigation for impacts to CDFG jurisdictional resources. The established CDFG jurisdictional areas will provide a native buffer around the Corps-jurisdictional establishment areas. While no specific acreage mitigation credit has been allocated for the establishment of these native buffers, the native buffers will improve the functions and services of the Corps areas. The functions and services that will be provided by native buffers include greater average buffer width, improved buffer condition, improved floodplain connection, improved flood-prone area, and greater interspersion and zonation.

2.5 Overall Watershed Improvements to be Gained

The planned mitigation projects will be designed to provide overall watershed improvements. Such improvements include:

- A reduction of tributary channel incisement with the incorporation of engineered drop structures and flood flow attenuation materials.
- Improved tributary hydrologic regime through creek bed stabilization that promotes increased surface water persistence and groundwater recharge.
- Improved riparian corridor connectivity between the river and tributary drainages through replacement of existing agricultural ditches with restored riparian channels.
- Improved floodplain connectivity through the establishment of riparian buffers and the stabilization of eroded and incised channel banks.
- Increased interspersion and zonation with the establishment of a greater variety of plant zones.
- Reduced exotic vegetation through long-term management. Control of exotic vegetation within the mitigation areas will not only improve the functions and values of the on-site mitigation areas but also of habitat areas downstream of the project areas by minimizing the release of weed propagules downstream.
- Greater topographic complexity and biochemical processes through design engineering of channel gradients and flood-prone buffers.

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3.0 DESCRIPTION OF THE PLANNED COMPENSATORY MITIGATION SITES

3.1 Process of Selecting Mitigation Sites

Mitigation within tributary drainages (with the exception of Salt Creek) was designed to maintain the geographic distribution of jurisdictional resources within the major tributary canyons and along the Santa Clara River. The selection of the major tributary drainages was also based on RMDP design considerations. The design of these jurisdictional drainages takes into account the existing hydrologic regime in each canyon.

Mitigation areas were selected through a comprehensive evaluation process described in detail in the Revised Draft Newhall Ranch Mitigation Feasibility Report (Dudek 2007b). To maintain consistency with the *Hybrid Functional Assessment of Wetland and Riparian Habitats for the Newhall Ranch Habitat Management Plan* (HFA; URS 2004; revised and now referred to as HARC), Dudek divided the stream channels within the RMDP into reaches, as in the HFA, for discussing mitigation potential. A total of 57 reaches were evaluated within the RMDP, with 46 occurring within proposed open space and preserve areas. Stream reaches within the tributary canyons (with the exception of Salt Creek) were evaluated separately from this study.

Dudek considered three types of mitigation potential: wetlands enhancement, stream bank stabilization restoration, and jurisdictional establishment. For wetlands enhancement, the percent cover of non-native, invasive plants was estimated in wetland vegetation communities in potential wetlands enhancement areas within the RMDP. For the Santa Clara River, there are substantial wetlands enhancement opportunities in various wetland vegetation communities. However, due to the extensive effort required to estimate and map invasive plant cover percentages, and the high potential for this to change between the present conditions and future implementation, specific enhancement opportunities were not evaluated in the Santa Clara River and associated riparian vegetation communities, but could be assessed during the preparation of site-specific mitigation plans.

For riparian vegetation establishment, Dudek evaluated the suitability of potential mitigation opportunities in the RMDP based on several factors pertinent to determining suitability of mitigation projects, including hydrology, soil conditions, existing vegetation, habitat connectivity, stream bank stability, construction/maintenance access, grading requirements, planting and irrigation requirements, mitigation credit, and long-term management considerations. The criteria were prioritized based on their suitability for jurisdictional establishment mitigation and are described in more detail below.

Hydrology

Hydrology is the most critical factor in determining potential suitability for jurisdictional establishment. Hydrology along each of the reaches in the RMDP was evaluated based on a number of factors, including the location in the watershed, presence and/or persistence of surface water, source of water, and amount of surface water. Potential sites with the presence and/or persistence of surface water, a natural water source, and a higher amount of surface water were considered to have greater restoration potential and were therefore ranked higher in this analysis. The HFA classified each of the reaches as ephemeral, ephemeral/intermittent, riverine persistent, or perennial. The HFA classifications for each stream reach were taken into consideration when evaluating and ranking hydrology.

Soil Conditions

Soil conditions were evaluated based on the type of soils present, which relates to erosive potential and water holding capacity, presence of organic matter, and soil disturbance. In general, soil types throughout the RMDP were of the same general type, Balcom-Castaic-Saugus association, which is a combination of silty clay loam and loam. The soils are derived from weakly consolidated sediments, soft sandstone, and soft shale and are generally highly erosive and well drained. In the upper reaches (higher elevations), there seemed to be a greater composition of rock in the soil; however, the soil remained unconsolidated and highly erosive.

Other soil types present in more limited areas include Chino loam, which occurs on nearly level land. It is a deep soil with a seasonally high water table present within 3 to 4 feet from the surface. This soil type is suitable for wetland mitigation. Sandy alluvial land, Cortina sandy loam, Hanford sandy loam, Sorrento loam, and Yolo loam are soils found along the Santa Clara River and its tributaries and are generally suitable for wetland mitigation. Castaic and Saugus soils are other soil types found in potential mitigation areas that are severely eroded and highly erosive.

In this analysis, soils with lower erosion potential, greater water holding capacity, higher presence of organic matter, and less soil disturbance were considered to have greater suitability for jurisdictional establishment/restoration. However, nearly all soils within the RMDP appeared to have high erosion potential and high soil disturbance.

Existing Vegetation

The existing vegetation was evaluated based on the vegetation communities present; age and structural heterogeneity, including canopy development; presence of non-native, invasive plants; and riparian corridor connectivity. Potential mitigation sites adjacent to stream channels with

intact native wetland vegetation, diverse age and structural heterogeneity, a well-developed tree canopy, lack of non-native invasive plants, and the presence of a riparian corridor were ranked higher in this analysis based on the rationale that if these conditions are present, then there are potentially adequate conditions to create additional riparian habitat.

Habitat Connectivity

For potential wetlands enhancement areas, this criterion was evaluated based on connectivity of riparian habitat to adjacent transitional upland habitats. For potential jurisdictional establishment areas and stream bank stabilization areas, this criterion was evaluated based on connectivity of the restored riparian habitat after the hypothetical installation of the mitigation areas. The level of disturbance of the transitional uplands habitat was the primary consideration. Potential sites with degraded vegetated buffers dominated by non-native vegetation are more vulnerable to erosion and more likely to contribute weed seed to potential mitigation sites. Therefore, sites with native vegetated buffers were ranked higher than those with degraded, non-native buffers. An additional consideration was connectivity to permanent unnatural features such as roadways or developed areas. Adjacency to these types of areas was ranked moderate based on the fact that roadways or developed areas are less likely to be vulnerable to erosion but, depending on how edge areas are planted/maintained, can be more or less likely to contribute weed seed to potential mitigation sites.

Stream Bank Stability

A general assessment of channel morphology was conducted to identify areas with the highest stream bank stability. Features that provide insight into this issue include the presence of cut banks, slip faces, underfit/overfit stream courses, degree of braided flow, and bed grain size. The stability of the stream banks along each of the reaches was evaluated based on the development of flood plain terraces, angle of the bank cuts, and stability of the bank soils. Areas with stream banks that have multiple terraces, gentle angles on the bank cuts, and more stable bank soils were considered more suitable, and ranked higher, than those without terraces, steep bank cuts, and instable bank soils.

Construction/Maintenance Access

Each of the reaches was evaluated based on construction and/or maintenance access to potential mitigation sites. The presence of roads that are suitable for grading equipment was a key factor in the identification of wetland establishment sites. Sites that are adjacent to existing roads or

those that could be easily accessed from existing roads were considered more suitable potential jurisdictional establishment/restoration sites than sites that are inaccessible to vehicles.

Grading Requirements

The amount of grading required to construct potential jurisdictional establishment/restoration sites was evaluated. Potential sites where minimal grading would be needed to achieve establishment/restoration goals were considered more suitable sites and were therefore ranked higher than potential sites that would require extensive grading. No detailed calculations were made to determine actual volume of material that would have to be removed to restore or create riparian vegetation communities. Estimations of grading requirements were generally based on the depth of cut required and the surface area to be graded.

Irrigation Availability

Irrigation availability was evaluated along each reach. Potential jurisdictional establishment/restoration sites with access to a potential irrigation source were ranked higher than those without.

Mitigation Credit

The amount of acreage available for jurisdictional mitigation credit was evaluated at each potential site. Areas where greater mitigation acreage could be achieved were ranked higher than sites that would result in minimal mitigation acreage. In general for this factor, sites less than 1 acre were ranked low, sites between 1 and 5 acres were ranked moderate, and sites greater than 5 acres were ranked high.

Long-Term Management Considerations

Long-term management considerations include issues that could create long-term management problems in the future after the installation of mitigation sites. Factors evaluated for each potential jurisdictional establishment/restoration site include the degree to which a site would be self-sustaining in the long term, potential for reinvasion of non-native invasive plant species, future access constraints, and potential to be subject to damage from flooding or to contribute to flooding in unwanted areas. Sites that would be self-sustaining, have minimal potential for reinvasion of invasive non-native plant species, provide uninhibited long-term access, and be less prone to damage from flooding or contribute flooding in unwanted areas were considered to have greater suitability in terms of minimizing long-term management problems and were therefore ranked higher in this analysis.

Based on site investigations and considering the above factors, it was determined that the mitigation opportunities along the margins of the Santa Clara River, including Mayo Crossing, and Salt Creek, provided the best opportunities for jurisdictional establishment outside of the RMDP development areas.

3.2 Location of Compensatory Mitigation Sites

Temporary and permanent jurisdictional impacts will be mitigated as described above. The locational information of each of the planned mitigation sites is summarized in Table 8.

Table 8
Mitigation Site Locations

Mitigation Locations	Latitude	Longitude	USGS 7.5-Minute Map	Township	Range	Section
Mayo Crossing	-118.673˚	34.407˚	Val Verde	T4N	R17W	28
Potrero Canyon CAM	-118.664˚	34.395˚	Val Verde	T4N	R17W	27
Salt Creek Enhancement/Creation	-118.684˚	34.390˚	Val Verde	T4N	R17W	28
Santa Clara River at Long Canyon Bridge	-118.634˚	34.420˚	Val Verde	T4N	R17W	23
Lion Canyon	-118.623˚	34.416˚	Newhall	T4N	R17W	24
Long Canyon	-118.642˚	34406˚	Val Verde	T4N	R17W	22
San Martinez Grande Canyon	-118.669˚	34.417˚	Val Verde	T4N	R17W	26
Potrero Canyon Drainage	-118.640˚	34.397˚	Val Verde	T4N	R17W	27

3.3 Ownership Status

All land within the RMDP area is owned in fee title by Newhall Land. Land ownership includes all water rights associated with each parcel.

3.4 Existing Functions and Values of Compensatory Mitigation Sites

The existing functions and values of compensatory mitigation sites vary but generally include two sets of conditions. One set of conditions pertains to the tributary drainages that will be graded and reconfigured as a component of the RMDP in order to accommodate construction techniques that are necessary to stabilize the RMDP area. These tributary drainages currently provide typical functions and values commensurate with moderately to severely disturbed intermittent and ephemeral drainages in the region, as described in **Section 1.5**. However, due to the proposed design to reconfigure the tributary drainage channels, the existing functions and values will be temporarily lost and then replaced with the implementation of the planned mitigation.

The other set of conditions present at planned mitigation sites pertains to the mitigation areas that are planned along the Santa Clara River (including Mayo Crossing) and Potrero Canyon CAM and Salt Creek. In these instances, the existing functions and values of the planned mitigation areas are typically very low because the current land use is agriculture (Santa Clara River and lower portions of Salt Creek) or grazing (Potrero Canyon CAM and Salt Creek). Under these land uses, the land is repeatedly disturbed and therefore does not support native vegetation communities and associated functions and values.

3.5 Present and Proposed Uses of the Compensatory Mitigation Sites

Past and current land uses at each of the mitigation sites differ. Mitigation sites within the RMDP are described below:

Advanced Mitigation Areas

Current land uses at the Potrero Canyon, Mayo Crossing, and the Salt Creek mitigation areas include agricultural land (particularly in the lower reaches of the Salt Creek area) and ranching and farming facilities such as access roads and creek crossings. The planned Mayo Crossing mitigation area is an active, intensive agricultural area that occurs within the Santa Clara River corridor. Once implemented, the mitigation areas within Potrero Canyon, Salt Creek and at Mayo Crossing are planned as conserved open space as part of the RMDP.

River Mitigation at Long Canyon Bridge

At present, the planned jurisdictional establishment mitigation area adjacent to the Santa Clara River is under active agriculture. Once implemented, these mitigation areas are planned as conserved open space as part of the RMDP.

Tributary Canyon Mitigation Sites

Current land uses at the Lion, Long, Potrero, Chiquito Canyon and San Martinez Grand Canyon mitigation sites include a combination of open space, grazing, and oil and gas extraction activities. Ranching and energy facilities within these canyons include access roads, creek crossings, and well pads. Once implemented, these mitigation areas are planned as conserved open space as part of the RMDP.

4.0 IMPLEMENTATION PLAN FOR THE COMPENSATORY MITIGATION SITE

Implementation of the mitigation design requires a series of coordinated, progressive steps to properly install the planned mitigation projects. Many of these steps are prerequisites for subsequent activities to occur. This section describes the steps that are necessary to implement this mitigation plan.

4.1 Rationale for Expecting Project Success

The rationale for expecting project success includes the implementation of restoration designs that consider and incorporate appropriate conditions for the establishment and sustainment of the target vegetation communities. Grading and contouring designs and their successful implementation will be integral to project success to ensure that elevations are established that will allow dynamic interaction with subsurface low flows, the water table, and periodic seasonal flooding.

To support the success of the restoration designs, the individual mitigation projects will be planted with species that are successfully growing in adjacent native areas and within the watershed. Vegetation communities will be appropriately located in accordance with their respective water needs, with less hydric vegetation communities being located in transitional upland locations and more hydric vegetation communities being located closer to anticipated surface and subsurface flows or groundwater. Further, the sites will be maintained for a period of 5 years to control non-native species. Site-specific restoration tools will also be utilized as appropriate, including temporary irrigation systems, rock gabions, berms, riprap, or other features designed to retain, entrain, or convey surface water flows.

Where mitigation is proposed within the tributary drainages, vegetation communities associated with these drainages will be successfully mitigated through establishment of comparable vegetation communities. The channel and mitigation designs support the conclusion that all representative vegetation communities present and replacement ecological functions and services can be successfully established in the project context. The following factors support this conclusion:

- The mitigation sites will tie in to existing hydraulic inputs, essentially extending the existing hydraulic regime of the tributary channels into the mitigation site. Therefore, the runoff hydrograph of storm events will remain similar in intensity and duration as presently observed and recorded in the existing drainages with similar scour and deposition functions as the impacted channel. This hydrology function is key to

establishing self-sustaining vegetation communities, such as mulefat scrub, southern willow scrub, southern cottonwood–willow riparian forest, and unvegetated streambed.

- In instances where soil characteristics may be critical to the resulting habitat supported by the reconstructed channel (e.g., Long Canyon), soil salvage and replacement may be implemented, where feasible. Soil salvage will be implemented in these instances to provide comparable grain size distribution within the constructed channel bottom. Soil salvage and replacement will be used to create a similar soil profile as found in the impacted stream course. This profile will have similar percolation and water retention characteristics as the impacted channel. The soil profile restoration is an essential factor in differentiating native communities along the stream course, and this physical characteristic will be recreated in the constructed channel.
- Channel designs incorporate grade structures that provide multiple services to the associated vegetation communities. Channel structures will create subsurface hydrology variability that will effectively create moisture gradients that support the desired range of native vegetation communities. Subsurface moisture retention is anticipated to be greatest immediately upstream of these structures. The resultant mesic pockets at these locations will support southern cottonwood–willow riparian forest and southern willow scrub vegetation communities. Drier soil conditions and retreating groundwater resources upstream of the structures will favor mulefat scrub and other ephemeral drainage vegetation communities that are capable of persisting without reliable subsurface water. The most xeric conditions are anticipated to occur between grade structures. Coarse bed materials placed at these locations will create non-vegetated waters of the United States. These areas serve as groundwater percolation sites that replenish local groundwater. The high percolation rates associated with these areas will maintain the channel in a non-vegetated state that is typical of many channel reaches in the tributaries.
- A variable channel width will be used to create areas of scour and deposition that are characteristic of the existing canyon. Scour and deposition are important functions that specific vegetation communities rely upon to persist in a particular location. Providing a variety of scour and deposition features will support diverse vegetation communities.
- A layer of semi-permeable material, such as clay, may be used to enhance subsurface water storage and resources for riparian vegetation where southern cottonwood–willow riparian forest and southern willow scrub are planned. This technique is used to perch water resources within the root zone of wetland species.
- Use of local plant materials will maintain the genetic integrity and species diversity found within tributary canyons.

4.2 Responsible Parties

The responsible parties identified in **Section 1.1** also apply to this section.

4.3 Financial Assurances

Implementation of the mitigation and 5-year maintenance and monitoring programs according to the specifications described herein will be funded through performance bonds or other approved financial assurance mechanism in accordance with the Corps Permit, for each mitigation area. Additional bonds will be issued as each mitigation area is implemented and shall include mitigation implementation costs associated with mitigation final design, construction, planting, irrigation and maintenance, and performance monitoring and reporting.

The amount of security posted for each construction notification shall be based on the estimated cost of carrying out the mitigation measures and monitoring activities for that project. The permittee may request and obtain partial or final release of any established security upon demonstrating to the Corps and CDFG that mitigation, monitoring, and reporting obligations have been satisfied for a project, or portion thereof. Updated security cost estimates and a replacement security may be submitted as necessary to carry out those activities yet to be fully satisfied. The Annual Mitigation Monitoring Report submittal shall be used for such requests.

It is anticipated that within 30 days of receiving a security proposal, a replacement instrument, or a request for partial or full release of an individual project security, the Corps shall, in writing: (1) review the cost estimates and adjust those estimates as needed to reflect the probable costs of carrying out, or completing, the required mitigation and monitoring measures; (2) review the request for partial or final security release; and (3) approve or deny the request for security replacement or release. Any denial of a security shall be in writing, with a reason for the decision.

