HABITAT MITIGATION AND MONITORING PLAN

SUNRISE POWERLINK

CORPS FILE NUMBER 2007-00704-SAS

SUBMITTED BY:

SDG&E
8315 Century Park Court, CP21G
San Diego, California 92123-1548
Contact: Alan Colton

PREPARED BY:

WRA, INC.
2169-G East Francisco Blvd
San Rafael, CA 94901

JULY 8, 2010

This Page Left Intentionally Blank

TABLE OF CONTENTS

List of Figures

List of Tables

1.0 INTRODUCTION AND PURPOSE

San Diego Gas and Electric (SDG&E) is constructing a new 500/230 kilovolt (kV) electric transmission line that would traverse approximately 120 miles between the El Centro area of Imperial County and southwestern San Diego County, in southern California (Figure 1). Construction of this transmission line, along with associated roads, facilities, and maintenance areas, will result in impacts to areas under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the State Water Quality Control Board (SWRCB), and the California Department of Fish and Game (CDFG). State and federal regulations require mitigation for impacts to 'waters of the US' and 'waters of the State'. This Habitat Mitigation and Monitoring Plan (HMMP) describes how the mitigation will be accomplished, including preservation, restoration and enhancement activities, monitoring and performance criteria, and management of mitigation areas.

1.1 Responsible Parties

SDG&E is the party responsible for implementing mitigation for the Sunrise Powerlink Project. WRA, Inc. is the applicant's authorized agent and preparer of this HMMP for mitigation to "waters of the US" and "waters of the State".

Primary contact information for these parties is below:

Project Applicant:
SDG&E
8315 Century Park Court, CP21G
San Diego, California 92123-1548
Contact: Alan Colton
Contact Phone: (858) 654-8727

Authorized Agent:
WRA, Inc.
2169-G East Francisco Blvd.
San Rafael, CA 94901
Contact: Michael Josselyn, PhD, PWS
Contact Phone: (415) 454-8868

SDG&E will be responsible for implementing the project mitigation through completion of the initial monitoring period. Long term management of the mitigation properties will be the responsibility of the respective land manager (e.g., Bureau of Land Management, County of San Diego, U.S. Forest Service, or non-profit or conservation land management organization). The description of the long-term management for these mitigation areas, the restrictions to be placed on the areas, and the financial commitments will be described fully within the Habitat Management Plan (HMP) to be prepared by Sunrise Powerlink and are summarized in the appropriate sections of this document.

1.2 Document Overview and Purpose

The purpose of this document is to describe the mitigation, monitoring, and management for permanent and temporary project impacts to streams and dry washes within "single and complete crossings" associated with the construction, operation, and maintenance of the Sunrise Powerlink. In addition, restoration of temporary impacts to streams, wetlands, and dry washes within the construction footprint is described as part of the Restoration Plan for Temporary Impacts to Waters (Appendix A).

Mitigation for the impacts associated with "single and complete projects" will be consolidated and implemented at five mitigation sites. Four of these sites are located along the Sunrise Powerlink project alignment, and one is located in the desert area north of the alignment (see Figure 2). Existing conditions and proposed mitigation activities at each of these sites is described in Sections 3.0 and 5.0 below. The mitigation sites include:

- Desert Cahuilla Property
- Suckle Property
- Long Potrero Property
- Lightner Property
- Chocolate Canyon

The mitigation, monitoring, and management described in this HMMP is intended to meet the permit requirements of the US Army Corps of Engineers (USACE), California Department of Fish and Game (CDFG), and State Water Resources Control Board (SWRCB), as well as the USACE regulatory requirements for preparation of mitigation plans set forth in 33 CFR 332.4(c). The regulatory requirements contained in 33 CFR 332.4(c) generally encompass the requirements of mitigation and monitoring plans for all of the resource agencies. These regulations require a HMMP to include:

- *Mitigation Objectives, including resource type, amounts, and methods of compensation (see Section 4.0 and Section 5.0)*
- *Site Selection, including key factors for providing mitigation at a given site (see Section 3.0)*
- *Site Protection Instrument (see Section 7.2)*
- *Baseline Information, including ecological characteristics of impacted and mitigation sites (see Section 2.3.2 for impacted sites, Section 3.0 for mitigation sites)*
- *Determination of Credits, including a description of how the mitigation will provide compensatory mitigation for impacts (see Section 4.0)*
- *Mitigation Work Plan, including detailed descriptions of the work to be performed in implementing mitigation (see Section 5.0)*
- *Maintenance Plan, including maintenance activities to ensure continued viability of the mitigation site (see Sections 6.5 and 7.0)*
- *Ecologically based Performance Standards (see Section 6.6)*
- *Monitoring Requirements and Methods (see Section 6.0)*
- *Long-term Management Plan, including long term financing mechanisms (see Section 7.0 and to be provided in greater detail within Habitat Mitigation Plans to be prepared separately)*
- *Adaptive Management Plan (see Sections 6.5 and 7.0)*
- *Financial Assurances to ensure project mitigation will be effectively implemented and maintained (see Sections 6.7 and 7.5)*

Project impacts were described as part of the Pre-Construction Notification prepared for the USACE, as part of the Lake and Streambed Alteration Agreement Notification Package prepared for the CDFG, as part of the Water Quality Certification Application prepared for the SWQCB, and as modified by subsequent submittals. All permit application documents contain a complete project description. Project modifications have been made since these project permit applications were filed in order to further reduce environmental impacts, including those to streams, wetlands, and dry washes.

Figure 1. Project Area Location Map

Sunrise Powerlink
San Diego/Imperial County, California

0 5 10 20 Miles

wra
ENVIRONMENTAL CONSULTANTS

Map Date: June 2010
Map By: Derek Chan
Base Source: ESRI
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\Fig1_LocMap_20100630.mxd

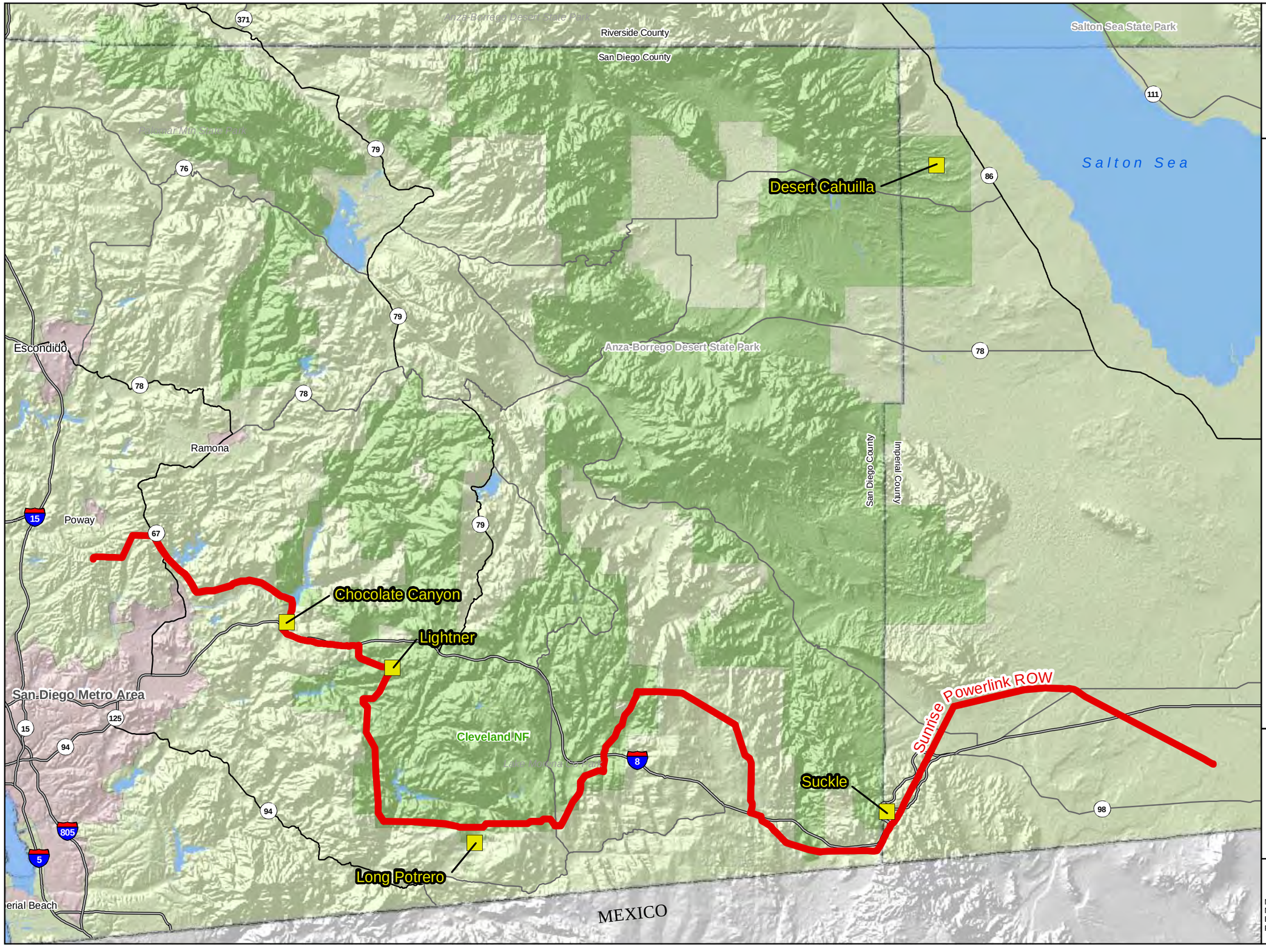
wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

Sunrise Powerlink

San Diego/Imperial County, California

Figure 2.

Overview of Mitigation Area Locations



Legend

- Mitigation Area

N
W E
S

0 5 10
Miles

Map Date: June 2010
Map By: Derek Chan
Base Source: ESRI
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\Fig2_MitigationSites_20100629.mxd

2.0 PROJECT DESCRIPTION

The Sunrise Powerlink Transmission Project will traverse approximately 120 miles between the El Centro area of Imperial County and southwestern San Diego County, in southern California. The proposed ROW has been assigned mileposts (MP), which range from the Imperial Valley Substation (MP 0) to the Sycamore Canyon Substation (MP 118). The Project is described in five separate links according to the following mileposts: Link 1 (MP 0 to MP 52.5), Link 2 (MP 52.5 to MP 90.0), Link 3 (Suncrest Substation), Link 4 (MP 92.8 to MP 99.0), and Link 5 (MP 90.0 to 92.8 and MP 99.0 to MP 118). The project description and impact summaries below are based on the project permit application packages, the Project Modification Report (PMR), and subsequent engineering design changes made at the request of the USACE.

2.1 Summary of Delineated Wetlands and Waters

The Preliminary Jurisdictional Determination Report for the project was approved by the Corps of Engineers in March 2010. Table 1 provides a summary of the jurisdictional areas along the project alignment. The majority of the delineated areas consist of ephemeral streams (including dry washes) and wetlands.

Table 1. Summary of All Delineated Jurisdictional Features on Sunrise Powerlink Project.

Habitat Type	Size (acres)		Length (linear feet)	Number of Features
	Waters of the U.S.	Waters of the State[1]		
Wetlands:				
Palustrine Emergent Wetlands (PEM)	115.65	115.65	N/A	38
Total Wetlands	**115.65 acres**	**115.65 acres**		**38**
Streams and Dry Washes:				
Perennial streams	0.16	0.31	1,379.50	3
Intermittent streams/drainages	2.93	5.21	23,261.29	33
Ephemeral streams/dry washes	386.80	436.18	526,851.79	1,002
Total Streams and Dry Washes	**389.89 acres**	**441.70 acres**	**551,492.58 feet**	**1,038**

[1]Waters of the State are inclusive of Waters of the U.S., and include the area within the Ordinary High Water Mark (the extent of federal jurisdiction) as well as the area to the top of bank, or edge of riparian vegetation (whichever is further).

2.2 Summary of Project Activities Associated with Nationwide Permit 12 Crossings

Table 2 below summarizes both permanent and temporary project activities. Complete descriptions of these activities can be found in the project permit applications.

Table 2. Summary of Project Activities

Project Component	Impact Type		Description
	Perm[1]	Temp[2]	
Structure Footings	X		Concrete foundations (ground-anchors) for structures
Structure Pad Area	X		100 ft x 100 ft area at each power transmission structure containing the structure footings
Work Area		X	200 ft x 200 ft or 200 ft x 400 ft areas encompassing a structure pad area
Maintenance Area	X		75 ft x 35 ft area established adjacent to the tower for maintenance after construction
Stringing Area		X	Work area for the equipment and activities required for stringing power lines; size varies by site.
Tower Staging Area Pad (TSAP)	X		100-ft diameter area for helicopter landing zone or equipment loading zone for helicopters
Guard Structure		X	Structures to protect roads crossed by conductors during construction only
New Access Road	X	X	Roads constructed as part of Project to provide access to power facilities for construction; permanent access roads will remain after construction for maintenance and temporary access roads will be regarded and restored to pre-existing conditions
Construction Yard		X	Areas for equipment storage, helicopter access and operations, field offices, and other facilities; site specific mapping.
Other Grading	X		Grading not encompassed by other components and required for safety and erosion control
Suncrest Substation Area	X		Substation facility

[1] An impact is categorized as “permanent” if the affected area will not be restored to pre-construction conditions.
[2] An impact is categorized “temporary” if the area can and will be restored to pre-construction conditions.

2.3 Summary of Project Impacts

Within the “single and complete projects” proposed for the Sunrise Powerlink, temporary and permanent impacts to Waters of the State (WOS) and Waters of the U.S. (WOUS) would occur as summarized in Table 3.

Table 3. Summary of Impacted Jurisdictional Features with Single and Complete Crossings (as updated March 2010)

Habitat Type		Impact Size (acres)		Length (linear feet)	Number of Features
		Waters of the U.S.	Waters of the State[1]		
Wetlands	Permanent	0.078	0.078	--	2
	Temporary	--	--	--	--
Perennial streams	Permanent	0.007	0.018	26	1
	Temporary	--	--	--	--
Intermittent streams/drainages	Permanent	0.094	0.103	1,916	5
	Temporary	0.003	0.006	158	2
Ephemeral streams/drainages	Permanent	0.50	0.83	7,871	99
	Temporary	0.37	0.58	8,282	79
Dry Washes	Permanent	2.39	2.47	--	76
	Temporary	6.78	7.10	--	104
Total Impacts	**Permanent**	**3.069**	**3.499**	**9,813**	**183**
	Temporary	**7.153**	**7.686**	**8,440**	**185**

[1]Waters of the State are inclusive of Waters of the U.S., and include the area within the Ordinary High Water Mark (the extent of federal jurisdiction) as well as the are to the top of bank, or drip line of riparian vegetation (whichever is further).

2.4 Baseline Conditions of Impacted Areas

In June 2010, WRA conducted an assessment of a representative sample of impact sites using the California Rapid Assessment Method (CRAM). This assessment provides scores which quantify the condition and functional value of impacted streams and dry washes along the Sunrise Powerlink ROW. Given the small number of wetland impacts, no CRAM was performed on wetlands. The methodology was applied with guidance from the Southern California Coastal Water Research Project (SCCWRP), one of the organizations involved in the development of CRAM, to ensure that the unique stream and dry wash habitats along the ROW were given adequate consideration within the CRAM framework. The assessment was applied to a subset of 30 impact areas selected as representative of total impacts. CRAM evaluation locations are shown in Figure 3. The results of the assessment are summarized below. CRAM scores from individual sites and a more detailed explanation of assessment methods and procedures are presented in Appendix B.

One of the benefits of using CRAM is that the statewide CRAM "calibration average" as reported at the CRAM website can be used as a basis to compare scores from a particular site to an average score from a number of similar habitats throughout California. The CRAM calibration average and scores from impacted dry washes and streams along the Sunrise Powerlink ROW are summarized in Figure 4.

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

Sunrise Powerlink

San Diego/Imperial County, California

Figure 3.

Stream and Dry Wash Impact Sites Assessed Using CRAM

Legend

- Sunrise Powerlink ROW

CRAM Sites

- Dry Wash
- Ephemeral
- Intermittent
- Perennial

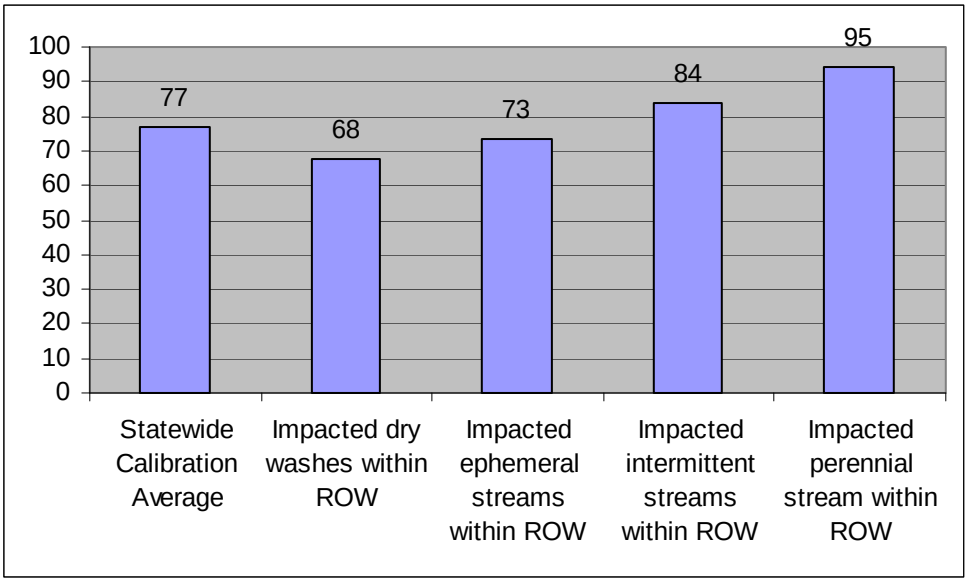
N
W E
S

0 5 10
Miles

Map Date: June 2010
Map By: Derek Chan
Base Source: ESRI
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\Fig3_CRAMSites_20100630.mxd

Two key considerations should be noted for the interpretation of Sunrise Powerlink CRAM scores. The first is that the CRAM assessment procedure is weighted in favor of large, structurally complex riverine wetlands (Collins et al. 2008a). This is based on the assumption during development of CRAM that the range of services a wetland provides increases with structural complexity and size. Second, beyond this preference for larger wetlands, the methodology used for Sunrise Powerlink was intended for perennial streams, while the majority of streams along the ROW are ephemeral or intermittent[1]. Although consultation was performed to ensure the validity of the results, scores for ephemeral streams, intermittent streams, and dry washes should be viewed accordingly in comparison to the statewide average. SCCWRP and other authors of CRAM methodology intend to issue a CRAM module(s) in the future that can specifically be used for ephemeral and/or desert streams. However, until this module is released, SCCWRP recommends using the riverine wetlands module for perennial streams as the best available methodology to assess streams of all types.

Figure 4. Overall CRAM Scores for impacted dry washes and streams within the Sunrise Powerlink ROW compared to the Statewide calibration average for riverine wetlands.



2.4.1 Baseline Conditions at Impacted Streams

Streams proposed to be impacted along the Sunrise Powerlink ROW include one perennial stream, seven intermittent drainages, and 178 small ephemeral streams, and 180 ephemeral desert streams (dry washes). These streams are located in a variety of habitat types included: Sonoran desert, desert transitional areas in western Imperial County, mountains in eastern San Diego County and foothills and agricultural land in San Diego County. Hydrology and landscape setting strongly influenced CRAM scores, with larger perennial or intermittent features scoring higher than smaller ephemeral features.

[1] Definitions of stream types are as defined by the Corps of Engineers in the March 2007 issuance of the Nationwide Permit program.

All assessed streams with proposed impact sites within the Sunrise Powerlink ROW yielded scores within 20% of the CRAM calibration average. As seen in Figure 4, while ephemeral streams scored slightly below average, both intermittent and perennial streams scored above average. All assessed streams scored high on the Buffer/Landscape attribute due to the path of the ROW through fairly remote, undeveloped areas. Many streams had a minor amount of sedimentation or erosion due to existing access roads nearby or other minimal forms of disturbance. At least 1-2 dominant invasive plant species were usually found at each site. Most stream impact sites were generally in good condition, however few were at the highest end of the range.

Ephemeral streams within the Sunrise Powerlink ROW received lower CRAM scores than intermittent streams, perennial streams, and the statewide average for perennial streams. Ephemeral streams typically did not support riparian or wetland vegetation, and in many cases were only discernible from the surrounding uplands due to their location in topographic draws and minimal indications of infrequent water flow (indicators of Ordinary High Water Marks observed). Ephemeral streams scored lower than intermittent and perennial streams in the areas of Hydrology and Physical Structure, and notably lower in Biotic Structure. This can generally be explained by the erratic nature of water flow in the channels that does not have a great enough frequency to create typical riverine microhabitats or support an abundance of riparian vegetation. However, ephemeral streams within the ROW generally had more entrenchment, sedimentation, and/or erosion than other stream types within the ROW.

All intermittent streams within the Sunrise Powerlink ROW were assessed using CRAM and scored above the statewide calibration average. These streams scored substantially higher than the statewide averages for the Buffer/Landscape, Hydrology, and Biotic Structure metrics. These high scores can generally be attributed to stream location in remote, undisturbed habitats, and their support of healthy riparian plant communities and channel structure and capacity that supports larger storm events. The intermittent streams sampled scored lower than the statewide average on the Physical Structure attribute, due to minimal physical channel development. Larger streams with perennial hydrology generally score higher in this area.

The one perennial stream assessed along the Sunrise Powerlink ROW received a very high CRAM score. This stream, near the town of Alpine, scored higher in all CRAM attributes than the statewide calibration average. The average overall CRAM score for this perennial stream was 18 percentage points above the statewide average, which represents significantly better condition according to the CRAM procedure. These high scores show that this stream is in very good condition and provides high levels of functions and values to its environment.

2.4.2 Baseline Conditions at Impacted Dry Washes

Dry washes within the Sunrise Powerlink ROW are located in the Sonoran Desert region of southwestern Imperial County. The majority of these drainages are small channels approximately one meter wide or less. Also, a number of broad, flat washes that comprise a large jurisdictional area will be partially impacted. These drainages have typical ephemeral hydrology, carrying water only during and immediately after large rainfall events during the winter and spring. Impacts to approximately 40 “single and complete projects” containing dry washes are anticipated along the Sunrise Powerlink ROW.

CRAM scores for dry washes were lower than the scores for all stream types described in Section 2.4.1. However, the low scores may largely reflect the inability of the current CRAM methodology to adequately score features within ephemeral desert systems.

Dry washes assessed within the ROW scored highly in some areas and low in others. While the overall CRAM score for these areas is more than 10 percentage points below the statewide calibration average, dry washes scored higher than the statewide average in the areas of Buffer/Landscape and Hydrology. In many cases, dry washes were impacted by 1-2 dominant invasive plant species, existing access roads, and off-road vehicle traffic, but they received high scores for their setting in remote, fairly undisturbed areas. Dry washes also generally had low levels of erosion and entrenchment, suggesting that these systems are less prone to damaging floods. Dry washes scored low in the areas of Physical and Biotic Structure, largely due to the small and infrequent nature of flowing water within these drainages in addition to the general lack of large or dense vegetation in desert environments. Flow within these streams is insufficient to create microhabitat features typically associated with healthy riverine systems, and is also insufficient to support large, dense, or diverse vegetation. As with other stream types assessed within the Sunrise Powerlink ROW, dry washes were found to be in generally good condition.

This Page Left Intentionally Blank

3.0 EXISTING CONDITIONS WITHIN PROPOSED MITIGATION SITES

The baseline information for each of the five mitigation sites listed in Section 1.0 are discussed in detail below, as well as factors that were considered in selection and identification of mitigation opportunities for each site.

3.1 Desert Cahuilla Property

The Desert Cahuilla Property is a 675 acre desert dry wash mitigation site located within the Salton Sea Watershed of Imperial County, California. It is situated approximately 7 miles west of the Salton Sea and is bounded on all sides by desert dry wash habitat with no urban development nearby. The site ranges from approximately 350 to 680 feet NGVD in elevation.

Site Selection: This site was selected for mitigation based on the presence of extensive dry washes (84 acres total), and the relative lack of disturbance of the site owing to its remote location. The preservation of dry washes provides mitigation for Initial collection of baseline information prior to a site visit to the property indicates that enhancement opportunities such as the removal of invasive species, are available in the upper portion of the site watershed. These enhancements could further increase the overall function and value of the site.

Soils: Soils in this region are mapped as Badland-Beeline-Rillito. Badland soils are characterized as very rapid runoff. Beeline soils are well drained with medium to rapid runoff and moderately rapid permeability. The Rillito soil series is somewhat excessively drained with slow or medium runoff and moderate permeability (USDA 2010a). Badland, Beeline and Rillito soils are classified as non-hydric (USDA 2010b). .

Vegetation: This property is made up of Sonoran creosote bush scrub and Sonoran creosote bush scrub- disturbed vegetation communities. Dominant plant species observed within these communities include creosote bush (*Larrea tridentata*), with white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), and ocotillo (*Fouquieria splendens*). Areas that were void of any vegetation were classified as unvegetated habitat-desert pavement.

Hydrology: Precipitation is the main source of hydrology for this site. This site typically receives on average 3.21 inches of rainfall per year (USDA 2010c). Site hydrology is essentially undisturbed.

3.2 Suckle Property

The Suckle Property is comprised of three parcels totaling 199 acres. It is located along Interstate 8 within the Salton Sea watershed. Several out buildings and a residence are located adjacent to the northwest corner of the property. A PVC pipe originating at the northernmost desert fan palm oasis appears to run to one of these buildings. Interstate 8 runs along the northern portion of the site, curving along the western boundary to the south. The site ranges from 2,200 to 2,357 feet in elevation.

Site Selection: The site was selected based on the presence of desert dry wash systems throughout, the presence of desert fan palm oasis habitat, as well as opportunities for removal of invasive tamarisk (*Tamarix* spp.) and Arundo (*Arundo donax*) in both habitats to improve existing conditions. The site contains more than seven acres of dry washes (desert ephemeral streams), and approximately 0.9 acres of desert fan palm oasis vegetation (see Table 4). In

addition, the site contains discrete populations of tamarisk and Arundo, presenting the opportunity for removal of outlying populations of these species to improve habitat conditions.

Table 4. Jurisditional Areas at the Suckle Property

	Acres
Desert Dry Wash	7.47
Desert Fan Palm Oasis (wetland)	0.88
TOTAL:	7.92

Soils: Soils at the site are mapped as Rock Outcrop-Lithic Torriorthents-Omstott. Omsott soils are characterized as well drained with rapid to medium runoff and moderate to moderately rapid permeability (USDA 2010a). Soils are non-hydric (USDA 2010b).

Vegetation: This property is made up of Sonoran mixed woody and succulent scrub habitat. Dominant plant species observed include white bursage (*Ambrosia dumosa*), desert peach (*Prunus andersonii*), Bigelow's nolina (*Nolina, bigelovii*), desert agave (*Agave deserti*), prickly pear (*Cylindropuntis* spp.), and Parish's goldeneye (*Viguiera parishii*). Dominant native plant species found in the desert fan palm oasis habitats include California fan palm (*Washingtonia filifera*), yerba mansa (*Anemopsis californica*), and sandbar willow (*Salix exigua*).

Hydrology: Precipitation is the main source of hydrology for this site. This site typically receives on average 3.21 inches of rainfall per year (USDA 2010c). Interstate 8 intersects with an area of desert dry washes on the southern end of the property. The largest desert dry wash on the southern end of the property flows from the west through a culvert under I-8 and onto the Suckle property. Natural hydrology in this dry wash system may be somewhat impeded by the Arundo and Tamarisk infestations in the middle of this stream.

3.3 Lightner Property

The Lightner Property is the largest of the mitigation sites, totaling approximately 697 acres[2] and comprised of 9 parcels. It is located within the San Diego River watershed, approximately 1.5 miles south of Interstate 8 off of Japatul Valley Road and Bell Bluff Truck Trail in San Diego County, California. The Suncrest Substation of the Sunrise Powerlink Project is located in the central portion of the property spanning two parcels (APN # 52303013 and 52303014). This mitigation property is surrounded on all sides by mountainous terrain with no urban development in close proximity. This site ranges from 2,240 to 3,080 feet NGVD in elevation.

Site Selection: The Lightner Property was selected as mitigation based on the presence of a large intact watershed area containing ephemeral and intermittent streams along with wet meadows supporting emergent vegetation. It also supports a diverse number of habitats including Englemann Oak and habitat for the Hermes Copper butterfly. The site offers a variety of restoration opportunities including removal of earthen dams along streams, enhancement of riparian and wetland areas through planting and revegetation, and removal and management of invasive species. The presence of the Suncrest Substation within the site offers the opportunity

[2] All acreages reported for mitigation areas are exclusive of the transmission ROW or other transmission facilities.

to manage long term preservation of habitat values in the area directly surrounding one of the project's largest impacted areas.

A total of four wetlands and 24 total streams are present on the property; 16 streams are ephemeral and 6 are intermittent. The acreage and length of ephemeral streams is outlined in Table 5 below.

Table 5. Jurisditional Areas at the Lightner Property

	Acres	Linear Feet
Ephemeral Streams	0.45	14,365
Intermittent Streams	0.24	7,291
Emergent Wetlands	0.83	-
TOTAL:	1.52	15,094

Soils: The dominant soil type found within this property is Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes. Additional soil types on the property include Fallbrook rocky sandy loam, 9 to 30 percent slopes; Fallbrook sandy loam, 9 to 15 percent slopes, eroded; Cieneba coarse sandy loam, 30 to 65 percent slopes, eroded; Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded; Acid igneous rock land; and Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, eroded. These soil series are well to somewhat excessively drained ranging from low to rapid runoff with moderately rapid permeability (USDA 2010a). None of the soil series listed above appear on the San Diego County hydric soils list (USDA 2010b).

Vegetation: The majority of the property is dominated by southern mixed chaparral except in areas where emergent wetlands were observed. All ephemeral streams and all but one intermittent stream observed were surrounded by southern mixed chaparral species. Dominant plant species observed within this community include scrub oak (*Quercus berberidifolia*), chamise (*Adenostoma fasciculatum*), various manzanita species (*Arctostaphylos* spp.), and a variety of lilac species (*Ceonothus* spp.). One intermittent stream in the western half of the property contains predominantly southern mixed chaparral vegetation, however, low densities of riparian species including sycamores (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), and mule fat (*Baccharis salicifolia*) were found adjacent to this stream. These riparian species are representative of southern coast live oak riparian forest vegetation community. Dominant plants found in emergent wetlands were Mariposa rush (*Juncus dubius*) and common toad rush (*Juncus bufonis*). *Lythrum hyssopifolium* was also a dominant wetland plant species but was only found to occur in one of the eastern wetlands on the property.

Hydrology: Precipitation and resulting runoff from adjacent lands are the main sources of hydrology for ephemeral streams on this property. Intermittent streams rely on precipitation and runoff as well but are also spring fed which contributes to the increased duration of water flow. On average, this region receives 18.6 inches of rain per year (USDA 2010c). Natural hydrology for portions of the site has been altered through the construction and placement of earthen dams/berms and road crossings. Several earthen dams/berms are located in the western region of the property (APN # 52302007), altering sediment dynamics and hydrologic regimes in the downstream areas. A road crossing is located on the eastern boundary of APN # 52303012, bisecting an emergent wetland.

3.4 Long Potrero Property

The Long Potrero Property is a 471 acre mitigation site consisting of 5 parcels. It is located in the Cottonwood Creek-Tijuana River watershed, approximately 7.5 miles southwest of Interstate 8 off Buckman Springs Road and Highway 94/Campo Road in San Diego County, California. This site is surrounded by mountainous terrain with no urban development nearby. Elevations on this site range from 2,420 to 2,690 feet NGVD.

Site Selection: The Long Potrero site provides an opportunity to provide a variety of habitat protection for wetlands, riparian areas, and endangered species. This area is extremely valuable in terms of a high mountain meadow area and supports wet meadows, riparian areas, and streams. The site is also known to support the arroyo (*Bufo californicus*) toad and is within Quino checkerspot butterfly (*Euphydryas editha quino*) critical habitat. Though the presence of these species may limit removal of some of the earthen dams, stream enhancement activities and removal of non-native plants would further increase the overall functions and value of the site. The property is adjacent to the Cleveland National Forest therefore protection of this site would increase the overall amount of protected open space lands associated with the National Forest.

This site is composed of a series of ephemeral, intermittent and perennial streams along with the presence of several freshwater marshes and emergent wetlands. There are a total of 18 wetlands and 17 streams present on this site; 3 streams are ephemeral, 13 are intermittent and 1 is perennial. The acreage and length of ephemeral streams is outlined in Table 6 below.

Table 6. Jurisdictional areas at the Long Potrero Property

	Acres	Linear Feet
Ephemeral Streams	0.25	3,400
Intermittent Streams	2.09	19,282
Perennial Streams	0.01	229
Freshwater Marsh/ Emergent Wetlands	15.90	-
TOTAL	18.25	22,911

Soils: There are seven native soil types mapped throughout the property. The two dominant soil types mapped are La Posta rocky loam coarse sand, 5 to 30 percent slopes and acid ingenious rock land. Additional soil types on the property consist of: Tollhouse rocky coarse sandy loam, 30 to 65 percent slopes; Fallbrook sandy loam, 5 to 9 percent slopes; Fallbrook sandy loam, 9 to 15 percent slopes; Visalia sandy loam, 0 to 2 percent slopes; and Mottsville loamy coarse sand, 2 to 9 percent slopes. Soils on this site are well to excessively drained and range from slow to medium runoff. The Fallbrook and Tollhouse soils have rapid to very rapid runoff (USDA 2010a). None of the soil series listed above appear on the San Diego County hydric soils list. The Visalia series does contain unnamed inclusions which are mapped as hydric (USDA 2010b).

Vegetation: The Long Potrero property is dominated by southern mixed chaparral except in areas where riparian and emergent wetlands areas were observed. Dominant southern mixed chaparral species observed on the site include chamise (*Adenostoma fasciculatum*), California buckwheat (*Eriogonum fasciculatum*), redstem filaree (*Erodium cicutarium*), laurel sumac (*Malosma laurina*) and various bromes (*Bromus* spp.). Riparian areas were dominated by coast live oak (*Quercus agrifolia*) while freshwater marshes and emergent wetlands were dominated by Mariposa rush (Juncus dubius), commond toad rush (*Juncus bufonis*), common spike rush (*Eleocharis macrostachya*) and little hogweed (*Portulaca oleracea*) with low densities of *Rumex* and *Artemesia* spp. occurring throughout.

Hydrology: Precipitation and resulting runoff from adjacent lands are the main sources of hydrology for ephemeral streams on this property while intermittent and perennial streams are spring fed. Rainfall for this region averages 15.4 inches per year (USDA 2010c). Numerous access roads and earthen dams/berms are present on site, impeding the flow of some streams on site. Wetlands are bisected and discontinuous due to access roads and several stock ponds have formed in areas adjacent to the earthen dams/berms. Many of these stock ponds support the arroyo toad.

3.5 Chocolate Canyon Property

The Chocolate Canyon Property is approximately 75 acres and is comprised of 6 parcels. It is located within the San Diego River watershed, east of Interstate 8, directly adjacent to the highway off Peulz Valley Road in San Diego County, California. The northern and eastern boundaries of the property are bounded by mountainous terrain with urban sprawl to the west. This site ranges from 900 to 1,290 feet NGVD in elevation.

Site Selection: The Chocolate Canyon property was selected as a mitigation property due to its connection with adjoining open space and location within a watershed supporting public water supply. Preservation of this area offers the opportunity to expand an existing San Diego Multiple Species Conservation Plan (MSCP) preserve area. The mitigation site contains a mixture of ephemeral, intermittent and perennial streams along with an abundance of freshwater marsh wetlands. Selection of this site would allow for the protection of intermittent and riparian habitats found on property. Enhancement opportunities are also available with the removal of invasive species such as, giant reed and castor bean. This in turn will provide habitat improvement for the Least Bell's Vireo (*Vireo bellii pusillus*), Southwestern Willow Flycatcher (*Empidonax traillii extimus*), and the California Gnatcatcher (*Polioptila californica californica),* all of which occur on this site, by revegetating areas where invasives are removed.

