DRAFT

HABITAT CONSERVATION PLAN

OPERATION, REPAIR, MAINTENANCE, AND REPLACEMENT OF STATE WATER PIPELINE FROM THE POLONIO PASS WATER TREATMENT PLANT TO LAKE CACHUMA, SAN LUIS OBISPO COUNTY AND SANTA BARBARA COUNTY, CALIFORNIA

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Prepared for

Central Coast Water Authority
255 Industrial Way
Buellton, CA 93427-9565

Prepared by

Science Applications International Corporation
5464 Carpinteria Avenue, Suite K
Carpinteria, CA 93013
and
Cardno
201 North Calle Cesar Chavez, Suite 203
Santa Barbara, CA 93103

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EXECUTIVE ABSTRACT

The Central Coast Water Authority (CCWA) has applied for an Incidental Take Permit, pursuant to section 10(a)(1)(B) of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (Act), from the U.S. Fish and Wildlife Service (Service) for the incidental take of three listed animal species (San Joaquin kit fox, California red-legged frog, and California tiger salamander). In addition, two federally-listed bird species (southwestern willow flycatcher and least Bell's vireo), two federally-listed fish (unarmored threespine stickleback and tidewater goby), and one federally-listed amphibian (arroyo toad), are proposed for inclusion on the permit with no authorization of take because implementing avoidance measures in the Habitat Conservation Plan (HCP) would prevent take. Take of federally-listed plant species is not prohibited under the Act and, therefore, cannot be authorized pursuant to section 10. The federally-listed Chorro Creek bog thistle, Gambel's watercress, Pismo clarkia, and La Graciosa thistle are proposed for inclusion on the permit in recognition of the conservation benefits provided for them in the HCP. The state-listed Swainson's hawk and plant species, seaside bird's-beak, are also proposed for inclusion on the permit should they become listed under the Act during the life of the permit. Hereafter, these species are referred to collectively as 'covered species'.

The proposed incidental taking would occur within the Coastal Branch, Phase II and the Mission Hills/Santa Ynez Extension pipeline permanent easement and at associated facilities (e.g., Polonio Pass Water Treatment Plant, three tank sites, the Santa Ynez Pump Station, and various valves and turnouts), adjacent areas within 300 feet of the permanent pipeline easement, the off-site mitigation areas owned by the state Department of Water Resources (DWR), and downstream/downslope of facility sites for a distance of 2,000 feet and a width of 20 feet (based on the assumption that turbulence and turbidity/sedimentation from planned discharges or repair work in streams would not extend beyond that distance based on observations during construction and operations) in San Luis Obispo and Santa Barbara counties, California. In support of the application, CCWA proposes to implement the following HCP to meet the requirements of law for a section 10(a)(1)(B) permit.

The HCP delineates the responsibilities of CCWA and the Service and is intended to enable the state water pipeline facilities within San Luis Obispo and Santa Barbara counties to be maintained, operated, repaired, replaced, and reconstructed (operations and maintenance) in such a way as to result in conservation of the species covered in the HCP and their habitat within the boundaries of the HCP. CCWA will avoid take of covered species and disturbance to their habitat to the extent feasible during operation and maintenance of the project. Where take of covered species and impacts to their habitat are not avoidable, measures to minimize the amount of take and habitat disturbance and to restore the habitat to pre-disturbance or better conditions will be implemented. These measures include:

- Check access road maps and environmental databases to identify covered species locations prior to activities that could disturb animals, vegetation, or soils.
- Survey project areas where covered species could be present prior to the work using qualified biologists (having expertise in the species covered by this HCP and approved or permitted by the Service).

- Isolation of the work space (including access, stockpiles, staging, and stream diversions) and relocation of covered species with authorized take to suitable habitat outside the work area.
- Scheduling of maintenance activities to avoid spawning, migration, breeding, or nesting seasons of covered species and breeding of migratory birds.
- Providing environmental training for all operations and maintenance personnel at least annually and for any contractors working in or near covered species habitat immediately before the work occurs.
- Monitoring by qualified biologists during activities in or adjacent to covered species habitat.
- Salvage and replacement of topsoil whenever excavation is necessary in a natural plant community.
- Revegetation of the disturbed area with the plant community present (including native species as appropriate for the site) prior to the disturbance.
- Installation of erosion and sediment control measures for all soil-disturbing activities.
- Use existing roads and tracks, where available, and specific access routes that have been developed for the project for access to project facilities. No new road construction is planned. Any new routes needed to access repair sites or due to changes in land use will be developed in consultation with a biologist to avoid take of covered species and appropriate permits will be obtained.
- Posting signs in blowoff and dewater vaults adjacent to California red-legged frog and other covered species known or potential habitat stating "CAUTION: Releases from this vault may impact endangered species. Contact your supervisor before opening valve".
- Control of vegetation around vaults and in access tracks by mechanical methods.
- Maintain a list of qualified biologists that are either approved by the Service or have the appropriate permits to survey for and handle the covered species.
- Operation of the Polonio Pass Water Treatment Plant sludge lagoons to minimize potential for take of California red-legged frogs and California tiger salamanders.
- Maintain on site all necessary equipment to implement measures for avoiding and minimizing take.

Measures to mitigate unavoidable take of covered species or temporary/permanent impacts to their habitat include:

- Restoration of affected habitat to pre-disturbance or better conditions.
- Purchase of 3 credits at $2,500 per credit in the California Department of Fish and Wildlife Palo Prieto Mitigation Bank for preservation and management of California red-legged frog habitat.
- Purchase of 3 credits at $2,500 per credit in the California Department of Fish and Wildlife Palo Prieto Mitigation Bank for preservation and management of California tiger salamander habitat plus an additional credit at $35,000 in the La Purisima Conservation Bank for state-listed California tiger salamander.

The HCP is designed to minimize take of three federally-listed animal species and their habitat and to further the conservation of these species. It also provides mitigation for unavoidable take. No take of other covered species present or potentially present within the HCP boundaries is anticipated due to implementation of avoidance measures. The HCP defines measures to ensure that the elements of the HCP are implemented in a timely manner. The HCP also discusses the possibility of changed circumstances and unforeseen events occurring, and proposes actions to address such contingencies. Funding for the HCP, alternatives to the proposed operation and maintenance of the state water pipeline, and other measures required by CCWA and the Service are discussed. A listing of the known locations for covered species in the project area, and other pertinent supporting documents, are included in the appendices.

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DEFINITION OF TERMS

AGL	Above ground level
CCWA	Central Coast Water Authority
CDFG	California Department of Fish and Game (prior to 2013)
CDFW	California Department of Fish and Wildlife (after January 2013)
cfs	Cubic feet per second
Covered species	Species that are federally-listed as threatened or endangered for which incidental take is being requested in this HCP and species that are state- or federally-listed as threatened or endangered for which incidental take is not being requested due to implementation of avoidance measures
CNDDB	California Natural Diversity Data Base
DWR	Department of Water Resources (California)
Emergency	Event requiring immediate CCWA action to prevent or repair damage to project facilities and/or to prevent or minimize take of covered species
Feasible	Feasibility is based on a number of factors that include technical (e.g., can be accomplished with readily available equipment or technology), environmental (e.g., will not adversely affect habitat or individuals of other covered species), economic (e.g., can be accomplished for a reasonable cost), and safety (i.e., will not cause loss or damage to private property or threat to human well-being)
gpm	Gallons per minute
HCP	Habitat Conservation Plan
IA	Implementing Agreement
Monitor	Duties include: inspect work sites to verify that all minimization and avoidance measures are implemented for protection of covered species; train workers about covered species; halt or redirect work to prevent take of covered species; relocate covered species out of work area; monitor restoration sites until performance criteria are met
MG	Million gallons
NMFS	National Marine Fisheries Service (NOAA Fisheries)
O&M	Operation, repair, replacement, and maintenance of the project facilities by CCWA
Permanent Impact	Permanent loss of habitat and where habitat (usually vegetation) restoration is not complete in 5 years
ppm	Parts per million
Project	Operation and maintenance of pipeline and appurtenant facilities, from Tank 1 and the Polonio Pass Water Treatment Plant to Lake Cachuma, to deliver State Water Project water to participants in San Luis Obispo and Santa Barbara counties
Qualified Biologist	Person with demonstrable survey and handling experience for those species covered in the HCP and who has been approved by the Service and CDFW, or has in possession (or has the ability to secure) a section 10(a)(1)(A) permit to

	work with these species
Species of Special Concern	State designation for species not listed as endangered, threatened, or candidate for such listing for use in tracking status
SWP	State Water Project
Take	To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct
Temporary Impact	Impact of short duration, where habitat (usually vegetation) recovery occurs in less than 5 years and streambed impacts that last less than 2 years
USFWS	U.S. Fish and Wildlife Service, also the Service

1.0 INTRODUCTION

The purpose of this Habitat Conservation Plan (HCP) is to satisfy the requirements of obtaining an Individual Incidental Take Permit under section 10(a)(1)(B) of the Endangered Species Act. The HCP addresses the potential impacts to, and measures to avoid or offset such impacts to, the following species (hereafter referred to collectively as 'covered species') or their habitat during operation and maintenance (O&M) of the State Water Project (SWP) from Tank 1 (raw water tanks) and the co-located Polonio Pass Water Treatment Plant in San Luis Obispo County to Lake Cachuma in Santa Barbara County:

Common Name	***Scientific Name***
San Joaquin kit fox	*Vulpes macrotis mutica*
California red-legged frog	*Rana (aurora) draytonii*
California tiger salamander	*Ambystoma californiense*
Southwestern willow flycatcher	*Empidonax traillii extimus*
Least Bell's vireo	*Vireo bellii pusillus*
Unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*
Tidewater goby	*Eucyclogobius newberryi*
Arroyo toad	*Anaxyrus (Bufo) californicus*
Chorro Creek bog thistle	*Cirsium fontinale* var. *obispoense*
Gambel's watercress	*Rorippa gambellii*
Pismo clarkia	*Clarkia speciosa* ssp. *immaculata*
La Graciosa thistle	*Cirsium loncholepis*
Swainson's hawk	*Buteo swainsoni*
Seaside bird's-beak	*Cordylanthus rigidus* ssp. *littoralis*

Incidental take of San Joaquin kit fox, California red-legged frog, and California tiger salamander could occur even with implementation of avoidance and minimization measures that are part of this HCP, and mitigation for this take is provided. No take of the other covered species is anticipated due to implementation of avoidance measures in the HCP.

The life of the SWP facilities covered in this HCP is estimated to be 75 to 100 years. The term of the permit is for a period of 30 years, although the permit can be renewed following the procedures described in Section 6.3.3. This HCP is being prepared because activities attributed to the Central Coast Water Authority's (CCWA's) operation and maintenance of the SWP pipeline and appurtenant facilities may cause incidental take of federally-listed species, and because:

- The U.S. Army Corps of Engineers (Corps), who will be issuing permits for certain O&M activities, does not have jurisdiction over all O&M activities that have the potential to result in take of listed species;
- The first Biological Opinion issued by the U.S. Fish and Wildlife Service (Service) for the project in 1993 (prior to construction) covered seven listed animal species (blunt-nosed leopard lizard, San Joaquin kit fox, giant kangaroo rat, peregrine falcon, bald eagle, unarmored threespine stickleback, and least Bell's vireo) and two listed plant species (California jewelflower and Hoover's woolly-star). Incidental take was authorized by the Service for the animal species during construction as well as for six of these species

(excluding least Bell's vireo) during O&M. The second Biological Opinion issued by the Service for the project in 1996 (during construction) only covered one species, California red-legged frog, that had become listed during project construction and authorized take for that species just during construction. Construction is now complete, and take parameters need to be established for O&M activities;

- California tiger salamander and southwestern willow flycatcher have been listed since the construction Biological Opinions were issued and are known to occur within the area covered by this HCP; and

- Two of the off-site mitigation areas developed for construction impacts have covered species present or potentially present (Arroyo Grande and Cuesta Tunnel North Portal), and access to or management activities at these sites during project O&M could result in take of covered species.

Take from accidents caused by natural disasters and negligence by others that require repairs of project facilities in covered species habitat is covered in this HCP as is take from accidents resulting from project activities. Accidents and negligence by others that does not require repairs of project facilities in covered species habitat are not covered in the HCP. Potential impacts of covered and non-covered accidents are discussed for each species as applicable. How CCWA will respond to accidents that could affect covered species is discussed in Section 6 (under changed and unforeseen circumstances). Take from use of pesticides, rodenticides, and other chemicals is also not covered by this HCP, nor is the act of taking, moving, or delivering water covered. This HCP incorporates those portions of the construction Biological Opinions that are still relevant to project operation and maintenance and supersedes these opinions.

1.1 BACKGROUND AND SITE DESCRIPTION

The SWP was designed and built in the 1960s by the Department of Water Resources (DWR) to capture runoff from the Sierra Nevada mountain range and distribute it to major portions of the state through a system of aqueducts, pipelines, and reservoirs. The Coastal Branch, Phase II is a component of the SWP, which delivers water to San Luis Obispo County and Santa Barbara County participants. It extends from Devils Den in Kern County to the south side of the Santa Maria River. The Mission Hills I Extension continues this pipeline to Tank 5 on Vandenberg Air Force Base (VAFB) in Santa Barbara County (Figure 1-1). The Coastal Branch, Phase II includes a water treatment plant in San Luis Obispo County known as the Polonio Pass Water Treatment Plant (co-located with Tank 1). Project participants receive water from the Coastal Branch, Phase II via DWR and locally constructed pipelines and facilities constructed specifically for delivery of SWP water as well as via existing facilities. The new pipeline facilities include the Chorro Valley, Guadalupe, Santa Maria, Missions Hills II/Santa Ynez I Extensions, Vandenberg Air Force Base, Buellton, and Santa Ynez pipelines. Existing pipeline facilities include the Santa Ynez River Water Conservation District, Improvement District #1 pipeline (Santa Ynez Extension II); South Coast Conduit; and reservoirs such as Lake Cachuma, Lauro, and Sheffield.

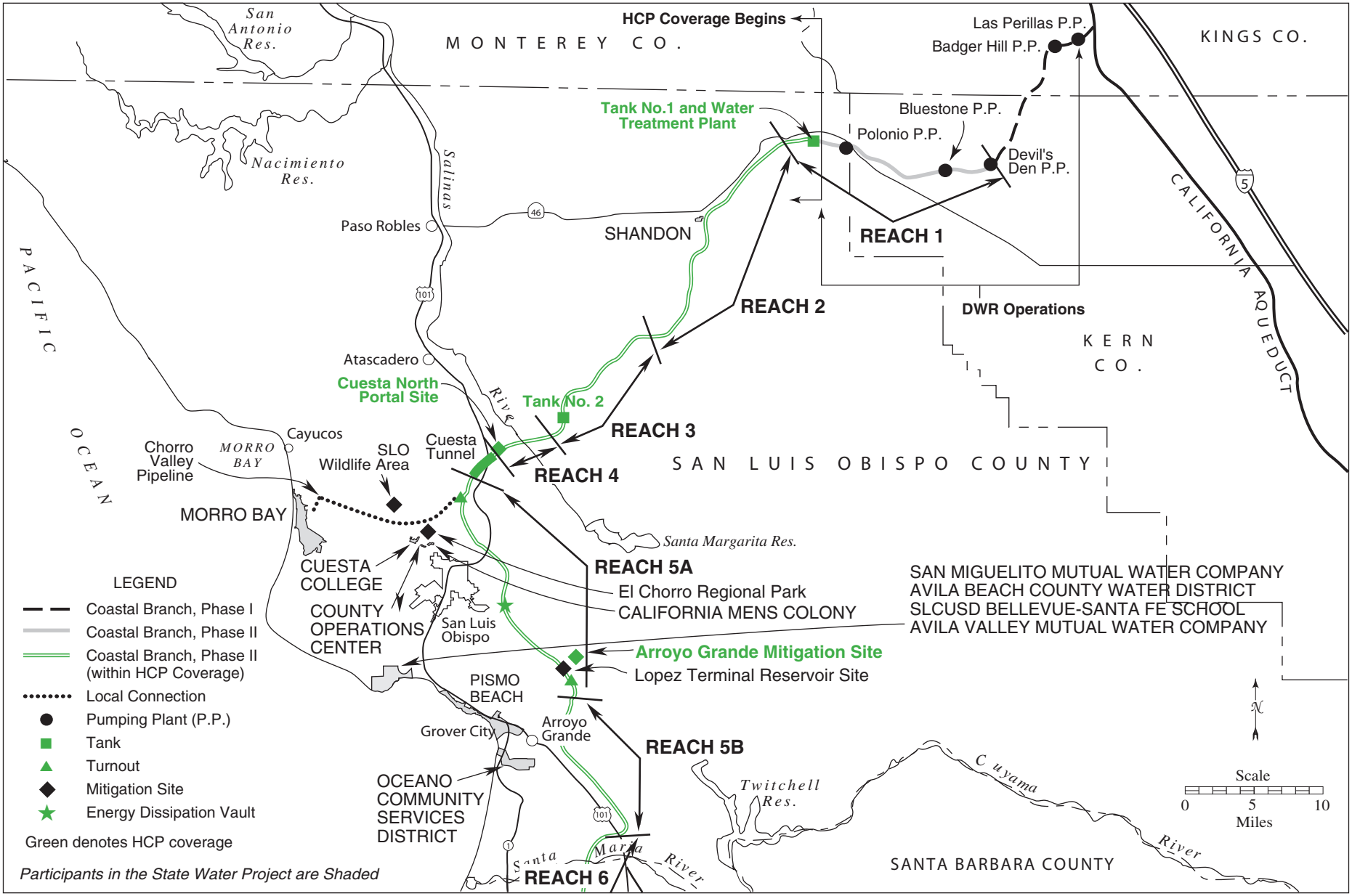

Figure 1-1. Location Map for Project Facilities and Mitigation Sites (Page 1)

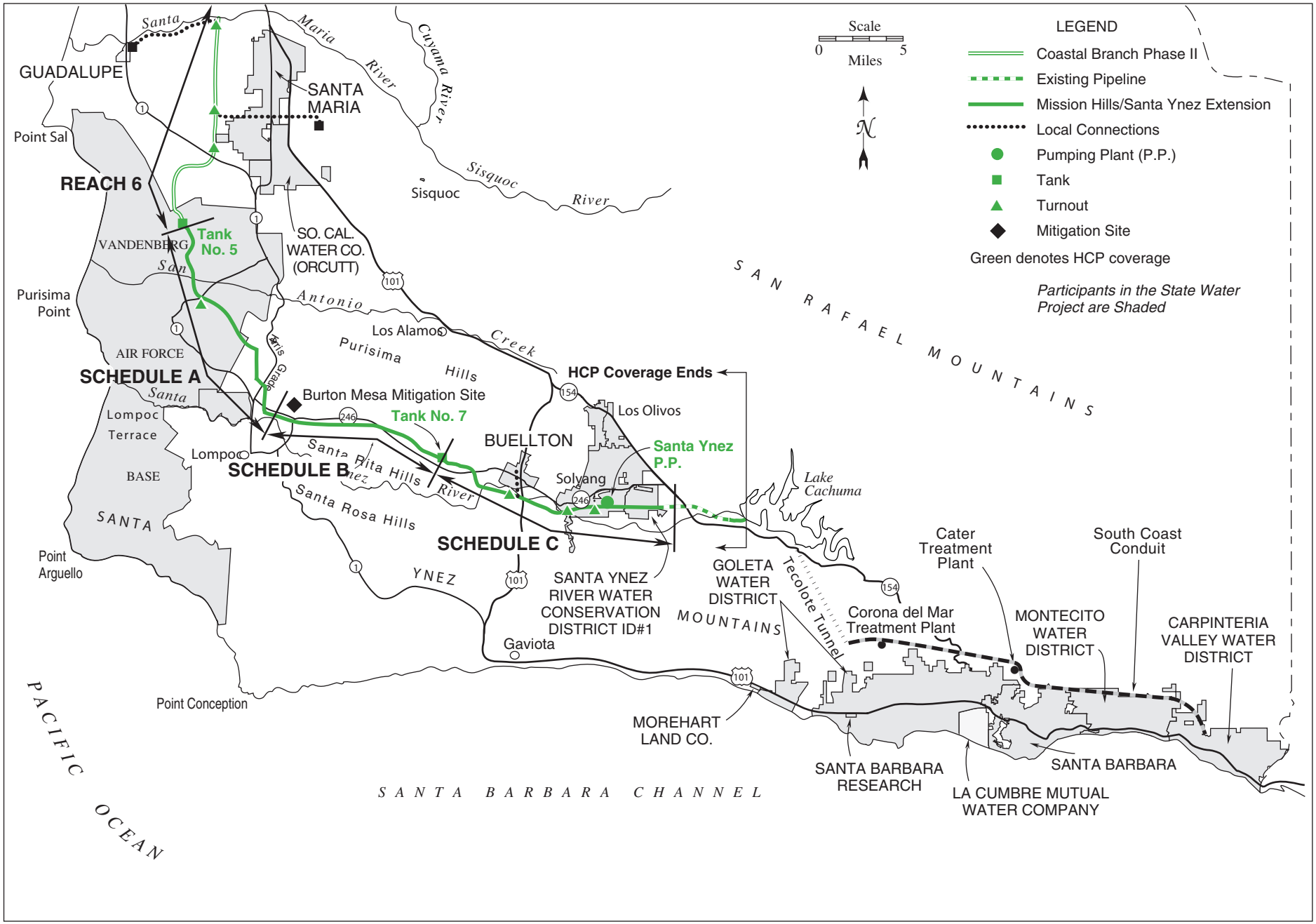

Figure 1-1. Location Map for Project Facilities and Mitigation Sites (Page 2)

The treated water portion of the Coastal Branch, Phase II and Mission Hills/Santa Ynez Extensions is the subject of this HCP, is operated by CCWA, and extends 131 miles from the Polonio Pass Water Treatment Plant to Lake Cachuma in Santa Barbara County (Figure 1-1). It includes:

- A buried pipeline (30 to 60 inches in diameter) within a permanent easement that is generally 60 to 100 feet wide but can be up to 300 feet wide or as narrow as 30 feet for short distances (30 to several hundred feet).
- Four storage tank sites: Tank 1 (includes DWR's raw water tanks, Polonio Pass Water Treatment Plant, and CCWA's treated water tanks) at approximately 120 acres, Tank 2 at 9 acres, Tank 5 at 5 acres, and Tank 7 at 5 acres.
- Permanent access roads with permanent easements of 40 to 60 feet wide.
- The Santa Ynez Pump Station covering 5 acres.
- Various appurtenant facilities within the pipeline easement (fiber optic cable, valve and turnout vaults, and cathodic protection).
- Additional lands at the Tank 2 site (approximately 143 acres) and at the North Portal of Cuesta Tunnel (approximately 60 acres) that contain no project facilities; and the Arroyo Grande Mitigation site (40 acres) just east of Biddle Park.

Based on pre-construction field surveys conducted by DWR and CCWA biologists in 1987-1995 and aerial photographs (1987 and 1992) the buried pipeline passes through a mosaic of plant communities including grassland (primarily non-native annual grasses), oak woodland and forest, chaparral, coastal sage scrub, riparian scrub and woodland, and wetlands (freshwater marshes) as well as agriculture, introduced forest (e.g., eucalyptus groves), and barren or disturbed areas (e.g., roads and landscaping). The pipeline also crosses numerous streams and rivers (approximately 245) in San Luis Obispo and Santa Barbara counties. Construction was initiated in 1994 and completed in 1997. After construction, the project area was revegetated using seed mixes and container plantings to restore the site to near pre-project conditions as required in project permits. The revegetation effort is being monitored (3 to 5 years, or longer if needed) to verify success and to identify and eliminate weed and erosion problems. A number of state- and federally-listed species of plants and animals as well as species of special concern are found in habitats crossed by the pipeline. Known and potential locations for covered species are identified in various sections of this HCP and are detailed in Appendix A.

On October 1, 1996 CCWA and DWR signed an Operations and Maintenance Agreement giving CCWA the responsibility to operate and maintain the treated water portion of the pipeline. This includes all pipeline appurtenances and right-of-way downstream of the Polonio Pass Water Treatment Plant. This HCP will, therefore, address that portion of the Coastal Branch, Phase II, and Mission Hills/Santa Ynez Extensions from the Polonio Pass Water Treatment Plant to Lake Cachuma.

1.2 HISTORY OF CONSERVATION PLANNING

Two Biological Opinions for federally listed species were obtained for project construction, one at the beginning of the project in 1993 (1-8-93-F-20) (USFWS 1993a) and the second when the California red-legged frog was listed in June 1996 (1-8-96-F-16) (USFWS 1996a). Specific

conditions for protection of species were included in these opinions, including measures for some species during O&M. These measures are included in sections 2.10 and 3. A state Biological Opinion (CDFG 1993a) with a Memorandum of Understanding (MOU) was issued to DWR for the Coastal Branch, Phase II, and a Management Authorization (CDFG 1993b) with an MOU was issued to CCWA. These documents included specific conditions for protection of species and mitigation measures for temporary and permanent impacts to species and habitats. The measures and conditions in these documents were used in developing this HCP for continued protection of covered species during project O&M.

On-site restoration of habitat and off-site mitigation for temporary and permanent impacts of construction to state/federally-listed species, species of special concern, and special concern habitats were also implemented as required by the California Department of Fish and Game (CDFW) and the Service. Off-site mitigation areas for construction impacts (see Figure 1-1 and Table 1-1) include (1) a 40-acre parcel near Arroyo Grande (Arroyo Grande Mitigation Site), (2) a 42-acre portion of the parcel owned by DWR at Tank 2, and (3) a 25-acre plot within the Burton Mesa Management Area (BMMA Site). In addition, the Big Sandy Wildlife Area and the San Luis Obispo Wildlife Area owned by CDFW, and El Chorro Regional Park and lands around Lopez Terminal Reservoir owned by the County of San Luis Obispo, are being used for oak tree mitigation. Two of these sites are described in Section 2.9 for take coverage. The Tank 2 site is part of the project and, therefore, within the HCP boundaries, but no covered species are known to be present at that site. The remainder of the sites is not within the HCP boundaries and is not covered by the HCP.

Table 1-1. Mitigation Areas for Construction Impacts Required by CDFW and the Service

Mitigation Site	*Owner*	*Size (acres)*	*Mitigation Action*	*Habitats/Species*
Arroyo Grande	DWR	40	Habitat restoration	Wetland, riparian, oak woodland; willow flycatcher, California red-legged frog, southwestern pond turtle
BMMA	State Lands Commission	25	Habitat restoration	Burton Mesa chaparral
Tank 2	DWR	42	Preservation and habitat restoration	Oak woodland
Big Sandy Wildlife Area	State (CDFW)	200+	Habitat restoration	Oak trees
Cuesta Tunnel, North Portal	DWR	13	Habitat restoration	Oak trees
San Luis Obispo Wildlife Area	State (CDFW)	10	Habitat restoration	Oak trees
El Chorro Regional Park	San Luis Obispo (SLO) County	5	Habitat restoration	Oak trees
Lopez Terminal Reservoir	SLO County	4	Habitat restoration	Oak trees

1.3 HCP BOUNDARIES

The boundaries of this HCP (also referred to as 'project area' on occasion) involve the facility sites [120-acre Tank 1/Polonio Pass Water Treatment Plant, 9-acre Tank 2 plus 143 acres

adjacent, energy dissipation vault (in permanent easement), 5-acre Tank 5, 5-acre Tank 7, and 5-acre Santa Ynez Pump Station] and permanent easements for access roads (40 to 60 feet wide) and the pipelines (30 to 300 feet wide but generally 60 to 100 feet) to deliver SWP water in San Luis Obispo and Santa Barbara counties that will be operated and maintained by CCWA from the Polonio Pass Water Treatment Plant to Lake Cachuma (Figure 1-1). It also includes adjacent areas within 300 feet of the permanent pipeline easement that could be affected during O&M activities as well as the off-site mitigation areas owned by DWR (i.e., 40-acre Arroyo Grande and 60-acre Cuesta Tunnel, North Portal) for the length of the permit. Work in streams and planned discharges of water could have adverse effects on aquatic or upland habitats, and covered species dependent on these habitats, downstream/downslope of facility sites. The linear distance over which such effects could occur is estimated to be 2,000 feet, or less, by assuming that turbulence and turbidity/sedimentation from planned discharges or repair work in streams would not extend beyond that distance based on observations during construction and operations. The width of the disturbance would generally be the width of the stream (for water discharges) plus the banks (for excavations), which could be up to about 200 feet. The excavations would be within the permanent easement plus the 300 feet on either side, while the stream width would average about 20 feet. The total area within the HCP boundaries is approximately 11,252 acres (see Table 1-2). The portion of the Coastal Branch, Phase II from Devils Den to Tank 1 (at the Polonio Pass Water Treatment Plant) is included in a separate HCP prepared by DWR. Thus, that portion of the pipeline and associated appurtenant facilities are not addressed in this HCP. Operation and maintenance of the local distribution lines connecting to the Coastal Branch, Phase II and Mission Hills/Santa Ynez Extensions are not CCWA's responsibility and are not included in this HCP.

Table 1-2. Area within HCP Boundaries

Location	*Calculation*	*Area (acres)*
Permanent easement (av. = 70 ft wide) + 300 ft on each side	(300 ft + 70 ft + 300 ft) (5280 ft/mi) (131mi)/(43560 ft^2/acre)	10,639
4 tank sites	120 (Tank 1) + 9 (Tank 2) + 5 (Tank 5) + 5 (Tank 7) acres	139
Santa Ynez Pump Station		5
Extra land at Tank 2 and Cuesta North Portal	143 + 60 acres	203
Access roads (permanent easements av. = 50 ft wide)	(50 ft) (25 mi) (5280 ft/mi)/(43560 ft^2/acre)	152
Arroyo Grande Mitigation Site		40
Stream crossings with blowoffs and potential for listed species	(2000 ft - 335 ft) (20 ft) (96 crossings)/(43560 ft^2/acre)	74
TOTAL		11,252

1.4 HCP GOAL AND OBJECTIVES

The goal of this HCP is to establish a program that will guide implementation of CCWA's O&M activities while simultaneously protecting or avoiding covered species and their habitat such that no adverse effects or an overall net positive benefit to covered species occurs within the area covered by this HCP. To this end, the objectives of this HCP are to:

1. Specify protocols for field workers (i.e., maintenance people and monitoring biologists) to follow while implementing O&M activities,

2. Establish procedures for avoiding or minimizing impacts to covered species and their habitat,
3. Define a process for measuring the quantity and quality of covered species' habitat that is affected by O&M activities,
4. Outline the mitigation program that will be implemented to offset impacts of O&M activities on covered species and their habitat,
5. Define procedures for measuring habitat restoration after project O&M activities, and
6. Define a program that will track performance of the conservation program, respond to new information or changing conditions, and detect and reconcile deficiencies or problems in a timely manner.

The goal and objectives of this HCP form the basis of the overall conservation program.

2.0 PROJECT DESCRIPTION

The project for this HCP is operation and maintenance of SWP facilities from Tank 1 to Lake Cachuma. These facilities comprise a 43-million-gallon-per-day water treatment plant and a potable water pipeline, with appurtenant facilities, that is buried except for several short segments such as at the San Andreas Fault, Arroyo Grande Creek, Los Berros Creek, and the Santa Ynez River crossing at the Alisal Road Bridge. The appurtenant facilities include air release (AR) valves, air vacuum and air release (AVAR) valves, blowoff and dewater valves, manways, cathodic protection system with above ground test and rectifier stations, a buried fiber optic communication system, four storage tank sites, five valve facilities, nine turnout facilities, and one pump station. Most of the AR, AVAR, and blowoff/dewater valves are located in concrete vaults that extend above ground for access. Most of the blowoff valves and manways south of Arroyo Grande, however, are buried. The above ground structures must be accessed on a regular basis during operation of the pipeline for testing and maintenance. The fiber optic cable and splice boxes are buried. The buried structures will only be accessed (by excavation) when actually needed for use or when repairs are necessary. Overflow basins are present at the Tank 7 site and at the pump station. The purpose of these basins is to retain runoff and to catch overflow water in the event of valve and backup system failure. Their size is approximately equal to tank capacity.

CCWA plans to obtain a general permit from the Corps to cover maintenance and repairs needed in wetlands or waters of the U.S. during the next five years of O&M. Appropriate CDFW and Regional Water Quality Control Board permits/certifications will also be obtained. In subsequent years, CCWA will either obtain general permits or specific Nationwide Permits (NWPs) from the Corps for O&M activities within the Corps' jurisdiction.

The following sections describe operation and maintenance of the project (i.e., activities to be covered by the HCP). Measures to avoid or minimize take of covered species are discussed in Section 2.10 and are part of the project.

2.1 POLONIO PASS WATER TREATMENT PLANT

The water is treated to potable standards at a conventional water treatment facility located at the Tank 1 site, and then enters the buried pipeline for distribution to project participants. The disinfection process at the plant involves addition of chlorine and then ammonia to form chloramines. Residual disinfectant concentrations in the water leaving the treatment plant are currently 2 parts per million (ppm) of total chlorine and 0.5 ppm of total ammonia. At the plant effluent pH of 8.0 and a temperature of 15°C, the un-ionized ammonia concentration will be 0.027 ppm. The total ammonia concentration is 0.4 ppm as nitrogen, which is well below the 1-hour average water quality goal of 5.6 ppm at pH 8.0 and of 2.13 ppm at pH 8.5 once every three years (on average) for protection of aquatic life (EPA 1998). For chlorine, however, the residual in the pipeline is expected to be above the 1-hour average water quality goal of 0.019 ppm for protection of aquatic life (EPA 1998). Temperature data for the Coastal Branch, Phase I from September 1994 through October 1996 indicate that the average monthly temperature of water entering the Polonio Pass Water Treatment Plant could range from 12°C in winter to 25°C in summer (September) with a daily maximum of 29°C. Average monthly temperatures were below 20°C from October through April. The treatment process and transit through the pipeline

have minimal effects on temperature (less than 1°C over the length of the pipe) because the buried pipe is insulated by its concrete liner and the ground.

The water treatment process isolates solid materials during the sedimentation process. These slurried solids are piped to on-site sludge lagoons for further settling. Once the solids have settled in the lagoons, the decant water is pumped back to the headworks of the plant for retreatment. When a lagoon fills with sludge, it is taken off line and given time to dry (usually 6 to 8 months). The dry sludge is then removed to a county-approved on-site sludge monofill. The water treatment plant has three sludge lagoons so that the filling and drying process can be rotated from one to the next without interrupting the treatment process.

The area set aside for the sludge monofill is outside the facility fence but within the area of permanent construction impacts for San Joaquin kit fox (see Section 5.3). Surveys for San Joaquin kit fox will be performed prior to use of this area as described in Section 2.10.5. CCWA staff transfers the dried sludge from the sludge lagoon to the adjacent sludge monofill area using a dump truck with a maximum capacity of 5 cubic yards (and a front-end loader to fill the truck). Since 2010, the sludge is placed in the monofill area immediately adjacent to previously stored sludge to a thickness of approximately three feet, and the top of the pile is flattened to minimize runoff of the material. Control measures to keep sediments from running off site include a protective dike approximately 24 inches high around the entire monofill site with a dirt access track between the dike and the sludge pile. Grasses and forbs from the adjacent areas colonize the sludge and provide further erosion control. CCWA estimates that up to 1,100 cubic yards of sludge will enter the sludge lagoons annually and that drying and sludge removal from the lagoons will occur approximately once every two years per lagoon.

The water treatment plant has a storm drain system that collects runoff from the paved areas and building surfaces. This system discharges into a small, natural drainage on the southwest side of the site. The plant also has an overflow system (for accidental treated water tank spills) that discharges into the same small drainage (OP-7A) as the storm drain but further downstream. The fence around the water treatment plant and Tank 1 site will be inspected twice a year as described in Section 2.10.5.

2.2 PIPELINE OPERATION

The SWP pipeline in San Luis Obispo and Santa Barbara counties is operated to deliver water to project participants (water purveyors). In 2003, the number of participants was 24. Their entitlements [in acre-feet per year (afy)] to SWP water in 1999 ranged from 7 afy to 16,200 afy and total 45,408 afy. Some of these purveyors may sell part or all of their entitlement to other participant purveyors or to new entities over the life of the project. This may require construction of new turnout vaults along the pipeline route. Ground disturbance for any new turnout vaults would be limited to a small area similar to that described for maintenance and repairs (see Section 2.6). Construction of any new turnouts is covered under changed circumstances in Section 6 due to the uncertainty of when and where this could occur. The effects of growth inducement resulting from the water, however, are not covered because such growth is the responsibility of local governments with jurisdiction over land use.

The amount of deliveries each purveyor wants on a monthly basis is requested of CCWA, the agency that controls pipeline operation, which in turn schedules water deliveries with DWR at the San Joaquin Operations Center in Metler, California. These requests can vary by season and

by year. For those participants located along the pipeline, water exits the main pipeline at turnout facilities (vaults, valves, and meters) into local distribution pipelines. For participants along the South Coast of Santa Barbara County, water is discharged into Lake Cachuma via a pipeline through Bradbury Dam and then withdrawn from the lake at the existing facilities for delivering water to Santa Barbara (through Tecolote Tunnel and the South Coast Conduit). The maximum delivery rate into Lake Cachuma is 24 cfs in 6 cfs increments. These increments are determined by the capacity of the four pumps at the Santa Ynez Pump Station. The chloramines used for disinfection of the water are removed with sodium bisulfite at the pump station prior to delivery of water to Lake Cachuma. The pumps automatically shut off if an oxidation potential (disinfectant residual) of 0.1 ppm (limit of detection) is detected by an oxidation-reduction analyzer in the water leaving the pump station.

Deliveries of SWP water to Lake Cachuma use the existing outlet works at Bradbury Dam, and any releases of SWP water to the Santa Ynez River are covered under the Biological Opinion issued by the National Marine Fisheries Service (NMFS) to the Bureau of Reclamation on September 11, 2000 for operation of the dam. Therefore, water deliveries to Lake Cachuma are not covered under this HCP.

2.3 ACCESS

Access to facilities will be by existing roads, tracks, and the permanent easement for the pipeline. The existing roads include public and private roads used by the public and private landowners, respectively, as well as access roads constructed on private lands as part of the project. Tracks between existing roads and project facilities have developed from periodic project vehicle traffic to these facilities, including driving in the permanent easement. Access by CCWA employees and their contractors on private roads, project access roads, and tracks between the existing roads and project facilities is a covered activity. Landowners have unrestricted access to drive on the project access roads and two-tracks, and may require CCWA to use different roads on their property to access the pipeline corridor. No new road construction by CCWA would result from this. In the unlikely case that temporary new access must be developed for repairs, the route will be developed to avoid take of covered species. Maps showing approved access roads (see Appendix B) will be kept in the CCWA office for reference by employees. These maps are also in an electronic database and will be updated as needed (e.g., when land use changes or land owners establish different access routes on their property and request that CCWA use the new access routes) (see Section 2.10.2). CCWA will generally use 4-WD vehicles (standard pickup trucks) for maintenance and repairs. In areas where normal 4-WD vehicles would not work or would damage habitat (i.e., in very sandy soils or very steep terrain), an all-terrain vehicle will be used. CCWA has two "mules" for this purpose. These vehicles are 2-person, 4-WD, balloon-tired vehicles capable of negotiating difficult terrain with minimal impact. CCWA vehicles will be stored at each end of the pipeline to ensure fast response to all areas and will be maintained in good working order according to the manufacturer's recommendations at an appropriate service center (i.e., dealer service facilities) or the CCWA maintenance stations at Buellton and Polonio Pass.