4.4 Implementation Schedule

Project implementation will vary as RMDP projects are brought forward for construction. In general, mitigation project installation will be timed to occur in the late fall/early winter prior to the onset of the rainy season. In some cases where extreme flood volumes and velocities are expected, such as in the Santa Clara River, installation will occur in late spring or early summer to allow for a period of plant establishment before the onset of the fall rainy season. Individual project timelines will vary depending on a variety of factors related to construction. A general sequential ordering of implementation tasks is shown below (as applicable to each individual project):

- Plant propagule collection and container plant propagation

- Initiate enhancement component of project, if applicable
- Salvage native plant materials for mulch
- Salvage topsoil from existing jurisdictional or non-wetland waters of the United States areas
- Salvage tree trunks over 12 inches in diameter at breast height for wildlife habitat and stabilization structures
- Finish grading and contouring restoration areas to be compatible with adjacent native vegetation and streambed
- Apply salvaged topsoil and test for fertility
- Install irrigation system
- Conduct "grow and kill" cycles at the discretion of the project biologist
- Install salvaged native vegetation mulch in temporary impact areas, if available
- Install container stock throughout all mitigation and buffer areas
- Apply seed mixes in all mitigation areas
- Begin 120-day plant establishment maintenance and monitoring period
- Begin 5-year maintenance and monitoring period.

4.5 Site Preparation

The following mitigation project elements will be considered and implemented, as appropriate, on each of the mitigation sites. The degree of application of these elements will be determined and defined in the site-specific mitigation plans that will be included in each construction notification package.

4.5.1 Special-Status Species Avoidance and Pre-Construction Wildlife Surveys

Prior to mitigation site clearing or vegetation removal, special-status species surveys may be necessary, depending on their potential to be present and previous survey efforts. These special-status species may include arroyo toad, California red-legged frog, American badger, unarmored threespine stickleback, arroyo chub, Santa Ana sucker, southwestern pond turtle, western spadefoot toad, coast horned lizard, silvery legless lizard, coastal western whiptail, rosy boa, San Bernardino ringneck snake, coast patch-nosed snake, burrowing owl, San Diego black-tailed jackrabbit, San Diego desert woodrat, mountain lion natal dens, active roosts of special-status bats, San Emigdio blue butterfly, ringtail, *Pyrgulopsis castaicensis* n. sp., trask shoulderband

snail, two-striped garter snake, south coast garter snake, and nesting birds. If necessary, special-status species surveys will occur in accordance with Newhall Ranch Specific Plan Program EIR (County of Los Angeles 2003) mitigation measures SP 4.6-53, SP 4.6-54, and SP 4.6-59; Final EIS/EIR mitigation measures BIO-17, BIO-18, BIO-41, BIO-43, BIO-46, BIO-50, BIO-53, BIO-54, BIO-56, BIO-57, BIO-58, BIO-60, BIO-61, BIO-65, BIO-83, BIO-86, and BIO-89; and project-specific mitigation measures.

4.5.2 Boundary Fencing

Prior to beginning mitigation site preparation work and vegetation restoration efforts, the limit of work shall be confirmed and delineated with protective high-visibility orange construction fencing, if not already in place from site-development construction.

Protective fencing shall be installed in all areas adjacent to native vegetation and/or wetland areas. Protective fencing shall be maintained for the duration of construction activities to maximize habitat protection. Protective fencing shall be removed upon completion of construction and vegetation restoration work, as directed by the project biologist.

4.5.3 Erosion Control-Best Management Practices

Erosion prevention and sediment control measures shall be implemented as indicated and in accordance with the adopted project grading/erosion-control plans, associated grading and resource agency permits, and Stormwater Pollution Prevention Program (SWPPP). Erosion prevention and sediment control devices will be implemented and maintained as necessary to prevent erosion and to prevent deposition of sediment off site, including into adjacent riparian areas. The project biologist will monitor best management practices (BMPs) during mitigation construction and grading and will provide periodic monitoring reports to Newhall Land.

The dynamic and volatile seasonal flow patterns of the Santa Clara River and some of its tributaries are responsible for the highly variable storm flow events in the project area. Storm flow could result in the loss of project fencing and may affect BMPs. Project fencing and BMPs lost/affected due to storm flow events will be replaced or modified, or additional erosion control devices shall be installed at the discretion of the project biologist.

4.5.4 Vegetation Mulching

It is anticipated that native mulch will be applied to the temporary impact areas to encourage natural recruitment. The source of that native mulch will either be from on site or from Newhall Land's nearby mulching facility. If mulch from on site is used, it will be made from native

vegetation removed during vegetation clearing. If the on-site mulch must be stored for an extended period of time (greater than approximately 1 month), fresh native mulch from Newhall Land's mulching facility will be acquired and applied to the temporary impact areas following construction. Fresh native mulch created just before mitigation implementation will improve viability of seeds and propagules, as infertility of propagules will increase over time. Ideally, mulch will be no more than 1 week to 1 month old depending on the season. The mulch from a nearby project should be created from the same vegetation types with similar species composition. A portion of native topsoil salvaged from the impact areas (**Section 5.6**) will be mixed with mulch and spread over the mitigation areas.

All mulched native vegetation removed during construction will be stockpiled if it is to be used on site. Mulch from various vegetation types will be stored separately to ensure use in the correct area during mitigation implementation. The mulch will be spread in piles no higher than 3 vertical feet for storage until use. The piles will not be tarped or covered and should not be irrigated. Irrigating the piles may cause any viable seed to sprout in place. The stockpiled mulch shall be stored in the upland portion of the project site adjacent to the stockpiled topsoil. Orange construction fencing shall be placed around the stockpiled mulch as a BMP, and the words "salvaged mulch," along with the name of the vegetation type from which the mulch was created, shall be posted on signage around the pile. If mulch is stockpiled in an area that contains weeds/weed seed, the top 8 inches of soil shall be stripped before stockpiling the mulch to avoid seed contamination.

If recently created mulch cannot be found or attained, a possibility exists that some viable native seed/propagules may survive until mitigation site installation in mulch created on site. However, it is anticipated that there will be a significant period of time between harvest and installation, resulting in viable plant matter deteriorating and losing viability. The mulch will primarily provide organic matter to the soil and secondarily provide a source of viable seed or root/shoot sprouting.

4.5.5 Soil Salvaging

Following clearing and grubbing work, the topsoil may be salvaged from native vegetation areas impacted by project construction. If there exists a high proportion of weeds in the herbaceous layer, the top 5 to 6 inches will be stripped and used as backfill subsoil or removed from the area. Removal of the top few inches of soil will help reduce the amount of weeds that may germinate within the restoration areas. The soil in the region generally is relatively deep sandy alluvium, so removal of the top few inches should not negatively affect the edaphic conditions.

Soil shall be salvaged to a depth of 12 inches and stockpiled on site. The stockpiled topsoil shall be stored in the upland portion of the project site adjacent to the stockpiled mulch. Silt fencing shall be placed around the stockpiled topsoil as a BMP, and the stockpile shall be clearly marked. If topsoil is stockpiled in an area that contains weeds/weed seed, the top 8 inches of soil shall be stripped before stockpiling the topsoil to avoid seed contamination. In addition, if weeds are present and blooming during the time the soil is stockpiled, the soil shall either be covered with clear plastic, or a 30-foot-wide weed-free band shall be kept around the stockpiled soil. "Grow and kill" cycles are planned to ensure that any weed seeds in the salvaged soil are minimized after irrigation installation and prior to planting.

Soil salvage and replacement is particularly important for mitigation sites where a buried bank structure is planned. Salvaging the topsoil will help improve edaphic conditions for native seed germination, plant growth, and native vegetation establishment within the mitigation areas. Soil salvaging will also help to preserve soil biota, including mycorrhizal fungi. Once the salvaged soil is graded, but prior to planting, soil tests will be completed to test for suitable growing conditions. The results of soil suitability tests will determine the necessity of soil amendments, fertilizers, and/or mycorrhizae additions.

Topsoil placement and final grading shall be monitored and approved by the project biologist.

4.5.6 Grading and Site Preparation

Grading of the mitigation areas that require such activities will be accomplished during general site development and bank stabilization construction activities. Upon completion of bank protection construction work, the final grades within the restoration areas shall be established by grading the entire establishment area to elevations conducive to native habitat establishment. Topsoil salvaged during grading operations shall be dispersed over the restoration areas to a depth of approximately 12 inches and utilized to create the finished grade conditions. Any soils within the restoration areas that are deemed compacted by the project biologist shall be ripped and/or disked to a depth of 12 inches in two opposing directions and floated out to the satisfaction of the project biologist. Topographic contours of the mitigation area will include swales and hummocks that mimic the natural environment. A low-flow channel will be constructed in order to create appropriate river wash conditions.

If the quantity of salvaged topsoil is less than expected and is not enough to satisfy the above condition requiring soils to be spread approximately 12 inches thick, then salvaged soils will be placed in higher-priority locations. Since one of the main purposes of salvaging topsoil is to improve soil fertility, high priority for salvaged topsoil would be given to areas graded to a

greater depth that would be more likely to have lower soil fertility. Low-priority areas to receive salvaged topsoil include shallowly graded areas and areas where flooding poses a threat to wash newly laid soil away. If these measures still cannot compensate for less salvaged soil than expected, then salvaged soil may be spread at a thickness that will cover all areas of higher priority.

4.5.7 Weed Removal

This section addresses control of weeds within the project area during project installation. Prior to project installation, the mitigation sites must be free of invasive non-native annual grasses and forbs, as well as persistent perennial exotic species such as giant reed and tamarisk (*Tamarix ramosissima*). Mitigation sites that will require the existing soil to be removed and replaced will likely reduce the weed seed bank. However, if there is a significant lag time between initial excavation and mitigation project installation, it is possible that weeds may recruit and reproduce within that time period.

Following installation of the irrigation system and prior to installation of plant material, "grow and kill" weed removal treatments will be conducted by the restoration contractor. "Grow and kill" cycles begin with irrigation over an approximately 2-week period to encourage non-native seedling emergence. Once weeds begin to germinate and grow, a foliar application of an appropriate herbicide is applied to kill target weeds. Additional "grow and kill" cycles may be required, as recommended by the project biologist.

Weed control will require a combination of physical, chemical, and cultural control methods. The project biologist will coordinate with the restoration contractor/pesticide applicator to identify specific locations where weed control is necessary and which control methods are appropriate for the site conditions and target species. Any chemical use should be conducted using methods that minimize effects to adjacent/desirable native species.

All weed control and removal work shall be performed in compliance with all applicable federal and state laws and regulations, safety precautions, and pesticide label directions. The restoration contractor shall possess a valid California Qualified Applicator Certificate or Qualified Applicator License, and Pest Control Business License or Maintenance Gardener Pest Control Business License, as appropriate for the situation.

The restoration contractor shall refer to the specific pesticide label for information on proper timing, application rates, and any use restrictions. The restoration contractor must follow all applicable label directions, laws, regulations, and safety precautions when performing weed

control. Should the restoration contractor require a specific weed control recommendation for any control effort, he or she shall consult a licensed pest control adviser for a written recommendation.

4.6 Planting Plan

The planting plan will vary for each mitigation area depending upon site-specific conditions related to hydrology and soils. More detailed planting plans will be defined in each site-specific mitigation plan to be submitted with each construction notification package. Representative plant palettes are shown in Tables 9–19. Planting will follow grading, installation of salvaged soil and mulch, irrigation system installation, and "grow and kill" weed-control cycles.

The plant palettes have been designed to represent the composition of species that occur within the impacted vegetation communities and to create additional appropriate native vegetation communities through a formulated composition of container stock and seed mix. The species included are important components of the revegetation program. However, site-specific adjustments (e.g., seeding rates, species composition) to these generalized planting palettes may be made as deemed appropriate by the project biologist.

Table 9
Southern Cottonwood–Willow Riparian Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Application Rate (pounds/acre)*
Ambrosia acanthicarpa	Annual bursage	60	1
Amsinckia menziesii	Yellow fiddleneck	25	1
Artemisia douglasiana	Mugwort	10	2
A. dracunculus	Tarragon	10	1
Clarkia purpurea	Winecup clarkia	80	1
Elymus glaucus	Blue wildrye	85	2
Eriogonum gracile var. *gracile*	Buckwheat	15	1
E. fasciculatum	California buckwheat	10	2
Gnaphalium californicum	California everlasting	2	1
Isocoma menziesii	Goldenbush	15	2
Lasthenia californica	Coast goldfields	50	1
Layia platyglossa	Tidy tips	60	1
Leymus triticoides	Creeping wild rye	80	1
Lupinus bicolor	Lindley's annual lupine	90	2
Mimulus aurantiacus	Bush monkeyflower	2	2
Phacelia cicutaria	caterpillar phacelia	80	1
Verbena lasiostachys	Western verbena	50	1
		Total pounds/acre	**23**

Table 9
Southern Cottonwood–Willow Riparian Plant Palette

Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Baccharis salicifolia	Mulefat	1 gallon	8
Ericameria palmeri var. *pachylepis*	Goldenbush	1 gallon	6
Leymus condensatus	Giant wild rye	1 gallon	6
Pluchea sericea	Arrow weed	1 gallon	8
Populus fremontii	Fremont cottonwood	1 gallon	20
Quercus agrifolia	Coast live oak	1 gallon	25
Rhus trilobata	Skunkbrush	1 gallon	4
Ribes aureum	Golden currant	1 gallon	6
Salix exigua	Sandbar willow	1 gallon	10
S. laevigata	Red willow	1 gallon	12
S. lasiolepis	Arroyo willow	1 gallon	14
Salvia mellifera	Black sage	1 gallon	6
Sambucus mexicana	Mexican elderberry	1 gallon	12

Table 10
Mulefat Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Ambrosia acanthicarpa	Annual bursage	60	1.0
Artemisia douglasiana	Mugwort	10	2.0
Iva axillaris	Poverty weed	15	2.0
Lessingia glandulifera	Lessingia	80	1.0
Phacelia cicutaria	caterpillar phacelia	80	1.0
Pluchea odorata	Marsh fleabane	15	0.5
Senecio flaccidus var. *douglasii*	Butterweed	5	5.0
		Total pounds/acre	**12.5**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Baccharis salicifolia	Mulefat	1 gallon	8
Eriodictyon crassifolium var. *nigrescens*	Yerba santa	1 gallon	6
Opuntia basilaris var. *ramosa*	Beaver-tail cactus	1 gallon	6
Pluchea sericea	Arrow weed	1 gallon	8
Ribes aureum	Golden currant	1 gallon	6
Salix exigua	Sandbar willow	1 gallon	10
S. lasiolepis	Arroyo willow	1 gallon	14

Table 10
Mulefat Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Sambucus mexicanus	Mexican elderberry	1 gallon	12

Table 11
Arrow Weed Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Ambrosia acanthicarpa	Annual bursage	60	1
Artemisia californica	California sagebrush	10	1
A. tridentata	Big sagebrush	10	2
Atriplex canescens ssp. *canescens*	Four-wing saltbush	35	1
Clarkia purpurea	Winecup clarkia	80	1
Eriogonum gracile var. *gracile*	Buckwheat	15	1
E. fasciculatum	California buckwheat	10	5
Leymus triticoides	Alkali rye	80	1
L. condensatus	Giant wild rye	70	2
Phacelia cicutaria	caterpillar phacelia	80	1
		Total pounds/acre	**16**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Baccharis salicifolia	Mulefat	1 gallon	8
Pluchea sericea	Arrow weed	1 gallon	8
Salix exigua	Sandbar willow	1 gallon	8

Table 12
Southern Coast Live Oak Riparian Forest Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Amsinckia menziesii var. *menziesii*	Yellow fiddleneck	25	1.0
Artemisia californica	California sagebrush	10	2.0
Bromus carinatus	California brome	85	6.0
Clarkia purpurea	Winecup clarkia	80	0.5
Collinsia heterophylla	Purple Chinese houses	85	2.0
Eriogonum gracile var. *gracile*	Buckwheat	15	1.0

Table 12
Southern Coast Live Oak Riparian Forest Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
E. fasciculatum	California buckwheat	10	6.0
Isocoma menziesii	Goldenbush	15	3.0
Lasthenia californica	Coast goldfields	50	0.5
Leymus triticoides	Alkali rye	80	3.0
Mimulus aurantiacus	Bush monkeyflower	2	2.0
Nassella cernua	Nodding needlegrass	75	3.0
Nemophila menziesii	Baby blue-eyes	75	2.0
Phacelia cicutaria	caterpillar phacelia	80	1.0
Trichostema lanatum	Woolly bluecurls	40	2.0
		Total pounds/acre	**35.0**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Juglans californica	Black walnut	1 gallon	20
Leymus condensatus	Giant rye grass	1 gallon	6
Marah macrocarpus	Wild cucumber	1 gallon	30
Opuntia littoralis	Coastal prickly-pear	1 gallon	6
Pluchea sericea	Arrow weed	1 gallon	8
Prunus ilicifolia	Holly-leaf cherry	1 gallon	12
Quercus agrifolia	Coast live oak	1 gallon	20
Rhus trilobata	Squaw bush	1 gallon	6
Ribes californicum	California gooseberry	1 gallon	6
Rosa californica	California rose	1 gallon	6
Sambucus mexicana	Mexican elderberry	1 gallon	12

Table 13
Arrow Weed Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Artemisia tridentata ssp. *tridentata*	Big basin sagebrush	10	1
Atriplex canescens ssp. *canescens*	Four-wing saltbush	35	1
Chrysothamnus nauseosus	Rubber rabbit brush	10	3
Eriastrum densifolium	Perennial eriastrum	5	1
Eriogonum gracile var. *gracile*	Buckwheat	15	1
Gnaphalium californicum	California everlasting	2	1
Isocoma menziesii	Goldenbush	15	3