There are a total of six freshwater wetlands and 17 total streams. Of these 18 streams, 15 are ephemeral, 1 is intermittent and 1 is perennial (Table 7)

Table 7. Jurisdictional areas at Chocolate Canyon

	Acres	Linear Feet
Ephemeral Streams	0.27	8,758
Intermittent Streams	0.01	305
Perennial Streams	1.08	3,150
Freshwater Marsh	1.42	-
TOTAL:	2.78	12,213

Soils: The dominant soil type mapped for this mitigation site is listed as Cienba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded. A small portion of the northeastern section of the property is mapped as Cienba coarse sandy loam, 30 to 65 percent slopes, eroded. The soils are well to excessively drained and range from medium to very rapid runoff (USDA 2010a). Neither soil series appears on the San Diego County hydric soils list (USDA 2010b).

Vegetation: The dominant vegetation community within this site is Diegan coastal sage scrub except in riparian areas adjacent to intermittent and perennial streams and where freshwater marshes were mapped. Dominant plant species observed within this community include California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), along with various brome species throughout. Riparian areas adjacent to the intermittent and perennial stream are characterized as southern coast live oak riparian forest with the presence of coast live oak (*Quercus agrifolia*), willow species (*Salix* spp.), and western sycamores (*Platanus racemosa*). High densities of poison oak (*Toxicodendron diversilobum*) were also observed along both intermittent and perennial stream banks while moderate densities of California grape (*Vitis californica*) were found only along perennial stream banks. Freshwater marshes occurred along the stream channel of the main perennial stream. Dominant vegetation observed in these marshes include California blackberry (*Rubus ursinus*), California mugwort (*Artemisia douglasiana*), and common three square (*Scirpus pungens*). Several large patches of the invasive giant reed (*Arundo donax*) were observed along the perennial stream channel and a few individual stands of castor bean (*Ricinus communis*) were found along the main access road in the southwestern section of the property.

Hydrology: Precipitation and resulting runoff from adjacent lands are the main sources of hydrology for the ephemeral and intermittent streams which then flow into the main perennial stream, Chocolate Canyon Creek. Stream flow from Chocolate Canyon Creek then travels downstream into El Capitan Reservoir. Average precipitation for this region is approximately 18.6 inches of rain per year (USDA 2010c). Access roads appear to have altered the natural hydrology by bisecting a small portion of the ephemeral streams on site. Aside from the presence of a small cross bridge at the upstream portion of Chocolate Canyon Creek, the hydrology for this and the intermittent stream appear to remain in their natural state.

4.0 MITIGATION GOALS AND OBJECTIVES

The objective of the mitigation program is to result in "no net loss" and, if possible, a net increase in habitat function and value for unavoidable project impacts to streams and dry washes through preservation, enhancement, and restoration of streams and dry washes at five mitigation sites.

The overall goals of the mitigation are to:

- Preserve and manage resources on each of the five properties in perpetuity
- Restore and enhance function of wetlands, riparian zones, streams, and dry washes
- Manage each property to remove and minimize cover by invasive species
- Manage and preserve wetland, stream and dry wash wildlife habitat functions

Mitigation activities include preservation, enhancement, and restoration actions as described below:

- Preservation is defined as purchase and long-term protection of habitats under public or non-profit conservancy ownership and placement of the property under a natural resource management plan that is prepared for each property. Preservation actions will eliminate habitat damage under private ownership and will provide long term benefits to both habitat and species, combining lands with larger public ownership of open space lands in several cases (e.g. adding to the Multiple Habitat Planning Area within the County or City of San Diego or adding to US Forest Service holdings).

- Enhancement actions are those which improve habitat quality through planting of native vegetation, invasive weed management, or erosion control measures. Enhancement actions are intended to result in improved riparian habitat condition and function and contribute to long-term species benefits.

- Restoration actions involve removal of dams, roads, and other human features that have altered natural hydrology or affected natural stream processes. Restoration is necessary to remove the influence of human alterations and promote long-term resiliency and responsiveness to physical and ecological processes.

This Page Left Intentionally Blank

5.0 MITIGATION IMPLEMENTATION

This section of the HMMP is divided into two parts. The first part provides a description of mitigation implemented for each mitigation site, with maps and tables showing acreages and locations of mitigation within each property. The second section describes implementation methods for general mitigation activities that may be performed at one or more of the mitigation sites. These activities are generic in nature and will be referenced in appropriate sections for each respective mitigation site where appropriate.

5.1 Activities Planned at Each Mitigation Site

Preservation, restoration, and enhancement activities planned for each mitigation site are described in the following sections. Details regarding site preparation and Best Management Practices (BMPs) used throughout all of the mitigation sites are described in Section 5.2.

5.1.2 Mitigation Activities at the Desert Cahuilla Property

As described above in Section 3.1, the Desert Cahuilla property was selected based on the presence of extensive areas of desert dry washes and is included as mitigation for project impacts to dry washes. Mitigation to be implemented at the Desert Cahuilla Property include:

- Preservation of dry washes
- Enhancement of dry washes by invasive plant control

Mitigation acreage within the Desert Cahuilla property is listed in Table 8 below. Mitigation activities planned for the Desert Cahuilla property are shown in Figure 5, and described further in the text below.

Table 8. Summary of Mitigation at the Desert Cahuilla Property

Mitigation Action	Area (acres)
Dry Wash Preservation and Enhancement	83.14

Invasive Plant Control

Non-native invasive species will be removed from dry washes and surrounding areas within the Desert Cahuilla property. Efforts to remove and control non-native plant species will focus on tamarisk and other plant species designated in the *High* category (high level of negative ecological impact in California) by the California Invasive Pest Council (CalIPC). These species will be removed by hand or treated by spot spraying with an herbicide that has been approved by the regulatory agencies. Plant material that is removed will be bagged and removed in a manner that prevents the spread of seed within or off the site.

Table 9. Priority Non-native and Invasive Plants to be Removed at the Desert Cahuilla Property

Botanical Name	Common Name	Method of Control
Tamarix spp.	tamarisk, salt cedar	Tamarisk Control Method (Section 5.2)

APN: 00701001
675.3 acres

(1) Invasive, non-native plant removal and control, including *Tamarix spp.,* throughout dry washes.

Legend

Parcel Boundary

Dry Washes (84.13 acres)

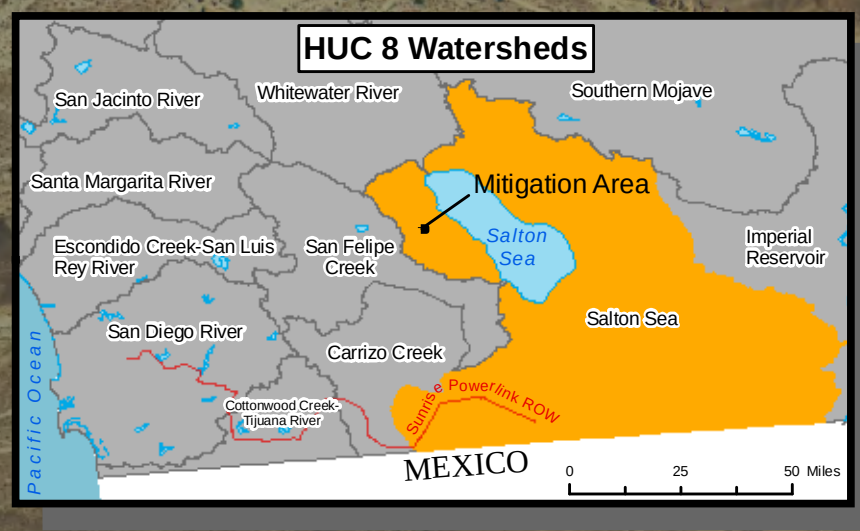


Figure 5. Mitigation Activities at the Desert Cahuilla Property

N
W E
S

Sunrise Powerlink
Imperial County, California

0 300 600 1,200 Feet

ENVIRONMENTAL CONSULTANTS

Map Date: July 2010
Map By: Derek Chan
Base Source: NAIP, 2005; Imperial County, NHD, NWI
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\DesertCahuilla_Existing_20100707.mxd

Sequence and Timing

Mitigation activities will be implemented concurrent with project impacts to dry washes. Sequence and timing that is related to specific planting methods and weed removal methods are described in Sections 5.2.

5.1.2 Mitigation Activities at the Suckle Property

The Suckle property was selected for mitigation based on the presence of dry washes, as well as desert fan palm oasis vegetation. The Suckle property is included as mitigation for project impacts to dry washes, and also offers the opportunity for preservation and enhancement of desert fan palm oasis wetland vegetation. Mitigation to be implemented at the Suckle property includes:

- Preservation of dry washes
- Preservation of desert fan palm oasis woodland vegetation
- Enhancement of dry washes and desert fan palm oasis woodland vegetation by invasive plant control

Mitigation acreage within the Suckle property is listed in Table 10 below. Mitigation activities planned for the Suckle property are shown in Figure 6, and described further in the text below.

Table 10. Summary of Mitigation at the Suckle Property

Mitigation Action	**Area (acres)**
Dry Washes	
Dry Wash Preservation	5.11
Dry wash Enhancement and Preservation	1.50
Total Dry Washes	**6.61**
Wetlands	
Desert Fan Palm Oasis Woodland Enhancement and Preservation	0.88
Total Wetlands	**0.88**

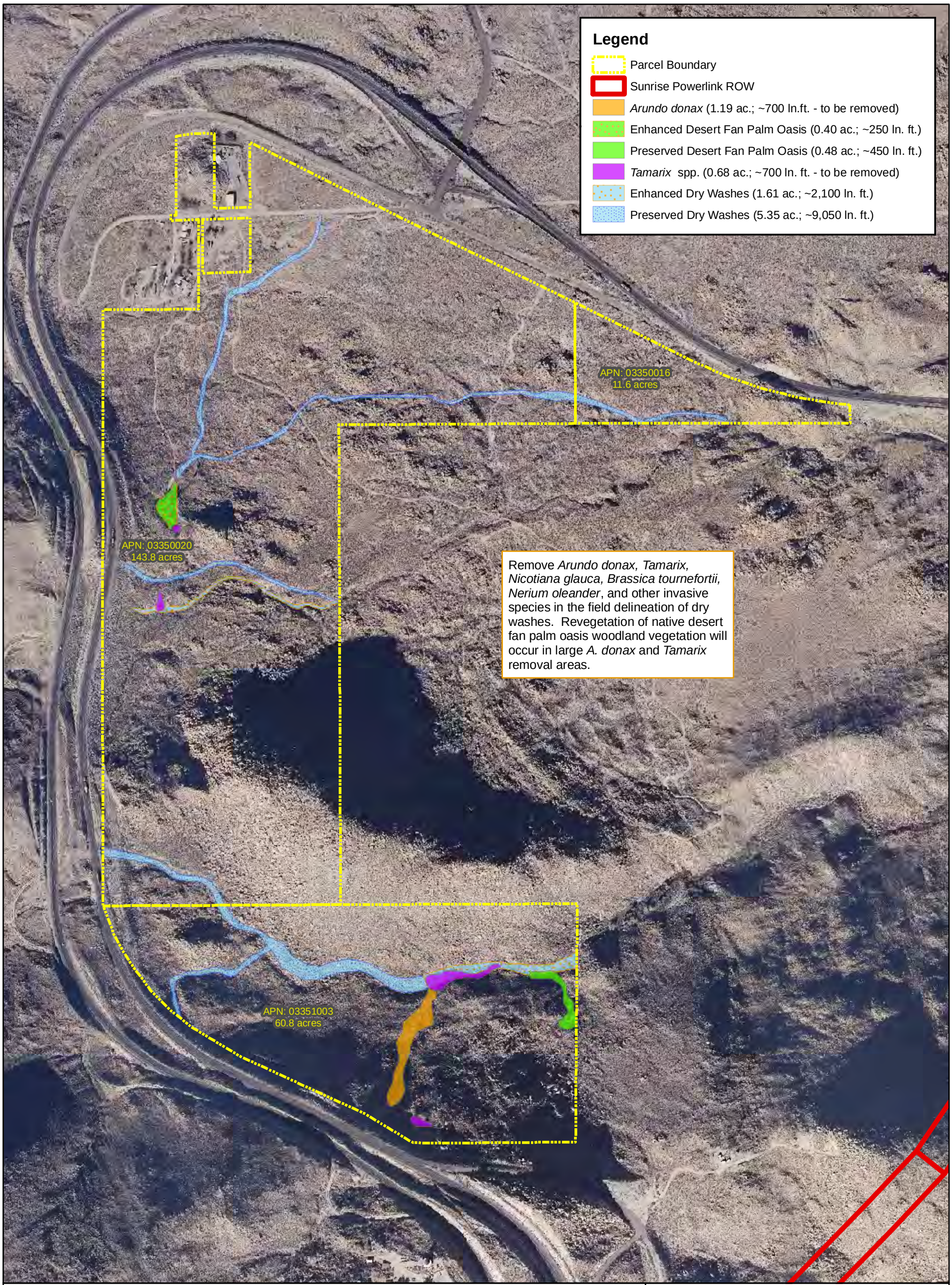


Figure 6. Mitigation Activities at the Suckle Property

N
W E
S

Sunrise Powerlink
Imperial County, California

0 250 500 1,000 Feet

wra
ENVIRONMENTAL CONSULTANTS

Map Date: July 2010
Map By: Derek Chan
Base Source: Imperial County
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\Suckle\Suckle_Mitigation_20100707.mxd

Invasive Plant Control

Non-native invasive species will be removed from dry washes, desert fan palm oasis wetland vegetation and surrounding areas within the Suckle property. Efforts to remove and control non-native invasive plant species will focus on tamarisk (*Tamarix* spp.), *Arundo donax*, and other plant species designated in the High category by CalIPC. These species will be removed by hand or treated by spot spraying with an herbicide that has been approved by the regulatory agencies. Plant material that is removed will be bagged and removed in a manner that prevents the spread of seed within and off the site.

Table 11. Priority Non-native and Invasive Plants to be Removed at the Suckle Property

Botanical Name	Common Name	Method of Control
Tamarix spp.	tamarisk, salt cedar	Tamarisk Control Method (Section 5.2)
Arundo donax	Arundo	Arundo Control Method (Section 5.2)

Sequence and Timing

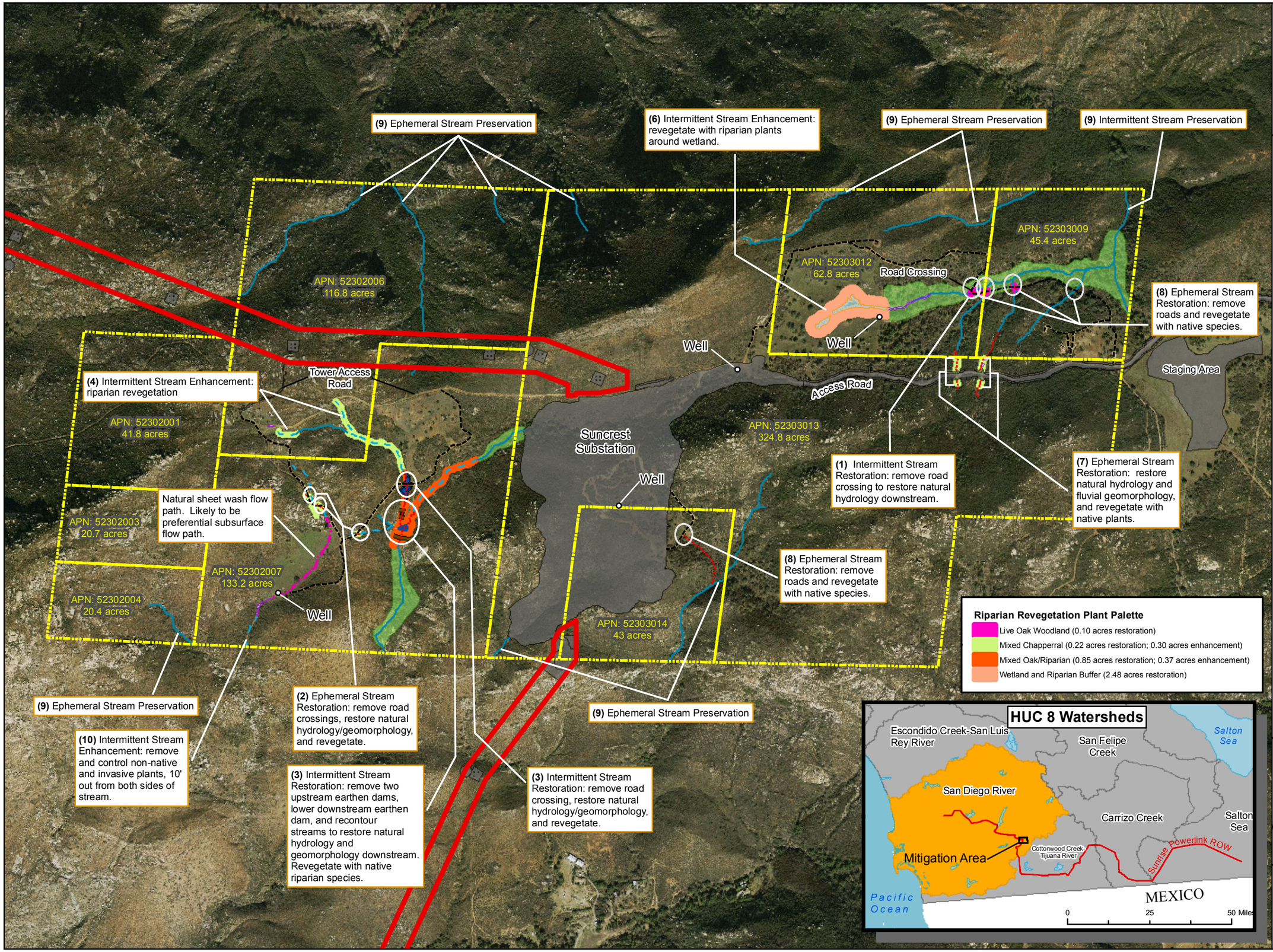
Mitigation will be implemented concurrent with project impacts to dry washes and wetlands. Sequence and timing that is related to specific planting methods and weed removal methods are described in Sections 5.2.

5.1.3 Mitigation Activities at the Lightner Property

As described above in Section 3.3, the Lightner property was selected for mitigation based on a number of opportunities for restoration of natural stream hydrology and geomorphology in areas previously altered by human activities such as grazing, road construction, and pond creation. The Lightner property offers opportunity to mitigate for project impacts to ephemeral and intermittent streams, wetlands, and riparian vegetation. Mitigation implementation proposed at the Lightner Property includes:

- Preservation of streams, wetlands and riparian habitat
- Removal of abandoned roads
- Removal of abandoned road stream crossings
- Installation of oversized culverts along the improved access road
- Removal and alteration of dams to restore/enhance streams
- Control of non-native and invasive plant species
- Enhancement of wetland vegetation
- Enhancement of riparian vegetation
- Control of non-native and invasive plant species

Mitigation acreage within the Lightner property is listed in Table 12 below. Mitigation activities planned for the Lightner property are shown in Figure 7, and described further in the text below.



wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

Sunrise Powerlink

San Diego County, California

Figure 7.

Mitigation Activity at the Lightner Property

Legend

- Parcel Boundary
- Sunrise Powerlink ROW
- Construction Impact Area
- Preserved Riparian Habitat (15.83 acres)
- Enhanced Wetlands (0.62 acres)
- Preserved Wetlands (0.20 acres)
- Man-made Pond (to be removed)
- Man-made Pond (to be enhanced)
- Dirt Roads (to be removed)
- Earthen Dams/Berms (to be removed)
- Non-defined Channel

Streams

Mitigation Action:

- Enhancement (0.12 ac.; 3,218 ln. ft.)
- Preservation (0.61 ac.; 17,613 ln. ft.)
- Restoration (0.07 ac.; 2,720 ln. ft.)

Note: *Stream and Riparian acreage calcuations do not include areas within the Sunrise Powerlink ROW or Construction Impact Areas. Stream acreages are based on OHWM width. Riparian areas are based on CDFG riparian dripline.*

N
W E
S

0 400 800 1,600
Feet

Date: July 2010
Base Source: NAIP, 2005; San Diego County
Map By: Derek Chan
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\Lightner\Lightner_Mitigation_20100707.mxd

Table 12. Summary of Mitigation at the Lightner Property		
Mitigation Action	**Area (acres)**	**Length (linear feet)**
Streams		
Stream Preservation	0.61	17,613
Stream Enhancement and Preservation	0.12	3,218
Stream Restoration and Preservation	0.07	2,720
Total Streams	**0.80**	**23,551**
Wetlands		
Wetland Preservation	0.10	NA
Wetland Enhancement and Preservation	0.73	NA
Total Wetlands	**0.83**	**NA**
Riparian		
Riparian Preservation	15.83	NA
Riparian Enhancement and Preservation	0.67	NA
Riparian Restoration and Preservation	3.40	NA
Total Riparian	**20.10**	**NA**

Stream Channel and Riparian Restoration

Stream channel restoration activities at the Lightner property include the restoration of natural stream hydrology by decommissioning dirt roads, restoration of stream channel areas currently impacted by the presence of earthen dams and culverts, and replanting restored intermittent streams with riparian vegetation and ephemeral streams with adjacent chaparral vegetation. Methods for revegetation are described below in Section 5.2.

Reconnection of Historic Flow through the Meadow Area – Watershed Restoration

The southwestern meadow on the Lightner Property receives water from adjacent valley hillsides and from an ephemeral stream channel that will have two road crossings removed and some drainage pattern restoration (see Appendix C for figures showing these various areas). The morphology of the meadow is characterized as a relatively broad, elliptically shaped valley floor surrounded by steep, yet low-relief valley walls (bedrock ridges). The valley floor that comprises the meadow is approximately 900 feet long and 300 feet wide, and does not currently support a defined stream channel despite the presence of a channel upstream and downstream of the meadow. The ephemeral stream that enters the meadow from the northeast fans out, discharging its water and depositing fine sediment as a small alluvial fan. The meadow is composed of alluvium and supports an unconfined aquifer. This was determined based on the valley morphology characteristics and the presence of a well at the downstream end of the meadow.

Historic flow pattern connectivity from the northern ephemeral stream through the meadow to the intermittent stream near the well is proposed in the mitigation action by restoring the drainage network upstream along the ephemeral stream channel. Implementation of road removal and stream restoration actions on the ephemeral stream upstream of this site may improve water delivery patterns to the meadow, yet the road ditch that presently diverts flow from the natural stream channel still reaches the meadow at a nearby discharge point farther

west. Restoration of the drainage pattern in the upper watershed could potentially cause the ephemeral stream channel to extend out into the meadow naturally, creating a defined channel form. Construction of a discrete stream channel through the meadow area is, however, not recommended as it has the potential to have several adverse effects on the local hydrogeologic, geomorphologic, and ecologic conditions. Effects may include: (1) incision into the meadow surface would potentially lower groundwater levels, at least perched groundwater levels, that would lead to decreased soil moisture that is critical for maintaining meadow vegetation; and/or (2) further incision and/or head-cutting at the created channel's downstream point in the meadow as high energy flows would be focused in the channel rather than diffused across the relatively flat meadow surface.

Removal of Abandoned Roads

The project will remove several abandoned roads that currently cross and adversely impact existing stream channels. The removal of the roads will ensure that unauthorized use of the roads by automobiles will not have future adverse effect at the stream crossings. The goal of this activity is to restore the original upland topography and stream geometry, and create conditions that favor revegetation of these areas with chaparral scrub vegetation. In general, the roads were created by cutting the uphill slope and filling the downhill slope to create a level cross slope. The topography will be restored by removing the down hill fill and filling the uphill cut. After the road way has been graded, approximately 2-4 feet of salvaged topsoil (from the substation footprint and other impact areas) with a native seed bank will be placed over all disturbed areas. In addition, disturbed areas will be direct seeded with chaparral scrub species. Finally, erosion control measure will be applied to all disturbed areas that result in bare soil.

Removal of Road Crossings and Associated Stream Channel Restoration

In conjunction with the decommissioning of abandoned roads, segments of several existing channels will be restored in locations where they currently cross existing roads that will be removed. In total, there are eleven stream crossings throughout the Lightner property that will be removed.

At these sites existing stream channels are interrupted by roads. In most cases water flows directly across the road and rejoins the channel on the down stream side. In some cases water is diverted via a road side ditch and does not currently rejoin the channel on the down stream side. In most cases, the roads were created by cutting and filling. As a result of this type of grading, the segment of the channel on the uphill side of the road has adjusted such that the channel profile has lowered.

Restoration activities will include the creation of a new channel to reconnect the upstream and downstream segments of the channel that were interrupted by the road. The new channel will be sized based on field measurements of the cross section of the channel above and below the existing road. The field measurements will be adapted slightly to match the slope of the profile elevation of the new channel segment. Grading for these sites will be performed in conjunction with the removal of the abandon road. Grading will occur during the dry season and erosion control measures will be installed prior to October 15. These areas will be re-vegetated in accordance with the revegetation plan as described below.

Road Crossing Removal and Stream Restoration in Northeast

Near the northeastern corner of the property (APNs: 5230312 and 52303009), a narrow, unpaved road runs along an intermittent stream and crosses it once, in addition to crossing two ephemeral tributaries. There is a third, relatively poorly defined ephemeral stream channel that is also crossed by the road (eastern-most crossing). These four locations can be viewed in greater detail in Figure C-1 and C-2 of Appendix C. Despite the18-inch diameter culvert installed beneath the road (currently blocked), the crossing constructed of earthen materials (silts, sands, and some boulders) effectively impounds water upstream, forming a seasonal pond during wet years. The stored water remains because the bottom elevation of the pond is lower than the base of the culvert opening. The ponded water was recently measured to be about 2 feet in maximum depth and about 500 square feet in water surface area.

As viewed in field photos taken at this road crossing (Figures C-3 and C-4), the channel morphology immediately upstream and downstream of the crossing can be characterized as a small (5-8 ft wide x 0.5-1 ft deep), steep (~6% gradient) channel, densely covered with herbaceous and wetland vegetation, with some riparian vegetation farther upstream and downstream from the road crossing. The valley bottom in this reach is somewhat confined, while the pond area is relatively wider, with upland surfaces sloping down to the active channel in a concave profile (10-35% gradient). The channel and valley bottom geometry is clearly expressed in three cross-sections that were surveyed upstream of the pond, across the pond, and downstream of the road crossing (Figure C-6). The pond area and road crossing are also represented in a longitudinal profile of this reach (Figure C-7), where one can see the channel drops down into the pond, which further suggests that the pond was excavated, possibly to provide road construction materials, water supply for livestock, or both.

Based on a review of historical aerial photographs of the property, the road crossing at the intermittent stream was determined to be relatively new, having been constructed sometime between the summers of 2002 and 2003 (Google Earth, accessed 28 June 2010). Prior to 2002, the road followed a different course through the valley and, instead, continued in the upstream direction toward the broad meadow without crossing the stream. An historic aerial photograph taken in 1953 shows the road's original alignment along the southern side of the stream channel (Figure C-2).

As part of the mitigation plan for this property, the four road crossings described above will be removed to restore the natural stream hydrology and morphology. At the intermittent stream road crossing, this relatively larger stream impediment will be wholly removed and recontouring of the stream reach upstream in the pond area will occur to restore a more constant channel and valley bottom geometry (in cross-section view) and gradient (in longitudinal profile view). The dip-section crossings at the three ephemeral stream channels will also be removed, although this can be achieved relatively more easily by digging a small pilot channel through the road at the crossing. At all sites, road cuts that may be present adjacent to the crossings will be filled to restore the natural upland topography and to avoid road drainage impacts to the restored stream course. Plantings along disturbed and/or re-contoured surface will occur to stabilize slopes and minimize excessive fine sediment runoff. Overall, it is important that these streams and adjacent upland areas be restored in this recommended fashion in order to: (1) re-establish hydrologic connectivity through the respective stream reaches; and (2) avoid channel instabilities that could lead to differential erosion and/or sedimentation, which would likely undermine the success of the stream enhancement and restoration actions.

Road Crossing Removal and Restoration of the Stream Channel above the Southwest Meadow

At the western end of the Tower Access Road, a narrow, unpaved road branches and trends south and down-gradient toward the southwestern meadow at the southwestern corner of the property (APNs: 52302006 and 52302007). An ephemeral stream channel that drains to the meadow area is crossed in two locations by this road (Figures C-1 and C-9). Additionally, a rather poorly-defined ephemeral tributary stream also crosses the road halfway between the other two crossings. These crossings are dip-sections which ideally allow waters to flow over the road and continue downstream in the stream channel. However, due to a long history of multiple road re-alignments in the immediate area (see below), the natural drainage pattern has been altered. Specifically, the existing road intercepts runoff from the western half of this stream basin and routes the flow into a ditch that never reconnects with the natural stream channel until they both fan out at the upper end of the southwestern meadow.

A review of historic aerial photographs of this area of the property reveals that the roads have been moved several times. As can be viewed in an aerial photograph taken in 1953 (Figure C-10), an abandoned road that presently joins the existing road from the northwest (orange-colored line in Figures C-9 and C-10) was once the primary access road through this area, but was abandoned sometime between 1996 and 2002 (Google Earth, accessed June 2010). The existing, active road course was built sometime during this time period, which created the upper-most crossing of the ephemeral stream channel in this area. Heading down-gradient, the road previously bifurcated into two roadways that straddled the lower reach of the stream channel (Figure C-10). The west, or river right, branch of this abandoned road remains today as an incised ditch that routes water intercepted by the active roadway away from the natural stream channel (Figures C-11, 12, and 13). The lower-most crossing of the natural stream channel by the active roadway is positioned close to and towards the east of this incised ditch (Figures C-9, C-14). The channel and the ditch both fan out at the upper end of the meadow and on either side of an historic dwelling structure that pre-dates the 1953 aerial photographs.

To reconnect the western half of the natural drainage area to the ephemeral stream channel, the existing road will be removed nearly in its entirety. Specifically, the two road crossings shown in Figures 11 and 16 (of Appendix C) will be removed and a channel will be carved through the crossing to reconnect the upstream and downstream channel reaches. Additionally, the surfaces adjacent to the crossings will be recontoured to restore a more natural topography, which will ultimately ensure that the drainage basin is effectively connected with the active stream channel. The upper-most removal will specifically reconnect the headwaters (swale) to the active stream channel (add about 10 ft [road width] in stream length). The lower-most crossing removal will similarly add about 10 ft in restored stream length.

In addition to the road crossing removal, the drainage pattern will be restored by removing the road (through excavation and/or filling where appropriate), filling in the downstream road ditch that presently routes water to the west, and by re-connecting the small tributary channel (or swale) to the stream channel. This action will also preserve the abandoned road/ditch segment that joins the active roadway from the northwest since it appears that this feature can effectively function as a tributary to the natural stream channel (Figures C-9, 11, 15). The point of re-connection of the small tributary, the abandoned road/ditch segment, and the natural stream channel is shown in Figures C-9 and C-12. The creation of this confluence will restore the natural drainage area to the ephemeral stream channel.

A series of longitudinal profiles and cross-sections recently surveyed in the valley bottom effectively represent the key existing topographic features that are discussed above, including

the natural stream channel, the existing and abandoned roadways, and road-related ditches (Figure C-16). In all cross-sections, it can be clearly seen that the natural stream channel lies at a lower elevation than the adjacent ditches and, therefore, this result supports our contention that removal of the roads and filling of the road-related ditches will ensure that the western half of the basin will freely drain to the natural channel, effectively increasing its total drainage area and, more importantly, the amount of water conveyed by the stream. The final restoration action will be to extend the stream channel an additional 25 to 40 feet from its existing mouth (or fan) to avoid discharging flow directly at a large, old Engelmann oak tree and the historic dwelling structures.

Road Crossing Removal and Restoration of the Stream Channel West of the Reservoir

The existing, unpaved road discussed above continues down-gradient and towards the east where it crosses two ephemeral stream channels (Figure C-17). Both of these streams drain the same steep-sided hillside before discharging in the large reservoir. The channels are poorly defined and densely covered by chaparral, thereby making field assessments difficult. The southwestern stream channel extends above the road crossing while the northeastern stream ends at its respective crossing (Figures C-18 and 19).

The roadway was cut into the steep hillside and a small berm (<2 ft high) lies along the outboard side. Rilling is pervasive on this road surface indicating that runoff concentrates and erodes the surface before eventually reaching a water break or cut in the road berm and flowing down-gradient to the large reservoir. Based on a review of available historic aerial photographs, it appears that the road was constructed between the summers of 2002 and 2003 (Google Earth, accessed June 2010).

The road will be removed in its entirety from the ridge line west of the two stream channels and to the northeast where it forms a small stock pond. The best approach to remove the road and ensure successful reconnection and/or enhancement of the two stream channels will be to effectively restore the natural topography. This will entail filling in the road cut sections and excavating the areas of the road that have been built above the adjacent, natural topography. Additionally, cuts will be made across the roadway to re-connect the downstream and upstream sections of the southwestern stream channel. In the restored hillside above the northeastern stream channel, the channel will be extend slightly up-gradient by cutting an equally sized channel into the re-contoured surface. In total, this action will add approximately 25 feet of stream length and will restore and/or enhance the natural hydrology (i.e., drainage area). This action will also prevent further fine sediment erosion into the existing road surface, which likely has been accumulating down-gradient in the large reservoir.

Road Crossing Removal and Stream Restoration East of the Substation

Beneath the substation footprint lies an existing road loop that originates from the Tower Access Road to the north (Figure C-20). A portion of this road will remain beyond the east-side of the substation footprint. This road segment also crosses the headwaters of an ephemeral stream channel that drains to the southeast. The recently constructed roadway (between 2002 and 2003 [Google Earth, accessed June 2010]) is built up about 4 to 8 feet from the base of the headwater swale on the up-gradient and down-gradient sides of the crossing, respectively. A weakly defined channel is present immediately down-gradient from the crossing that is about 2 feet wide and less than 0.5 feet deep. The channel frequently becomes difficult to discern from the adjacent valley bottom due to sedimentation, leaf litter coverage, or both; however, this channel form continues down to the stream's confluence with another ephemeral stream

channel approximately 500 feet downstream from the road crossing. On either side of the headwaters swale, the road is cut into the ground surface, which appears to route intercepted runoff via outboard ditches on the down-gradient and up-gradient sides of the crossing (C-21 and C-22).

The crossing will be completely removed within the drainage boundaries of the ephemeral stream. At the actual crossing where the road is built up, the fill material will be excavated down to the natural ground surface elevation. The road cut areas situated farther back from the crossing will be filled, along with any road-related ditches in order to restore natural runoff patterns that lead towards the stream channel rather than down the adjacent upland areas as is presently occurring. This restoration action will directly increase the stream length by about 12 feet (road width) and will enhance the hydrologic connectivity between the stream and its headwaters.

Removal and Alteration of Dams and Associated Stream Channel Restoration

A water storage reservoir and dam located to the west of the substation footprint receives runoff from a contributing drainage area of approximately 0.21 square miles (Figure C-23 and 24). Two intermittent streams drain into the reservoir, referred to herein as the northwestern and northeastern stream channels (Figure C-25). The northwestern stream channel is crossed by a narrow, unpaved roadway that was constructed between the summers of 2002 and 2003 (Google Earth, accessed June 2010) (Figures C-23 and C-26). The headwaters of the northeastern stream channel will be modified as they lie beneath the future substation footprint (see Appendix D). Both streams also have three berms that each impound a variably-sized stock pond, likely used when the property supported active cattle ranching.

Based on a review of historical aerial photographs of the property, it appears that the large reservoir and dam were present onsite prior to 1953—the oldest aerial photograph date available for review in this assessment (Figure C-24). It is not clear in this photograph whether the stock ponds were present, although it is obvious that the upstream-most berm and pond on the northwestern stream channel (NW Berm A and Pond A) were not present since these features were constructed in 2002 or 2003 when the road was built (Figure C-26). Presently, a few of the ponds, of which there are three on each stream (not including the large reservoir), store standing water in wet years. The “wet” ponds observed in recent June 2010 surveys of the site were NW Pond C (the downstream-most pond on the northwestern stream channel) and NE Pond A (the upstream-most pond on the northeastern stream channel). The large reservoir had several feet in depth of stored water at the time of the survey. The berms, ponds, reservoir, and dam are shown in greater detail in longitudinal profiles of the two streams and farther downstream beyond the dam (Figure C-27).

The two stream channels upstream of their ponds and berms share similar characteristics, namely they have comparable drainage areas, stream gradients (~6%), valley morphologies, and channel geometries: bankfull width and depth of about 2 and 0.5 feet, respectively (Figures C-28a and b). The bed and bank substrates are composed mostly of silty sand, with rare occurrences of gravels, cobbles, and even boulders and bedrock. Dense chaparral vegetation covers much of both streams, while the northeastern stream channel supports a relatively more established riparian corridor as it is somewhat shielded to the north of a rocky butte (i.e., cooler temperatures with less direct solar radiation).

Because the large reservoir supports habitat for migratory birds in the spring, this feature will remain and the stream channel will not be restored to a completely natural condition here.