In some instances, surveillance of the pipeline for leaks may be accomplished using fixed-wing aircraft or helicopters. Such surveys would be during the dry season when unusual wet (green) areas could be identified. Grasslands and areas with sparse tree or shrub cover are more suitable for aerial surveys, and these occur in patches throughout the pipeline corridor. The flights would be at an elevation of approximately 1,000 feet above ground for fixed-wing

aircraft and for helicopters. Helicopters could also be used for access to structures if roads are not passable (e.g., washout of bridges or landslides) and work must be conducted at a particular structure to keep the pipeline operating safely or, if needed, to respond to an accident. An elevation of 1,000 feet above ground will be maintained for such flights except when landing or evaluating an accident. Helicopters would not be used, except in emergency situations, at locations where covered species could be adversely affected (e.g., bird nesting).

2.4 ROUTINE INSPECTION/MAINTENANCE – ABOVE GROUND FACILITIES

Under normal circumstances, routine maintenance and inspection of above ground facilities (e.g., AVARs, blowoff valves, and cathodic protection stations) will occur every 1 to 6 months. Isolation valves (4) are inspected monthly, and the energy dissipation valve and water storage tanks are inspected weekly; all are maintained annually.

- Monthly—11 cathodic protection rectifier stations (at 5- to 20-mile intervals along the pipeline) are monitored (field checked = read and adjusted as needed) with data recorded.
- Monthly—Pipeline alignment is checked for evidence of leaks (wet spots), erosion problems, vandalism, or other potential problems.
- Every 6-12 Months—AVARs/manholes (341), blowoff/dewater valves (130), and their associated vaults, are inspected with preventive maintenance.
- Annually—Cathodic protection test stations (approximately 250) are monitored with data recorded.

Usually, maintenance of AVARs and blowoff/dewater valves will involve operation of the valves, lubrication, and replacement of worn parts as per manufacturer specifications. Occasionally, use of solvents, paint, caulking, and sealing materials and sand/bead blasting will be necessary. Parts will be removed from the field, repaired, and repainted whenever possible. When field application of solvents, paint, caulking, and sealing materials etc. is necessary, care will be taken that these materials do not enter the environment. Drop and protective cloths will be used, and all excess and used materials will be removed from the site and disposed of properly. All hazardous materials will be handled as described in Section 2.10.7. The sections or reaches of the pipeline alignment are driven at least monthly to look for noticeable problems such as wet spots on the alignment, erosion, and vandalism. Routine inspections of facilities in or adjacent to sensitive areas will not be scheduled during or immediately after rain events or during the breeding, migration, or nesting season for covered species if such inspections would result in take or adversely affect the habitat of these species (see Section 2.10.6).

Project facilities are designed to last at least 75 to 100 years. Routine inspections (listed above) may identify isolated equipment/facilities that need replacement on an ongoing basis for preventative maintenance (e.g., valves, cathodic test wiring, and buried anode equipment). In addition, some facilities may require upgrading (e.g., replacement of equipment within existing facilities) to meet operations requirements.

Maintenance will also include keeping culverts under access roads and drainage facilities near access roads free of obstructions and debris. Accumulations of these materials will be removed

as needed, generally during the dry season. Methods used will depend on the type and size of culvert or drainage facility, amount and kind of material that has accumulated, and site characteristics such as vegetation, water flow, and bank structure. Frequent checks and clean-out will be used to minimize the need for use of large equipment with the potential to damage habitat for covered species. Small amounts of debris blocking culverts in areas with limited access for equipment will be removed by hand tools. Woody debris will be returned to the stream on the other side of the culvert as long as it would not adversely affect flow or downstream culverts. Accumulated sediments may be excavated using equipment such as a backhoe or flushed with water in dry drainages. Flushed sediments will be removed from the stream bed whenever they could degrade water quality, block or alter normal stream flow, increase erosion of banks, or degrade wetlands or habitat for covered species. For flowing streams, removal will likely be by excavation (with a backhoe or similar equipment of the appropriate size for the site) with sediment control measures installed to minimize turbidity and sediment deposition downstream. Work in streams, except inside culverts, may require a Corps permit with associated CDFW and Regional Water Quality Control Board approvals and consultation with the Service and/or NMFS if federally-listed species are present and may be affected. Existing roads, bridges, and paths to project facilities will be maintained and repaired as necessary using professional standard of care for the appropriate engineering discipline. In habitats for covered species, protection measures described in Section 2.10 will be implemented.

2.5 DEWATERING FOR MAINTENANCE/REPAIRS

Some maintenance and repair activities will require draining segments of the pipeline for access to valves or internal inspection of the pipe. The water will be released from blowoff valves designed for that purpose. Three types of blowoff valves are present along the pipeline: major, intermediate, and minor. The nine major blowoff valves along the pipeline from the Tank 1 site to Lake Cachuma (adjacent to San Juan Creek, Huerhuero Creek, Salinas River, San Luis Obispo Creek tributary, Lopez Terminal Reservoir, Santa Maria River, San Antonio Creek tributary, Cebada Channel, and Santa Ynez River) will be used to drain large sections of the pipeline and can be used to release large amounts of water at a controlled rate. All of these major blowoffs have energy dissipating valves. Although the maximum design discharge rate from these blowoffs is 9,000 gallons per minute (gpm), discharge of 1,000 gpm (2.2 cfs) or less has been found to be adequate for dewatering the pipeline at these locations. When large volumes of water need to be released, the rate of release is gradually increased to the desired level for that specific release to avoid or minimize surges and to avoid environmental damage such as scour. Intermediate blowoff valves are used to drain smaller sections of the pipeline and can handle intermediate volumes of water. Minor blowoff valves are the most numerous and are located to allow draining of small segments of the pipeline. Discharge rates for these blowoffs range from 20 to 400 gpm. When the water discharged during maintenance and repairs could enter a flowing stream, disinfectants will be removed from the water as it is released using portable dechloramination units that inject sodium thiosulfate pre-mixed with water directly into the blowoff valve or into the discharge as it exits the blowoff. The discharged water is regularly tested to ensure that the disinfectants are being removed. Precautions will be taken during these releases to prevent erosion and scour (see Section 2.10.3 Dewatering Operations). Erosion and sediment control materials will be on site in case they are needed (see dewatering plan in Appendix C). Parts of Reaches 5B and 6 and Schedule C were drained and inspected in 1998 and 2000. Two miles of pipe were inspected in 1998 and about 6 miles were inspected in 2000. Most of Reaches 5B and 6 was drained in November 2001 for further inspection and repairs

based on the inspection in 2000. Draining of other sections of the pipeline will be on a rotational basis. Typically, short sections of pipe will be inspected with a frequency of approximately once per year, usually in the fall. The exact timing for shutdown and draining of the pipe sections is determined by water demand, weather conditions, and environmental considerations (see Section 2.10.6).

2.6 GROUND DISTURBANCE/EXCAVATION FOR MAINTENANCE/REPAIRS

Routine maintenance and emergency repairs may also require vegetation removal and ground disturbance in localized areas. This includes periodic erosion-control work and maintenance of dirt/gravel access roads. Buried structures such as blowoff valves and manways (in Reaches 5B and 6 and Schedules A-C), cathodic test station wiring, and fiber optic cable splice boxes may occasionally need to be excavated for inspection, repairs, or access to the pipe (estimated to be every 2 to 5 years at some location along the pipeline). However, when CCWA first accesses these buried blowoffs, a round concrete structure is placed from the blowoff structure to the ground surface with a lid to eliminate the need for excavation in the future. In addition, potential leak sites and suspected corrosion hot spots, if any occur, will also need to be excavated for repair, replacement, and reconstruction. Such excavations will generally involve removal of topsoil followed by excavation of a sloped pit large enough to safely access the structure in question. The disturbance will occur in areas previously disturbed by construction and will be limited to several hundred square feet in most cases but could be 0.2 acre or more if pipe sections need to be replaced. Other than pipeline inspections, such inspections and work are not routine, and many years may pass between occurrences. The non-routine inspections will be addressed under changed circumstances (Section 6) due to the uncertainty of when and where they could occur. All non-emergency repairs will be scheduled to avoid impacts to species addressed in this HCP on a site-by-site basis (see Section 2.10).

When excavation is necessary, the work space will be clearly marked (see Section 2.10.1) and will include space for supplies (such as sand and pipe), equipment, topsoil salvage and protection, spoil storage, erosion control, and vehicle parking. Work requiring excavation will normally be conducted by a private contractor hired by CCWA. Equipment expected to be used includes a rubber-tired backhoe (for minor excavations), front-end loader, tracked excavator (for deep or large excavations), dump truck (to deliver sand or haul away excess spoil), and pickup trucks. Pipe delivery, if needed, will be by semi-truck. The contract documents for such work will contain provisions for environmental protection such as topsoil salvage and replacement, environmental training, erosion control, and restoration with plant species appropriate for the site (see Section 2.10 for more detail on protection measures).

Areas where natural vegetation is removed during maintenance activities will be revegetated to the same plant community present (on or adjacent to the work site) before maintenance took place using native species to the extent practicable (i.e., native species will be used where physical and land use conditions would allow such species to grow). The area will be seeded with the seed mix appropriate for the area, and any native trees (e.g., oaks or pines) removed will be replanted at a ratio (generally 5:1 or 10:1, depending on the species) to ensure replacement of those lost. The area will be monitored for revegetation success in accordance with the specifications in Appendix D.

2.7 VEGETATION/PEST CONTROL

Routine vegetation mowing is expected to take place immediately surrounding approximately 188 above ground vaults and structures (within about 6 feet) to allow access, directly over or adjacent to the pipeline (generally 6 feet, width of mower) for vehicle access along two-tracks where no existing roads are present, and for fire prevention. Mechanical methods of vegetation control (e.g., weed whacker or flail mower towed behind a small rubber-tired tractor) will be used to the extent feasible. Equipment causing the least habitat disturbance will be used whenever appropriate for the work to be done. Mowing of grasses along the access routes (primarily in the center of the two-track, a width of approximately 2 feet) where no existing roads are present will occur in late spring to summer as needed to maintain access and to minimize the potential for fire. Where trees that can become large begin to grow within about 10 feet of the pipe centerline (primarily in oak woodland or riparian areas), these trees will be removed while small. Replacement trees of the same species will be planted away from the pipeline if suitable habitat and land use allow. Tree and shrub cutting and removal will be scheduled to avoid disturbance to migratory bird nesting (e.g., by cutting trees and shrubs in the late summer and fall) and covered species to the extent feasible. Small trees will be removed by hand. For larger trees, a rubber-tired backhoe will be used to remove the tree, or the tree will be cut with a chain saw, and the stump will be ground out or sealed to prevent growth of suckers. The resulting cut or otherwise removed woody debris will be left in the right-of-way (or outside the right-of-way with landowner approval) to provide wildlife habitat.

Screening of openings in vaults will be used as the method of choice in controlling most pests. Several of the DWR vaults were constructed with openings between vent screens that are large enough to allow small animal and insect entry. Animals that get into the vaults usually die, and CCWA staff must remove the dead or frightened animals. To remedy this problem, CCWA staff has placed a band of 18-inch wide galvanized wire fabric with 1/8-inch mesh around the circumference of each vault with gaps between the existing screens. The wire mesh is kept in place with stainless-steel banding. This protection method appears to be very effective at keeping animals and insects out of the vaults. It is also inexpensive and relatively quick to install. CCWA staff secured all vaults by October of 1999 using this method. If rodents become a problem, live traps or other live removal methods may be used.

In 1999, CCWA removed the grates from the tops of the energy dissipation structures located adjacent to the blowoff and dewater vaults in Reaches 1 through 4 and replaced them with fiberglass covers that completely seal the opening. The grates had allowed small animals to fall into the structures and become trapped.

Vegetation that colonizes the land surrounding the sludge lagoons at the water treatment plant is routinely removed by cutting (e.g., with a weed whacker). Emergent vegetation that colonizes the margins of the lagoons is removed by herbicide (Aqua Master® that is approved in California for use in aquatic environments) when it becomes evident. Ground squirrels within the treatment plant fence are trapped and removed to prevent damage to equipment and vehicles.

2.8 ENVIRONMENTAL TRAINING

All new hires and contractors working in the field will receive environmental training prior to beginning work, and all employees will receive annual training. This training will include a

description of covered species and their habitats, measures to protect and avoid them, and penalties for violating federal and state regulations for protecting listed species. The training material will be taken from the CD-ROM developed for the project and updates to the covered species database (Appendix A) regarding the status and locations of covered species. The Operations Manual contains a section on environmental protection (Appendix E) that includes measures to be followed for protection of sensitive resources, including covered species.

2.9 MITIGATION SITES FOR CONSTRUCTION IMPACTS

In addition to O&M of the water pipeline and associated facilities, this HCP will also cover ongoing monitoring and maintenance of one off-site mitigation area set aside for the impacts of construction on riparian and aquatic species covered in the state biological opinion for construction (least Bell's vireo, willow flycatcher, California red-legged frog, and southwestern pond turtle), riparian habitat, and oak woodlands and of one area set aside for impacts of construction activities on oak trees. These mitigation areas are the Arroyo Grande Mitigation Site and the Cuesta Tunnel North Portal site (see Table 1-1). A portion of the Cuesta North Portal site is being used for mitigation of oak tree impacts. The sites will either continue to be managed for sensitive and covered species habitat or oak trees (as appropriate) by CCWA or be managed by an entity approved by CDFW in perpetuity. The following activities at these sites may affect covered species and will be covered by the HCP.

The Arroyo Grande Site (purchased by DWR) is located adjacent to Biddle Park and includes a segment of Arroyo Grande Creek approximately 1,500 feet in length. The access road includes a railroad flatcar bridge over the creek that is supported on wooden abutments. California red-legged frogs are known to be present in Arroyo Grande Creek. Much of the site (about 85 percent) was in agriculture and the stream was regularly cleared of vegetation before restoration and habitat enhancement began. Wetland (in Arroyo Grande Creek), flood plain and terrace riparian (30 acres), and oak woodland (10 acres) habitats are being restored to offset impacts during construction of the Coastal Branch, Phase II. The riparian habitat has been planted with willow, sycamore, cottonwood, bay laurel, valley and coast live oak, elderberry, coyote brush, toyon, coffeeberry, redberry, California sagebrush, dogwood, mulefat, wild rose, mugwort, marsh baccharis, snowberry, nightshade, alkali rye, and giant wild rye. The plantings were initially watered to assist in establishment, and weed control is routinely conducted. Over time, repairs (such as bank stabilization) may be necessary to keep the bridge over the creek safe for vehicles. Beaver dams in the creek on the site may also need to be breached or removed to prevent damage to the bridge. These activities and weed control have the potential to result in take of California red-legged frogs.

The type and frequency of bridge repairs are unknown but may include recontouring of the bank and installation of riprap for bank protection on one or both banks within about 50 feet of the bridge. Such activities are not routine and would be covered under changed circumstances in Section 6. Control of beaver activity will be necessary at intervals during the project and could include partial breach of dams to complete removal as well as trapping or shooting of beaver (in accordance with applicable regulations) for protection of the bridge. Beaver removal by shooting (by licensed animal control agent) has been tried in the past and found to be ineffective. When beaver dam breaching or removal becomes necessary, a plan for this activity will be prepared and submitted to the Service and NMFS for approval prior to the work. The most likely control activity will be notching of the dam to lower the water level to below the bridge abutments. This notching will be conducted using hand tools and will lower the water

level in the pond behind the dam in increments to prevent scour and to reduce the potential for immediate rebuilding by the beavers. Placement of wooden stakes in the stream bed upstream of the bridge may also be used to help entice the beavers to move the dam upstream. Measures to protect California red-legged frogs will be included in the plan, and all appropriate permits will be obtained.

Approximately 13 acres of riparian and oak woodland habitat along about 500 feet of a creek are being enhanced or restored by removal of non-native plant species and planting of native species at the Cuesta Tunnel North Portal site. In addition, about 300 feet of gunnite was removed from the creek channel. An ephemeral pond is also present adjacent to the creek. California red-legged frogs are not presently known to inhabit the creek or pond but could colonize these habitats in the future. Monitoring and maintenance activities for the habitat restoration and vehicle traffic to and from the facilities at the North Portal (access road is adjacent to and crosses creek) have the potential to result in take of red-legged frogs.

2.10 MEASURES TO AVOID AND MINIMIZE TAKE OF COVERED SPECIES

CCWA has developed an O&M Manual that includes a section on environmental requirements for the purpose of minimizing project effects on all environmental resources, including covered species (see Appendix E). In addition, access road maps (USGS 7.5 minute quadrangle) and a database showing the known locations of covered species are kept at the CCWA office for reference when planning maintenance activities. These maps and the database are updated annually as needed by CCWA's environmental consultant using information from the California Natural Diversity Data Base (CNDDB), or equivalent, and other sources such as county resource maps, web sites, and personal observations. For non-routine O&M activities covered under changed circumstances, updates of species information for the work site will be conducted along with field surveys if covered or migratory bird species could be present.

CCWA is committed to preserving the environment in which it works and has incorporated environmental requirements in its O&M Manual. Where feasible, O&M activities will be conducted using the most environmentally friendly methods available to do the work (e.g., use of hand tools or small equipment rather than larger equipment). In addition, frequent checks and maintenance (e.g., clean out of culverts) will be conducted to reduce the need for using large equipment, particularly in habitats with covered species. CCWA and their representatives will implement the following measures (described in sections 2.10.1 through 2.10.8) to avoid and minimize take of covered species and impacts to their habitats. Where covered species with authorized take need to be moved to minimize take from O&M activities, only qualified biologists, or people trained by and working under their direction, shall handle the animals or plants. The current protocols recommended by the Service will be used for each life stage being relocated and for surveys to locate the species prior to project activities that could cause take (see Appendix F). If the protocols need to be modified to fit site-specific circumstances, the qualified biologist will describe the proposed modified methodology (in writing) to the appropriate agency and obtain their approval before implementing the methodology (see Section 7). When no protocols are available for surveys of covered species, proposed methods will be submitted to the Service for approval prior to such surveys.

2.10.1 General

- Maintenance personnel shall check access road maps and environmental resource databases to identify potential sensitive areas before any activities that could disturb animals, vegetation, or soils (including water discharges) occur, and also check to determine if any permits (Corps or CDFW) are needed.
- Surveys will be conducted by qualified (approved/permitted) biologists in areas where covered species could be present (see Table 2-1) using appropriate protocols (Appendix F) prior to any ground disturbing (e.g., excavation), water discharge (also see Section 2.10.5), or vegetation control (see Section 2.10.4) activities. Although certain emergency repairs that require immediate action may preclude pre-construction surveys, qualified environmental personnel will be called to assist in the repair and restoration process. Environmental monitors will also monitor such work if the work area (or the immediate vicinity) contains covered species, or their habitat, that could be affected during the work. The monitors will be empowered to, and will, stop or redirect work if take of a covered species could occur. If covered species for which no take is authorized or listed species not covered in the HCP are found to be present, take will be avoided by scheduling the work when the species is not present or by establishing a protective buffer between the work and the species' occupied habitat. The permit will be amended (see Section 6.3) if take of these species cannot be avoided through adaptive management (Section 7).
- The area to be disturbed shall be minimized whenever vegetation must be cleared, underground structures need to be excavated, or access roads or streams need to be repaired. The need to minimize the area disturbed and the limits of the work area will be clearly explained to all contractors and equipment operators by CCWA inspectors or environmental monitors. Limits of the work area will be clearly marked in covered species habitat using flagging or other highly visible markers.
- For stream repair work, the damage requiring repair will be assessed by an engineer and an environmental specialist. A plan for repairs that includes environmental protection as specified in this HCP will be prepared, and appropriate permits (e.g., Corps, CDFW, and the Regional Water Quality Control Board) will be obtained prior to implementing the plan.
- CCWA's Regulatory Specialist or an approved/permitted biologist will provide environmental training for all equipment operators and inspectors at least once a year and immediately after hire for new employees, contractors, or consultants. This includes briefing on requirements for topsoil salvage and other environmental protections specific to the work areas such as chaparral and riparian woodland, oak trees, covered species habitat, and streams.
- No equipment will be operated in a flowing stream until appropriate permits have been obtained and a site-specific plan for water diversion and erosion control has been prepared and implemented. Protection of covered species, if present, shall be included in the plan.
- O&M personnel will not bring domestic pets onto or adjacent to the pipeline corridor during O&M activities unless confined or leashed.
- All food-related trash and litter shall be placed in closed containers inaccessible to wildlife and disposed of weekly at facility sites and daily at work sites along the pipeline corridor.

- Topsoil shall be salvaged, marked and stored separately from spoil material, protected from wind or water erosion and from inadvertent mixing with subsoils, and replaced over backfill for excavations of any size where soil is present. The depth of topsoil will vary from less than one foot to three feet depending on specific location. In agricultural areas, input will be requested from the landowners regarding any special techniques for handling agricultural soils on their properties. All practical soil conservation techniques will be implemented. Except where erosion-control considerations prevent it, all areas are to be graded back to approximate original contours.

Table 2-1. Covered Species Surveys

Species	*Locations*[1]	*When to Survey*
San Joaquin kit fox	Tank 1 to Station 2083	Prior to any ground disturbing activities, including sludge disposal at the Polonio Pass Water Treatment Plant
Southwestern willow flycatcher/ willow flycatcher (state listed)	Santa Ynez River west of Buellton; between Highway 154 & Bradbury Dam; (willow flycatcher) Salinas River, San Luis Obispo Creek, Arroyo Grande Creek, & Tar Spring Creek	Prior to any ground disturbing activities or tree removal, May through August
Least Bell's vireo	Salinas River, Tar Springs Creek, Santa Ynez River	Prior to any ground disturbing activities or tree removal, May through August
Swainson's hawk	Any area with oak or riparian trees within 0.5 mile of work	Prior to any ground disturbing activities or tree removal, April through July
California red-legged frog	Polonio Pass WTP sludge lagoons; known & potential habitats (see Appendix A)	Prior to any ground disturbing activities, erosion repair, culvert cleanout, or water discharges
California tiger salamander	Tank 1 area; Reach 6 Station 4949 to 5170 and Schedule B and C Station 980 to 1367	Prior to any ground disturbing activities, erosion repair, or water discharges
Arroyo toad	Salinas, Santa Maria, Santa Ynez rivers	Prior to any ground disturbing activities
Chorro Creek bog thistle	Drainages and seeps in serpentine soil from South Portal of Cuesta Tunnel to end of Reservoir Canyon	Prior to any ground disturbing activities or water discharges
La Graciosa thistle	Wet areas from Highway 166 (Main Street) southward to Point Sal Road	Prior to any ground disturbing activities
Pismo clarkia	Arroyo Grande to Santa Maria River	Prior to any ground disturbing activities
Seaside bird's-beak	Schedule A Station 245 to 652 and Schedule B Station 1104 to 1190	Prior to any ground disturbing activities

1. Known and potential locations from Appendix A; to be updated as new information on species locations becomes available.

- After maintenance and repairs are completed, a final cleanup of the work site will include removal of stakes, lath, flagging, barrels, cans, drums, hazardous materials, contaminated soils, and any other trash, debris, refuse, or wastes generated by or during maintenance or repair activities. These materials will be disposed offsite. Heavily compacted soils will be loosened by a cultivator or similar device. With replacement of the topsoil, rock and natural plant debris will also be replaced in areas where such material was originally found if it will

not interfere with existing land use or cause a hazard. Contouring to natural grade will be done without disruption to adjacent undisturbed areas. Sediment collected in any sediment traps will be removed and deposited at a site where it will not erode back into a water course.

- Appropriate erosion and sediment controls will be installed following O&M work, regularly monitored, and maintained after storm events until disturbed soils become stable. All earthwork over 0.5 acre will conform to the conditions of the General Storm Water Permit of the State Water Resources Control Board (SWRCB). For smaller sites, appropriate BMPs will be used. Site-specific, best management practices from the *Stormwater Best Management Practice Handbook – Construction* (California Stormwater Quality Association 2003) , Caltrans *Storm Water Quality Handbooks – Construction Site Best Management Practices (BMPs)* (Caltrans 2003), or the *Erosion and Sediment Control Field Manual* (Regional Water Quality Control Board) will be implemented in conjunction with all earthwork. This will include use of temporary erosion-control measures during the rainy season and routine preventive maintenance of erosion-control measures until the affected soils are stable.
- Vegetation removed during maintenance or repair activities will be reseeded or replanted following the guidelines set for the particular plant community/species in the Plant Community Revegetation Manuals (Reaches 5B/6 and Schedules A/B/C) and the Restoration Plan (Reaches 1-5A), including weed control and monitoring until performance criteria in those manuals (Appendix D) are met. Any temporary cover crops used will be annual species that have minimal competition with recolonizing native species or with efforts to reestablish native vegetation. Annual revegetation monitoring reports will be prepared and submitted to the Service for restoration within covered species habitat.
- CCWA will notify the Service (fire ecologist) by phone (805-644-1766) within 48 hours whenever a project activity causes a fire in covered species habitat.
- CCWA will notify the Service by phone, fax, or e-mail prior to O&M activities when covered species are found to be within the work area and could be affected by those O&M activities. The notification will include the species, approximate number of individuals, type of work to be done, type of effects that could occur, and measures to be implemented to reduce the potential for take.

2.10.2 Access

- Access to specific structures will be confined to established routes (see Appendix B). Maps of these routes will be kept in the CCWA office for reference and copying by employees.
- To avoid damage to covered species habitat and to minimize the potential for collision with a covered species in that habitat, no cross country driving or short cuts between structures will be permitted except where necessary to respond to an emergency.
- CCWA 4-WD vehicles (4X4 extra cab pickup trucks) will be used for inspections and routine preventive maintenance.
- "Mules" (Kawasaki all-terrain off-road vehicle) will be used where terrain is steep or where regular trucks would damage the soil and vegetation to minimize soil disturbance that could result in runoff of sediments to streams and covered species habitat. Locations include, but are not limited to, downstream of Tank 2 along Highway 229, north of Cuesta Grade, and in Reservoir Canyon.

- Helicopters or aircraft may be used for leak detection throughout the year and to inspect storm damage after major rainfall events. Aircraft typically depart from and return to existing airports. Low level flights over known or potential nesting habitat for covered and other migratory bird species will be avoided during the breeding season.
- If helicopters must land along the pipeline easement for emergency responses (i.e., medical or maintenance), the Service will be notified by phone or fax within 48 hours whenever the location is near habitat for covered mammal or bird species.
- Work in covered species habitat in areas not accessible from all-weather surfaced roads will be scheduled for dry periods so that dirt roads or two-tracks can be used for access unless such scheduling would compromise safe operation of the project.
- CCWA vehicles will be regularly maintained to prevent leaks of fuels or lubricants. If a vehicle breaks down along the pipeline alignment, it is anticipated that it will be towed out and that repairs will be made at an approved shop or location where the natural environment would not be adversely affected by such repairs.
- If new temporary access routes need to be constructed by CCWA for specific repairs, they will be located to avoid take of covered species. Plans will be developed for such routes in consultation with a qualified biologist, and appropriate permits for road construction will be obtained. Any new access routes provided by landowners (e.g., due to land use changes) will be placed on the access maps (Appendix B).

2.10.3 Dewatering/Release Operations

- Signs have been posted by CCWA in blowoff and dewater vaults adjacent California red-legged frog habitat (known or potential habitat) and other covered species habitat that warn operations staff that listed species may be present and need to be considered before any release of water occurs. The signs read as follows:

  > CAUTION: Releases from this vault may impact endangered species. Contact your supervisor before opening valve.

  Signs will be installed in additional vaults whenever new locations for covered species are identified. This information will also be printed on the distribution tech, instrumentation tech, or water treatment plant personnel work orders.
- The following steps shall be taken whenever O&M activities require release of water from the pipeline, tanks, or turnouts, or when vaults that have become flooded are dewatered:
  - Access road maps and environmental databases shall be checked for the presence of covered species.
  - The CCWA Regulatory Specialist and/or contractor's environmental consultant shall be consulted.
  - A discharge plan (see Appendix C) shall be implemented that addresses
    - discharge to land where feasible
    - dechloramination
    - SWP water temperature and pH
    - testing of discharged water for chloramines residual, pH, and temperature

- discharge location
- energy dissipation to prevent erosion
- avoiding temporary rapid raising or lowering of water levels where covered species (all life stages) could become stranded
- turbidity and temperature monitoring up and downstream of discharge for all water entering a stream channel
- contingency plan to address erosion, turbidity, temperature, and failure of equipment to remove disinfectants

– Table 2-2 summarizes measures to be used at specific locations where covered species could be present. These measures will also be implemented at new locations for these species identified during the project.

Table 2-2. Protection of Covered Species during Dewatering

Station[1]	*Site*	*Species*[2]	*Protection Measures*[3]
722+30	OP-7A	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed to ponds or upstream; schedule discharge for August 1-December 1/January 1; monitor during discharge.
2508+00	Salinas River	RLF	Use dewatering plan; survey for RLF immediately prior to discharge; schedule discharge for August 1-December 1/January 1; monitor during discharge if species is present.
2591+75	Trout Creek	RLF	Use dewatering plan; discharge to uplands; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge if species is present.
2661+80	Yerba Buena Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
2812+80	Santa Margarita Creek	RLF	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge if species is present.
2920+25 to 2959+35	SLO-6 to Kirshner Creek	RLF	Use dewatering plan (at 4 blowoffs); survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge if species is present.
3039+20 & 3069+50	SLO-14 & SLO-16	RLF	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge, if present.
3100+40	Fox Hollow (tributary to SLO Creek)	**RLF** (**RLF** in SLO Creek)	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge, if present.

Table 2-2. Protection of Covered Species during Dewatering

Station[1]	*Site*	*Species*[2]	*Protection Measures*[3]
3110+55	SLO-19 (tributary to SLO Creek)	RLF (**RLF** in SLO Creek)	Use dewatering plan; survey for RLF immediately prior to discharge if water present in creek; schedule discharge for April 1-December 1/January 1; ramp up discharge slowly; monitor during discharge, if present.
3139+80	LM-3	RLF	Use discharge plan; survey for RLF prior to discharge; schedule discharge for August 1-December 1/January 1; monitor during discharge, if present.
3180+15	LM-4	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge, if present.
3229+60	Hampton Creek	RLF	Use dewatering plan; survey for RLF prior to discharge; schedule discharge for August 1-December 1/January 1; monitor during discharge, if present. Unlikely to be used.
3246+80	Reservoir Canyon	RLF	Use dewatering plan; survey for RLF immediately prior to discharge; schedule discharge for August 1-December 1/January 1; monitor during discharge, if present. Unlikely to be used.
3379+70	E. Fork San Luis Obispo Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
3567+35	AG-8	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
3819+91*	Arroyo Grande Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
3842+42*	Arroyo Grande Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
3952+90	Tar Spring Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
4000+95*	Arroyo Grande Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge. Not used until storm drain completed.
4073+20	OC-2	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge. Unlikely to be used.
4111+60	OC-4	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.

Table 2-2. Protection of Covered Species during Dewatering

Station[1]	*Site*	*Species*[2]	*Protection Measures*[3]
4155+30	OC-6	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
4212+70	Los Berros Creek	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
4663+00	Santa Maria River	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; schedule discharge for August 1-December 1/January 1.
4934+30	Green Canyon	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
4968+80	SM-4	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
167+80 and 177+10 (Sch A)	Unnamed ST & San Antonio Creek	(**RLF, UTS,** in San Antonio Creek)	Use dewatering plan; schedule discharge for October 1-December 1/January 1; monitor during discharge.
554+20	Unnamed A	**RLF**	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge. Unlikely to be used.
1366+00	Santa Ynez River	**RLF SWWF**	Use dewatering plan; discharge onto river bar with energy dissipation; schedule discharge for September 1-December 1/April 1; monitor during discharge.
1561+60	Nojoqui Creek	**RLF**	Use dewatering plan; discharge to uplands or dry creek bed; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge.
1716+07* 1721+50* 1730+00*	Santa Ynez River	RLF	Use dewatering plan; discharge onto river bar or use diffuser; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1, ramp up discharge slowly; monitor during discharge.
ID#1 Crawford & Cachuma Village	Santa Ynez River	RLF	Use dewatering plan; survey for RLF immediately prior to discharge; relocate any RLF that could be injured or killed; schedule discharge for August 1-December 1/January 1; monitor during discharge. Unlikely to be used.

1. Pipeline station number for stream, except where marked with * which indicates blowoff station numbers
2. RLF = California red-legged frog; SWWF = southwestern willow flycatcher; UTS = unarmored threespine stickleback
3. Criteria for discharges after December 1 are given in Section 2.10.6. Methods for capture and relocation are described in Section 2.10.5.

Bold indicates known presence

2.10.4 Vegetation Control

- Mechanical methods, such as a mower or weed whacker, shall be used to clear vegetation as needed for safe access to facilities within the pipeline corridor (e.g., vaults and cathodic protection stations). Areas to be cleared include approximately 6 feet around vaults and a strip about 6 feet wide for vehicle access in the pipeline corridor where access roads are present and along access tracks in the pipeline corridor where vegetation has overgrown the access route and become a fire hazard.
- Trees and other large-growing, deep-rooted plants that become established over the pipeline (within approximately 10 feet of pipe centerline) shall be removed mechanically (by hand when small or by rubber-tired backhoe if larger), where feasible, before they reach a large size. See timing restrictions in Section 2.10.6.
- Where clearing of vegetation from the pipeline corridor is required outside the area to be excavated, shrubs and trees will be cut at ground level and stumps will be protected in areas to be used by equipment with a layer of spoil (subsoil) a minimum of 6-12 inches thick over geotextile or plastic so that all subsoil can be removed.
- Work, including movement and parking of equipment, shall be avoided within the drip line of trees to the extent feasible. Where such work is necessary, care will be taken to prevent damage to tree trunks, limbs, and root systems.
- Removal of streamside vegetation during O&M activities shall be avoided to the maximum extent feasible while allowing the necessary work to be completed, and the affected area shall be restored to pre-project, or better, conditions after work is complete in accordance with Appendix D.
- Any pruning of oak trees shall occur under the direction of the CCWA Regulatory Specialist. Pruning will occur outside of the nesting season (April 1 to August 1) unless surveys show that no covered or migratory bird species are nesting in or adjacent to the trees to be pruned.

2.10.5 Covered Species Habitat

- A list of biologists qualified to survey for and handle species covered in this HCP will be maintained by CCWA. These biologists shall have the appropriate Service and CDFW permits/approvals to engage in such activities. Only such qualified biologists will capture and relocate covered species. Capture methods will follow current protocols or use methods adapted to site-specific conditions as approved by the Service. Relocation sites will be selected by the qualified biologists with approval by the Service.
- Approved/permitted biologists will survey for covered species where potentially present (see Table 2-1) using current protocols (Appendix F), where available. If the survey indicates that one or more of these species are present, CCWA will prepare and implement a protection plan using the appropriate measures from this HCP prior to the onset of and during any activities that could result in take. For most species, it is more cost-effective to assume presence and implement protection measures than to adequately survey for presence. Qualified environmental monitors (approved/permitted for covered species or working under the direction of a qualified biologist) will be present if covered species could be affected during the work. Approved/permitted biologists may be disallowed from

performing this service if a biologist fails to carry out or inadequately performs his/her duties.

- Before vegetation clearing or ground disturbance, a qualified biologist will capture and relocate any California red-legged frogs or California tiger salamanders, but no San Joaquin kit fox which will be avoided, that may be found within the work area using current protocols, as available, or other methods (as approved by the Service) as follows. If the required work activity can be feasibly conducted while avoiding take of these three covered species, avoidance measures will be used. Other covered terrestrial animal species will be avoided.
  - Covered plant species will be avoided to the extent feasible. If individuals cannot be avoided, the appropriate consultations with the Service will be conducted prior to the work. As approved by the Service, the plants will either be salvaged for replanting at the site or recorded so that they can be replaced at the work site using seed or container stock.
  - California red-legged frogs that could be taken by water discharges will be captured (by seine, dip net, or traps) and relocated to suitable habitat upstream prior to the discharge. For other project activities affecting aquatic habitats, the captured individuals will be relocated to nearby suitable habitat within the same drainage area. Relocation will be in a clean moist bucket with a lid to a site determined by a qualified biologist prior to the work or through consultation with the Service.
  - Dens and burrows inhabited by San Joaquin kit fox within 100 feet of a work site will be flagged for avoidance in accordance with the Standard Recommendations for the Protection of San Joaquin kit Fox in Appendix F. Natal dens for San Joaquin kit fox will be avoided by 150 feet (February through July) or as specified by the Service.
  - Ground squirrel and gopher burrows within areas to be excavated in California tiger salamander upland habitat shall be hand excavated to the depth allowed by soil conditions, and any California tiger salamanders found will be captured by hand, placed in a clean bucket, and relocated to burrows outside the work area. Hand tools are to be used unless other methods are necessary and specified in the protection plan. Erosion in salamander upland habitat will be inspected by a qualified biologist prior to repair. Any salamanders found will be captured and relocated to nearby burrows.
- Covered species habitats adjacent to the work area will be fenced or clearly marked with flagging as determined necessary and appropriate by an approved/permitted biologist to avoid damage or disturbance to these habitats (i.e., to keep work activities out of that habitat). Fencing can be chain link, plastic, or barbed wire as appropriate for the specific site and work activities. Flagging can be attached to stakes, fence posts, or vegetation.
- Water diversion in all streams will include measures to assure safe passage of aquatic life through the work area. Covered species such as California red-legged frogs will be relocated (as described above) by an approved/permitted biologist to suitable habitat outside the work space. Conditions for work in streams will be established under Section 1600 of the Fish and Game Code, sections 401 and 404 of the Clean Water Act, and the project Individual Incidental Take Permit from the Service. The appropriate permits will be obtained prior to any work in streams.