Table 13
Arrow Weed Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Lessingia glandulifera	Lessingia	80	1
Lupinus bicolor	Lindley's annual lupine	90	6
Phacelia cicutaria	caterpillar phacelia	80	2
		Total pounds/acre	**20**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Artemisia tridentata ssp. *parishii*	Sagebrush	1 gallon	6
Artemisia tridentata ssp. *tridentata*	Great basin sagebrush	1 gallon	6
Opuntia californica var. *parkeri*	Cane cholla	1 gallon	6
Eriodictyon crassifolium var. *nigrescens*	Yerba santa	1 gallon	6
Eriogonum fasciculatum	Flat-topped buckwheat	1 gallon	6
Malacothamnus fasciculatus	Chaparral mallow	1 gallon	6
Prunus ilicifolia	Holly-leaf cherry	1 gallon	10
Quercus agrifolia	Coast live oak	1 gallon	25
Yucca whipplei	Our Lord's candle	1 gallon	6

Table 14
California Sagebrush Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Artemisia californica	California sagebrush	10	6
Brickellia californica	California brickellbush	3	2
Chaenactis glabriuscula	Yellow pincushion	10	2
Encelia actoni	Acton's encelia	15	5
Eriogonum fasciculatum	California buckwheat	10	6
Gnaphalium californicum	California everlasting	2	1
Isocoma menziesii	Goldenbush	15	2
Lasthenia californica	Coast goldfields	50	1
Lessingia glandulifera	Lessingia	80	1
Lotus scoparius var. *scoparius*	Deerweed	85	1
Lupinus bicolor	Lindley's annual lupine	90	6
Nassella lepida	Foothill needle grass	65	1
N. pulchra	Purple needlegrass	75	1
Phacelia cicutaria	caterpillar phacelia	80	1

Table 14
California Sagebrush Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Trichostema lanatum	Woolly bluecurls	5	4
		Total pounds/acre	**40**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Artemisia californica	California sagebrush	1 gallon	5
Isomeris arborea	Bladderpod	1 gallon	6
Leymus condensatus	Giant wild rye	1 gallon	6
Malacothamnus fasciculatus	Chaparral mallow	1 gallon	5
Opuntia littoralis	Prickly-pear cactus	1 gallon	6
Ribes californicum	California gooseberry	1 gallon	5
Salvia leucophylla	Purple sage	1 gallon	6

Table 15
Cismontane Alkali Marsh Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Ambrosia psilostachya	Western ragweed	6	1.0
Atriplex canescens ssp. *canescens*	Four-wing saltbush	35	1.0
Distichlis spicata	Salt grass	70	4.0
Leymus triticoides	Alkali rye	80	1.0
Pluchea odorata	Marsh fleabane	15	0.5
		Total pounds/acre	7.5
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Anemopsis californica	Yerba mansa	1 gallon	3
Baccharis salicifolia	Mulefat	1 gallon	8
Distichlis spicata	Salt grass	liners	1
Juncus acutus ssp. *leopoldii*	Southwestern spiny rush	1 gallon	5
Juncus mexicana	Mexican rush	1 gallon	3
Malvella leprosa	Alkali mallow	1 gallon	3
Scirpus americanus	Winged three-square	1 gallon	3

Table 16
Southern Willow Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Application Rate (pounds/acre)*
Artemisia douglasiana	Mugwort	10	2
A. dracunculus	Tarragon	10	1
Elymus glaucus	Blue wildrye	85	2
E. fasciculatum	California buckwheat	10	2
Gnaphalium californicum	California everlasting	2	1
Isocoma menziesii	Goldenbush	15	2
Lasthenia californica	Coast goldfields	50	1
Layia platyglossa	Tidy tips	60	1
Leymus triticoides	Creeping wild rye	80	1
Lupinus bicolor	Lindley's annual lupine	90	2
Mimulus aurantiacus	Bush monkeyflower	2	2
Verbena lasiostachys	Western verbena	50	1
		Total pounds/acre	**18**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Baccharis salicifolia	Mulefat	1 gallon	8
Leymus condensatus	Giant wild rye	1 gallon	6
Pluchea sericea	Arrow weed	1 gallon	8
Rhus trilobata	Skunkbrush	1 gallon	4
Ribes aureum	Golden currant	1 gallon	6
Salix exigua	Sandbar willow	1 gallon	10
S. laevigata	Red willow	1 gallon	12
S. lasiolepis	Arroyo willow	1 gallon	12
Sambucus mexicana	Mexican elderberry	1 gallon	12

Table 17
Herbaceous Wetlands Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Ambrosia psilostachya	Western ragweed	6	2
Distichlis spicata	Salt grass	70	3
Leymus triticoides	Alkali rye	80	2
Pluchea odorata	Marsh fleabane	15	1
		Total pounds/acre	**8**

Table 17
Herbaceous Wetlands Plant Palette

Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Anemopsis californica	Yerba mansa	1 gallon	3
Baccharis salicifolia	Mulefat	1 gallon	10
Juncus mexicana	Mexican rush	1 gallon	3
Pluchea sericea	Arrow weed	1 gallon	10
Salix exigua	Sandbar willow	1 gallon	10
Scirpus americanus	Winged three-square	1 gallon	3

Table 18
Alluvial Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Artemisia tridentata ssp. *tridentata*	Big basin sagebrush	10	1
Atriplex canescens ssp. *canescens*	Four-wing saltbush	35	1
Chrysothamnus nauseosus	Rubber rabbit brush	10	3
Eriastrum densifolium	Perennial eriastrum	5	1
Eriogonum fasciculatum	California buckwheat	15	4
Gnaphalium californicum	California everlasting	2	1
Isocoma menziesii	Goldenbush	15	3
Lessingia glandulifera	Lessingia	80	1
Lupinus bicolor	Lindley's annual lupine	90	2
Phacelia cicutaria	NCN	80	2
		Total pounds/acre	**19**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Artemisia tridentata ssp. *tridentata*	Great basin sagebrush	1 gallon	6
Eriodictyon crassifolium var. *nigrescens*	Yerba santa	1 gallon	6
Eriogonum fasciculatum	California buckwheat	1 gallon	6
Yucca whipplei	Our Lord's candle	1 gallon	6

Table 19
Mexican Elderberry Scrub Plant Palette

Seed Mix			
Scientific Name	*Common Name*	*Minimum Percent Live Seed*	*Rate (pounds/acre)*
Amsinckia menziesii var. *menziesii*	Yellow fiddleneck	25	1.0
Artemisia californica	California sagebrush	10	2.0
Bromus carinatus	California brome	85	6.0
Clarkia purpurea	Winecup clarkia	80	0.5
Collinsia heterophylla	Purple Chinese houses	85	2.0
E. fasciculatum	California buckwheat	10	6.0
Lasthenia californica	Coast goldfields	50	0.5
L. condensatus	Giant wild rye	70	2.0
Mimulus aurantiacus	Bush monkeyflower	2	2.0
Nassella cernua	Nodding needlegrass	75	3.0
Nemophila menziesii	Baby blue-eyes	75	2.0
Phacelia cicutaria	caterpillar phacelia	80	1.0
Trichostema lanatum	Woolly bluecurls	40	2.0
		Total pounds/acre	**30.0**
Container Plants			
Scientific Name	*Common Name*	*Size*	*Spacing (feet on center)*
Juglans californica	Black walnut	1 gallon	20
Leymus condensatus	Giant rye grass	1 gallon	6
Marah macrocarpus	Wild cucumber	1 gallon	30
Prunus ilicifolia	Holly-leaf cherry	1 gallon	12
Quercus agrifolia	Coast live oak	1 gallon	20
Rhus trilobata	Squaw bush	1 gallon	6
Ribes californicum	California gooseberry	1 gallon	6
Rosa californica	California rose	1 gallon	6
Sambucus mexicana	Mexican elderberry	1 gallon	10

4.6.1 Container Planting

Plant materials used to implement the planting plan will generally include 1-gallon container stock, mulched material, and native seed as indicated in Tables 9–19. All container plants will be checked for viability and general health upon arrival at the mitigation site by the project biologist. Plant materials not meeting acceptable standards will be rejected. Plant species and quantities will be confirmed after delivery by the project biologist. General locations for installation will be designated on the construction documents. Specific locations for installation will be designated on planting plans or marked on site temporarily with pin flags by the project biologist.

Standard planting procedures will be employed for installing container plants. Holes approximately twice the size of the root ball of the plant will be dug using a post hole digger or power auger. Holes will be filled with water and allowed to drain immediately prior to planting. Backfill soil containing amendments (as directed by the project biologist) will be placed in every planting hole following soaking, with the top of the root ball entirely below grade. Some woody wetland species (e.g., willows) specified by the project biologist will be planted into the soil slightly deeper than this standard, approximately 2 to 4 inches above the root collar of the plant. This additional planting depth for these species will help ensure greater rooting strength and provide additional protection against seasonal scour and/or uprooting due to high flow velocities after winter storm events.

Mulch will be raked around installed container plants to a diameter of 2 feet or 1.5 times the drip line, whichever is greater. Mulch will be 3 to 4 inches deep. This mulch is in addition to the mulch made from salvaging native material from on site. Herbivory cages are not expected to be necessary, as a certain level of herbivory is planned for and built into plant palettes. Should herbivory increase beyond expected amounts, the project biologist has the ability to take steps to counteract herbivory. See **Section 8.5.1** for more information on addressing herbivory problems.

4.6.2 Seed Application (Hydroseed and/or Drill Seeding)

Following container plant installation, mitigation areas will be stabilized with specified hydroseed mixes (Tables 9–19) and a light application of a soil binder, primarily for erosion control. Individual mixes have been prescribed for different vegetation communities. Labels for each mixture will be inspected and approved by the project biologist prior to mixing and application. All mixes are to include the specified seed mix at the prescribed rate per acre, virgin wood cellulose fiber mulch at 2,000 pounds per acre (if applicable), commercial fertilizer at the specified rate as directed by the project biologist during finish grading, and a commercial binder ("Guar gum," "super tack," or equivalent) at 100 pounds per acre.

Applying seed via hydroseed instead of drill seeding will allow for the installation of the irrigation system prior to "grow and kill" cycles being conducted before seeding. Irrigation during the "grow and kill" cycles will greatly increase the germination among weeds and improve the ability to remove them from the seed bank.

Drill seeding may be useful in areas where an irrigation system is not being installed (i.e., the temporary mitigation areas) if/when seeding is decided to be necessary. If drill seeding is decided upon as the method of application, it must be done prior to container planting, which could be done immediately after the drill seeding.

4.7 Irrigation Plan

The primary goal of this Plan is to establish native vegetation communities capable of maintaining and supporting themselves in perpetuity. However, native container plants and seed may require irrigation for establishment on the mitigation site, especially during summer months. When an irrigation system is deemed appropriate and necessary, a temporary aboveground overhead spray irrigation system will be installed. Where necessary, drip irrigation may also be used to deliver irrigation water directly to woody container plantings. The irrigation system shall be utilized to support the container stock plantings and seed mixtures until they can survive on their own based on observed and predicted seasonal rainfall and effective plant rooting depth.

All irrigation will be installed by the restoration contractor according to the construction documents and specifications associated with the project-specific mitigation plans. The irrigation systems will be designed with aboveground components to facilitate removal once the system is decommissioned.

Irrigation will be used during the plant establishment period of the project. It is planned that irrigation use will be discontinued at least 3 years before the end of the 5-year maintenance period to demonstrate the self-sustainability of the established vegetation communities.

Irrigation design and layout will be provided with the final construction plans. The irrigation systems may utilize a series of solar- or battery-operated controllers that operate independent irrigation circuits, minimizing irrigation maintenance requirements for the site. Irrigation on site will likely consist of polyvinyl chloride piping staked at grade with coverage provided by spray heads.

Consideration shall be taken to keep irrigation components out of the way of flood disturbance. Should portions of the irrigation systems become damaged or lost due to unforeseen flood events, the restoration contractor will be required to replace lost components and/or modify the design based on recommendation of the project biologist.

4.8 Construction Drawings and As-Built Conditions

Following approval of this mitigation plan and subsequent site-specific mitigation plans, a final design will be prepared and integrated into construction drawings and specifications. Construction documents will incorporate the most current site condition information available. The plan package will include a site plan showing proposed work areas, construction details, irrigation and planting plans, and any additional grading. Construction documents shall provide location and details of any resource agency–required signage or access restrictions.

Specifications shall define the scope of mitigation construction activities, the quality and type of materials to be used, permit requirements, specific performance-based standards of construction quality, and, when appropriate, specific required construction methodologies. Specifications shall be prepared in a recognized industry format such as Construction Standards Institute (CSI) format or Greenbook.

As-built plans for individual mitigation projects will be required only if the installation of the mitigation project substantially deviates from the approved site-specific mitigation plan and/or construction documents. If necessary, as-built plans will reflect changes to the configuration of vegetation community areas and site elevations that may affect project success. As-built plans will include field recordation of final mitigation site limits and geographic information system–based record mapping of mitigation sites down to the vegetation community level.

5.0 MAINTENANCE ACTIVITIES DURING THE MONITORING PERIOD

Because the goal of the maintenance and monitoring plan is to establish a natural riparian system that can support itself without maintenance, the primary effort of the maintenance plan is concentrated in the first few seasons of plant growth when weeds can easily outcompete native plants. The intensity of the maintenance activity is expected to subside each year as the native plant materials become more established and as local competition from non-native plants for resources in the mitigation areas is minimized through ongoing control.

5.1 Maintenance Activities

Maintenance activities will be conducted concurrently with the installation of the mulch, container plants, and seed materials in the mitigation areas and will continue throughout the initial 120-day establishment period and through the 5-year maintenance and monitoring period, concluding once success criteria have been met.

5.1.1 Weed Control

Ongoing weed control activities will occur within the mitigation areas throughout the 5-year maintenance period. All debris and slash generated from weed-removal activities will be disposed of off site in a legally acceptable manner. The goal of the weed control efforts will be to maintain the project with less than 5% cover of non-native plant species for the 5-year maintenance period.

Target weed species include all perennial exotic and weedy annual forb species listed on the Cal-Invasive Plant Council *California Invasive Plant Inventory* (Cal-IPC 2006, 2007). Specific focus will be on species that pose a risk to the development of the planned vegetation communities. Appropriate measures for control will be determined based on current literature and known methods of control.

Weed-control measures may include direct physical or mechanical removal (e.g., cutting with weed whip machines, mowing) and herbicide application. Weeding will be performed as recommended by the project biologist to keep any weeds establishing on the mitigation site at manageable levels. Specified weed species will be controlled before seed-set. (Other species that appear may need to be controlled if deemed necessary by the project biologist.)

Non-native grasses will be controlled within the project boundaries during the 5-year monitoring period, but complete eradication may not be possible due to the ubiquitous nature of their

distribution within the region. Presence of non-native grasses will not be used as a criterion for project success. Herbicide control will be used for persistent plant species specified by the project biologist, as well as any additional perennial species that are low-growing and are difficult to control by other methods. The restoration contractor should coordinate with the project biologist and Newhall Land to identify specific sites where chemical herbicide may be used. Any herbicide treatment must be specified by a licensed pest control adviser and applied by a licensed pest control applicator.

5.1.2 Trash Removal

Trash will be removed from the mitigation areas during maintenance visits. Trash consists of all man-made materials, equipment, or debris dumped, thrown, washed, blown, and left within the mitigation areas. Trash and inorganic debris washed or blown onto the mitigation site will be removed regularly. Deadwood and leaf litter from native trees and shrubs will not be removed. Downed logs and leaf litter provide valuable microhabitats for invertebrates, reptiles, small mammals, and birds. In addition, the decomposition of deadwood and leaf litter is essential for the replenishment of soil nutrients and minerals.

5.1.3 Irrigation Maintenance

Mitigation areas may be irrigated to promote plant survival during the drier parts of the year, primarily the summer months. Irrigation may be used in winter months to simulate an average or above-average rain season if natural precipitation is lacking. It is expected that the irrigation system will be utilized for a maximum of 2 years, excepting conditions for implementation of adaptive management activities. Irrigation volume will be gradually reduced over time to acclimate plants to a non-irrigated condition prior to complete cessation of irrigation. Irrigation from June to November may be minimized to allow plants to experience normal drought cycles and to promote appropriate root growth. The restoration contractor will maintain the irrigation system at the optimum level of operation.

Consultation with the project biologist will be necessary to determine the timing for the cessation of irrigation. Irrigation should stop at the earliest possible date without risking substantial loss of plantings. It is expected that the irrigation system will be abandoned no earlier than the end of Year 1. Irrigation will most likely be discontinued by the end of Year 2 of the 5-year monitoring and maintenance period. Irrigation components, such as valves and sprinkler heads, may be salvaged for reuse elsewhere at the end of the establishment period. As previously stated, if irrigation is deemed necessary beyond Year 2, adaptive management methods may be necessary to bring the project up to success criteria.

5.2 Responsible Parties

The responsible parties described in **Section 1.1** are also responsible for the performance of maintenance during the monitoring period.

5.3 Schedule

The maintenance schedule will commence once the mitigation construction is complete and accepted by the owner. Maintenance activities will be performed on a monthly basis for the first 120 days after installation. Thereafter, the frequency of maintenance activities may be decreased as appropriate to a minimum of quarterly, depending on factors such as native vegetation development, size and diversity of non-native populations, legacy weed seed bank, presence of trash, irrigation schedule, public access, etc. A detailed maintenance schedule will be prepared and presented in each site-specific mitigation plan to be included in each construction notification package.

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6.0 MONITORING PLAN FOR THE COMPENSATORY MITIGATION SITES

The purposes of monitoring of the mitigation sites are to: (1) monitor the progress of the native revegetation area by assessing whether native vegetation establishment has achieved the performance criteria established for the project, and (2) direct and monitor the maintenance activities and determine remedial actions in a manner that ensures that appropriate maintenance occurs in a timely manner. The monitoring shall be performed by a qualified biologist or habitat restoration specialist. Following installation at the mitigation sites, monitoring shall be required for 5 years or until success criteria are met.

The project biologist shall be responsible for monitoring the activities of all contractors associated with mitigation implementation during finish grading, soil amending, irrigation installation, mulch application, container planting, and seeding; for monthly monitoring during the 120-day plant establishment/maintenance period; and for quarterly monitoring during the 5-year maintenance and monitoring period. The project biologist will communicate and coordinate with the restoration contractor to ensure the timely performance of project activities. The project biologist shall submit progress reports to Newhall Land during installation and 5-year monitoring site visits, and annual reports to the Corps and the permittee each year on the anniversary date during the 5-year monitoring period. The mitigation project areas shall be accessible to Corps staff throughout project review and installation and during the 5-year maintenance and monitoring period.