However, lowering of the dam to an elevation just above the determined Ordinary High Water elevation of about 2,860 feet above mean sea level (NAVD88 datum) is recommended. This restoration action will retain waters in the reservoir during spring while improving hydrologic connectivity between the upstream reaches and downstream of the existing dam. Additionally, the road crossing at NW Berm A will be removed completely and the previously excavated upland slopes adjacent to the historic stream channel will be filled in order to restore channel and valley cross-section geometries and longitudinal gradients that are consistent with those above NW Pond A. This channel geometry will need to broaden as it approaches the large reservoir.

The other berms and ponds that will be removed are NW Pond and Berm B, NE Pond and Berm B, and NE Pond and Berm C as these are more frequently dry and do not afford any suitable wetland habitat. The channel and valley bottom cross-section geometries and longitudinal gradients will be restored to a more natural configuration as much as possible to avoid inducing erosion and/or sedimentation processes that could negatively impact the stream's post-restoration morphologic, hydrologic, and ecologic conditions. The NW Pond and Berm C and NE Pond and Berm A would remain intact as they do afford suitable wetland habitat.

Hydrological Connectivity Improvements along the Substation Access Road

The existing narrow, unpaved road that will be improved and serve as the Tower Access Road crosses two ephemeral stream channels at Site 7 on the eastern portion of the property (Figure C-31). These two streams flow down to an intermittent stream channel, as discussed in as part of an abandoned road removal and stream restoration action. The existing crossings at Site 7 are dip-sections where water passes directly over the road. The crossings do form small impounded areas (~100 square feet by ~2 feet maximum depth) immediately upstream (Figures C-32 and 33). The primary road improvement will be road widening, which will include some degree of cut and fill work. The two stream channels at Site 7 will cross the improved roadway via culverts designed to CalTrans specifications. The contributing drainage areas to each crossing are relatively small (0.027 square miles per crossing) and, therefore, the road improvements should be able to efficiently convey flows and sediment during at least average winter conditions. A hydrologic evaluation of the stream crossing improvements and culverts was not available for review for the qualitative assessment presented here.

Invasive Plant Control

Non-native species will be removed from the stream channels, wetlands, ponds, and immediately surrounding areas designated within the Lightner Property. Efforts to remove and control non-native plant species will focus on the species listed in Table 13, as well as other species designated in the High catergory by CalIPC. These species will be removed using appropriate techniques for individual species based on best available management techniques. Plant material that is removed will be bagged and removed in a manner that prevents the spread of seed within the site.

Table 13. Priority Non-native and Invasive Plants to be Removed for Wetland Enhancement at the Lightner Property

Botanical Name	Common Name	Method of Control
Centaurea melitensis	Tocalote	Hand/Mechanical Removal, Herbicide
Lamarckia aurea	goldentop grass	Hand/Mechanical Removal, Herbicide

Lythrum hyssopifolium	hyssop loosestrife	Hand/Mechanical Removal, Herbicide
Hirschfeldia incana	Mustard	Hand/Mechanical Removal, Herbicide

Revegetation

Stream enhancement and restoration mitigation activities will include planting native plants to enhance or create native plant communities (Figure 7). Revegetation activities will utilize four plant palettes for the revegetation of the mitigation activity areas: Mixed Chaparral, Mixed Oak/Riparian, Live Oak Woodland, and Riparian Buffer. Each of these palettes will be described in the following subsections. For the enhancement and restoration areas identified at the Lightner Property, one or more of these plant palettes will be utilized:

Activity	Description	Plant Palette
1 and 8	Road Crossing Removals	Live Oak Woodland
2	Road Crossing Removals	Mixed Chaparral
3	Dam Removal/Alteration	Mixed Oak/Riparian
4	Channel Revegetation-East Branch	Mixed Oak/Riparian
4	Channel Revegetation-West Branches	Mixed Chaparral
6	Wetland Enhancement	Wetland and Riparian Buffer
7	Wildlife-Friendly Culverts	Mixed Chaparral

Mixed Chaparral Plant Palette

Mitigation activity areas 2, 4 (West Branch), and 5 will be revegetated using the Mixed Chaparral plant palette (Figure 7). The primary method of establishing these plants will be topsoil with seed bank and direct seeding. The project will initially attempt to revegetate chaparral scrub areas using topsoil with seed bank and/or direct seeding but might, as part of an adaptive management program, use containerized plants if the primary methods do not result in survival rates that meet performance requirements. The plant species and method of planting for the Mixed Chaparral plant palette are listed in Table 14. The project may not utilize all of the plants that are listed in the plant palette depending on availability of the seed from the property.

Table 14. Plant Species and Planting Method[1] for Mixed Chaparral Plant Palette

Botanical Name	Common Name	Method of Planting[1]
Arctostaphylos glauca	big berry manzanita	Direct Seed, Containerized Plants[2]
Adenostoma fasciculatum	Chamise	Direct Seed, Containerized Plants[2]
Artemisia californica	coastal sage brush	Direct Seed, Containerized Plants[2]
Ceanothus greggii	desert ceanothus	Direct Seed, Containerized Plants[2]
Ceanothus leucodermis	chaparral whitethorn	Direct Seed, Containerized Plants[2]
Epilobium canum	California fuschia	Direct Seed, Containerized Plants[2]
Eriogonum fasciculatum	California buckwheat	Direct Seed, Containerized Plants[2]
Eriophyllum confertiflorum	Golden Yarrow	Direct Seed
Helianthemum scoparium	common sun rose	Direct Seed
Lotus scoparius	Deerweed	Direct Seed

Table 14. Plant Species and Planting Method[1] for Mixed Chaparral Plant Palette		
Malosma laurina	laurel sumac	Direct Seed
Nassella cernua	Nodding needlegrass	Direct Seed
Quercus berberdifolia	scrub oak	Containerized Plant
Salvia apiana	white sage	Direct Seed

Notes
1. Topsoil will be salvaged from areas with Chaparral scrub within the footprint of the proposed substation. Topsoil with seed bank will be used in all areas where access facilitates placement of topsoil. Topsoil with seed bank may not be used in areas that are subject to erosion within restored stream channels.

Seasonal Wetland and Riparian Buffer Plant Palette

There is one substantial seasonal wetland on the Lightner Property (mitigation activity 6, Figure 7) that will be enhanced by planting. Planting will occur within three distinct zones: wetted zone (area with in the wetland and subject to typical wetland hydrology), intermediate zone (area on the upland edge of the wetland within 3' to 10' of the wetland where plants are dependent on the proximity to wetland hydrology), and dry zone (upland area surrounding the wetland, within 40' to 80' of the intermediate zone). The plant species and method of planting for the revegetation of seasonal wetlands and adjacent areas are listed in Table 15.

Table 15. Plant Species and Method of Planting for the Seasonal Wetland and Riparian Buffer Plant Palette			
	Botanical Name	**Common Name**	**Method of Planting**
Wetted Zone	*Eleocharis macrostachya*	creeping spikerush	Direct Seed, Containerized Plants[1]
	Eleocharis parishii	Parish's spikerush	Direct Seed, Containerized Plants[1]
	Rumex salicifolius	willow dock	Direct Seed
Intermediate Zone	*Calandrinia ciliata*	red maids	Direct Seed
	Juncus bufonius	toad rush	Direct Seed, Containerized Plants[1]
	Nemophila menziesii	baby blue eyes	Direct Seed
	Baccharis salicifolia	Mulefat	Pole cutting, Containerized Plants[1]
	Quercus agrifolia	coast live oak	Containerized Plants
Dry Zone	*Elymus glaucus*	blue wildrye	Direct Seed
	Malosma laurina	laurel sumac	Direct Seed
	Muhlenbergia rigens	Deergrass	Direct Seed, Containerized Plants[1]
	Quercus engelmannii	Engelmann Oak	Containerized Plants
	Sambucus nigra ssp. caerulea	blue elderberry	Containerized Plants

Notes:
1. Containerized plants may be used seed sources are unavailable.

Mixed Oak/Riparian Plant Palette

Mitigation activity 3 and the eastern tributary of mitigation activity 4 (Figure 7) will be revegetated with the Mixed Oak/Riparian Plant Palette. Planting will occur with in three distinct zones, as appropriate: in-channel (within the ephemeral and/or intermittent stream channel), between ordinary high water mark (OHWM) and top of bank (TOB), and above TOB. A consulting biologist, hydrologist, or otherwise qualified consultant will determine these indicators to establish planting areas in the field. The plant species and method of planting for the revegetation of seasonal wetlands and adjacent areas are listed in Table 16.

Table 16. Plant Species and Method of Planting for the Mixed Oak/Riparian Plant Palette

	Botanical Name	**Common Name**	**Method of Planting**
In-Channel	*Juncus dubious*	Mariposa rush	Direct Seed, Containerized Plants[1]
	Juncus bufonius	Toad rush	Direct Seed, Containerized Plants[1]
Between OHWM/TOB	*Asclepias fascicularis*	narrowleaf milkweed	Direct Seed
	Calandrinia ciliata	red maids	Direct Seed
	Claytonia perfoliata	Miner's lettuce	Direct Seed
	Pseudognaphalium californicum	California everlasting	Direct Seed
	Phacelia cicutaria	caterpillar phacelia	Direct Seed
	Sambucus nigra ssp. caerulea	blue elderberry	Direct Seed, Containerized Plants[1]
Above TOB	*Arctostaphylos glauca*	big berry manzanita	Direct Seed, Containerized Plants[1]
	Artemisia californica	California sagebrush	Direct Seed, Containerized Plants[1]
	Artemisia dracunculus	tarragon	Direct Seed
	Ceanothus leucodermis	chaparral whitethorn	Direct Seed
	Epilobium canum	California fuschia	Direct Seed
	Eriogonum fasciculatum	California buckwheat	Direct Seed
	Eriophyllum confertiflorum	golden yarrow	Direct Seed
	Malosma laurina	laurel sumac	Direct Seed
	Muhlenbergia rigens	deergrass	Direct Seed, Containerized Plants[1]
	Nemophila menziesii	baby blue eyes	Direct Seed
	Platanus racemosa	Sycamore	Pole Cuttings, Containerized Plants
	Quercus agrifolia	coast live oak	Containerized Plants
	Quercus engelmannii	Engelmann oak	Containerized Plants
	Rhus ovata	Sugarbush	Direct Seed
	Salvia apiana	white sage	Direct Seed

Notes:
1. Containerized plants are to be used if seeding does not result in an outcome that meets the performance requirements.

Live Oak Woodland Plant Palette

Mitigation activities 1, 7, and 8 (Figure 7) will be revegetated with the Live Oak Woodland Plant Palette. Planting will occur within four distinct zones, where applicable: in-channel (within the ephemeral and/or intermittent stream channel), at OHWM, between OHWM and TOB, and above TOB. A consulting biologist, hydrologist, or otherwise qualified consultant will determine these indicators to establish planting locations in the field. The plant species and method of planting for the revegetation of streams and adjacent areas are listed in Table 17.

Table 17. Plant Species and Method of Planting for the Live Oak Woodland Plant Palette

	Botanical Name	Common Name	Method of Planting
In-Channel	*Juncus dubious*	Mariposa rush	Direct Seed, Containerized Plants[1]
At OHWM	*Eleocharis macrostachya*	creeping spikerush	Direct Seed, Containerized Plants[1]
Between OHWM/TOB	*Elymus glaucus*	blue wildrye	Direct Seed
Above TOB	*Muhlenbergia rigens*	deergrass	Direct Seed, Containerized Plants[1]
	Quercus agrifolia	coast live oak	Containerized Plants
	Quercus engelmannii	Engelmann oak	Containerized Plants
	Sambucus nigra ssp. Caerulea	blue elderberry	Containerized Plants

Notes:
1. Containerized plants are to be used if seeding does not result in an outcome that meets the performance requirements.

Source of Water for Plant Establishment

If available, the project will utilize irrigation as an aid in the establishment of plants at the Lightner site. Potential water sources for irrigation include the two existing wells, one in the northeast and one in the southwest portion of the property (Figure 7). These wells need to be refurbished if used. If available, irrigation will be utilized to aid in the establishment of containerized upland plants and may be utilized to aid in the establishment of plants within seasonal wetland areas. The irrigation system will utilize drip for containerized upland plants and may utilize spray or flood irrigation for seasonal wetland areas depending on the topography within the seasonal wetlands.

Sequence and Timing

Topsoil salvage and removal within the footprint of the substation will be performed during the first stage of the construction of the substation. Mitigation activities that require grading will be performed during the construction of the substation and include in the installation of erosion control measures. The placement of topsoil with seed bank will be performed after all grading is completed. In general grading will be performed between April 15 and October 15 to avoid working during the rainy season. The first seed application will be performed in conjunction with the application of erosion control measures. Detailed timing requirements are described above in the sections that describe the planting methods that will be utilized. The timing and sequence

of the mitigation activities will need to be coordinated with the construction substation activities with regard to access and safety. Sequence and timing that is related to specific planting methods and weed removal methods are described in Sections 5.2.

5.1.5 Mitigation Activities at the Long Potrero Property

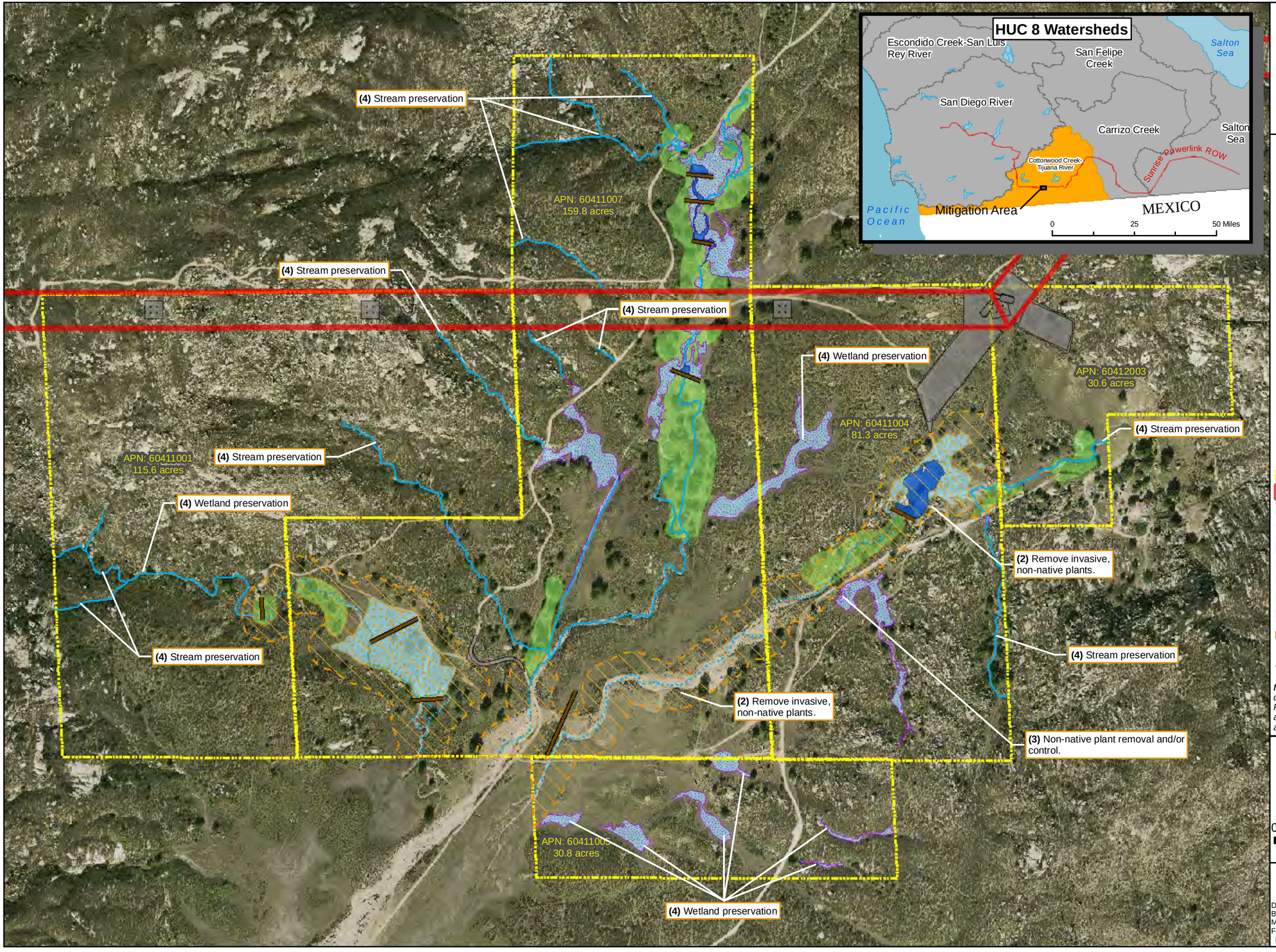
The following section describes the mitigation activities that will be performed at the Long Potrero Property (Figure 8). These activities are summarized in the list below. Mitigation activities at the Long Potrero Property are limited due to the presence of the Arroyo toad (*Bufo californicus*). No grading or significant earth disturbance will be permitted with the site to protect this species and its habitat.

- Preservation of streams, wetlands and riparian habitat
- Control of non-native and invasive plant species

Mitigation acreage within the Long Potrero property is listed in Table 18 below. Mitigation activities planned for the Long Potrero property are shown in Figure 8, and described further in the text below.

Table 18. Summary of Mitigation Activities Long Potrero Property

Mitigation Action	Area (acres)	Length (linear feet)
Streams		
Stream Preservation	1.39	16,857
Stream Enhancement and Preservation	0.96	6,054
Total	**2.35**	**22,911**
Wetlands		
Wetland Preservation	10.00	N/A
Wetland Enhancement and Preservation	5.90	N/A
Total	**15.90**	**N/A**
Riparian		
Riparian Preservation	13.11	N/A
Riparian Enhancement and Preservation	3.46	N/A
Total	**16.57**	**N/A**



wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

Sunrise Powerlink

San Diego County, California

Figure 8.

Mitigation Activites at the Long Potrero Property

Legend

- Parcel Boundary
- Sunrise Powerlink ROW
- Construction Impact Area
- Earthen Dams/Berms
- Man-made Ponds (1.28 acres)
- Enhanced Riparian Habitat (3.95 acres)
- Preserved Riparian Habitat (12.62 acres)
- Enhanced Wetlands (5.99 acres)
- Preserved Wetlands (9.91 acres)
- Proposed Exotic Species Removal
- Enhanced Streams (0.96 ac.; 6,054 ln. ft.)
- Preserved Streams (1.39 ac.; 16,857 ln. ft.)

Note: *Stream and Riparian acreage calcuations do not include areas within the Sunrise Powerlink ROW or Construction Impact Areas. Stream acreages are based on OHWM width. Riparian areas are based on CDFG riparian dripline.*

N
W E
S

0 250 500 1,000
Feet

Date: July 2010
Base Source: NAIP, 2005; San Diego County
Map By: Derek Chan
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\LongPotrero\LongPotrero_Mitigation_20100707

Invasive Plant Control

Invasive and weedy non-native species will be removed from the site, as feasible, within 120 feet of the stream channels, wetlands, and ponds. Table 19 lists the invasive and non-native species that will be control and the method(s) that will be used to control them.

Table 19. Non-native and Invasive Plants to be Controlled and the Method of Control

Botanical Name	Common Name	Method of Control
Centaurea melitensis	Tocalote	Hand/Mechanical without Ground Disturbance, Herbicide
Rumex crispus	curly dock	Hand/Mechanical without Ground Disturbance, Herbicide
Tamarix sp.	Tamarisk	Tamarisk Control Method

Sequence and Timing

The sequence and timing for the mitigation activities will be concurrent with project construction. Sequence and timing that is related to specific planting methods and weed removal methods are described in Sections 5.2.

5.1.6 Mitigation Activities at Chocolate Canyon

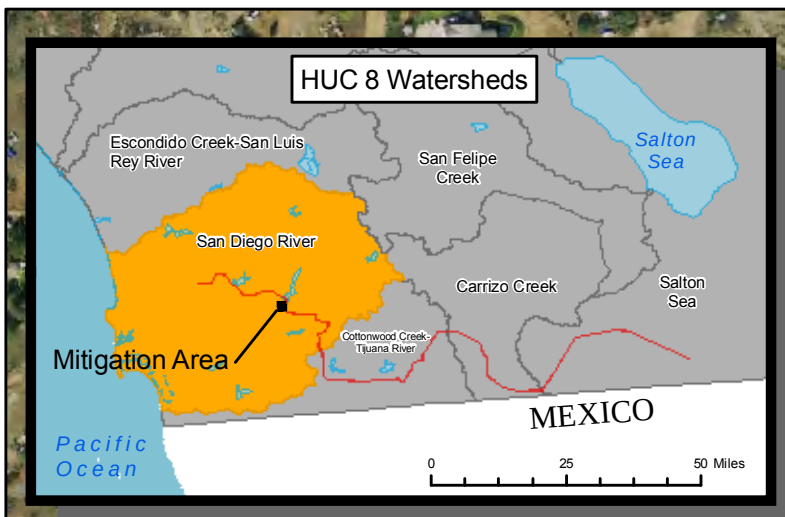
The following section describes the mitigation at the Chocolate Canyon Property (Figure 9). Mitigation at Chocolate Canyon includes:

- Preservation of streams, wetlands and riparian habitat
- Control of non-native and invasive plant species

Mitigation acreage within Chocolate Canyon is listed in Table 20 below. Mitigation activities planned for Chocolate Canyon are shown in Figure 9, and described further in the text below.

Table 20. Summary of Mitigation Activity at the Chocolate Canyon Property

Mitigation Action	Area (acres)	Length (linear feet)
Streams		
Stream Preservation	0.29	9,051
Stream Enhancement and Preservation	1.08	3,163
Streams Total	**1.37**	**12,214**
Wetlands		
Wetland Preservation	1.01	NA
Wetland Enhancement and Preservation	0.02	NA
Wetlands Total	**0.0**	**NA**
Riparian		
Riparian Preservation	10.25	NA
Riparian Enhancement	0.30	NA
Riparian Total	**10.55**	**NA**



Legend

- Parcel Boundary
- Sunrise Powerlink ROW
- Construction Impact Area
- *Ricinus communis* (0.12 acres - to be removed)
- *Arundo donax* (0.47 acres - to be removed)
- Riparian Enhancement (0.30 acres)
- Riparian Preservation (10.25 acres)
- Wetland Enhancement (0.02 acres)
- Wetland Preservation (1.01 acres)
- Enhanced Streams (1.08 ac.; 3,163 ln. ft.)
- Preserved Streams (0.29 ac.; 9,051 ln. ft.)

APN: 40222108
35.8 acres

(1) All jurisdictional riparian habitat, perennial, intermittent and ephemeral streams, and wetlands outside the ROW will be preserved within these Mitigation Areas.

APN: 40222107
36.4 acres

APN: 40235104
6.1 acres

Chocolate Canyon Stream

APN: 40222010
7.7 acres

APN: 40221101
6.7 acres

APN: 40222009
2.1 acres

(3) Mitigation opportunities consist of removing all invasive *Ricinus communis* (0.12 acres) from locations within the Chocolate Canyon watershed and it's tributaries within these Mitigation Areas. Biological surveys will be conducted each year to make sure that *R. communis* does not colonize within the mitigation area.

(2) Mitigation opportunities consist of removing all invasive *Arundo donax* (0.47 acres) from locations along Chocolate Canyon stream and it's tributaries within these Mitigation Areas. Biological surveys will be conducted each year to make sure that *A. donax* does not colonize within the mitigation area.

Note: *Stream and Riparian acreage calcuations do not include areas within the Sunrise Powerlink ROW or Construction Impact Areas. Stream acreages are based on OHWM width. Riparian areas are based on CDFG riparian dripline.*

Figure 9. Mitigation Activities at Chocolate Canyon

N W E S

Sunrise Powerlink
San Diego County, California

0 150 300 600 Feet

wra
ENVIRONMENTAL CONSULTANTS

Map Date: June 2010
Map By: Derek Chan
Base Source: NAIP, 2005, San Diego County
Filepath:L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\ChocolateCanyon\ChocolateCanyon_Mitigation_20100629.mxd

Invasive Plant Control

Invasive and weedy non-native species will be removed from the Chocolate Canyon site, as feasible, within 120' of the stream channels, wetlands, and ponds. The non-native species arundo (*Arundo donax*) and castor bean (*Ricinus communis*) have been observed on the site, and are targets for removal, due to their ability to invade and replace native plant communities and diminish wildlife habitat (Table 21).

Table 21. Non-native and Invasive Plants to be Controlled and the Method of Control for the Chocolate Canyon Property

Botanical Name	Common Name	Method of Control
Arundo donax	arundo	Arundo Removal Protocol
Ricinus communis	Castor bean	Hand/Mechanical Removal, Herbicide

Arundo infestations will be removed along 40' distance from the main Chocolate Canyon perennial stream (Figure 9). Methods used for removal of Arundo are described in Section 5.2. At Mitigation Area 3, Castor bean (*Ricinus communis*) will be removed by hand. As necessary, herbicide may be applied.

Sequence and Timing

Mitigation will be implemented concurrent with project impacts to jurisdictional areas.

5.2 General Mitigation Implementation Methods and BMPs

This section describes general methods for implementation of mitigation activities that would occur throughout all of the mitigation sites. These activities include site preparation, weed removal, planting, and erosion control BMPs that would be implemented as applicable to a given site.

5.2.1 Implementation Methods for Control of Non-native Invasive Weeds

Weed removal will be implemented as part of enhancement activities, during site preparation for restoration activities, and as part of management activities. Weed removal methods implemented for each species at each site are indicated in each respective the invasive plant control tables in Section 5.1 above. Specifics on the implementation of these methods are described in more detail below.

Weed Removal as part of site preparation

Mowing will be used to remove non-native and invasive plants species in order to prepare restoration and enhancement areas, as appropriate, prior to application of seeding and the installation of plants. Based on the remoteness and topography of the mitigation sites, mowing will be implemented using weed-eaters (or "weed-whackers") or similar trimmers with string or metal blades. This method may be used to minimize the extent and height of non-native annual herbs and grasses. Mowing will be used only if it will not have a deleterious effect on native plant species that are interspersed with the weeds.

Hand and Mechanical Removal of Entire Plants

Hand removal or use of small handheld equipment (such as a Weed Wrench or a chainsaw) is the preferred method of removing invasive plant species from the mitigation areas, as appropriate. This method of weed removal will be used in areas where the associated ground disturbance will not adversely affect sensitive wildlife species. Plant materials that are removed will be removed entirely and disposed of carefully, including stems and all root fragments, to prevent regeneration or spread. In general, removal will be performed during the late winter or early spring when soils are moist enough to remove entire plants without breaking the roots.

Weeds will be removed before the species sets seed. When this is not feasible, seed heads will be removed from plants prior to removing the stems and roots. Seed heads of invasive species will be placed in plastic trash bags and removed from the project site.

If hand removal methods are tried and found to be ineffective after several years of repeated treatment, or the problem is too widespread for hand removal to be practical, then chemical controls may be implemented as described below.

All of the methods described in this section will be adapted to each species based on its morphology and phenology.

Hand and Mechanical Removal without Ground Disturbance

As necessary, weed removal will be performed using methods that do not cause ground disturbance. At these sites, mowing will be used to remove herbaceous non-woody plant material. For woody material, including shrubs and trees, the trunk of the plant will be removed within 6 inches of the ground.

If the species has the ability to sprout from the cut trunk, then the cut stump will be treated with Garland in accordance with the manufacturer's specifications to ensure that the cut stump will not sprout. Cut stumps will be subsequently monitored and repeatedly cut and treated with herbicide until the stump is dead. The above ground plant material shall be removed from the site and disposed at a municipal recycling center that is equipped to process and recycle green waste. The removal shall be performed at a time when the plants do not have ripe seed. If this is not feasible, then seeds will be removed, placed in plastic bags and disposed offsite. Seedlings and small plants may be hand-pulled, if it is determined to be acceptable by the project biologists.

Herbicides

Herbicides will be used when removal and mowing are not effective and may be used in conjunction with these other methods for species that are known to be difficult to control. The project will use Glyphosate- or triclopyr-based herbicides, such as Rodeo, or other products that are approved for use near wetlands and streams. Herbicides will not be used when rain is predicted within 24 hours after application. The owner and applicator must comply with all state and local regulations regarding the application of herbicides.

Herbicides will be applied using a localized spot-treatment method and applied in a manner that will eliminate or reduce drift onto native plants. Herbicides may also be applied to cut stumps for large woody plants or large clumps of herbaceous weed that cannot be effectively removed.

As an alternative to commercially manufactured herbicides, the project may use an organic alternative of horticultural vinegar (20%) spray or common household vinegar (5%) spray. Herbicides may also be applied to cut stumps for large woody plants.

Arundo Removal

Currently, the preferred methods of Arundo removal in Southern California are called the bend-and-spray or hook methods, both which imitate nature. Alternatively, the cut stump method can be used in areas where Arundo stems cannot be bent. Where Arundo is removed near the edge of streams, caution must be used so as not to allow any pieces of Arundo to fall in or near intermittent or perennial streams. Timing of Arundo stem spraying and removal is extremely important. Late summer through early fall (August to October) is the most effective time of year. Follow up spraying of resprouts must be done on an annual basis once resprouts are approximately three feet tall.

Due to the height of Arundo (up to 20 feet tall) and interspersion with surrounding native vegetation, sensitive species, and/or water, these methods have proven effective for remotely located small to moderately sized infestations (Newhouser 2008). Using the bend-and-spray method, a worker bends the Arundo stems away from the native vegetation and the applicator sprays with the approved herbicide. The person prepping the Arundo grasps the cane with two hands between stem nodes and bends or snaps the cane so that it splits longitudinally without breaking off. If done properly, over 90% of the bent canes will remain intact for spraying. The nodes should not be bent as they tend to break off completely. Arundo stems must be living to translocate herbicide to their rhizomes and kill the plant. Next, a fan shape should be created with the bent canes on the ground. With a crew of two or three workers to bend the Arundo stems, and one applicator, the removal team can rotate between three or four clumps of Arundo at a time.

The hook method allows the applicator to work solo, working the hook with left hand (between pumping) and spraying with the right hand. Using a hook, the worker gathers up to 10 Arundo stalks to concentrate them for quicker application. This method uses the least amount of herbicide and has the least potential to overspray and risk of non-target plant species damage. The hook resembles a swimming pool rescue hook (8 foot wooden pole with a an 18 inch PVC hook with an additional side hook on top) and was designed to reach up and pull Arundo stems down away from desirable vegetation to spray them. The hook is very useful on small patches of Arundo to reach to the center of the clump. According to the hook technique, the worker inserts the hook vertically into the upright canes and then turn the hook horizontally to grab approximately 10 canes. The next step is to pull the stems towards you while stepping back and sliding the hook up the canes. As you slide the hook up the stems, the Arundo stems will bend toward you and you will be able to spray the full length of the cluster of stems in the hook.

The cut-stump method may be used in remote areas where Arundo stems cannot be bent to spray or in situations where a foliar spray application poses a significant risk to aquatic species, desirable vegetation, and other non-target species. It may also be used where standing dead Arundo poses a fire hazard and when conducting a follow-up treatment on a small amount of regrowth. Using this method, Arundo stems are cut approximately one foot from the ground with a chainsaw, lopper, or machete. The stem stump is then immediately painted with herbicide (must be painted with herbicide within 1 minute of cutting to be effective). Dye will be added to the herbicide to mark treated stumps and ensure full coverage. All cut biomass must be mulched and/or carried off site per the specific site management plan.

Tamarisk Removal

Tamarisk or salt cedar (*Tamarix* spp.) may be removed by hand, using herbicide application, cut-stump, or basal bark methods. When plants are small, hand pulling or a weed wrench can be used to remove individuals. Hand pulling and uprooting insures that plants do not resprout. However, all biomass must be removed off site. Aerial application of the imazapyr herbicide, alone or in combination with glyphosate, may be used for controlling *T. ramosissima* in dense stands where little or no native vegetation is present. On smaller sites the cut-stump method has been found successful when triclopyr herbicides are used. Basal bark applications of Garlon4 have been effective on plants with a basal diameter of less than 4 inches. The use of triclopyr (Garlon4 or Remedy) mixed with oil and applied as a basal bark or cut stump treatment has been used with great success on scattered infestations, with limited resprouting occurring. Using the basal bark treatment, an herbicide mixture is applied to the lower 18 inches of the plant. Herbicides that may be used at aquatic sites include Arsenal and Habitat, however are not selective and must be used with care.

5.2.2 Implementation Methods for Planting

The following planting methods may be used: topsoil with seed bank, direct seed, containerized plants, and pole cuttings. This section describes the implementation methods that will be used at the sites to plant native plant species.

Topsoil with Seed Bank

Where excavation is occurring for project activities, topsoil containing natural seed bank materials will be salvaged from the in areas with existing native chaparral scrub. In these areas, the above ground plant material will be removed and processed into mulch for re-use around newly planted, containerized upland plants. After the plant material has been cleared and grubbed, approximately 4 to 6 inches of topsoil will be removed and stockpiled for reuse. Salvaged topsoil with seed bank will be stored in a control area and controlled to prevent contamination and unauthorized use. Salvaged topsoil with seed bank will be utilized within 12 months of salvaging. Salvaged topsoil with seed bank will be spread on designated enhancement areas to a depth of 2 to 4 inches and stabilized using the erosion control measures that are outlined in this mitigation plan.

Direct Seeding

Seed for revegetation efforts will be collected form the mitigation properties. Seed will be collected from within the mitigation properties. Seed collection will be performed during the appropriate time of year for each species. If possible, at least two temporally discrete seed collections will be performed for each species to increase the probability of obtaining ripe seed.

Seeding will take place annually between October 1st and November 1st. The first seeding will be performed in conjunction with site preparation and the installation of erosion control measures. Up to 3 annual seed applications may be required during the mitigation monitoring period in order to establish plants from seed, given the variability in annual rainfall and the expected low germination and survival rates of seeded plants.

Planting Containerized Plants

Containerized plants will be used to re-establish oak species and may be used to re-established wetland species. Oak seed and containerized wetland plants will be collected and propagated to produce containerized plants for revegetation activities that are scheduled for the fall/winter of 2011 or later.

Planting Pole Cuttings

Pole cuttings shall be cut from nearby sources from a minimum of 5 individual live plants, to increase the probability of including cuttings from both male and female plants. Poles will have a minimum length of 3 feet long and a maximum length of 4 feet. Poles will have a minimum cut-end basal diameter of ¾" and a maximum cut-end basal diameter of 1 ½". The base of pole cuttings will be buried in a planting hole such that 2/3 of the length of the pole is below ground. Pole cuttings will be installed by digging a hole with a diameter of approximately 6" in diameter and 2" deep. The hole will be dug with hand tools. Pole cuttings will be placed at or just above the typical water line of ponds, wetlands and along stream channels. Pole cuttings will be planted between November 15 and December 15. The mitigation plan includes 3 consecutive years of planting pole cuttings in order to compensate for the expected high mortality rate.

5.2.3 Erosion Control Measures

Erosion control measures will be utilized in areas that involve grading and in conjunction with any mitigation activities that result in bare ground. These areas will be covered with rice straw to protect the surface from erosion. In areas where the slope is greater then 3:1 (horizontal to vertical), straw wattles, straw bales, and/or silt fence may be installed to reduce the velocity of runoff and trap sediment. Wattles, bales and silt fence will either be biodegradable or will be removed as part of the mitigation, when they are no longer needed.

5.3 Summary of Mitigation Activities

A summary of mitigation activities at Sunrise Powerlink is contained in Table 22.

- Total Sunrise Powerlink mitigation for dry washes is 90.61 acres to mitigate for permanent project impacts to approximately 2.4 acres of dry washes. This represents a mitigation ratio of 38:1 for permanent impacts to dry washes.

- The total stream mitigation for the Sunrise Powerlink project is 4.54 acres (57,705 linear feet) to mitigate for total impacts of 2.78 acres (2,100 linear feet) of impact to waters of the U.S. and 3.17 acres (2,100 linear feet) of waters of the State. This represents a mitigation ratio of 1.6:1 by acreage and 27:1 for linear feet for waters of the U.S. and 1.4:1 for acreage and 27:1 for linear feet.

- Total mitigation for wetlands is 19.14 acres to mitigate for project impacts to 0.08 acres of wetlands. This represents a mitigation ratio of 239:1 for project impacts to wetlands.

- For riparian areas, the total mitigation is 47.95 acres to mitigate for approximately 0.10 acres of impact. This represents a mitigation ratio of 480:1 for riparian areas.