- The fence around the Tank 1 and water treatment plant site will be inspected twice annually, and immediately (within 24 hours) if any San Joaquin kit fox are found within the fence, for holes and burrows or erosion under the fence that could allow San Joaquin kit fox to enter the site. Repairs will be made after any burrows are checked, using protocol surveys, to verify that no San Joaquin kit fox are present. Any San Joaquin kit fox found inside the fence will be allowed to escape through gates in the fence. If the San Joaquin kit fox does not leave, the Service/CDFW will be contacted to determine how to remove the animal from the facility.
- At the water treatment plant, the sludge lagoons will be operated and maintained to minimize the potential for take of California red-legged frogs and California tiger salamanders. Emergent vegetation that colonizes the lagoons will be treated with herbicide (Aqua Master® that is approved in California for use in aquatic environments) as soon as the plants extend above the water surface and are treatable, and the full (of sludge) lagoon will be dried out starting about January so that it is dry by late summer (about August, similar to drying of vernal pools). Surveys for California red-legged frogs and California tiger salamanders will be conducted if work in the lagoons or drains from the water treatment plant is necessary at any other time of year. Any California red-legged frogs found in the lagoons or at the drains from the plant will be captured and relocated (as described above) to the ponds near the access road by qualified biologists if project O&M activities could result in take of the frogs. California tiger salamanders found in the lagoons will be captured by seine, dip net, or shad scoop and transferred to the ponds in a clean bucket with water from the lagoon.
- Speed limit on the Tank 1 access road will be 25 mph, and signs for the speed limit will be posted at regular intervals along the road in the areas where California red-legged frogs would likely cross the road. Deliveries and visitors (e.g., janitors and vendors) will be scheduled between 7 AM and 5 PM, except in emergencies. The speed limit will be enforced by initial warnings (two) to non-CCWA personnel followed by termination of contracts with offending businesses for a third infraction. For CCWA personnel, the first infraction results in a verbal warning, the second results in a written warning, and the third results in time off or termination. This issue also will be taken up through annual performance reviews for salary increases.
- Surveys will be conducted in the sludge monofill area to determine if any active San Joaquin kit fox dens are present prior to disposal of sludge. Any active kit fox dens found will be avoided as described above.
- Any covered species found within project facilities (e.g., San Joaquin kit fox, California red-legged frog, California tiger salamander) will be allowed to escape. If this is not feasible, the individual(s) will be captured and relocated to suitable habitat by Service-approved biologists. For kit fox, the Service/CDFW will be contacted to determine how to capture and remove the animal. If neither agency can be reached in approximately two hours and the animal is in danger of injury or mortality if not captured, the best judgment of the Service-approved biologist will be used to handle the situation. If capture is necessary after work hours or on a weekend/holiday, the animal will be captured and relocated if uninjured, and the Service will be notified by phone message or fax within 48 hours. Injured animals will be handled as described in Section 7.3.
- CCWA's Regulatory Specialist will provide annual environmental training, as well as updates, for all affected operations and maintenance personnel, including at the Tank 1 and

water treatment plant site. New hires will be trained prior to commencing work. The training will discuss protection of covered species/habitats addressed in the HCP, procedures to follow when working or driving in/adjacent to those habitats, and the consequences of failing to comply with the protection measures in the HCP. The Regulatory Specialist will keep training records to ensure compliance and include them in the annual reports (see Section 7.3).

- No intentional intrusions upon, killing, or collection of covered species at or around CCWA work sites will be permitted. If California red-legged frog, California tiger salamander, or San Joaquin kit fox are found within an operation, repair, or maintenance work area and could be taken as a result of the work, they will be allowed to move out of the work area or will be removed by approved/permitted biologists and relocated to appropriate habitat using the methods described above. If any other covered species are found and could be taken as a result of the work, adaptive management procedures (see Section 7) will be followed.
- For work in streams where covered species could be present, all appropriate permits will be obtained, including a Corps permit and consultation with the Service. Work will be conducted in accordance with the permits and any conditions therein. The following measures will be included in the permit applications as appropriate:
  - Isolate the workspace from flowing water for the purpose of avoiding heavy equipment in flowing water, sedimentation, turbidity, and direct effects to covered species. Prior to work, sandbag cofferdams, straw bales, culverts, or visqueen (hereafter referred to as diversion) shall be installed to divert stream flow away from or around the work space. The diversion shall remain in place during the work and will be removed immediately after work is completed.
  - When isolating the workspace from flowing water, ensure and maintain a corridor for unimpeded passage of aquatic species during work activities.
  - Use existing ingress or egress points, if available, or perform work from the top of the creek banks, for the purposes of avoiding work and heavy equipment in flowing water and disturbing instream habitat.
  - Photograph the work space immediately before, during, and after work activities are completed for the purpose of developing a reference library of instream and riparian habitat characteristics.
  - Excavation of a channel for the purpose of isolating the workspace from flowing water is prohibited.
  - Minimize disturbance to riparian and upland vegetation. Replace vegetation (shrubs and trees) affected by the work with native species and ensure a success ratio of no less than 2:1.
  - Revegetate soil exposed as a result of work activities using seed casting, hydroseeding, or live planting methods no later than 30 days after the work has been completed. If the season is not appropriate for planting within 30 days, soil surface will be mechanically stabilized and planting will occur in the next appropriate season. Only native species shall be used for hydrophytic, shrub, and tree revegetation. Willow cuttings will be planted in fall, after the rains begin, if no water is present in the stream when work is complete.

- Revegetated areas shall be inspected during spring and fall for 2 years for the purposes of qualitatively assessing growth of the plantings or seedlings and the presence of exposed soil. The presence of native and non-native vegetation and extent (percent area) of exposed soil shall be noted, and the area shall be photographed during each inspection.
- A plan for restoring instream habitat within the areas affected by work activities to pre-work conditions and characteristics shall be developed and implemented.
- A qualified biologist shall continuously monitor placement and removal of the diversion for the purpose of removing species covered by the site-specific permits that would be adversely affected. The qualified biologist shall capture any such species stranded in residual wetted areas as a result of stream flow diversion and workspace dewatering, and relocate the individuals to a suitable instream location either immediately upstream or downstream of the work area. The biologist shall note the number of such species observed in the affected area, the number of individuals relocated, and the date and time of the collection and relocation. One or more of the following methods shall be used to capture the species: dip net, seine, throw net, minnow trap, and hand. Electrofishing is prohibited from use.
- The biologist shall daily monitor work activities, instream habitat, and performance of sediment control/detention devices for the purpose of identifying and reconciling any condition that could adversely affect covered species or their habitat. The biologist shall be empowered to halt work activity and to recommend measures for avoiding adverse effects to covered species and their habitat. The biologist shall ensure a corridor for unimpeded passage of aquatic species during the work.
- The biologist shall contact the Service immediately if one or more individuals of covered species are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required.
- Erosion-control and sediment detention devices shall be incorporated into work activities and implemented immediately before commencing work. These devices shall be in place during construction activities, and after if necessary, for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water, and of detaining sediment-laden water on site. The devices shall be placed at all locations where the likelihood of sediment input exists.
- Placement of any soil/sediment berm for isolating any workspace from flowing water is prohibited.
- When dewatering an area, either a pump shall remove water to an upland disposal site, or a filtering system shall be used to collect then return clear water to the creek for the purpose of avoiding input of sediment/water slurry to flowing water. The pump intake shall be fitted with fish exclusion netting or a device that excludes fish.
- Provide a written monitoring report to the Service within 15 working days following completion of any work activity. The report shall include the number of individuals of covered species killed or injured during the work activity and biological monitoring; the number and size of all life stages observed/relocated; and photographs taken during, before, and after work activity.

- Provide a written report describing results of the revegetation task to the Service within 15 working days following completion of revegetation. The report shall include a description of the locations planted or seeded, the area (sq ft) revegetated, a plant palette, planting or seeding methods, proposed methods to monitor and maintain the revegetated area, performance or success criteria, and pre- and post-planting color photographs of the revegetated area.
- Include the results of the vegetation monitoring in the annual HCP report. The report shall include color photographs taken of the restored work area, and estimated percent of exposed soil remaining within each area affected by the work.

2.10.6 Timing Restrictions

- Routine O&M work in or immediately adjacent to drainages will be scheduled for and completed during the dry season (approximately April 1 to November 1), except at those locations where the presence of species covered in this HCP and migratory bird nesting alters that window or with prior approval from the Service and CDFW (as appropriate).
- In California tiger salamander habitat (Tank 1 area; Stations 4949 to 5134 and 980-1184), work will be confined to the period from June 1 to December 1 to avoid the breeding season, or during dry periods outside that window when activities such as erosion repairs are necessary.
- In California red-legged frog habitat (known and potential as listed in Appendix A), work requiring ground disturbance will be performed between August 1 and November 1, or December 1 if winter rains have not begun. Protection measures described in this HCP will be implemented. These include (as appropriate for specific sites):
  - Installation of barriers (e.g., smooth metal in uplands and stagnant water; ¼-inch mesh in flowing water with flashing on top edge) to keep California red-legged frogs out of the work area.
  - Installation and maintenance of sediment and erosion controls.
  - Relocation of California red-legged frogs (all life stages) from the work area to suitable habitat nearby by qualified biologists, using current protocols.
  - Training of workers (see Section 2.10.1).
  - Monitoring at regular intervals that depend on site-specific conditions during the work to verify that no California red-legged frogs have entered the work area.
  - Removal of barriers as soon as work is complete, either by qualified biologists or monitored by them.
  - Restoration of habitat to pre-work contours and revegetation with native species.
  - Monitoring after revegetation to verify that criteria for restoration have been met.
- At the Santa Ynez River blowoff valve (Station 1366+60), discharges to the river bed by hose generally will be scheduled for September 1 to December 1 to avoid disturbance to nesting southwestern willow flycatchers or least Bell's vireo. Discharges may be scheduled for December through March if the discharge can be made such that no project water flows into the river.

- At the three Santa Ynez Extension II (Meadowlark Lane area to Lake Cachuma) blowoffs, two located adjacent to the Santa Ynez River and one at Santa Agueda Creek, discharges (if needed) will be during the dry season when minimal to no flow is present in Santa Agueda Creek and flows are low in the river. Discharges from the Cachuma Village blowoff will be to uplands such that no project water flows into the river. Releases will be in accordance with Section 2.10.3.
- At all locations shown in Table 2-2, except the Santa Ynez River, schedule dewatering discharges for August 1 to December 1. Discharges can be scheduled in December for streams inhabited by California red-legged frogs if surveys show that no eggs or larvae are present within 1,000 feet of the discharge if no water is present or if no major rainfall events (greater than one inch) have occurred that fall.
- In drainages with riparian habitat that supports nesting of covered or migratory birds or where the construction Biological Opinions (federal and state) identified restrictions (e.g., Salinas River, San Juan Creek, San Luis Obispo Creek, Arroyo Grande Creek, and Tar Spring Creek), work will be performed during the dry season after nesting has been completed (generally after August 1 for most species) except when surveys show that no nesting is occurring at or near the work site.
- In shrub and tree areas, vegetation cutting or tree removal will be confined to August 1 to December 1 unless surveys by a qualified biologist show that no covered bird species or migratory birds are nesting there.

2.10.7 Hazardous Materials

- Hazardous Materials Business Plans (Appendix G) for O&M activities along the pipeline and at the water treatment plant will be followed at all times. These plans will be revised as necessary to cover additional accidents or changes in hazardous materials used during the life of the project.
- Storage of hazardous materials such as fuels, lubricants, solvents, and disinfection chemicals will be in designated storage areas at existing project facilities, or in staging areas for maintenance work at least 100 feet away from drainages, wetlands, and stream beds. Specific plans for storage of hazardous materials at staging areas will be established prior to any work that requires use of these materials.
- Servicing of equipment and refueling will occur within the approved work area but will not be allowed within 100 feet of any habitat for a covered species, stream bed, wetland, or drainage unless expressly approved by CCWA supervision and an approved/permitted biologist.
- Sorbent materials will be maintained on site for immediately cleaning up minor spills (i.e., a few gallons).
- All contractors hired for maintenance work involving use of equipment in areas where hazardous materials could enter drainages or natural vegetation will prepare a spill response plan (see Appendix G) to be approved by CCWA prior to the work. For work in or adjacent to habitat for covered species, the plan will be submitted to the Service for review. The plan will specify excavation and transportation procedures for spills that contact natural soils, cleanup methods for aquatic habitats (if appropriate), measures to protect covered species (including notification of the Service if covered species could be affected),

regulatory compliance and documentation procedures, and designation of a destination for proper treatment and/or disposal of contaminated materials.

- Storage or use of hazardous materials in or near streams will be consistent with CDFW and all other applicable regulations.

2.10.8 Fire Control Procedures

- No fire will be permitted in a CCWA construction area.
- Smoking by contractor personnel will be allowed only in designated areas cleared of vegetation or in enclosed vehicles as specified in contracts and enforced by CCWA inspectors. CCWA personnel are not allowed to smoke in facilities, vehicles, or along the pipeline corridor.
- All construction equipment and workers' vehicles will be equipped with appropriate spark arrestors. Mowing equipment will not be used during high fire conditions, except in emergencies.
- Fire extinguishers and a shovel will be available at all construction sites and on all work-related vehicles.
- During construction-type O&M activities in high fire hazard areas, CCWA supervisors will maintain daily contact (by phone and e-mail) with local firefighting agencies throughout the dry season to be updated on fire conditions. Fire conditions will be communicated to all maintenance personnel.
- All contractors hired by CCWA for maintenance work in areas where fires could start in natural habitats will prepare and implement a CCWA-approved fire protection and control plan (see Appendix H) before beginning work.

3.0 SUMMARY OF EXPECTED IMPACTS

Operations and maintenance activities have the potential to result in take of covered species or to adversely affect their habitat. Protection measures will be implemented during activities that could result in take of covered species as described above in Section 2.10. As a result, take is expected to be low, and most impacts to covered species habitat are expected to be localized and temporary. The following sections describe the general types of impacts that could occur from O&M activities. Impacts to habitat and take for each covered species are discussed in Section 4.

3.1 POLONIO PASS WATER TREATMENT PLANT

San Joaquin kit fox are known to be present in the vicinity of the water treatment plant and could enter the fenced facility through burrows under the fence, erosion that allows access under the fence, and holes in the fence. San Joaquin kit fox that enter the facility could be injured or killed by vehicle traffic or other O&M activities. San Joaquin kit fox could also be injured or killed by collision with vehicles coming to and from the facility. The potential for San Joaquin kit fox to enter structures at the treatment plant (e.g., buildings or vaults) is very low since most are kept closed. Activities associated with disposal of the treatment process sludge at the monofill site have a low potential to cause take of San Joaquin kit fox as well because the monofill area is checked prior to each disposal event to determine if any active San Joaquin kit fox dens are present. Any found will be avoided (Section 2.10.5).

California red-legged frogs are present in several man-made ponds on both sides of the access road to the treatment plant and in the drainage (OP-7A) just west of the facility site. During the rainy season, California red-legged frogs could move between ponds over land (and the access road), making them susceptible to mortality from vehicle traffic on the access road. Storm drains from the facility and the water tank underdrains and overflow empty into the drainage (OP-7A) that contains California red-legged frogs just west of the facility. Effects of storm drain water are expected to be negligible since the water would mix with runoff from the surrounding area. Transport of pollutants spilled at the treatment plant site that could wash into the storm drains is the primary source of potential take. Cleanup of pollutant spills such that spilled materials hazardous to aquatic life do not enter the storm drains until either neutralized or diluted to below toxic levels will minimize this potential. California red-legged frogs have been observed in the sludge lagoons and could be affected by drying of the lagoons (e.g., stranding of eggs and tadpoles). Removal of emergent vegetation that colonizes the lagoons is not expected to result in take of this species because only herbicides approved as safe for use in aquatic habitat would be applied following manufacturer guidelines..

California tiger salamanders could potentially use the ponds near the access road, and the sludge lagoons, for breeding and use burrows in adjacent grasslands for shelter the remainder of the year. Operation of the treatment plant would result in no take of this species during breeding because measures to avoid take of California red-legged frog tadpoles would also protect tiger salamander larvae. Placement of dried sludge from the lagoons into the monofill site has a low potential to affect tiger salamanders because the monofill area will be checked for burrows during the kit fox den surveys, the material is light and will not be compacted (i.e., tiger salamanders would be able to push through the material to exit the burrow), and few if

any tiger salamanders would be expected to use the monofill area due to distance from the ponds.

3.2 PIPELINE OPERATION

As described above in Section 2.2, discharge of SWP water to the Santa Ynez River has been covered under the Biological Opinion for operation of Bradbury Dam, and service area impacts are not covered by this HCP. Normal operation of the pipeline would not affect covered species. Effects of maintenance activities are discussed in the following sections.

3.3 ACCESS

Driving about once a month and mowing (generally once in the spring) in covered species habitat (e.g., San Joaquin kit fox and California tiger salamander) could cause a collapse of occupied burrows and the death of any trapped animals. The potential for such impacts is reduced by the requirement that driving be confined to existing roads and a two-track over the pipeline where such roads are not present. Few burrows would be expected in those locations, and driving and mowing during dry conditions when soils are hard will minimize the potential for burrow collapse. Driving on two-tracks when soils are moist (in winter and spring) would have a low potential for causing burrow collapse because few if any burrows are expected to be present in the two-track.

Vehicle traffic on project roads or in the pipeline corridor could also result in injury or death of San Joaquin kit fox, California tiger salamander, and California red-legged frog through collision. O&M personnel will receive environmental training that addresses such issues, including information about the species and their habitats, reporting requirements, and penalties.

Where access is by dirt road or track, compaction of the tracks and formation of ruts could increase erosion of slopes by channeling storm runoff. The eroded sediments would be deposited in low areas, including streams. Mowing the access track in grass and shrub habitats will keep vegetation low. Mowing in San Joaquin kit fox habitat (Tank 1 to Station 2083) would be in grassland only and would not permanently change the plant community. Mowing in shrub habitats may cause a permanent change in the plant community by altering the species composition, but no animal species covered in this HCP are expected to occur in these habitats. Erosion control will be implemented in project areas where erosion occurs along or as a result of access roads. This could include installation of water bars and revegetation on an as needed basis.

Use of fixed-wing aircraft or helicopters at 1,000 feet above ground level (AGL) for surveillance of the pipeline corridor during the dry season (summer and fall) could affect covered species, such as the San Joaquin kit fox, that are sensitive to such noise. Flights would be in the daytime when San Joaquin kit fox are usually in dens. The covered bird species could still be nesting into summer, but overflights would be primarily over grassland and sparse shrub habitats where nesting of these species does not occur. In addition, known or potential locations of covered bird species (see Appendix A) will be avoided by such flights. Covered amphibians and fish are not expected to be adversely affected by such overflights, and no take would occur.

3.4 ROUTINE INSPECTION/MAINTENANCE – ABOVE GROUND FACILITIES

Inspection of vaults and field checks of cathodic protection test stations would cause no take of covered species (e.g., San Joaquin kit fox) other than those associated with access to these facilities. Maintenance/repairs of equipment inside vaults is also expected to cause no take of covered species because none are expected to be present. If any with authorized take (California red-legged frog, California tiger salamander, or San Joaquin kit fox) are present, however, they would be captured and released (a form of take) by qualified biologists approved or permitted by the appropriate agencies. For covered species with no authorized take, adaptive management procedures would be followed (see Section 7).

Maintenance activities to keep culverts under access roads clear of debris have the potential to result in take of covered species such as the California red-legged frog either directly or indirectly. These activities will be conducted during the dry season, except in emergency situations, and normally will be completed within one day. Take in the form of injury or mortality is unlikely because habitat will be inspected by a Service-approved biologist prior to work in those locations. If covered species are observed, appropriate protective/avoidance measures (see Section 2.10) will be implemented. Relocation of any covered species would result in take in the form of capture, and possibly injury or mortality of some individuals. Take through indirect effects could occur as a result of habitat alteration caused by the maintenance activity. The area of habitat affected would be small, usually within the area where habitat has been previously altered (culverts), and of short duration (a few hours).

3.5 DEWATERING FOR MAINTENANCE/REPAIRS

Two types of intentional dewatering may be necessary during O&M: (1) draining segments of pipe and (2) removing water from or bypassing water around the work space for repairs in drainages, in vaults that have become flooded (by proximity to streams or by equipment failure), or where the water table is high. Dewatering will, by necessity, occur in topographically low areas that are either in or near drainage ways. Release of water into flowing streams and installation/removal of temporary bypass facilities (e.g., flumes) has the potential to cause increased water flow, temporary alteration of habitat, and the potential for scour, turbidity, and sediment deposition. The species and life stages taken, if any, would depend on the location, timing, and volume of the discharge. In some cases, addition of water to drainages during the dry season could temporarily benefit the species by increasing habitat available. Short duration discharges during winter to spring would be similar to runoff from a storm at that time of year and could affect breeding in California red-legged frogs, particularly in smaller streams. The potential also exists that some individuals could be stranded as released water is reduced or eliminated. Erosion of the bank or bed from discharges into flowing or dry streams could cause turbidity and sedimentation downstream. Water bypass facilities would temporarily dewater a short (usually less than 100 feet) segment of stream habitat, but is not expected to prohibit movement of aquatic organisms. Dewatering of some pipeline segments is expected to occur at approximately 2-year intervals and to be scheduled for the fall. Since covered species are not present at most dewatering sites, the dewatering frequency at sites where they are present will be less often.

Erosion and sediment control as well as energy dissipation measures will be installed and maintained during dewatering activities to prevent and minimize environmental damage both

at the dewatering site and downstream. Individuals of covered species with authorized take that could be adversely affected will be relocated from the work space before it is dewatered by qualified biologists approved or permitted by the Service and relocated to nearby suitable habitat. Handling of these animals has the potential for causing stress, injury, or mortality of individuals moved. For planned water releases into any stream, unless visual observations show that no surface water is present in the entire area that could be affected by the discharge, chloramines will be removed from the water during the release using portable decloramination units. (The reaction of sodium thiosulfate with chlorine/chloramines is instantaneous. CCWA staff monitor the discharge stream approximately 50 feet downstream to be sure no residual remains.) Such releases will be scheduled to avoid or minimize take of covered species (see Section 2.10.3).

3.6 GROUND DISTURBANCE/EXCAVATION FOR MAINTENANCE/REPAIRS

O&M activities or construction of new turnout vaults (see Section 2.2) requiring excavation or other ground disturbances will cause a temporary loss of habitat for foraging (e.g., San Joaquin kit fox) and burrows (e.g., San Joaquin kit fox and California tiger salamander). Excavation also would occur when buried blowoff valves or manholes (primarily from Arroyo Grande to Santa Ynez) need to be used or when repairs to buried structures are necessary. All but the excavation of buried blowoff valves or manholes are not a routine maintenance activity, are expected to occur infrequently over the life of the project, and will be covered under changed circumstances (Section 6). The area affected by blowoff or manhole excavation would usually be less than 100 feet by 100 feet and at less than four locations per year with most in areas having no covered species. As described in Section 2.6, a concrete structure from the blowoff structure to the ground surface will be installed the first time such excavation is needed, eliminating the need for future excavation. Such activities would last for several weeks to months and, with the exception of emergencies, would be scheduled for the dry season to minimize erosion and sediment runoff from the work area. Covered plant species, if present in the work area, could be crushed or removed. Excavation at stream crossings, non-routine activity covered under changed circumstances, could result in a temporary loss of habitat for aquatic species such as California red-legged frogs, and a possible temporary disruption of their daily movement patterns. Runoff of sediments to adjacent streams could occur if work takes place during the rainy season particularly if exposed soil is not protected. Dewatering effects at stream crossings have been addressed above. Open pits during repairs have the potential to trap animals such as San Joaquin kit fox. Implementing species protection measures, such as installing barrier fencing and relocation of animals within the work space (by qualified biologists for covered species), has the potential to result in mortality to the animals due to stress or accidental injury. Increased human activity in or adjacent to covered species habitat could result in harassment of those species through noise and visual presence.

Covered species will be avoided where feasible through use of pre-construction surveys (in appropriate seasons) to determine if any such species are present and through scheduling repair or turnout vault construction activities for times when the species are not likely to be present. Avoidance of breeding and nesting seasons for all covered species, as well as migratory birds, will also be included in scheduling the work (see sections 2.10.5 and 2.10.6). Any covered animal species, for which take is authorized, found within the work space will be relocated to nearby suitable habitat by qualified biologists. Open trenches or pits in covered species habitat will be closed as soon as feasible. The openings will be covered or have escape

ramps installed at the end of each work day. Pipe ends will be plugged at the end of each day to prevent animals from entering.

3.7 VEGETATION/PEST CONTROL

Annual mowing or cutting vegetation within about 6 feet of vaults and other structures as well as along access tracks would keep vegetation low for portions of the year in those areas (see Section 3.3). The area affected in habitat for San Joaquin kit fox is estimated to be 1.3 acres around the vaults (400 square feet at each of 137 vaults) and approximately 8.7 acres along the access tracks (strip about 2 feet wide in 36 miles of two-tracks) in Reaches 1 and 2 and to Station 2083 in Reach 3. Mowing would also occur around vaults and along approximately 35 miles of two-tracks in the remainder of the pipeline corridor, but little of this would be in habitat for covered species. Mowing would make the vicinity of vaults less attractive to species seeking cover and reduce the potential for take from collision with inspection vehicles. The small area affected would have negligible effects on habitat for these species. Mowing has the potential to result in mortality of individual California red-legged frogs taking cover within the grass. Impacts of the access tracks on vegetation and San Joaquin kit fox habitat were assumed to be permanent (see Section 5.3) and have been mitigated as a part of construction. Mowing the access tracks is expected to have no impacts on migratory birds that nest in grasses because nesting is unlikely to occur in the strip between the tire tracks due to vehicle traffic.

Removal of trees that would become large (e.g., oak and sycamore) within 10 feet of the pipe centerline using mechanical equipment would cause a temporary disturbance when the activity occurred. This could disrupt nesting southwestern willow flycatchers, least Bell's vireo, or Swainson's hawks (covered species) if their nests were adjacent. The removal in or near habitats for these and other migratory bird species will be scheduled for the fall after nesting is complete to avoid such impacts.

3.8 ENVIRONMENTAL TRAINING

Environmental training of project personnel, contractors, and consultants will not result in take of covered species. This training is conducted to avoid or minimize the potential for take of these species and to avoid take of nesting migratory bird species.

3.9 MITIGATION SITES FOR CONSTRUCTION IMPACTS

Restoration and maintenance activities at the Arroyo Grande Mitigation Site as well as access into the site have the potential to result in take of covered species. For example, mechanical weed control activities could injure California red-legged frogs using upland habitats adjacent to Arroyo Grande Creek. The potential for such take is very low since weed control generally occurs during the late spring and summer when the frogs are not likely to be very far from the creek, and weed control will be reduced or eliminated once the riparian vegetation has developed. Repair activities for the bridge over Arroyo Grande Creek and beaver dam breaching or removal also have the potential to result in take of California red-legged frogs. The timing and amount of bank repair necessary for protection of the bridge will depend on how much bank erosion is caused by high flows during spills at Lopez Dam. Such repairs will be addressed under changed circumstances (Section 6).

Breaching or removal of beaver dams near the bridge has the potential to result in take of California red-legged frogs due to lowering the water level in the pond formed by the beaver dam. This could strand red-legged frog eggs above the lowered water level if breaching occurred during their breeding season in the spring. As described in Section 2.9, a plan will be prepared that includes a description of the action and alternatives, timing, and measures to avoid or minimize take of California red-legged frogs. The plan will be submitted to the Service and other appropriate agencies for approval prior to the work. Impacts to covered species will be avoided or minimized through use of the protection measures in the HCP. All appropriate permits will be obtained, and their conditions will be implemented.

Driving on access roads within the mitigation sites where covered species are present (such as California red-legged frogs) has the potential for take of those species through vehicle collision. Red-legged frogs are known to be present in Arroyo Grande Creek and potentially could be present at the Cuesta North Portal site.

4.0 BIOLOGICAL DATA AND UNAVOIDABLE EFFECTS

A number of federally-listed species are known or have the potential to occur in the project area. Many of these are also state-listed. Table 4-1 lists the covered species addressed in this HCP along with their listing status as of March 2013.

Table 4-1. Species Covered by the HCP

Common Name	*Scientific Name*	*Federal Status*	*State Status*
San Joaquin kit fox	*Vulpes macrotis mutica*	E	T
California red-legged frog[1]	*Rana (aurora) draytonii*	T	SSC
California tiger salamander[2]	*Ambystoma californiense*	E/T	T
Southwestern willow flycatcher[3]	*Empidonax traillii extimus*	E	E
Least Bell's vireo	*Vireo bellii pusillus*	E	E
Unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*	E	E, FP
Tidewater goby[4]	*Eucyclogobius newberryi*	E	SSC
Arroyo toad[5]	*Anaxyrus (Bufo) californicus*	E	SSC
Chorro Creek bog thistle	*Cirsium fontinale* var. *obispoense*	E	E
Gambel's watercress	*Rorippa gambellii*	E	E
Pismo clarkia	*Clarkia speciosa* ssp. *immaculata*	E	R
La Graciosa thistle[6]	*Cirsium loncholepis*	E	E
Swainson's hawk	*Buteo swainsoni*	--	T
Seaside bird's-beak	*Cordylanthus rigidus* ssp. *littoralis*	--	E

1. Revised critical habitat designated on March 17, 2010
2. Critical habitat in Santa Barbara County designated on November 24, 2004 and for central population on August 23, 2005; federally listed as E in Santa Barbara County and T in San Luis Obispo County; Fish and Game Commission adopted regulations for state listing species as threatened on May 20, 2010
3. Entire species is state-listed; critical habitat for subspecies designated on October 19, 2005 and revised on January 3, 2013
4. Additional critical habitat designated January 31, 2008 and revised on February 6, 2013
5. Critical habitat designated on April 13, 2005 and revised on February 9, 2011
6. Critical habitat designated on March 17, 2004

E = Endangered, T = Threatened, SSC = Species of Special Concern, FP = Fully Protected, R = Rare

The San Joaquin kit fox, California red-legged frog, and California tiger salamander would benefit from implementation of measures in the HCP to minimize or avoid take of covered species while the other species would benefit from measures to specifically avoid take.

4.1 COVERED SPECIES WITH TAKE AUTHORIZED

4.1.1 San Joaquin Kit Fox (*Vulpes macrotis mutica*)

Species Description

The San Joaquin kit fox was listed as endangered by the Service on March 11, 1967 and as threatened by the State of California on June 27, 1971 (CDFG 2000). It is one of eight recognized subspecies of San Joaquin kit fox. The following description was taken from the State Biological Opinion (CESA No. 9317 in USFWS 1993a).

The San Joaquin kit fox resembles a small lanky dog with disproportionately large ears. Coloration ranges from light buff to grayish along the back and tail (which is black tipped), gray to rust or yellowish along the sides, and white on the belly. Total length, with tail, is about

32 inches. The species hunts for rodents, rabbits, and other prey by night from dens that are typically excavated in loose soil. Individual animals may use from 3 to 24 separate dens, and one den may have 1 to 36 entrances that extend into several individual tunnels and chambers reaching depths of up to 10 feet. Man-made structures such as culverts and pipes may also be used as dens. Den entrances are characteristically higher than wide and are small enough to prevent access by large carnivores such as coyotes. The entrance dimensions are generally about 8 to 10 inches in height and less than 8 inches in width but may be as narrow as 4 inches. Burrows of other animals, particularly California ground squirrels, may also be opportunistically enlarged and used as den sites. Although occupied dens may show freshly excavated soil, scat, and prey remains, such obvious sign may also be inconspicuous or absent.

San Joaquin kit fox forage and live in an area of 1 to 2 square miles. Mating occurs in December to January, and pups are born in February to March. The young begin to disperse at around five months of age. Survival rates for San Joaquin kit fox pups are low with about 25 percent of the pups surviving beyond eight months. Mortality for this species has been documented to occur from attacks by coyotes, road kills, conversion of habitat, shooting, drowning, entombment, pneumonia, and starvation. In addition, widespread non-project use of rodenticides may result in mortality, since San Joaquin kit fox are extremely vulnerable to secondary poisoning through consumption of poisoned ground squirrels or other scavenged rodents.

The San Joaquin kit fox historically inhabited a large portion of central California, extending roughly from southeastern Contra Costa County south along the eastern edge of the Interior Coast Range to the southern San Joaquin Valley, including major portions of western Kern and Tulare counties. San Joaquin kit fox were also distributed through adjacent valleys, foothills, and plains, including portions of San Luis Obispo County, Monterey County, and the Santa Clara Valley on the western side of the Interior Coast Range. Habitat conversion has been the principal reason for state and federal listing of the species as endangered. Agricultural development is the principal contributing factor to the decline of available San Joaquin kit fox habitat. By 1983, approximately 42 percent of "suitable" San Joaquin kit fox habitat had been lost as a result of such developments.

Status in Project Area

San Joaquin kit fox are known to forage and use dens in the project area from Tank 1 to the ridge between La Panza and O'Donovan roads (Station 2083) in Reach 3 (CNDDB 2003). The species is known to occur in the Big Sandy Wildlife Area. Abundance in the project area is not known.

Effects of Proposed Action

Vehicle traffic on access roads (approximately once per month) associated with O&M activities has the potential to cause mortality of San Joaquin kit fox through collision with the animals or collapse of burrows. The probability of this happening is very low due to the low frequency of vehicle traffic, such traffic being in the daytime only, the sparse distribution of San Joaquin kit fox, and regular environmental training of project personnel. Few, if any, individual San Joaquin kit fox are expected to be taken (injured or killed) over the life of the project through collision with project vehicles. Vehicle traffic on two-tracks in the pipeline corridor could result in collision with individuals of this species as well as collapse of burrows. Mowing the two-tracks and about 6 feet around vaults would change the habitat from tall to short herbaceous vegetation for several weeks to months following the mowing in the spring. The mowing

would reduce the potential for collision with vehicles by increasing visibility and reducing the suitability of the habitat for cover. The amount of habitat affected would be approximately 1.3 acres around the vaults and about 8.7 acres associated with the two-tracks (within permanent impact area). Collapse of burrows by project vehicles driven along the two-tracks is expected to be negligible because most of the driving would be when soils are dry and hard, few if any burrows are expected in the two-track, and the number of vehicle trips will be low. Use of fixed-wing aircraft or helicopters at 1,000 feet AGL for surveillance of the pipeline corridor during the dry season (summer and fall) would have minimal effects on San Joaquin kit fox since most would be in dens during the day and overflights would be of short duration.

Erosion of access roads or tracks potentially could result in deposition of sediments in low areas used by San Joaquin kit fox, thus degrading that habitat for cover or foraging. The amount of habitat affected would be small because the amount of erosion in a road or track would be small (a few inches to feet wide by up to several hundred feet long) and most of the sediment is likely to enter drainages in the low areas.

In addition, earth-moving activities between Tank 1 and Station 2083 could impact dens by collapsing or excavating them. Animals in the dens could be trapped or killed. Surveys will be conducted for three days using tracking medium or an infra-red beam camera (see Appendix F) to determine if any active San Joaquin kit fox dens are present prior to any earth-moving activities, and these will be flagged for avoidance (Section 2.10.5). Earth-moving activities in San Joaquin kit fox habitat are expected to occur infrequently over the life of the project, could affect approximately 0.2 acre for each occurrence, and are covered under changed circumstances. The location will depend on where erosion or pipeline repairs are needed.

Operation of the sludge monofill, located outside the water treatment plant site fence, has a low potential to result in take of San Joaquin kit fox. Sludge from the lagoons (inside the fence) is transported to the monofill site by truck during the day which is unlikely to encounter any individuals of this species. Placement of sludge in the monofill could cover burrows used by San Joaquin kit fox that have entered the monofill site and has the potential to trap the animal in the burrow. The monofill area will be inspected prior to use to determine if any potential San Joaquin kit fox burrows are present, and any found will be avoided (see Section 2.10.5).

San Joaquin kit fox could also get inside the Tank 1 and water treatment plant perimeter fence via ground squirrel or badger burrows, holes in the fence, or erosion. San Joaquin kit fox that enter the site could be injured by collision with vehicles or by other O&M activities. Although very unlikely, San Joaquin kit fox could become trapped in buildings or open vaults on the site. Any San Joaquin kit fox found within the facilities will be allowed to escape or be removed as described in Section 2.10.5. Since the facility is new, holes in the fence are not anticipated for many years. Erosion and burrows by ground squirrels or badgers could occur throughout the life of the project. CCWA staff, however, will inspect the perimeter fence twice annually to detect burrows, erosion, and holes, or when San Joaquin kit fox are found inside the facility. Holes and erosion will be repaired while burrows will be filled after surveys to verify that San Joaquin kit fox are not present in the burrows. Few, if any, individual San Joaquin kit fox are expected to be taken (injured, harassed, captured and released) at the Tank 1 site.

The accident most likely to affect San Joaquin kit fox would be fire. Habitat would be temporarily altered until vegetation grows back. This would reduce cover and potentially prey abundance. Water spills in upland areas could cause erosion of habitat and potential flooding

of burrows. The amount of habitat affected would likely be a linear corridor where the water flows. The size of the area impacted would depend on the location and topography.

CCWA O&M staff will be given environmental training annually (see sections 2.8 and 2.10.5). Records for new locations of covered species within the project area will be checked at least annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A).

4.1.2 California Red-legged Frog (*Rana draytonii*)

Species Description

The California red-legged frog was proposed for listing as endangered on February 2, 1994 (USFWS 1994a). The species was listed as threatened on May 23, 1996 (USFWS 1996a), and the final rule became effective on June 24, 1996. Critical habitat was designated for the California red-legged frog on March 13, 2001 (USFWS 2001a) and includes essential aquatic habitat, associated uplands, and dispersal habitat connecting essential aquatic habitat. This designation was rescinded, and the boundaries were to be redrawn by 2005 under a legal agreement signed on July 2, 2002 (SFGate.com, July 4, 2002). The revised critical habitat was proposed on April 13, 2004 (USFWS 2004a), further revised in 2005 (USFWS 2005a), and designated on April 13, 2006 (USFWS 2006a). Revised critical habitat was again proposed on September 16, 2008 (USFWS 2008b) and designated on March 17, 2010 (USFWS 2010a). The following description was taken from the Biological Opinion (1-8-96-F-16) for the Coastal Aqueduct (USFWS 1996b), the final listing rule, and the proposed rule for critical habitat (USFWS 2004a, 2005a).

The California red-legged frog is one of two subspecies of the red-legged frog (*Rana aurora*) found on the Pacific coast. It is a fairly large frog with adults reaching 5 inches (snout to vent length). The skin of the back is brown, gray, olive, red, or orange with dark flecks or spots. A prominent dorsolateral fold of skin extends from the eye to the hip. The underside is white, often with patches of bright red or orange on the abdomen and hind legs. The final listing rule states that the species occupies a fairly distinct habitat, combining both specific aquatic and riparian components. Adults prefer dense, shrubby or emergent riparian vegetation closely associated with deep (more than 2.3 feet in depth), still or slowly moving water. However, recent observations indicate that California red-legged frogs will occur in a variety of habitat types, including aquatic, riparian, and upland habitats with permanent water nearby. Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter, foraging areas, and dispersal corridors. California red-legged frogs breed from November through April, with the earlier breeding records occurring in southern localities. Eggs hatch in 6 to 14 days while larvae take 3.5 months or longer to metamorphose. California red-legged frogs may live 8 to 10 years. The frogs disperse upstream and downstream of breeding habitat to forage and seek resting habitat. They take cover in small mammal burrows and moist leaf litter (up to 100 feet from water) in dense riparian vegetation with drying of creeks in summer, but will use other cover sites when traveling overland. Adults can be found within streams over 1.8 miles from breeding habitat and within dense riparian vegetation more than 328 feet from water. After winter rains begin, California red-legged frogs may move away from aquatic habitats, primarily at night, and can travel one mile from those habitats (USFWS 1997a). Juveniles may also disperse locally shortly after metamorphosis in July-September and away from their natal habitats during warm rain events.

Critical habitat includes (1) aquatic breeding habitat (includes natural and manmade ponds, slow-moving streams or pools in streams, and other ephemeral or permanent waters) that hold water for a minimum of 15 weeks in all but the driest years, (2) non-breeding aquatic habitat (similar to breeding habitat but may not hold water as long) that provides shelter, foraging, predator avoidance, and aquatic dispersal habitat for juveniles and adults, (3) upland habitat within 200 feet of aquatic and wetland habitat with various vegetation types and natural or manmade structures for cover, and (4) dispersal habitat (upland or wetland) located between occupied locations within 0.7 mi of each other with no barriers (USFWS 2005a).