6.1 Performance Standards and Success Criteria

The mitigation sites will be considered "complete" upon meeting all of the following success criteria. In a construction notification letter, the permittee may request modification of success criteria on a project-by-project basis. Acceptance of such requests will be at the discretion of the Corps.

- Regardless of the date of initial planting, any restoration site must have been without active manipulation by irrigation for a minimum of 3 years prior to CDFG and the Corps' consideration of successful completion.
- The percent cover and species richness of native vegetation shall be evaluated based on local reference sites for the plant communities in the impacted areas. Success criteria will be established at the time of a final mitigation plan for the specific mitigation site, and will generally follow the success criteria shown in Tables 20 and 21.
- Non-native species cover will be no more than 5% absolute cover.

Giant reed, tamarisk, perennial pepperweed (*Lepidium latifolium*), tree of heaven (*Ailanthus altissima*), pampas grass (*Cortaderia selloana)*, and any species listed on the California State Agricultural list, or Cal-IPC list of noxious weeds will be controlled on the revegetation site as of the date of completion approval per Tables 20 and 21.

- Mitigation sites meet the criteria for Difficult Wetlands Situations in the Arid West; Chapter 5 of the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (http://www.usace.army.mil/CECW/Documents/cecwo/reg/trel08-28.pdf) to provide targeted jurisdictional mitigation acreage.
- Using the HARC assessment methodology described in **Subsection 2.1.1**, or other approved functional assessment methodology, the compensatory mitigation site shall meet or exceed the baseline functional scores (HARC AW-score units) of the impact area in jurisdictional waters of the United States. If the compensatory mitigation site(s) cannot meet or exceed the baseline functional score of the impact area(s) (HARC AW-score units) in jurisdictional waters of the United States, additional mitigation area may be required to compensate for the functional loss.
- The permittee shall mitigate all temporary construction impacts affecting waters of the United States, by restoring pre-project contours and revegetating temporary impact areas with appropriate native vegetation after completion of construction in the area, in accordance with the Mitigation Plan. At a minimum, the acreage and functions and services of the revegetation area shall equal or exceed the acreage and functions and services of the temporary impact areas. Functions and services for temporary impact and revegetation areas shall be compared annually using HARC-AW units and/or a similar Corps-approved method to assess functions and services as described in the Mitigation Plan.
- To demonstrate a minimum of 1:1 replacement of functions and services, permanent impact and compensatory mitigation areas shall be compared annually using HARC-AW (Hybrid Assessment of Riparian Condition- Area Weighted) units and/or a similar Corps-approved method to assess functions and services as described in the above Mitigation Plan.

Example performance criteria have been established for three planned vegetation communities: southern cottonwood–willow riparian, arrow weed scrub, and mulefat scrub. The criteria are based upon expected vegetative development within properly functioning native vegetation of the same type and are listed in Table 20. Depending on specific site conditions at the planned mitigation site, these performance criteria may be revised in final mitigation plans. Performance criteria for additional vegetation communities not shown here will be developed during the

preparation of site-specific mitigation plans and will be based on reference communities of the same type and occurring within similar conditions.

Performance criteria will be utilized to assess the annual progress of the restoration areas and are regarded as interim project objectives designed to achieve the final goals. Fulfillment of performance criteria will indicate that the mitigation areas on the project site are progressing toward the vegetation community types and functions that constitute the long-term goals of the plan. Performance criteria for areas permanently impacted (establishment areas) include a minimum container plant survivorship, an average height requirement of planted tree species, and a minimum required native plant cover. Performance criteria for vegetative cover within river wash have not been established because the ultimate goal is to recreate the mostly barren nature of the vegetation community type and the routine scouring. Performance criteria for temporarily impacted areas (revegetation areas) include minimum container plant survivorship, an average height requirement of planted tree species, and a minimum required native plant cover (Table 21).

Table 20
Performance Guidelines for Establishment Areas (Permanent Impact)

Criteria	Year 1[1]	Year 2	Year 3	Year 4	Year 5
Container plant survival[2]	100%	80%	80%	70%	70%
Container Tree Heights					
Fremont cottonwood	4 ft.	6 ft.	8 ft.	10 ft.	12 ft.
Coast live oak	2 ft.	3 ft.	4 ft.	5 ft.	6 ft.
Arroyo willow	4 ft.	6 ft.	8 ft.	10 ft.	12 ft.
Sandbar willow	2 ft.	3 ft.	4 ft.	5 ft.	6 ft.
Vegetative Cover					
Southern cottonwood–willow riparian	15%	30%	40%	60%	80%
Arrow weed scrub	10%	20%	35%	55%	75%
Mulefat scrub	10%	20%	25%	40%	50%
Southern coast live oak riparian forest	15%	25%	35%	50%	70%
Cismontane Alkali Marsh	—	—	—	—	100%
Perennial non-native/exotic cover[3]	5%	5%	5%	5%	5%

[1] Percentages based upon visual estimates.
[2] All dead plants shall be replaced unless their function is anticipated to be performed by natural recruitment.
[3] The cover of non-native plant species at the mitigation sites shall not exceed 5% at any time within the 5-year maintenance period.

Table 21
Performance Guidelines for Revegetation and Enhancement Areas (Temporary Impact)

Criteria	Year 1[1]	Year 2	Year 3	Year 4	Year 5
Container plant survival[2]	—	100%[4]	80%[4]	80%[4]	70%[4]
Container Tree Heights					
Fremont cottonwood	—	4 ft[4]	6 ft[4]	8 ft[4]	10 ft[4]
Arroyo willow	—	4 ft[4]	6 ft[4]	8 ft[4]	10 ft[4]
Sandbar willow	—	2 ft[4]	3 ft[4]	4 ft[4]	5 ft[4]
Native Cover					
Southern cottonwood–willow riparian	15%	30%	45%	60%	80%
Arrow weed scrub	10%	20%	35%	55%	75%
Mulefat scrub	10%	20%	25%	40%	50%
Perennial non-native/exotic cover[3]	5%	5%	5%	5%	5%

[1] Percentages based upon visual estimates.
[2] All dead plants shall be replaced unless their function is being performed or is reasonably anticipated to be performed by natural recruitment.
[4] Only required if native cover does not reach target native cover at the end of Year 1 and if the project biologist recommends remedial seeding/planting.

If mitigation efforts fail to meet the performance standards listed in any one year, the project biologist may recommend remedial actions to be implemented (e.g., supplemental planting, seeding, transplanting) that will enhance the vegetation communities to a level in conformance with these standards. In addition, if native plant cover does not reach 50% of the pre-construction plant cover in the revegetation areas, these areas will be revegetated. River wash will not need to reach 50% of the pre-construction plant cover due to expected periodic scouring. Scouring is a regular disturbance with this vegetation community that makes predicting plant cover impossible. Scouring will provide new seeds/propagules to replace the plants that are swept away.

6.2 Target Functions and Values

The functions and services of the mitigation sites will be evaluated using the HARC assessment methodology (Appendix B), or other approved functional assessment methodology. If the compensatory mitigation sites do not replace the aggregate lost functional HARC AW units of the impact areas, additional mitigation area may be required to compensate for the functional loss. The success of mitigation areas will be judged in part by the functional assessment scores that are achieved.

6.3 Target Hydrologic Regime

Target hydrologic regimes are intended to mimic the pre-construction hydrology conditions. Corps jurisdictional area will be defined by the 10-year storm event. Areas established with hydrophytic vegetation within these jurisdictional areas are considered to be wetlands in accordance with Difficult Wetlands Situations in the Arid West; Chapter 5 of the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). For each project, the site-specific mitigation plan will include a description of the anticipated post-project hydrology system characteristics and how the system will support the target riparian vegetation communities. Generally, the target regime for tributaries will be maintained through appropriate connections to headwater areas of the tributary drainages. Urban runoff will be controlled by water quality basins that will collect stormwater before discharge into the tributary drainage. The passage of stormwater through these basins will regulate the flow of runoff into tributary drainages, thereby more closely managing the peak flows. River hydrology will remain unchanged for mitigation sites along the main river channel.

6.4 Target Jurisdictional and Non-Jurisdictional Acreages to be Established, Restored, Enhanced, and/or Preserved

A variety of vegetation types and jurisdictional areas will be created, restored, enhanced, and preserved throughout the Project area at designated mitigation sites. On-site (i.e., in-place) mitigation is planned for temporary impacts.

6.5 Monitoring Methods

After each site visit, a site observation report will be provided to Newhall Land and to the restoration contractor. The site observation report will include a description of the project status, site conditions, and any maintenance recommendations or remedial actions.

Monitoring of the mitigation areas will be performed monthly by the project biologist during the 120-day establishment period and quarterly throughout the duration of the project. Both horticultural (qualitative) monitoring and biological (quantitative) monitoring will be conducted at the mitigation areas. Permanent photodocumentation stations will be established along each transect to record the progress of the mitigation sites and graphically record plant establishment over the 5-year period. In the annual report, the project biologist will provide a summary of results of the monitoring activities completed during the prior year.

6.5.1 Construction/Installation Monitoring

The project biologist will make regular site visits during key milestones associated with implementation of each mitigation project. The project biologist also will review activities for conformance to this plan, environmental permit conditions, and the requirements of contract plans and specifications. Each site observation visit will be documented in an observation report. Construction shall be photodocumented and will be included in observation reports, as needed.

6.5.2 120-Day Plant Establishment Period and Monitoring

Upon successful completion of project installation as determined by the project biologist, the 5-year monitoring phase will begin. During the first 120 days of the 5-year monitoring period, container plants will be monitored for health and vigor. Should any of the container plants die during the 120-day plant establishment period, they will be replaced in kind at the expense of the restoration contractor to 100% of the original quantity at the recommendation of the project biologist. Should seed/hydroseed fail to germinate within the 120-day plant establishment period, it shall be reapplied at the expense of the contractor at the recommendation of the project biologist. The project biologist will perform monitoring monthly (every 30 days) during the 120-day plant establishment period and will make recommendations to the contractor to ensure conformance with the 120-day plant establishment requirements.

6.5.3 Qualitative Monitoring

Data on native vegetation coverage, weed presence, and site progress will be collected during monitoring visits and used in the annual monitoring report. Qualitative monitoring will be conducted to assess native container plant vigor and development, seedling recruitment from native hydroseed and natural sources, soil moisture content, presence/absence of plant pests or diseases, erosion and/or drainage conditions on site, presence/absence of non-native or invasive plant species, trash or debris accumulation, wildlife presence/absence, and project fencing/signage. All qualitative monitoring visits to the mitigation site will be documented with a monitoring report, which will be forwarded to Newhall Land and the restoration contractor. Any project deficiencies will be noted in the monitoring report, with accompanying recommendations for maintenance or remedial actions.

6.5.4 Quantitative Monitoring

Quantitative monitoring will be conducted to determine container plant survivorship/mortality, total native species cover and composition, and total non-native species cover and composition. Quantitative monitoring will be conducted by establishing permanent vegetation transects within

the mitigation areas at random locations at the end of Year 1. These transects will be utilized to help determine achievement of the yearly performance standards. Permanent photodocumentation stations will be established along each transect to record the progress of the mitigation site and graphically record plant establishment over the 5-year period.

Quantitative monitoring (i.e., data collection from transect locations) shall utilize a consistent sampling methodology throughout the monitoring period to ensure accuracy in comparative analysis. Quantitative monitoring shall include conducting dead plant counts to determine survival of the container stock, assembling species lists of species establishing from seed and visually estimating native and exotic plant cover within the mitigation area. Transect monitoring will be utilized to measure percent native/non-native cover during Years 2 through 5. The Habitat Restoration Specialist/Monitor shall determine transect locations, using a stratified-random sampling method. One transect shall be established in a reference site in proximity to the mitigation area to collect data to be used for comparison against the mitigation effort.

Transects will be sampled using the point-intercept method. A transect tape will be run between two posts, and a vegetative intercept line will be visually projected above and below the tape at every half-meter mark. Each native or non-native species that intercepts the projected line will be recorded. In addition to species, a vertical stratum for each "hit" will be recorded. Vertical strata include the herbaceous layer (0.0 to 1.0 meter), shrub layer (1.0 to 3.0 meters), and canopy layer (3.0 meters and higher). All plant species present within a 5-meter-wide "species richness" portion of each transect will be recorded. All data will be utilized to determine total percent plant cover, vertical structural diversity, percent native cover, percent non-native cover, overall species richness and diversity, and target species growth.

Quantitative monitoring will be conducted once annually in the fall at the end of the growing season to capture the project's complete growth. The project biologist will determine the appropriate number of transects to be installed on a site-by-site basis, but there shall be at least one transect per vegetation community type and at least one transect per every 3 acres. Transects will be 50 meters long, or the maximum length possible in areas with less than 50 linear meters available.

6.6 Monitoring Schedule

Monitoring will be performed throughout the 5-year maintenance and monitoring period as defined in each site-specific mitigation plan to be prepared and included in construction notification packages. In general, qualitative monitoring will be conducted on a quarterly basis during the initial years of mitigation establishment followed by quarterly monitoring in subsequent years until performance criteria are reached. Quantitative monitoring activities will

be performed annually in the fall at the end of the growing season to collect vegetation data for analysis and inclusion in the annual monitoring report.

6.7 Annual Monitoring Reports

An annual monitoring report will be submitted to the permitting agencies during the 5-year maintenance and monitoring period for each individual mitigation project. The monitoring reports will describe the existing conditions of the mitigation areas based on a HARC functional assessment based on functions and services metrics (Appendix B), routine site observations, and quantitative vegetation data collection. The reports will provide a comparison of annual success criteria with field conditions; calculate HARC AW units present at the conclusion of the monitoring year; identify all shortcomings of the project and project implementation; and recommend remedial measures necessary for the successful completion of the mitigation project. Each yearly report will provide a trend summary of the accumulated data. Annual reports also will include the following:

- A list of names, titles, and companies of all persons who prepared the content of the annual report and participated in monitoring activities
- A copy of the resource agency permits, any special conditions, and any subsequent letters of modification
- Prints of biological monitoring photographs
- Maps identifying monitoring areas, planting zones, and weed-removal areas as appropriate
- Quantitative data from transect measurements in Years 2 through 5 of the mitigation project.
- HARC metric scores (work sheet) and overall HARC score

The annual monitoring reports will be submitted to the resource agencies by April 1 of each year with the Annual Mitigation Status Report, and will report on mitigation status from the prior growing season (through fall of the prior year). The Annual Mitigation Status Report is required for projects installed under the Newhall Ranch Specific Plan, Mitigation Measure SP-4.6-9 (County of Los Angeles 2003).

7.0 COMPLETION OF COMPENSATORY MITIGATION

Two levels of mitigation completion will occur during RMDP implementation: 1) Individual mitigation site completion and final project-wide completion of compensatory mitigation.

Individual mitigation site completion will be based on success criteria and the establishment of jurisdictional acreage per **Section 7.1**. Upon submitting the annual report for the final year of each individual mitigation project, Newhall Land will notify the Corps of the degree to which final success criteria have been met and will request acceptance of the site, as appropriate. Completion of mitigation at individual sites will be supported by appropriate quantitative measures as described in **Section 7.1**. Following receipt of the notification of completion, the Corps may visit the site to confirm the completion of the mitigation effort and may issue formal letters of success upon acceptance. Removal of the irrigation system, if any, temporary fencing, and signage would occur prior to final sign-off.

Early release of individual mitigation sites may be possible if performance standards and success criteria are met early and the resource agencies agree with the level of establishment. Acceptance of the site would then be provided to CDFG as needed in support of the release of any financial security posted for the project (e.g., letter of credit, bond, etc.), and confirmation that project mitigation has been satisfied.

In the event that Newhall Land gets no response from the permitting agencies within 60 days of submittal of the final report, the final monitoring report will be deemed approved. Newhall Land will formally notify the permitting agencies that the mitigation site has satisfied the agency permits and that no further maintenance or monitoring will be conducted (excepting that required by long term management pursuant to **Section 9.0** and the RMDP), and Newhall Land may request immediate release of any financial securities held by any permitting agency for the project.

Project-wide completion of mitigation will involve an accounting of aggregate jurisdictional acreage and HARC AW units established throughout all mitigation sites as described in **Section 7.2**.

7.1 Completion of Compensatory Mitigation Sites

At the conclusion of the scheduled maintenance and monitoring period for each mitigation site, the mitigation site must meet the following standards to be considered complete:

- A Corps jurisdictional delineation will be conducted pursuant to Difficult Wetlands Situations in the Arid West; Chapter 5 of the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) to verify that

the mitigation site has established or restored the minimum jurisdictional acreage shown in Table 7 and as required by site specific mitigation plan. Documentation of the appropriate jurisdictional acreage pursuant to Section 6.1 and the site specific mitigation plan will demonstrate the mitigation site's contribution to the aggregate mitigation acreage needed to provide full, project-wide compensatory mitigation (Section 7.2).

- Attainment of vegetation performance standards as generally described in Section 6.1 and more specifically in the site specific mitigation plan.

HARC AW units will be calculated for completed mitigation sites using the HARC functional assessment methodology (Appendix B) to determine the contribution of the mitigation site to project-wide mitigation. However, HARC AW units will not be used to determine individual site completion.

7.2 Completion of RMDP Compensatory Mitigation

Once project-wide mitigation has been determined to be successful based on the following analysis, a final mitigation report will be prepared and submitted to the Corps. The final mitigation report will describe the two mitigation components that are required to demonstrate that RMDP compensatory mitigation has been accomplished:

- The aggregate established and restored jurisdictional acreage of all completed and signed-off mitigation sites will be compared against the required compensatory mitigation acreage. This established and restored jurisdictional acreage must be equal to or exceed the required jurisdictional acreage as defined in the Corps Permit for compensatory mitigation to be complete, and;
- Based on completed mitigation site HARC evaluations (Section 7.1), an accounting will be made of all mitigation sites to determine the aggregate number of HARC AW units achieved by all compensatory mitigation sites. The aggregate number of HARC AW units for all mitigation sites must be equal to or exceed the aggregate HARC AW units lost at permanent and temporary impact locations for the RMDP compensatory mitigation to be deemed complete on a functions and services basis.

If the jurisdictional acreage and HARC AW units meet or exceed impacted acreage and units, then RMDP mitigation will be considered to be complete. If the compensatory mitigation sites do not fully replace the aggregate jurisdictional acreage and/or lost functional HARC AW units, additional mitigation area may be required to compensate for the respective mitigation shortfall.