Table 22. Summary of Sunrise Powerlink Aquatic Resource Mitigation					
Site	**Resource Type**	**Mitigation Area [acres; linear feet (l.f.) for streams]**			
		Preservation	**Enhancement**	**Restoration**	**Total**
Desert Cahuilla	Dry Washes	83.14			83.14
	Streams				
	Wetlands				
	Riparian				
Suckle Property	Dry Washes	7.18 (10,940)	0.29 (260)		7.47 (11,200)
	Streams				
	Wetlands		2.38		2.38
	Riparian				
Lightner Property	Dry Washes				
	Streams	0.61 (18,170)	0.12 (3,218)	0.07 (2,720)	0.80 (23,551)
	Wetlands	0.10	0.73		0.83
	Riparian	15.83	0.67	3.40	19.90
Long Potrero	Dry Washes				
	Streams	1.39 (16,857)	0.96 (6,054)		2.35 (22,911)
	Wetlands	10.00	5.90		15.90
	Riparian	13.11	3.46		16.57
Chocolate Canyon	Dry Washes				
	Streams	0.29 (9,051)	1.08 (3,163)		1.37 (12,214)
	Wetlands	1.01	0.02		1.03
	Riparian	10.25	0.30		10.55
Totals	**Dry Washes**	**90.31**	**0.29**		**90.61**
	Streams	**2.3 (44,078)**	**2.16 (12,435)**	**0.07 (2,720)**	**4.50 (57,976)**
	Wetland	**11.11**	**7.53**		**19.14**
	Riparian	**39.19**	**4.43**	**3.40**	**47.02**

6.0 INITIAL MONITORING MAINTENANCE, AND PERFORMANCE CRITERIA

6.1 As-built Conditions Reporting

As-built conditions reporting will take place as part of the first annual monitoring report for each mitigation site where construction is proposed. As-built conditions reporting will include descriptions of grading and enhancement activities undertaken during mitigation implementation. If grading and enhancement activities take place during consecutive years, the as-built reporting will occur as part of the annual reporting the first year following implementation at a given mitigation site.

6.2 Mitigation Monitoring and Performance Criteria

The purpose of the project's mitigation monitoring program is to monitor the mitigation sites to assess the effects of enhancement and restoration activities, where applicable, as well as monitor for the management of negative environmental stressors that may affect ecosystem function. The project would use CRAM to provide quantitative evaluation of mitigation site waters during the initial monitoring period, as well as qualitative monitoring that would include monitoring and mapping of non-native invasive species, man-induced erosion, and other negative environmental stressors. Monitoring methods would be site specific to account for the differing habitat conditions and management responsibilities for each mitigation site. Monitoring at each site would be for a five year period, with Year 1 beginning upon completion of preservation agreements between SDG&E and the long term landholders for each mitigation site. Site specific monitoring methods are described below.

6.2.1 Desert Cahuilla Property Mitigation Monitoring and Performance Criteria

The monitoring for the Desert Cahuilla property will occur in Years 1, 3, and 5 of the monitoring period. Reporting will provide information on the following:

1. Mapping of Desert Dry Washes

Purpose: Monitoring of total acreage and distribution of dry desert washes on the property to provide information for management purposes.

Timing: Spring or summer following Years 1 and 5 of monitoring.

Methods: Mapping of dry desert washes would be completed using GIS based on high resolution (2-meter or less) aerial photographs flown during the respective monitoring year. Desert dry wash GIS mapping would be confirmed in the field through a site visit following GIS mapping. The final maps and total acreage of desert dry washes present at the site will be reported in the annual monitoring report in Years 1 and 5.

Performance Criteria: Total acreage of desert dry washes at the site may change under natural conditions during the course of the monitoring period. Such fluctuation may occur at the site as a natural process, and may result in an increase or a decrease in the total size and configuration of desert dry washes. If anthropogenic activities are determined to have resulted in a decrease in total acres of desert dry washes in Year 5 of monitoring, appropriate management actions will be undertaken to address these issues and restore natural site hydrology.

2. Quantitative CRAM Evaluation of Desert Dry Washes

Purpose: Provide quantitative evaluation of preserved desert dry washes to inform adaptive management through comparison of CRAM scores from year to year.

Methods: CRAM methodology as developed by SCWRP will be applied in Years 1, 3, and 5 for 5% of the dry washes on the property. Monitoring locations would provide a standard baseline to allow comparison between CRAM scores across monitoring years. Evaluation of dry washes using CRAM will be led by certified CRAM practitioners trained in the use of CRAM to evaluate these habitats. The results of dry wash evaluations using CRAM will be presented as part of the monitoring reports.

Performance Criteria: CRAM scores will be used to evaluate the need for management action to address scores that decrease for reasons. If CRAM scores decrease, reasons for the decrease will be reported as part of the annual monitoring report and appropriate management actions will be implemented.

3. Qualitative Monitoring for Non-native Invasive Species and Other Negative Environmental Stressors

Purpose: To monitor conditions in areas outside of CRAM Assessment Areas for negative environmental stressors, including non-native invasive species, that may affect the ability of the mitigation site to continue to provide adequate habitat functions.

Methods: The mitigation site will be surveyed during each annual monitoring visit to map and describe the occurrence of negative environmental stressors. For invasive species, the site will be surveyed for the locations of non-native invasive species populations ranked as a "High Priority" species by the California Invasive Plant Council (CalIPC). For any observed non-native invasive plant species, locations and extents of each population will be mapped, and estimates of population size (number of individuals) will be made. Other stressors to be evaluated include off-road vehicle use and man induced sources of erosion and sedimentation. If environmental stressors are identified, the source of the stressor, for example, a cut fence resulting in off-road vehicle use, or off-site source population for invasive species, will be identified and described for management action.

Performance Criteria: Negative environmental stressors will be addressed to the greatest extent feasible through management actions as recommended in each annual monitoring report. Non-native invasive species populations will be managed so they do not exceed more than 5% cover within waters. Monitoring reports in years 3 and 5 will contain a description of management activities performed each year based on previous year's management recommendations. The success of management recommendations will also be evaluated as part of the adaptive management strategy for the site (see Section 6.4 below).

6.2.2 Suckle Property Mitigation Monitoring and Performance Criteria

The monitoring for the Suckle property will occur in Years 1, 3, and 5 of the monitoring period. Reporting will provide information on the following:

1. Mapping of Desert Dry Washes and Desert Fan Palm Oasis

Purpose: Monitoring of total acreage and distribution of dry desert washes and desert fan palm oasis habitat on the property to provide information for management purposes.

Timing: Spring or summer following Years 1 and 5 of monitoring.

Methods: Mapping of dry desert washes and desert fan palm oasis habitat would be completed using GIS based on high resolution (2-meter or less) aerial photographs flown during the respective monitoring year. GIS mapping would be confirmed in the field through a site visit following GIS mapping. The final maps and total acreage of desert dry washes and desert fan palm oasis present at the site will be reported in the annual monitoring report in Years 1 and 5.

Performance Criteria: Total acreage of desert dry washes and desert fan palm oasis habitat at the site may change under natural conditions during the course of the monitoring period. Such fluctuation may occur at the site as a natural process, and may result in an increase or a decrease in the total size and configuration of desert dry washes. If anthropogenic activities are determined to have resulted in a decrease in total acres of desert dry washes or desert fan palm oasis habitat in Year 5 of monitoring, appropriate management actions will be undertaken to address these issues and restore natural site hydrology.

2. Quantitative CRAM Evaluation of Desert Dry Washes and Desert Fan Palm Oasis

Purpose: Provide quantitative evaluation of preserved desert dry washes and desert fan palm oasis to inform adaptive management through comparison of CRAM scores from year to year.

Methods: CRAM methodology as developed by SCWRP will be applied in Years 1, 3, and 5 for dry washes and desert fan palm oasis habitats on the property. Monitoring locations would provide a standard baseline to allow comparison between CRAM scores across monitoring years. Evaluation of dry washes and desert fan palm oasis using CRAM will be led by certified CRAM practitioners trained in the use of CRAM to evaluate these habitats. The results of dry wash and desert fan palm oasis evaluations using CRAM will be presented as part of the monitoring reports.

Performance Criteria: CRAM scores will be used to evaluate the need for management action to address scores that decrease for reasons. If CRAM scores decrease, reasons for the decrease will be reported as part of the annual monitoring report and appropriate management actions will be implemented.

3. Qualitative Monitoring for Non-native Invasive Species and Other Negative Environmental Stressors

Purpose: To monitor conditions in areas outside of CRAM Assessment Areas for negative environmental stressors, including non-native invasive species, that may affect the ability of the mitigation site to continue to provide adequate habitat functions.

Methods: The mitigation site will be surveyed during each annual monitoring visit to map and describe the occurrence of negative environmental stressors. For invasive species, the site will be surveyed for the locations of non-native invasive species populations ranked as a "High Priority" species by the California Invasive Plant Council (CalIPC). For any observed non-native invasive plant species, locations and extents of each population will be mapped, and estimates

of population size (number of individuals) will be made. Other stressors to be evaluated include off-road vehicle use and man induced sources of erosion and sedimentation. If environmental stressors are identified, the source of the stressor, for example, a cut fence resulting in off-road vehicle use, or off-site source population for invasive species, will be identified and described for management action.

Performance Criteria: Negative environmental stressors will be addressed to the greatest extent feasible through management actions as recommended in each annual monitoring report. Non-native invasive species populations will be managed so they do not exceed more than 5% cover within waters. Monitoring reports in years 3 and 5 will contain a description of management activities performed each year based on previous year's management recommendations. The success of management recommendations will also be evaluated as part of the adaptive management strategy for the site (see Section 6.4 below).

6.2.3 Long Potrero Property Mitigation Monitoring and Performance Criteria

Monitoring at the Long Potrero Property will occur during years 1, 2, 3, and 5 following acquisition.

1. Quantitative CRAM Evaluation

Purpose: Provide quantitative evaluation of preserved streams to inform adaptive management through comparison of CRAM scores from year to year.

Methods: CRAM methodology developed by SCWRP for riverine habitats in the project reach will be applied annually to enhanced stream reaches. CRAM Assessment Areas will remain the same from year to year to enable consistent comparison of performance. Evaluation of dry washes using CRAM will be led by certified CRAM practitioners trained in the dry wash CRAM module. The results of dry wash evaluations using CRAM will be presented as part of the annual monitoring reports.

Performance Criteria: CRAM scores will be compared to baseline CRAM scores for enhanced stream reaches. CRAM scores will increase compared to baseline conditions following enhancement and restoration. The rate and of increase will vary based on the baseline scores for each reach, and intensity of enhancement and restoration actions. Some CRAM scores may decrease compared to baseline conditions during Year 1 of monitoring as a result of grading or other construction activities. However, these scores will meet or exceed baseline conditions after Year 2, and will increase compared to baseline conditions by the final year of monitoring. If CRAM scores decrease, reasons for the decrease will be reported as part of the annual monitoring report and management actions will be implemented

2. Qualitative Monitoring for Non-native Invasive Species and Other Negative Environmental Stressors

Purpose: To monitor conditions in areas outside of CRAM Assessment Areas for negative environmental stressors, including non-native invasive species, that may affect the ability of the mitigation site to continue to provide adequate habitat functions.

Methods: The mitigation site will be surveyed during each annual monitoring visit to map and describe the occurrence of negative environmental stressors. For invasive species, the site will be surveyed for the locations of non-native invasive species populations ranked as a "High

Priority" species by the California Invasive Plant Council (CalIPC). For any observed non-native invasive plant species, locations and extents of each population will be mapped, and estimates of population size (number of individuals) will be made. Other stressors to be evaluated include off-road vehicle use and man induced sources of erosion and sedimentation. If environmental stressors are identified, the source of the stressor, for example, a cut fence resulting in off-road vehicle use, or off-site source population for invasive species, will be identified and described.

Performance Criteria: Negative environmental stressors will be addressed to the greatest extent feasible through management actions as recommended in each annual monitoring report. Non-native invasive species populations will be managed so they do not exceed more than 5% cover within waters. Monitoring reports in years 1 through 5 will contain a description of management activities performed each year based on previous year's management recommendations. The success of management recommendations will also be evaluated as part of the adaptive management strategy for the site (see Section 6.4 below).

6.2.4 Lightner Property Mitigation Monitoring and Performance Criteria

Due to the number of activities that will occur on the Lightner Property, monitoring will occur annually for five years. Elements of the monitoring program include:

1. Hydrological and Erosion Monitoring for Stream Enhancement

Purpose: To evaluate success of stream enhancement activities implemented during the implementation phase.

Methods: Enhanced and restored stream reaches will be monitored by a qualified hydrologist to evaluate the success of stream enhancement and restoration activities. For activities requiring grading and bank stabilization, a minimum of one upstream and downstream hydrological cross section will be taken to monitor stream channel evolution. All enhanced stream reaches will be monitored for erosion including nick points, headcuts, gullies, and washouts. The source of each erosion point will be evaluated to determine if the erosion is a natural part of stream evolution, or if the observed erosion is occurring as a result of human activities, including restoration activities.

Performance Criteria: Areas of erosion that are determined to be detrimental to the goals of the restoration will be addressed each year based on management recommendations in each annual monitoring report. If stream cross sections show that the enhanced stream reaches are not progressing as expected, management actions will be taken to address those issues.

2. Monitoring of Planted Vegetation

Purpose: To evaluate establishment of planted vegetation in enhanced and restored stream reaches.

Methods: Plants will be monitored each year for survival and percent cover. Each species present will be identified to the species level, counted, and the total areal coverage will be estimated. Irrigation systems will also be monitored to determine if repairs are needed to aid in initial establishment of planted species. In addition, a representative reference site will be evaluated for total percent cover by plant species and by woody vegetation.

Performance Criteria: As required in the Lake and Streambed Alteration Agreement, all mitigation planting shall have a minimum of 100% survival the first year and 80% survival thereafter and/or shall attain 75% cover of native woody perennials after three years and 90% cover of native woody perennials after five years. At the completion of the monitoring period, the mitigation site shall have received no supplemental irrigation for a period of two consecutive years, nonnative plants shall not make up more than 5 % of the entire cover of the site, no more than 5 % of the site shall consist of bare ground and the site shall be free of invasive exotic plant species classified as High Priority species by CalIPC.

3. Monitoring of Planted Wetland Vegetation

Purpose: To evaluate establishment of planted wetland vegetation in enhanced and restored stream reaches.

Methods: Planted wetland areas will be monitored each year for percent cover by native wetland species, as well as cover by non-native species. Monitoring will be performed along transects using a $0.25m^2$ quadrat. A permanent baseline transect will be established along the long axis of the planted wetland. Sub-transects will be placed at appropriate intervals along the baseline transect. Plant species cover will be estimated within $0.25m^2$ quadrats placed at randomly selected locations along each sub-transect. Percent cover by each plant species present in a quadrat will be estimated based on the following Braun-Blanquet Cover Classes:

Table 22. Braun-Blanquet System of Vegetation Cover Classes

Class	Range of Cover (%)	Mean (%)
6	95-100	98.5
5	75-95	87.5
4	50-75	62.5
3	25-50	37.5
2	5-25	15.0
1	1-5	2.5
+	Present at less than 1% cover	0.5

The mean for each cover class will be used to calculate the total vegetative cover, percent cover by wetland species, percent cover by native wetland species, and percent cover by non-native invasive species, if present. Species cover in the sampled quadrats will be averaged for each planted wetland area to generate estimated cover for the entire wetland area. Figure 10 shows a graphical illustration of the monitoring method using baseline and sub-transects.

Performance Criteria: Table 23 below shows the performance criteria for planted wetland areas.

Table 23. Performance Criteria for Planted Wetland Areas

Metric	Performance Criteria
Total plant cover	30% in Year 1

	50% in Year 5 60% in Year 10
Cover by wetland species	Greater than 50% relative cover during each year of monitoring
Cover by CalIPC High Priority invasive species	Less than 5% during each year of monitoring

4. Quantitative CRAM Evaluation

Purpose: Provide quantitative evaluation of preserved streams to inform adaptive management through comparison of CRAM scores from year to year.

Methods: CRAM methodology developed by SCWRP for riverine habitats in the project reach will be applied annually to enhanced stream reaches. CRAM Assessment Areas will remain the same from year to year to enable consistent comparison of performance. Evaluation of dry washes using CRAM will be led by certified CRAM practitioners trained in the dry wash CRAM module. The results of dry wash evaluations using CRAM will be presented as part of the annual monitoring reports.

Performance Criteria: CRAM scores will be compared to baseline CRAM scores for enhanced stream reaches. CRAM scores will increase compared to baseline conditions following enhancement and restoration. The rate and of increase will vary based on the baseline scores for each reach, and intensity of enhancement and restoration actions. Some CRAM scores may decrease compared to baseline conditions during Year 1 of monitoring as a result of grading or other construction activities. However, these scores will meet or exceed baseline conditions after Year 2, and will increase compared to baseline conditions by the final year of monitoring. If CRAM scores decrease, reasons for the decrease will be reported as part of the annual monitoring report and management actions will be implemented

5. Qualitative Monitoring for Non-native Invasive Species and Other Negative Environmental Stressors

Purpose: To monitor conditions in areas outside of CRAM Assessment Areas for negative environmental stressors, including non-native invasive species, that may affect the ability of the mitigation site to continue to provide adequate habitat functions.

Methods: The mitigation site will be surveyed during each annual monitoring visit to map and describe the occurrence of negative environmental stressors. For invasive species, the site will be surveyed for the locations of non-native invasive species populations ranked as a "High Priority" species by the California Invasive Plant Council (CalIPC). For any observed non-native invasive plant species, locations and extents of each population will be mapped, and estimates of population size (number of individuals) will be made. Other stressors to be evaluated include off-road vehicle use and man induced sources of erosion and sedimentation. If environmental stressors are identified, the source of the stressor, for example, a cut fence resulting in off-road vehicle use, or off-site source population for invasive species, will be identified and described.

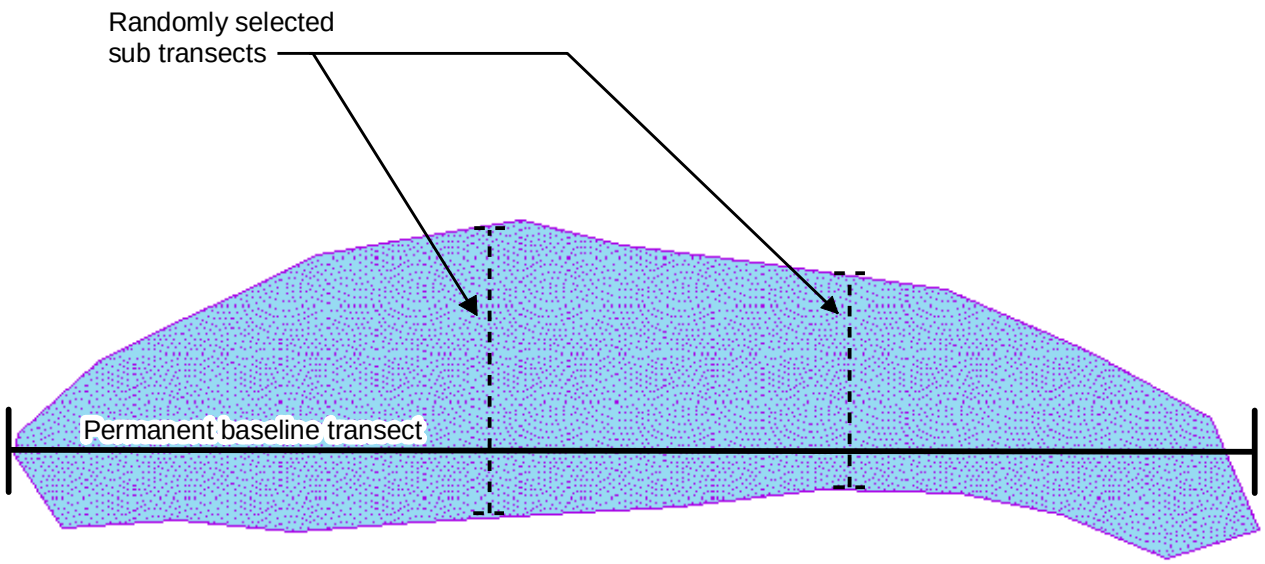


Figure 10. Graphical Illustration of Wetland Monitoring Method

Sunrise Powerlink
San Diego/Imperial County, California

wra
ENVIRONMENTAL CONSULTANTS

Map Date: July 2010
Drawn By: Derek Chan
Base Source:
Filepath: L:\Acad 2000 Files\17000\17128-3\GIS\ArcMap\Mitigation\Fig10_WtlndGraphic_20100701.mxd

Performance Criteria: Negative environmental stressors will be addressed to the greatest extent feasible through management actions as recommended in each annual monitoring report. Non-native invasive species populations will be managed so they do not exceed more than 5% cover within waters. Monitoring reports in years 2 through 10 will contain a description of management activities performed each year based on previous year's management recommendations. The success of management recommendations will also be evaluated as part of the adaptive management strategy for the site (see Section 6.4 below).

6.2.5 Chocolate Canyon Mitigation Monitoring and Performance Criteria

Monitoring at Chocolate Canyon will occur in Years 1, 3, and 5 and will include the following elements:

1. Quantitative CRAM Evaluation

Purpose: Provide quantitative evaluation of preserved streams to inform adaptive management through comparison of CRAM scores from year to year.

Methods: CRAM methodology developed for riverine habitats in the mitigation area will be applied annually to enhanced stream reaches. CRAM Assessment Areas will remain the same from year to year to enable consistent comparison of performance. Evaluation of dry washes using CRAM will be led by certified CRAM practitioners trained in the dry wash CRAM module. The results of dry wash evaluations using CRAM will be presented as part of the annual monitoring reports.

Performance Criteria: CRAM scores will be compared to baseline CRAM scores for enhanced stream reaches. CRAM scores will meet or exceed baseline conditions by the final year of monitoring. The rate and of increase will vary based on the baseline scores for each reach, and intensity of enhancement and restoration actions. If CRAM scores decrease, reasons for the decrease will be reported as part of each annual monitoring report and management actions will be implemented

2. Qualitative Monitoring for Non-native Invasive Species and Other Negative Environmental Stressors

Purpose: To monitor conditions in areas outside of CRAM Assessment Areas for negative environmental stressors, including non-native invasive species, that may affect the ability of the mitigation site to continue to provide adequate habitat functions.

Methods: The mitigation site will be surveyed during each annual monitoring visit to map and describe the occurrence of negative environmental stressors. For invasive species, the site will be surveyed for the locations of non-native invasive species populations ranked as a "High Priority" species by the California Invasive Plant Council (CalIPC). For any observed non-native invasive plant species, locations and extents of each population will be mapped, and estimates of population size (number of individuals) will be made. Other stressors to be evaluated include off-road vehicle use and man induced sources of erosion and sedimentation. If environmental stressors are identified, the source of the stressor, for example, a cut fence resulting in off-road vehicle use, or off-site source population for invasive species, will be identified and described.

Performance Criteria: Negative environmental stressors will be addressed to the greatest extent feasible through management actions as recommended in each annual monitoring report. Non-native invasive species populations will be managed so they do not exceed more than 5% cover within waters. Monitoring reports will contain a description of management activities performed each year based on previous year's management recommendations. The success of management recommendations will also be evaluated as part of the adaptive management strategy for the site (see Section 6.4 below).

6.3 Monitoring Schedule and Reporting Requirements

Monitoring at each mitigation site will be completed during the late spring or early summer of each monitoring year. Separate mitigation monitoring reports will be prepared for each respective mitigation site to enable clear communication to the respective landholder at each location. The reports will be compiled, summarized, and submitted to the Corps, CDFG, and SWRCB by December 31 of each monitoring year.

6.4 Maintenance and Adaptive Management during Initial Monitoring Period

SDG&E will be the responsible party for implementation of management activities during the initial monitoring period. Specific maintenance and management activities will be identified based on the results of each annual monitoring visit. Maintenance and monitoring recommendations will be developed by September 15 of each year to allow time for planning and mobilization of work crews prior to the rainy season. Maintenance activities that involve work in waters and wetlands will be conducted prior to the onset of winter rains. Other maintenance activities will be conducted prior to the annual monitoring in the year following the recommendation.

As part of each annual monitoring report, maintenance and management activities implemented during the previous year will be described and the results will be evaluated under the framework of adaptive management. If management and maintenance methods are not successful in addressing negative environmental stressors identified as part of annual monitoring reports, the methods will be examined and altered to increase the potential for success based on best professional judgment and management methods that are shown to be successful based on scientific research. In some cases, success of management and maintenance activities may not be evident over the course of only one year. This will be accounted for in annual monitoring reports through evaluation of whether or not management actions are contributing to progress towards the ultimate goal. In these cases, it may be necessary to wait for two years or more before altering methods as part of an adaptive management strategy. Each annual monitoring report will contain a section dedicated to evaluation of management and maintenance actions as part of the adaptive management strategy.

6.5 Financial Assurances

Financial assurance during the initial monitoring period will be guaranteed through issuance of a Letter of Credit. The dollar amount of the Letter of Credit will be based on estimated cost of mitigation implementation to be determined upon acceptance of the mitigation plan by resource agencies. The final dollar amount will be provided under separate cover upon issuance of project permits.

7.0 LONG TERM MANAGEMENT PLAN

Long term management is discussed as part of the Habitat Management Plan (HMP) for the Sunrise Powerlink Project, attached in Appendix E. Long term monitoring methods, management goals, and preservation instruments for the mitigation sites are discussed in that document. A PAR analysis has been performed for all land management activities including those necessary to maintain the wetlands and streams within the properties. The PAR analysis provides the basis for long-term funding determinations. A summary of the conveyance, land use restrictions, and funding is provided in Table 23.

Table 24. Summary of elements of Long-Term Management for Mitigation Parcels. Details to be provided in HMP.

Site	***Conveyed to:***	***Land Use Restrictions***	***Funding for Long-term Maintenance***
Desert Cahuilla	California Department of Parks and Recreation, to be part of Anza Borrego Desert State Park	The entire parcel would be managed as part of Anza Borrego; designated for conservation purposes. Restricted access.	SDG&E will provide funding for perpetual management of the prioperty; long-term costs estimated based on a PAR analysis of property maintenance and management of biological resources. Long-term management would include control of exotic species, habitat and species monitoring, access control, and related measures.
Suckle	Decision pending. Proposed options are US Department of Interior Bureau of Land Management (adjacent land owner) or a nonprofit conservancy.	Entire property would be managed for conservation purposes, with emphasis on the wetland resources and habitat for two listed species: Peninsular bighorn sheep and barefoot banded gecko. Restricted access.	
Long Potrero	Decision pending. Likely to be a combination of public agencies: U.S. Department of Agriculture Forest Service, US Department of Interior Bureau of Land Management, and potentially County of San Diego.	Entire property would be managed for conservation purposes, with emphasis on the wetland resources and other sensitive biological resources (including two listed species – Quino checkerspot and arroyo toad). Restricted access.	
Lightner	Decision pending. Likely to be a combination of entities: U.S. Department of Agriculture Forest Service and nonprofit conservancy.	Entire property would be managed for conservation purposes, with emphasis on the wetland resources, native trees, and other sensitive biological resources (including Hermes copper butterfly). Restricted access.	
Chocolate Canyon	City of San Diego	Entire property would be managed for conservation purposes	

8.0 REFERENCES

California Wetlands Monitoring Workgroup (CWMW). 2009. Using CRAM (California Rapid Assessment Method) to Assess Wetland Projects as an Element of Regulatory and Management Programs. Technical Bulletin. 46 pp.

Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2008a. *California Rapid Assessment Method (CRAM) for Wetlands, v. 5.0.2.* 157 pp.

Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2008b. *California Rapid Assessment Method (CRAM) for Wetlands, Riverine Wetlands Field Book, v. 5.0.2.* 45 pp.

CRAM website. 2010. CRAM scores for riverine wetlands. Accessed June 2010. **http://www.cramwetlands.org/**

Newhouser, M. 2008. Cal-IPC News: Protecting California's natural areas from wildland weeds. 16 (1):4-5.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA). 2010b. Official List of U.S. Hydric Soils.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA). 2010a. Soil Survey of San Diego County, California. In cooperation with the University of California Agricultural Experiment Station.

U.S. Department of Agriculture, National Resources Conservation Service (USDA). 2010c. Water and Climate Center (WCC) WETS Table San Diego County, California. Accessed on line at http://www.wcc.nrcs.usda.gov/cgibin/getwetco.pl?state=ca

U.S. Environmental Protection Agency (USEPA). 2006. Application of elements of a state water monitoring and assessment program for wetlands. Wetlands Division, Office of Wetlands, Oceans and Watersheds, U.S. Environmental Protection Agency, Washington, D.C.

WRA, Inc. 2010. Sunrise Powerlink Map Book. Prepared for SDG&E.

WRA, Inc. 2010. Preliminary Jurisdictional Determination Report. Prepared for SDG&E.

Appendix A. Sunrise Powerlink Temporary Waters Impact Revegetation Plan

This Page Left Intentionally Blank

Appendix A:
Restoration Plan for
Temporary Impacts to "Waters"

Introduction

This appendix outlines actions that will be taken during and after the construction phase of the Sunrise Powerlink project (SRPL; Project) to mitigate onsite temporary impacts to streams along the Project right-of-way (ROW). Temporary impacts that will result from the Project are outlined in the HMMP. In accordance with the FEIR/EIS, temporary impacts will be mitigated at a 2:1 ratio, but this appendix only addresses the portion of the restoration that will occur at the area of temporary impact, while the remaining mitigation will be incorporated into the offsite areas as described in the HMMP. Temporary impacts are associated with temporary work areas, temporary access roads, wire stringing sites, and construction yards. Each of the Project features are used only during Project construction and are not required for long term operation and maintenance of the transmission facilities. This appendix only addresses "waters"; a complete restoration plan for temporary impacts to sensitive vegetation communities (SDGE, 2010) including waters affected by the Project will contain this information.

Construction Monitoring

Construction on the Project will be monitored with qualified biological personnel. These monitors will, in addition to the duties described in Section D.2.5 of the FEIR/EIS, survey the temporarily impacted areas immediately prior to construction, identify potential means to minimize construction impacts, and document information relevant to temporary impact assessment (and restoration planning). Monitors will provide a report for each construction area detailing this information. In order to perform these duties, biological monitors on the Sunrise Powerlink project will be familiar with construction practices, native vegetation, and procedures for delineating jurisdictional wetlands and non-wetland waters. In addition, monitors will be familiar with all conditions contained in federal and state permits relating to wetland and "waters" protection. During construction, monitors will be responsible for documenting the type of impacts to waters. Such impacts may include placement of fill, excavation, or other impacts.

Avoidance and Minimization

Monitors will work with contractors to determine approaches to avoid or minimize temporary impacts to sensitive areas including jurisdictional waters and wetlands. Such possibilities may include establishment of off-limit areas, modifications of construction areas to avoid or minimize impacts, or use of temporary crossing materials that avoid fill placement. The majority of Project temporary impacts to "waters" involve streams, most of which have ephemeral hydrology. Delineation of these features has been based on the presence of ordinary high water (OHW) indicators, as described in the Corps Regulatory Guidance Letter No. 05-05, *Ordinary High Water Mark Identification* (Corps 2005) and *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008). The monitor will verify the location and extent of these "waters" prior to construction using a handheld GPS unit. If necessary, the monitor will update the GPS information for the impact areas during later stages of construction if the actual permanent or temporary impact areas are substantially different from what was initially predicted by the construction crews.

In addition, the monitor will be responsible for checking site conditions to assure that erosion control measures and best management practices required by the water quality mitigation measures and as described in the Project Stormwater Pollution Prevention Plans (SWPPP) are being implemented. Wetlands, if any, will be verified by the monitor within the construction footprint using standard protocols from the U.S. Army Corps of Engineers. The project will avoid all temporary impacts to wetlands; however, if wetlands are within the proximity of the construction area, they will be flagged and appropriate construction best management practices and erosion control measures will be implemented keep equipment and sediment out of any wetland areas.

Pre-Construction Site Documentation

Prior to the beginning of Project construction activities in temporary impact areas (temporary work areas, stringing sites, construction yards, temporary access roads), data on existing biological conditions including a plant species list (native and non-native plants) and site photos will be compiled by the Project Restoration Specialists. This information, along with the previously conducted vegetation mapping, focused plant and wildlife surveys, stream and wetland surveys, and weed surveys completed for the Project between 2007 and 2010 will help establish the baseline condition for each of the temporary project impact areas; these baseline conditions will help determine the target conditions for the site restoration, and specific performance criteria will be developed based on the existing site conditions.

For early planning and reporting purposes, the extent of impact areas has been estimated as closely as possible based on previous field delineations and construction plans, but on-site verification of the construction footprint and environmental conditions will provide the most accurate and detailed assessment of actual impacts. In addition, while early survey work provided sufficient information to characterize basic vegetation and habitat conditions at most sites, the Restoration Specialists can provide a more exact assessment of species and habitat within the actual area of impact. Vegetation around the areas of permanent and temporary impact will be surveyed by the biological monitor. Separate species lists will be compiled for the areas considered to be “waters” or non-vegetated channel, and the adjacent upland areas. The Project Restoration Specialists will also document the existing topography for temporarily impacted waters within the construction footprint. This information will be important for re-contouring channel banks and other soil surfaces to pre-project conditions. If wetlands are present, vegetation within the wetlands will be described separately.

The Restoration Program Manager will determine the need for collection of any additional site specific information to inform the restoration process. Due to the minimal nature of anticipated impacts in guard areas, this level of pre-construction information will not be collected in guard areas.

Project Impacts to “Waters”

For the SRPL Sensitive Vegetation Restoration Plan, Project impacts to waters and wetlands have been classified under the vegetation type “herbaceous wetlands, freshwaters, and streams”. This vegetation type includes federal- and state-jurisdictional waters, and wetlands. The majority of temporary Project impacts to ‘waters’ disturb portions of stream channels or desert dry washes with ephemeral stream hydrology. Remaining Project temporary impacts to ‘waters’ occur in several intermittent stream channels with adjacent riparian vegetation. The most common temporary Project impacts in these areas will be “fill,” or placement of soil or rock

in a waterway in order to create a stable road bed or base for construction equipment. In several instances, culverts may be placed in waterways, and these are also considered “fill”. When rock or other materials will be brought from offsite locations to facilitate construction activities in and adjacent to ‘waters’, only clean fill materials will be allowed. In some Project areas, it may also be necessary for construction crews to perform excavation within jurisdictional areas. Excavations may destroy portion of the stream banks where present, and these will also need to be restored after Project construction is completed. The SRPL Sensitive Vegetation Community Restoration Plan and this Appendix identify the Project restoration techniques for all temporary impacts to dry washes, stream channels, and their associated stream banks including native vegetation.

Seed Collection

Native plant seeds will be collected from permanent and temporary Project impact areas, as well as non-impacted portions of the project ROW prior to beginning Project construction activities. Initial seed collection efforts will focus on sensitive plant species located within Project impact areas, and subsequent seed collection will include more common plant species that will comprise the volume of the seed mixes utilized for Project restoration activities. The Program is anticipated to continue collecting seed from the Project ROW on an annual basis through the end of the construction period to ensure adequate seed supplies for all Project restoration activities, including potential remedial seeding.

All seed material will be collected by a professional contract seed-collector, qualified and authorized to collect native seed from wild source populations. Species flowering periods, annual rainfall patterns, elevation, and general field variability of plant populations all influence the timing of seed set, so collection managers will inspect native seed sources prior to mobilizing crews to identify optimal collection times for the desired species and for efficiency, seed will be collected for multiple species concurrently when possible. Seed material will consist of locally endemic native seed collected from the Project ROW where approved by the BLM, CPUC, USFS, and Resource Agencies, or from approved areas no more than 20 miles outside of the Project ROW (e.g. offsite habitat acquisition/mitigation parcels, etc.). Collecting seed for Project restoration activities from this predefined region will ensure Program consistency with the SRPL Mitigation, Monitoring, Compliance, and Reporting Program (MMCRP), and will protect the regional biodiversity and evolutionary fitness of native plant populations from genetic contamination potentially introduced by seed material obtained commercially or from other bioregions.

Availability of seed may be limited by edaphic factors including drought during the collection period, so flexibility in species selection and application rates will be necessary. Actual amounts of seed necessary for the Program will ultimately be determined by the purity and germination rates of the collected seed. Seed utilized for the Program will not contain more than 0.5 percent weed (as defined by Cal-IPC, 2006) seed by volume. All seed material will be separated and clearly labeled with the date of collection, location, and species by scientific name. All seed material will also be weighed, cleaned, and tested for purity and germination values. Seed material will then be mixed for the appropriate acreage of each habitat type within the various restoration sites along the Project ROW. Seeds will be stored in a cool, dry environment until delivery.