The historical range of the California red-legged frog extended from the vicinity of Point Reyes National Seashore, Marin County, California on the coast and from the vicinity of Redding, Shasta County, California inland southward to northwestern Baja California, Mexico. The species has sustained a 70 percent reduction in its geographic range in California as a result of several factors acting singly or in combination. Habitat loss and alteration, combined with over-exploitation and introduction of exotic predators, were significant factors in its decline in the early to mid-1900s. California red-legged frogs were probably extirpated from the Central Valley in the 1960s. Remaining aggregations of California red-legged frogs in the Sierra Nevada foothills became fragmented and were later eliminated by reservoir construction, increased exotic predator populations, grazing, and drought. The pattern of disappearance of California red-legged frogs in southern California is similar to that seen in the Central Valley, except that urbanization and its associated roadways, large reservoirs, exotic predators, and stream channelization projects were the primary factors causing population declines.

As of 2004, California red-legged frogs were known to occur in 248 streams or drainages from 26 counties in California (USFWS 2004a). As of 2010, the species is known from 30 California counties (USFWS 2010b).

Status in Project Area

Surveys prior to and during construction found California red-legged frogs at 23 locations crossed or immediately adjacent to the pipeline. Subsequent to construction, another seven locations were found (see Appendix A for locations). The project-related sightings include the man-made ponds adjacent to the access road to Tank 1, the sludge lagoons at the water treatment plant, and the irrigation return flow channel in the Santa Maria River. The latter location is just downstream of the major blowoff valve on the south side of the river. California red-legged frogs were also observed in pools fed by irrigation return flows adjacent to Bonita School Road, approximately 1.6 miles downstream of the blowoff valve. Other drainages, especially in Reach 5A (Cuesta Tunnel to Arroyo Grande), have suitable habitat and may contain California red-legged frogs, at least seasonally. The species is reported to occur in the Campbell vernal pools on the north side of Highway 246 between Buellton and Lompoc. This species has been reported in Nojoqui Creek (USBR 1999) and is also known to occur in marshes/irrigation return flow channels along the Guadalupe pipeline that parallels the south levee of the Santa Maria River. Adults and juveniles were observed in the Santa Ynez River in the vicinity of the microtunnel crossing during the fall of 2001 (SAIC field notes).

California red-legged frogs are expected to be permanent residents in perennial ponds, such as those near Tank 1, and streams, while use of small, intermittent streams is probably seasonal (during the winter to late spring) and may represent dispersal habitat. The presence and

abundance of California red-legged frogs within or adjacent to the pipeline corridor is expected to vary by season and by year.

The pipeline and associated facilities occur within critical habitat units SLO-1, SLO-3, and STB-2.

Effects of Proposed Action

CCWA O&M activities could result in take of California red-legged frogs through (1) mortality of individuals run over by project vehicle traffic on access roads (primarily at Tank 1), (2) temporary habitat disturbance and possibly mortality of individuals as a result of earth-moving repair or maintenance activities in streams and adjacent riparian habitat along the pipeline corridor, along access roads (e.g., culvert cleanout), and at the off-site mitigation sites, (3) vegetation control and dewatering of the sludge lagoons at the water treatment plant, (4) discharge of water from blowoff valves causing habitat damage such as scour and sedimentation, and (5) accidents such as releases of water containing disinfectants (from blowoff valves or pipeline rupture), release of water containing chemicals toxic to aquatic organisms or with degraded water quality into the storm drain system at the water treatment plant, or release of water (from air valves or pipeline rupture) that cause rapid fluctuations of water level or erosion and deposition of sediment into streams (see Section 6.1).

Project vehicle traffic on access roads would not cause a loss of habitat, but individual frogs could be killed or injured by collision with those vehicles during O&M activities. Project vehicle traffic is generally infrequent, about once a month, on most access roads and during the day. Thus, the potential for take of California red-legged frogs is unlikely. The access road to the Polonio Pass Water Treatment Plant, however, is used daily, and some traffic will be at night, particularly during winter, for shift changes. Deliveries of materials and most other visitors will be during the day when frog activity in uplands is generally low. The speed limit is posted on the access road, and operations personnel will receive annual environmental training. Access road culvert cleanout impacts are discussed in Section 3.3.

Earth-moving for maintenance or repairs could occur within California red-legged frog habitat (over 60 known/potential locations, see Appendix A) at intervals during the life of the project that will generally be less than once per year and will take several days to months to complete, depending on the work required. Excavation of buried blowoff valves in Reaches 5b and 6 and Schedules A-C (8 adjacent to known habitat, but only 6 likely to be used) will occur at intervals for regular maintenance inspections while excavation for pipeline repairs (at any stream crossing) would occur infrequently, if at all. The latter work would be addressed under changed circumstances (Section 6). The work will be scheduled for the summer to fall to avoid the breeding season, tadpole development, and the rainy season. Habitat will be restored upon completion of the work. The area impacted during blowoff excavation will be approximately 50 feet by 65 feet at each location, and the same location is not expected to be disturbed more frequently than once every 15-20 years. Riparian vegetation is not present at any of the buried blowoff locations in known red-legged frog habitat that are likely to be excavated. Wetland vegetation is present at one location and excavation would affect a small portion of the total amount at this site. Topsoil with plant material would be replaced at the site, and impacts on red-legged frogs would be minimal.

Earth-moving activities or placement of riprap could also occur in California red-legged frog habitat at the Arroyo Grande Mitigation Site during bridge repair under changed circumstances. The frequency of bridge repairs will depend, in part, on the number and size of spills from Lopez Lake. Removal or partial breaching of beaver dams at that location could also affect habitat by reducing water levels above the dam. Such activities will be planned to avoid or minimize impacts to California red-legged frogs by implementing the appropriate measures in Section 2.10.

Removal of emergent vegetation that colonizes the sludge lagoons at the water treatment plant and dewatering one lagoon at a time when it becomes full of sludge could result in take of California red-legged frog eggs, tadpoles, juveniles, or adults if the species becomes established in the lagoons. Plant removal would eliminate substrate for attachment of eggs and could remove any eggs present if the removal were to occur during the spring. Mechanical removal or hand pulling could also injure or kill tadpoles, juveniles, or adults within the vegetation. Drying one lagoon for sludge removal could desiccate eggs and kill tadpoles if this occurred in the spring to summer and if the frogs were present. Adults and juveniles could move to either of the remaining lagoons with water present. The lagoons will be managed to minimize their attractiveness to California red-legged frogs and the potential for take of any individuals present.

Planned discharges to California red-legged frog habitat during dewatering of pipeline segments have the potential to alter California red-legged frog habitat through scour and sediment deposition. The potential for impacts to habitat will be minimized by following a dewatering plan that includes surveys for the species prior to the discharge, energy dissipation, and ramping of the discharge to prevent rapid increases and decreases of flow in the creek. Dewatering into California red-legged frog habitat is expected to occur once every 1 to 2 years, except at the Santa Maria River where it will likely be less frequent, and will be scheduled to avoid breeding and the rainy season (see Section 2.10.6).

Storm runoff at the Polonio Pass Water Treatment Plant is expected to result in no take of California red-legged frogs because only traces of pollutants are expected to be present in the runoff and the water would mix with and be diluted by runoff from the surrounding area. Transport of pollutants spilled at the treatment plant site that could wash into the storm drains is the primary source of potential take. Cleanup of pollutant spills such that spilled materials hazardous to aquatic life do not enter the storm drains until either neutralized or diluted to below toxic levels will minimize this potential.

Maintenance activities to keep culverts under access roads clear of debris have the potential to take California red-legged frogs either directly or indirectly. These activities will be conducted during the dry season, except in emergency situations. Direct take (e.g., injury by equipment or turbidity) is expected to be infrequent and minimal since habitat where this species could occur will be inspected by a Service-approved biologist prior to work in those locations. If any individuals are observed, appropriate protective measures (see Section 2.10) will be implemented. Relocation of any individuals present would result in take through handling the animals and through possible mortality or injury of some individuals. Indirect effects could occur as a result of habitat alteration caused by the maintenance activity. The area of habitat affected would be small, usually within the area where habitat has been previously altered (culverts), or of short duration (a few hours). Take of the red-legged frog is expected to be infrequent and negligible.

Measures to avoid or minimize take have been incorporated into the project (see Section 2.10). These include surveys prior to any ground disturbing activities or water releases into known or potential habitat for the species and training of workers performing maintenance and repair activities. Over the life of the project, several individual California red-legged frogs are likely to be taken through collision with project vehicles on the Tank 1 and other access roads, releases of water during dewatering operations (although under controlled conditions such take is expected to be minimal), and handling to move the frogs out of the work space for repairs or sludge lagoon maintenance. Take from accidents is unlikely to occur, but could affect a number of individuals if such an accident did occur in California red-legged frog habitat. Records for new locations of covered species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A).

4.1.3 California Tiger Salamander (*Ambystoma californiense*)

Species Description

The California tiger salamander in Santa Barbara County was emergency listed as endangered on January 19, 2000 (USFWS 2000a) and was formally listed on September 21, 2000 (USFWS 2000b). A proposal to reclassify this population as threatened was published on May 23, 2003 (USFWS 2003a) but was not made final, and the Central California Distinct Population Segment (DSP) of the species was listed as threatened on August 4, 2004 with an exemption for existing routine ranching activities (USFWS 2004b). The Sonoma County DSP was listed as endangered on March 19, 2003 (USFWS 2003b). Critical habitat in Santa Barbara County was designated on November 24, 2004 (USFWS 2004c). Critical habitat for the central population was designated on August 23, 2005 (USFWS 2005b). It is was state listed as threatened on May 20, 2010 (Fish and Game Commission web site). The following description was taken primarily from Jennings and Hayes (1994).

California tiger salamanders are black with pale yellow spots. This species is a lowland inhabitant restricted to grasslands and low foothill regions of central and northern California. It breeds in long-lasting rain pools (e.g., vernal pools) that are often turbid, and sometimes in permanent ponds with no fish predators. During the dry season, the salamanders use rodent burrows, such as ground squirrel or Botta's pocket gopher, as well as man-made structures (e.g., pipes, septic tank drains, and wet basements) on occasion, at distances of up to 1 mile from the breeding pool, although most appear to be found within 2,300 feet of these pools (USFWS 2004d). Adults migrate to the pools to breed during relatively warm, late winter or spring rains. The eggs hatch into larvae that require a minimum of 10 weeks to reach metamorphosis. Juveniles emigrate in mass at night from the drying pool to refuge sites (rodent burrows).

The species occurs in the Central Valley from near Petaluma in Sonoma County to northwestern Tulare County and in the Coast Range south to near Buellton in Santa Barbara County. Fragmentation and loss of breeding habitat, introduction of exotic and transplanted predatory fish, loss of refuge habitat adjacent to breeding pools due to changes in land use (e.g., agriculture, urbanization, and converting dry land pasture to irrigated pasture), and barriers to migration (roads, berms, and road dividers) have all contributed to the decline of this species.

Status in Project Area

This species is known to breed in ponds and vernal pools near the pipeline corridor in the Orcutt and Santa Maria area as well as in the Campbell vernal pools between Lompoc and Buellton. California tiger salamanders were found in upland areas along Reach 6 of the pipeline from Station 5040 to 5046 and from 5083 to 5130 during construction. Breeding occurs in stock ponds within 200 feet of the pipeline at Station 5093 and within 450 feet of the pipeline at Station 5110. The latter pond, however, contained fish in 2001, and the dam at the other pond was breached. Breeding also occurs in vernal pools on the south side of the Tanglewood development east of the pipeline corridor and Black Road as well as on the Santa Maria airport. Potential habitat is present near the pipeline crossing of Highway 1 (USFWS 2009a). The Campbell vernal pools are located on the north side of Highway 246 across the road from the Schedule B pipeline at Station 1090. No salamanders were found in the Schedule B pipeline corridor during construction. The pipeline corridor passes through habitat within 1.2 miles of known breeding sites from Station 4949 to 5170 (Reach 6) and Station 1035 to 1367 (Schedule B and C) according to the 2009 USFWS habitat map. Individuals have also been observed on Highway 246 from Station 980 to 1022. Critical habitat units 1 and 6 include segments of the pipeline corridor from Station 5002 to 5134 and Station 1085 to 1125, respectively.

California tiger salamanders also occur in the vicinity of the Polonio Pass Water Treatment Plant. Known populations occur 4 to 7 miles to the south in O'Brien, Twisselmann, and Still lakes (CNDDB 2004). Project facilities in this area are not within any designated critical habitat for this species.

Effects of Proposed Action

Vehicle traffic to vaults and cathodic test stations within California tiger salamander upland habitat could collapse the mouths of burrows used by the salamanders as dry season refuges. The number of burrows affected is expected to be small since vehicle traffic will be infrequent (about once a month) and only use a two-track path in the pipeline corridor. Vehicle traffic on the access road to the Polonio Pass Water Treatment Plant for deliveries of supplies is during daytime hours when tiger salamanders are not likely to be active and crossing the road. Treatment plant personnel traffic is also primarily during the day, with traffic at night limited to a few vehicles associated with shift changes at the plant. These employees are given environmental training that includes discussion of tiger salamander crossing of the road, especially during rains.

Excavation of manways or other buried facilities as well as erosion repair in salamander upland habitat have the potential to damage burrows containing California tiger salamanders or to cause mortality of individuals by crushing or entrapping them. Surveys will be conducted prior to excavation or erosion repair in salamander habitat to identify potential burrow locations and to look for salamanders in burrows or eroded cuts, and workers will be given environmental training. Excavation of up to 5 manways between stations 5083 and 5130 was necessary in 1998 and 2000 for inspection of the pipe. Excavation in this area is expected to occur less than once every 10 years. Subsequent excavation could result in mortality of any individual salamanders in burrows at the work site. Few individuals are likely to be taken, however, due to the small area to be disturbed during excavation (approximately 0.075 acre at each blowoff and 0.026 acre at each manway) relative to the area where the salamanders could be present (at least 60 acres). Fill of eroded areas could trap or crush California tiger salamanders in the repair area. The

number of individuals that could be taken is small because erosion is generally repaired before it gets large, and the eroded cuts usually do not provide good refuge habitat for the species.

Placement of dried sludge in the Polonio Pass Water Treatment Plant sludge monofill site has the potential to cover burrow openings that could be used by tiger salamanders, thereby trapping them inside the burrows. The dried sludge is light and not compacted upon placement, and burrows actively used by rodents are expected to be cleared of sludge by the rodents. The tiger salamanders would also be able to push through the material to exit the burrow. The sludge monofill site is located approximately 3,000 feet or more from potential breeding ponds, and few if any tiger salamanders are likely to be present at the monofill site due to distance and the reduced probability (based on geometry) of presence at a specific location with increased distance from a breeding location.

A rupture of the pipeline or other major accidental water spill occurring within habitat for this species could result in take of the species through habitat alteration or mortality of larvae due to chloramines in the spilled water, sediment deposition in breeding ponds, or rapid fluctuations in water level. The probability of such an accident is very low, is not expected over the life of the project, and would be covered under changed circumstances.

4.2 COVERED SPECIES WITH NO TAKE AUTHORIZED

The following describes the covered species for which take is to be avoided by implementing the measures in Section 2.10.

4.2.1 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Species Description

The willow flycatcher was state-listed as endangered on December 3, 1990 (CDFG 2000); federal listing of the southwestern willow flycatcher as endangered occurred on February 27, 1995 (USFWS 1995), and critical habitat was designated on July 22, 1997. This designation was vacated in 2001, and a new proposal for critical habitat was issued on October 12, 2004 (USFWS 2004e). The final designation occurred on October 19, 2005 (USFWS 2005c) and was further revised on January 3, 2013 (USFWS 2013a). The Santa Ynez Management Unit critical habitat extends along the Santa Ynez River from State Highway 1 to 1 mile east of U.S. Highway 101. The following description was taken primarily from "A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol" (Sogge et al. 1997).

The southwestern willow flycatcher is one of four subspecies recognized in North America. All four subspecies breed in North America but winter to the south in Mexico, Central America, and possibly northern South America. The southwestern willow flycatcher is a brownish-green bird (5.25 to 6.5 inches) with an orange lower mandible and no eye ring. It breeds in California from the Santa Ynez River southward. This subspecies historically nested along the Salinas and Carmel rivers in Monterey County until the early 1970s. Dense riparian habitats 13 to 23 feet tall near surface water or saturated soil are used for nesting. Openings and areas of shorter or sparser vegetation are often present in the riparian habitats used. Southwestern willow flycatchers arrive in May to June for breeding and leave for wintering areas in August to September.

The willow flycatcher was once a common summer resident in California (CESA No. 9317 in USFWS 1993a) and included two subspecies. Breeding has been almost eliminated in the state, primarily due to the extensive loss, fragmentation, and modification of riparian habitats. Habitat losses continue as a result of urbanization, recreation, agricultural development, water diversion and impoundment, stream channelization, livestock grazing, and replacement of native plant species with non-natives. Brood parasitism by the brown-headed cowbird is another threat to the southwestern willow flycatcher.

Status in Project Area

The southwestern willow flycatcher is known to breed in willow riparian habitats along the Santa Ynez River just west of Buellton (about one mile west of Avenue of the Flags bridge) and near Lompoc (USBR 1999), and a breeding pair was observed near the pipeline corridor crossing about 3.5 miles west of Buellton during construction in 1995 (CNDDB 2003). The latter location is within the designated Santa Ynez Management Unit of critical habitat (USFWS 2013a). Microtunneling was used to install the pipeline under the river, and no habitat for willow flycatchers was disturbed. High river flows in March 2001, however, removed a portion of this habitat. No suitable habitat was present at the Alisal Road bridge crossing where the pipeline was suspended on the bridge. The existing pipeline used by the project from Santa Ynez to Lake Cachuma crosses the Santa Ynez River four times. Southwestern willow flycatchers potentially could use willow riparian habitat near two of these crossings during migrations. Willow flycatchers potentially could use riparian habitat at the Salinas River, San Luis Obispo Creek, Arroyo Grande Creek, and Tar Spring Creek as well during migration and potentially for nesting.

Effects of Proposed Action

CCWA O&M activities that require removal of riparian vegetation in known or potential habitat for this species, such as excavation for pipeline repair, are expected to occur very infrequently, if at all, during the life of the project. The likelihood of the species being present, except at the Santa Ynez River crossing west of Buellton, is also very low. Removal of trees that can become large over the pipeline is not expected to occur at the locations where willow flycatchers could be present (i.e., Salinas River, San Luis Obispo Creek, Arroyo Grande Creek, Tar Spring Creek, and the Santa Ynez River).

A blowoff valve is located on the bank of the Santa Ynez River immediately adjacent to the area where southwestern willow flycatchers were observed during construction. Use of this blowoff valve requires attaching a hose to the outlet and then extending it down the bank into the willow trees to avoid erosion of the bank. Energy dissipation measures, such as a filter bag, also will be installed at the discharge point. Such activities will be timed to occur outside the breeding period of the southwestern willow flycatcher, except in the case of an extreme emergency (see Section 2.10.6). Records for new locations of this species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Accidents are unlikely to affect willow flycatcher habitat.

4.2.2 Least Bell's Vireo (*Vireo bellii pusillus*)

Species Description

The least Bell's vireo was listed as endangered by California on October 2, 1980 (CDFG 2000) and by the Service on May 2, 1986 (USFWS 1986). Critical habitat was designated on February 2, 1994 (USFWS 1994b), but none is present in the project area.

The least Bell's vireo is a small gray bird with distinct white spectacles (eye-rings) and white wing bars. It is a summer visitor (from about mid-March to the end of August) that breeds in California (Small 1994). Preferred breeding habitat is dense riparian shrubbery with water flowing through it, although dry drainages in the desert bordered by mesquite and arrow-weed are used as well. This species is highly territorial (Barlow 1962, Fitch 1958, Salata 1982) with nesting territories ranging from one to four acres (Gray and Greaves 1981). Foraging for insects takes place in riparian and adjacent upland habitats, sometimes extending up to 900 feet from the nest (USFWS 1986). Fall migrants have been recorded along the South Coast of Santa Barbara County in September and October (Lehman 1994).

This species historically bred from as far north as Red Bluff in northern Tehama County to the Mexican border, including the Central Valley, inner Southern Coast Range, southern California coastal and interior valleys west of the deserts, and in Owens Valley and Death Valley (Small 1994). Populations began to decline about 1930 with very few remaining in northern and central California by 1970. Destruction of willow riparian habitat from stream channelization, water diversion, gravel mining, and agricultural/urban development along with parasitism by the brown-headed cowbird caused the rapid decline. Breeding still exists in San Benito, Santa Barbara, Inyo, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego counties (Small 1994). The population was estimated to be approximately 1,400 breeding pairs in 1996.

Status in Project Area

No nesting is known to occur in the immediate vicinity of the pipeline or associated facilities. The species, however, could potentially occur in dense riparian woodlands at the Salinas River, Tar Spring Creek, Santa Maria River, or the Santa Ynez River during spring and fall migrations.

Effects of Proposed Action

CCWA O&M activities are unlikely to affect least Bell's vireo. Repairs that require excavation of the pipe or vegetation clearing in riparian areas, at streams where this species could occur, are expected to occur infrequently, if ever, during the life of the project. Dewatering discharges at the Santa Ynez River blowoff would be conducted as described above for the willow flycatcher. Measures to protect that species would also protect the vireo. Records for new locations of this species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Accidents are unlikely to affect habitat for the least Bell's vireo.

4.2.3 Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*)

Species Description

The unarmored threespine stickleback was federally-listed as endangered on October 13, 1970 (USFWS 1970) and was state-listed as endangered on June 27, 1971 (CDFG 2000). It is also designated as fully protected by the state. Critical habitat has been proposed but not finalized and is not in the project area. The following description was taken from the State Management Authorization (Reference No. 9322 in USFWS 1993a) and other sources.

The unarmored threespine stickleback is a small, scaleless freshwater fish with three dorsal spines and a bony keel on the sides of the caudal peduncle. The back is dark, often with vertical bars, and the undersides are silvery. This species requires slow flow with aquatic vegetation for cover and nest material. The fish are sight feeders, and are intolerant of high turbidity. Most unarmored threespine sticklebacks complete their life cycle in one year, although a few individuals in a population apparently live two or three years. Spawning can occur throughout the year, but peak activity occurs between May and September. The males establish breeding territories, construct a nest of vegetation and sand, and brood the eggs until they hatch (Irwin and Soltz 1982).

The species was once widely distributed in southern California with records from the Santa Clara, Los Angeles, San Gabriel, and Santa Ana rivers as well as from the Santa Maria River drainage and San Antonio Creek in Santa Barbara County. By the 1940s this fish had been extirpated from the Los Angeles basin and from the Santa Maria River drainage. Factors leading to these population losses include large scale impoundments, stream channelization, increased water turbidity, introduction of non-native competitors and predators, water pollution, and hybridization with other subspecies of threespine stickleback (USFWS 1980). The present distribution of the species includes the headwaters of the Santa Clara River, its tributary San Francisquito Creek, and San Antonio Creek. Fish from the San Antonio Creek population have been introduced into Honda Creek on South Vandenberg Air Force Base, and ones from San Francisquito Creek have been transplanted to San Felipe Creek in Imperial County.

Unarmored threespine sticklebacks appear to be relatively abundant where found but continue to be threatened by stream degradation. The species is currently being managed by a recovery team, and the recovery plan was revised in 1985 (USFWS 1985). The agencies cooperating in the recovery effort have undertaken several actions to conserve the species, including (1) surveys to discover additional populations, (2) transplants to establish it in other waters, (3) surveys to discover exotic organisms, (4) eradication programs to remove or control exotic species, (5) a contingency plan to establish response procedures in case of oil or toxic chemical spills, and (6) genetic studies to ascertain taxonomic relationships. As a result of these efforts, a remnant population was discovered in Shay Creek (San Bernardino County), additional unarmored threespine stickleback populations have been established, and a potential change in the taxonomic status of one or more of the recognized extant populations was found. USFWS policy is to wait until the taxonomic revisions have been published in a reputable scientific journal before initiating changes in the management of a covered species.

Status in Project Area

This species is known to inhabit San Antonio Creek on Vandenberg Air Force Base and is likely to be present at and downstream of the pipeline crossing as well as at the confluence of the tributary that has a major blowoff located about 1,400 feet upstream. The pipeline was installed under San Antonio Creek by microtunneling.

Effects of Proposed Action

CCWA normal O&M activities, except pipeline dewatering, are expected to result in no take of the unarmored threespine stickleback. Releases of water, via a blowoff, into an unnamed tributary approximately 1,400 feet upstream of its confluence with San Antonio Creek could occur when the pipeline needs to be drained for inspection or repairs. These controlled releases would be made such that turbidity reaching San Antonio Creek would be minimal and the disinfectant residual would be essentially none. The increase in flow during the discharge is not expected to result in take of unarmored threespine sticklebacks.

Accidents, such as pipeline rupture due to a seismic event, could result in water containing chloramines reaching San Antonio Creek by flowing overland or down the tributary as well as rapid fluctuations in water level. In such cases, the pipeline will automatically shut down. Isolation valves are located on both sides of San Antonio Creek, one 2,070 feet to the north and the other 445 feet to the south. Unarmored threespine sticklebacks downstream of the spill could potentially be taken as a result of increased turbidity and sediment deposition, chloramines in the water, and sudden increased flow rates in the stream. Even with the isolation valves, approximately 133,000 gallons of water could be released. Chloramines in the spilled water would rapidly dissipate as the water comes in contact with soil and stream water so toxicity impacts would extend only a short distance downstream if water were spilled directly into the creek. Increased flow rate would be of short duration and would decrease with distance downstream as would increased turbidity and sedimentation. The probability of such accidents is very low, is not expected over the life of the project, and would be covered under changed circumstances.

4.2.4 Tidewater Goby (*Eucyclogobius newberryi*)

Species Description

The tidewater goby was federally listed as endangered on February 4, 1994 (USFWS 1994c) and is a state-designated Species of Special Concern (CDFG 2000). A proposed rule to delist the species, except in Orange and San Diego counties, was published on June 24, 1999 (USFWS 1999) but was later retracted. Critical habitat was designated for 10 habitats in Orange and San Diego counties on November 20, 2000 (USFWS 2000c), revised critical habitat that includes locations from Del Norte to Los Angeles counties was proposed on November 28, 2006 (USFWS 2006b), and final designation was on January 31, 2008 (USFWS 2008a). This designation was revised on February 6, 2013 (USFWS 2013b).

Tidewater gobies are small (usually less than 2 inches long) with large pectoral fins and fused pelvic fins that form a sucker-like disk. This is the only goby species along the coast of California that is restricted to low salinity (less than 10 parts per thousand [ppt]) waters. All life stages are completed in these waters (i.e., no marine life history phase occurs), although the fish

can live in waters with a salinity of over 40 ppt (Swift et al. 1989). This limits the frequency of genetic exchange between populations and lowers the potential for recolonization of a habitat once a population has been lost. Recolonization, however, has been documented to occur at distances up to 20 km from a source population (Lafferty et al. 1996). Tidewater gobies are benthic (living on the bottom substrate) and inhabit shallow waters (less than 3 feet deep) that are slow moving to still but not stagnant (Irwin and Soltz 1984). The coastal lagoons where these fish reside are typically closed off from the ocean by sand bars during summer. The substrate is generally sand and mud with abundant emergent and submerged vegetation (Moyle 1976). In addition to living in coastal lagoons, these fish can also move upstream at least 5 miles as has been documented in San Antonio Creek, Santa Barbara County (Irwin and Soltz 1984).

Spawning in southern California takes place primarily from late April to July, when males dig a vertical burrow approximately 10 to 20 cm into clean coarse sand for nesting. The eggs are attached to the walls of the burrow by the female and are guarded by the male until they hatch in 9 to 10 days. Larval gobies are pelagic and found around vegetation for a short time and then become benthic (Swift et al. 1989). The life span of a tidewater goby is generally only 1 year, although individuals in the northern part of their range may live to 3 years (Lee et al. 1980).

This species formerly inhabited lower stream reaches and coastal lagoons from the Smith River in Del Norte County, California to Agua Hedionda Lagoon in San Diego County (Lee et al. 1980). Its present distribution extends southward only to the mouth of San Onofre Creek in San Diego County. A reassessment of tidewater goby populations (USFWS 1999) indicates that 85 of approximately 110 historical populations remain. The remaining tidewater gobies in Orange and San Diego counties are located on the U.S. Marine Corps Base, Camp Pendleton.

Status in Project Area

Tidewater gobies occur in San Luis Obispo Creek, Pismo Creek, Santa Maria River, Shuman Canyon, San Antonio Creek, and the Santa Ynez River (Swift it al. 1989, Swift and Lafferty 1995). The Coastal Branch, Phase II pipeline crossings of San Luis Obispo Creek, the Santa Maria River, and Shuman Canyon and the Mission Hills/Santa Ynez Extension crossing of San Antonio Creek and the Santa Ynez River are all at least 5 miles upstream of the coastal lagoons where tidewater gobies breed. A tributary to Pismo Creek is crossed by the Coastal Branch, Phase II at least 6 miles upstream of the coastal lagoon. Tidewater gobies can move at least 5 miles upstream and thus could be in or near the pipeline corridor during winter. None of the designated critical habitat is near the pipeline corridor.

Effects of Proposed Action

Tidewater goby populations are not expected to be affected by CCWA O&M activities, including controlled releases of water during draining of pipeline segments, due to the distance between the Coastal Branch, Phase II and the Mission Hills/Santa Ynez Extension pipelines and tidewater goby habitat. Only in the case of a major accidental water release containing disinfectants that reached goby habitat could take occur (e.g., mortality due to disinfectant toxicity or habitat alteration from scour or sediment deposition). This is unlikely due to the distance of the potential spill sites from tidewater goby habitat and the loss of disinfectants through reaction with organic material as the spill moves down the stream. Such spills during winter when the gobies move upstream would have a greater potential for impact, but high

winter runoff flows would act to dilute the spill as well as provide organic material for reaction with the disinfectant. Measures have been incorporated into the project to minimize impacts of such accidents, which would be covered under changed circumstances.

4.2.5 Arroyo Toad (*Anaxyrus californicus*)

Species Description

The arroyo toad was federally listed as endangered on January 17, 1995. It is also a state Species of Special Concern (CDFG 2000). Critical habitat was proposed on April 28, 2004 (USFWS 2004f) and the final designation occurred on April 13, 2005 (USFWS 2005d). Revised critical habitat was proposed on October 13, 2009 (USFWS 2009b) and designated on February 9, 2011. The following description is taken from Jennings and Hayes (1994).

The arroyo toad is small (2 to 3 inches) with light greenish gray or tan warty skin and dark spots. The underside is buff colored and often has no spots. A light-colored stripe crosses the head and eyelids. This species has very specialized habitat requirements. Adults breed in overflow pools adjacent to the channel of 3rd or greater order streams that have no predatory fish. Pools with little woody vegetation around the margin and with shallow, slow-flowing water over sand or gravel are preferred, and the pools must be within about 300 feet of juvenile and adult habitat. The latter is characterized by a shoreline or central bar with soils dampened by capillary action and having some emergent vegetation, although stable, sandy terraces with a scattered shrub and tree overstory and little understory are also used. Adults are nocturnal with most activity from the first substantial rains until early August. Breeding occurs between early April and early July, and the tadpoles take 65 to 85 days to metamorphose. Juveniles then feed for about 8 weeks before burrowing 10 to 18 cm into sandy substrate where they remain inactive for 6 to 8 months. Adults dig relatively deep burrows on stream terraces in summer and remain inactive through fall and winter. Arroyo toads are generally found within 650 to 3,280 feet of streams with broad floodplains in coastal areas but closer in mountainous areas. Individuals, however, have been observed up to 1.2 miles from breeding streams (USFWS 2004f).

This species historically occurred from the upper Salinas River near Santa Margarita in San Luis Obispo County south to the Rio Santo Domingo system in Baja California, Mexico, primarily in coastal drainages although six locations are known from the desert slope. Less than 25 known populations remain. Changes in the natural hydrologic regime, excessive human use (camping), urban development, placer mining, off-road vehicle use, introduction of exotic predators, and cattle grazing have been and continue to be factors impacting arroyo toad populations.

Status in Project Area

The arroyo toad is not known to occur in the immediate project area, although the historic population in the Salinas River near Santa Margarita was close to the pipeline route. The species is also present in the Sisquoc River upstream of its confluence with the Cuyama River to form the Santa Maria River, and in the Santa Ynez River upstream of Lake Cachuma. The presence of this species in or near the pipeline corridor is not likely now (2013) or in the future. None of the designated critical habitat units are near the project.

Effects of Proposed Action

CCWA O&M activities are not expected to affect any known arroyo toad populations. If the species were to expand its current range into the project area (e.g., Salinas, Santa Maria, or Santa Ynez rivers), activities that affect streams, such as excavation of manways or the pipeline and discharge of water from blowoff valves, could have the potential to impact the species through temporary habitat disturbance similar to that described for the California red-legged frog. Any records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species data base (Appendix A). Measures, including those already in this HCP, needed to avoid take of the arroyo toad will be implemented if the species is found in the project area.

4.2.6 Chorro Creek Bog Thistle (*Cirsium fontinale* var. *obispoense*)

Species Description

The Chorro Creek bog thistle was federally-listed as endangered on December 15, 1994 and was state-listed as endangered in June 1993 (CDFG 2000). The following description is taken from the Federal Register (USFWS 1994d).

The Chorro Creek bog thistle is a rugged perennial herb with glandular hairs on the leaves. During the second or third year, it produces numerous nodding heads of whitish to pinkish-lavender flowers. It is restricted to open seep areas on serpentine outcrops. It is known from nine locations; eight are to the south and west of San Luis Obispo, and one is 30 miles northwest near San Simeon. Extant populations are threatened by trampling from cattle, proposed water diversions, and road maintenance.

Status in Project Area

This species occurs near the Coastal Branch, Phase II pipeline corridor in a seep about 100 feet southwest of the pipeline (approximately Station 3042) at the base of the hillside across Miossi Creek from the project. This species has the potential to be present in seeps and drainages in serpentine soils from the South Portal of Cuesta Tunnel to the headwaters of Reservoir Canyon.

Effects of Proposed Action

CCWA O&M activities are not expected to result in damage to known habitat for the Chorro Creek bog thistle. The accidental release of a large volume of water from either of the two AVAR valves or one dewater valve just upstream of the population adjacent to Miossi Creek could affect that population through erosion of the habitat. The likelihood of such an accident is very low over the life of the project and would be covered under changed circumstances. If an accident were to occur and affect the species, the Service would be notified, damage to the habitat and population would be assessed by a qualified biologist, and a plan to restore the habitat and species would be developed and implemented after approval of the Service. Records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Measures to avoid take of this species will be implemented if the species is found in the project area.

4.2.7 Gambel's Watercress (*Rorippa gambellii*)

Species Description

Gambel's watercress was federally-listed as endangered on August 3, 1993 (USFWS 1993b) and was state-listed as threatened in February 1990 (CDFG 2000). The following description is taken from the Draft Recovery Plan (USFWS 1997b).

Gambel's watercress is a perennial rhizomatous branched herb, which can grow up to six feet in length. It roots at lower nodes, while upper stems generally remain erect. It blooms in April to July and produces dense inflorescences with white flowers. It occurs in freshwater or brackish marshes from sea level to about 1,500 feet in elevation. Historically, it occurred in wetland locations in southern California ranging from Los Angeles and San Bernardino counties to San Luis Obispo County, plus one additional population in the Valley of Mexico, near Mexico City. There are two extant populations of Gambel's watercress. One is in San Luis Obispo County, and the other is on Vandenberg Air Force Base within the San Antonio Creek watershed (Santa Barbara County).

Status in Project Area

This species is not present within the pipeline right-of-way or at associated facilities. Only the San Antonio watershed population is located approximately one mile downslope of the pipeline. The species historically occurred in San Antonio Creek upstream of the pipeline (Elvin, personal communication 2006).

Effects of Proposed Action

CCWA O&M activities are anticipated to have no effect on this species. A catastrophic rupture of the pipe in the vicinity of the population of Gambel's watercress in the San Antonio watershed could potentially damage the population by scour or sedimentation, were water from the rupture to reach the population with sufficient force. This is highly unlikely due to the distance (about one mile) between the pipeline and the population of the species and the low probability of a pipeline rupture at a location that could affect this species. If the species were to be found in San Antonio Creek downstream of the pipeline crossing, similar impacts could occur from a pipeline rupture. Automatically closing isolation valves on both sides of the creek crossing, however, would limit the amount of water that could be spilled at that location. Such accidents would be covered under changed circumstances. If an accident were to occur and affect the species, the Service would be notified, damage to the habitat and population would be assessed by a qualified biologist, and a plan to restore the habitat and species would be developed and implemented after approval of the Service. Release of water from the major blowoff located approximately 1,400 feet upstream on a tributary to San Antonio Creek would have a low potential to affect Gambel's watercress, if it were present, because the release would be gradually increased as described in Section 2.5. Records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Measures to avoid take of this species will be implemented if the species is found in the project area.

4.2.8 Pismo Clarkia (*Clarkia speciosa* ssp. *immaculata*)

Species Description

The Pismo clarkia was federally-listed as endangered on December 15, 1994 (USFWS 1994d) and was state-listed as rare in November 1978 (CDFG 2000). The following description is taken from the Federal Register (UFSWS 1994d).

The Pismo clarkia is an erect or decumbent annual herb. It produces flowers with petals that are white or cream-colored at the base, streaking into pinkish or reddish-lavender in the upper part. It grows in pockets of dry sandy soils, possibly ancient sand dunes, within grassy openings in chaparral and oak woodlands. The historical range for this species includes the area between the town of Edna and the Nipomo Mesa area. Five out of nine original populations remain today in varying condition. Current threats include development and road maintenance.

Status in Project Area

The species is not known to occur within the immediate vicinity of the project, and no individuals were found during pre-construction surveys of the pipeline corridor and facility locations. However, appropriate habitat for this species exists within or adjacent to the pipeline corridor in portions of Reservoir Canyon (at elevations below 600 feet), along Orcutt Road (from Station 3705 to 3760), on Newsom ridge, and just south of Los Berros Creek, and it could be found there in the future.

Effects of Proposed Action

CCWA O&M activities are not expected to have any effects on this species unless it becomes established in or adjacent to the pipeline corridor. If this were to happen, earth-moving activities or accidental fires during O&M (changed circumstances) could affect those individual plants in the work or fire area. Records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Measures to avoid take of this species will be implemented if the species is found in the project area.

4.2.9 La Graciosa Thistle (*Cirsium loncholepis*)

Species Description

The La Graciosa thistle was federal-listed as endangered in March 2000 and was state-listed as endangered in February 1990 (USFWS 2000d, CDFG 2000). It is included in CNPS List 1B (Skinner and Pavlik 1994, Holland et al. 1995). Critical habitat was designated on March 17, 2004 (USFWS 2004g), and revised critical habitat was designated on November 3, 2009 (USFWS 2009c).

The La Graciosa thistle inhabits margins of coastal wetlands and low-lying swales or dune slacks in coastal dunes in southern San Luis Obispo County and northern Santa Barbara County, with one inland population at the head of Las Flores Canyon (southeast of the coastal populations) (USFWS 2001b). It is a low-growing, short-lived (one to several years) species that flowers once and dies. The plants have bright green foliage and nearly white flowers that occur

primarily from June through August. Seed is dispersed by wind. This species is known from approximately 17 occurrences with the dune populations generally being small and isolated from each other. The Santa Maria River mouth area supports the largest concentration of this species, which is most frequently found in grassy patches on the upper margins of marshes associated with the Santa Maria River estuary. Floods in 1998 greatly reduced the number of La Graciosa thistle plants in that area. Threats to the remaining populations include groundwater pumping, oil field development, oil field remediation, and competition from aggressive native and non-native plants (USFWS 2001b).