In this aggregate functional analysis, mitigation sites with a higher quantity of completed HARC units than anticipated in the site specific mitigation plan may offset mitigation sites that may have a lower quantity of HARC score than anticipated. Thus, if the overall balance of completed HARC units for the mitigation sites, in the aggregate, meets or exceeds the HARC units impacted, then the RMDP mitigation will be considered to have fully compensated for RMDP impacts.

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8.0 CONTINGENCY MEASURES

If the mitigation site does not meet the success criteria as defined in site specific mitigation plan, generally described in **Section 6.1**, and as required by **Section 7.0**, then contingency measures will be implemented. The contingency measures may include remedial work to increase the functions and values of the mitigation site and/or the addition of mitigation land to compensate for the lost functions and services.

In accordance with Mitigation Measure BIO-7, if at any time prior to resource agency approval of the mitigation area, the site is subject to a force majeure event (flood, fires, or drought), the permittee shall be responsible for replanting the damaged area, except in the case of fire, natural recruitment may be allowed depending on the extent of the fire damage and whether any fire lines permanently damaged mitigation site vegetation or channel geometry. The site will be subject to the same success criteria as provided for in Mitigation Measure BIO-6. Should a second force majeure event occur prior to Agency approval of the restoration area, the permittee shall coordinate with the Agencies and develop an alternative restoration strategy(ies) to meet success requirements. This may include mitigation elsewhere in the Santa Clara River corridor or tributaries.

8.1 Initiating Procedures

If performance criteria are not met for all or any portion of the mitigation projects or if the final success criteria are not met, the project biologist and Newhall Land will prepare an analysis of the cause(s) of failure within the appropriate annual report and, if determined necessary by permitting agencies, propose remedial action for agency approval. If the mitigation sites have not met the performance criteria by the end of the 5-year maintenance and monitoring period, Newhall Land's maintenance and monitoring obligations will continue until contingency measures are negotiated and implemented to bring the mitigation site into compliance with the established standards or until the permitting agencies grant final mitigation project permit compliance/approval.

8.2 Alternative Locations for Contingency Compensatory Mitigation

If a deficiency of Corps-jurisdictional acreage or functions and values is determined based on the analysis described in **Section 7.0**, then additional mitigation site options will be presented to the Corps and a plan for contingency measures will be negotiated.

8.3 Funding Mechanism for Long-Term Management

In perpetuity, land stewardship activities on mitigation lands will be funded through a non-wasting endowment held by an agency-approved land management entity in accordance with Corps Special Condition XX.

8.4 Responsible Parties

Newhall Land, its successors, or its assignees are responsible for all contingency efforts that are required to complete compensatory mitigation for each development phase of the RMDP.

8.5 Adaptive Management Plan

Adaptive management will be implemented in the event of unforeseen or probable but unpredictable circumstances. Adaptive management is defined, for the purposes of this Plan, as a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation areas. Adaptive management will include the utilization of regular qualitative assessments and rapid quantitative assessment data gathered in the field prior to and during the mitigation project to assess the health and vigor of vegetation communities within the mitigation sites. Following an event that causes damage to all or part of a mitigation site, the data will be used in part to drive management considerations for repair of the damaged areas. Achieving the key goals of mitigation completion and establishment of self-sustaining native vegetation communities will be the focus of all adaptive management decisions. Individual environmental stressors are discussed below, along with an anticipated range of management responses to correct any damage that may occur to the mitigation site. Enhancement of adjacent disturbed vegetation within the Santa Clara River floodplain may be considered as an adaptive management measure in the event that certain vegetation communities are no longer supported at the project sites.

8.5.1 Herbivory

Some grazing and browsing by native mammals is expected to occur within the mitigation area. The plant palettes for each vegetation community have been designed to accommodate a moderate level of plant browsing. If browse levels should become elevated (i.e., if significant plant mortality and cover reduction occurs) as indicated by qualitative or quantitative monitoring of the mitigation sites, remedial measures will have to be implemented. Browse guards (fencing) may be installed around the base of trees and young shrub container plants in affected areas to reduce plant mortality.

8.5.2 Flooding

Flooding is anticipated to occur on occasion within the mitigation areas. Flooding may periodically reduce overall plant cover within the stream channel. If quarterly monitoring of the channel indicates that cover is being reduced below tolerable levels, remedial planting or seeding may be required. Additional mulch, cuttings, or container plants may be placed in strategic areas to address changed flow characteristics of the stream channel.

Due to the highly volatile nature of the Santa Clara River's flood regime, additional flow entrainment or velocity protection features may be recommended. In addition, vegetation communities with the lowest Manning's coefficient will be positioned in potential areas of highest flow rate in an attempt to reduce flood-related damage to the establishment/restoration sites. In addition, larger tree trunks from clearing operations may be strategically placed to provide additional non-intrusive protection for mitigation areas, while also providing habitat for small mammals, reptiles, and other small wildlife.

8.5.3 Drought

Seasonal drought is a normal annual cycle in northern Los Angeles County, and all plant palettes have been designed with drought-tolerant plant species that are capable of withstanding seasonal fluctuations in available moisture. However, an extended drought could occur, including low seasonal rainfall and prolonged high temperatures that may negatively affect the mitigation sites (e.g., cause lower native cover, higher plant mortality, or increased potential for pest infestations on site). Planned irrigation will reduce or eliminate the effects of drought on container plants and seedlings during the first 2 years of the mitigation projects. Any remedial options that may be necessary after 2 years from the installation date will likely require an additional period of site irrigation to relieve plants from drought stress and/or provide for new seed growth. All irrigation components may be left in place after Year 2, in case remedial seeding and/or container planting is/are required at a later project date. If the irrigation systems are required at a later date, irrigation should be used only as necessary (i.e., periodic watering versus regular daily watering).

8.5.4 Wildfire/Geologic Events

In the event that a mitigation site or a portion of a mitigation site burns in a wildfire or suffers from mass movements (e.g., landslides, slope sloughing, or other geologic events), the restoration biologist and/or Newhall Land shall promptly review the site and determine what action, if any, should be taken. The primary anticipated post-fire management activity involves monitoring the site and controlling annual weeds that may invade burned areas following a fire

event, especially when such weeds were not previously present or were present in lower densities. If fire control lines or other forms of bulldozer damage occur in the mitigation sites, these areas would be repaired and revegetated to pre-burn conditions or better.

In general, a burned site will be left to recover naturally from wildfire or geologic events. The native habitat types within the preserve are well adapted to recover from wildfires unless the fire frequency is artificially increased. Therefore, burned areas should not be seeded or sprayed with soil stabilizer, straw, or hay. The latter two items are usually contaminated with various problematic weed seeds and often include noxious weed seed. In addition, active post-fire revegetation and soil stabilization efforts interfere with natural post-fire successional species and vegetation development stages that should be allowed to occur for the habitat to properly recover and regenerate.

The preferred erosion control devices to be used, if necessary, include fabric silt fencing, gravel or sand bags (made of biodegradable burlap), straw wattles certified as weed-free (not just free of "U.S. Department of Agriculture noxious weeds," but free of all weeds), and judicious seeding with locally indigenous native species free of weed seed.

The same passive, successional regeneration holds true for mass-movement, landslide, or slope-sloughing types of events. Some plant species have evolved and/or adapted to recruit into these types of geologically disturbed areas.

9.0 LONG-TERM MANAGEMENT PLAN

After completion of the performance-based mitigation requirements during the 5-year maintenance and monitoring program, management of the mitigation areas will transition to long-term management. Long-term management will be conducted in accordance with the RMDP (December, 2010).

9.1 Management and Maintenance Responsibilities

Following successful completion of the mitigation project(s), the jurisdictional areas will be managed by an environmental land management entity/organization (Land Manager), such as CNLM, or an approved alternative, as agreed to by Newhall Land and the appropriate resource agencies.

9.1.1 Management Actions

Management actions shall be performed at the direction of the Land Manager. Management actions shall include invasive species control, removing accumulated trash and repairing broken or damaged fences, gates, locks, signage, and other open space-related items as may be deemed necessary by the Land Manager.

9.1.2 Long-Term Monitoring

The long-term monitoring methodology for the jurisdictional areas will focus on the persistence of appropriate functions and values provided by the mitigation program by conducting regular qualitative monitoring visits. Specifically, the items addressed during monitoring visits shall include an evaluation of natural recruitment, presence/absence of plant pests or diseases, erosion and/or drainage conditions on site, presence/absence of non-native or invasive plant species, trash or debris accumulation, wildlife presence/absence, and project fencing/signage.

9.1.3 Reporting

Annual management reports shall be prepared documenting the status of the open space areas including jurisdictional areas in accordance with the RMDP. Long-term management and reporting may be phased. The annual report will be comprehensive in addressing all the managed areas by each Land Manager. The annual report will contain a description of the management actions, monitoring, and adaptive management activities conducted in each of the management areas during the calendar year.

9.2 Conservation Mechanism

Provisions for conservation, public access, and long-term resource stewardship were incorporated as part of the Newhall Ranch Specific Plan approvals granted by Los Angeles County (County) in 2003, and Resource Management and Development Plan approvals by the California Department of Fish and Game (CDFG) in 2010. In accordance with Corps Permit Special Condition XX, conservation easements or deed restrictions will be recorded over the mitigation sites for impacts to Corps-jurisdiction as shown in Table 22.

Table 22
LEDPA Conservation Land Dedication/Recordation Schedule

Open Space Area	Conservation Instrument	Fee Ownership	Schedule/Phase of Development
High Country SMA			
High Country (Part 1)	Conservation Easement to CDFG	High Country Recreation & Conservation Authority (JPA)	At Issuance of 2,000th Residential Building Permit
High Country (Part 2)	Conservation Easement to CDFG	High Country Recreation & Conservation Authority (JPA)	At Issuance of 6,000th Residential Building Permit
High Country (Part 3)	Conservation Easement to CDFG	High Country Recreation & Conservation Authority (JPA)	At Issuance of 11,000th Residential Building Permit
Salt Creek – Ventura County			
Salt Creek Watershed w/in Ventura County	Conservation Easement to CDFG	High Country Recreation & Conservation Authority (JPA)	Upon Approval of Potrero Canyon TTM
Santa Clara River			
Santa Clara River (LMV Phase 1)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Landmark Village TTM Development – Castaic Creek Confluence Area
Santa Clara River (LMV Phase 2)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Landmark Village TTM Development – Long Canyon Bridge Area
Santa Clara River (LMV Phase 3)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Landmark Village TTM Development – Castaic Creek at SR126 Area
Santa Clara River (MV Phase 1)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Mission Village TTM Development – SJ Flats to Lion Canyon
Santa Clara River (MV Phase 2)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Mission Village TTM Development – Middle Canyon Spring Area

Table 22
LEDPA Conservation Land Dedication/Recordation Schedule

Open Space Area	Conservation Instrument	Fee Ownership	Schedule/Phase of Development
Santa Clara River (MV Phase 3)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Mission Village TTM Development – Commerce Center Bridge Area
Santa Clara River (UC Phase 1)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Utility Corridor Construction between Chiquito and San Martinez Grande drainages
Santa Clara River (UC Phase 2)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Utility Corridor Construction west of San Martinez Grande
Santa Clara River (WRP)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Newhall Ranch Wastewater Reclamation Plant (WRP) construction
Santa Clara River (HS)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Homestead Village South TTM Development
Santa Clara River (Pot)	Conservation Easement to CDFG	Center for Natural Lands Management (CNLM)	At completion of Potrero Village TTM Development
Tributary Drainages			
Mission Village Preserved and Lion Canyon Drainages	Conservation Easement to CDFG or Deed Restriction	Center for Natural Lands Management (CNLM)	At completion of Mission Village TTM Development
Homestead Village South Preserved and Long Canyon Drainages	Conservation Easement to CDFG or Deed Restriction	Center for Natural Lands Management (CNLM)	At completion of Homestead South Village TTM Development
Homestead Village North Preserved, Chiquito, San Martinez Grande Drainages	Conservation Easement to CDFG or Deed Restriction	Center for Natural Lands Management (CNLM)	At completion of Homestead North Village TTM Development
Potrero Canyon Drainage and CAM Mitigation Site	Conservation Easement to CDFG or Deed Restriction	Center for Natural Lands Management (CNLM)	At completion of Potrero Village TTM Development

The Conservation Areas will be subject to easements and rights of way of record and will reserve all rights not needed for conservation purposes and will allow any activities that are needed for the development of the Specific Plan. The Conservation Easement will reserve all water and

water rights, excluding water necessary to support existing aquatic resources. Further, the Conservation Easement will reserve all oil, oil rights, minerals, mineral rights, natural gas rights and other hydrocarbons by whatsoever name known, geothermal steam and all products derived from any of the foregoing, that may be within or under the Conservation Area, together with the perpetual right of drilling, mining, exploring and operating therefor and storing in and removing the same from the Conservation Area or any other property, without, however, the right to drill, mine, store, explore or operate through the surface of the Conservation Area or the upper 500 feet of the subsurface of the Property for such substances.

Should any active well locations continue to operate during and/or after development, then the related acreage will be excluded from the conservation instruments. New or additional surface entry for oil and gas exploration or extraction will be restricted from all of the proposed Corps mitigation conservation areas.

The following Conservation Mechanism information will be included with each Construction Notification that identifies Corps mitigation within the conservation area:

- Draft Conservation Easement or Conservation Covenant for each specific conservation area
- Property Analysis Record (PAR) for funding of long-term management of the conservation area

Property Assessment and Warranty documentation to identify encumbrances associated with the conservation area.

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APPENDIX A

Vascular Plant Species Observed within the Newhall Ranch Specific Plan Area (2002–2006)

APPENDIX A
Vascular Plant Species Observed within the Newhall Ranch Specific Plan Area (2002–2006)

LYCOPODIAE

SELAGINELLACEAE – SPIKE-MOSS FAMILY

Selaginella bigelovii – Bigelow's spike-moss

EQUISETAE

EQUISETACEAE – HORSETAIL FAMILY

Equisetum hyemale – common scouring-rush
Equisetum laevigatum – smooth scouring-rush
Equisetum telmateia – giant horsetail

FILACEAE

AZOLLACEAE – MOSQUITO FERN FAMILY

Azolla c.f. *filiculoides* – duckweed fern

DENNSTAEDTIACEAE – BRACKEN FAMILY

Adiantum jordanii – California maiden-hair
Pellaea andromedifolia – coffee fern
Pellaea mucronata var. *mucronata* – bird's-foot fern
Pentagramma triangularis – goldenback fern

DRYOPTERIDACEAE – WOOD FERN FAMILY

Dryopteris arguta – coastal wood fern

POLYPODIACEAE – POLYPODY FAMILY

Polypodium californicum – California polypody

CONIFERAE

CUPRESSACEAE – CYPRESS FAMILY

* *Cedrus deodara* – deodar cedar
Juniperus californica – California juniper

PINACEAE – PINE FAMILY

* *Pinus halepensis* – Aleppo pine
* *Pinus pinea* – stone pine

ANGIOSPERMAE (DICOTYLEDONES)

AIZOACEAE – FIG-MARIGOLD FAMILY

* *Aptenia cordifolia* – baby sun-rose
* *Carpobrotus* sp. – sea-fig

AMARANTHACEAE – AMARANTH FAMILY

* *Amaranthus albus* – tumbleweed
Amaranthus blitoides – prostrate amaranth
* *Amaranthus hybridus* – amaranth
Amaranthus palmeri – Palmer's amaranth
Amaranthus powellii – Powell's amaranth
* *Amaranthus retroflexus* – rough pigweed

ANACARDIACEAE – SUMAC FAMILY

Malosma laurina – laurel sumac
Rhus ovata – sugar-bush
Rhus trilobata – squaw bush
* *Schinus molle* – Peruvian pepper-tree
Toxicodendron diversilobum – poison-oak

APIACEAE – CARROT FAMILY

* *Anethum graveolens* – dill
Apiastrum angustifolium – wild celery
* *Apium graveolens* – celery
Berula erecta – cutleaf water-parsnip
Bowlesia incana – American bowlesia
* *Conium maculatum* – poison hemlock
* *Coriandrum sativum* – cilantro
* *Daucus carota* – Queen Anne's lace
Daucus pusillus – rattlesnake weed
Lomatium utriculatum – common lomatium
Lomatium caruifolium – alkali parsnip
Sanicula bipinnata – poison sanicle
Osmorhiza brachypoda – California sweet-cicely
* *Petroselinum crispum* – parsley
Sanicula crassicaulis – Pacific sanicle
* *Torilis arvensis* – Japanese hedge-parsley
* *Torilis nodosa* – knot hedge-parsley
Yabea microcarpa – California hedge parsley

APOCYNACEAE – DOGBANE FAMILY

Apocynum cannabinum – Indian hemp
* *Vinca major* – periwinkle

ASCLEPIADACEAE – MILKWEED FAMILY

Asclepias californica – California milkweed
Asclepias fascicularis – narrow-leaf milkweed

ASTERACEAE – SUNFLOWER FAMILY

Achillea millefolium – yarrow
Achyrachaena mollis – blow-wives
Acourtia microcephala – sacapellote
Agoseris grandiflora – large-flowered agoseris
Agoseris retrorsa – spear-leaf agoseris
Ambrosia acanthicarpa – annual burweed
Ambrosia confertifolia – weak-leaved burweed
Ambrosia psilostachya – western ragweed
Artemisia californica – coastal sagebrush
Artemisia douglasiana – California mugwort
Artemisia dracunculus – tarragon
Artemisia tridentata – Great Basin sagebrush
Baccharis douglasii – marsh baccharis
Baccharis emoryi – Emory's baccharis
Baccharis pilularis – coyote brush
Baccharis salicifolia – mulefat
Baccharis sarothroides – chaparral broom
Brickellia californica – California brickellbush
Brickellia nevinii – Nevin's brickellbush
* *Carduus pycnocephalus* – Italian thistle
* *Centaurea melitensis* – star thistle
Chaenactis artemisiifolia – artemisia pincushion
Chaenactis glabriuscula – yellow pincushion
Chrysothamnus nauseosus – rubber rabbitbrush
Cirsium occidentale var. *californicum* – California thistle
Cirsium occidentale var. *occidentale* – cobwebby thistle
* *Cirsium vulgare* – bull thistle
* *Cnicus benedictus* – blessed thistle
Conyza canadensis – horseweed
Conyza coulteri – Coulter's conyza