Anticipated Site Conditions

The Project temporary impact areas are summarized below in Table 1. These impact areas will occur within each of the vegetation communities listed above and are presented in order of expected degree of impacts. Guard structures and stringing sites are expected to have fewer physical impacts following construction than construction yards and temporary access roads due to anticipated uses and duration of construction activities. While individual uses and impact minimization measures may vary by project area (e.g. mats used in stringing areas within desert pavement areas), these generalized impacts will guide restoration prescriptions prior to and following the completion of project construction activities.

Table 1. Post-Construction Site Conditions in Temporary Impact Areas

Project Area	Anticipated Activities /Duration	Anticipated Post-Construction Site Condition
1 - Guard Structures	Guard structures consist of three metal poles that will be installed in the ground within a variety of habitat areas to prevent wires from contacting the ground during stringing. Each guard structure will be in place for up to four weeks during wire installation.	Expect minimal ground disturbance consisting of three divot holes in each habitat area that may only require soil replacement and/or minor broadcast seed application and follow up weed monitoring/maintenance may be required at each site.
2 - Stringing Sites	Stringing sites will be used after tower construction is completed and during wire pulling and installation. Wire stringing activities are anticipated to occur for approximately four weeks at each pull site.	Expect most sites to use drive and crush, as opposed to blading and direct removal of vegetation. Heavy equipment will be used on the site so some degree of localized soil compaction is anticipated. Where grading and vegetation/soil removal are necessary, soil salvage would be recommended. Decompaction, soil re-contouring (and amending), and hydroseeding would be required in portions of each site.
3 - Temporary Work Areas	Temporary work areas will be used to establish tower foundations, complete conventional tower assembly and erection, and store and maintain equipment for tower assembly. These areas will receive heavy foot traffic as well as a variety of heavy equipment, steel, tools, and other construction materials. Construction activities are anticipated to occur over three to six weeks at most tower sites.	Expect most temporary work areas to be graded and have vegetation removed. Soil salvage is not anticipated in these areas but would be recommended where feasible. Heavy machinery and foot traffic would result in some degree of soil compaction. Decompaction, weed removal, soil re-contouring (and amending), and hydroseeding would be required throughout each site.
4 - Construction Yards	Construction yards will have multiple uses that are anticipated to extend over one year at most sites, and over two years at yards where field offices will be established (Alpine, Rough Acres). These activities include tower steel and construction materials (soil, rock, concrete) storage, contractor vehicle and heavy equipment parking, helicopter landing, vehicle wash stations, etc.	Expect all woody vegetation to be removed where necessary, with relatively level areas and sparse vegetation crushed. Expect rock and/or steel plates to be used in some areas, and grading to fit the needs of the contractor at these sites. Due to varied uses and extended duration of impacts, a high degree of soil compaction may occur. Trash and debris removal, soil decompaction, weed removal, soil re-contouring (and amending), and hydroseeding would be required throughout each site.
5 - Temporary Access Roads	Temporary access roads will be used to access tower sites where conventional construction is necessary but the roads are not allowed to remain. These roads will be in place for approximately six to eight weeks duration to accommodate the tower construction process.	Expect all vegetation to removed, grading to be performed and heavy equipment use during the construction period will result in a moderate to high degree of soil compaction. Decompaction, weed removal, soil re-contouring (and amending), and hydroseeding would be required.

Trash and Debris Removal

After completion of Project construction activities, the Restoration Contractor will remove all trash and debris from the temporary impact area(s) to be restored. This includes all man-made materials and construction debris (e.g., concrete washout, wire, hardware, metal, plastic, glass, ceramic, rubber, etc.) that may be left onsite. Organic materials including wood debris, plant material, straw, sand, and minor amounts of rock or gravel base materials may be incorporated into the site soils prior to soil decompaction. The Restoration Contractor will be responsible for removal of all trash and debris from the restoration site.

Weed Removal

Weed control in the restoration areas will be conducted a minimum of 30 days before seeding activities are initiated. The restoration site(s) will be maintained in weed-free condition prior to seed installation. Weed control will use mechanical methods including removal by hand or string trimmers, or chemical herbicide application when recommended by the Restoration Contractor. The prescription for weed removal will include both methods because the success of chemical control methods may be increased by using one or more manual removal methods prior to herbicide application. Manufacturer specifications regarding the length of time which must pass following herbicide application prior to planting and seeding will be followed. The prescriptions for weed control discussed in this plan are adopted from and coincide with the Weed Control Plan for the SDG&E SRPL Project ([Weed Control Plan] Recon Environmental, Inc., 2009). Table 2 below displays the Project list for those species that must be controlled within Project restoration areas. The weed species list comes from direct observation of weed species occurring along the Project route as recorded by Recon Environmental during the rare plant survey and documented in the Rare Plant Survey Report (Recon, 2009). Weed species observed are presented below, with the associated California Invasive Plant Council (Cal-IPC) listing (Cal-IPC, 2006).

Table 2. SRPL Invasive Plant Species List[1]

Scientific Name	Common Name	Cal-IPC Rating[2]
Brassica tournefortii	Sahara mustard	Severe
Bromus madritensis	red brome	Severe
Bromus tectorum	cheat grass, downy brome	Severe
Cortaderia selloana	pampas grass	Severe
Foeniculum vulgare	fennel	Severe
Tamarix ramosissima	salt cedar	Severe
Atriplex semibaccata	Australian saltbush	Moderate
Avena barbata	slender wild oat	Moderate
Avena fatua	wild oat	Moderate
Brassica nigra	black mustard	Moderate
Bromus diandrus	ripgut grass	Moderate
Carduus pycnocephalus	Italian thistle	Moderate
Centaurea melitensis	tocolote, star-thistle	Moderate
Cirsium vulgare	bull thistle	Moderate
Cynodon dactylon	Bermuda grass	Moderate
Dittrichia graveolens	stinkwort	Moderate
Hirschfeldia incana	short-pod mustard	Moderate
Lolium multiflorum	Italian ryegrass	Moderate
Nicotiana glauca	tree tobacco	Moderate
Oxalis pes-capre	bermuda buttercup	Moderate
Sisymbrium irio	London rocket	Moderate
Vulpia myuros	rattail fescue	Moderate
Brassica rapa	field mustard	Limited

Scientific Name	Common Name	Cal-IPC Rating[2]
Bromus hordeaceus	soft chess	Limited
Descurainia sophia	fine-leaf tansy-mustard	Limited
Erodium botrys	long-beak filaree	Limited
Helminthotheca echioides [*Picris echioides*]	bristly ox-tongue	Limited
Hypochaeris glabra	smooth cat's-ear	Limited
Marrubium vulgare	horehound	Limited
Medicago polymorpha	California bur clover	Limited
Polypogon monspeliensis	annual beard grass	Limited
Rumex crispus	curly dock	Limited
Salsola tragus	Russian thistle, tumbleweed	Limited
Schismus barbatus	Mediterranean schismus	Limited
Tamarix sp.	tamarisk	Limited

1 List developed by RECON for SRPL Project Weed Management Plan. 2 Species organized according to invasiveness rating by the California Invasive Plant Council (Cal-IPC, 2006).

Physical Removal Methods

Physical weed control methods are labor intensive and will generally be utilized to control relatively small populations of weeds, or used in sensitive habitats where wildlife may be indirectly affected by weed removal activities. These weed control methods may provide an advantage in native habitats where desirable species are left in place while removing surrounding weeds. Recommended physical control methods are as follows:

- Dethatching, or removal of a layer of dead vegetation, will be utilized where dense plant litter may prevent native seed from germinating. Care will be taken when using this method because it can cause soil disturbance and thereby promote weed establishment;
- Hand pulling will be utilized to remove annual and biennial species in relatively small areas (e.g. less than one acre) prior to seed set and minimize soil disturbance;
- Cutting will be utilized to remove shrub and tree species. This method will require follow-up herbicide applications to kill the root system and prevent resprouting; and
- Mechanical removal will be utilized to remove weed infestations from large areas (e.g. greater than one acre) where few or no native plant species are present. This method will utilize a mower, weed whacker, or tiller.

Chemical Weed Removal Methods

Chemical means of controlling weeds consists of the application of herbicides. Herbicides can be a very effective method in controlling weed species by killing or inhibiting plant growth. The appropriate method of chemical application varies based on species and also with the degree of infestation, time of year, temperature, and environmental conditions. Herbicides will be used to control weeds by a qualified applicator licensed by the State of California Department of Pesticide Regulation and only where directed by the Restoration Contractor.

Per the weed control plan adopted for this Project, SDG&E will designate a Weed Control Manager to oversee weed removal efforts and to approve any trained staff or certified pesticide applicators who will handle herbicides. The environmental risks of using herbicides will be minimized by using marker dyes to make the herbicide visible in areas where it has been applied. Higher visibility is desirable because it allows personnel to more effectively protect themselves against contamination; prevents unintended multiple application to a particular area

or plant; ensures complete coverage of the target area and plants; and informs personnel of overspray and wind-drift issues, which protects non-target plants.

Soil Decompaction

As shown in Table 1 above, decompaction of soils following construction activities is anticipated to be required for portions of all stringing sites, as well as throughout all construction yards and temporary access road areas. Decompaction of soils will improve water infiltration and allow for plant root growth in restoration areas. These Project areas will be decompacted by ripping/cross ripping, to a depth of at least 12 inches when possible, with ripper teeth mounted to the back of a bulldozer, or disking and scarifying less compacted surfaces using farming implements including tillers and disks pulled by tractors. After the compacted soil surface is broken up, implements to smooth the rough surface and return it to its original contour (e.g., drag harrows with both spike-tines and flex-tines, or link-chain harrows) will be utilized. On temporary access roads, berms will be broken up and leveled to allow natural drainage of the area.

Soil Re-Contouring

Sites that require grading or that are partially or entirely located on slopes will be contour-graded to as close to the pre-impact condition as possible prior to the implementation of restoration activities. The following landform grading techniques will be incorporated during re-contouring to return the topography of the sites to a condition that blends with the surrounding undisturbed habitat areas:

- Varying slope ratios will be used to avoid the regularity and linearity of straight graded 2:1 slopes throughout the project site. Slope ratios will vary in the horizontal planes and both steep and flat gradients should be incorporated;
- Drainage devices, V-ditches, terrace drains, and benches will be constructed on an angle as inconspicuously as possible (i.e., with a backcut). Any portion of a drainage device that is visible from a distance will be tinted with an appropriate earthen tone color to be disguised with the surrounding habitat; and
- In areas where newly graded slopes meet the existing landform, the graded slope will transition in a manner that appears natural (i.e., contours will be smoothed rather than end abruptly at existing contours).

Restoration of Temporary Impacts to 'Waters'

The Project temporary impacts to 'waters' will be restored after Project construction is complete as closely as possible to pre-construction conditions. Information collected by biological monitors and Restoration Specialists prior to and during the Project construction phase will be utilized to facilitate this restoration process. Restoration activities will generally include removal of fill material from 'waters', and restoration of previous grade and soil surface contours as described above.

Removal of fill, if applicable, in 'waters' will include excavation of road bed materials placed in drainages and/or removal of any temporary culverts. Where imported gabion or cobble was used a fill material, complete removal with machinery and by hand is anticipated to be completed. Where soil fill was used, the material will be excavated to the depth and width of the original stream or dry wash contours, as determined by measurements taken by biological monitors and/or restoration Specialists. The restored channel will be matched to the

undisturbed upstream and downstream portions to approximate pre-project conditions. Following removal of any fill material, the grade and contours of channel banks at temporary impact sites will be restored.

Soil Testing

Following soil decompaction and re-contouring activities, the Restoration Specialist will determine if soil sampling should be conducted. A standard composite soil sampling method will be used to represent average soil conditions onsite and to reduce sampling effort and analytical cost. The proposed restoration site will be subdivided into areas of uniform soil based on soil color, slope, texture, and drainage. Each area with distinguishable soils within the restoration site and adjacent habitat will be sampled separately. Composite samples will consist of 2 to 10 randomly selected soil cores from areas with similar soils throughout the site. Each soil core will be taken from 0 to 4 inches below the surface and combined to make the composite sample. If most of the areas within the restoration site are uniform, two composite soil samples will suffice. The number of composite samples taken from each site will depend on local site conditions and will be determined by the Restoration Specialist. Samples will be sent to a soil lab for Standard Agricultural Suitability Analysis.

Soil Amendments

To improve moisture and nutrient holding capacity and to improve conditions for root growth, the Restoration Specialist may recommend that organic soil amendments be added to the soil. Organic matter is not only a good source of nutrients, but also is beneficial for improving soil structure and soil quality for long-term plant growth. Based on the results of the soils analysis, the Restoration Specialist may recommend the addition of compost or other micronutrient supplements, such as phosphorus and potassium, to improve soils insufficient in nutrients. Soil amendments will be determined by field and lab soil tests conducted by the Restoration Specialist. Compost may also be added to a hydroseed mixture prior to application. Compost is a product produced by the controlled biological decomposition of organic matter that has been sanitized through the generation of heat and stabilized to be beneficial to plant growth. Compost is usually derived from chipped, shredded, or ground vegetation or clean, processed wood products.

Seed Sources

Seed material will be installed following the completion of all necessary soil preparation activities described above. The seed lists presented in Section 3 are composed of plant species known to occur in the Project impact areas and are based upon the results of plant surveys conducted for the Project. Species selected for seeding have been observed in habitats with similar conditions to those present onsite prior to construction activities, These Project-specific seed mixes are expected to return temporary Project impact areas to fully functional plant communities with the Program timeframe.

Seed Application Timing

To promote successful plant establishment, seeding will ideally occur between October 1 and March 15 annually to take advantage of winter rains and cooler, moderate temperatures. Project construction is anticipated to begin in Fall/Winter 2010, and continue through approximately 2012. Due to the large number of temporary impact sites to be restored and the

fact that restoration will ultimately be driven by completion of the construction schedule in any given area, these seed application timing conditions may not always be met. The use of hydroseed with wood fiber and a binder, as prescribed in Table X below, will facilitate seed application outside of this seasonal window assuming the restoration site will not be subject to significant surface disturbance prior to the onset of the winter rain season in southern California. If the site(s) are disturbed after seed application, the Restoration Contractor will reapply the seed mix between October 1 and March 15.

Mycorrhizal Inoculation

The restoration areas will receive granular mycorrhizal inoculum. The Program will avoid application of multi-species commercial inoculum. The inoculum will contain only a single species of fungus to minimize the potential for persistence of non-native fungi. Note that native fungal species can typically return to a site naturally within one to three years if suitable host plants are available (St. John, 1998). Mycorrhizal inoculum provides symbiotic organisms that are often the key to the success of a restoration project. Natives require these organisms, and weeds typically do not. Their presence can sometimes make weeds less troublesome on a restoration project. The following conditions apply to the use of inoculum for the Program:

- Endo (arbuscular) mycorrhizal inoculum will be registered by the California Department of Food and Agriculture and consist of spores, mycelium, and mycorrhizal root fragments in a solid carrier suitable for handling by broadcast seeding, hydroseeding, or drill seeding. The carrier will be the material in which the inoculum was originally produced and may include organic materials, vermiculite, perlite, calcined clay, or other approved materials consistent with mechanical application and good plant growth;
- A single species inoculum will be used when available. However, if this is not feasible, for each endomycorrhizal inoculum the species *Glomus intraradicies* will be a minimum of 50 percent of the propagules. The inoculum will carry a supplier's guarantee of 80,000 propagules minimum per kg; the minimum propagule count will be shown on each label provided. If more than one fungal species is claimed by the supplier, the label will include a guarantee for each species claimed;
- Endomycorrhizal inoculum is a live material that will be stored, transported, and applied at temperatures of less than 90 degrees Fahrenheit (32°C). If temperatures will exceed 90 degrees Fahrenheit, the inoculum will be covered or incorporated within three hours of its application.

Seeding Methods

One or a combination of three available methods of seed application may be used for the Program depending upon the specific restoration site conditions. These include hydroseeding, broadcast (or hand-broadcast) seeding, and land imprinting. Where these specifications apply to only a single seeding method, they should be considered as applicable only if the Restoration Contractor selects the corresponding method.

Hydroseeding

Hydroseeding will be the primary application method chosen to apply the seed in all Project restoration areas. Hydroseeding is a conventional method of revegetation widely used in large scale revegetation efforts. The effective method of combining seed mixtures with the necessary agents includingfertilizer, fiber mulch, tackifier, dyes, and other additives, allows for the quick

germination of seeds, which can be spread over a large area using trucks and/or trailer mounted tanks. Hydroseed hoses typically do not exceed 300 feet, and application requires that water be provided for the slurry mixture by a water truck or other method. Therefore, hydroseeding will be effective in most areas of the Project where vehicle access is available within 300 feet or less of the restoration site.

Hydroseeding Application

The restoration areas will be seeded using a two-stage hydroseed application method. Preventive measures will be taken to avoid damage to adjacent, undisturbed vegetation. The hydroseed application should be conducted under the direction of the Restoration Contractor in accordance with the following requirements:

- All hydroseed mixing will be completed in a clean tank. The tank will be rinsed a minimum of three times. It is the Restoration Contractor's responsibility to locate a washout area where rinsing can be carried out legally. The hydroseeder will be equipped with a built-in continuous agitation and recirculation system of sufficient operating capacity to produce homogeneous slurry and a discharge system that will apply slurry to the designated areas at a continuous and uniform rate;
- The slurry preparation will take place within the Project ROW whenever possible and should be started by adding water to the tank with the engine running at half-throttle. Good recirculation will be established when the water level has reached the height of the agitator shaft. At this time, the seed and inoculum will be added. The fiber (first application) or tackifier (second application) will be added when the tank is at least 30 percent filled with water. The hydroseeding Restoration Contractor will commence spraying once the tank is full and a homogeneous slurry has been created;
- The hydroseeding Restoration Contractor will spray designated areas with the slurry in a sweeping motion and in an arched stream until a uniform coat is achieved, with no slumping or shadowing as the material is spread at the required rate;
- The hydroseed slurry must float down from the arched stream as opposed to being shot directly at the ground. During hydroseeding, adjacent plants will be protected from damage (including but not limited to coating with seed or tackifier, damage by direct spray, and damage by dragging the hose). The tanks will be emptied completely during each stage of hydroseeding. Excessive coating on adjacent plants will be removed before the end of the day;
- Any slurry mixture that has not been applied by the hydroseeding Restoration Contractor within one hour after mixing will be rejected and replaced at the Restoration Contractor's expense. In addition, no construction activity or vehicular or mechanical tracking will occur within the designated hydroseeded areas after hydroseed has been applied.

The Program hydroseed specifications for the first and second hydroseed application within all restoration areas are summarized below in Table 3.

Table 3. SRPL Hydroseed Application Specifications

First Hydroseed Application	**Second Hydroseed Application** (within 2 hours of first application)
Specified seed and suitable carrier	1,500 lbs/acre of long strand wood fiber
500 pounds lbs/acre of long-strand wood fiber	90 lbs/acre of M-Binder
60 lbs/acre of endomycorrhizal inoculum	N/A

Equipment and Supplies for Hydroseeding

Fiber Mulch

Fiber mulch used for the Program hydroseeding will only be 100 percent long-stranded wood fiber. Fiber will not contain recycled wood pulp products. The mulch will be applied at a rate of between 1,500 and 3,000 pounds per acre or per manufacturer's recommendation. The mulch may contain dyes to provide visual cues to which areas have and have not received seed.

Compost

Compost may be utilized for the Program in lieu of fiber mulch or combined with fiber mulch. It is a product produced by the controlled biological decomposition of organic matter that has been sanitized through the generation of heat and stabilized to be beneficial to plant growth. Compost is usually derived from chipped, shredded or ground vegetation or clean processed wood products and has numerous biological and physical benefits. Several commercial brands are available. In all cases, the manufacturer's application rate recommendation will be followed.

Binder

Tackifier forms a firm, resilient, re-absorbent membrane that fastens seed to the soil surface. Tackifier used for the Program hydroseeding will be Ecology Controls, M-Binder, or an equivalent product. The binder will to be applied at 90 pounds per acre or per manufacturer's recommendation.

Water

Water will be obtained by the Restoration Contractor in compliance with the Project water use plan and will be free of harmful impurities, excess chlorine, and salts.

Restoration Approach for 'Waters'

The following hydroseed mixes will be applied within Project temporary impact areas to dry washes, and ephemeral and intermittent stream channels. The seed mixes are designed to provide rapid erosion control within the first growing season, where possible, and re-introduce native grasses, herbs, and/or shrubs to the edges of the channel and the stream banks where the jurisdictional areas transition into upland vegetation communities. Three distinct seed mixes have been designed for various portions of the Project ROW, which are identified by milepost in Tables 4 through 6 below. These seed mixes will be applied by hydroseed as described above (where possible), or by hand broadcasting in temporary impact areas of the Project ROW where hydroseed equipment cannot gain access. The mixes are intended to be applied to the stream banks and adjacent upland areas extending approximately 10 to 15 feet outward from the top of bank on both sides of the stream channel or dry wash.

Table 4. Desert Non-Vegetated Channel Seed Mix (MP 0–34)

Species	Common Name	Annual/ Perennial	Life Form
Ambrosia dumosa	burrobush	perennial	shrub
Camissonia boothii	Booth's evening primrose	annual	herb
Cryptantha muricata	Redroot cryptantha	perennial	herb
Geraea canescens	desert sunflower	annual	herb
Plantago patagonica	wooly plantain	annual	herb
Pleuraphis rigida	big galleta grass	perennial	grass

Table 5. Interior Mountain Non-Vegetated Channel Seed Mix (MP 34–92)

Species	Common Name	Annual/ Perennial	Life Form
Artemisia douglasiana	Douglas' mugwort	perennial	herb
Chaenactis artemisifolia	white pincushion	annual	herb
Elymus trachycaulis ssp. trachycaulis	slender wheatgrass	perennial	grass
Gutierrezia californica	California matchweed	perennial	shrub
Mimulus bicolor	yellow monkeyflower	Annual	herb
Sisrynchium bellum	blue-eyed grass	perennial	herb

Table 6. Coastal Slope and Foothill Non-Vegetated Channel Seed Mix (MP 92–117)

Species	Common Name	Annual/ Perennial	Life Form
Bromus carinatus	California brome	perennial	grass
Escholtzia californica	California poppy	annual	herb
Platago erecta	dotseed plantain	perennial	herb
Lotus scoparia	deerweed	perennial	shrub
Muhlenbergia rigens	deergrass	perennial	grass
Phacelia distans	common phaecilia	annual	herb

Maintenance, Monitoring, and Reporting Period

The maintenance, monitoring, and reporting period will begin with implementation of the restoration work (as specified above) at each of the Project's temporary impact sites, and will continue for a minimum of five years, or until the specified success criteria have been achieved. Each restoration site will have an initial 120-day installation period, inclusive of the 5-year maintenance, monitoring, and reporting period. The 120-day period is a standard review period to ensure that restoration activities at all sites have been implemented by the maintenance and/or Restoration Contractors consistent with all Program specifications. Note that because the Project construction activities will occur in a phased manner between 2010 and 2012 (estimated), maintenance, monitoring, and reporting for each of the Project restoration sites will also occur in overlapping time periods. The Restoration Program Manager will develop and manage a master maintenance, monitoring, and reporting schedule that will document the periods for each site.

4.4 As-Built Assessment

At the conclusion of the 120-day installation period, an As-Built assessment report will be submitted by the Restoration Program Manager to the CPUC (and the BLM or USDA Forest Service on their managed lands, where applicable). The As-Built report will document what preparation activities were implemented for each site, specify the quantities, types, and dates of

hydroseed installed, and provide photographs taken from pre-designated points at each site. The Restoration Specialist will keep records of site preparation activities and restoration activities. In addition, any substantial problems encountered, or necessary changes made to the Program in the field will be recorded and included in the As-Built assessment report. Recommendations for corrective measures, if any, will be made by the Restoration Specialist immediately upon conclusion of the onsite As-Built assessment. The Restoration Program Manager will determine the individual restoration sites included in each As-Built assessment report.

Maintenance, Monitoring, and Reporting Schedule

Table 7. Generalized Program Maintenance, Monitoring, and Reporting Schedule

Task	Year 1	Year 2	Year 3	Year 4	Year 5
Restoration Site Installation	Begins 120-day and 5-year periods when complete.				
As-Built Report[1]	120 Days After Restoration Installation				
Restoration Site Maintenance[2]	Begins upon Installation and continues a minimum of monthly during 120-day period, quarterly after (or as needed to meet performance standards)	Quarterly (or as needed to meet performance standards)	Quarterly (or as needed to meet performance standards)	Quarterly (or as needed to meet performance standards)	Quarterly (or as needed to meet performance standards)
Maintenance Monitoring/Report[1]	Monthly for 12—day period, quarterly for remainder of Year 1	Quarterly	Quarterly	Semi-Annually	Semi-Annually
Performance Monitoring/Report[1]	Annually (on anniversary of restoration installation)	Annually	Annually	Annually	Annually
Reference Photos[1]	Beginning and end of 120-Day Period and end of Year 1	Annually	Annually	Annually	Annually
Remedial/Contingency Measures[2]	As needed at end of 120-day period or throughout Year 1 to meet performance standards	As needed to meet performance standards	As needed to meet performance standards	As needed to meet performance standards	As needed to meet performance standards

[1]To be conducted by the Restoration Specialists. [2]To be conducted by the Maintenance/ Restoration Contractors.

Maintenance Activities

Maintenance activities will be conducted concurrent with the installation of the hydroseed materials in the mitigation areas, and will continue throughout the initial 120-day establishment period, concluding a minimum of five years from the date of installation. The Maintenance/Restoration Contractors maintenance activities on the site will be conducted monthly during the 120-day establishment period, quarterly during the remainder of year one of the project, and quarterly or as directed by the Restoration Specialist during years two through five. Recommendations for maintenance efforts will be based upon qualitative site observations and will include maintenance items listed below.

Non-Native/Invasive Plant Removal

Non-native and invasive plant (weed) control will begin with the 120-day establishment period and continue at a minimum throughout the five-year maintenance, monitoring, and reporting period as needed. The Restoration Specialist will monitor physical and/or chemical herbicide applications within the restoration areas and provide recommendations for additional weed

control if necessary. Weed control will consist of the complete removal of selected non-native vegetation (i.e., seed heads, stems, roots), and all debris and slash generated from weed removal activities will be disposed of offsite in a legally acceptable manner.

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 Restoration Specialist to keep any weeds establishing on the mitigation site at manageable levels. The species presented in Table 2 will be removed before seed-set (other species that appear may be added to this list if deemed necessary by the Restoration Specialist). All Program weed control activities will be implemented according to the SRPL Weed Control plan (RECON, 2010).

Trash/Debris Removal

Trash will be removed from the restoration areas by hand during monthly (120-day installation period) and quarterly maintenance visits. Trash consists of all man-made materials, equipment, or debris dumped, thrown, washed, blown, and left within the restoration areas. Deadwood and leaf litter of native trees and shrubs will not be removed. The Maintenance/Restoration Contractors will be responsible for prompt trash and debris removal. Following each site inspection, the Restoration Specialists will communicate any additional trash and debris removal requirements to the Restoration Contractor.

Erosion Control

The Restoration Specialists will monitor the sites at each visit for erosion. The Maintenance/Restoration Contractors are responsible for preventing erosion through the installation and maintenance of best management practices (BMPs) where required. In addition to the establishment of native vegetation, which will minimize erosion, non-vegetative erosion control measures may be used as prescribed by the Restoration Specialist or Restoration Program Manager. Such erosion control measures, or BMPs, may include certified weed-free straw mulch application, jute netting, sandbags, soil binders, trenches, or dissipaters. Any such measures must preclude the introduction of weed species into the seed bank of areas where native vegetation either occurs or is to be restored. Drainage and sedimentation control devices will be routinely cleaned, maintained, and repaired prior to and during the rainy season by the Maintenance/Restoration Contractor. All repairs to these systems will be executed immediately to offset erosion problems.

Access Restriction

The Maintenance/Restoration Contractors will install, at the direction of the Restoration Specialist or Restoration Program Manger, temporary fencing and/or signage restricting access to the restoration areas when determined that pedestrian traffic or vandalism has become problematic at a site. Vertical mulch (described below) may also be used to restrict access to restoration areas.

Vertical Mulching

Vertical mulching involves installing plants or dead and downed plant materials into the ground to discourage unwanted entry into restoration areas. This practice may be used at construction yards, stringing areas, or other areas in which public access is not permissible and fencing is

not the preferred method of restricting unwanted entry. Vertical mulch is often used in desert environments; however, this approach may be used within other habitats as determined necessary by the Restoration Specialist or Restoration Program Manager. Placing vertical mulch (shrubs, cacti, grasses, and other plant material either dead or alive) helps obscure closed roads or barren ROWs, which is especially important at former access roads or staging areas to prevent trespass. Replanted plants for vertical mulch will not be irrigated, are not subject to restoration success criteria, and may be allowed to expire. Vertical mulch can also reduce wind speed, facilitate deposition of blowing soil and organic litter, and can create safe sites for plant establishment. Any cactus or yucca species that were beyond the suitable range for transplanting can be installed as vertical mulch within the Project ROW.

Monitoring and Reporting Activities

The Program will require maintenance monitoring and reporting, as well as performance monitoring and reporting. Maintenance monitoring will be conducted by the Restoration Specialists to determine the effectiveness of maintenance activities on each restoration site and prescribe any additional maintenance activities that may be required. Performance monitoring will be completed by the Restoration Specialists to document restoration site progress relative to the established performance criteria, and prescribe any remedial measures that may be required to ensure that each restoration site in the Program meets the performance criteria within the 5-year maintenance, monitoring, and reporting period.

Maintenance Monitoring

The Restoration Specialists will perform regular maintenance inspections according to the monitoring schedule provided in Table 7 above. Qualitative monitoring will be conducted during each maintenance monitoring visit to assess seedling recruitment from native hydroseed and natural sources, native plant vigor and development, soil moisture content, presence/absence of plant pests or diseases, erosion and/or drainage conditions onsite, presence/absence of non-native or invasive plant species, trash or debris accumulation, wildlife presence/absence, and project fencing and signage condition (where applicable). The Restoration Specialists will also monitor the installation and maintenance of all best management practices (BMPs) outlined in accordance with the restoration standards of the CPUC, BLM, USDA Forest Service, and all other respective agencies. Qualitative monitoring will also require establishment of photo points to visually document restoration site progress. A series of fixed photo points will be established by the Restoration Specialist within each restoration site. A minimum of four photo points per site will be established to allow visual evaluation of the site. Photo points will be keyed to permanent features unlikely to change or disappear during the monitoring periods. Where no such feature is available, a monument will be marked by GPS coordinates and or a 2-foot (0.6 m) length of 0.5-inch (1.2 cm) rebar will be driven into the ground with 2 inches (5 cm) left exposed above the ground. All photo points will be marked on an aerial photograph showing GPS coordinates and permanent landscape features. Photos will be taken during all maintenance monitoring site visits by the Restoration Specialists. Following each maintenance inspection, the Restoration Specialists will submit maintenance monitoring reports to the Restoration Contractor and to SDG&E via the Restoration Program Manager.

Maintenance Monitoring Reports

Following each maintenance inspection, the Restoration Specialist will submit a maintenance monitoring report to the Maintenance/Restoration Contractors and to SDG&E via the

Restoration Program Manager. The Restoration Program Manager will provide a standardized report form that Restoration Specialists will utilize for maintenance monitoring and reporting. The ultimate purpose of the maintenance monitoring reports is to advise all parties whether sufficient progress is being made to ensure on-schedule, successful completion of the Program. All qualitative monitoring visits to the restoration sites will be documented with a monitoring report, which will be submitted to the Maintenance/Restoration Contractors via the Restoration Program Manger. Any restoration site deficiencies will be noted in the monitoring report, with accompanying recommendations for maintenance and/or remedial actions. Maintenance monitoring and reporting will be performed monthly during the 120-day period, and quarterly throughout the remaining 5-Year maintenance, monitoring, and reporting period, or until performance standards are met.

Performance Monitoring

Performance monitoring will include quantification of vegetative cover and the establishment of a series of fixed photo-points throughout the restoration area. Performance monitoring will be the responsibility of the Restoration Specialists. Annual performance monitoring will be completed by the Restoration Specialists one year after hydroseed application (or broadcast seeding or land imprinting, where applicable) and will continue, at a minimum, annually throughout the five-year maintenance, monitoring, and reporting period, or until the restoration sites have met the established performance standards. Performance monitoring will be completed to ensure consistency with the FEIR/EIS, MMCRP, and applicable agency standards (e.g., CPUC, BLM, and USFS).

Quantitative monitoring will be conducted to determine total bare ground cover, total native species cover and composition, total non-native species cover and composition, vertical stratification of native herb, shrub, and tree species on each restoration site, and overall plant species diversity. All quantitative monitoring will be conducted utilizing one of two methods approved for the Program: by establishing permanent vegetation transects or permanent vegetation quadrats. The Program performance monitoring method for each type of Project restoration site is summarized in Table 8 below.

Permanent vegetation transects will be utilized within larger restoration sites and will be marked with Global Positioning System (GPS) coordinates, and the direction of each transect will be recorded using a compass. The starting point for each transect will be determined by overlaying a grid onto aerial photographs of the Project route and randomly selecting transect locations that do not overlap. The permanent vegetation transects will be sampled using the point-intercept method (Canfield 1941), and adapted by California Native Plant Society (CNPS, 2001). A transect tape will be run between two posts either 25 or 50 meters apart, and a vegetative intercept line will be visually projected above and below the tape at every half-meter mark. Each plant within the herb, shrub, or tree strata that intercepts the projected line will be recorded, by species. In addition, all plant species present within the five-meter wide “species richness” portion of the transect will be recorded by species. All data will be utilized to determine total percent bare ground, percent native plant cover, percent non-native plant cover, overall species richness and diversity, and percent Quino host/nectar plant (where required). The percent cover for each species (including bare ground) will be 100 times the number of observations of that species, divided by the total number of sample points.

Table 8. SRPL Sensitive Habitat Restoration Program Performance Monitoring Methods

Project Area	Post-Construction Restoration Site Size	Performance Monitoring Method	Target Sampling Area (Percent of Restoration Site)
1 - Guard Structures	100 square feet or less	Qualitative monitoring	N/A
2 - Stringing Sites	2.75 acres or less	Quantitative monitoring utilizing a maximum of three randomly placed 5-meter wide point-intercept transects, with a maximum length of 25 meters. Length and number of transects will be adjusted based on actual disturbance area.	2.0 percent
3 - Temporary Work Areas	0.70 acre or less	Quantitative monitoring utilizing a maximum of 10 randomly placed 5 square-meter quadrats. Number of quadrats will be adjusted based on actual disturbance area.	2.0 percent
4 - Construction Yards	1.59 acres to 92.46 acres	Quantitative monitoring utilizing a maximum of 30 and a minimum of two randomly placed 5-meter wide point-intercept transects, with a maximum length of 50 meters. Number and length of transects will be adjusted based on actual disturbance area.	2.0 percent
5 - Temporary Access Roads	0.80 acres or less	Quantitative monitoring utilizing a maximum of 10 randomly placed 10 square-meter quadrats. Number of quadrats will be adjusted based on actual disturbance area.	2.0 percent

Permanent vegetation quadrats (5 square meters) will be utilized within smaller restoration sites, and the center point for each quadrat will be marked with Global Positioning System (GPS) coordinates. The position for each quadrat will be determined by overlaying a grid onto aerial photographs of the Project route and randomly selecting locations that do not overlap. Every plant species in each quadrat will be recorded by number and estimated cover. All data will be averaged to determine total percent bare ground, percent native plant cover, percent non-native plant cover, overall species richness and diversity, and percent Quino host/nectar plant (where required). The same quadrats will be re-sampled each year to reduce the likelihood that changes detected from year to year will be due to chance alone. All field data will be recorded on standardized data sheets.

Annual Performance Reports

The data collected for all Project restoration sites within a given year will be compiled and included in an annual monitoring report for the Program. Due to the large number of individual restoration sites within the Program, the Restoration Program Manager will determine how annual reports will be structured by the Restoration Contractor to meet agency requirements and facilitate a thorough and timely review. Annual monitoring reports will be completed submitted to the CPUC, BLM, and USFS during the five-year maintenance, monitoring, and reporting period of the Program. Annual performance reports outlining the results of the restoration performance monitoring will be submitted at the anniversary of the installation date each year. The performance reports will describe the existing conditions of the restoration sites derived from quantitative data collection. The reports will provide a comparison of annual success criteria with field conditions, identify any shortcomings of the restoration sites, and recommend remedial measures necessary for the successful completion of the Program. Each yearly report will provide a summary of the accumulated data.