Status in Project Area

Several populations of this species have been found close to the Santa Maria River estuary more than 8 miles from the pipeline crossing of the river. The pipeline corridor crosses the Pismo-Orcutt critical habitat unit for this species from Highway 166 south to Highway 1. Much of the pipeline corridor in this area is within agricultural fields, although several wetland areas are crossed by the pipeline in drainages. The pipeline and associated facilities cross critical habitat unit 2 from approximately Station 5009+50 to 5133+72. No individuals of this species were observed in or adjacent to the pipeline corridor during pre-construction and post-construction surveys.

Effects of Proposed Action

CCWA routine O&M activities are not expected to have any effects on populations of the La Graciosa thistle. The buried blowoffs within the designated critical habitat are unlikely to be used, and measures to protect California tiger salamanders and California red-legged frogs in the southern part of this critical habitat would also protect La Graciosa thistles. Surveys will be conducted if any ground-disturbing activities are necessary within the range of this species, and measures to avoid any individuals found will be implemented. Records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Measures to avoid take of this species will be implemented if the species is found in the project area.

4.2.10 Swainson's Hawk (*Buteo swainsoni*)

Species Description

Swainson's hawk was state-listed as threatened on April 17, 1983 (CDFG 2000). The following description was taken from the State Biological Opinion (CESA 9317 in USFWS 1993a).

The Swainson's hawk is a medium-sized buteo with relatively long, pointed wings and a long, square tail. Three main color morphs (light, rufous, and dark) have been observed in California populations. Adult birds have dark brown heads with a dark breast band that is set off from a lighter belly in the light morph birds. In dark morph birds, however, the entire body may be a sooty brown to black color. The throat is white or partially white in dark birds. The wings are bicolored underneath with the wing linings generally lighter than the dark flight feathers. Females are larger than males. Swainson's hawks require large, open habitats with abundant prey for foraging that are near nest sites. Native grasslands, lightly grazed pastures, alfalfa and other hay crops, and some grain and row croplands provide suitable foraging areas. Their diet

includes insects, birds, and small mammals with the California vole (*Microtus californicus*) a staple in the Central Valley. Nesting occurs along the edges of riparian woodlands as well as in lone trees or groves of trees in agricultural fields. Preferred trees in the Central Valley include valley oak (*Quercus lobata*), Fremont cottonwood (*Populus fremontii*), walnut (*Juglans hindsii*), and large willows (*Salix* spp.) that average about 58 feet in height. Over 85 percent of Swainson's hawk territories in the Central Valley are located in riparian systems adjacent to suitable foraging areas. The birds migrate to South America for the winter.

This species historically was found throughout lowland California, except portions of desert regions. They were not present in the Sierra Nevada, north coast ranges, or Klamath Mountains. In the early 1900s, over 17,000 pairs of Swainson's hawk may have been present in the state. The population has declined to about 550 pairs. Agricultural and urban expansion as well as loss of riparian habitat due to bank stabilization, shooting, pesticide poisoning of prey, competition from other raptors, and human disturbances at nest sites continue to threaten the population.

Status in Project Area

The Swainson's hawk could occur throughout the project area. A potential nest site was observed near the pipeline crossing of San Juan Creek during pre-construction surveys.

Effects of Proposed Action

O&M activities are not expected to result in take of Swainson's hawks since no known nests are located in or immediately adjacent to project facilities. Nesting, however, could occur there in the future. Surveys will be conducted prior to ground-disturbing activities or tree removal that could affect the species, and the work will be scheduled to avoid impacts to nesting birds. Use of fixed wing aircraft or helicopters for surveillance of the pipeline corridor during the dry season has a very low potential to adversely affect nesting Swainson's hawks. Overflights would be approximately 1,000 feet AGL and would occur no more than once a month, and flights would be primarily over grassland and sparse shrub habitats that are not used for nesting, unless trees are present. Known or potential locations for nesting would be avoided. Records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Measures to avoid take of this species will be implemented if the species is found in the project area.

4.2.11 Seaside Bird's-beak (*Cordylanthus rigidus* ssp. *littoralis*)

Species Description

The seaside bird's-beak was state-listed as endangered in 1982. The following description is taken from the CESA Memorandum of Understanding (MOU), reference number 9322 (in USFWS 1993a) and Chuang and Heckard (1986).

The seaside bird's-beak is an annual root hemiparasite in the figwort family. Plants are erect, branched, and 30 to 80 cm tall. Herbage is pale yellowish (often becoming reddish tinged) and covered with fine hairs. The pale yellow flowers, in clusters of 5 to 8 at the ends of branches, occur from July to August. This subspecies occurs on late Pleistocene sand dunes with scattered

live oak-Monterey pine and maritime chaparral on the Monterey Peninsula and near the coast of southern Monterey Bay as well as in sandy areas north of Lompoc. Plants thrive in areas of recent surface soil disturbance. The population near Lompoc is thought to be from an introduction in the distant past. Characteristics of the subspecies have spread eastward into the population of *C. rigidus* ssp. *rigidus*.

Status in Project Area

The seaside bird's-beak has been reported north of Lompoc and about 7 miles west of Buellton (CNDDB 2003). The population north of Lompoc occurs at a number of sites located on private lands and Vandenberg Air Force Base, primarily in Burton Mesa chaparral. Field surveys prior to construction of the Mission Hills/Santa Ynez Extension located many plants of the subspecies *rigidus* in sandy soils between Vandenberg Village and Burton Mesa Boulevard. The identity of these plants was verified by Dr. Chuang. No plants of either subspecies were found in other areas of Burton Mesa chaparral along the pipeline route from Tank 5 to Mission Hills. Field surveys after project construction indicated that the common subspecies (*rigidus*) was abundant in the pipeline corridor. Known locations for the seaside bird's-beak at La Purisima Mission State Historic Park and in the Lompoc Oil Field north of the Harris Grade-Rucker Road intersection are outside the HCP boundaries. This species has also been reported along what is now Highway 246 from near Drum Canyon Road west to the Campbell vernal pools. That population was found in 1956. No plants of this species were observed during pre- and post-construction surveys of the pipeline corridor.

Effects of Proposed Action

The construction corridor through Burton Mesa chaparral immediately after construction was suitable for colonization by subspecies of *Cordylanthus rigidus.* None of the subspecies *littoralis* have been found during monitoring in 1995 through 2003. Plants from the subspecies *rigidus* have colonized the corridor in the area where they were present prior to construction. O&M activities requiring ground disturbance could then affect those plants. Before any ground breaking repair or maintenance activities are performed, surveys will be conducted in those areas to verify that none of the listed subspecies are present. If any are found to occur in areas where ground disturbance is necessary for project maintenance, the Service would be notified, potential damage to the habitat and population would be assessed by a qualified biologist, and a plan to restore the habitat and species would be developed and implemented after approval of the Service as described under changed circumstances. Records for new locations of listed species within the project area will be checked annually in a centralized database, such as the CNDDB or equivalent, and used to update the project covered species database (Appendix A). Measures to avoid take of this species will be implemented if the species is found in the project area.

5.0 ANTICIPATED TAKE AND MITIGATION

5.1 TAKE ESTIMATES

Take, in terms of individuals of a species, is difficult to accurately predict for O&M activities because:

- Abundance within the project area is poorly known for the species covered in this HCP. Distribution information for these species is also incomplete.
- Animals are mobile, and the abundance of covered species within the HCP boundaries at any one time will vary considerably and may often be none
- Extent, location, and timing of many O&M activities are dependent upon when such activities are necessary and will vary over the life of the project.
- Many covered O&M activities occur at existing project facilities or involve vehicle traffic on existing roads within dispersal habitat for covered species, and dispersal patterns of animals are difficult to predict.
- The project is a linear corridor (typically 60 feet wide) that intersects small segments of covered species' habitat at different locations. For example, the amount of red-legged frog aquatic habitat within the pipeline corridor at any one stream is generally 60 feet long times the width of the water surface.

Nevertheless, CCWA has estimated take of individuals as shown in Table 5-1. The estimated take is low due to the narrow project corridor and small work areas that could be disturbed during maintenance and repair activities. Except in emergency situations, maintenance and repair activities are scheduled in advance which allows time for avoidance and minimization measures in Section 2.10 to be implemented. For San Joaquin kit fox, California red-legged frog, and California tiger salamander (at or near Polonio Pass Water Treatment Plant), these estimates represent a reasonable worst case. For the California tiger salamander in Santa Barbara County, estimates of take based on habitat affected have been used because the number of individuals that could be present within work areas is unknown. These estimates are shown in Table 5-2. Implementation of avoidance measures in Section 2.10 will prevent take of all other covered species.

Effects on individual species are discussed above in Section 4.0. The project disturbances to habitat are primarily temporary and include:

- Driving through covered species habitat (e.g., San Joaquin kit fox and California tiger salamander) on existing roads and project tracks.
- Mowing grass and some shrubs in access tracks where roads are hidden by vegetation and dry vegetation poses a fire hazard or an obstacle to access.
- Maintaining culverts under project access roads plus any associated turbidity and sedimentation.
- Excavation of buried facilities for required operation, maintenance, or repairs and any sediment runoff.

- Dewatering discharges with associated erosion and sediment controls.
- Human presence in or adjacent to covered species habitats.
- Lowering water level behind beaver dam on Arroyo Grande Creek by notching dam.

Table 5-1. Estimated Take of Covered species

O&M Activity	*Location*	*Species*	*Take (number & cause)*
WTP operation	WTP	San Joaquin kit fox	1 adult/juvenile per life of project by vehicle collisions, relocation after capture inside fenced area, etc.
	Access road	California red-legged frog California tiger salamander*	1 adult/juvenile of each species per 10 years by vehicle collision on access road
	Sludge lagoons	California red-legged frog California tiger salamander*	1 adult/juvenile per 5 years, each species; undetermined number of eggs/larvae from normal operation of sludge lagoons and vegetation control; undetermined number from relocation
Access	Reaches 1&2 & part of 3	San Joaquin kit fox	1 adult/juvenile per life of project from vehicle collisions during routine inspections
	Reaches 5&6	California red-legged frog	1 adult/juvenile per 10 years from vehicle collisions
Inspection/ maintenance	Reaches 5&6	California red-legged frog	1 adult or juvenile California red-legged frog per life of project from culvert cleanout on access roads; undetermined number of same life stages from relocation
Dewatering	Entire route	California red-legged frog	Undetermined number of eggs/larvae from fluctuating flows during discharge
Ground disturbance	Reaches 5&6 Schedule A-C	California red-legged frog	1 adult/juvenile California red-legged frog per life of project from excavation of blowoffs at 8 or fewer locations
Vegetation/ pest control	Varies	California red-legged frog	1 adult/juvenile per life of project from mowing two-tracks and around vaults

Note: Take includes harm and harassment, as well as harassment from relocating individuals from work areas. Take estimates per 5 or 10 years are average number in that time interval over the life of the project.

*If present in this area.

Table 5-2. Estimated Take by Habitat Area

O&M Activity	*Location*	*Species*	*Take (area)*
Ground disturbance maintenance (routine)	Stations 4949 to 5134 & 1035 to 1184	California tiger salamander	0.9 acre

Note: Area of take for tiger salamander based on 13 buried vaults in known habitat that could be excavated (8 routinely and 5 very infrequently), disturbing 0.026 acre at 7 manways and 0.075 acre at 6 blowoffs; 0.28 acre for erosion repair.

Permanent disturbances to habitat include (with species most likely to be affected):

- Maintenance of access tracks to appurtenant facilities where roads become overgrown by vegetation (San Joaquin kit fox and California red-legged frog).
- Erosion repairs, such as rock armor, that permanently alter habitat (California red-legged frog). Such repairs are not part of normal maintenance and are covered under changed circumstances (Section 6).
- Frequently repeated habitat alteration at the same location such that habitat does not recover between disturbances (California tiger salamander, California red-legged frog, and San Joaquin kit fox). This is not expected to occur during planned O&M activities and would be covered under changed circumstances in Section 6.

Whenever O&M activities occur in covered species habitat, all individuals observed in the work area could be taken in the form of harassment during relocation of these individuals to outside the work area. Species that would be relocated are California red-legged frog and California tiger salamander. In some instances, take can occur without being detected. This is particularly true for work in California tiger salamander upland habitat since finding individuals in burrows is very difficult. For species that are difficult to find in the wild, such as California tiger salamanders and California red-legged frogs, whenever an injured or dead individual is found within the work area during O&M activities, the potential exists that more individuals were taken than were found. Whenever take of any covered species occurs as a result of O&M activities, CCWA will evaluate the cause of take to see if it was unavoidable and determine if adaptive management measures (see Section 7) are needed to reduce take during future O&M activities in the same or similar habitat for the species.

Take of covered species can also occur as a result of changed circumstances as described in Section 6. Because considerable uncertainty is associated with changed circumstances, the location and amount of take cannot be predicted. Avoidance and minimization measures in Section 2.10 will be implemented whenever changed circumstances occur to prevent or minimize the amount of take.

5.2 ESTIMATED IMPACTS OF TAKE

How take can affect the population of a covered species for which take is authorized depends on several factors such as the number of individuals taken, total size of the population, and population dynamics of the species (e.g., age, growth, mortality, etc.). Take of individuals can reduce reproduction through loss of adults and recruitment through loss of eggs, larvae, or juveniles. Take in the form of habitat alteration or loss can also affect reproduction and recruitment as well as growth and mortality. The magnitude of this effect is related to size (relative to total available) and type of habitat affected plus timing and duration of the effect.

The covered O&M activities are anticipated to result in take through (1) mortality or serious injury of a few individuals of covered species (see Table 5-1), (2) harassment through capture and relocation of individuals in the work area, and (3) loss or temporary disturbance of small amounts of habitat (see Table 5-2). The numbers in Table 5-1 were estimated using scientific judgment through consideration of the frequency of O&M activities within covered species habitat (e.g., red-legged frog streams), the amount of habitat affected, time of year for O&M activities, project measures to avoid or minimize impacts, and likelihood that covered species

could be present at or adjacent to the work. Harassment impacts from capture and relocation of individuals cannot be estimated with any degree of accuracy because the number that could be present when O&M activities take place and the amount and type of work necessary where the species are present is unknown. Most project effects on habitat are expected to be temporary, affect a small area, and be of short duration. The distance downstream that water discharge could affect the habitat is dependent on the volume and release rate of the water, size of the stream channel, and flow present at the time of discharge. The following describes the effect of take from O&M activities, excluding accidents, on each species for which take authorization is requested.

San Joaquin kit fox – Several individuals (estimated reasonable worst case of 2 per 75 years) could be taken through vehicle collisions. This number of individuals over a 75-year life of the project is not expected to adversely affect survival of the species, and the actual number taken is anticipated to be less. Capture and relocation of individuals would also constitute take, but this is unlikely to occur. Mowing of access tracks (8.7 acres) and around vaults (1.3 acres) will temporarily alter approximately 10.0 acres of habitat by shortening vegetation. No excavation activities are planned as part of routine O&M but could occur as a result of changed circumstances. Surveys using existing protocols (Appendix F) will be conducted prior to any excavation activities to ensure that no occupied burrows are in the work area.

California red-legged frog – Although several individuals (juveniles or adults) could be taken over the life of the project, the number taken per year is estimated to be less than one. Mowing of access tracks, excavation to access buried blowoffs, and dewatering discharges are predicted to temporarily affect a small amount of habitat per year. Mowing would occur around vaults and along access tracks adjacent to several known locations for red-legged frogs on an annual basis. Excavation of buried blowoffs adjacent to streams inhabited by this species and release of water for dewatering pipeline segments (from buried or above-ground vaults) may not occur every year. Vehicle traffic on the access road to the treatment plant and operation of the sludge lagoons also have the potential to result in take of this species. Non-routine activities such as excavation for pipeline repairs in red-legged frog habitat would occur infrequently over the life of the project and would be covered under changed circumstances. Considering the measures to avoid take of this species and to restore disturbed habitat, take is likely to be considerably less. The project passes through areas where this species is relatively abundant, and loss of less than one individual per year is not anticipated to adversely affect the survival of the species. No habitat would be permanently lost.

California tiger salamander – The project passes through upland habitat used by this species. Intermittent ground disturbances in upland habitat within 1.2 miles of breeding habitat in Santa Barbara County are expected to affect up to 0.9 acre (Table 5-2). Project traffic in this area is not expected to cause any mortality of individuals because most project traffic will be during the day in dry weather, and the salamanders move primarily at night in wet weather. Whether any individuals would be taken during earth-work in their upland habitat will depend on the distribution of the salamanders in burrows and the number and size of the work areas. This loss is included in the habitat take calculation. Loss of a few juveniles would not affect survival of the local population but loss of one or more adults has the potential to reduce the population, if the lost adults would have spawned again. Habitat for burrowing animals will be restored after earth-work is completed so that loss of burrow habitat would be short term (usually less than one year). Loss of a few individuals at intervals of several years or less frequently is unlikely to affect survival of the species.

California tiger salamanders also have the potential to be present in the vicinity of the Polonio Pass Water Treatment Plant. Project traffic to and from vaults along the pipeline route in this area is not expected to cause any mortality of individuals for the same reasons described above. Vehicle traffic on the access road to the water treatment plant has a low potential to take salamanders crossing the road. Such traffic at night is limited to a few vehicles associated with shift changes at the plant. These employees are given environmental training that includes discussion of tiger salamander crossing of the road, especially during rains. The potential for take of tiger salamanders using burrows in the sludge monofill is low due to distance from potential breeding ponds. Operation and maintenance of the sludge lagoons could also result in take of this species if breeding were to occur in the lagoons.

5.3 MITIGATION OF IMPACTS

5.3.1 Project Facility Construction Impacts

Permanent impacts to covered species (San Joaquin kit fox, willow flycatcher, least Bell's vireo, and California red-legged frog) and their habitat during construction of the project have been mitigated off-site in compliance with the State Biological Opinion (CESA 9317) and State Management Agreement (CESA 9322) issued for project construction. Appendix J lists the areas permanently impacted. These areas were restored after construction, with off-site mitigation at a ratio of 5:1 for least Bell's vireo and southwestern willow flycatcher and 3:1 for San Joaquin kit fox and California red-legged frog. Mitigation for temporary construction impacts from Tank 1 to Tank 5 has been negotiated with CDFW and will be as agreed to in those negotiations.

Mitigation Site Management

A habitat management plan has been prepared for the Arroyo Grande Mitigation Site, Burton Mesa Management Area site, Tank 2 site, and the Cuesta Tunnel North Portal site. This plan specifies management to preserve natural habitats and the species using these habitats. Copies of the plan were submitted to the Service, NMFS, and CDFW in June 2003.

5.3.2 O&M Activity Impacts

As described above in Section 2.10, take of covered species and impacts to their habitats will be avoided to the extent feasible during CCWA O&M activities. Where take of individuals or habitat impacts are not avoidable for species with authorized take, CCWA will implement the measures described above in Section 2.10 for minimization of take and impacts to habitat, including restoration of habitats temporarily disturbed. CCWA O&M activities will generally have temporary impacts on the same areas (habitats) that were affected by project construction. Additional mitigation (e.g., land purchase) for subsequent disturbances to these previously permanently "taken" habitats for all covered species, other than restoration of the habitat disturbed during O&M activities, is not required. Take of any covered species within that habitat, however, would require mitigation.

For temporary impacts of O&M activities to covered species habitat (in habitats that were temporarily affected during construction), mitigation will entail restoration of the habitat to pre-disturbance or better conditions. This includes restoring ground contours and revegetation in accordance with the revegetation manuals prepared for project construction (see Appendix

D). If the disturbances occur frequently enough to cause a permanent impact (i.e., habitat recovery to meet performance criteria takes longer than 5 years or habitat is disturbed again prior to such recovery) in areas where construction impacts were temporary, and these impacts increase take beyond that authorized, then CCWA will amend the permit. Anticipated O&M activities are not expected to result in permanent impacts to covered species habitat beyond what occurred during construction and was already mitigated.

California Red-Legged Frog

CCWA has purchased three (3) credits (=acres) at $2,500 each at the Palo Prieto Mitigation Bank to offset the potential take of less than one California red-legged frog per year as a result of project O&M activities. The number of credits was determined based on observations of approximately four adult and juvenile California red-legged frogs per acre in a marsh pond on Vandenberg AFB (SAIC field notes) and one to six observed per kilometer of streams in the Los Padres National Forest (Hubbertt and Murphey 2005). Since O&M of the pipeline from 1997 through March 2013 has resulted in no recorded take of this species, 3 credits (acres) will more than compensate for the predicted loss of California red-legged frogs per year.

San Joaquin Kit Fox

Mitigation for take of San Joaquin kit fox was established in the Biological Opinion for project construction and operation, and that mitigation has been implemented. Therefore, no additional mitigation is necessary for take during O&M.

California Tiger Salamander

CCWA has purchased three (3) credits (=acres) at $2,500 each at the Palo Prieto Mitigation Bank to offset the potential take through disturbance of upland habitat in Santa Barbara County and harm or harassment in San Luis Obispo County as a result of project O&M activities. Three credits will compensate for 2.7 acres of habitat based on an estimated 0.9 acre of disturbance (see Table 5-2) due to erosion repairs and access to manways/blowoffs within California tiger salamander upland habitat in Santa Barbara County with mitigation at a 3:1 ratio, and the potential harm or harassment of adults/juveniles or larvae at the Polonio Pass Water Treatment Plant (see Table 5-1). An additional mitigation credit at $35,000 has been purchased in the La Purisima Conservation Bank for potential take of the state-listed California tiger salamander in Santa Barbara County. No take of this species has been observed during O&M of the water treatment plant from 1997 through April 2015. A habitat assessment for the species in San Luis Obispo County found that the species is not likely to be present in the vicinity of the treatment plant.

6.0 CHANGED/UNFORESEEN CIRCUMSTANCES

A number of events or circumstances could occur during the term of this HCP that would require modification of the HCP and/or the Incidental Take Permit and/or require additional conservation and mitigation measures. These include events that can be predicted (changed circumstances) and those that cannot (unforeseen circumstances). Federal regulation [50 CFR §§17.22(b)(1)(iii) and 17.32(b)(1)(iii)] require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during implementation of the HCP. In addition, the Habitat Conservation Plan Assurances (No Surprises) Rule [50 CFR 17.22 (b)(5) and 17.32(b)(5)] defines changed and unforeseen circumstances and describes the obligations of the permittee and the Service. The purpose of the Assurances Rule is to provide assurances to non-Federal landowners participating in habitat conservation planning under the Endangered Species Act that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented HCP, in light of unforeseen circumstances, without the consent of CCWA.

6.1 CHANGED CIRCUMSTANCES

Changed circumstances are defined as changes in circumstances affecting a species or geographic area covered by an HCP that can be reasonably anticipated by plan developers and the Service (e.g., the new listing of a species, a fire, or other natural catastrophic event in areas prone to such an event). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and these additional measures were already provided for in the plan's operating conservation program (e.g., the conservation management activities or mitigation measures expressly agreed to in the HCP, then CCWA will implement those measures as specified in the plan. However, if additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the plan's operating conservation program, the Service will not require these additional measures absent the consent of CCWA, provided that the HCP is being "properly implemented" (properly implemented means the commitments and the provisions of the HCP have been or are being fully implemented) and the species adequately covered.

6.1.1 Changed Circumstances Covered by the HCP

Changed circumstances covered by this HCP include natural disasters (e.g., floods, earthquakes, and fire), new listing of species that occur in the HCP boundaries, accidents caused by the project (e.g., from equipment or facility failure causing water spills, erosion, or fires), new information about the species covered in this HCP, new information about listed species not covered by this HCP, and changes in project activities (e.g., non-routine maintenance activities) that could result in take of covered species during covered activities. Although location and frequency of such events cannot be predicted, those that have a reasonable probability to occur in the project area at least once over the life of the project are listed in Table 6-1. Take of covered species resulting from changed circumstances has not been estimated due to the uncertainties associated with such circumstances (e.g., unknown locations, area affected, timing, species present, and their abundance). How such take or the potential for take will be addressed is discussed below in Section 6.1.2.

Table 6-1. Anticipated Covered Changed Circumstances

Event	*Species*	*Changed Circumstance*	*Response*
Natural disasters	San Joaquin kit fox; California red-legged frog; California tiger salamander; unarmored threespine stickleback	Events that cause damage or potential for damage to project facilities, such as pipeline rupture or erosion, and require erosion control or repair/reconstruction of facilities in covered species habitat. Fire: Temporary loss of vegetative cover for <1 yr in grasslands; temporary effects on California red-legged frog habitat through increased runoff of sediments and on San Joaquin kit fox habitat; 5-10 yrs for chaparral shrub recovery; temporary effects on California red-legged frogs through increased runoff of sediments Flood/Earthquake: Damage or threat of damage to facilities from erosion or pipeline rupture in covered species habitat; habitat alteration	Evaluate burned areas within HCP boundaries for erosion potential; seed with native species present before fire, as necessary; install sediment and erosion-control measures in project boundaries, as needed, to prevent erosion that could affect covered species; work with fire-fighting agencies to minimize impacts to known locations of covered species Evaluate damage, obtain permits, and implement repairs
Project-related accidents (see Table 6-2)	San Joaquin kit fox; California red-legged frog; California tiger salamander; unarmored threespine stickleback	Degraded water quality (temporarily) from water or hazardous materials spills; altered habitat from fires, pipeline leaks/spills, spills into drains, or erosion	Evaluate take and damage to habitat; implement measures to repair habitat while minimizing or avoiding take of the species; request a minor or major amendment with the Service, as appropriate, and mitigate loss of individuals beyond authorized take; reports to agencies
New listing of species	Unknown	Newly listed species within HCP boundaries; potential for take will depend on species characteristics relative to project operations	Evaluate potential for take from project; coordinate with the Service; implement measures to avoid take; amend permit if take could occur
New information on covered species	Any covered species	Newly identified locations, or increase or decrease in abundance, at known locations within HCP boundaries; critical habitat designation (e.g., San Joaquin kit fox); potential for take will depend on species characteristics relative to project operations	Evaluate potential for increased take or take of covered species with no authorized take, implement appropriate measures from Section 2.10, or develop new measures applicable to the species that will minimize and avoid take; coordinate with the Service on how to address increased take if it is occurring or anticipated
Project modifica-tions	Any covered species	Changes in project activities (e.g., construction of new turnouts or increased frequency of internal inspections requiring draining of pipeline segments) or non-routine maintenance (e.g., pipeline repairs requiring excavation, bridge repairs or removal of beaver dams at Arroyo Grande Mitigation Site, erosion repair)	Evaluate potential for increased take and modify project activities or develop new avoidance and minimization measures applicable to the site and species; request a minor or major amendment with the Service, as appropriate
New information on listed species not covered in HCP	Any listed species (e.g., bald eagle, steelhead)	Newly identified locations, or increase or decrease in abundance, within HCP boundaries; designation of critical habitat within the HCP boundaries; potential for take will depend on species characteristics relative to project operations.	Evaluate potential for take and modify project activities to minimize or avoid take or develop new avoidance measures applicable to the site and species; coordinate with the Service to amend permit if take exists

Accidents that could result from the project are related primarily to equipment or facility failures that are not caused by natural disasters. A number of accidents (Table 6-2) have the potential to occur during project O&M that could affect covered species.

Table 6-2. Project-Related Accidents

Accident	*Location*	*Occurrence*	*Species*
Trapping animals inside vaults	Where vaults are within species' habitat	Infrequently if ever	San Joaquin kit fox, California red-legged frog
Spills of water with disinfectant residual or other chemicals	Polonio Pass Water Treatment Plant	Infrequently if ever	California red-legged frog, San Joaquin kit fox, California tiger salamander
Water spills causing a rapid fluctuation in water level and/or having disinfectant residual	Blowoff or dewatering valves in species' habitat	Spill unlikely but could affect water levels and quality	California red-legged frog, unarmored threespine stickleback, Gambel's watercress
Erosion with associated sedimentation/turbidity from leaks in the pipeline or valves	Anywhere within pipeline route	Only for moderate to large leaks	California tiger salamander, San Joaquin kit fox, California red-legged frog
Failure of erosion-control or energy dissipation measures during dewatering	Blowoff or dewatering valves in species' habitat	Low potential at most dewatering sites	California red-legged frog
Spills of fuels or lubricants from equipment during repair activities	Adjacent to streams anywhere within pipeline route	Unlikely	California red-legged frog
Fires from vehicles driving in dry vegetation	Primarily San Joaquin kit fox habitat, but elsewhere also	Unlikely	San Joaquin kit fox

6.1.2 Plan to Address Changed Circumstances

When changed circumstances occur, the following procedures will be implemented as appropriate for each incident.

- Define the changed circumstance.
- Contact the Service within 30 days, by phone (in 5 working days) and in writing (in 14 working days).
- Determine how the changed circumstance did or could affect covered species and their habitat, including altering the potential for take by covered activities.
- Evaluate the effectiveness and applicability of existing measures in the HCP to avoid or minimize take from the changed circumstance.
- Determine if additional or modified protection measures are necessary.

- Assess whether changes in operations are feasible that would reduce the potential for take.
- Develop a plan to address the specific changed circumstance, such as from natural disasters or project-related accidents.
- Obtain all appropriate permits for any necessary repair work.
- Implement all appropriate HCP measures to avoid or minimize take.
- Record actions taken and their effectiveness.
- Record amount of take by species resulting from the changed circumstance.
- Notify the Service for changed circumstances that will require modified or additional measures to avoid or minimize take to determine if the permit needs to be amended.
- Apply adaptive management as needed to address the changed circumstance.

More detail regarding the responses to changed circumstances is given below for situations where such detail can be developed prior to the event occurring.

If a species that is not covered by the HCP or for which no take is authorized by the permit but that may be affected by covered activities is listed under the Endangered Species Act during the term of the section 10 permit, the section 10 permit will be re-evaluated by the Service, and the HCP covered activities will be modified, as necessary, to insure that the activities covered under the HCP will not result in take of, jeopardy to, or adverse modification of the critical habitat of the newly-listed species. In addition, if any currently-listed species that is not covered by the HCP, or for which no take is authorized by the permit, is discovered to be at risk of take, jeopardy, or adverse modification of its critical habitat by project activities covered by the HCP, the section 10 permit will be re-evaluated by the Service, and the HCP-covered activities will be modified, as necessary, to insure that the activities covered under the HCP will not result in take of, jeopardy to, or adverse modification of the critical habitat of the non-covered listed species or covered species with no authorized take. CCWA shall implement the modifications to the HCP-covered activities identified by the Service as necessary to avoid the take of, jeopardy to, or adverse modification of the critical habitat of the newly-listed species, currently-listed non-covered species, or covered species with no authorized take. CCWA shall continue to implement such modifications until such time as CCWA has applied for and the Service has approved an amendment of the section 10 permit, in accordance with applicable statutory and regulatory requirements, to cover the newly-listed species, currently-listed non-covered species, or covered species with no authorized take, or until the Service notifies CCWA in writing that the modifications to the HCP-covered activities are no longer required to avoid take of, jeopardy to, or adverse modification of the critical habitat of the newly-listed species, currently-listed non-covered species, or covered species with no authorized take. If take of, jeopardy to, or adverse modification of the critical habitat of the newly-listed species (or currently-listed species not covered by the HCP or covered with no authorized take) cannot be avoided, CCWA will immediately notify the Service to discuss the potential impacts and to initiate the amendment process (see Section 6.3).

When an accident occurs as a result of the project that has the potential to affect covered species or their habitat, the following procedures will be implemented. CCWA will immediately (within 24 hours) notify the appropriate agencies (e.g., the Service, CDFW, Corps, and Regional Water Quality Control Board) by phone or FAX. This initial contact will include discussion of

apparent impact and acceptable measures to prevent further impact while the problem is being addressed. CCWA will then have qualified biologists survey the affected area (both on site and off site) immediately after the accident to assess the amount and extent of environmental damage that occurred. Measures approved (verbally) by the agencies to prevent any further damage (e.g., installing erosion control or diverting flow away from covered species habitat, relocating individuals out of harm's way, etc.) will be implemented immediately. Within 5 working days of the accident, CCWA shall submit a written initial incident report describing the accident and effects on covered species or their habitat, response chronology, measures taken to prevent further impact, cleanup measures implemented, and planned or proposed mitigation measures to repair or offset habitat damage. If covered species or their habitat have been affected by the accident or could be affected by remedial measures, CCWA will prepare and implement a work plan for repair of the damage and mitigation of any impacts to covered species and their habitat. The plan will be approved by the appropriate agencies (CDFW or the Service) before implementation. The plan will specify the type, amount, and location of compensatory mitigation; monitoring protocols and performance criteria; performance milestones and schedule; and contingencies. Any permits required for the work will be obtained prior to implementing the plan. Within 3 weeks after the cleanup and any repair work in the species habitat is completed, a final incident report shall be submitted to the agencies describing estimated damage, what was accomplished, and the effectiveness of all protection measures used.

In the case of changes in circumstances that preclude implementation of the terms of the HCP or the Permit, CCWA shall immediately notify the Ventura Field Office of the Service. Principal staff contacts for the proposed action shall be alerted. If a changed circumstance results in mortality or injury to a covered species above the levels predicted and permitted, operations will be adapted so that take is avoided until the threat to the species is eliminated, the issue is resolved to the satisfaction of the Service, or the HCP is amended.

Funding for the costs of changed circumstances is discussed in Section 8.0.

6.1.3 Changed Circumstances not Provided for in the HCP

Take of covered species caused by natural disasters such as earthquakes, fires, drought, or floods that do not affect or threaten project facilities is not provided for under this HCP. Nor is take that results from negligence by others that does not affect project facilities (i.e., caused by activities of non-CCWA individuals within CCWA easements on private or public property), land use modifications (e.g., change of grazing lands to more intensive agriculture or conversion of grazing or agricultural lands to urban areas) within or adjacent to project facilities and easements, and global warming or other climate change covered under this HCP.

6.2 UNFORESEEN CIRCUMSTANCES

Unforeseen circumstances are events or changes in circumstances affecting a species or geographical area covered by an HCP that cannot be reasonably anticipated and that result in an adverse change in the status of the covered species. In the case of an unforeseen event during implementation of the HCP, CCWA shall immediately notify the Service staff who have functioned as the principal contacts for the proposed action. In determining whether such an event constitutes an unforeseen circumstance, the Service shall consider, but not be limited to, the following factors: size of the current range of the affected species; percentage of range

adversely affected by the HCP; percentage of range conserved by the HCP; ecological significance of that portion of the range affected by the HCP; level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP; and whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

If the Service determines that additional conservation and mitigation measures are necessary to respond to the unforeseen circumstance where the HCP is being properly implemented, the additional measures required of CCWA must be as close as possible to the terms of the original HCP and must be limited to modifications within any conserved habitat area or to adjustments within lands or waters that are already set-aside in the HCP's operating conservation program. Additional conservation and mitigation measures shall involve the commitment of additional CCWA land or financial compensation or restrictions on the use of CCWA land or other natural resources otherwise available for development or use under the original terms of the HCP, only with the consent of CCWA.

As noted above, CCWA will immediately notify the Service whenever unforeseen circumstances related to or observed during project activities occur that could substantially increase impacts to covered species or their habitat within the HCP boundaries (or outside the boundaries if caused by project activities). CCWA will also prepare documentation that describes the unforeseen circumstance, how it affects project operation and covered species, the amount of take (by species) that resulted from the unforeseen circumstance, actions taken by CCWA upon discovery of the unforeseen circumstance and those planned for the future, applicability and effectiveness of existing measures in the HCP to avoid or minimize take of covered species under the unforeseen circumstance, and any new measures recommended to avoid or minimize take from project activities. An assessment will also be made to determine whether additional mitigation and/or modification of the permit are necessary. This documentation will be submitted to the agency for review and comment. If any unresolved issues remain after this submittal, a meeting will be scheduled to discuss these issues, potential solutions, and a schedule to complete the resolution process.

6.3 AMENDMENT PROCEDURES

6.3.1 Minor Amendments

This HCP may, under certain circumstances, be amended without amending its associated permit, provided that such amendments are of a minor or technical nature and that the effect on the species involved and the levels of take resulting from the amendment are not significantly different from those described in the original HCP. Examples of minor amendments to the HCP that would not require permit amendment include:

- Minor revisions to survey, monitoring, or reporting protocols;
- Minor revisions of the HCP's plan area or boundaries (e.g., changes of a few feet at specific locations or changes in access roads to be used requiring no new road construction and causing no negative impact to covered species and their habitat);
- Minor changes in operating procedures that do not increase the potential for take of covered species; and

- Minor corrections to documents (e.g., typographical and spelling errors).

To request a minor amendment to the HCP, CCWA must submit to the Service in writing a description of the proposed amendment, an explanation of why the amendment is necessary or desirable, and an explanation of why the effects of the proposed amendment are believed not to be significantly different from those described in the original HCP. If the Service concurs with the amendment proposal, it shall authorize the HCP amendment in writing, and the amendment shall be considered effective upon the date of the Service's written authorization.

6.3.2 Major Amendments

During the specified permit period, the HCP or permit may be amended in accordance with all applicable legal requirements, including but not limited to the Endangered Species Act, the National Environmental Policy Act, and the Service's permit regulations. Changes that would require a major amendment of the HCP and/or section 10(a)(1)(B) permit include, but are not limited to, the following:

- Significant revision of the permit area boundary (e.g., adding/expanding facilities to be covered by the HCP or increasing the area that could be affected by water releases);
- The listing under the Endangered Species Act of a new species not currently addressed in this HCP that may be taken by project activities;
- Potential for take of covered species for which take is not authorized during covered activities;
- Modification of any important project action or mitigation component under the HCP, including funding, that may significantly affect authorized take levels, effects of the project, or the nature or scope of the mitigation program; or
- Any other modification of the project likely to result in significant adverse effects to the covered species in this HCP not addressed in the original HCP and permit application.

To request a major amendment to the HCP and/or section 10(a)(1)(B) permit, CCWA must submit to the Service in writing a description of the proposed amendment, an explanation of why the amendment is necessary or desirable, and an explanation of the potential impacts to the covered species, associated habitat, and human environment. Major amendments may require a change in one or more of the Service's decision documents, including the Biological Opinion and Findings. If the Service concurs with the amendment proposal, it shall authorize the HCP and/or section 10(a)(1)(B) permit amendment in writing, and the amendment shall be considered effective upon the date of the Service's written authorization.

6.3.3 Permit Renewal

Upon expiration, the CCWA section 10(a)(1)(B) permit may be renewed, if necessary, without the issuance of a new permit, provided that the permit is renewable, all compliance requirements are up-to-date (including report submittal), and that biological circumstances and other pertinent factors affecting the species covered in the HCP at the site are not significantly different than those described in the original HCP. Approximately 6 months prior to the expiration of the permit, CCWA shall submit to the Service, in writing:

- A request to renew the permit;
- Reference to the original permit number;
- Certification that all statements and information provided in the original HCP and permit application, together with any approved HCP amendments, are still true and correct, or inclusion of a list of changes.
- A description of what take has occurred under the existing permit; and
- A description of what portions of the project are still to be completed, if applicable, or what activities under the original permit the renewal is intended to cover.