Coreopsis bigelovii – Bigelow's coreopsis
* *Coreopsis tinctoria* – calliopsis
Corethrogyne filaginifolia – virgate cudweed aster
* *Cotula coronopifolia* – African brass-buttons
* *Cotula australis* – Australian brass-buttons
Deinandra increscens ssp. *increscens* – no common name
Encelia actoni – Acton's encelia
Encelia californica – California bush sunflower
Encelia farinosa – brittlebush, incensio
Ericameria palmeri var. *pachylepis* – goldenbush
Ericameria pinifolia – pine-bush
Erigeron foliosus – leafy daisy
Eriophyllum confertiflorum – long-stem golden yarrow
Euthamia occidentalis – western goldenrod
Filago californica – California fluffweed
* *Filago gallica* – narrow-leaf filago
* *Gazania linearis* – gazania
Gnaphalium bicolor – bicolor cudweed
Gnaphalium californicum – California everlasting
Gnaphalium canescens ssp. *microcephalum* – white everlasting
Gnaphalium leucocephalum – Sonora everlasting
Gnaphalium luteo-album – white cudweed
Gnaphalium sp. *nova* – everlasting
Gnaphalium palustre – lowland cudweed
Gnaphalium stramineum – cotton-batting plant
Grindelia sp. – gumplant
Hazardia squarrosa ssp. *grindelioides* – saw-toothed goldenbush
Helianthus annuus – common sunflower
Helianthus sp. nova – undescribed sunflower
Hemizonia fasciculata – fascicled tarweed
Hemizonia kelloggii – Kellogg's tarweed
Heterotheca grandiflora – telegraph weed
Heterotheca sessiliflora – golden aster
Hypochaeris glabrata – smooth cat's ear
* *Hypochaeris radicata* – hairy cat's ear
Isocoma menziesii – goldenbush
Isocoma menziesii var. *menziesii* [*Haplopappus venetus*] – Menzies' goldenbush
Iva axillaris – poverty weed
* *Lactuca saligna* – willowleaf lettuce

* *Lactuca serriola* – prickly lettuce
Lagophylla ramosissima – common hareleaf
Lasthenia californica – coast goldfields
Layia glandulosa – white layia
Layia platyglossa – tidy tips
Lepidospartum squamatum – scale-broom
Lessingia filaginifolia – California aster
Lessingia glandulifera – lessingia
Madia exigua – small tarweed
Madia gracilis – slender madia
Malacothrix clevelandii – Cleveland's malacothrix
Malacothrix saxatilis – cliff malacothrix
* *Matricaria matricarioides* – pineapple weed
Micropus californicus – slender cottonweed
* *Picris echioides* – bristly ox-tongue
Pluchea odorata – marsh-fleabane
Pluchea sericea – arrow weed
Psilocarphus tenellus – slender woolly-heads
* *Pulicaria paludosa* – Spanish sunflower
Rafinesquia californica – California chicory
Senecio californicus – California butterweed
Senecio flaccidus var. *douglasii* – butterweed
* *Senecio vulgaris* – common groundsel
Silybum marianum – milk thistle
Solidago californica **–** California goldenrod
* *Sonchus asper* – prickly sow-thistle
* *Sonchus oleraceus* – common sow-thistle
* *Spartium junceum* – Spanish broom
Stebbinsoseris heterocarpa [*Microseris heterocarpa*] – brown puffs
Stephanomeria cichoriacea – chicory-leaved Stephanomeria
Stephanomeria exigua – small wreath plant
Stephanomeria pauciflora – wire-lettuce
Stephanomeria virgata – twiggy wreath plant
Stylocline gnaphaloides – everlasting nest-straw
Uropappus lindleyi [*Microseris lindleyi*] – silver puffs
Wyethia ovata – mule ears
Xanthium spinosum – spiny cocklebur
Xanthium strumarium – cocklebur

BETULACEAE – BIRCH FAMILY

Alnus rhombifolia – white alder

BORAGINACEAE – BORAGE FAMILY

Amsinckia menziesii var. *intermedia* – yellow fiddleneck
Amsinckia menziesii var. *menziesii* – yellow fiddleneck
Amsinckia tessellata – devil's lettuce
Cryptantha sp. – forget-me-not
Cryptantha decipiens – gravel cryptantha
Cryptantha intermedia – common forget-me-not
Cryptantha micrantha – redroot cryptantha
Cryptantha microstachys – Tejon cryptantha
Cryptantha muricata – prickly cryptantha
Heliotropium curassavicum – wild heliotrope
Pectocarya linearis – slender pectocarya
Pectocarya penicillata – pectocarya
Pectocarya setosa – pectocarya
Plagiobothrys arizonicus – popcorn flower
Plagiobothrys canescens – rusty popcorn flower
Plagiobothrys collinus – California popcorn flower
Plagiobothrys fulvus – common popcorn flower

BRASSICACEAE – MUSTARD FAMILY

Arabis sparsiflora – no common name
Athysanus pusillus – dwarf athysanus
* *Brassica nigra* – black mustard
* *Capsella bursa-pastoris* – shepherd's purse
Caulanthus lasiophyllus – California mustard
Descurainia pinnata ssp. *halictorum* – tansy mustard
Erysimum capitatum – wall flower
* *Hirschfeldia incana* – short-podded mustard
Lepidium lasiocarpum – peppergrass
* *Lepidium latifolium* – peppergrass
Lepidium oblongum – peppergrass
Lepidium virginicum – wild peppergrass
* *Lobularia maritime* – sweet-alyssum
* *Raphanus sativus* – wild radish
* *Rorippa nasturtium-aquaticum* – water cress
* *Sisymbrium altissimum* – tumble mustard

* *Sisymbrium irio* – London rocket
* *Sisymbrium officinale* – hedge mustard
* *Sisymbrium orientale* – oriental mustard
Stanleya pinnata var. *pinnata* – Prince's plume
Thysanocarpus curvipes – fringepod
Thysanocarpus laciniatus – lacepod
Tropidocarpum gracile – slender dobie-pod

CACTACEAE – CACTUS FAMILY

* *Cereus peruvianus* – Peruvian apple cactus
Opuntia basilaris var. *ramosa* – beaver-tail cactus
Opuntia californica var. *parkeri* – cane cholla
Opuntia littoralis – coastal prickly-pear
Opuntia × *vaseyi* – prickly-pear cactus
* *Trichocereus spachianus* – golden torch cactus

CAMPANULACEAE – BELLFLOWER FAMILY

Nemacladus ramosissimus – Nuttall's threadplant

CAPPARACEAE – CAPER FAMILY

Isomeris arborea – bladderpod

CAPRIFOLIACEAE – HONEYSUCKLE FAMILY

Lonicera interrupta – chaparral honeysuckle
Lonicera subspicata – southern honeysuckle
Sambucus mexicana – Mexican elderberry
Symphoricarpos sp. – snowberry
Symphoricarpos c.f. *mollis* – spreading snowberry

CARYOPHYLLACEAE – PINK FAMILY

* *Cerastium glomeratum* – sticky mouse-ear
* *Herniaria hirsuta* ssp. *cinerea* – gray herniaria
Loeflingia squarrosa – no common name
* *Silene gallica* – common catchfly
Spergularia sp. – stickwort, starwort
* *Spergularia rubra* – sand-spurrey
* *Spergularia* c.f. *villosa* – villous sand-spurrey
* *Stellaria media* – common chickweed
Stellaria nitens – shining chickweed

CASUARINACEAE – SHEET OAK FAMILY

* *Casuarina cunninghamiana* – Australian pine

CHENOPODIACEAE – GOOSEFOOT FAMILY

Atriplex canescens – four-winged saltbush
* *Atriplex heterosperma* – weedy orache
Atriplex lentiformis – big saltbush, quail brush
* *Atriplex rosea* – tumbling oracle
* *Atriplex semibaccata* – Australian saltbush
Atriplex serenana var. *serenana* – bractscale
Atriplex suberecta – Australian saltbush
Atriplex triangularis – spearscale
* *Bassia hyssopifolia* – five-hooked bassia
* *Beta vulgaris* – garden beet
* *Chenopodium album* – lamb's-quarters
* *Chenopodium ambrosioides* – Mexican tea
Chenopodium berlandieri – pitseed goosefoot
* *Chenopodium botrys* – goosefoot
Chenopodium californicum – California goosefoot
* *Chenopodium murale* – nettle-leaved goosefoot
Chenopodium rubrum – red goosefoot
* *Salsola tragus* – Russian-thistle
* *Spinacia oleracea* – spinach

CONVOLVULACEAE – MORNING-GLORY FAMILY

Calystegia macrostegia ssp. *cyclostegia* – morning-glory
Calystegia peirsonii – Peirson's morning-glory
* *Convolvulus arvensis* – bindweed

CRASSULACEAE – STONECROP FAMILY

Crassula connata – dwarf stonecrop
Dudleya cymosa – unidentified dudleya
Dudleya lanceolata – lanceleaf dudleya

CUCURBITACEAE – GOURD FAMILY

Cucurbita foetidissima – coyote-melon, calabazilla
Marah fabaceus – California manroot
Marah macrocarpus – wild cucumber

CUSCUTACEAE – DODDER FAMILY

Cuscuta californica – California dodder
Cuscuta pentagona – five-angled dodder
Cuscuta subinclusa – canyon dodder

DATISCACEAE – DATISCA FAMILY

Datisca glomerata – Durango root

ERICACEAE – HEATH FAMILY

Arctostaphylos glandulosa ssp. *mollis* – manzanita
Arctostaphylos glauca – bigberry manzanita

EUPHORBIACEAE – SPURGE FAMILY

Chamaesyce albomarginata – rattlesnake spurge
* *Chamaesyce maculata* – spotted spurge
Chamaesyce polycarpa – small-seed sand mat
Chamaesyce serpyllifolia – thyme-leafed spurge
Croton californicus – California croton
Eremocarpus setigerus – doveweed
Euphorbia spathulata – reticulate-seed spurge
* *Ricinus communis* – castor-bean
Stillingia linearifolia – linear-leaved stillingia

FABACEAE – PEA FAMILY

Amorpha californica var. *californica* – false indigo
* *Acacia baileyana* – golden wattle
Astragalus didymocarpus – white dwarf locoweed
Astragalus gambelianus – Gambel's locoweed
Astragalus trichopodus – Santa Barbara locoweed
Glycyrrhiza lepidota – wild licorice
Lathyrus laetiflorus – wild sweet pea
Lathyrus vestitus – wild pea
Lotus corniculatus – bird's-foot lotus
Lotus hamatus – grab lotus
Lotus humistratus – lotus
Lotus purshianus – Spanish-clover
Lotus salsuginosus – coastal lotus
Lotus scoparius var. *scoparius* – deerweed
Lotus strigosus – strigose deerweed
Lupinus bicolor – Lindley's annual lupine

Lupinus excubitus – Mountain Springs bush lupine
Lupinus excubitus var. *excubitus* – grape soda lupine
Lupinus excubitus var. *hallii* – grape soda lupine
Lupinus hirsutissimus – stinging lupine
Lupinus microcarpus var. *densiflorus* – chick lupine
Lupinus microcarpus var. *microcarpus* – chick lupine
Lupinus sparsiflorus – Coulter's lupine
Lupinus succulentus – arroyo lupine
Lupinus truncatus – collar lupine
* *Medicago polymorpha* – California burclover
* *Medicago polymorpha* var. *brevispina* – short-spined California burclover
* *Medicago sativa* – alfalfa
* *Melilotus alba* – white sweet-clover
* *Melilotus indica* – yellow sweet-clover
* *Robinia pseudoacacia* – black locust
Trifolium sp. – clover
Trifolium albopurpureum – rancheria clover
Trifolium ciliolatum – tree clover
* *Trifolium fragiferum* – strawberry clover
Trifolium fucatum – bull clover
Trifolium gracilentum – pin-point clover
* *Trifolium hirtum* – rose clover
Trifolium microcephalum – maiden clover
* *Trifolium repens* – white clover
Trifolium willdenovii – valley clover
Vicia americana – American vetch
Vicia exigua – slender vetch
Vicia hassei – Hesse's vetch
* *Vicia villosa* ssp. *villosa* – winter vetch

FAGACEAE – BEECH FAMILY

Quercus agrifolia – coast live oak
Quercus berberidifolia – scrub oak
Quercus chrysolepis – canyon live oak
Quercus douglasii × *Q. lobata* – oak
Quercus douglasii – blue oak
Quercus lobata – valley oak

GERANIACEAE – GERANIUM FAMILY

* *Erodium brachycarpum* – shortfruit stork's bill
* *Erodium botrys* – long-beaked filaree
* *Erodium cicutarium* – red-stemmed filaree
* *Erodium moschatum* – white-stemmed filaree

GROSSULARIACEAE – CURRANT FAMILY

Ribes aureum – golden currant
Ribes californicum – California gooseberry
Ribes malvaceum – chaparral currant

HYDROPHYLLACEAE – WATERLEAF FAMILY

Emmenanthe penduliflora – whispering bells
Eriodictyon crassifolium var. *nigrescens* – yerba santa
Eucrypta chrysanthemifolia – common eucrypta
Nemophila menziesii – baby blue-eyes
Nemophila parviflora var. *quercifolia* – oak-leaved nemophila
Nemophila pedunculata – littlefoot nemophila
Phacelia cicutaria – caterpillar phacelia
Phacelia cicutaria var. *hispida* – caterpillar phacelia
Phacelia cicutaria var. *hubbyi* – caterpillar scorpionweed
Phacelia distans – blue fiddleneck
Phacelia imbricata ssp. *imbricata* – imbricate phacelia
Phacelia minor – wild Canterbury-bell
Phacelia ramosissima – shrubby phacelia
Phacelia viscida – sticky phacelia
Pholistoma auritum – fiesta flower

JUGLANDACEAE – WALNUT FAMILY

Juglans californica – Southern California black walnut

LAMIACEAE – MINT FAMILY

* *Lamium amplexicaule* – henbit
* *Marrubium vulgare* – horehound
Mentha citrata – orange mint
Monardella lanceolata – mustang mint
Salvia apiana – white sage
Salvia × *bernardina* – no common name
Salvia columbariae – chia
Salvia leucophylla – purple sage

Salvia mellifera – black sage
Scutellaria tuberosa – Danny's skullcap
Stachys ajugoides – bugle hedge-nettle
Stachys ajugoides var. *rigida* – rigid hedge-nettle
Stachys albens – white hedge-nettle
Trichostema lanatum – woolly bluecurls
Trichostema lanceolatum – vinegar weed

LAURACEAE – LAUREL FAMILY

Umbellularia californica – California laurel

LOASACEAE – STICK-LEAF FAMILY

Mentzelia sp. – blazing star
Mentzelia laevicaulis – blazing star
Mentzelia micrantha – small-flowered stick-leaf

LYTHRACEAE – LOOSESTRIFE FAMILY

Lythrum californicum – California loosestrife

MALVACEAE – MALLOW FAMILY

Malacothamnus fasciculatus ssp. *laxiflorus* – chaparral bush mallow
Malacothamnus fremontii – bush mallow
Malacothamnus marrubioides – bush mallow
* *Malva neglecta* – common mallow
* *Malva parviflora* – cheeseweed

MELIACEAE – MAHOGANY FAMILY

* *Melia azedarach* – Chinaberry

MORACEAE – FIG FAMILY

* *Ficus carica* – edible fig

MYRTACEAE – MYRTLE FAMILY

* *Eucalyptus* sp. – eucalyptus
* *Eucalyptus camaldulensis* – red gum
* *Eucalyptus globulus* – blue gum
* *Eucalyptus leucoxylon* – white ironbark
* *Eucalyptus polyanthemos* – silver dollar gum
* *Eucalyptus sideroxylon* – red ironbark

NYCTAGINACEAE – FOUR O'CLOCK FAMILY

Mirabilis laevis var. *crassifolia* [*M. californica*] – California wishbone-bush

OLEACEAE – OLIVE FAMILY

Fraxinus dipetala – California ash
* *Fraxinus uhdei* – tropical ash
Fraxinus velutina – velvet ash
* *Ligustrum lucidum* – glossy privet
* *Olea europaea* – mission olive

ONAGRACEAE – EVENING-PRIMROSE FAMILY

Camissonia bistorta – southern sun cup
Camissonia bistorta × *hirtella* – sun cup
Camissonia boothii – sun cup
Camissonia boothii ssp. *decorticans* – shredding evening primrose
Camissonia californica – mustard primrose
Camissonia hirtella – sun cup
Camissonia micrantha – miniature sun cup
Camissonia strigulosa – sun cup
Clarkia cylindrical – speckled clarkia
Clarkia purpurea – winecup clarkia
Clarkia speciosa – clarkia
Clarkia unguiculata – elegant clarkia
Epilobium brachycarpum – willow herb
Epilobium canum ssp. *canum* – California fuchsia
Epilobium ciliatum – California cottonweed
Ludwigia peploides – yellow waterweed
Ludwigia repens – water primrose
Oenothera elata – evening primrose
* *Oenothera laciniata* – evening primrose

OROBANCHACEAE – BROOM-RAPE FAMILY

Orobanche fasciculata – clustered broom-rape
Orobanche parishii ssp. *parishii* – broom-rape
Orobanche sp. – broom-rape

PAEONIACEAE – PEONY FAMILY

Paeonia californica – California peony

PAPAVERACEAE – POPPY FAMILY

Argemone corymbosa – prickly poppy
Dendromecon rigida – tree poppy
Dicentra chrysantha – golden ear-drops
Dicentra ochroleuca – yellow bleeding heart
Eschscholzia californica – California poppy
Meconella denticulata – small-flower meconella
Papaver californicum – fire poppy
Platystemon californicus – California creamcups

PLANTAGINACEAE – PLANTAIN FAMILY

Plantago erecta – dot-seed plantain
* *Plantago indica* – plantain
* *Plantago lanceolata* – English plantain
* *Plantago major* – common plantain
Plantago c.f. *ovata* – woolly plantain