4.8 Performance Criteria

Performance criteria have been established for each of the 22 vegetation communities to be restored for the Program, and are presented below in Table 9. The performance criteria are based upon the expected development of the intended vegetation communities for each onsite

restoration area from hydroseed (or broadcast seeding or land imprinting, where applicable) without supplemental irrigation. The Program will not utilize supplemental irrigation or container planting, with the exception of specific restoration areas where rare plant species may be translocated (see SRPL Rare Plant Restoration Plan). Therefore, native cover is anticipated to develop relatively slowly within all restoration sites, because supplemental irrigation will not be used for the Program (excepting as a remedial measure, as described in Section 4.9), and because many of the Project temporary impact areas are located in arid areas where seasonal rainfall is minimal. Although most vegetation communities are likely to develop more slowly under these conditions, when site preparation and seed application is implemented according to the Program specifications, all vegetation communities would be expected to reach the performance criteria in Table 9 within the 5-Year maintenance, monitoring, and reporting period. The performance criteria include total percent of bare ground within the site, percent absolute cover of native plant species cover within the site, percent absolute cover of non-native (includes invasive species) plant species cover in the site, plant species diversity expressed as a percentage of the species in the original seed mix for the site, and percent of native cover composed of the host and nectar plants for the quino checkerspot butterfly (*Euphydryas editha quino*). This last performance criterion is applicable only where the impacted area was identified as quino habitat prior to project construction, and only occurs within certain vegetation communities as shown in Table 9.

Table 9. SRPL Sensitive Vegetation Community Restoration Program 5-Year Performance Criteria

Vegetation Communities and Performance Criteria [1, 2]	Year 1					Year 2					Year 3					Year 4					Year 5				
	% Bare Ground[3]	% Native Cover[4]	% Non-Native Cover[5]	%Species Diversity[6]	%Quino Host Plant Cover[7]	% Bare Ground[3]	% Native Cover[4]	% Non-Native Cover[5]	%Species Diversity[6]	%Quino Host Plant Cover[7]	% Bare Ground[3]	% Native Cover[4]	% Non-Native Cover[5]	%Species Diversity[6]	%Quino Host Plant Cover[7]	% Bare Ground[3]	% Native Cover[4]	% Non-Native Cover[5]	%Species Diversity[6]	%Quino Host Plant Cover[7]	% Bare Ground[3]	% Native Cover[4]	% Non-Native Cover[5]	%Species Diversity[6]	%Quino Host Plant Cover[7]
Chaparral																									
Chamise Chaparral	70	20	10	20		60	30	10	30		45	45	10	45		35	60	5	60		20	75	5	70	
Northern Mixed Chaparral	65	25	10	25		55	35	10	35		40	50	10	50		30	65	5	65		20	75	5	80	
Redshank Chaparral	80	15	5	20		70	25	5	30		60	35	5	5		50	45	5	60		45	50	5	70	
Scrub Oak Chaparral	80	15	5	20		70	25	5	30		60	35	5	5		50	45	5	60		45	50	5	70	
Semi-Desert Chaparral	80	15	5	20		70	25	5	30		60	35	5	5		50	45	5	60		45	50	5	70	
Southern Mixed Chaparral	65	25	10	25		55	35	10	35		40	50	10	10		30	65	5	65		20	75	5	80	
Coastal and Montane Scrub																									
Big Sagebrush Scrub	70	25	5	20		60	35	5	35		45	50	5	45		30	65	5	60		20	75	5	70	
Diegan Coastal Sage Scrub	65	25	10	25		55	35	10	35		45	45	10	50		40	55	5	60		35	60	5	80	
Diegan Coastal Sage Scrub – Inland Form	75	15	10	20		70	20	10	35		60	30	10	45		55	40	5	60		50	45	5	70	
Flat-Topped Buckwheat Scrub	75	15	10	20		70	20	10	35		65	25	10	45		60	35	5	60		55	40	5	70	
Desert Scrub and Dune																									
Sonoran Creosote Bush Scrub	88	2	10	20		85	5	10	25		82	8	10	35		78	12	10	45		75	15	10	50	
Sonoran Mixed Woody and Succulent Scrub	83	2	15	25		80	5	15	35		77	8	15	45		78	12	10	55		75	15	10	60	
Sonoran Desert Mixed Scrub	83	2	15	20		80	5	15	25		77	8	15	35		78	12	10	45		75	15	10	50	
Sonoran Mixed Woody Scrub	83	2	15	20		80	5	15	25		77	8	15	35		78	12	10	45		75	15	10	50	
Sonoran Desert Wash Scrub	88	2	10	20		85	5	10	25		82	8	10	35		78	12	10	45		75	15	10	50	
Sonoran Desert Scrub	88	2	10	20		85	5	10	25		82	8	10	35		78	12	10	45		75	15	10	50	
Grassland and Meadow																									
Non-Native Grassland	50	25	25	25		45	35	25	50		35	45	20	70		25	55	20	80		20	60	20	90	
Herbaceous Wetland, Freshwater Marsh, and Streams																									
Non-Vegetated Channel	75	20	5	20	N/A	70	25	5	30	N/A	65	30	5	40	N/A	60	35	5	50	N/A	55	40	5	60	N/A
Woodland and Forest																									
Coast Live Oak Woodland	65	25	10	25	N/A	60	30	10	40	N/A	55	35	10	55	N/A	55	40	5	70	N/A	50	45	5	85	N/A
Peninsular Juniper Woodland and Scrub	90	5	5	20	N/A	85	10	5	30	N/A	80	15	5	40	N/A	75	20	5	50	N/A	70	25	5	60	N/A
Riparian Woodlands and Forests																									
Southern Coast Live Oak Riparian Forest	65	25	10	25	N/A	60	30	10	40	N/A	55	35	10	55	N/A	55	40	5	70	N/A	50	45	5	85	N/A

Table 9 footnotes:
[1] – This table subject to revision based upon reference site data (when collected).
[2] – All performance criteria will be quantified for each restoration site (excepting guard areas) on an annual basis via square meter frame quadrats or pint-intercept transects as described in Section 4.7.3.1 above.
[3] – Bare ground is the total percentage of area within each restoration site that does not contain plants. Rock, litter, and soil all are bare ground categories that will be quantified during annual performance monitoring.
[4] – Native cover is the absolute cover percentage of native plant species in each restoration site including all strata – tree, shrub, herb, and/or vine.
[5] – Non-native cover is the absolute cover percentage of non-native or invasive plant species in each restoration site including all strata – tree, shrub, herb, and/or vine.
[6] – Species diversity is the percentage of native species present in the restoration site from the original hydroseed mix (e.g., 5 of 7 species = 71 percent). Additional native plant species not from the mixes will be recorded and reported in this total percentage.
[7] – Quino checkerspot butterfly host plant cover is applicable to these vegetation communities only. The percent cover of *Plantago erecta*, *P. patogonica*, *Antirrhinum coulteranium*, *Cordylanthus rigidus*, and/or *Castilleja exserta* will be quantified and reported relative to other native and non-native species within each applicable restoration site where quino habitat was present prior to Project construction.

These performance criteria will be utilized to assess the annual progress of the restoration sites, and are regarded as interim Program objectives designed to achieve the final goals. Fulfillment of these performance criteria will indicate that the restoration sites are progressing toward the vegetation communities (and habitat types) that constitute the long-term goals of the Program. If restoration efforts fail to meet the performance standards listed below in any one year, the Restoration Specialist will recommend remedial actions to be implemented (e.g., supplemental seeding, weeding, etc.) that will enhance the restoration site(s) to a level in conformance with these standards.

Remedial Measures

If at any time the restoration areas do not meet the performance standards, the Restoration Specialists will be responsible to notify the Maintenance/Restoration Contractors, who can implement any additional maintenance activities and restore Program compliance with the performance standards. The Restoration Specialists will continue to employ measures after the five-year period if the monitoring success criteria have not been achieved. In addition, the Restoration Specialists may continue the successful techniques and/or employ adaptive management protocols and recommendations to ensure the successful revegetation of each restoration area (Aspen Environmental Group, 2008).

All remedial measures for the Program will comply with the maintenance and monitoring requirements in accordance with the CPUC, BLM, USFS, and applicable state and federal agencies for habitat restoration in the State of California (Aspen Environmental Group, 2008). Remedial measures may include additional seeding, erosion control, weeding, or other measures to comply with the maintenance and monitoring requirements of the CPUC, BLM, and USFS.

Initiating Procedures for Remedial Measures

If performance criteria are not met for any portion of the Program, the Restoration Specialists and Restoration Program Manager will prepare an analysis of the cause(s) of failure within the appropriate annual report and propose remedial actions for agency approval. If the any of the restoration sites have not met the performance criteria by the end of the 5-year maintenance, monitoring, and reporting period, SDG&E's maintenance, monitoring, and reporting obligations will continue until remedial measures are negotiated and implemented to bring the restoration site(s) into compliance with the established standards or until the agencies grant final Program compliance/approval.

Adaptive Management

Adaptive management will be implemented in the event of unforeseen or probable but unpredictable circumstances. Adaptive management is defined, for the purposes of this Program, as a flexible, iterative approach to the long-term management of restoration sites 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 restoration site(s). Adaptive management will include the utilization of regular quantitative assessments and rapid qualitative assessment data gathered in the field

during the Program to assess the health and vigor of all vegetation communities and restoration sites. Following an event that causes damage to all or part of the restoration site(s), these data will be used in part to drive management considerations for repair of the damaged areas. Achieving the performance criteria of the Program through establishment of self-sustaining native vegetation communities in temporary project impact areas 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 restoration sites.

Excessive Browse

Grazing and browsing by native mammals is expected to occur within the majority of mitigation sites, including all vegetation communities restored for the Program. The plant palettes for each vegetation community have been designed to incorporate a moderate level of plant browsing. If browse levels should become elevated on any site(s) (i.e., if significant plant mortality and cover reduction occurs) as indicated by qualitative or quantitative monitoring of the mitigation site(s), remedial measures will be implemented. Browse guards (plastic fencing) may be installed around the base of young shrubs in affected areas to reduce plant mortality, or around portions of the restoration site(s). In addition, remedial seeding may be necessary depending upon the stage of the restoration project. The hydroseed mix may be adjusted prior to re-application to include species that are less palatable to browsing mammals in the area. Each of these options would require the use of Program contingency funds to restore affected areas.

Fires

Periodic fire is important to the regeneration of many of the chaparral and coastal and montane scrub vegetation communities within the Program restoration sites and can help to maintain high levels of bio-diversity. Fire at intervals of more than 20 years are often necessary to maintain these vegetation communities in optimal condition, but more frequent fires due to natural or human-induced causes may result in decreased shrub regeneration, increased invasion by non-native grasses, and an over-all decrease in bio-diversity. Fire can be managed on the mitigation sites to the extent that human induced fires may be prevented, but naturally occurring wildfires are expected to occur within these vegetation communities on and adjacent to the Program restoration sites. If fire destroys any portion of a mitigation site or sites prior to achieving the performance criteria, the site(s) will be qualitatively monitored at more frequent intervals, to be determined by the Restoration Specialists and Restoration Program Manager, and remedial measures will be incorporated as necessary. The seed palettes for these communities have been designed with as many fire-resistant native plant species as possible and are expected to recover within several growing seasons after a fire event. Fire within other vegetation communities (e.g., woodlands and forests, riparian woodland and forests) may produce more long-lasting damage to woody canopy species and may require remedial seeding as directed by the Restoration Specialist, and potentially extending the 5-year maintenance, monitoring, and reporting period to allow the restoration site(s) to achieve the Program performance criteria. Depending upon the degree of damage, slash removal, container planting, and supplemental watering may also need to be considered in these areas (if possible), subject to approval by the

Restoration Program Manager who would authorize the use of program contingency funds.

Flooding

Flooding is anticipated to occur in many of the restoration sites for the Program, especially within the desert and dune vegetation communities in eastern Imperial and extreme western San Diego Counties where broad desert dry washes are prevalent in and adjacent to the Program restoration sites. In addition, many of the ephemeral stream channels temporarily impacted by the Project in the remaining vegetation communities in San Diego County may be subject to periodic flooding. The seed mixes for these areas have been designed to provide erosion control with native grass, herb, and shrub species to the greatest extent feasible, and target cover values for these areas have been adjusted to factor in the relatively high disturbance rates that may occur due to seasonal flooding. Flooding is anticipated to periodically reduce overall plant cover within and adjacent to stream channels and desert dry washes, but with application of erosion control materials at all Program restoration sites in conformance with the Project SWPPP, seasonal flooding is not anticipated to reduce cover below a level in conformance with the Program performance standards. If qualitative and/or quantitative monitoring of the dry wash or stream channel areas indicates that cover is being reduced below tolerable levels, re-contouring of restoration sites within the first two years after seed application, installation of addition erosion control materials, and/or remedial seeding may be recommended by the Restoration Specialists. These remedial measures would be subject to approval by the Restoration Program Manager, who would authorize the use of program contingency funds.

4.9.5 Prolonged Drought

Seasonal drought is anticipated to occur within all of the Program restoration sites annually, and all vegetation community seed palettes have been designed with drought-tolerant native plant species that are capable of withstanding drastic seasonal fluctuations in available moisture onsite. Drought conditions are anticipated to be most extreme in the desert portion of the Project, including the Imperial Valley, Mountain Springs Grade, and Jacumba area restoration sites. All program sites are anticipated to be restored with seed application only and without supplemental irrigation, so target cover values for all vegetation communities have been adjusted based on the Program specifications and expected temporal development in each Project area. However, an extended drought could potentially occur during any portion or all of the Program 5-year maintenance, monitoring, and reporting period including low seasonal rainfall and prolonged high temperatures that may negatively affect any of the Program restoration site(s) (*e.g.,* lower plant cover, higher plant mortality, increased potential for pest infestations onsite, *etc*.). Since supplemental irrigation is not possible in most Program restoration areas (either by fixed irrigation system or hand watering), remedial measures for prolonged drought would be limited to remedial seeding prior to any anticipated precipitation, extension of the 5-year maintenance, monitoring, and reporting period, and/or negotiation with the resource agencies to adjust the Program performance criteria for expected vegetation community development under extended drought conditions. These remedial measures will be recommended as required by the Restoration Specialists and would be subject to approval by the Restoration Program Manager, who would authorize the use of program contingency funds.

Remedial Measure Funding Mechanisms

The same funding source available for the Program, as established by the SDG&E, will be available for any additional planning, implementation, maintenance, monitoring, and/or reporting of any remedial measures that may be required to achieve the Program performance criteria.

Completion of Mitigation

The Restoration Program Manager will notify the CPUC, BLM, USFS, and any other applicable regulatory agencies upon submitting the annual report for the final year that the Program performance criteria have been met, and request acceptance of the Program restoration sites and release from the agency permit conditions. Early release will not be possible per the SRPL FEIR/EIS.

Regulatory Agency Confirmation

Following receipt of the notification of completion, the CPUC, BLM, USFS, and any other applicable regulatory agencies may designate personnel visit the restoration sites to confirm the successful completion of the Program and will issue formal letters of success prior to acceptance.

This Page Left Intentionally Blank

Appendix B. Summary of Baseline CRAM Results

This Page Left Intentionally Blank

APPENDIX B – Functional Assessment including CRAM

INTRODUCTION

Implementation of the Sunrise project is expected to result in impacts to Waters of the U.S., Waters of the State, and other areas such as riparian zones under state jurisdiction. A complete HMMP requires that a functional assessment be performed for impact sites to determine the extent of impacts to functions and values that may occur as a result of the project. Working in conjunction with Southern California regulatory agencies, it was determined that the California Rapid Assessment Method (CRAM) for wetlands should be used as a functional assessment methodology.

CRAM METHODOLOGY

The California Rapid Assessment Method for Wetlands (CRAM) provides a rapid, cost-effective, scientifically robust method to evaluate the condition of wetlands and waters. This method was developed mainly by the San Francisco Estuary Institute in cooperation with the US Environmental Protection Agency (USEPA), and the use of this method is gradually being implemented by regulatory agencies throughout the State. CRAM is considered a "Level 2" assessment according to the USEPA's 3-tiered framework for assessing and monitoring surface waters (USEPA 2006). A Level 2 approach consists of rapid, field-based assessments of the overall condition or functional capacity of wetlands and/or their likely stressors. Level 2 results can be used to cost-effectively survey the overall condition of wetlands across landscapes, watersheds, and regions (CWMW 2009).

The CRAM method relies on rating wetlands with regard to four main attributes:

- Buffer and Landscape Context
- Hydrology
- Physical Structure
- Biotic Structure

Each of these four main attributes is divided into several key functional components or metrics. Each metric provides a score which is used in calculating an overall CRAM score for the wetland. These metrics are described below.

CRAM uses a scoring system of A, B, C, or D to rate the various metrics. These ratings are then transferred to a numeric value (A=12 points, B=9 points, C=6 points, and D=3 points) for purposes of calculating averages and final scores. The "A" rating corresponds to the highest value and highest functioning state for the particular metric it is describing, whereas the "D" rating reflects a degraded, poorly functioning, or highly altered metric. The overall score is expressed as a percentage, with the highest possible score being 100%.

CRAM has undergone significant calibration studies to evaluate the most appropriate ways to weight and combine metric scores to give a reasonable assessment of overall wetland function. The statewide CRAM "calibration average" can be used as a basis to compare CRAM scores from a particular site to scores that may be expected from similar habitats throughout California. Calibration scores for several wetland types, along with scores from hundreds of individual assessment sites, are available on the CRAM website.

Scoring guidelines are expected to produce scores which can be used to compare wetland function for features throughout the state.

Wetland Classification

CRAM has been designed to assess six different classes of wetlands, and metric narratives differ depending on which type of wetland is being assessed. All impacts for the Sunrise project involved streams, thus all impact sites were assessed according to the procedure for riverine wetlands, using the CRAM User's Manual (Collins *et al.* 2008a) along with the Riverine Wetlands Field Book (Collins *et al.* 2008b). According to CRAM guidance, riverine wetlands encompass all non-tidal, flow-through wetlands with channelized flow and a distinct inlet and outlet. Minor modifications of the procedure were used following recommendations from Southern California Coastal Water Research Project (SCCWRP) staff in order to apply the perennial riverine methodology to small ephemeral streams and desert dry washes. It was understood that many of the streams within the Sunrise right-of-way would receive somewhat lower CRAM scores due to their small size and ephemeral hydrology.

Assessment Area Definition

An Assessment Area (AA) is the portion of a wetland or water that is assessed using CRAM. The guidelines and sizes for establishing the AA are different depending on site conditions and the type of wetland being assessed, but CRAM guidelines generally recommend using AAs between about 0.5 and 2.0 hectares (1.24 - 4.94 acres). For a smaller wetland, the boundary of the wetland and the boundary of the AA may be the same. For a larger wetland, the AA may be only a portion of the wetland. CRAM considers wetlands and the adjacent transitional zone to be part of the same system, thus CRAM AAs include a portion of the land surrounding the wetland that may technically be considered "upland" according to Section 404 of the Clean Water Act.

For riverine wetlands, the AA should begin at a hydrological or geomorphic break in form or structure of the channel that corresponds to a significant change in flow regime or sediment regime. If no such break exists, then the AA can begin at any point near the middle of the wetland. Riverine AAs should extend landward from the backshore of the floodplain to include the adjacent riparian area that probably accounts for bank stabilization and most of the direct allochthanous inputs of leaves, limbs, insects, etc. into the channel including its floodplain. Any trees or shrubs that directly contribute allochthanous material to the channel should be included in the AA in their entirety. If the lateral limits of allochthanous input are not discernable, then the AA should extend laterally from the backshore toward the uplands for a distance equal to twice the site potential vegetation height, i.e. twice as far as the height of the trees in the riparian zone.

Metrics Evaluated

The following sections describe the specific metrics used to evaluate wetland function in the CRAM assessment.

Buffer and Landscape Context

For the purposes of CRAM, a buffer is a zone of transition between the immediate margins of a wetland or riparian area and its surrounding environment that is likely to help protect the wetland from anthropogenic stress. Buffers can protect wetlands by filtering pollutants, providing refuge for wetland wildlife, acting as barriers to disturbance by people and pets, and reducing the risk of invasion by non-native plants and animals. Metrics used to rate AAs with respect to buffer and landscape context included: 1) landscape connectivity, 2) percent of AA with a buffer, 3) average buffer width, and 4) buffer condition.

Hydrology

Hydrology includes the sources, quantities, and movement of water in the stream, plus the quantities, transport, and fate of water-borne materials, particularly sediments. The hydrology of a wetland directly affects many physical processes including nutrient cycling, sediment trapping, and pollution filtration. In CRAM, the hydrology of the AA is assessed based on three metrics: 1) water source, 2) hydroperiod, and 3) hydrologic connectivity.

*Physical Structure**Error! Bookmark not defined.***

Physical structure is defined as the local physical, chemical, or biological features that provide or support habitat for biota. CRAM assumes that the capability of a wetland to support characteristic native flora and fauna is positively correlated to physical structural complexity. The two metrics used to evaluate the physical structure of the AA are structural patch richness and topographic complexity.

Biotic Structure

The biotic structure of a wetland includes all of the organic matter that contributes to its material construct or architecture. Plants strongly influence the quantity, quality, and spatial distribution of water and sediments within wetlands, greatly influence water movement through wetlands, and provide the main source of primary nutrition for water-dependent wildlife. CRAM uses three metrics to rate the AA's biotic structure: 1) plant community, 2) horizontal interspersion and zonation, and 3) vertical biotic structure.

Stressor Identification

An anthropogenic perturbation within a wetland or its environment setting is defined as a stressor in CRAM (Collins *et al*. 2008a). Identified stressors are likely to negatively impact the condition and function of the AA. Stressors that relate to the four CRAM attributes (Section 2.1) are identified in the field. Stressors do not necessarily affect the score of a CRAM AA, but they are noted as part of the assessment.

Precision of CRAM Scores

While CRAM provides a useful numeric score for the ecological condition of a wetland, site conditions and differences in practitioner opinion can result in some variation of scores. Analyses conducted by the CRAM developers suggest that overall CRAM scores can have up to 10% error due to differences in practitioners, while individual attribute scores may have up to 5% error (CWMW 2009). Therefore, differences in overall CRAM scores less than 10 percentage points or in attribute scores less than 5 percentage points may not represent significant differences in overall condition.

For the Sunrise Powerlink, it is likely that all CRAM scores have a high degree of precision. A small staff of only four biologists conducted all of these assessments after spending multiple days calibrating to ensure agreement on treatment of common field scenarios. Thus, the amount of error between CRAM scores for individual sites on the Sunrise Powerlink ROW is probably well under 10%. The difference between these scores and the statewide average could still be up to 10%, although this variability should be minimized by calibration and guidance activities described below.

SUNRISE POWERLINK CRAM ASSESSMENT METHODOLOGY

The central functional assessment methodology used to assess impact sites on the Sunrise Powerlink Project was CRAM. Southern California regulatory agencies involved in oversight of the Project widely supported the use of this standardized approach.

All impacts along the Sunrise Powerlink ROW are stream impacts. Other wetland types will not be impacted by the Project. Therefore, as described above, the most appropriate CRAM assessment module for the impact sites was the module for riverine wetlands (Collins *et al*. 2008b). This module was used for all assessments described in this report.

Special consideration was given to the implementation of CRAM on the Sunrise Powerlink project. CRAM methodology for riverine wetlands is intended for fairly large, perennial waterways, as the name implies. Small, ephemeral, or desert drainages were given little or no consideration during the development of the riverine CRAM module. Therefore, staff from SCCWRP, a group involved in the development of CRAM, were specifically involved in different aspects of the Sunrise project to ensure that these CRAM assessments produced valid scores for the waterways being assessed, particularly in desert ephemeral stream systems. In addition to this assistance, SCCWRP audited ten percent of all CRAM assessments for the Sunrise Powerlink project to ensure that procedures were properly applied and that the scores obtained were consistent with scores obtained by the CRAM authors.

CRAM analyses of impact sites were performed by WRA field crews in June 2010.

Sampling method

Due to the large number of individual impact sites along the Sunrise Powerlink ROW, a subset of impact sites was selected for assessment. SCCWRP staff advised that at least thirty assessments would be necessary in order for the results to be representative of the entire Project. Twenty-five impact sites were randomly selected from the set of all impact sites along the power line right-of-way, and an additional five sites were identified as being a high priority for assessment due the presence of a more substantial watercourse or impact. These thirty sites were assessed using CRAM.

Field protocols

Standard CRAM methodology for riverine wetlands was applied to all impact sites selected for assessment, with minor adjustments necessary for application to the Project and its unique setting. These adjustments included modification of sample site or AA, and modification of the measurements used to assess entrenchment (explained in CRAM as the "hydrologic connectivity" metric). Modifications were developed by SCCWRP or established with input from SCCWRP in order to ensure that these modifications did not invalidate the results.

During fieldwork, the location of a proposed impact site along a particular stream required AAs to be established in a manner that deviates slightly from typical CRAM protocol. As explained above, a number of considerations are necessary to define the boundaries of an AA that adequately represents the stream being assessed and is not confounded by conditions that cannot be consistently found along the remainder of the stream. However, since the goal of the assessments was to obtain baseline information for the impact sites, it was necessary to position the AA to encompass the area of impacts even if it was a less ideal AA under the normal CRAM approach. Field teams were instructed to choose an AA that overlaps the impact area and also includes some distance downstream (ideally 100m). If this was not possible, the next drainage downstream or nearby was assessed instead. For example, on the waterways 16-DW-11 and 10-DW-1, the impact site was at the downstream end of the drainage, near its confluence with a larger drainage. In these areas the stream channels became more broad and divided into numerous smaller channels. Typical CRAM guidance would recommend that the AA for these streams be located further upstream, some distance away from the confluence in an area that adequately represents that majority of the channel. However, in these cases it was still possible to assess the impact area while avoiding the confluence. At stream 62-S-13, conversely, there was not a sufficient length of channel to establish an AA upstream from a confluence, and the next drainage downstream (62-S-12) was assessed instead.

A modified approach to the CRAM "hydrologic connectivity" metric was developed by SCCWRP for dry washes in the desert region of Imperial County. This metric normally examines the entrenchment of a stream channel through measurements of width and depth, and a channel with the capacity for floodwater to spread over a wider area will receive a higher score. However, this system of measurements could not easily be applied to large desert washes that were often spread over a very broad area with multiple small channels passing between hummocks or islands that would only rarely be submerged by flooding. Therefore, a procedure was established to identify the floodplain of desert washes as a surrogate for the "flood prone area" that is normally established in CRAM through measurements of width and depth. The floodplain was seen as the area beyond all active stream channels that is only rarely submerged by floodwater, during floods that may only happen every 10-20 years. Signs of these rare flood flows are persistent in desert systems, allowing field technicians to identify the floodplain. Such signs included lack of "desert pavement" (a compacted soil condition common in upland areas of the Sonoran desert), secondary channels at higher elevation, scour on upper channel banks, or slight changes in vegetation. In addition to this surrogate for "flood prone area," it was established that only the single largest channel in the wash would be measured in order to obtain "bankfull width." This approach produced results that were seen to adequately reflect conditions within dry washes.

RESULTS

Complete CRAM scores for all impact sites assessed are presented in Table B-1. The type and location of all assessed sites along the ROW are presented in Figure B-1. An overview of these results is presented in Section 2.4 of the HMMP.

Table B-1. CRAM scores for individual impact sites within the Sunrise Powerlink ROW.

			Buffer and Landscape Context					Hydrology				Physical Structure		
CRAM ID	Hydrology	OVERALL CRAM SCORE	Landscape Connectivity	% of AA with Buffer	Average Buffer Width	Buffer Condition	Attribute Score (Final %)	Water Source	Hydroperiod or Channel Stability	Hydrologic Connectivity	Attribute Score (Final %)	Structural Patch Richness	Topographic Complexity	Attribute Score (Final %)
5-DW-7	Dry Wash	**62**	12	12	12	12	**100**	12	12	3	**75**	3	6	**38**
5-DW-8	Dry Wash	**72**	12	12	12	12	**100**	12	12	9	**92**	6	6	**50**
7-DW-10	Dry Wash	**64**	12	12	12	9	**93**	12	9	12	**92**	3	6	**38**
8-DW-2	Dry Wash	**65**	12	12	12	9	**93**	12	9	12	**92**	3	6	**38**
9-DW-9	Dry Wash	**71**	12	12	12	9	**93**	12	12	12	**100**	6	6	**50**
10-DW-1	Dry Wash	**73**	12	12	12	6	**85**	12	9	12	**92**	6	6	**50**
11-DW-1	Dry Wash	**62**	12	12	12	6	**85**	12	9	12	**92**	3	6	**38**
13-DW-15	Dry Wash	**65**	12	12	12	9	**93**	12	12	6	**83**	3	6	**38**
14-DW-12	Dry Wash	**69**	12	12	12	12	**100**	12	12	12	**100**	3	6	**38**
15-DW-1	Dry Wash	**69**	12	12	12	12	**100**	12	9	9	**83**	6	6	**50**
15-DW-8	Dry Wash	**71**	12	12	12	12	**100**	12	12	12	**100**	3	6	**38**
16-DW-11	Dry Wash	**69**	12	12	12	6	**85**	12	9	12	**92**	6	6	**50**
17-DW-7	Dry Wash	**63**	12	12	12	9	**93**	12	12	6	**83**	3	6	**38**
17-DW-2	Dry Wash	**71**	12	12	12	9	**93**	12	9	12	**92**	6	6	**50**
35-S-2	Ephemeral	**69**	12	12	12	9	**93**	12	12	6	**83**	3	6	**38**
35-S-4	Ephemeral	**71**	12	12	12	9	**93**	12	9	12	**92**	6	6	**50**
53-S-8	Ephemeral	**78**	12	12	12	12	**100**	12	12	12	**100**	6	6	**50**
54-S-10	Ephemeral	**64**	12	12	12	9	**93**	12	6	3	**58**	3	3	**25**
62-S-12	Ephemeral	**80**	12	12	12	12	**100**	12	9	9	**83**	9	6	**63**
79-S-1	Ephemeral	**83**	12	12	12	9	**93**	12	12	12	**100**	6	9	**63**
82-S-1	Intermittent	**83**	12	12	12	12	**100**	12	12	12	**100**	6	6	**50**
92-S-4	Ephemeral	**73**	12	12	12	12	**100**	12	9	9	**83**	3	6	**38**
92-S-6	Ephemeral	**83**	12	12	12	12	**100**	12	12	12	**100**	6	6	**50**
107-S-2	Ephemeral	**72**	12	12	12	9	**93**	12	12	12	**100**	3	6	**38**
107-S-4	Ephemeral	**68**	12	12	12	9	**93**	12	9	3	**67**	6	6	**50**
109-S-1	Intermittent	**88**	12	12	12	12	**100**	12	9	12	**92**	9	6	**63**
111-S-9	Perennial	**82**	12	12	12	9	**93**	12	12	3	**75**	9	6	**63**
112-S-2	Intermittent	**82**	12	12	9	6	**83**	12	12	12	**100**	6	6	**50**
117-S-1	Perennial	**95**	12	12	12	9	**93**	12	12	12	**100**	12	9	**88**
130-S-1	Ephemeral	**69**	12	12	12	9	**93**	12	12	6	**83**	3	9	**50**

Table B-1. CRAM scores

		Biotic Structure					
CRAM ID	**Hydrology**	**Number of Plant Layers**	**Number of Co-dominant Species**	**Percent Invasion**	**Horizontal Interspersion and Zonation**	**Vertical Biotic Structure**	**Attribute Score (Final %)**
5-DW-7	Dry Wash	6	3	12	3	3	**36**
5-DW-8	Dry Wash	6	3	12	6	3	**44**
7-DW-10	Dry Wash	6	3	9	3	3	**33**
8-DW-2	Dry Wash	6	3	6	6	3	**39**
9-DW-9	Dry Wash	6	6	6	6	3	**42**
10-DW-1	Dry Wash	6	9	9	9	6	**64**
11-DW-1	Dry Wash	6	3	9	3	3	**33**
13-DW-15	Dry Wash	6	6	12	6	3	**47**
14-DW-12	Dry Wash	6	6	12	3	3	**39**
15-DW-1	Dry Wash	6	9	12	3	3	**42**
15-DW-8	Dry Wash	6	6	12	6	3	**47**
16-DW-11	Dry Wash	6	6	12	6	3	**47**
17-DW-7	Dry Wash	6	6	12	3	3	**39**
17-DW-2	Dry Wash	9	6	12	6	3	**50**
35-S-2	Ephemeral	9	6	9	6	6	**56**
35-S-4	Ephemeral	6	3	6	6	6	**47**
53-S-8	Ephemeral	9	6	9	9	6	**64**
54-S-10	Ephemeral	9	9	12	9	9	**78**
62-S-12	Ephemeral	9	6	12	9	9	**75**
79-S-1	Ephemeral	12	9	9	9	9	**78**
82-S-1	Intermittent	12	12	12	9	9	**83**
92-S-4	Ephemeral	9	9	12	9	6	**69**
92-S-6	Ephemeral	9	12	12	9	9	**81**
107-S-2	Ephemeral	12	9	6	6	6	**58**
107-S-4	Ephemeral	12	9	9	6	6	**61**
109-S-1	Intermittent	12	12	9	12	12	**97**
111-S-9	Perennial	12	12	9	12	12	**97**
112-S-2	Intermittent	12	9	9	12	12	**94**
117-S-1	Perennial	12	12	9	12	12	**97**
130-S-1	Ephemeral	6	6	6	6	6	**50**

This Page Left Intentionally Blank

Appendix C. Data Summary for Hydrological Improvements

This Page Left Intentionally Blank

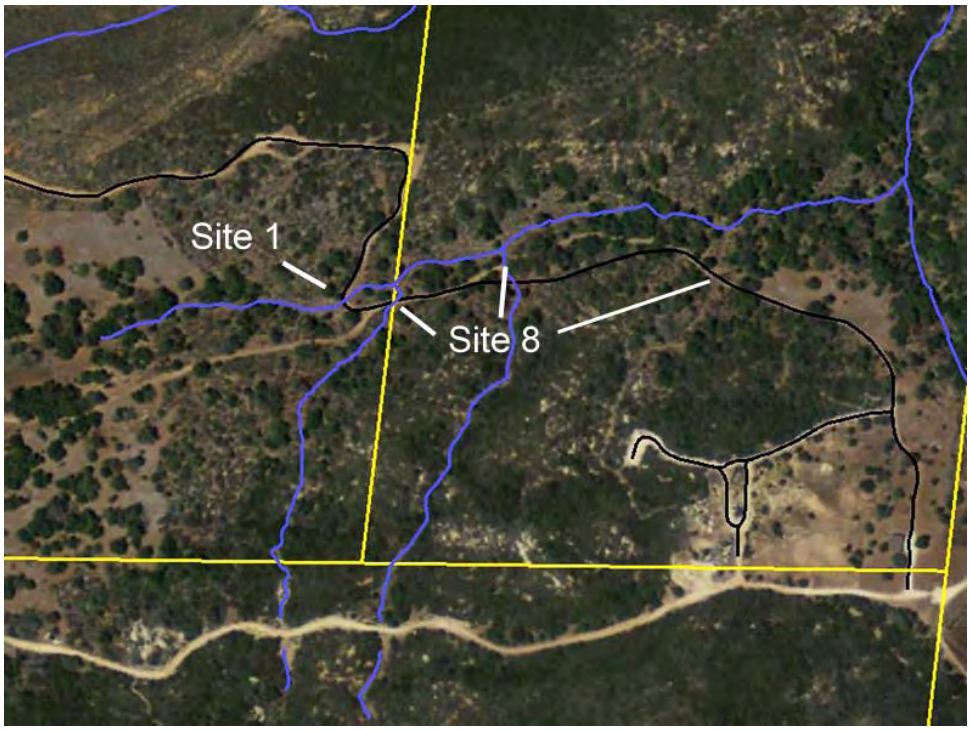


Figure C-1. View of existing road crossings at Sites 1 and 8 (aerial photograph taken 25 May 2009, source: Google Earth, accessed 2010). Present day road alignment shown in black and streams shown in blue.