6.4 PERMIT REVOCATION

The permit may be revoked for any of the following reasons (50 CFR 13.28):

- The permittee willfully violates any Federal or state statute or regulation, or any Indian tribal law or regulation, or any law or regulation of any foreign country, which involves a violation of the conditions of the permit or of the laws or regulations governing the permitted activity.
- The permittee fails within 60 days to correct deficiencies that were the cause of a permit suspension.
- The permittee becomes disqualified under Section 13.21(c) of 50 CFR.
- A change occurs in the statute or regulation authorizing the permit that prohibits the continuation of a permit issued by the Service.
- Except for permits issued under Section 17.22(b) through (d) or Section 17.32(b) through (d) of this subchapter, the population(s) of the wildlife or plant that is the subject of the permit declines to the extent that continuation of the permitted activity would be detrimental to maintenance or recovery of the affected population.

7.0 ADAPTIVE MANAGEMENT, MONITORING, AND REPORTING

Operations and maintenance (O&M) activities are programmatic in nature, making it difficult to predict what type of activities will need to be performed and when and where they will be required. Also, the effectiveness of the avoidance and minimization measures is not known for all potential situations that could arise during O&M. Thus, uncertainty exists around the estimated take levels and potential impacts to covered species habitat. To combat this uncertainty, CCWA will implement the following adaptive management program. The purpose of adaptive management measures in an HCP is to help CCWA meet the biological goal and objectives outlined in the HCP.

Measures have been included in the HCP to avoid and minimize project take of covered species and impacts to their habitat to the extent feasible, but some modifications to the measures or addition of other measures (such as newly developed methods to protect species) may be necessary to ensure maximum protection of covered species under specific O&M conditions. Consequently, CCWA will perform regular checks during and after implementation of those measures to determine their effectiveness, the actual extent of O&M take and impacts to covered species habitat, and habitat restoration success. Monitoring and reporting are described in sections 7.2 and 7.3. Funding assurances for monitoring and management responsibilities described below are discussed in Section 8.

7.1 ADAPTIVE MANAGEMENT

The need for adaptive management can be triggered by changed circumstances as well as by the results of surveys and monitoring to verify that the HCP is being implemented properly. Specific triggers include, but are not limited to:

1. New information on covered species.
2. Accidents and natural disasters that change the potential for take.
3. Avoidance or minimization measures are not meeting the biological goal and objectives of the HCP.
4. Potential for take is found to be greater than the levels predicted in Section 5.
5. Habitat restoration in covered species habitat is not meeting performance criteria.

The following describes how the need for adaptive management will be identified, procedures to be implemented as part of the adaptive management program, and coordination with the Service.

Monitoring and reporting, as described below, will be necessary to verify that the avoidance, minimization, and mitigation measures in the HCP are being implemented and to determine the effectiveness of these measures for each type of O&M activity. Monitoring will be required whenever O&M activities could affect covered species or their habitat. The results of this monitoring will be evaluated after each activity to determine the effectiveness of the particular measures used to protect covered species and to determine if and when adaptive management is needed to meet the goal and objectives of the HCP. A record of each evaluation will be kept that includes a description of the work performed, site conditions, species protection measures

used, effectiveness of the measures, and any changes to make the measures more effective (if found not to be effective). Effectiveness will be evaluated using the following questions. Did the existing measures:

- Minimize the potential for take (including need for capture/relocation)?
- Avoid breeding or other sensitive periods?
- Minimize habitat disturbance (e.g., loss of vegetation, water quality)?
- Maintain movement pathways?
- Restore habitat to pre-work or better conditions?

Whenever the evaluation indicates that the HCP goal and objectives may not be met, the Service will be notified within 30 days, or before further O&M activities that could affect covered species are undertaken. Changes in the species protection measures will be made as necessary based on the results of this evaluation and inserted into the HCP using revision marks after approval by the Service. A log of all changes, including date, will be kept with the HCP. The results of all monitoring will be evaluated annually as well to determine the overall effectiveness of the measures as applied to each species individually.

When site-specific conditions require that surveys for or capture of covered species use methods other than those in agency-developed protocols (Appendix F), CCWA will prepare a plan describing the methods proposed and submit this plan to the appropriate agencies for review and approval prior to implementing the plan. Depending on the conditions requiring the changed methods, CCWA will submit the plan so that the agencies have a minimum of 5 working days to review and comment on the plan. Any changes recommended by the agencies will be incorporated into the plan prior to its implementation.

The CCWA Regulatory Specialist will compile the field monitoring results as well as observations on how well the protection measures are being implemented on a day-to-day basis. This information will be evaluated at the conclusion of each activity that involves protection of covered species in the HCP and on an annual basis (or more frequently if necessary) for normal O&M activities that require avoidance of or minimization of effects on covered species with authorized take and avoidance of covered species with no authorization of take to determine if the project is maintaining or enhancing preservation of these species as set forth in the goal and objectives for the HCP (see above). If the project is not meeting the goal, steps will be taken to identify where the protection process is failing and how to modify the process so the covered species preservation goal can be met. Based on the above evaluations, procedures established in the HCP will be modified, and new procedures may be added, with the approval of the Service, and amendment of the permit if necessary. These modifications or new procedures will be submitted to the appropriate agencies for their review and approval. After a 20-working-day (or other mutually agreeable schedule) review period, any comments will be incorporated and the changes added to the HCP. Monitoring data for restoration of habitats disturbed during O&M activities will also be reviewed annually to determine if remedial measures are necessary to meet restoration criteria within the estimated time.

To help adapt the HCP to changing conditions, CCWA will annually check a centralized database, such as the CNDDB or equivalent, and with the Service/CDFW for new information about the covered species to update the project covered species database for tracking these

species within the HCP boundaries (Appendix A). This information will also be added to the project access road maps (Appendix B). These sources will also be checked prior to O&M activities, particularly non-routine work, that have the potential to affect covered species.

Surveys for and monitoring during dewatering releases in known California red-legged frog habitats may be reduced in scope at particular sites if such surveys and monitoring clearly show that this species is not affected by dewatering activities at those sites. Any such changes will be implemented only after recommendations by qualified biologists that are documented through monitoring and reporting (see below).

Whenever take, in the form of harassment, injury, or mortality, of any covered species is observed as a result of project activities, the incident will be reviewed to determine if the take could have been avoided. If the take is determined to be avoidable in the future through modification of O&M procedures that do not prevent safe and efficient operation of the project, such changes will be made. If the take incident was unavoidable and similar events could result in future take above the estimates in Section 5, CCWA will evaluate ways to reduce future take for this species, or coordinate with the Service to amend the permit and provide additional mitigation for such take.

This monitoring, evaluation, and refinement of the protection measures will continue over the life of the project to ensure that the HCP goal and objectives are being met. When the adaptive management measures described in this section involve revision of the ongoing management plan, the costs of revised or new measures will be within the limits of the contingency fund established by CCWA as described in Section 8.

7.2 MONITORING REQUIREMENTS

CCWA will conduct monitoring to (1) ensure that the protocols and protection measures are implemented, (2) determine the effectiveness of the measures, (3) make sure that the project maintains or enhances conservation of the species covered in this HCP, (4) track take, including amount of covered species habitat affected by O&M activities, (5) ensure that the mitigation measures are effective, and (6) ensure that the conservation program is being implemented in full. CCWA has hired (and will continue to retain) a Regulatory Specialist to make sure that all requirements for environmental protection are implemented. This includes bringing in environmental specialists as needed to monitor work in covered species habitat and to relocate individuals of covered species with authorized take when necessary to protect them from injury or death.

The following sections describe the types of monitoring that will be conducted to achieve the six items listed above. The frequency of field monitoring will depend on the frequency and type of O&M activities within covered species habitats. It will involve, as appropriate, one or more surveys to determine presence of the species prior to the work and to describe habitat present, continuous monitoring to periodic checks during the work as determined by qualified biologists, and periodic (primarily seasonal) monitoring checks for habitat restoration (i.e., revegetation). Evaluation of the monitoring results has been described in Section 7.1.

7.2.1 Pre-O&M Activity Surveys

Pre-work surveys will be necessary prior to any work at sites where covered species could be present in the proposed work space for specific O&M activities. Surveys for covered species at work sites, where they could occur, will be as follows. A survey to determine presence, using appropriate protocols, and approximate number of individuals in the work area will be conducted immediately prior to the work. This survey will also include a quantitative (e.g., size of work area in covered species habitat) and qualitative characterization of the habitat to be affected (e.g., vegetation type and density or number of trees, stream width and depth, substrate type, number of burrows, etc.) with photographs documenting the pre-work conditions. Any individuals of covered species with authorized take that could be harmed by the work will be captured and relocated as set forth in the avoidance and minimization measures. The results of these surveys will be recorded in field notes and in a survey report to be kept on file at CCWA. If a covered species is present or likely to be present, a site-specific plan for avoiding or minimizing impacts will be developed prior to the work and implemented. This plan will include monitoring during all phases of the O&M activity that could result in take of a covered species. If a covered species with no authorized take could be present, a plan for avoiding impacts will be developed through adaptive management and implemented.

7.2.2 O&M Activity Monitoring

The CCWA Regulatory Specialist or an environmental specialist under contract to CCWA will provide environmental training for all workers at the site and be present whenever work activities have the potential to adversely affect covered species or their habitat. The monitor (qualified biologist) will capture and relocate any covered species with authorized take that are in the work area and could be adversely affected by the work. The environmental monitor will be empowered to halt or redirect work, if a covered species is found in the work area and could be injured or killed, until the individual(s) is moved out of harm's way for species with authorized take or leaves the work on its own for species with no authorized take. Monitoring logs will be kept for all monitoring activities to document implementation of the species protection plans, observations during O&M activities, any take of covered species, and habitat restoration at the end of the work. The latter includes replacing topsoil, configuring streams to pre-construction contours, and replanting vegetation. If covered species with no authorized take could be affected by the O&M activity, work will be halted, and adaptive management will be implemented that may include rescheduling for when the species is not present or amending the permit to include take for the species.

7.2.3 Post-O&M Activity Monitoring

Field monitoring will be conducted following O&M activities in covered species habitat to document habitat restoration success, including the revegetation performance criteria described in the three revegetation manuals in Appendix D. Whenever conditions that will prevent meeting the performance criteria are found (e.g., weed infestations or erosion), remedial actions will be implemented immediately. The results of this monitoring will be summarized at the end of each year in a monitoring report. Monitoring will continue until the performance criteria are met. Post-O&M activity monitoring will also assess the covered species habitat quantity and quality as well as the approximate number of individuals present relative to that recorded during pre-work surveys.

7.2.4 Mitigation Monitoring

Monitoring of riparian habitat restoration along Arroyo Grande Creek at the Arroyo Grande Mitigation Site will continue until the habitat is well established and functioning as a riparian woodland.

No monitoring is necessary for the California red-legged frog and California tiger salamander mitigation of credits purchased at the Palo Prieto Mitigation Bank or for the California tiger salamander mitigation of credit purchased at the La Purisima Conservation Bank.

7.2.5 Inspections

The CCWA Regulatory Specialist will conduct checks of all non-routine maintenance work (including water discharges) to determine if O&M personnel are implementing the measures in Section 2.10 and record the results of these checks in a log to be analyzed at least annually (more frequently if non-compliance is found). The Regulatory Specialist will also make sure that all field monitoring of O&M activities in covered species habitat is conducted by Service-approved biologists (or trained biologists under their direct supervision), that all habitat restoration (i.e., revegetation) monitoring occurs as described in the Appendix D manuals, and that restoration performance criteria are met or exceeded.

The CCWA Regulatory Specialist will maintain a log for environmental training sessions that includes date and personnel attending for employees and contractor personnel. Other monitoring activities include recording all take in a permanent log for the project, keeping a total of all covered species habitat affected (area in square feet or acres) each year (by species), and annual updating of the project covered species database with new information on location of covered species within the HCP boundaries. Any listed species not covered by the HCP identified in the HCP boundaries during the database check will be evaluated to determine if this represents a changed circumstance and if adaptive management is required to avoid take. New locations will also be added to the access route maps. The new locations will receive the same protections as the existing locations.

7.2.6 HCP Implementation Monitoring

Monitoring to determine if the HCP goal is being met will occur as spot checks throughout the year whenever work occurs in covered species habitats and at the end of each year when records for implementing HCP measures are evaluated as described above in Section 7.1. This will include a review of overall avoidance and minimization measure effectiveness, mitigation performance, and take levels. The monitoring results will be compared with the HCP goal and objectives.

The criteria to be used in evaluating performance of the HCP are:

- Take levels are below those predicted for each covered species.
- Avoidance and minimization measures are effective or immediately modified to be effective.
- CCWA staff and contractors are complying with all HCP requirements.
- Annual environmental training and the covered species database update are performed.

- Habitat restoration is meeting or exceeding performance criteria.
- Performance of mitigation and minimization measures is as planned or better.

7.3 REPORTING REQUIREMENTS

Revegetation and habitat restoration monitoring reports will be prepared whenever habitat for covered species is disturbed by O&M activities. These reports will be included or summarized in the required annual monitoring report (Section 7.3.3). Management plans will be developed for all purchased mitigation lands that do not have existing management plans. These plans will be submitted to the Service for approval before implementation. If such lands are purchased as a result of changed circumstances, an amendment to the HCP and permit will be necessary (Section 6.3). Reporting for dead or injured covered species and effectiveness of protection measures is described below.

All reports will include the following certification from a responsible company official who supervised or directed preparation of the report:

> I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

7.3.1 Dead or Injured Covered species

Upon discovery of any dead or injured covered species within the HCP boundaries, the following procedures will be followed:

- Notification by telephone or FAX to the Service, and CDFW as appropriate, within 24 hours of the discovery.
- If injured animals are found during normal business hours, obtain from the agencies directions on how to handle the animals and what to do with them. If the agencies cannot be reached or if the animals are found outside of normal business hours, they will be handled using the best judgment of the CCWA Regulatory Specialist or an authorized biologist.
- Provide a written report to the same agencies within 5 working days that describes
  - Location where species was found, date, and time
  - Species and number of individuals
  - Apparent cause of injury or death
  - Circumstances surrounding species injury or death
  - Nature of injuries and status of the individuals
  - Disposition of any remains (obtain information on how and where to dispose of dead animal remains from the Service at 805-644-1766)
  - Name and affiliation of the person who found the injured or dead species.

7.3.2 Effectiveness of Protection Measures

Upon completion of every repair and maintenance work in covered species habitat, including relocating individuals out of the work area by a qualified biologist, the monitor will prepare a brief report that describes the protection measures used, numbers of individuals moved or avoided, effects on the species, effectiveness of the protection measures, and recommendations for improving the measures. This report will be submitted to the CCWA Regulatory Specialist for inclusion in the monitoring record for the project. These reports also will be summarized in the annual reports. Any recommendations for improving the protection measures that are approved by the Service will be incorporated into the HCP (see Section 7.1).

7.3.3 Annual Reports

Annual reports will be prepared and submitted to the Service by July 1 each year to evaluate compliance with the HCP and to determine if the goal and objectives of the HCP are being met. These reports will include:

- Objectives of the monitoring program
- Effects of the HCP on covered species and/or habitats
- Location (map) of sampling/monitoring sites (e.g., project work sites) with narrative description of work performed the previous year
- Area and type of covered species habitat affected by O&M activities in the previous year
- Total take by type (e.g., capture, harm, kill) for each covered species at each work site for all O&M activities performed the previous year
- Data collection methods
- Training records including dates, personnel, and person giving training
- Timing (dates), duration, and frequency of observations
- Data analysis (as appropriate) and by whom
- Evaluation of progress in obtaining the goal and objectives of the HCP as well as terms and conditions of the Permit
- CCWA annual budget line items for HCP implementation
- Recommendations to improve compliance
- Any changed or unforeseen circumstances that occurred and how they were addressed
- When and under what circumstances adaptive management was triggered. A discussion on the approach and results will be included.

Any changes in circumstances that increase the potential for take of covered species will be evaluated (see Section 6.1), and the monitoring and reporting will be adjusted as needed to ensure compliance with the HCP.

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8.0 FUNDING FOR THE HABITAT CONSERVATION PLAN

8.1 BACKGROUND

All expenses of CCWA and DWR (related to the project), including operation expenses, debt service payment, capital purchases/improvements, and pass-through expenses are paid by CCWA's participants with proportionate participation by San Luis Obispo County. The Water Supply Agreements for the Santa Barbara County project participants and the Master Water Treatment Agreement for the San Luis Obispo County participants provide the guidelines to be followed when billing the project participants for CCWA charges. The agreements stipulate that the fixed CCWA and DWR costs will be billed to the project participants once a year and be due and payable on June 1 of each year. The variable charges, which are based on the requested deliveries by each project participant, are billed three months in advance on a quarterly basis.

The project participants are billed for the CCWA expenses based on the Board of Director's adopted fiscal year (July 1 to June 30) budget. Additionally, the fixed portion of the DWR charges is billed based on the most recent calendar year Statement of Charges. (DWR prepares its Statement of Charges on a calendar year basis.) The DWR State Water Project Analysis Office (SWPAO) also supplies CCWA with projected estimates of the following calendar year charges. The current calendar year Statement of Charges and the SWPAO estimated charges are used to calculate the amount payable by the project participants for the budgeted fiscal year.

The CCWA operating expenses are billed directly to project participants in accordance with their Water Supply Agreements. Operating expenses include line items for all anticipated needs. They include line items for personnel, office expenses, supplies and equipment, monitoring expenses, environmental and habitat restoration, repairs and maintenance, professional services, general and administrative, and other expenses (e.g., mitigation costs for the California tiger salamander, California red-legged frog, and San Joaquin kit fox).

8.2 HCP COSTS

Table 8-1 lists the estimated costs of implementing the HCP. These costs are divided into the main elements of the HCP: implementing avoidance and minimization measures, monitoring, mitigation, changed circumstances, adaptive management, and reporting. The total cost for the initial 30 years, with inflation, is estimated to be $1,799,213. This includes up to $332,009 for changed circumstances. Annual costs for implementing avoidance and minimization measures during routine O&M activities and adaptive management will be included as line items in the annual budget prepared by CCWA Operations and Maintenance staff based on the previous year's expense history and anticipated expenses for the upcoming fiscal year. The cost for California tiger salamander and California red-legged frog mitigation is $50,000. Expenses for changed circumstances such as fire or flood that require habitat restoration (e.g., erosion control and revegetation) would be covered through a contingency budget line item as described below.

Table 8-1. HCP Implementation Costs

Activity	*Frequency/ Duration*	*Unit Cost*[1]	*One-time Cost*	*Cost/ year*[1]	*Total*[2]
AVOIDANCE & MINIMIZATION MEASURES					
Surveys for covered species prior to activities	1 per year/6 days	$2,560/ day		$15,360	$674,346
Training		$200/ person		$4,000	$175,611
Record check for new locations of covered species + updating database and maps	Annual	$1,790	$7,200	$1,790	$85,786
MONITORING					
Monitoring during work	1 per year/3 days	$3,120		$3,120	$136,976
MITIGATION					
Restoration (0.05 acre)	1 per year	$868		$868	$38,108
Mitigation bank credits for California tiger salamander	1 per project	$2,500 & $35,000 /credit	$42,500		$42,500
Mitigation Bank credits for California red-legged frog	1 per project	$2,500/ credit	$7,500		$7,500
CHANGED CIRCUMSTANCES ESTIMATE					
Natural disasters; 14 acres affected in HCP boundary	1 per 30 years	$1,742/ ac	$24,390		$24,390
Project-related accidents	1 per 30 years		$30,000		$30,000
New listing of species	1 per 30 years	$18,500	$18,500		$18,500
New information on covered species	1 per 30 years	$18,500	$18,500		$18,500
Project modifications[3] Surveys Monitoring (6 days/event) Restoration (0.5 ac)[4]	4 per 30 years	 $6,440 $7,200 $20,308			 $37,849 $42,315 $120,455
New information on listed species not covered by HCP	1 per 30 years	$40,000			$40,000
ADAPTIVE MANAGEMENT					
Evaluations/modification of project or protection measures	1 per year	$2,960		$2,960	$129,952
REPORTING					
Reports (annual)	1 per year	$5,280		$5,280	$226,526
TOTAL			$100,090	$33,378	$1,834,213[5]

1. Costs are estimated using consultant rates for 2010; annual costs are for 2010 and do not include costs that would occur in only some years (as for changed circumstances).
2. Inflation of 2.5% is added each year for 30 years for annual costs and costs that occur at intervals during the 30 years.
3. Unit costs will be paid in full when they occur through a budget line item or the annual contingency line item. Costs estimated to be in years 6, 12, 18, and 24.
4. Planting labor for 3 years each time seed and materials at beginning of each time, monitoring for 5 years each time.
5. Includes one-time costs (without inflation because costs occur at beginning of HCP), one/30-year costs (without inflation because time of occurrence is unknown), and annual costs with inflation.

8.3 FUNDING SOURCE

Each Santa Barbara County participating water agency has signed a Water Supply Agreement with CCWA. This agreement specifically states that all payments approved by the Authority must be paid when due. Default remedies include legal action, loss of water rights and an increase in non-defaulting contractor costs. Additionally, the Water Supply Contract between the State of California Department of Water Resources and Santa Barbara County Flood Control and Water Conservation District (master contract) grants additional relief action by providing for reimbursement through County property tax rolls. Therefore, unanticipated expenses due to fire, flood, etc. are assessed to project participants and must be promptly paid.

CCWA also maintains a $2,000,000 emergency operations and maintenance account to ensure repairs, remediation, and addressing changed circumstances, as necessary, can be initiated without delay. CCWA does not need Board approval to use this money for emergencies. Coupled with annually budgeted environmental monitoring and remediation line items that exceed $150,000 and a contingency line item (designated amount that is 2.5 percent of total O&M budget and can be used to address changed circumstances), CCWA maintains sufficient financial assets to cover any anticipated or unanticipated environmental requirement or changed circumstance. Mandatory HCP costs, such as conservation easements, will be included as line items in the budget or paid from the contingency line item. Should a changed circumstance occur that costs more than was estimated in Table 8-1, CCWA will provide the additional funds to respond to the changed circumstance.

Capital Improvement Projects (CIPs) are a component of the non-operating expense section of the budget. The CIP budget includes expenses for fixed asset/equipment purchases as well as all expenses associated with construction and repair projects undertaken by CCWA. These projects are generally not a part of normal operations and maintenance and would be included under changed circumstances. CIP expenses are billed directly to project participants in accordance with their Water Supply Agreements. Once a CIP is identified as being necessary, CCWA will define the scope of work and develop a budget. As described in Section 2.10, the potential presence of covered species or their habitat will be evaluated by CCWA's Regulatory Specialist, and if required, a qualified biologist, prior to planning of the project. If any covered species or habitat could be present, measures to avoid or minimize take will be included, as necessary, in the planning and design of the project. The scope of work will include the design and plans for the project, construction, monitoring, and site restoration/revegetation.

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9.0 ALTERNATIVES TO THE PROPOSED ACTION

Section 10(a)(2)(A)(iii) of the Endangered Species Act of 1973, as amended, [and 50 CFR §222.307 (b)(5)(iv)] requires that alternatives to the taking of species be considered and reasons why such alternatives are not implemented be discussed. These alternatives are presented as follows:

9.1 NO PROJECT ALTERNATIVE

The no project alternative is not a viable alternative because failure to operate and maintain the pipeline and associated facilities would not meet the purpose and need for the project (i.e., water delivery to project participants). Cessation of water deliveries would result in water shortages in the service areas of the project participants.

9.2 NO ACTION ALTERNATIVE

This alternative would result in no action on the part of the Service and no incidental take permit would be issued. Operation and maintenance of the project so that no take of covered species occurs is a goal of the project, and measures are incorporated into the project to attain that goal to the maximum extent feasible. In reality, however, take for at least some individuals of the species covered in the HCP for which take authorization is requested is likely to occur at some time over the life of the project, particularly from accidents. Operation of the project to avoid take over the life of the project would require no maintenance activities to occur in covered species habitat. This would greatly increase the risk of accidents (due to equipment failure) that could affect those species. Consequently, this alternative is not viable in the long term because it would result in an inoperable water delivery system.

9.3 MAINTENANCE ALTERNATIVES

Alternative means of accomplishing several O&M activities are possible and have been considered. These include (1) use of fixed-wing aircraft and helicopters for pipeline surveillance rather than ground-based vehicles, (2) timing of maintenance activities to avoid covered species, (3) less frequent maintenance, and (4) use of small equipment only for repairs.

Use of fixed-wing aircraft and helicopters for some of the pipeline surveillance is part of the proposed project. Exclusive use of these methods, however, could result in missing small leaks, especially during the rainy season and spring when most vegetation is green. In addition, access to the vaults for maintenance of the valves within them and to check cathodic test stations would be precluded by exclusive use of aircraft. Without regular on the ground checks of these structures, safe pipeline operation would be jeopardized.

Timing of maintenance activities to avoid disturbance to covered species is included in the project, where feasible. For species that are seasonal visitors along the pipeline route (e.g., southwestern willow flycatcher), avoidance is feasible under most circumstances. For resident species (e.g., San Joaquin kit fox and California red-legged frog), avoidance is not always feasible, although the breeding season can usually be avoided.

The frequency of maintenance has been developed to balance costs of maintenance activities (e.g., labor, transportation, materials, and environmental monitoring or restoration) against

costs associated with infrequent maintenance (e.g., replacement of equipment and project outages). Environmental concerns have been and will continue to be taken into consideration in the scheduling of maintenance activities. Reducing the frequency of maintenance increases the potential for equipment failure and for substantial repair/replacement activities that could adversely affect covered species.

Small equipment will be used for repairs to the maximum extent feasible, but large equipment may be necessary to accomplish repairs in a short time and thus decrease the potential for or duration of impact to covered species. In some cases, small equipment would not be adequate to complete repairs.

9.4 MINIMUM CONSERVATION ALTERNATIVE

The minimum conservation alternative would involve operation and maintenance of the project without many of the protection measures that have been incorporated into the project. This includes the environmental training, surveys before work in covered species habitat, avoidance measures, and habitat restoration. Impacts on covered species could be substantially higher than for the project.

9.5 MAXIMUM CONSERVATION ALTERNATIVE

Under the maximum conservation alternative, additional environmental measures would be incorporated into O&M procedures, such as habitat enhancement rather than just habitat restoration after disturbance. In most instances, habitat disturbance during O&M will be small in area and short in duration; restoration of the disturbed area will in most cases fully mitigate the impacts. Enhancement of small areas is generally not effective in helping the species, and enhancement outside the project boundaries (pipeline easements or facility sites) would require landowner approvals as well as written assurances that the enhancement will remain undisturbed. Landowners are not likely to be amenable to such agreements without payment of a large fee or purchase of the property, if at all. Thus, habitat enhancement outside the project boundaries could only occur on a case-by-case basis with willing landowners.

9.6 COMPARISON OF ALTERNATIVES

The following table shows a comparison of the relative impacts on covered species for each of the alternatives addressed along with a feasibility rating.

Alternative	*Impact Level*	*Feasibility*
No project	5	1
No action	1	3
Alternative maintenance	4	2
Minimum conservation	3	4
Maximum conservation	2	2
Proposed action	2	5
Ranking is from lowest (1) to highest (5) impact or feasibility. Impact level is relative level of impact to covered species while the feasibility rank is the technical feasibility of maintaining an operating water delivery system based on the judgment of project engineers.		

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HCP APPENDIX A

Covered Species Locations

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Station		Site Name	Permits Needed	Sensitive Species Present*	Notes
From	To				
Reach 1					
704+00	2083+00	Reaches 1 - 3		**San Joaquin kit fox**	in all except irrigated agriculture
		Tank 1		**California red-legged frog, San Joaquin kit fox**; potential California tiger salamander	red-legged frogs adjacent to access road, in drainage with storm drain/plant drain, & in sludge lagoons; **red-legged frog Critical Habitat Tank 1 to Sta. 828** designated 17 March 2010
722+30		OP-7A	Corps/CDFG	**California red-legged frog**	no vehicle crossing; blowoff; **Critical Habitat Tank 1 to Sta. 828** designated 17 March 2010
756+90		OP-8	Corps/CDFG	potential California red-legged frog	steep banks, no vehicle crossing; blowoff; Critical Habitat Tank 1 to Sta. 828 designated 17 March
765+00		OP-9	Corps/CDFG	potential California red-legged frog	steep banks, no vehicle crossing; blowoff; Critical Habitat Tank 1 to Sta. 828 designated 17 March
787+70		OP-9.5	Corps/CDFG	potential California red-legged frog	access road crossing also; Critical Habitat Tank 1 to Sta. 828 designated 17 March 2010
798+35		OP-10	Corps/CDFG	potential California red-legged frog	access road crossing also; dewater valve; Critical Habitat Tank 1 to Sta. 828 designated 17 March
848+10		C-2	Corps/CDFG	potential California red-legged frog	access road crossing also; blowoff
Reach 2					
873+50		C-3	Corps/CDFG	potential California red-legged frog	access road crossing also
1302+20	1313+00	San Juan Creek	Corps/CDFG	potential Swainson's hawk nesting	pipeline bored under creek; major blowoff
Reach 3					
Reach 4					
2504	2508	Salinas River	Corps/CDFG	**steelhead**; potential least Bell's vireo, willow flycatcher, California red-legged frog	major blowoff; **steelhead Critical Habitat** designated on 2 Sept 2005
2559+00	2624+00		USFWS	**California red-legged frog**	**Critical Habitat** designated 17 March 2010 for **Sta 2559 to 2624**
2591+75		Trout Creek	Corps/CDFG	**steelhead**; potential California red-legged frog	channel cutting new banks in 1998; no vehicle crossing; blowoff; **steelhead Critical Habitat** designated on 2 Sept 2005; red-legged frog Critical Habitat designated 17 March 2010
2661+80		Yerba Buena Cr.	Corps/CDFG	**California red-legged frog**	no vehicle crossing; blowoff
2699+00	3252+00		USFWS	**California red-legged frog**	**Critical Habitat Sta. 2699 to 3252** designated 17 March 2010

Station		Site Name	Permits Needed	Sensitive Species Present*	Notes
From	To				
2812+80		Santa Margarita Cr.	Corps/CDFG	potential steelhead, California red-legged frog	blowoff; Critical Habitat designated 17 March 2010
Reach 5A					
2894+75		SLO-3.7	Corps/CDFG	potential California red-legged frog	marsh; no vehicle crossing; Critical Habitat designated 17 March 2010
2909+70		SLO-4	Corps/CDFG	**California red-legged frog;** potential steelhead	wetland; no vehicle crossing; **Critical Habitat** designated 17 March 2010
2914+40		SLO-4.5	Corps/CDFG	potential California red-legged frog, steelhead	no vehicle crossing; Critical Habitat designated 17 March 2010
2915+35		SLO-5	Corps/CDFG	potential California red-legged frog, steelhead	wetland; no vehicle crossing; buried blowoff; Critical Habitat designated 17 March 2010
2920+25	2920+90	SLO-6	Corps/CDFG	potential California red-legged frog	access road crossing also, no culvert; dewater valve; Critical Habitat designated 17 March 2010
2924+95		SLO-7.2	Corps/CDFG	**California red-legged frog**	blowoff; **Critical Habitat** designated 17 March 2010
2925+80		SLO-7.3	Corps/CDFG	potential California red-legged frog	Critical Habitat designated 17 March 2010
2941+65		SLO-7.8	Corps/CDFG	potential California red-legged frog	wetland; access road crossing also; Critical Habitat designated 17 March 2010
2944+80		SLO-8	Corps/CDFG	potential California red-legged frog	wetland; access road crossing also; tributary to Kirshner Cr.; blowoff; Critical Habitat designated 17 March 2010
2953+20		SLO-9	Corps/CDFG	potential California red-legged frog	wetland; blowoff; Critical Habitat designated 17 March 2010
2958+45		Kirshner Creek	Corps/CDFG	potential California red-legged frog	blowoff; Critical Habitat designated 17 March 2010
3007+30		Brizziolari Creek	Corps/CDFG	**red-legged frog, steelhead**	blowoff/AVAR; **Critical Habitat** designated 17 March 2010; **Critical Habitat** designated on 2 Sept 2005
3039+20		SLO-14	Corps/CDFG	potential California red-legged frog	wetland; access road crossing also; dewater valve; red-legged frog Critical Habitat designated 17 March 2010
3042+00			USFWS	**Chorro Creek bog thistle**	in seep on west side of Miossi Creek
3048+30		SLO-15	Corps/CDFG	potential California red-legged frog	wetland; access road crossing also; red-legged frog in Miossi Creek; Critical Habitat designated 17 March 2010
3061+80			USFWS	**Chorro Creek bog thistle**	in seep on west side of Miossi Creek

Station		Site Name	Permits Needed	Sensitive Species Present*	Notes
From	To				
3069+50		SLO-16	Corps/CDFG	potential California red-legged frog	wetland; access road crossing also; red-legged frog in Miossi Creek; blowoff; Critical Habitat designated 17 March 2010
3078+60		SLO-17	Corps/CDFG	potential California red-legged frog	wetland; access road crossing also; Critical Habitat designated 17 March 2010
3100+40		SLO-18 (Fox Hollow)	Corps/CDFG	**California red-legged frog**	tributary to San Luis Obispo Creek (**steelhead**); no vehicle crossing; dewater valve; **Critical Habitat** designated 17 March 2010
3110+55		SLO-19	Corps/CDFG	potential California red-legged frog	tributary to San Luis Obispo Creek (**steelhead**); major blowoff
3113+85		San Luis Obispo Cr.	Corps/CDFG	**California red-legged frog, steelhead**; potential willow flycatcher	pipeline bored under creek; **tidewater goby** at mouth of creek, **steelhead Critical Habitat** designated on 2 Sept 2005; red-legged frog Critical Habitat designated 17 March 2010
3180+15		LM-4	Corps/CDFG	**California red-legged frog**	access road crossing also; blowoff; **Critical Habitat** designated 17 March 2010
3182+50		LM-5	Corps/CDFG	potential California red-legged frog	access road crossing also; Critical Habitat designated 17 March 2010
3229+60		Hampton Cr.	Corps/CDFG	potential California red-legged frog	rock lined tributary at Sta. 3227; access road crossing also; blowoff; Critical Habitat designated 17 March 2010
3246+80		Reservoir Canyon Creek (LM-8)	Corps/CDFG	potential California red-legged frog	access road crossing also; blowoff; Critical Habitat designated 17 March 2010
3272+25		W. Corral de Piedra	Corps/CDFG	**California red-legged frog**	pipeline bored under creek, tributary to Price Canyon (**tidewater goby**)
3379+70		E. Fork SLO Creek (AG-1)	Corps/CDFG	**California red-legged frog, steelhead**	wetland; blowoff/AVAR
3489+15	3489+85	W. Corral de Piedra	Corps/CDFG	potential steelhead	blowoff/AVAR, tributary to Price Canyon (**tidewater goby**)
3525+70		E. Corral de Piedra	Corps/CDFG	potential steelhead	dewater valve, tributary to Price Canyon (**tidewater goby**)
3567+35		AG-8	Corps/CDFG	**California red-legged frog**	dewater valve
3706+35		AG-19	Corps/CDFG	potential California red-legged frog	
3731+60	3732+00	AG-20	Corps/CDFG	potential California red-legged frog	wetland ??; blowoff/AVAR at Sta. 3730+60

Station		Site Name	Permits Needed	Sensitive Species Present*	Notes
From	To				
3770+20		Arroyo Grande Cr.	Corps/CDFG	**California red-legged frog, steelhead**; potential willow flycatcher	pipeline on bridge over creek; **steelhead Critical Habitat** to Lopez Dam designated on 2 Sept 2005
Reach 5B					
3853+00			USFWS	**Pismo clarkia**	in grassland adjacent to Branch Mill Road; 2003 record
3898+70	3904+10	AG-21.5		**California red-legged frog**	in ponds adjacent to pipeline
3952+90		Tar Spring Cr.	Corps/CDFG	**California red-legged frog, steelhead**; potential willow flycatcher, least Bell's vireo	AVAR at top of bank
4073+20		OC-2	Corps/CDFG	**California red-legged frog**	no vehicle crossing; blowoff (buried)
4111+60		OC-4	Corps/CDFG	**California red-legged frog**	blowoff (buried)
4132+20		OC-4.1	Corps/CDFG	potential California red-legged frog	blowoff (buried)
4140+20		OC-5	Corps/CDFG	potential California red-legged frog	blowoff (buried)
4155+30		OC-6	Corps/CDFG	**California red-legged frog**	no vehicle crossing; blowoff (buried)
4167+40		OC-7	Corps/CDFG	potential California red-legged frog	access road crossing also; blowoff (buried)
4185+40		OC-7.5	Corps/CDFG	potential California red-legged frog	blowoff (buried)
4212+70		Los Berros Creek		**California red-legged frog, steelhead**	pipeline spanned creek; intermediate blowoff; **steelhead Critical Habitat** designated on 2 Sept 2005
4509+70		Nipomo Cr. #2	Corps/CDFG	**California red-legged frog**	blowoff (buried)
Reach 6					
4587+70				**California red-legged frog**	in ponds adjacent to pipeline
4618+65	4619+40	SM-0.4		**California red-legged frog**	in ponds adjacent to pipeline
4639+00	4663+00	Santa Maria River	Corps/CDFG	**California red-legged frog, steelhead, tidewater goby**; potential least Bell's vireo	near south levee at flood control channel (blowoff) outflow into river; major blowoff; **steelhead Critical Habitat** designated on 2 Sept 2005; tidewater goby Critical Habitat at river mouth designated on 6 February 2013
4726+00				**California red-legged frog**	in pond adjacent to pipeline
4785+45				**California red-legged frog**	just east of blowoff on north side of Main Street
4934+30		Green Canyon	Corps/CDFG	**California red-legged frog**	intermediate blowoff in grassland/agriculture

Station		Site Name	Permits Needed	Sensitive Species Present*	Notes
From	To				
4949+00	5170+00			**California tiger salamander**	within 1.2 mi of known breeding ponds; in ground squirrel & gopher burrows; adults breed in ponds/pools during winter rains; known upland habitat Sta. 5040-5046 & 5083-5134; **Critical Habitat** designated on 24 Nov 2004 for **Sta. 5002+00 to 5134+00**
4966+20	4968+80	SM-4	Corps/CDFG	**California red-legged frog**	blowoff (buried) in grassland
5013+00	5134+00		USFWS	potential La Graciosa thistle	**Critical Habitat** designated 3 November 2009
5035+50	5037+60	SM-7	Corps/CDFG	potential California tiger salamander, California red-legged frog	freshwater marsh; blowoff (buried); California tiger salamander Critical Habitat designated 17 march 2010
5068+00			USFWS	**Gaviota tarplant**	southwest of Highway 1 and Black Road intersection, 1962 record; questionable location
5077+00	5278+00		USFWS	**California red-legged frog**	**Critical Habitat** designated 17 March 2010 for **Sta. 5077 to 5278**
5257+40		Shuman Creek	Corps/CDFG	**California red-legged frog**	blowoff (buried); **Critical Habitat** designated 17 March 2010
Schedule A					
177+10		San Antonio Creek	Corps/CDFG	**California red-legged frog, steelhead, unarmored threespine stickleback, tidewater goby**	pipeline bored under creek
240+00				**Gambel's watercress**	in drainage downslope of ROW
330+00	345+00	Vandenberg AFB	USFWS	potential seaside bird's-beak	ID of subspecies is questionable
406+00	423+00		USFWS	potential seaside bird's-beak	ID of subspecies is questionable
554+40		Unnamed A	Corps/CDFG	**California red-legged frog**	no vehicle crossing; blowoff (buried)
Schedule B					
980+00	1022+00			potential California tiger salamander	observed on Highway 246
1035+00	1367+00			**California tiger salamander**	within 1.2 mi of known breeding ponds; **Critical Habitat Sta. 1085 to 1130** designated on 24 Nov 2004
1101+00	1120+00	Campbell Vernal Pools		**California red-legged frog**, **California tiger salamander**	on N side of Highway 246; **California tiger salamander Critical Habitat Sta. 1085 to 1130** designated on 24 Nov 2004
1119+00	1190+00		USFWS	potential seaside bird's-beak	along Highway 246 (historic record from 1956)

Station		Site Name	Permits Needed	Sensitive Species Present*	Notes
From	To				
Schedule C					
1366+00	1374+00	Santa Ynez River	Corps/CDFG NOAA Fisheries/ USFWS	**southwestern willow flycatcher** (nesting May-August)**, tidewater goby, California red-legged frog, steelhead**; potential least Bell's vireo	pipeline bored under river; major blowoff on N bank, no access to river May through August; erosion of bank issue when using blowoff; pile retard system upstream along north river bank; **flycatcher Critical Habitat** designated State Highway 1 to 1 mile east of U.S. Highway 101 on 3 January 2013; **steelhead Critical Habitat** designated on 2 Sept 2005
1561+60		Nojoqui Creek	Corps/CDFG	**California red-legged frog;** potential steelhead	blowoff (buried)
1722+00	1732+00	Santa Ynez River	Corps/CDFG	**steelhead**; potential California red-legged frog	pipeline suspended on bridge; blowoff (buried) at 1716+07 & blowoffs on both sides of bridge (1721+50 & 1730+00); **steelhead Critical Habitat** designated on 2 Sept 2005
1775+80		Alamo Pintado Cr.	Corps/CDFG	potential California red-legged frog	AVAR on west bank; access road crossing also downstream
1906+30	1908+90	Zanja de Cota	Corps/CDFG	potential California red-legged frog	wetland; blowoff (buried)
Existing Pipeline					
199+25		Unnamed tributary to Santa Ynez River	Corps/CDFG	**California red-legged frog**	ID #1 pipeline taken over by CCWA; blowoff at tributary confluence with river; access road crossing also
163+00		Santa Agueda Creek	Corps/CDFG	potential steelhead	ID #1 pipeline taken over by CCWA
		Santa Ynez River	Corps/CDFG	**steelhead**; potential California red-legged frog	ID #1 pipeline taken over by CCWA; 4 crossings of river; **steelhead Critical Habitat** designated on 2 Sept 2005

* Bold indicates threatened or endangered species known to be present:

Covered Species for which take is authorized

Covered Species for which no take is authorized and that are to be avoided

Non-Covered Species to be avoided

HCP APPENDIX B

Access Road Maps

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Kern County

San Luis Obispo County

Santa Barbara County

Pacific Ocean

Note:
Known locations of listed species are shown, but they may be present at other locations as well.