PLATANACEAE – SYCAMORE FAMILY

Platanus racemosa – western sycamore

POLEMONIACEAE – PHLOX FAMILY

Allophyllum divaricatum – purple false gillyflower
Allophyllum glutinosum – sticky false gillyflower
Eriastrum densifolium – woollystar
Eriastrum densifolium ssp. *densifolium* – woollystar
Eriastrum densifolium ssp. *elongatum* – elongate eriastrum
Eriastrum densifolium ssp. *mohavense* – Mohave eriastrum
Eriastrum sapphirinum – sapphire eriastrum
Gilia angelensis – angel gilia
Gilia capitata – globe gilia
Gilia splendens – splendid gilia
Leptodactylon californicum – prickly phlox
Linanthus androsaceus – common linanthus
Linanthus pygmaeus – linanthus
Navarretia atractyloides – holly-leaf skunkweed
Phlox gracilis – slender phlox

POLYGONACEAE – BUCKWHEAT FAMILY

Chorizanthe fimbriata – fringed spineflower
Chorizanthe parryi var. *fernandina* – San Fernando Valley spineflower

Chorizanthe staticoides – Turkish rugging
Eriogonum angulosum – angle-stem buckwheat
Eriogonum baileyi – Bailey's buckwheat
Eriogonum brachyanthum – short-flowered buckwheat
Eriogonum elongatum – long-stemmed buckwheat
Eriogonum fasciculatum ssp. *foliolosum* – California buckwheat
Eriogonum fasciculatum ssp. *polifolium* – California buckwheat
Eriogonum gracile var. *gracile* – slender woolly buckwheat
Eriogonum gracillimum – rose and white buckwheat
Eriogonum maculatum – spotted buckwheat
Eriogonum nudum – naked buckwheat
Eriogonum c.f. *viridescens* – buckwheat
Lastarriaea coriacea – lastarriaea
* *Polygonum arenastrum* – common knotweed
* *Polygonum argyrocoleon* – smartweed
Polygonum lapathifolium – willow weed
Polygonum punctatum – perennial smartweed
Pterostegia drymarioides – granny's hairnet
* *Rumex conglomeratus* – whorled dock
* *Rumex crispus* – curly dock
Rumex hymenosepalus – wild rhubarb
Rumex maritimus – golden dock
Rumex obtusifolius – dock
Rumex salicifolius – willow dock

PORTULACACEAE – PURSLANE FAMILY

Calandrinia ciliata – redmaids
Calyptridium sp. – pussypaws
Claytonia parviflora – small-leaved montia
Claytonia perfoliata – miner's lettuce
* *Portulaca oleracea* – common purslane

PRIMULACEAE – PRIMROSE FAMILY

* *Anagallis arvensis* – scarlet pimpernel

RANUNCULACEAE – BUTTERCUP FAMILY

Clematis ligusticifolia – yerba de chiva
Clematis pauciflora – ropevine
Delphinium cardinale – scarlet larkspur
Delphinium parryi ssp. *parryi* – Parry's larkspur

RHAMNACEAE – BUCKTHORN FAMILY

Ceanothus crassifolius – hoary-leaved ceanothus
Ceanothus foliosus – southern blue lilac
Ceanothus leucodermis – white-bark ceanothus
Ceanothus tomentosus – woolyleaf ceanothus
Rhamnus crocea – redberry
Rhamnus ilicifolia – holly-leaf redberry

ROSACEAE – ROSE FAMILY

Adenostoma fasciculatum – chamise
Cercocarpus betuloides – mountain-mahogany
Cercocarpus betuloides var. *betuloides* – birch-leaf mountain-mahogany
Cercocarpus betuloides var. *blancheae* – island mountain-mahogany
Heteromeles arbutifolia – toyon
Prunus ilicifolia – holly-leaf cherry
Prunus virginiana var. *demissa* – western choke-cherry
Rosa californica – California rose
Rubus ursinus – California blackberry
* *Sanguisorba minor* – garden burnet

RUBIACEAE – MADDER FAMILY

Galium angustifolium – narrow-leaved bedstraw
* *Galium aparine* – goose grass
Galium nuttallii ssp. *nuttallii* – San Diego bedstraw
Galium porrigens – climbing bedstraw

SALICACEAE – WILLOW FAMILY

Populus fremontii – Fremont cottonwood
Populus tremuloides – quaking aspen
Salix exigua – narrow-leaved willow
Salix gooddingii – black willow
Salix laevigata – red willow
Salix lasiolepis – arroyo willow
Salix lucida ssp. *lasiandra* – golden willow

SAURURACEAE – LIZARD'S-TAIL FAMILY

Anemopsis californica – yerba mansa

SAXIFRAGACEAE – SAXIFRAGE FAMILY

Lithophragma bolanderi – Bolander's woodland star
Saxifraga californica – California saxifrage

SCROPHULARIACEAE – FIGWORT FAMILY

Antirrhinum coulterianum – white snapdragon
Antirrhinum multiflorum – withered snapdragon
Castilleja affinis – coast paintbrush
Castilleja densiflora – dense-flowered owl's-clover
Castilleja exserta – common owl's-clover
Castilleja foliolosa – woolly Indian paintbrush
Collinsia heterophylla – purple Chinese houses
Collinsia parviflora – maiden blue eyed Mary
Cordylanthus rigidus – bird's beak
Keckiella cordifolia – heart-leaf penstemon
Linaria canadensis – toadflax
Mimulus aurantiacus – bush monkeyflower
Mimulus aurantiacus var. *pubescens* – bush monkeyflower
Mimulus brevipes – yellow monkeyflower
Mimulus guttatus – seep monkeyflower
Mimulus pilosus – downy monkeyflower
Penstemon centranthifolius – scarlet bugler
Scrophularia californica – California figwort
* *Verbascum thapsus* – woolly mullein
* *Verbascum virgatum* – wand mullein
* *Veronica anagallis-aquatica* – water speedwell
* *Veronica persica* – Persian speedwell

SIMAROUBACEAE – QUASSIA FAMILY

* *Ailanthus altissima* – tree of heaven

SOLANACEAE – NIGHTSHADE FAMILY

Datura wrightii – western jimsonweed
* *Nicotiana glauca* – tree tobacco
Nicotiana quadrivalvis – Indian tobacco
* *Solanum americanum* – small-flowered nightshade
Solanum douglasii – white nightshade
* *Solanum elaeagnifolium* – silver leaf horse-nettle
* *Solanum sarrachoides* – hairy nightshade
Solanum xanti – chaparral nightshade

TAMARICACEAE – TAMARISK FAMILY

* *Tamarix* sp. – tamarisk
* *Tamarix ramosissima* – tamarisk

ULMACEAE – ELM FAMILY

* *Ulmus pumila* – Siberian elm

URTICACEAE – NETTLE FAMILY

Hesperocnide tenella – western nettle
Parietaria hespera – western pellitory
Urtica dioica – giant creek nettle
* *Urtica urens* – dwarf nettle

VERBENACEAE – VERVAIN FAMILY

Verbena lasiostachys – western verbena

VIOLACEAE – VIOLET FAMILY

Viola pedunculata – Johnny jump-ups

VISCACEAE – MISTLETOE FAMILY

Phoradendron macrophyllum – big leaf mistletoe
Phoradendron villosum – oak mistletoe

VITACEAE – GRAPE FAMILY

Parthenocissus vitacea – woodbine, Virginia creeper
Vitis girdiana – desert wild grape

ZYGOPHYLLACEAE – CALTROP FAMILY

* *Tribulus terrestris* – puncture vine

ANGIOSPERMAE (MONOCOTYLEDONES)

ARECACEAE – PALM FAMILY

* *Washingtonia robusta* – Mexican fan palm

CYPERACEAE – SEDGE FAMILY

Carex alma – sturdy sedge
Carex praegracilis – clustered field sedge
Carex sp. – sedge
Cyperus eragrostis – tall cyperus
Cyperus esculentus – yellow nut-grass

* *Cyperus involucratus* – nutsedge
Cyperus odoratus – coarse cyperus
Eleocharis montevidensis – slender creeping spike-rush
Eleocharis parishii – Parish's spikerush
Eleocharis rostellata – beaked spikerush
Scirpus acutus – hard-stemmed bulrush
Scirpus americanus – winged three-square
Scirpus maritimus – alkali bulrush
Scirpus microcarpus – bulrush
Scirpus robustus – Pacific coast bulrush

IRIDACEAE – IRIS FAMILY

Sisyrinchium bellum – blue-eyed grass

JUNCACEAE – RUSH FAMILY

Juncus sp. – rush
Juncus acutus ssp. *leopoldii* – southwestern spiny rush
Juncus balticus – wire rush
Juncus bufonius – toad rush
Juncus longistylis – rush
Juncus mexicanus – Mexican rush
Juncus rugulosus – wrinkled rush
Juncus textilis – Indian rush
Juncus torreyi – rush
Juncus triformis – Yosemite dwarf rush
Juncus xiphioides – iris-leaved rush

LEMNACEAE – DUCKWEED FAMILY

Lemna minuscula – duckweed
Lemna valdiviana – duckweed

LILIACEAE – LILY FAMILY

* *Allium cepa* – onion
Allium porrum – leek
* *Amaryllis belladonna* – naked lady
* *Asparagus officinalis* – asparagus
Bloomeria crocea – common goldenstar
Brodiaea terrestris ssp. *kernensis* – dwarf brodiaea
Calochortus clavatus var. *gracilis* – slender mariposa lily
Calochortus venustus – mariposa lily

Calochortus weedii var. *vestus* – late-flowered mariposa lily
Chlorogalum pomeridianum – soap plant
Dichelostemma capitatum – blue dicks
Muilla maritima – common muilla
Yucca whipplei – Our Lord's candle
Yucca schidigera – Mojave yucca

POACEAE – GRASS FAMILY

Achnatherum coronatum – giant needlegrass
* *Agrostis* sp. – bentgrass
* *Agrostis viridis* – water bent
Aristida adscensionis – six-weeks three-awn
* *Arundo donax* – giant reed
* *Avena barbata* – slender oat
* *Avena fatua* – wild oat
Avena sativa – cultivated oat
* *Bromus arenarius* – Australian brome
Bromus carinatus – California brome
Bromus catharticus – California brome
Bromus catharticus var. *catharticus* – California brome
* *Bromus diandrus* – ripgut grass
Bromus grandis – tall brome
* *Bromus hordeaceus* – soft chess
* *Bromus madritensis* ssp. *rubens* – foxtail chess
* *Bromus sterilis* – sterile brome
* *Bromus tectorum* – cheat grass
* *Cortaderia selloana* – pampas grass
* *Crypsis schoenoides* – prickle grass
* *Cynodon dactylon* – Bermuda grass
* *Digitaria sanguinalis* – hairy crabgrass
Distichlis spicata – salt grass
* *Echinochloa colonum* – jungle-rice
Echinochloa crus-galli – barnyard grass
* *Eleusine indica* – goose grass
Elymus elymoides – bottlebrush squirreltail
Elymus glaucus – western wild-rye
Elymus multisetus – big squirreltail
Eragrostis mexicana – lovegrass
* *Festuca arundinacea* – tall fescue

* *Hordeum marinum* – Mediterranean barley
* *Hordeum murinum* – glaucous foxtail barley
Koeleria macrantha – Junegrass
* *Lamarckia aurea* – goldentop
* *Leptochloa uninervia* – Mexican sprangletop
Leymus condensatus – giant ryegrass
Leymus triticoides – beardless wild rye
* *Lolium multiflorum* – Italian ryegrass
* *Lolium perenne* – perennial ryegrass
* *Lolium temulentum* – darnel
Melica imperfecta – California melic
Muhlenbergia asperifolia – scratch-grass
Muhlenbergia microsperma – littleseed muhly
Nassella cernua – nodding needlegrass
Nassella lepida – foothill needlegrass
Nassella pulchra – purple needlegrass
Panicum capillare – western witchgrass
* *Panicum miliaceum* – broom corn millet
* *Parapholis incurva* – sickle grass
Paspalum distichum – knotgrass
* *Phalaris aquatica* – Harding grass
* *Phalaris minor* – Mediterranean canary grass
* *Piptatherum miliaceum* – smilo grass
* *Poa annua* – annual bluegrass
Poa secunda – Malpais bluegrass
* *Polypogon interruptus* – ditch beard grass
* *Polypogon monspeliensis* – rabbit's-foot grass
Schismus barbatus – abumashi
Sorghum bicolor – sorghum
Sorghum halepense – Johnsongrass
Sporobolus airoides – alkali sacation
* *Triticum aestivum* – cultivated wheat
Vulpia microstachys – fescue
* *Vulpia myuros* – rattail fescue
Vulpia octoflora – six-weeks fescue

POTAMOGETONACEAE – PONDWEED FAMILY

Potamogeton foliosus – leafy pondweed

***TYPHACEAE* – CATTAIL FAMILY**

Typha angustifolia – narrow leaved cattail
Typha domingensis – slender cattail
Typha latifolia – broad-leaved cattail

* signifies introduced (non-native) species

APPENDIX B

Hybrid Assessment of Riparian Condition (HARC) Methodology

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Date _____ Newhall Site_____

Stream Reach Number_____

Surveyor Initials _____ Assessment Area (AA) Number_____

Buffer Metrics (CRAM and LLFA)

1. *(office, verify in field)* Average Width of Buffer	
> 100 m	1.0
60 - 100 m	0.75
30 - 60 m	0.50
<30 m	0.10
None	0.0
2. *(office, verify in field)* Buffer Condition	
Area is characterized by natural, undisturbed upland with native vegetation and lack of invasive plants, lack of substrate disturbance, and lack of trash.	1.0
Buffer appears to have been moderately disturbed and may be characterized by presence of invasive plants, etc., (minor to moderate amounts of trash or debris visible); abandoned field; shrubland or buffer recently burned, but recoverable; dirt road crossing; or mowed, non-native ruderal.	0.75
Disced ruderal; dry-land farming; active agriculture.	0.50
Dirt road, not recoverable; residential; pastureland; landscaped park.	0.25
Buffer is highly disturbed, barren ground visible with highly compacted soils, moderate to high amounts of trash and other large debris; urban or industrial.	0.10
No buffer present.	0.0
3. *(office, includes sub-watershed outside AA)* Land Use/Land Cover	
<5% of watershed/landscape with LULC types that increase N/P/H/S.	1.0
>5 and <15% of watershed/landscape with LULC types that increase N/P/H/S; or recently burned open space.	0.75
>15 and <30% of watershed/landscape with LULC types that increase N/P/H/S.	0.50
>30 and <50% of watershed/landscape with LULC types that N/P/H/S.	0.25
>50% of watershed/landscape with LULC types that increase N/P/H/S.	0.10

Hydrology Metrics (CRAM, LLFA, HGM)

4. *(office, includes sub-watershed outside AA)* Water Source	
Water source derived from precipitation, groundwater and/or natural overland or tributary flow from catchments. No indications of artificial water sources.	1.0
Source of water is primarily natural; however, may receive occasional or small amounts of inflow from anthropogenic sources, such as urban runoff, seepage, agriculture or POTW discharge. Natural flow regime.	0.75
Source of water is primarily anthropogenic, and receives inflow from anthropogenic sources, such as urban runoff, seepage, agriculture or POTW discharge. Non-natural flow regime.	0.50
Primarily supported by direct irrigation, pumped water, artificially impounded water, or other artificial hydrology; may be perennial flow; channel incision present.	0.25
No natural or non-natural flows occur at the present time.	0.0

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5. *(office, verify in field)* Hydroperiod	
Subject to natural peak flows and base flow.	1.0
Peak flow relatively natural, but base flows altered either by augmentation or reduction; or Reach has recently burned, but is recoverable; temporary peak flows are anticipated.	0.75
Peak flows altered by upstream activities (augmentation or reduction), but base flows are relatively natural.	0.50
Assessment area is subject to alteration of both peak flow and base flow. Recoverable.	0.25
Assessment area is subject to alteration of both peak flow and base flow. Not recoverable.	0.10
6. *(field)* Floodplain Connection	
Adjacent to an unrestricted floodplain that is comprised of natural or open space lands or agricultural lands.	1.0
In most years, storm flows or storm surges can escape the active channel and access adjacent benches, riparian areas, or the marsh plain. However, unnatural levees, berms or adjacent land uses restricts the extent of overbank inundation; or naturally confined channel.	0.75
Moderate channel constriction, incision, bank armoring agricultural constraint, or adjacent road precludes water from accessing adjacent benches, riparian areas or the marsh plain, except in very high flows; however, access is still possible.	0.50
All overbank flow beyond the bankfull channel is contained within a defined conveyance or channel and cannot access adjacent riparian areas, benches or marsh plain.	0.25
Channel is channelized and contains concrete or rip-rap slopes/bottom.	0.0
7. *(field)* Surface Water Persistence and Recharge	
Evidence of surface water ponding/storage on floodplain for greater than one day (intermittent). Substrate porosity is such that runoff persists; floodplain has complex microtopographic relief; or perennially flowing/saturated; or adjacent wetlands.	1.0
Evidence of surface water ponding/storage on floodplain for greater than one day (intermittent). Floodplain has simple microtopographic relief. (Non-wetland floodplain).	0.75
Evidence of surface water ponding/storage for less than one day (ephemeral).	0.50
Assessment area provides no features for ponding/storing water. Variable is recoverable and sustainable through natural processes.	0.25
Assessment area provides no features for ponding/storing water. Variable is not recoverable and sustainable through natural processes under current conditions.	0.0
8. *(field)* Floodprone Area	
Floodprone area not modified by cultural processes. FPA > 2.0x bankfull width.	1.0
Floodprone area confined by artificial structure(s) or culturally accelerated channel incision is minimal; FPA > 2.0x bankfull width; disturbance affects one side of drainage; or naturally v-shaped channels for small drainages.	0.75
Floodprone area is artificially confined or culturally accelerated channel incision is present; FPA > 1.5x bankfull width; disturbance affects one side of drainage.	0.50
Floodprone area is artificially confined or culturally accelerated channel incision is present; FPA < 1.5x bankfull width; disturbance affects both sides of drainage; variable is recoverable through natural processes under current conditions.	0.25
Floodprone area is artificially confined or culturally accelerated channel incision is present; FPA < 1.5x bankfull width; disturbance affects both sides of drainage Variable is not recoverable through	0.10