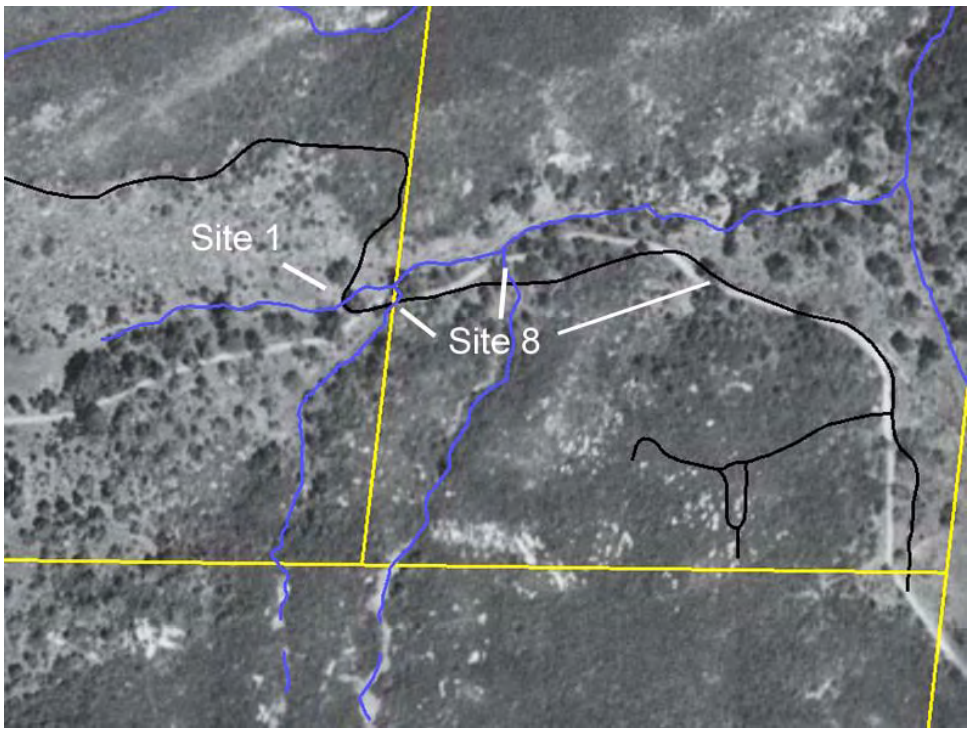
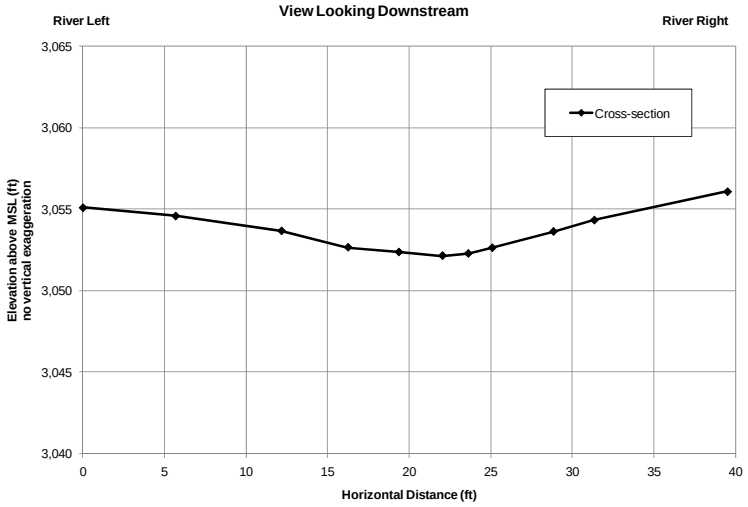


Figure C-2. View of historic road alignment at Sites 1 and 8 (aerial photograph taken 2 Apr 1953). Present day road alignment shown in black and streams shown in blue. Note that a road did not cross the stream at Site 1 (constructed 2002-2003) but did cross the three ephemeral tributary streams at Site 8.

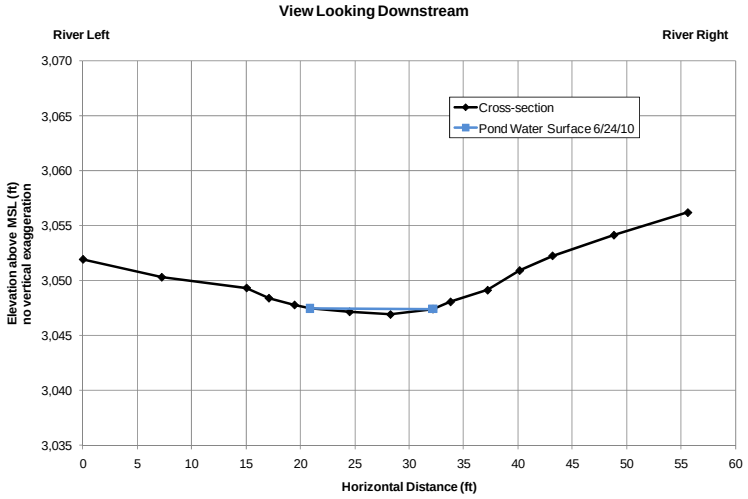
Figure C-3. At Site 1 looking upstream from the road crossing at a wetland impoundment.

Figure C-4. At Site 1 looking downstream from the road crossing at the downstream reach of the intermittent stream channel.

a)



b)



c)

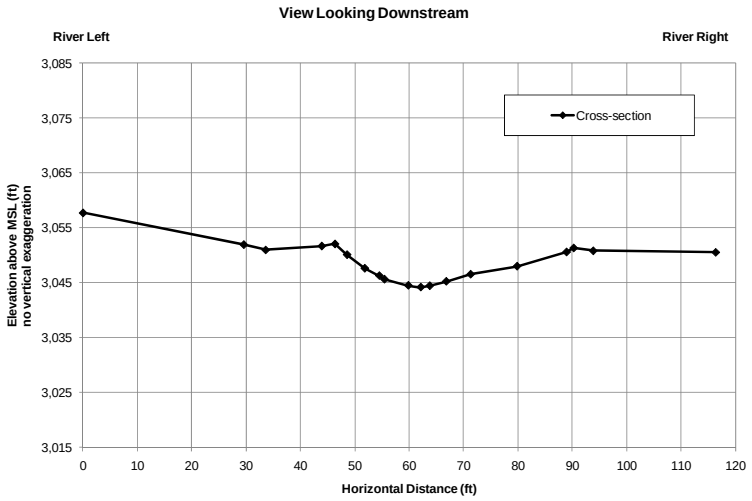


Figure C-5. Cross-sections upstream of the road crossing (a), across the pond upstream of the crossing (b), and downstream of the road crossing (c).

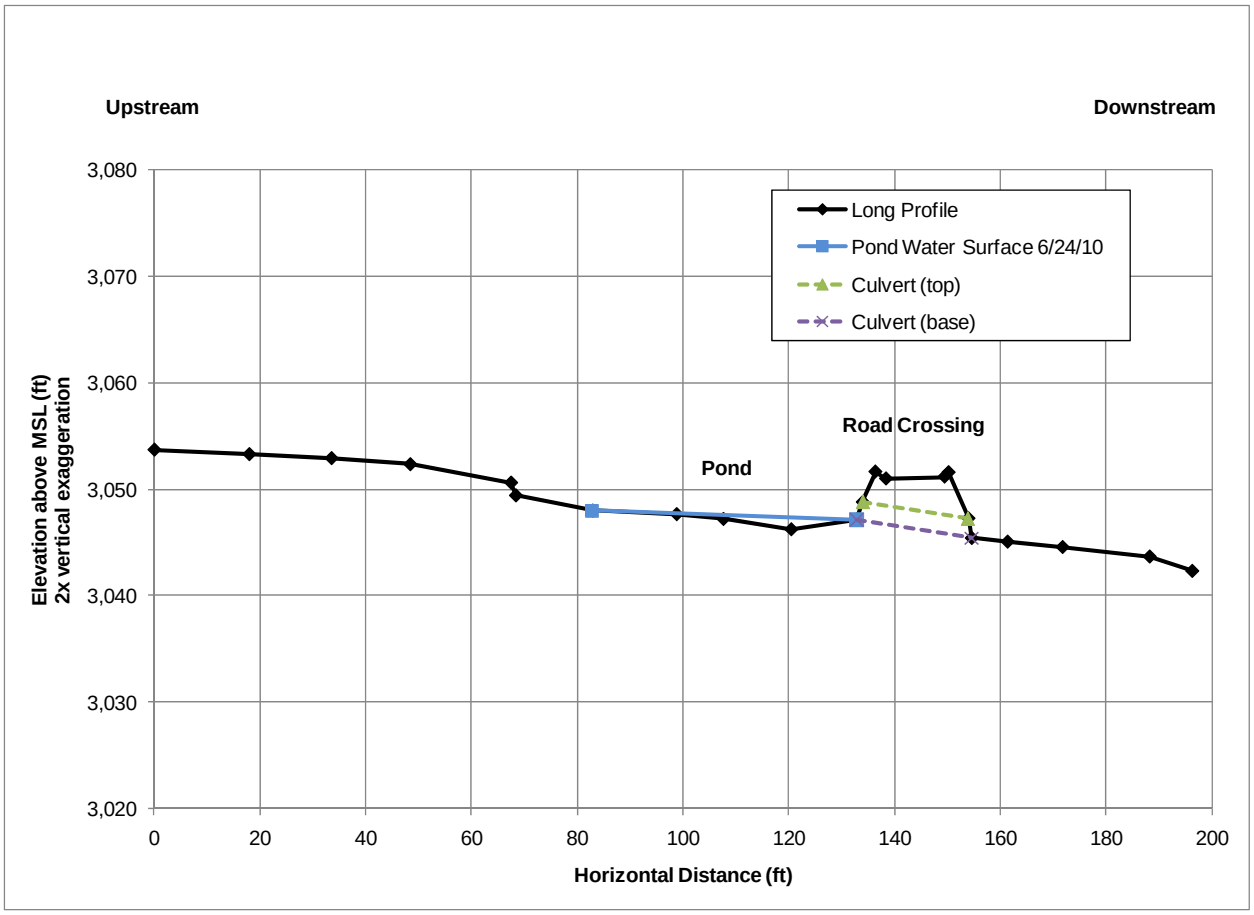


Figure C-6. Longitudinal profile along the intermittent stream channel at Site 1, with flow moving downstream from left to right. The road crossing presently impounds water on its upstream side forming a seasonal pond with wetland vegetation.

Figure C-7. At Site 8 looking east along existing road at the crossing of the western-most ephemeral stream (flow is right to left). Note that there is minimal impoundment on the upstream side of the crossing (right side of photo) and minimal channel drop on the downstream side (left side of image).

Figure C-8. At Site 8 looking east along existing road at the crossing of the middle ephemeral stream (flow is right to left); similar morphology as the western-most stream crossing (see Figure 9).

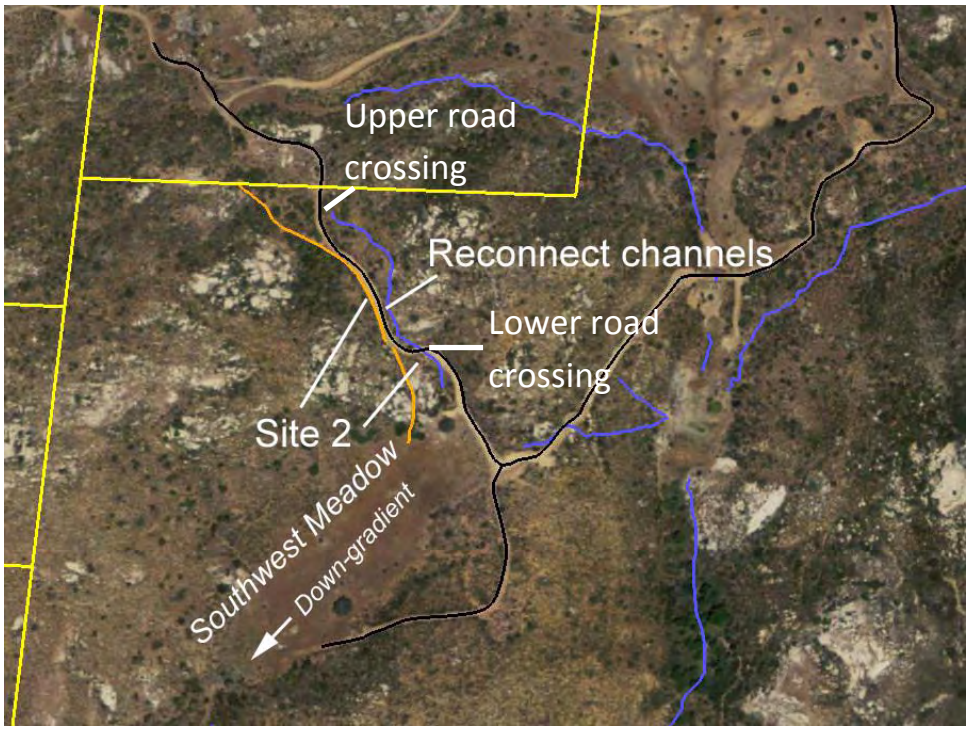


Figure C-9. View of existing road crossings at Site 2 along the stream channel that drains to the southwest meadow (aerial photograph taken 25 May 2009, source: Google Earth, accessed 2010). Present day road alignment shown in black, abandoned road and ditch shown in orange, and streams shown in blue.

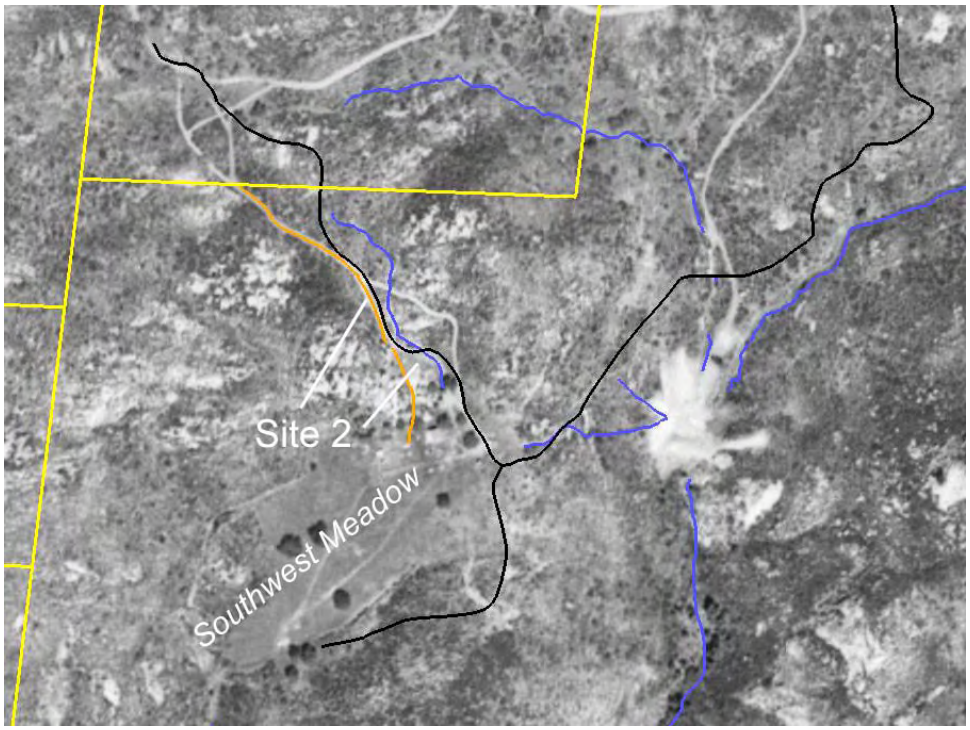


Figure C-10. View of historic road alignment at Site 2 (aerial photograph taken 2 Apr 1953). Present day road alignment shown in black, present day abandoned road and ditch shown in orange, and streams shown in blue. Note the abandoned road and ditch once served as the primary roadway.

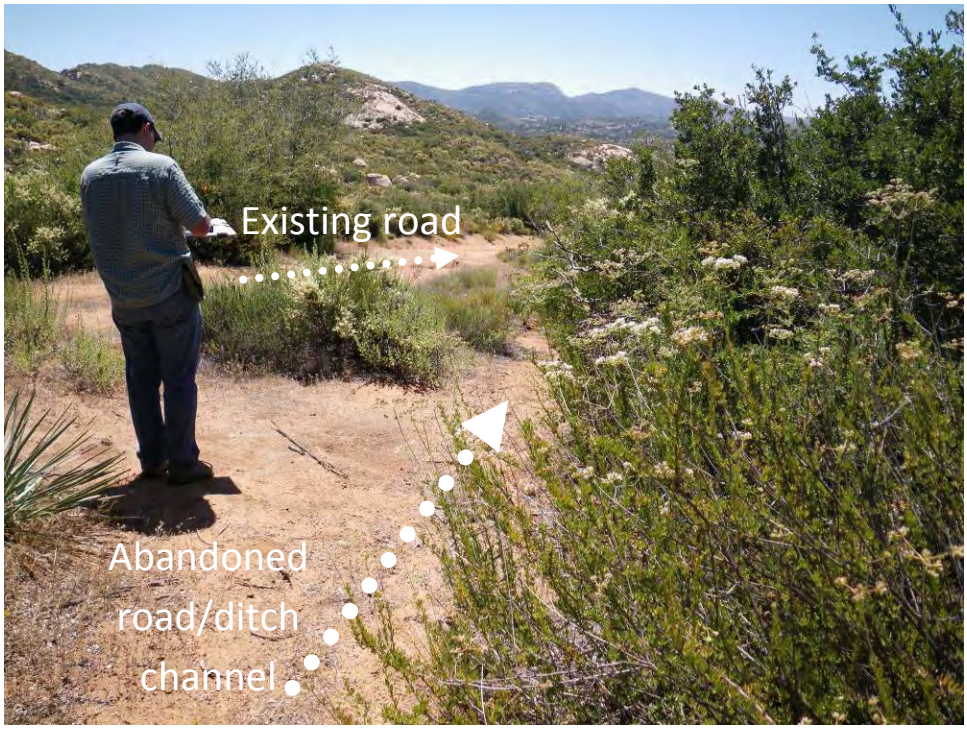


Figure C-11. At Site 1 looking downstream along abandoned road/ditch channel towards its confluence with the existing roadway. At the road, this channel continues along an inboard ditch.

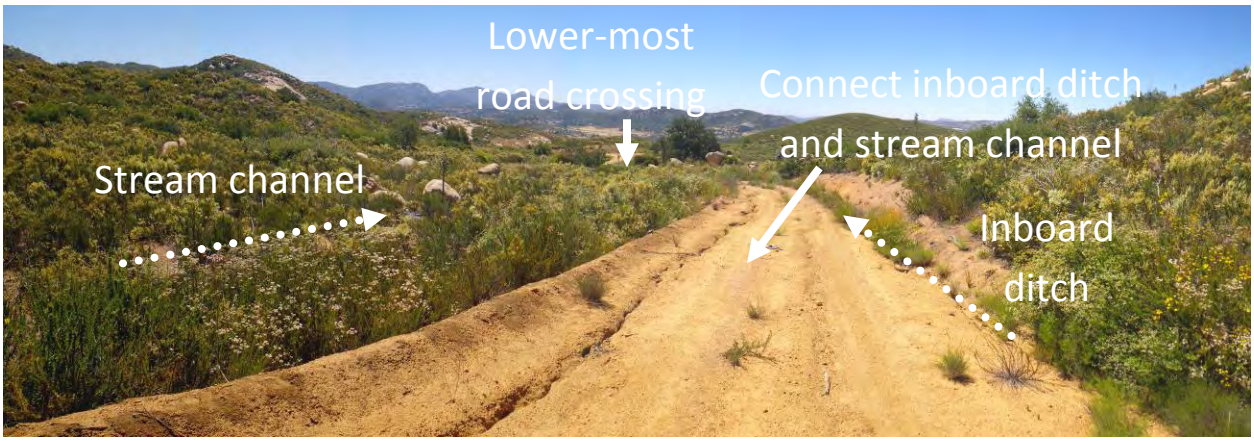


Figure C-12. At Site 1 looking down-gradient along the roadway with the stream channel running parallel to the left and an inboard ditch running on the right. The inboard ditch connects the abandoned road/ditch channel upstream to the ditch channel downstream.

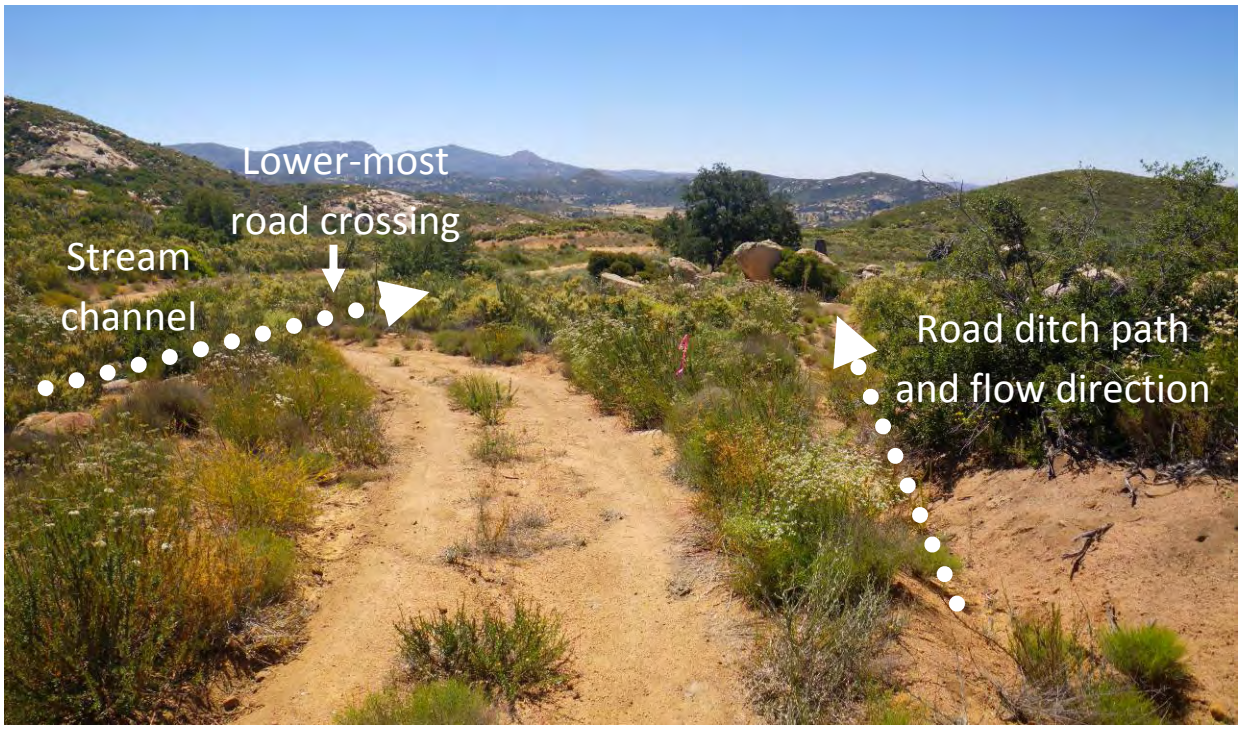


Figure C-13. At Site 1 looking down-gradient along the roadway with the inboard ditch diverting away to the right and the stream channel crossing on the left.

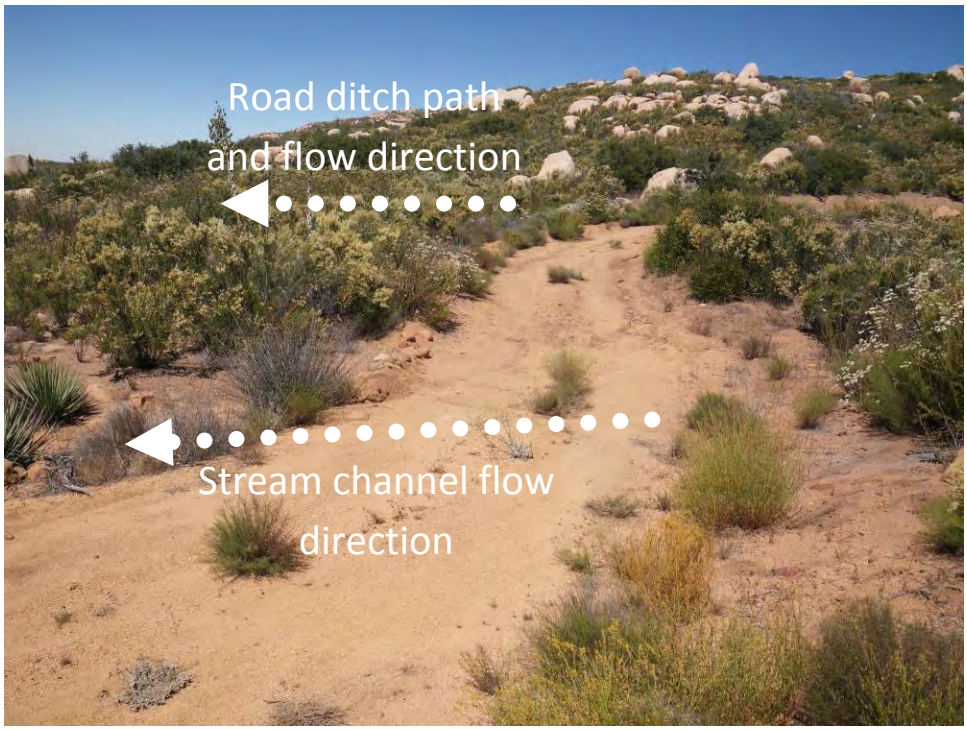


Figure C-14. At Site 2 looking at the lower-most road crossing of the stream channel that drains to the southwest meadow. The road ditch is also shown here.

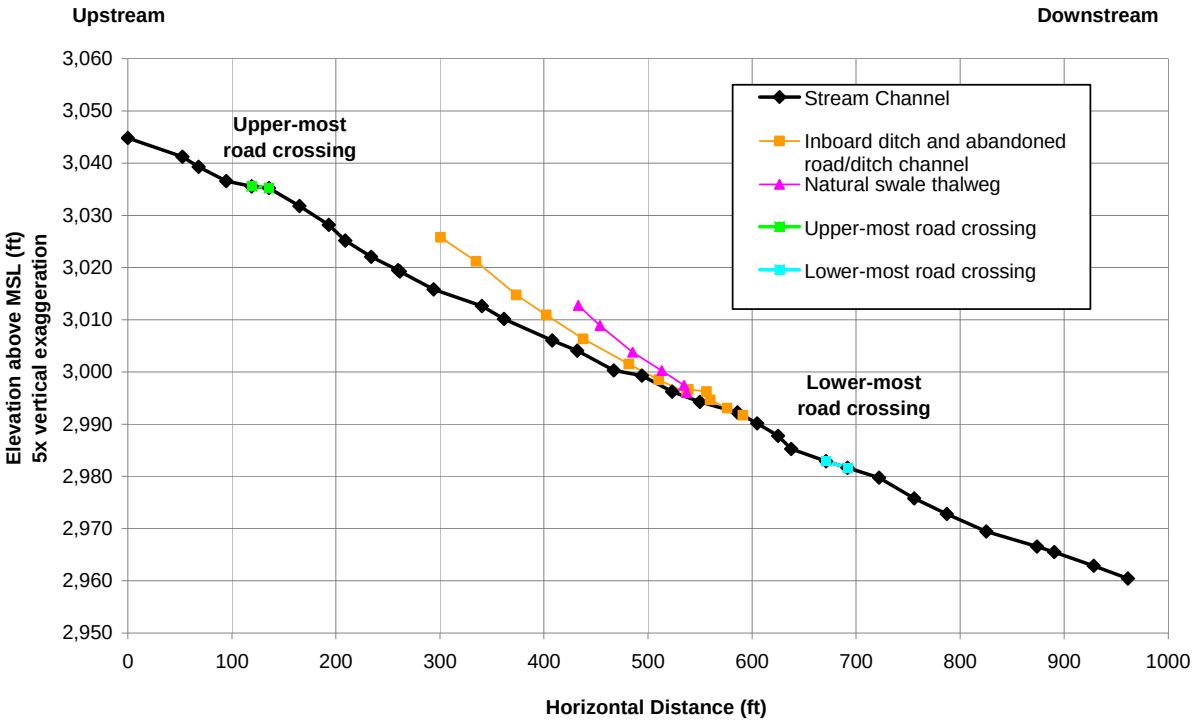
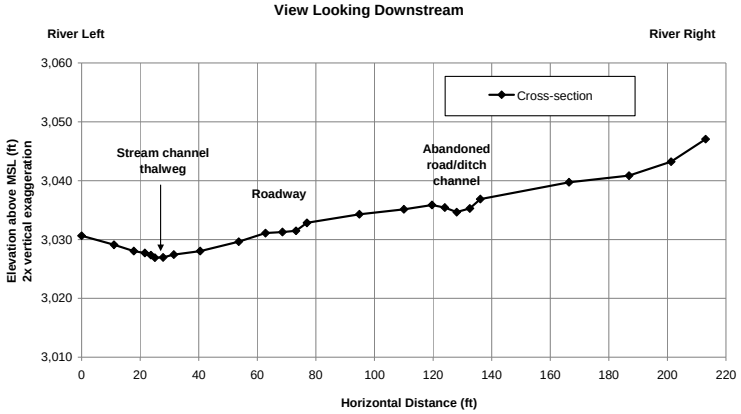
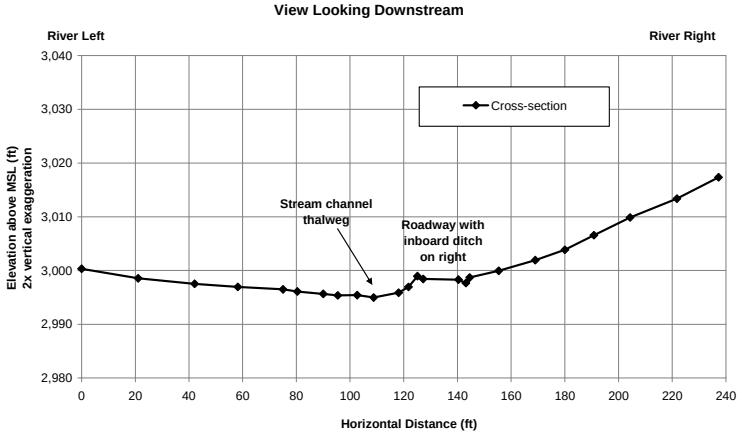


Figure C-15. Longitudinal profile along the intermittent stream channel at Site 1, with flow moving downstream from left to right. The road crossing presently impounds water on its upstream side forming a seasonal pond with wetland vegetation.

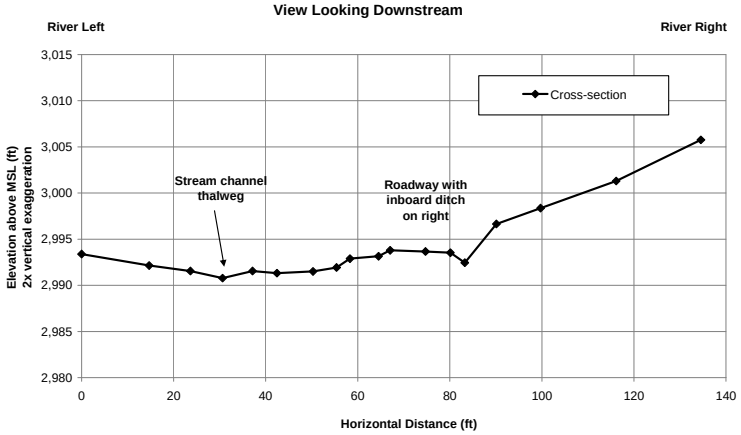
a)


View Looking Downstream
River Left
River Right
Cross-section
Stream channel thalweg
Roadway
Abandoned road/ditch channel
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
3,060
3,050
3,040
3,030
3,020
3,010
0
20
40
60
80
100
120
140
160
180
200
220

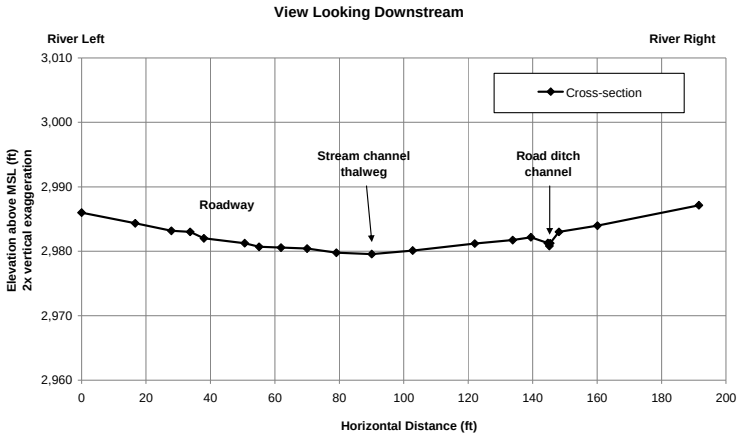
b)


View Looking Downstream
River Left
River Right
Cross-section
Stream channel thalweg
Roadway with inboard ditch on right
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
3,040
3,030
3,020
3,010
3,000
2,990
2,980
0
20
40
60
80
100
120
140
160
180
200
220
240

c)


View Looking Downstream
River Left
River Right
Cross-section
Stream channel thalweg
Roadway with inboard ditch on right
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
3,015
3,010
3,005
3,000
2,995
2,990
2,985
2,980
0
20
40
60
80
100
120
140

d)



e)

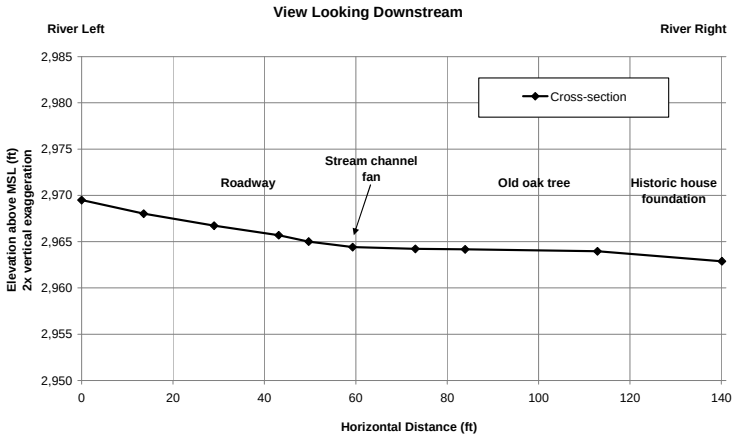


Figure C-16. Cross-sections upstream of the upper-most road crossing (a), upstream of the confluence with a natural ephemeral swale confluence and the proposed stream and ditch channel confluence (b), downstream of the proposed stream and ditch channel confluence (c), downstream of the lower-most road crossing (d), and across the fan of the stream channel at the upstream end of the southwestern meadow.

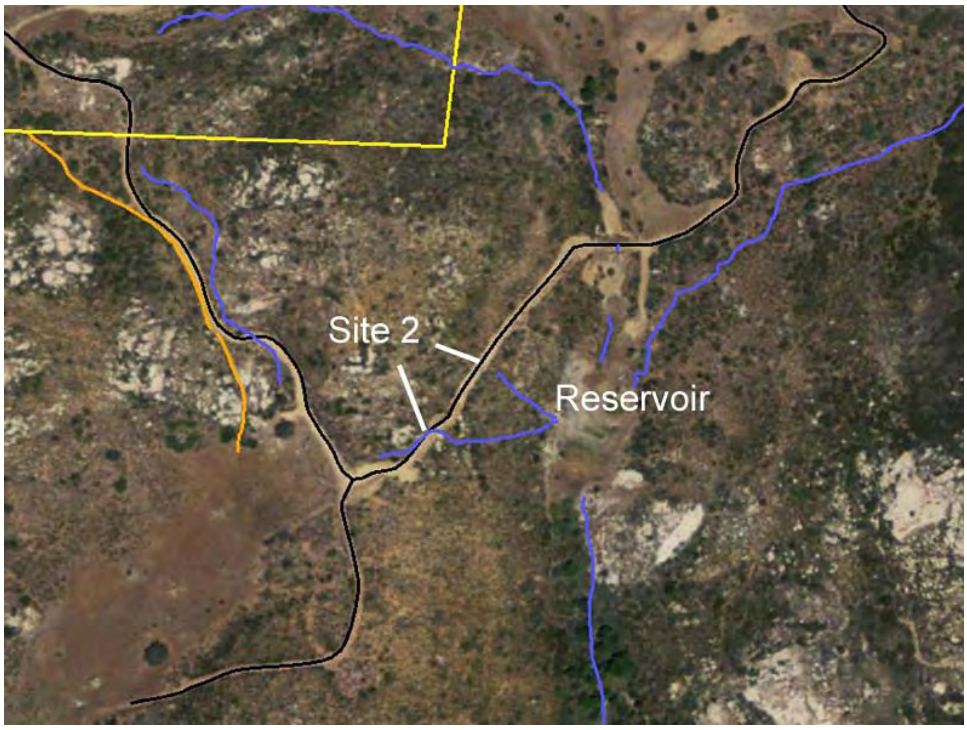


Figure C-17. View of existing road crossings at Site 2 along two ephemeral stream channels that drain eastward to the large reservoir (aerial photograph taken 25 May 2009, source: Google Earth, accessed 2010). Present day road alignment shown in black and streams shown in blue.