Pipe_Station	Map #
687-757	1
755-1088	2
1084-1343	3
1341-1564	4
1562-1879	5
1879-2231	6
2231-2503	7
2508-2846	8
2845-3076	9
3075-3375	10
3375-3636	11
3632-3926	12
3922-4184	13
4179-4465	14
4453-4689	15
4682-4897	16
4895-5143	17
5139-36	18
36-257	19
254-534	20
523-945	21
944-1324	22
1308-1685	23
1680-2010	24
0-230	25

Map Sheets
Pipe Alignment
Major Roads

N

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Miles

INDEX MAP

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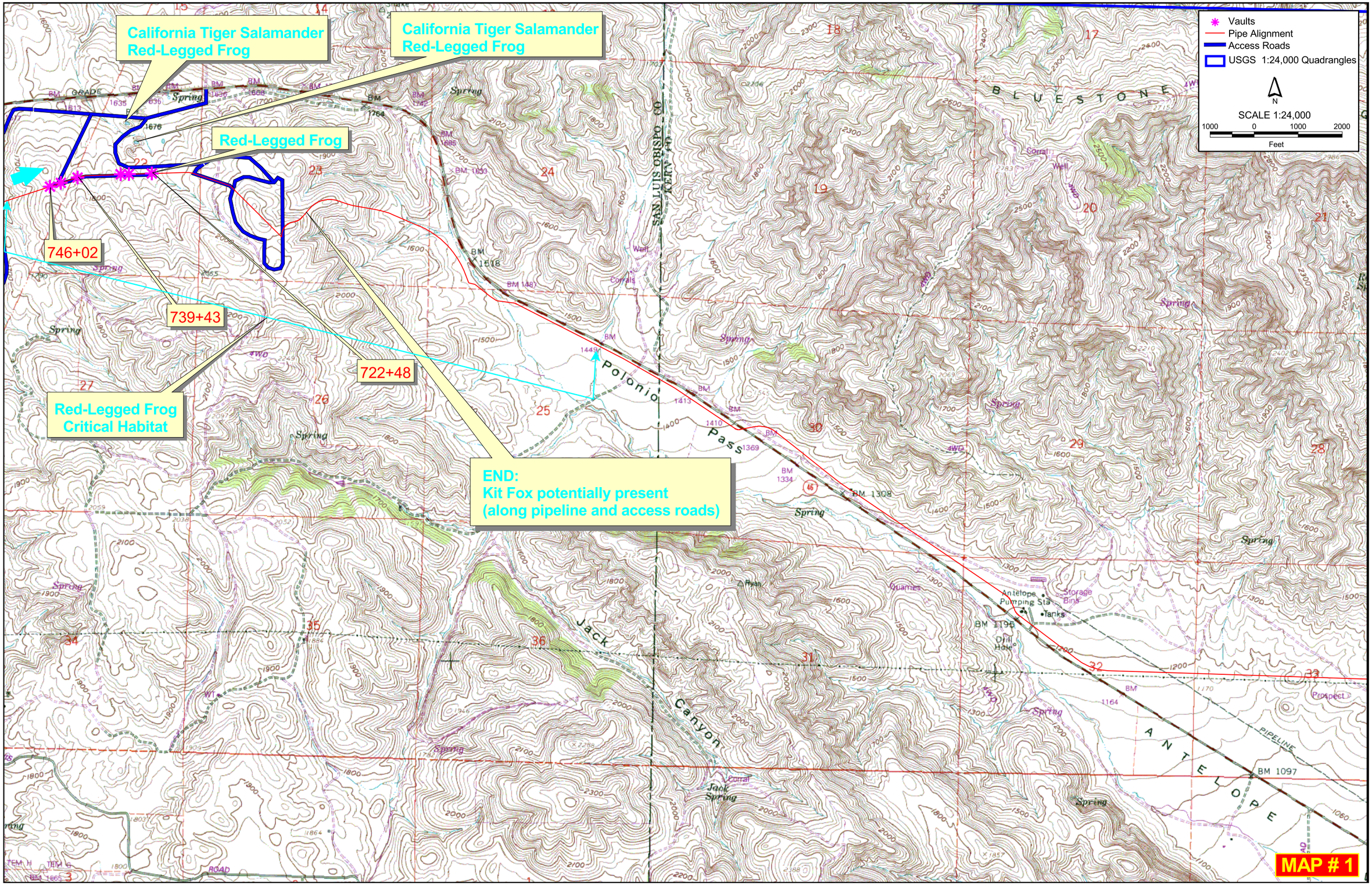

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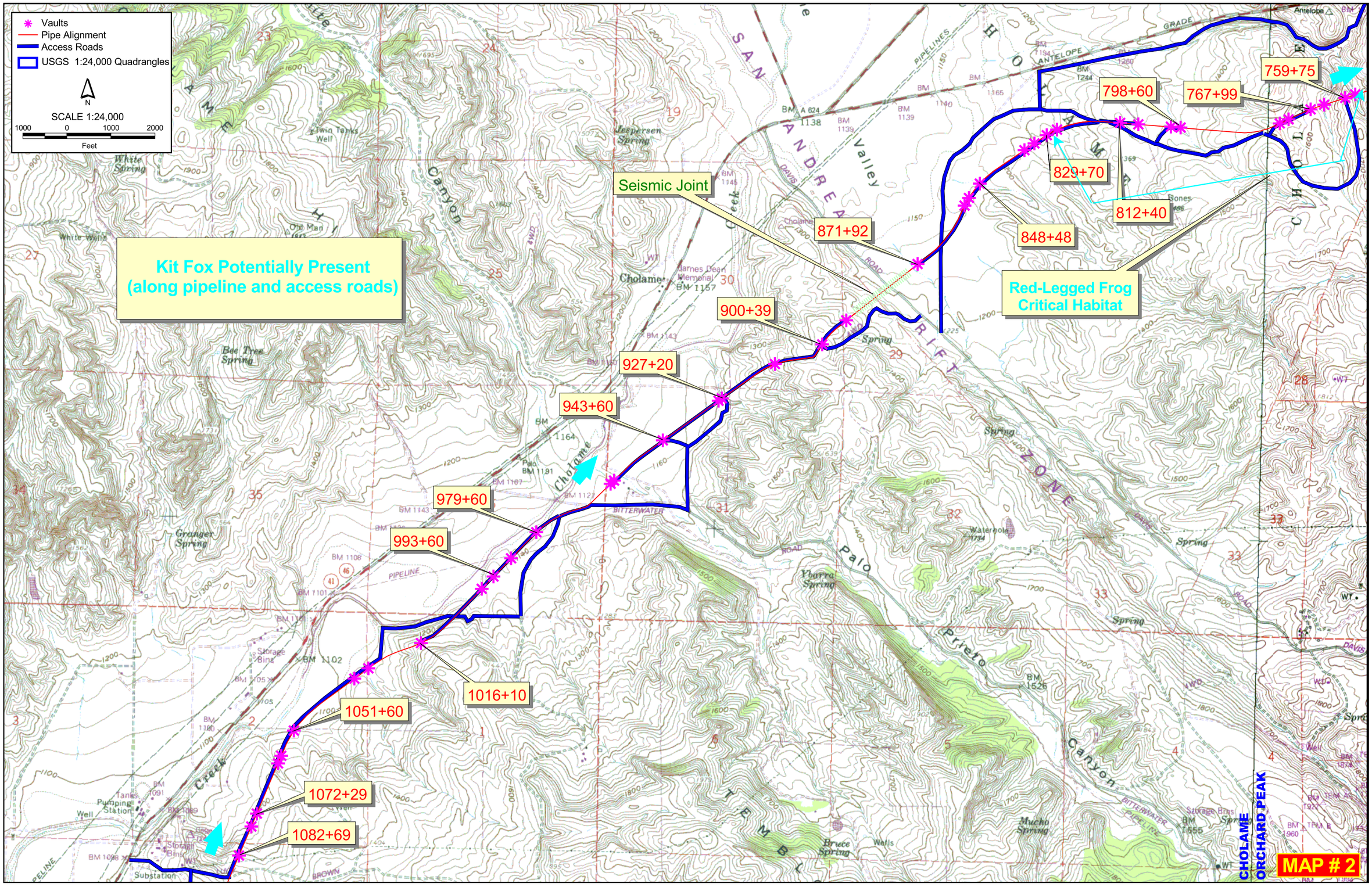

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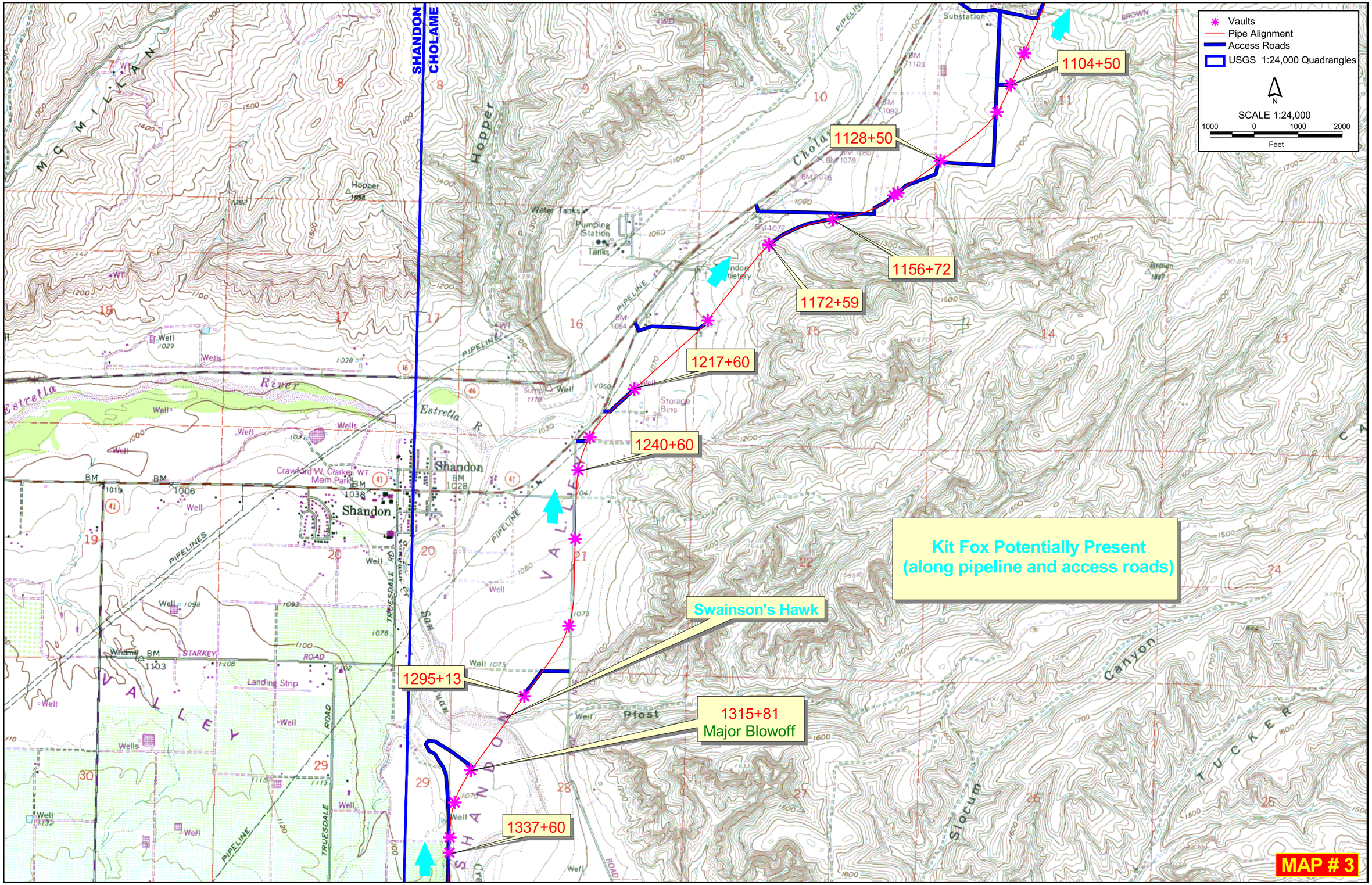

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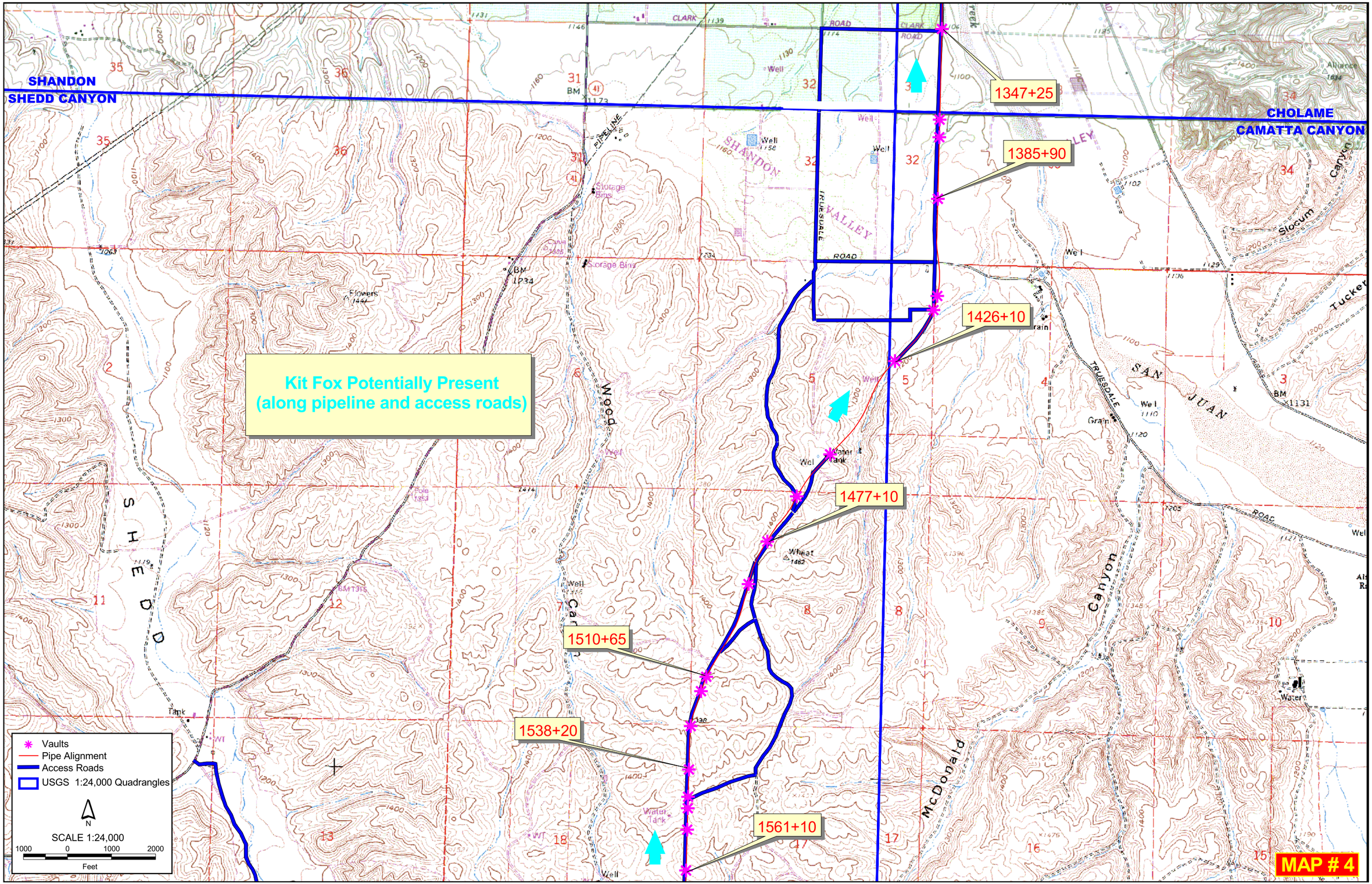

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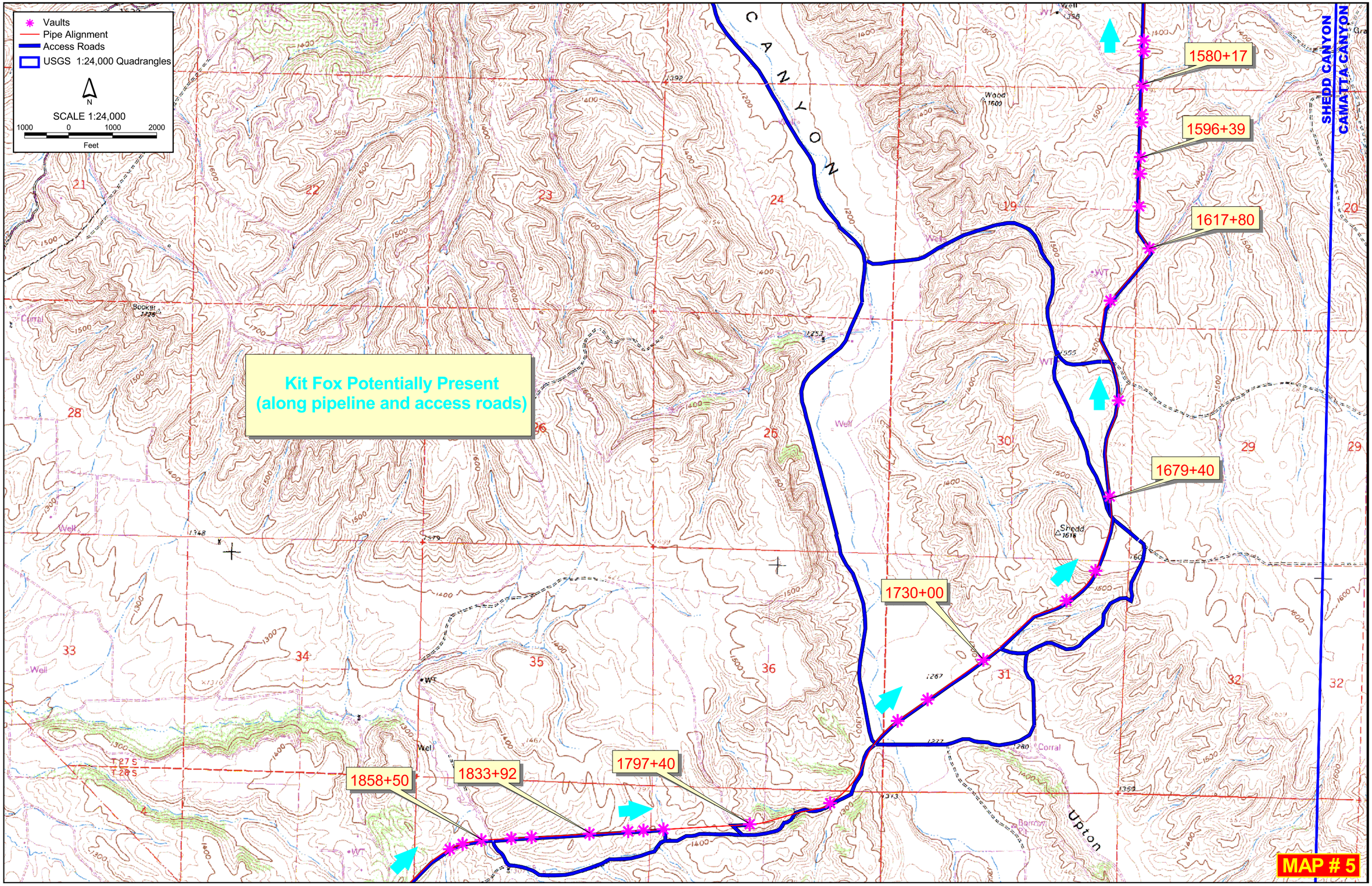

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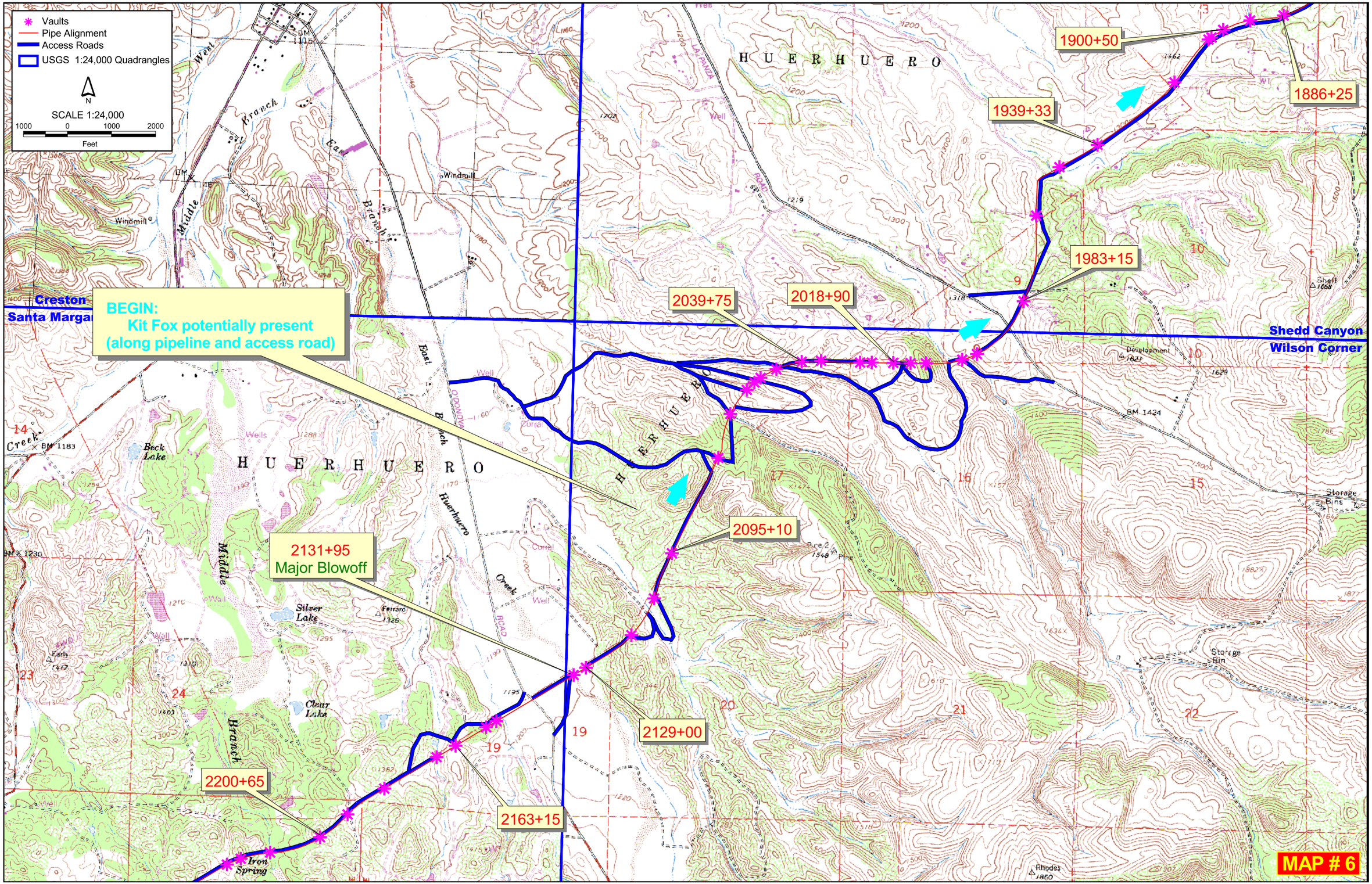

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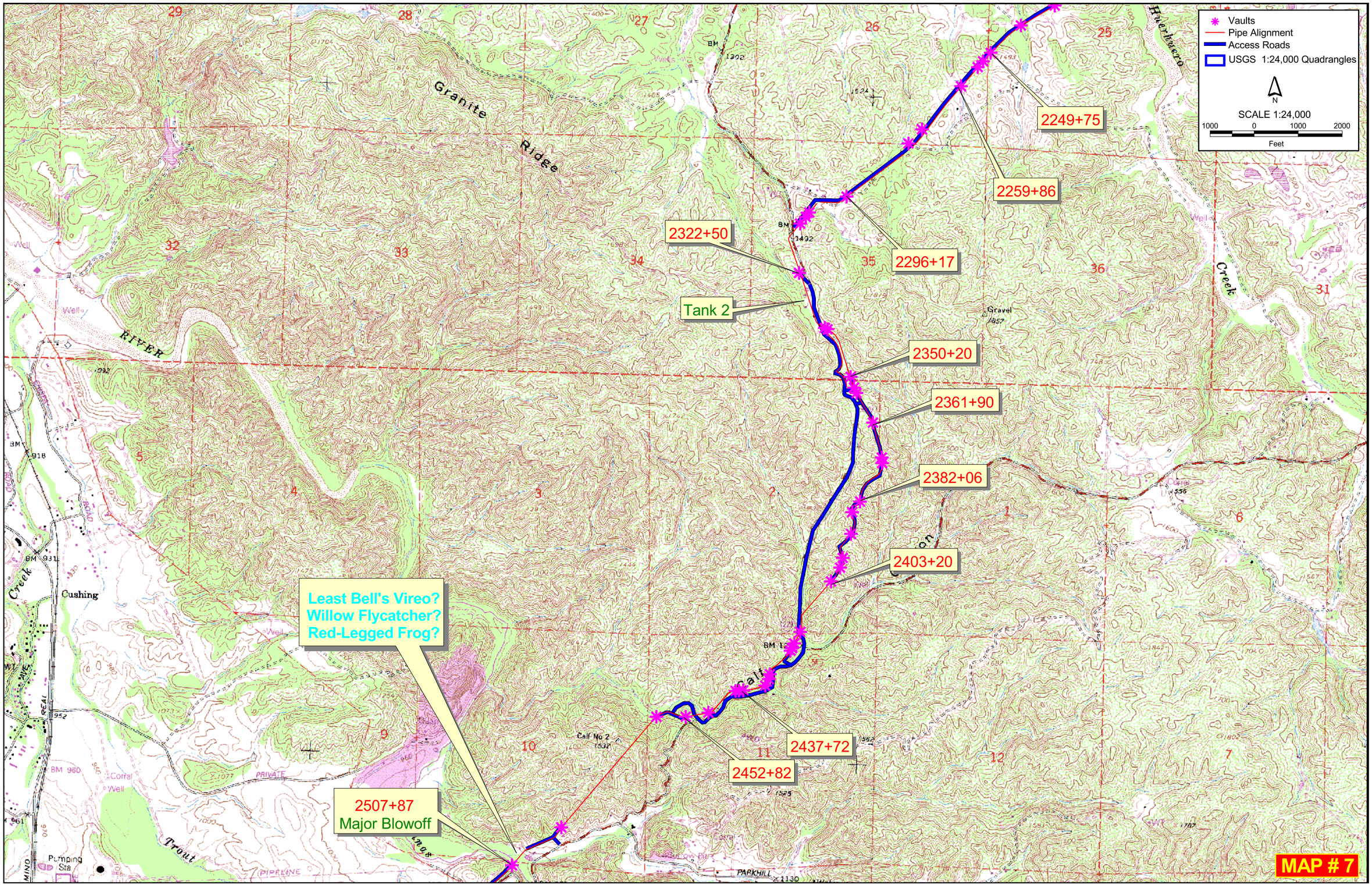

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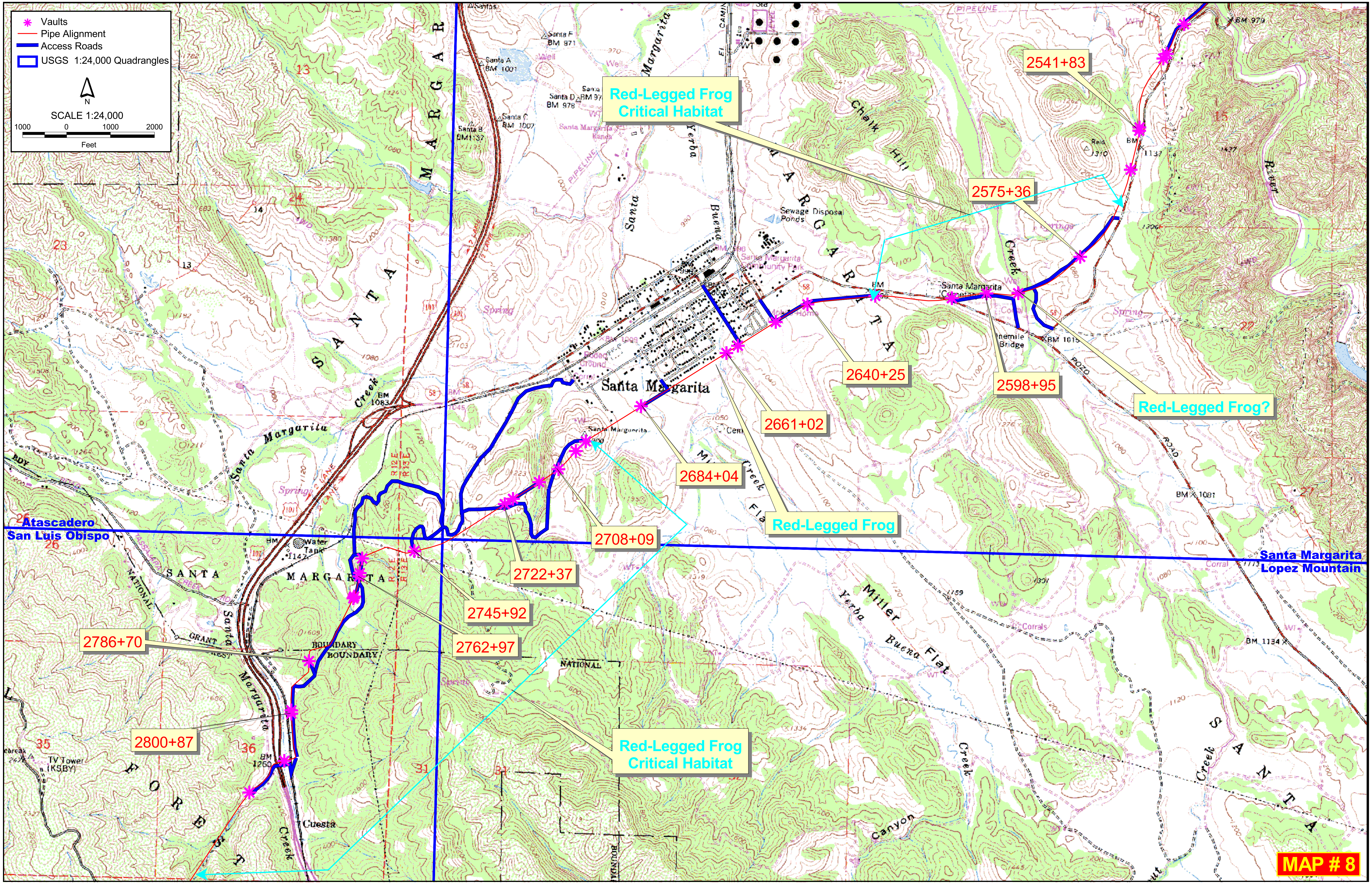

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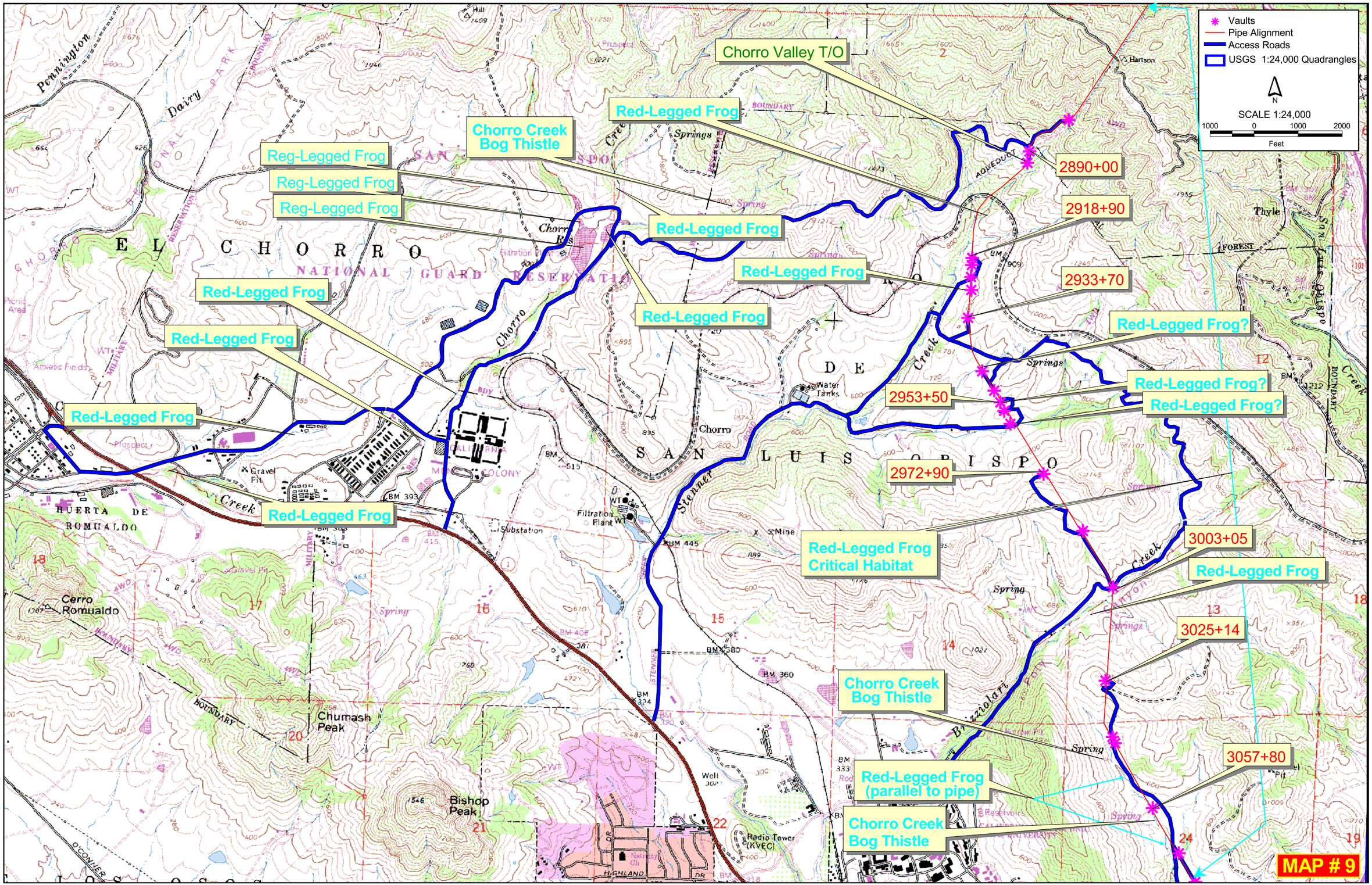
Vaults
Pipe Alignment
Access Roads
USGS 1:24,000 Quadrangles
N
SCALE 1:24,000
1000 0 1000 2000
Feet
Chorro Valley T/O
Red-Legged Frog
Chorro Creek Bog Thistle
Reg-Legged Frog
Reg-Legged Frog
Reg-Legged Frog
Red-Legged Frog
Red-Legged Frog
Red-Legged Frog
Red-Legged Frog
Red-Legged Frog
Red-Legged Frog
Red-Legged Frog
Red-Legged Frog?
Red-Legged Frog?
Red-Legged Frog?
Red-Legged Frog
Red-Legged Frog
Critical Habitat
Chorro Creek Bog Thistle
Red-Legged Frog (parallel to pipe)
Chorro Creek Bog Thistle
2890+00
2918+90
2933+70
2953+50
2972+90
3003+05
3025+14
3057+80
MAP # 9
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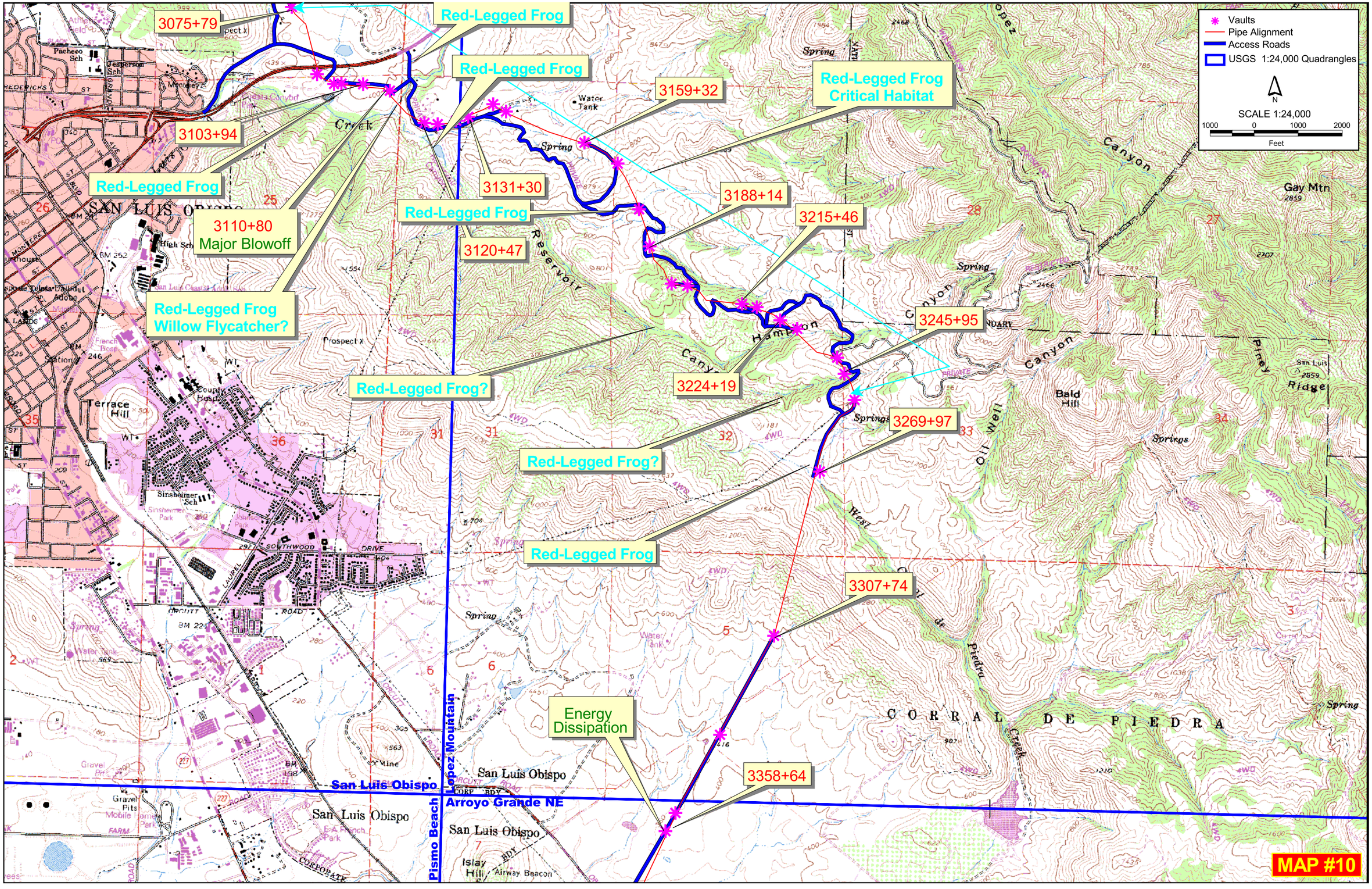