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natural processes under current conditions.	
Floodprone area is completely modified by concrete and/or rip-rap; disturbance affects both sides of drainage; variable is not recoverable through natural processes under current conditions.	0.0

Habitat Metrics – Physical Structure Metrics (CRAM, LLFA, HGM)

9. *(field)* Topographic Complexity	
Assessment area is dominated by a complex arrangement of micro and macro topographic features, such as meanders, bars, benches, secondary channels, backwaters, roots, pits, and ponds. Higher gradient systems may contain plunge-pool sequences.	1.0
Some macrotopographic features present, such as secondary channels; however, the complexity and interspersion of such features has been reduced by substrate alteration, flooding, grazing, trampling, or placement of fill material; or naturally v-shaped channel is a small drainage.	0.75
Assessment area consists of a single channel without macrotopographic features such as benches or secondary channels; however, the channel has microtopographic features such as bars, braiding, and presence of woody debris.	0.50
Assessment area consists of a single channel without macrotopographic features such as benches or secondary channels; however, the channel has microtopographic features such as bars, braiding, and presence of woody debris. Features may be the result of anthropogenic disturbance.	0.25
Assessment area consists of a uniform, straight channel with no substantive topographic features.	0.10
10. *(field)* Substrate Condition	
Soils in the assessment area or adjacent to the active channel are relatively intact, show evidence of surface organic matter accumulation, fallen trees, branches, and twigs or other course woody debris, decayed leaf litter, and a fine detritus of organic matter. Redoximorphic features may be visible within 30 cm of the surface; organic or clay layers may be present within the soil column (top 30cm).	1.0
Channel and adjacent benches are dominated by unconsolidated sand or other poorly formed native soils and/or bedrock outcrops. Substrate may exhibit moderate embeddedness or compaction; lack of organic layers in column; cattle may have had minor to moderate effects on sandy substrates.	0.75
Soils may exhibit some evidence of sparse organic litter or coarse woody debris. However, the assessment areas is mainly characterized by disturbed conditions, such as substantial filling, compaction, tilling, grazing, or similar activity, but appear recoverable with minimal intervention.	0.50
Soils are extremely compacted, dominated by imported fill or other predominantly upland (non-native) soils or have been deeply ripped, disced, or drained.	0.25
Channel is lined with concrete or rip-rap.	0.0

Habitat Metrics – Biotic Structure Metrics (CRAM, LLFA, HGM)

11. *(field)* Vertical Biotic Structure	
Most of the Assessment Area supports 3 height classes of vegetation; T/S/H; may also include vine layer.	1.0
About half of the Assessment Area supports 3 vegetative strata and/or most is covered by at least 2 height classes.	0.75
Between one quarter and half of the assessment areas supports 3 vegetative height classes and/or at least half of the site support 2 height classes.	0.50

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Less than one quarter of the Assessment Area supports 3 height classes OR less than one-half supports 2 or more height classes OR only one height class is present.	0.25
12. *(field)* Interspersion and Zonation	
2 or more plant zones exist along most of the active channel or shoreline, plus various tributary channels, meander scars, paleo-channels, or other features, producing a complex mosaic of vegetation in overhead view (zones can include submerged or emergent vegetation).	1.0
2 or more plant zones exist along about half of the main active channel or shoreline, and along a few of the tributary channels and other topographic features.	0.75
2 or more plant zones are apparent along about one quarter to half of the main active channel or shoreline.	0.50
2 or more plant zones are apparent along less than one quarter of the active channel.; OR sparse shrubs occur in confined/ incised channel.	0.25
Unvegetated channel.	0.10
13. *(field)* Ratio of Native to Non-Native Plants	
75 – 100% of the plant species are native and no stratum is dominated by non-native species.	1.0
50 - < 75% of species are native and/or up to 25% of the strata present are dominated by non-native species.	0.75
25 - < 50% of species are native and/or up to 25% of the strata present are dominated by non-native species.	0.50
10 – < 25 %of species are native and/or up to 50% of the strata present are dominated by non-native species.	0.25
0 - < 10 % of species are native and/or up to 100% of the strata present are dominated by non-native species.	0.10
No vegetation present. Variable is not recoverable and sustainable through natural processes under current conditions.	0.0
14. *(field, includes sub-watershed area outside of AA)* Riparian Vegetation Condition	
Vegetation represents reference condition with no chronic disturbance or recovered from historical disturbance. Presence of areas disturbed through natural processes (i.e., fire and flood) do not detract from score.	1.0
Native vegetation recovering with minor chronic disturbance (i.e., grazing). Presence of areas disturbed through natural processes (i.e., fire and flood) do not detract from score. Invasive, exotic species may be present.	0.75
Native vegetation common and widespread with moderate grazing pressure. Presence of areas disturbed through natural processes (i.e., fire and flood) do not detract from score. Invasive, exotic species may be present.	0.50
Native vegetation localized with heavy grazing pressure. Presence of areas disturbed through natural processes (i.e., fire and flood) do not detract from score.	0.25
Native vegetation absent, area hardened (i.e., paved, urban, etc.) or graded. Restoration impractical and unlikely for economic or political reasons.	0.0
15. *(office, verify in field, includes sub-watershed area outside of AA)* Riparian Corridor Continuity	
<5% of riparian reach with gaps/breaks due to cultural alteration.	1.0
>5 and <15% of riparian reach with gaps/breaks due to cultural alteration.	0.75
>15 and <30% of riparian reach with gaps/breaks due to cultural alteration.	0.50
>30 and <50% of riparian reach with gaps/breaks due to cultural alteration.	0.25
>50% of riparian reach with gaps/breaks due to cultural alteration.	0.10

Date _____ Newhall Site_____

Stream Reach Number_____

Surveyor Initials _____ Assessment Area (AA) Number_____

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Newhall Hybrid Functional Assessment Datasheet Notes - Riverine Wetlands Class

Step 1. Establish reaches and Assessment Areas (AAs) on aerial imagery. Use table below to help delineate AAs.
Step 2. Complete and initial score for functions 1,2,3,4,5,6,8, and 20 on each AA in the office. Use the notes for these functions below. These initial scores will be verified and updated as required during the field visit.
Step 3. Conduct the field visit and score all functions in each AA. Use the notes for all functions below. Note that there are two broad sets of functions – those that are evaluated and scored inside the established AA only, and those that require you to assess function conditions within the AA as well as along the majority of the selected reach in which the AA occurs to arrive at a function score. For this reason, look at as much of the reach as time permits. Functions 4,5,8,11,18,19,20 and 21 require an evaluation outside of the AA boundaries, and may be the last ones you score in a reach.

FEATURES USED TO DELINEATE RIVERINE AAs
• grade or water height control structures • weirs and other flow control structures • lotic-lentic transitions • natural falls • culverts • inlets and outlets (end-of-pipe discharges) • diversion ditches (brow ditches) • channel confluences • dams, levees, and banked road grades • uplands (*i.e.,* terrestrial breaks in floodplains, shorelines, riparian habitats) • open water areas broader than the wetlands (*i.e.,* wetlands on opposite shores of a large river) • major changes in degree of channel confinement, degradation, aggradation, slope, or bed form
FEATURES NOT USED TO DELINEATE RIVERINE AAs
• unpaved, unimproved single-lane roads • at-grade roads or Arizona crossings • bike paths and jogging trails at grade • equestrian trails • fences (unless designed to obstruct the movement of wildlife) • bare ground on the active floodplain or below the ordinary high water line • riffle – glide – pool transitions within a homogeneous reach of these features • spatial changes in land cover or land use along the wetlands border • property boundaries • state and federal jurisdictional boundaries
Source: CRAM Version 3.0.

1. Divide the perimeter of the AA into four sections, estimate the width of the buffer in each of the four sections up to 100m per side and calculate the mean buffer width.

Date _____ Newhall Site_____

Stream Reach Number_____

Surveyor Initials _____ Assessment Area (AA) Number_____

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2. Assess vegetative cover, substrate condition, and indicators of disturbance. If buffer sides vary in condition, score each side and calculate mean buffer condition score.
3. Assess the percentage of the drainage basin with land use/land cover types having the potential to increase the nutrient, pesticide, hydrocarbon, or sediment loading in downstream surface waters upland areas adjacent to and upstream from the reach being assessed (stressors - secondary or tertiary treated water inputs, oil production platforms, agricultural fields, paved roads, *etc*.).
4. Assess the primary origin of water input to the assessment reach and the degree to which water input has been affected or is controlled by adjacent land use activities including upstream activities (stressors - septic tanks, outfalls, urban and agricultural runoff, *etc*.)
5. Assess evidence of diversions, flow augmentations, or upstream constrictions. Dams and other upstream impoundments impact the hydroperiod if they control more than 25% of the upstream drainage area of the AA or if they are close enough to the AA to substantially affect the magnitude or timing of inflows. Diversions affect hydroperiod if they routinely reduce either base flow or storm flow to the assessment reach by more than 15%. Constrictions of the active channel within 1 km (upstream) of the AA also alter hydroperiod.
6. Assess degree of channel incision and look for evidence of extent and vigor of inundation of banks or terraces and overbank flow including wrack, debris, fine sediment deposits, and evidence of ponding on benches/terraces adjacent to the stream channel. Consider channel depth, presence of natural or man-made levees, and stream bank condition.
7. Assess the potential for surface water storage including the adjacent floodplain (note presence/absence of any hydrophytic vegetation). Perennial streams and wetlands will generally score higher than ephemeral/intermittent streams unless significant modifications to stream features have occurred.
8. Assesses the extent to which the lateral spread of flood flows are impeded by channel and buffer modifications (stressors – excessive channel incision, concrete channels, , development of floodplain, berms, walls, cisterns,
9. Count the number of micro-topographic features that affect stream elevation or influence the path of water flowing along a transect line through the AA (hummocks, pools, debris jams, multiple incised channels of various depths, sediment bars, micro-terraces, *etc*.) Lower order riverine wetlands and ephemeral channels have less topographic complexity and subtle indicators including large rocks, middens, or accumulations of woody debris. Trampling, filling, burying or other alterations of topographic features indicate a degraded condition.
10. Assess the presence or absence of intact, unaltered soil that is regularly saturated/inundated and has an accumulation of organic matter or coarse litter. Look for sub-surface redoximorphic features (top 30 cm of substrate), ponding, or organic matter accumulation, and observe any pits, ponds, backwaters and the floodplain within the AA (good condition indicators - leaf litter accumulation, coarse woody debris, dried algal mats, algal coating on sand grains in the channel bed, organic streaking in the soil horizon, etc.). Excessive sediment deposition, filling, down cutting, trampling, or compaction will reduce the score.
11. Count the number of vegetation height classes within the AA (canopy = >3m, shrub = 3m to 1m, herb = >1m).

Date _____ Newhall Site_____

Stream Reach Number_____

Surveyor Initials _____ Assessment Area (AA) Number_____

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12. Assess the horizontal structure of the AA by counting the number of different kinds of plant patches (minimum patch size is generally 3m by 3m) including all standing vegetation. These patches correspond to the Keeler-Wolfe plant series mapped for the area and/or general biotic patch types (*e.g.*, grasses, forbs, shrubs, vines, short and tall deciduous trees, short and tall evergreen trees, short and tall sedges/rushes, emergent macrophyte beds, floating macrophytes). Each patch should signify a different elevation or distance away from the usual high water mark or contour and the transition from the wetlands to the adjacent uplands is the primary evaluation zone in dry systems. Plant zones may be discontinuous and can consist of more than one plant species, but some zones may be mono-specific. In most cases, one plant species dominates each zone. Evaluate the number of zones present and the degree of interspersion among these zones (from a hypothetical plan view).

13. Briefly collect vegetation data in a 10 m X 50 m plot within the AA. Make separate lists of native and non-native herbs, shrubs and trees within the plot and use the ACOE 50/20 rule to determine dominant vegetation in each stratum if necessary. This data will also be used for steps 17 and 21.

14. Observe the general condition of the riparian corridor (floodprone area) in the reach (stressors – undercutting, grazing, grading, herbicidal control, insect infestations, *etc*.).

15. Estimate the percent of flood prone area along the main stem channel of the riparian reach occupied by native and non-native vegetation communities with adequate height and structure to allow faunal movement (*i.e.*, annual grassland with no shrub or tree component represents a corridor gap).

APPENDIX C

RMDP Functions and Services Compensatory Mitigation Tables

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Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
Chiquito Canyon	Waters Avoided	4.15	0.65	2.69
	Temporary Impact	3.36	0.65	2.18
	Permanent Impact	4.7	0.65	3.04
	Total HARC AW Unit Impacted	***12.21***	**---**	***7.90***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided	4.15	0.60	2.49
	Temporary Impact Areas	3.36	0.60	2.02
	Mitigation Establishment	9.80	0.60	5.88
	Total HARC AW Units Provided at Chiquito Canyon	**17.31**	**---**	**10.39**
	At completion of Mitigation, does the Chiquito Canyon Drainage provide Functions and Services equivalent or greater than Pre-Project?			**+ 2.48 , YES, excess AW Units**

Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
Lion Canyon	Waters Avoided	0	0.80	0.00
	Temporary Impact	2.17	0.80	1.73
	Permanent Impact	4.69	0.80	3.75
	Total HARC AW Unit Impacted	***6.86***	**---**	***5.48***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided	0.00	0.60	0.00
	Temporary Impact Areas	2.17	0.60	1.30
	Mitigation Establishment	2.10	0.60	1.26
	Total HARC AW Units Provided at Lion Canyon	**4.27**	**---**	**2.56**
	At completion of Mitigation, does the Lion Canyon Drainage provide Functions and Services equivalent or greater than Pre-Project?			**-2.92 ,NO, AW Unit Deficit**
	PROPOSED HARC DEFICIT MITIGATION SITE:		**Santa Clara River****	**2.92**

Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
Long Canyon	Waters Avoided	0.45	0.63	0.28
	Temporary Impact	0.01	0.63	0.01
	Permanent Impact	5.24	0.63	3.29
	Total HARC AW Unit Impacted	***5.7***	**---**	***3.58***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided	0.45	0.60	0.27
	Temporary Impact Areas	0.01	0.60	0.01
	Mitigation Establishment	23.40	0.60	14.04
	Total HARC AW Units Provided at Long Canyon	**23.86**	**---**	**14.32**
	At completion of Mitigation, does the Long Canyon Drainage provide Functions and Services equivalent or greater than Pre-Project?			**+10.74 , YES, excess AW Units**

Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
Potrero Canyon	Waters Avoided	31.01	0.76	23.50
	Temporary Impact	5.66	0.76	4.29
	Permanent Impact	2.05	0.76	1.55
	Total HARC AW Unit Impacted	***38.72***	**---**	***29.34***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided	31.01	0.70	21.71
	Temporary Impact Areas	5.66	0.70	3.96
	Potrero CAM Mitigation Establishment	19.00	0.80	15.20
	Potrero Drainage Mitigation Establishment	14.00	0.70	9.80
	Total HARC AW Units Provided at Potrero Canyon	**69.67**	**---**	**50.67**
	At completion of Mitigation, does the Potrero Canyon Drainage provide Functions and Services equivalent or greater than Pre-Project?			**+21.33 , YES, excess AW Units**

Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
San Martinez Canyon	Waters Avoided	1.27	0.79	1.00
	Temporary Impact	1.06	0.79	0.84
	Permanent Impact	0.22	0.79	0.17
	Total HARC AW Unit Impacted	***2.55***	**---**	***2.02***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided	1.27	0.60	0.76
	Temporary Impact Areas	1.06	0.60	0.64
	Mitigation Establishment	6.80	0.60	4.08
	Total HARC AW Units Provided at San Martinez Grande Canyon	**9.13**	**---**	**5.48**
	At completion of Mitigation, does the San Martinez Grande Canyon Drainage provide Functions and Services equivalent or greater than Pre-Project?			**+3.46 , YES, excess AW Units**

Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
Santa Clara River	Waters Avoided	449.74	0.77	346.30
	Temporary Impact	15.71	0.77	12.10
	Permanent Impact	5.79	0.76	4.41
	Total HARC AW Unit Impacted	***471.24***	**---**	***362.81***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided	449.74	0.77	346.30
	Temporary Impact Areas	15.71	0.57	8.95
	Mayo Crossing Mitigation Establishment	15.90	0.80	12.72
	Mitigation Establishment at Long Canyon Bridge	2.70	0.80	2.16
	Total HARC AW Units Provided at Santa Clara River	**484.05**	**---**	**370.13**
	At completion of Mitigation, does the Santa Clara River provide Functions and Services equivalent or greater than Pre-Project?**			**+7.33 , YES, excess AW Units**

Jurisdiction Name	Description	Waters of the U.S. (including wetlands)	HARC TotalScore	Impact to HARC AW Units
Salt Creek Canyon	Waters Avoided	80.9	0.79	64.30
	Temporary Impact	7.27	0.79	5.78
	Permanent Impact	0.23	0.79	0.18
	Total HARC AW Unit Impacted	***88.4***	**---**	***70.26***
	Mitigation - HARC	**Post-Project Acres**	**Approx. HARC TotalScore**	**Provided HARC AW Units**
	Waters Avoided***	80.90	0.79	64.30
	Temporary Impact Areas***	7.27	0.79	5.78
	Salt Creek Mitigation Establishment	18.50	0.40	7.40
	Salt Creek Mitigation Enhancement	19.70	0.10	1.97
	Total HARC AW Units Provided at Salt Creek Drainage	**126.37**	**---**	**79.45**
	At completion of Mitigation, does Salt Creek provide Functions and Services equivalent or greater than Pre-Project?			**+9.19 , YES, excess AW Units**

* Temporary Impact at Landmark Village Agricultural Ditch ignored - related to enhancement under CDFG Mitigation Requirements.

** HARC AW Unit deficit at Lion Canyon is proposed to be offset by enhancement activities within the approx. 450 acres of Avoided Santa Clara River, (exotic vegetation control within this area is expected to raise general HARC Total Score by 0.05 Units, for a total of 22.5 AW Score Units), thereby offsetting the approximately (3) HARC AW Unit deficit. Enhancement will be provided irrespective of potential excess HARC AW Units related to the Mayo and other River Mitigation Establishment Activities.

*** A very conservative approach has been taken for Salt Creek HARC estimates, and is reflective of the level of planning currently completed at the mitigation sites. As more detail regarding the mitigation plans is obtained, a higher HARC AW Total Score is likely.