Figure C-18. View of existing road crossing (southwestern stream channel) at Site 2. Removal of road will re-connect the upstream and downstream reaches of this ephemeral stream channel.

Figure C-19. View of existing road crossing (northeastern stream channel) at Site 2. Removal of road will extend the ephemeral stream slightly farther up-gradient.

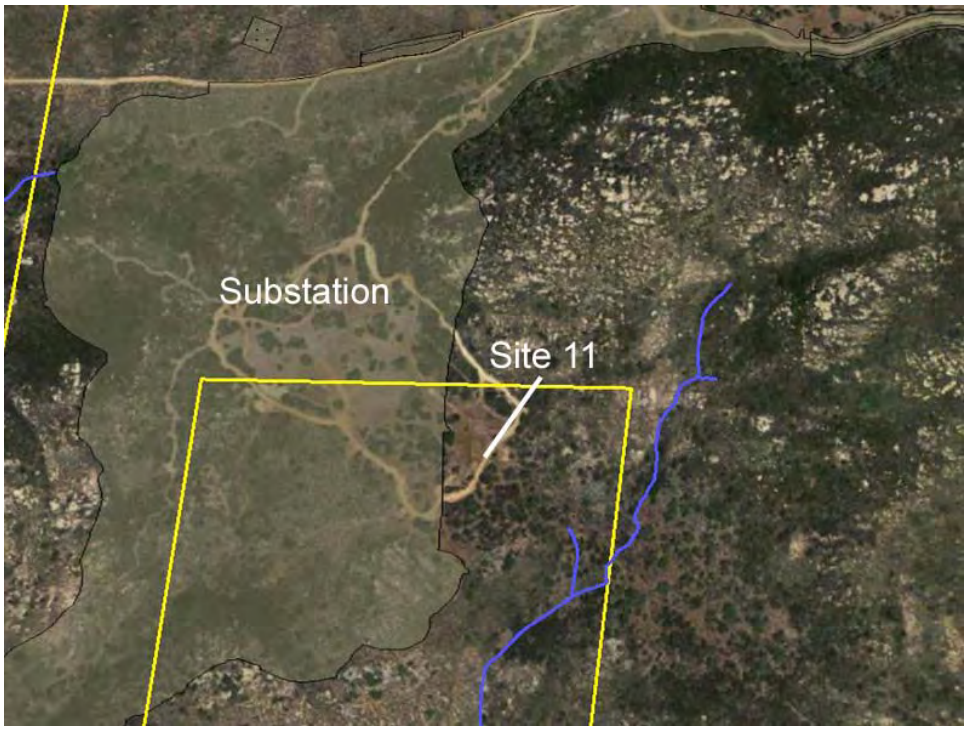


Figure C-20. View of existing road crossing at Site 11 above an ephemeral stream channel and situated on the east-side of the substation (aerial photograph taken 25 May 2009, source: Google Earth, accessed 2010). Present day road-loop alignment seen in the aerial photograph and streams shown in blue. Flow direction is to the southeast from the Site 11.

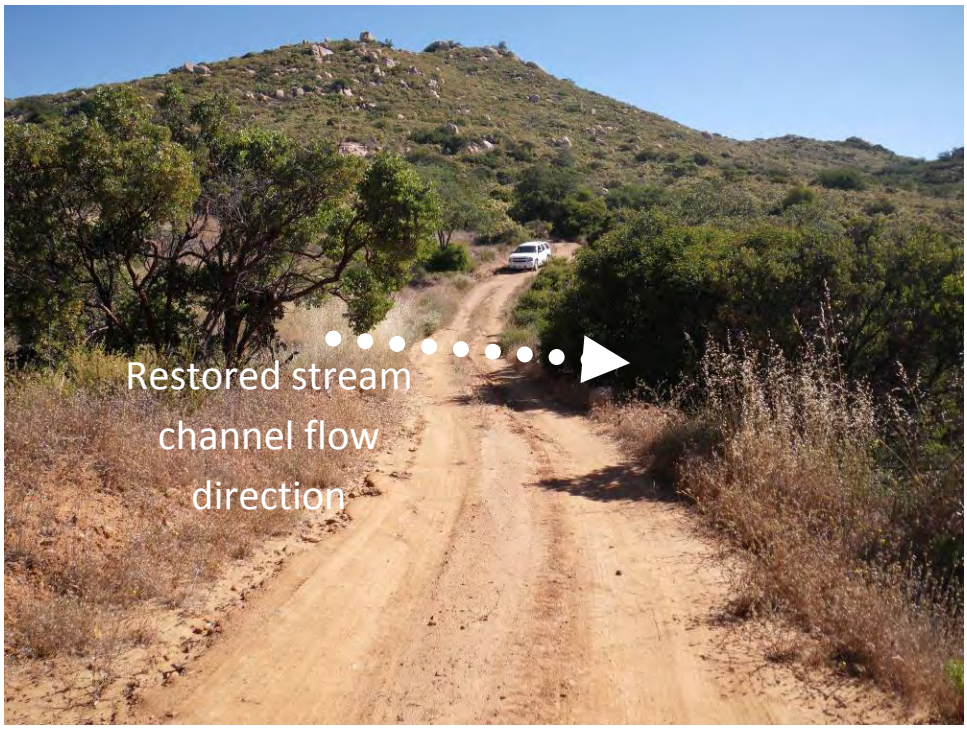


Figure C-21. View of existing road crossing at Site 11. Removal of road will re-connect the upstream and downstream reaches of this ephemeral stream channel, in addition to re-focusing the headwater drainage to the stream channel.

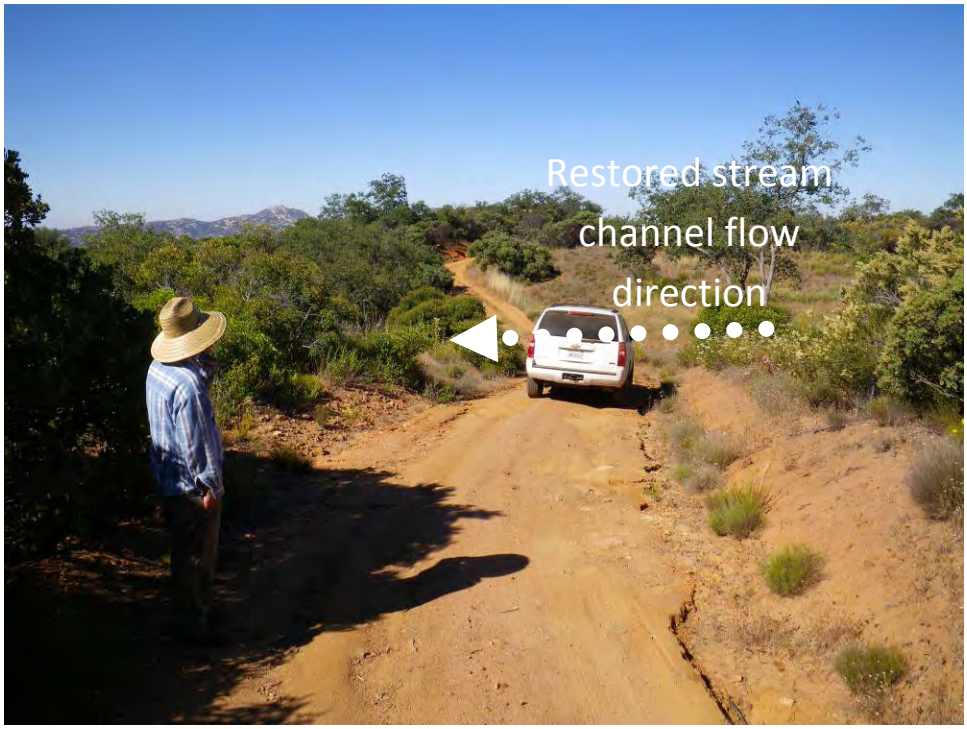


Figure C-22. View of same road crossing shown in Figure 23 at Site 11. Road cut areas will be filled to restore the natural topography surrounding the stream channel valley.

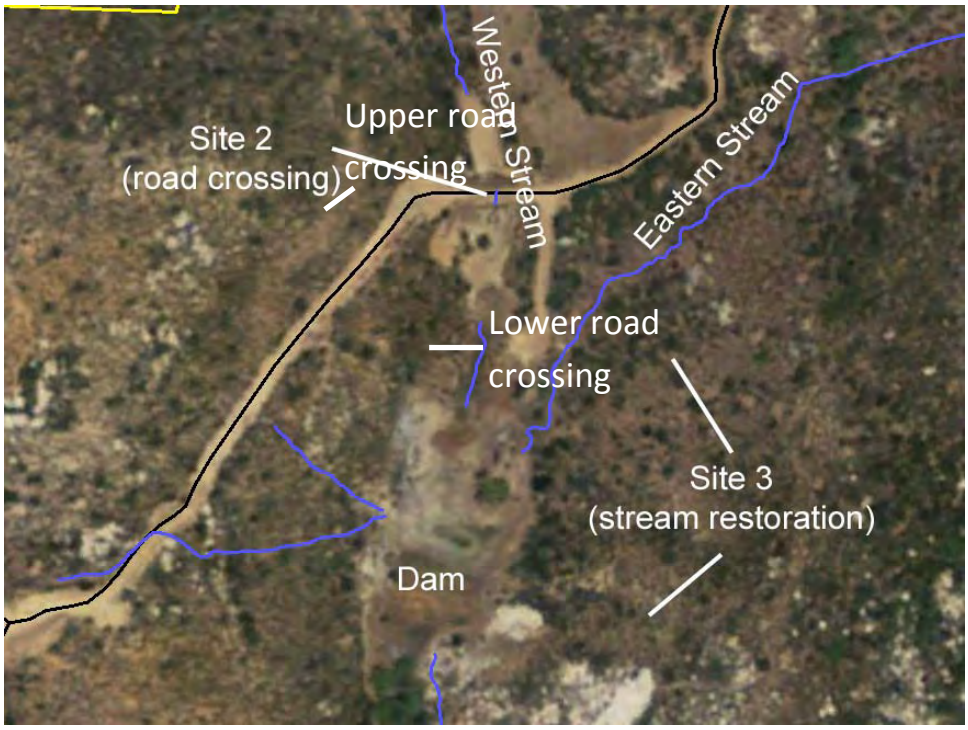


Figure C-23. View of the large reservoir, dam, road crossing, and northwestern and northeastern stream channels at Sites 2 and 3 (aerial photograph taken 25 May 2009, source: Google Earth, accessed 2010). Present day road alignment shown in black and streams shown in blue.

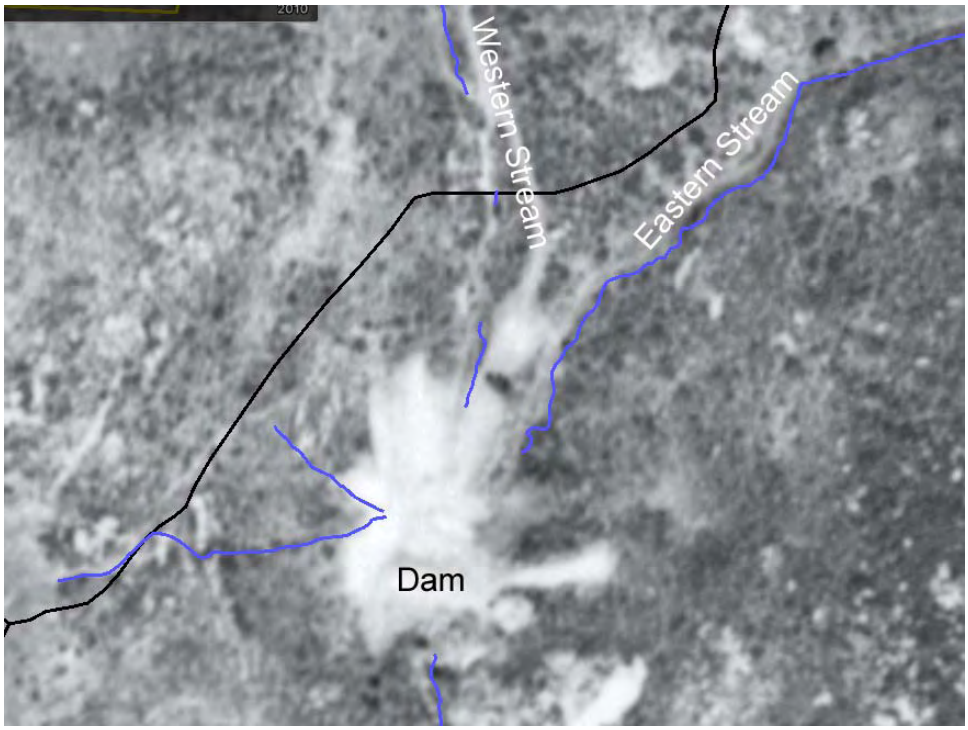


Figure C-24. View of historic road, stream, and dam alignment at Sites 2 and 3 (aerial photograph taken 2 Apr 1953). Present day road alignment shown in black and streams shown in blue. Note the roadway to the west and the road crossing were not present (constructed 2002-2003).

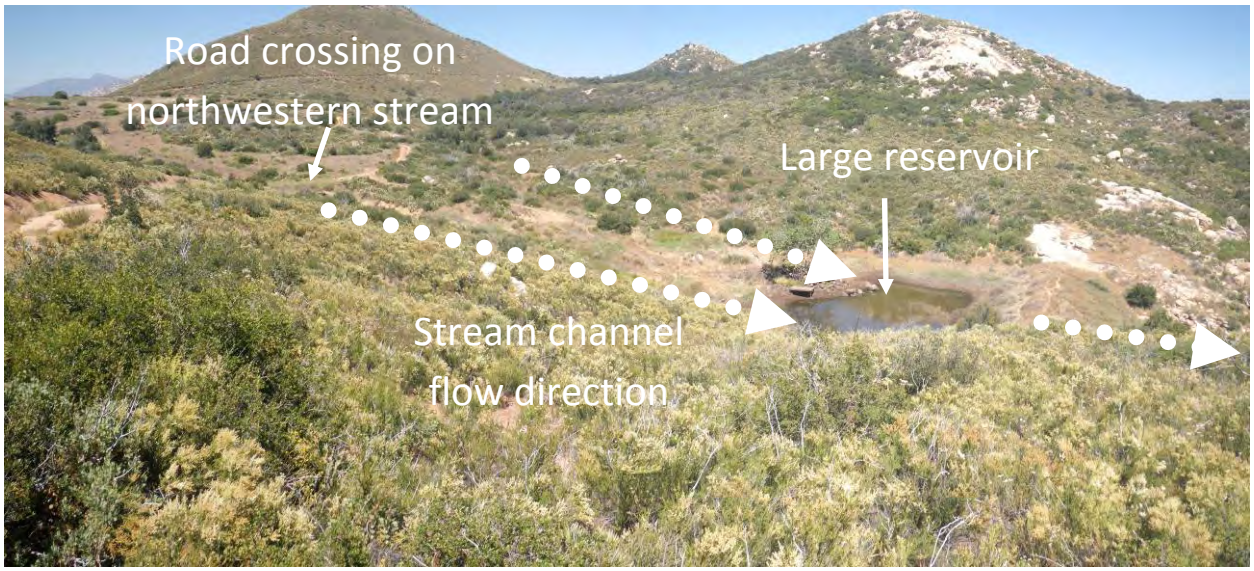
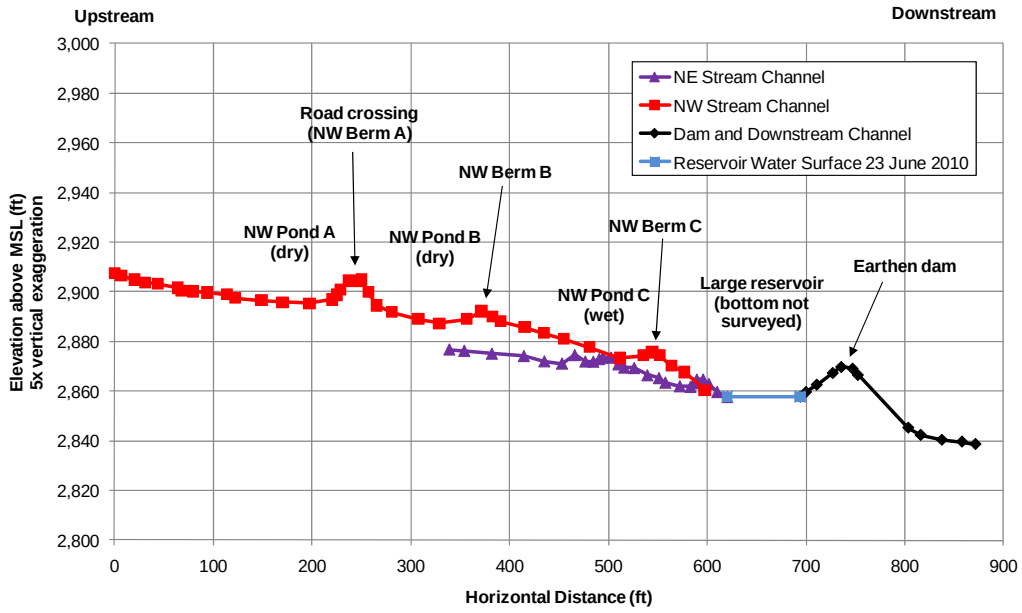


Figure C-25. Eastward view of the large reservoir, dam, road crossing, and northwestern and northeastern stream channels at Sites 2 and 3. Removal of road crossing and pond storage berms and lowering of the large reservoir dam will enhance hydrologic connectivity from the headwaters to the downstream of the large reservoir.

Figure C-26. View of road crossing over the northwestern stream channel with dry ponds (NW Ponds A and B) on the upstream and downstream sides at Site 2.

a)



b)

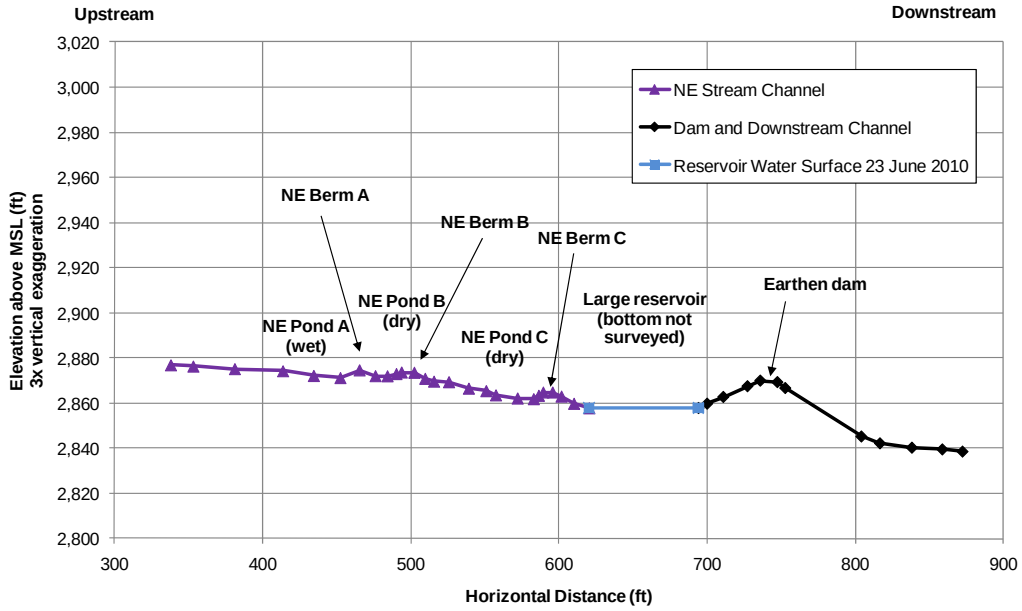
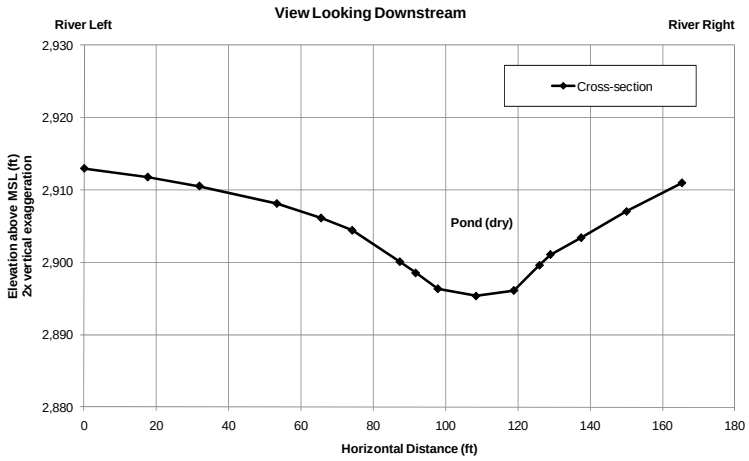


Figure C-27. Longitudinal profile along two intermittent stream channels that drain into the large reservoir at Site 3, with flow moving downstream from left to right (a). The longitudinal profile along the northeastern stream channel is shown as reference in (a) and alone in (b).

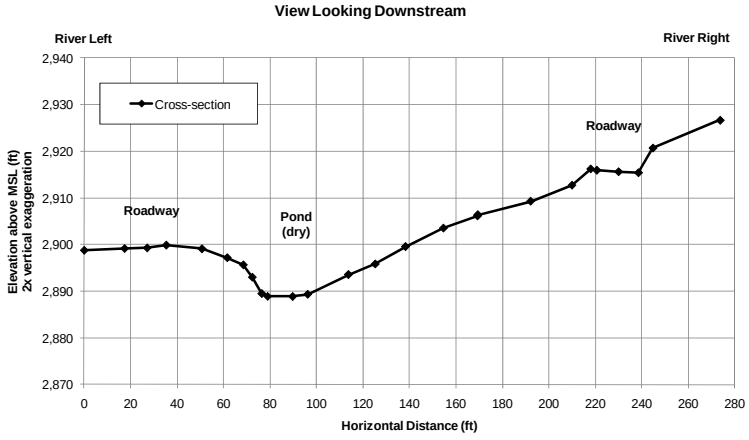
a)


View Looking Downstream
River Left
River Right
Cross-section
Stream channel thalweg
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,925
2,920
2,915
2,910
2,905
2,900
2,895
2,890
0
20
40
60
80
100
120
140

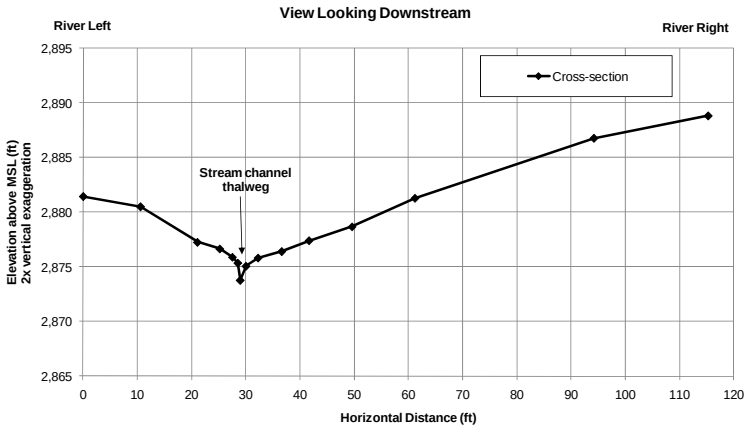
b)


View Looking Downstream
River Left
River Right
Cross-section
Pond (dry)
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,930
2,920
2,910
2,900
2,890
2,880
0
20
40
60
80
100
120
140
160
180

c)


View Looking Downstream
River Left
River Right
Cross-section
Roadway
Roadway
Pond (dry)
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,940
2,930
2,920
2,910
2,900
2,890
2,880
2,870
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280

d)



e)

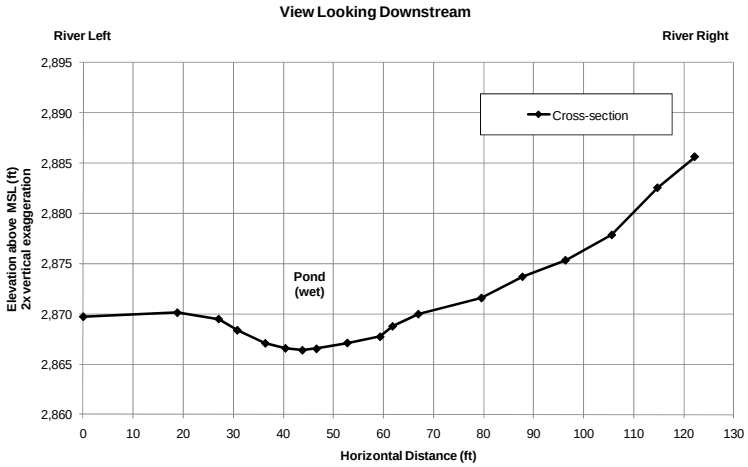
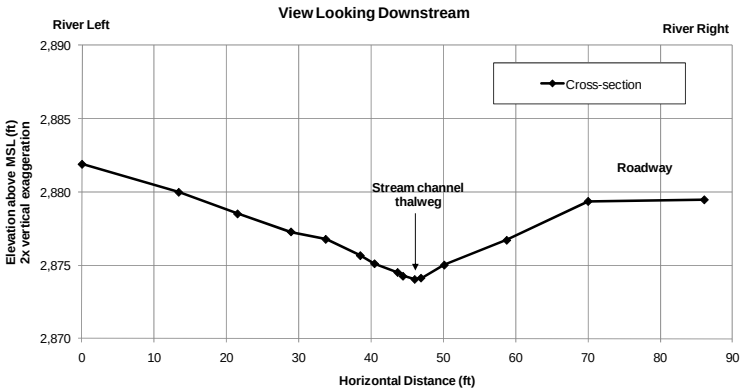
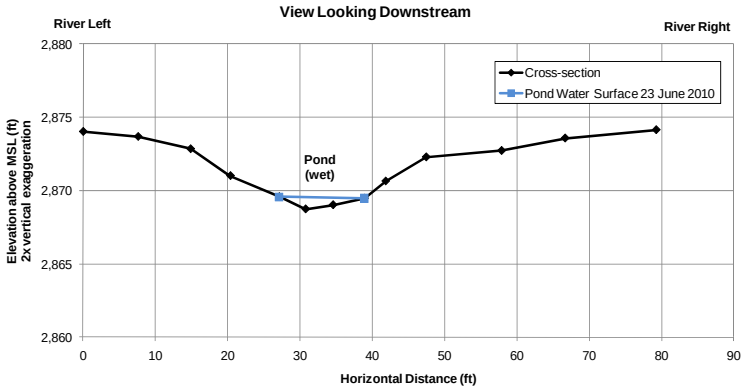


Figure C-28. Cross-sections along the northwestern stream channel above the large reservoir. The cross-sections span the natural stream channel above NW Pond A (a), the NW Pond A above the road crossing (b), the NW Pond B below the road crossing (c), the stream channel between NW Pond B and NW Pond C (d), and the NW Pond C above the large reservoir (e).

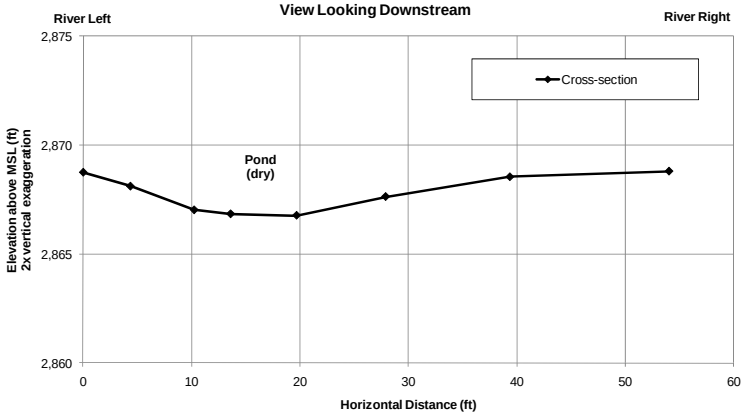
a)


View Looking Downstream
River Left
River Right
Cross-section
Roadway
Stream channel thalweg
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,890
2,885
2,880
2,875
2,870
0
10
20
30
40
50
60
70
80
90

b)


View Looking Downstream
River Left
River Right
Cross-section
Pond Water Surface 23 June 2010
Pond (wet)
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,880
2,875
2,870
2,865
2,860
0
10
20
30
40
50
60
70
80
90

c)


View Looking Downstream
River Left
River Right
Cross-section
Pond (dry)
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,875
2,870
2,865
2,860
0
10
20
30
40
50
60

d)

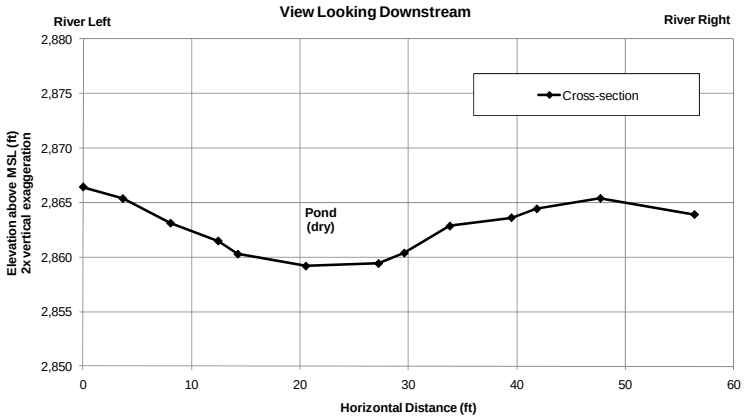

View Looking Downstream
River Left
River Right
Cross-section
Pond (dry)
Elevation above MSL (ft) 2x vertical exaggeration
Horizontal Distance (ft)
2,880
2,875
2,870
2,865
2,860
2,855
2,850
0
10
20
30
40
50
60

Figure C-29. Cross-sections along the northeastern stream channel above the large reservoir. The cross-sections span the natural stream channel above NE Pond A (a), the NE Pond A (b), the NE Pond B (c), and the NE Pond C above the large reservoir (d).

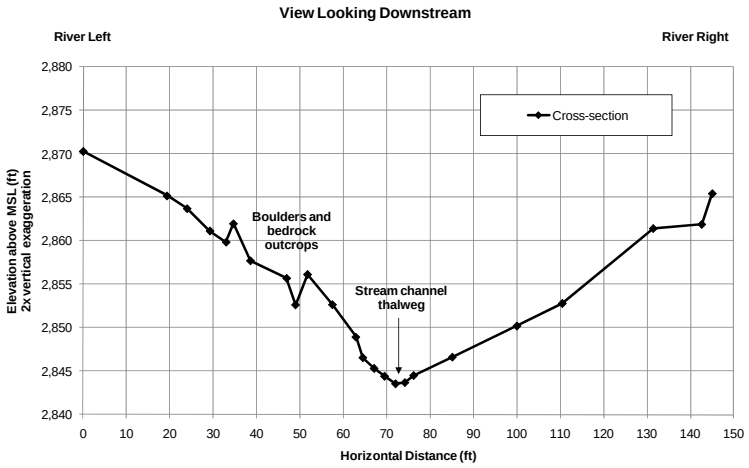


Figure C-30. Cross-section of the stream channel downstream of the large reservoir dam. Boulders and bedrock outcrops are present on the river-left upland slopes and the dam spillway is present in the notch near the top of the river-right upland slope.

Figure C-31. View of existing road crossings at Site 7 along the Tower Access Road above ephemeral stream channels (aerial photograph taken 25 May 2009, source: Google Earth, accessed 2010).

Figure C-32. View of road crossing at the eastern ephemeral stream channel at Site 7. A small dry pond area is present upstream of the crossing (left side of photo).

Figure C-33. View of road crossing at the western ephemeral stream channel at Site 7. A small dry pond area is present upstream of the crossing (left side of photo) and a boulder-control drop is present on the downstream side.

Appendix D. Description of Stream Management in the Suncrest Substation Area

This Page Left Intentionally Blank

Assessment of Suncrest Substation and Integration with Downstream Mitigation by Stillwater Sciences

An important component in developing a comprehensive and sustainable restoration design for the project mitigation site is understanding the impact of the Suncrest Substation on run-off dynamics. As with all watershed development projects, the increased area of compacted soil or imperviousness associated with the substation has the potential to increase the magnitude of storm-induced peak flows in the channels downstream and increase the rate at which flows peak and subside, also called flow 'flashiness.' In addition to flow routing effects, site development may also disrupt coarse sediment (i.e., sand and larger) delivery dynamics by stabilizing or otherwise trapping sediment that would have been transported downstream. This impact can cause downstream channel instability and is particularly pronounced where the undisturbed channel is in balance with relatively high sediment delivery rates, such as in many Southern California watersheds. As these site development impacts can limit downstream restoration options, we examined the plan to mitigate the hydrologic impacts of the Suncrest Substation with knowledge of site geologic and geomorphic conditions from the perspectives of both flow and sediment-delivery impacts.

The Suncrest Substation will have a footprint of approximately 100 acres and will be built on top of a headwater drainage network within the Sweetwater River watershed. To capture surface flow coming into and leaving the substation footprint, the Suncrest Substation Drainage Design Plan (SSDDP) calls for the installation of three detention basins located around the perimeter of the site. The southwest and southeast detention basins (detention basins #2 and #3, respectively) are positioned to control runoff entering small headwater catchments downstream of the Substation. The northwest detention basin (detention basin #1) is at the downstream end of the footprint and will control runoff from the site before it enters the small 1st-order, intermittent stream channel that drains to the small stock pond. According to the SSDDP, the detention basins were designed under the guidelines of the 2005 County of San Diego Drainage Design Manual, the 2009 Interim Hydromodification Management Criteria (IHMC) specified by the San Diego Municipal Permit for developed areas greater than 50 acres, and the 2010 County of San Diego Standard Urban Mitigation Plan Manual (SUMPM). Implementing these guidelines, detention basin design configurations and drainage outlet sizes will result in the following:

- no increase in 100-year storm peak flow rate over pre-developed conditions;
- detention basins that drain within 72 hours following the 100-year storm peak flow;
- post-developed flow rates and durations that do not exceed 10% of pre-developed values for flows between 20% of the pre-developed 5-year storm and the pre-developed 10-year storm; and
- the capture of sediment within storm water runoff from onsite and offsite tributary areas prior to entry into the detention basins.

However, we have not reviewed any of the hydrologic or engineering calculations for these ponds, so our review is restricted to an assessment of any potential downstream impacts under the assumption that these design standards are met.

Review of the detention basin design and desired function in the context of the watershed hydrologic and geomorphic processes suggests that the basins will not act to disrupt downstream channel stability in a substantial manner and should not impede downstream stream restoration actions. With respect to peak-flow effects, the combined requirements that the basin be able to handle flows that are 20% of the pre-developed 5-year storm and the 100-year storm suggest a minimal likelihood of impacts. Depending on detention basin configuration, peak-flow increases in downstream channels are theoretically possible for storms between a 10-year and 100-year recurrence. However, the difference in rainfall between these two recurrence intervals is relatively small and so reasonable peak-flow control is anticipated for the 10- to 100-year interval as well.

Flow durations are much more important when considering potential impacts to channels. We have reviewed documentation associated with the Interim Hydromodification Management Criteria, in which the County of San Diego has determined that flows generated by rainfall below the chosen threshold (20% of the 5-year storm) are very unlikely to result in channel erosion or significant sediment transport. Flow durations may increase above the provided level of control (10-year storm), but by definition such an event would have less than a 10% chance of occurring in any given year. Some degree of flow control is nonetheless likely to be provided by the control structures of the basins, even above this level. We do not have sufficient data to evaluate potential downstream consequences of any such extreme event, noting only that they lie outside the regulatory concern of San Diego County.

Detention basins, by the nature of their basic design, have the potential to create other impacts. Although such basins normally trap virtually all sediment generated upstream of and within their tributary area, field observations indicate that the coarse sediment production in the part of the watershed where the substation will be located is relatively low and the channels are already well-adjusted to a low coarse sediment yield. Therefore, potential sediment impacts from the Substation on downstream channel conditions also appear to be minimal.

A final caveat to our assessment is the unknown impact of detention basin outlets on localized erosion. Detention basins discharge flow at a single point, which does not always correspond to a pre-existing channel. It appears that detention basins #s 1 and 2 will discharge into existing channels, which should not result in channel erosion. However, the flow from detention basin #3 appears that it will be released directly onto a hillside before reaching the nearest channel, which could potentially cause the creation and downward erosion of an unstable outlet channel. Therefore, detention basin #3 may require an outlet structure to bypass discharge past any remaining portion of the hillside that is not removed during site grading.

Appendix E. Sunrise Powerlink Habitat Management Plan