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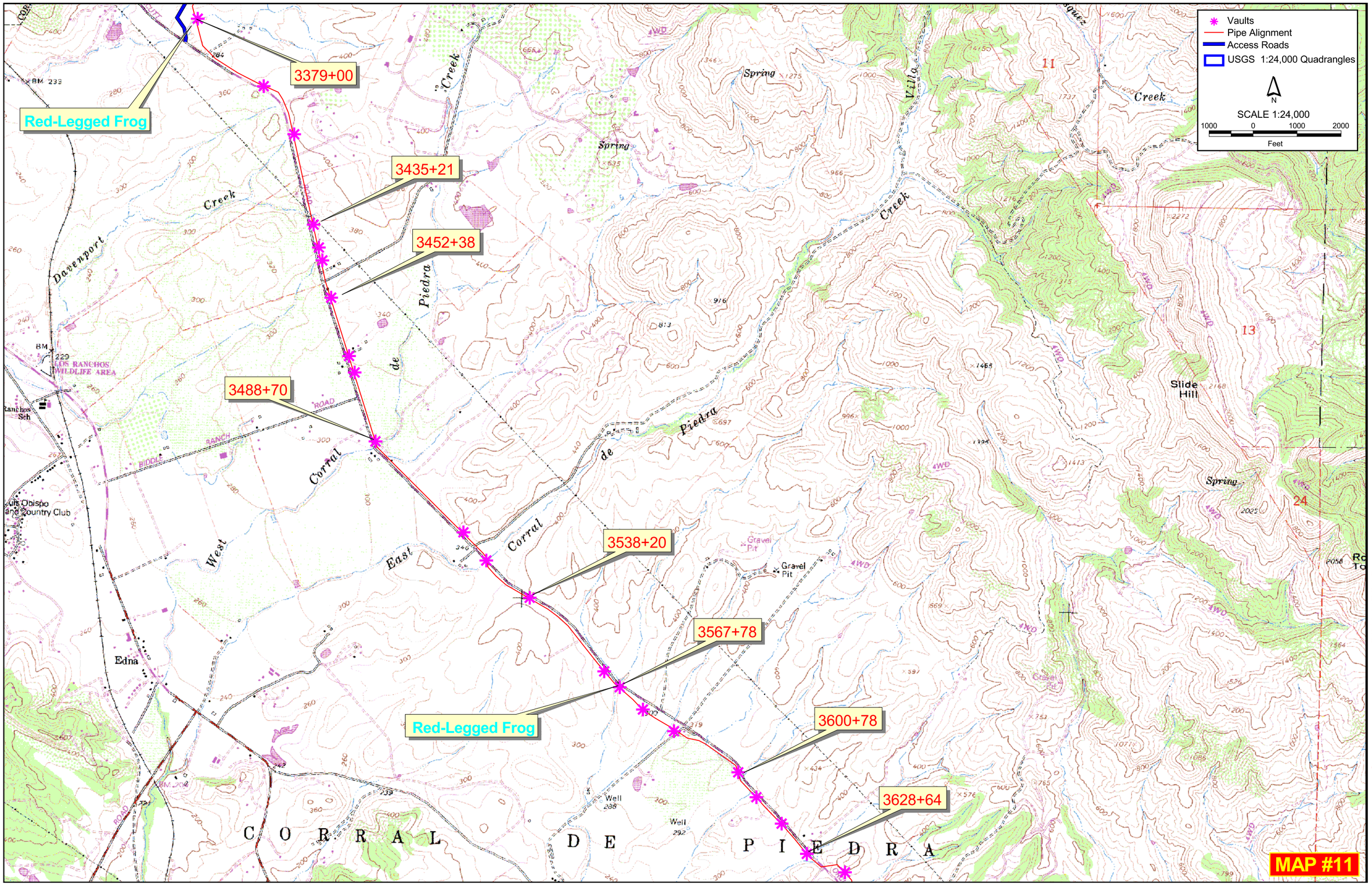

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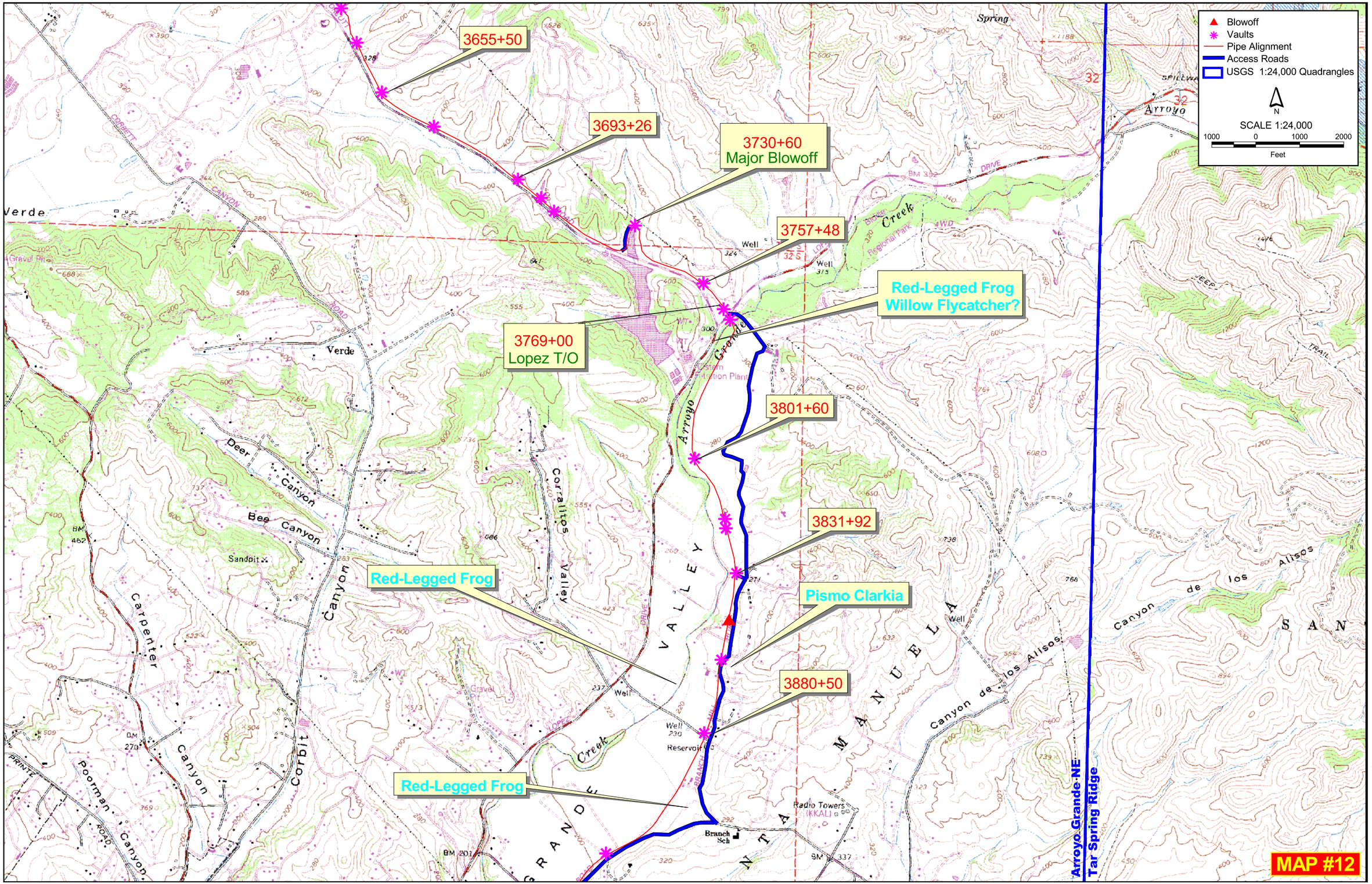

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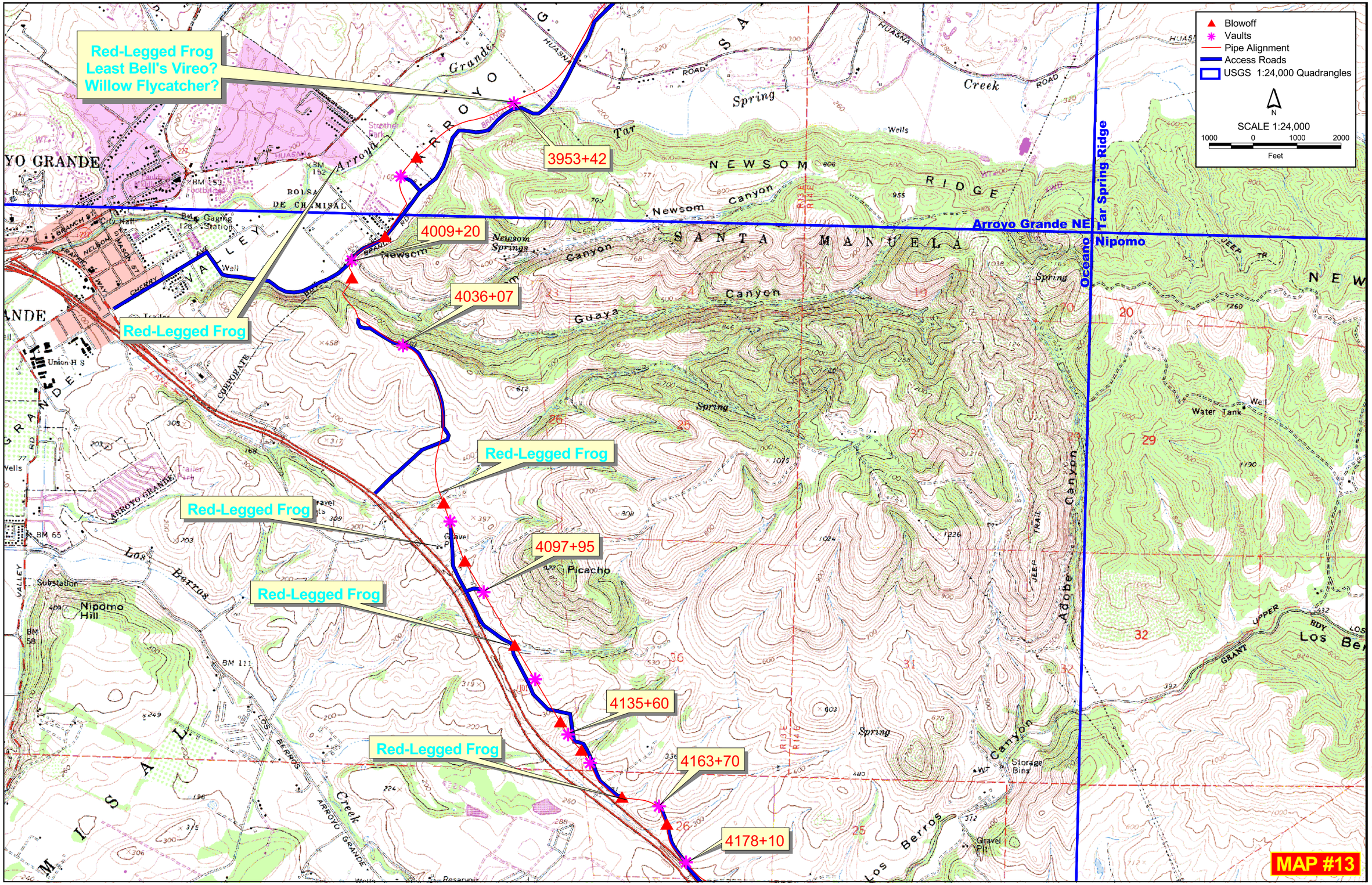

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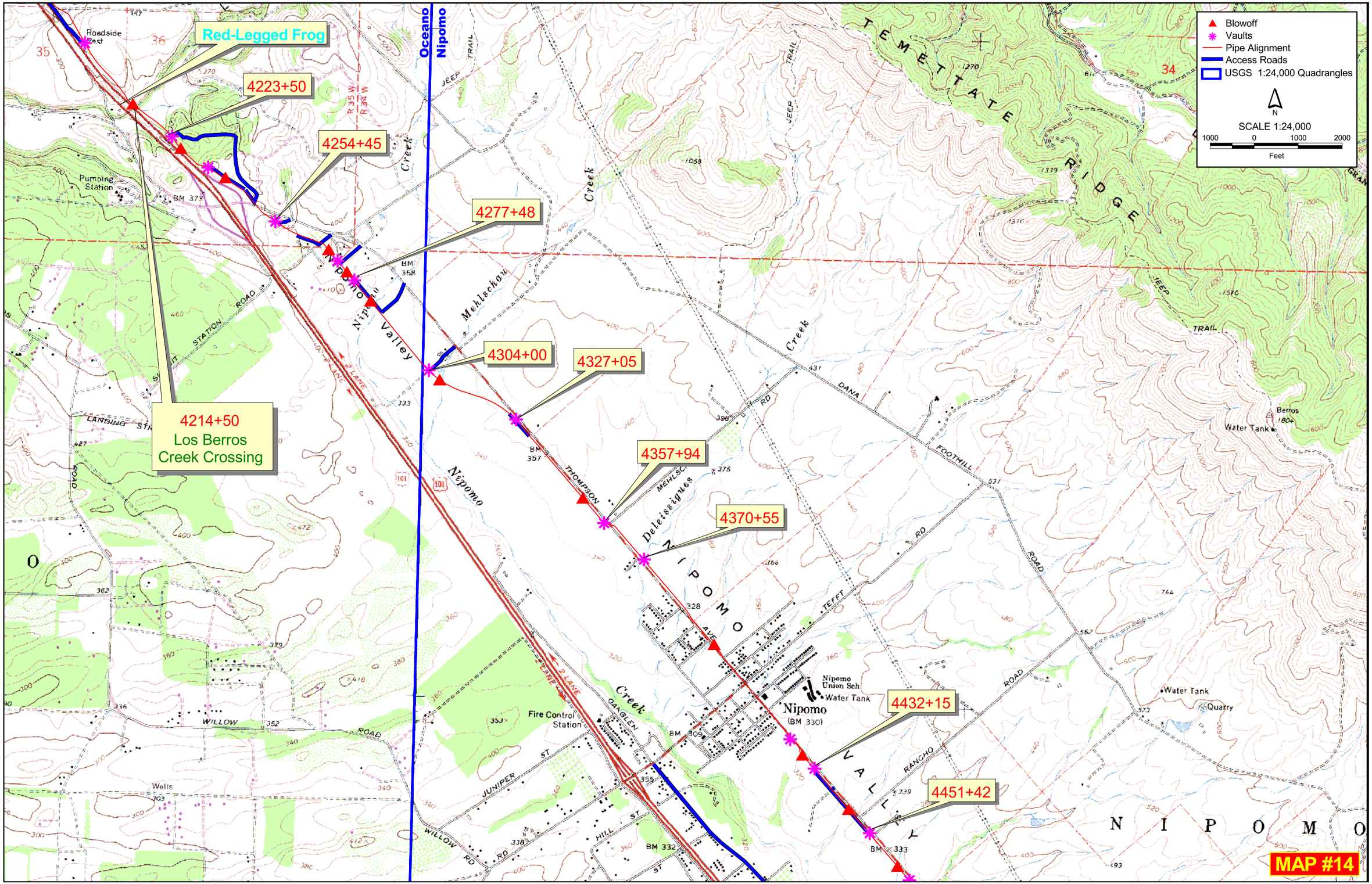

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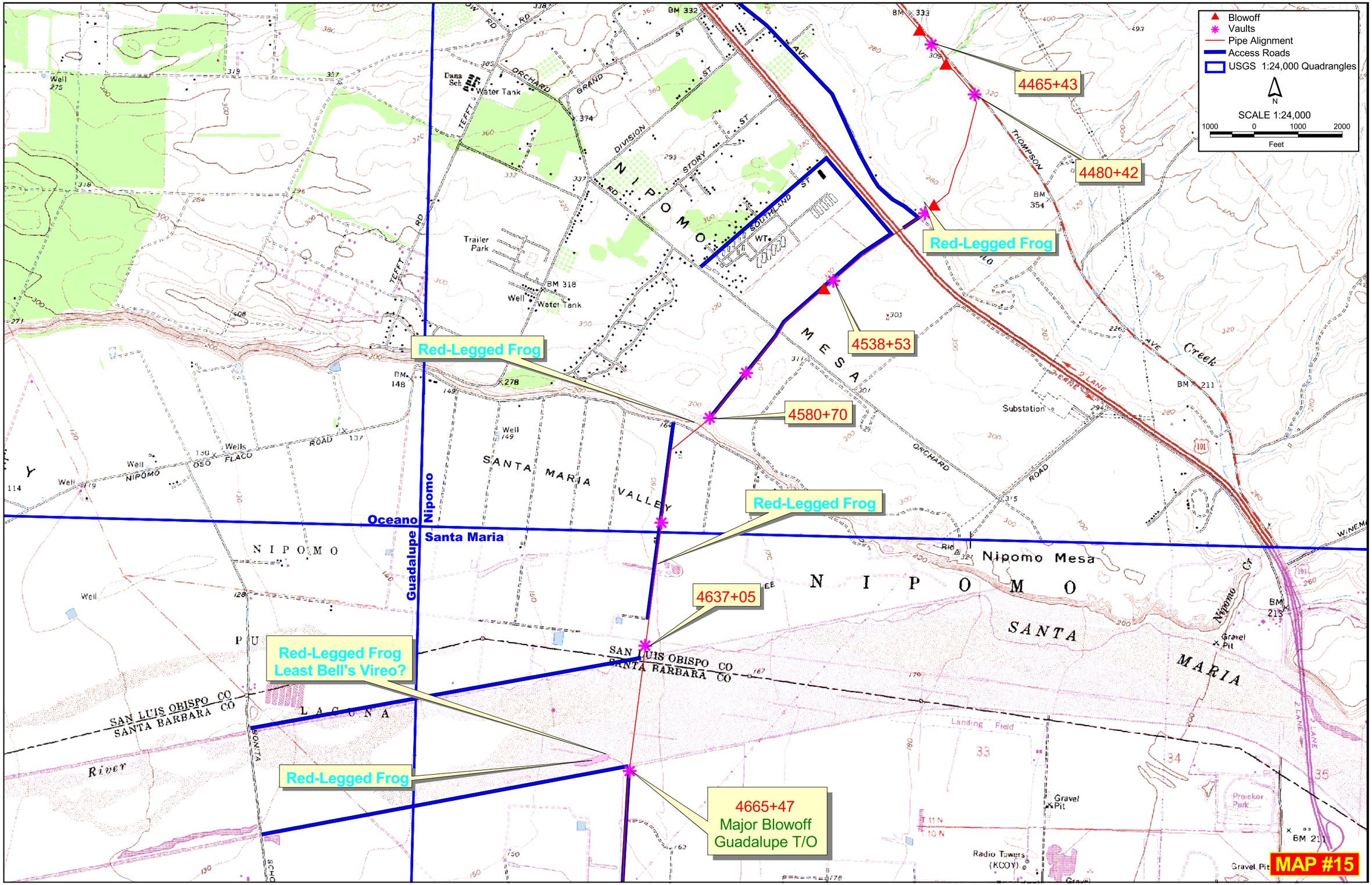

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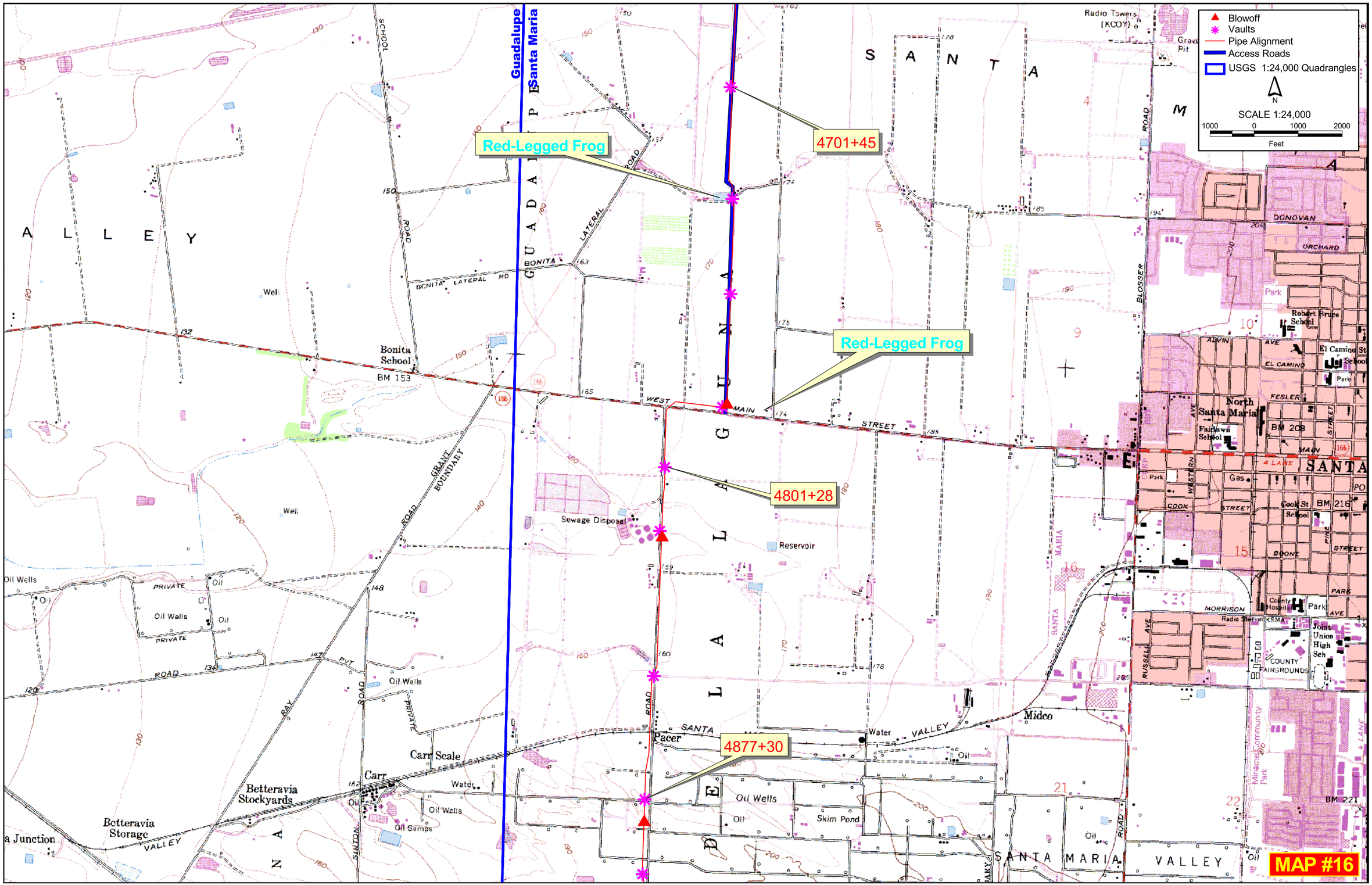

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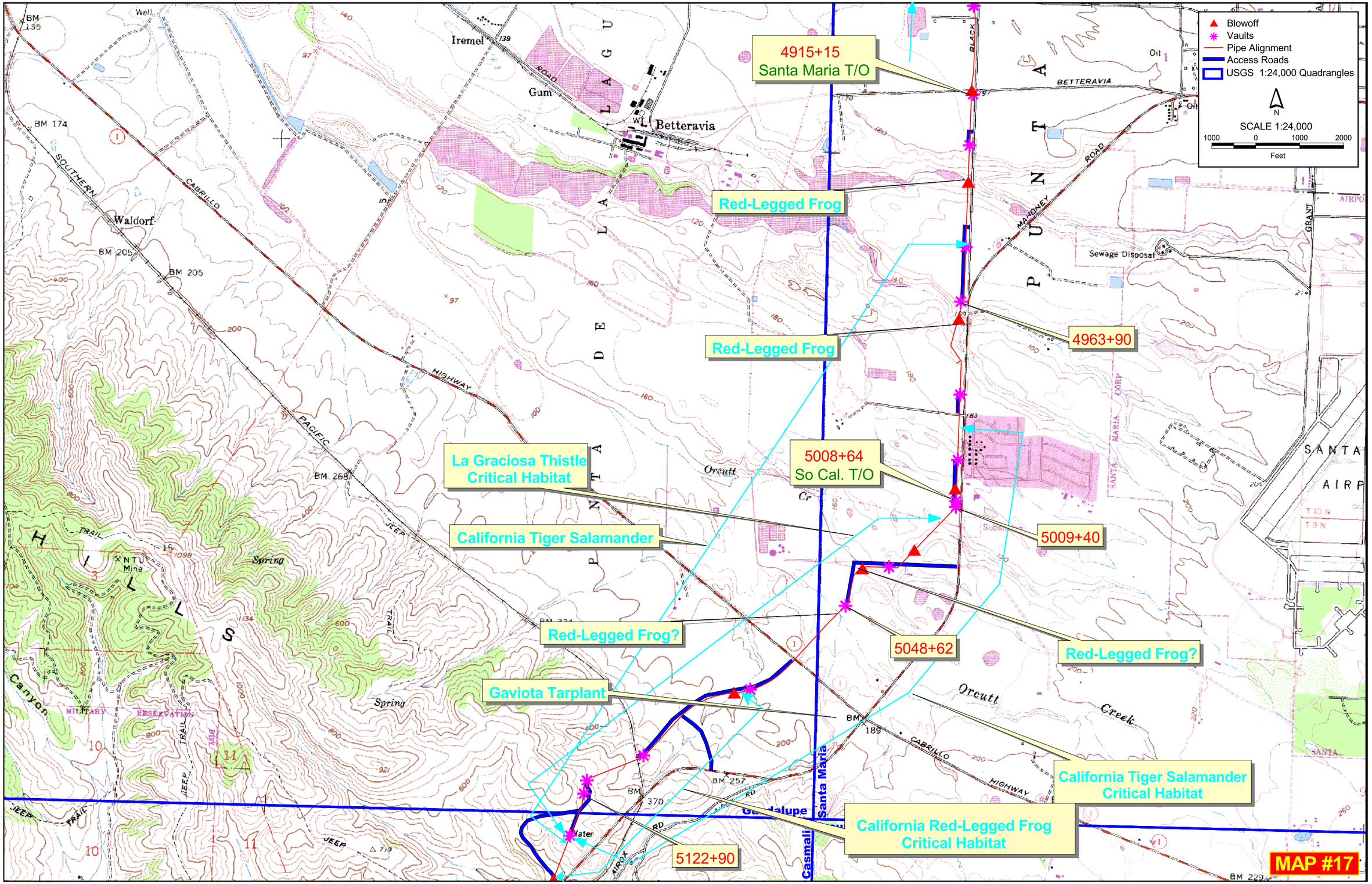
Blowoff
Vaults
Pipe Alignment
Access Roads
USGS 1:24,000 Quadrangles
N
SCALE 1:24,000
1000 0 1000 2000
Feet
4915+15
Santa Maria T/O
Red-Legged Frog
Red-Legged Frog
4963+90
5008+64
So Cal. T/O
5009+40
La Graciosa Thistle
Critical Habitat
California Tiger Salamander
Red-Legged Frog?
5048+62
Red-Legged Frog?
Gaviota Tarplant
California Tiger Salamander
Critical Habitat
California Red-Legged Frog
Critical Habitat
5122+90
MAP #17
Iremel
Gum
Betteravia
Waldorf
Orcutt
Orcutt Creek
Santa Maria
Guadalupe
Casmalia
Sewage Disposal
Oil
Spring
Water
BETTERAVIA
MAHONEY
ROAD
BLACK
GRANT
CABRILLO
HIGHWAY
SOUTHERN
PACIFIC
JEEP
TRAIL
MILITARY
RESERVATION
SANTA
AIRP
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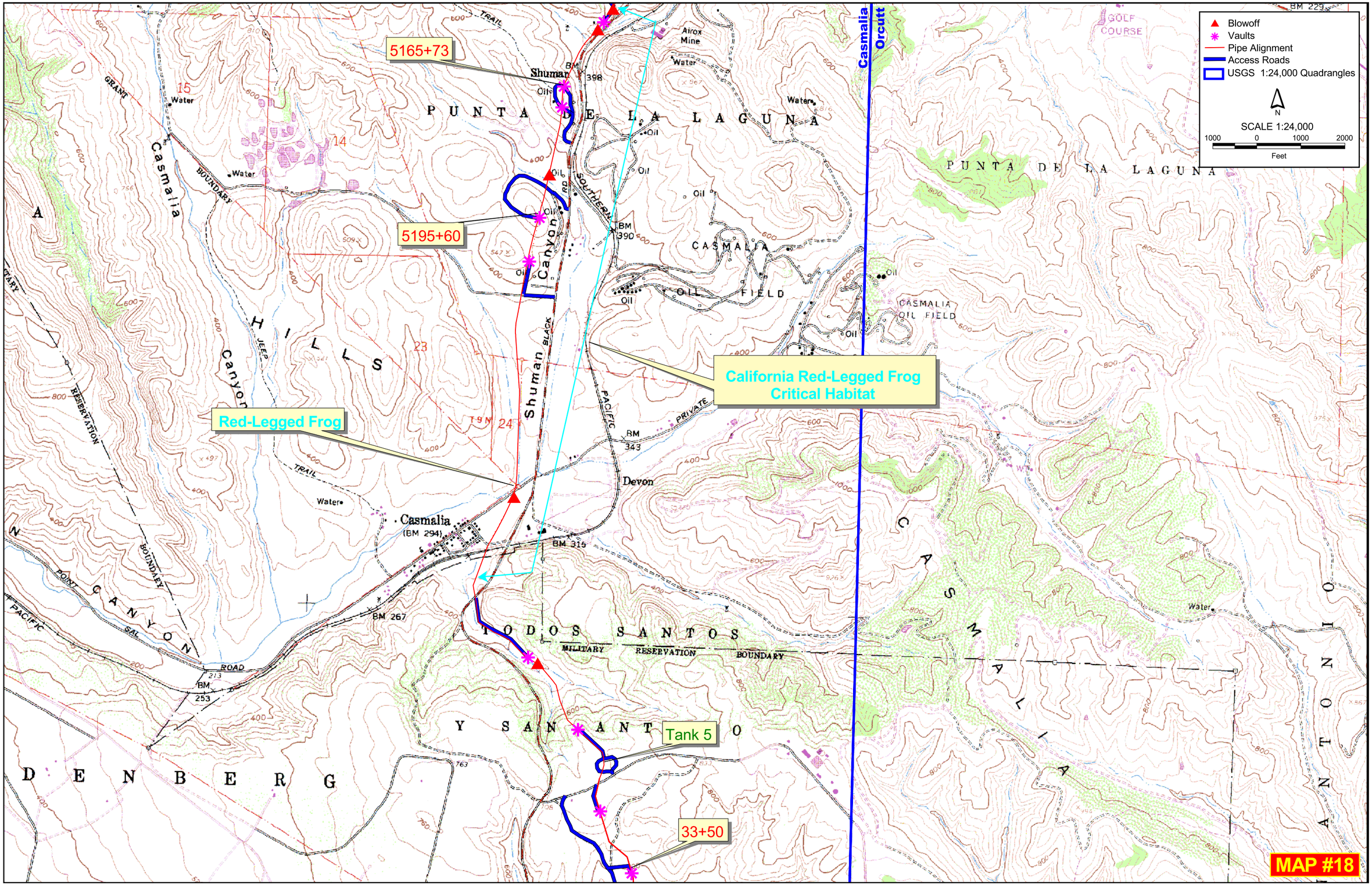

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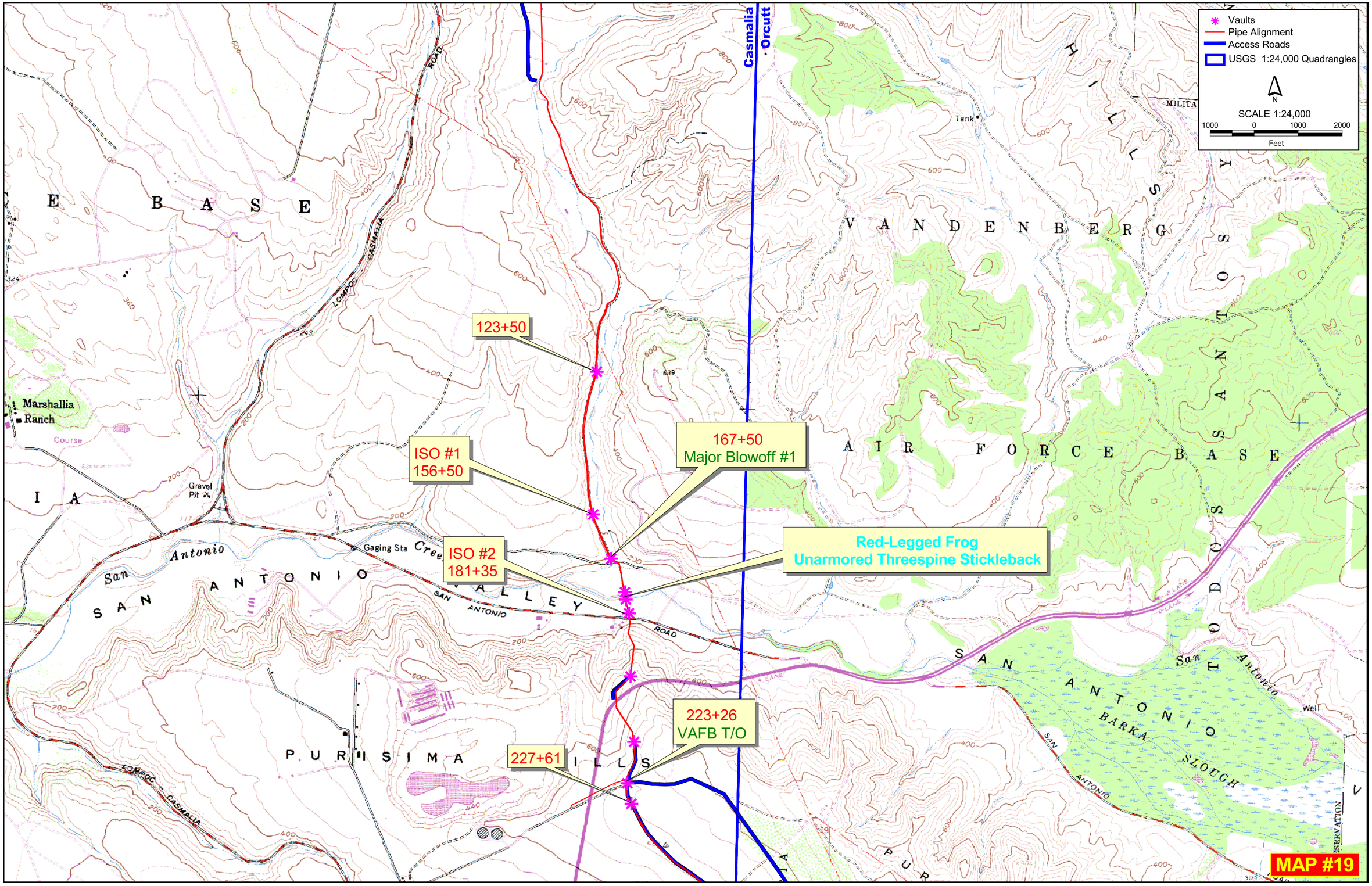
Vaults
Pipe Alignment
Access Roads
USGS 1:24,000 Quadrangles
N
SCALE 1:24,000
1000 0 1000 2000
Feet
Casmalia
Orcutt
123+50
ISO #1
156+50
167+50
Major Blowoff #1
ISO #2
181+35
Red-Legged Frog
Unarmored Threespine Stickleback
223+26
VAFB T/O
227+61
MAP #19
Marshallia Ranch
Gravel Pit
Gaging Sta
San Antonio Creek
SAN ANTONIO VALLEY
SAN ANTONIO ROAD
LOMPOC CASMALIA ROAD
PURISIMA HILLS
VANDENBERG AIR FORCE BASE
SAN ANTONIO BARKA SLOUGH
Tank
Well
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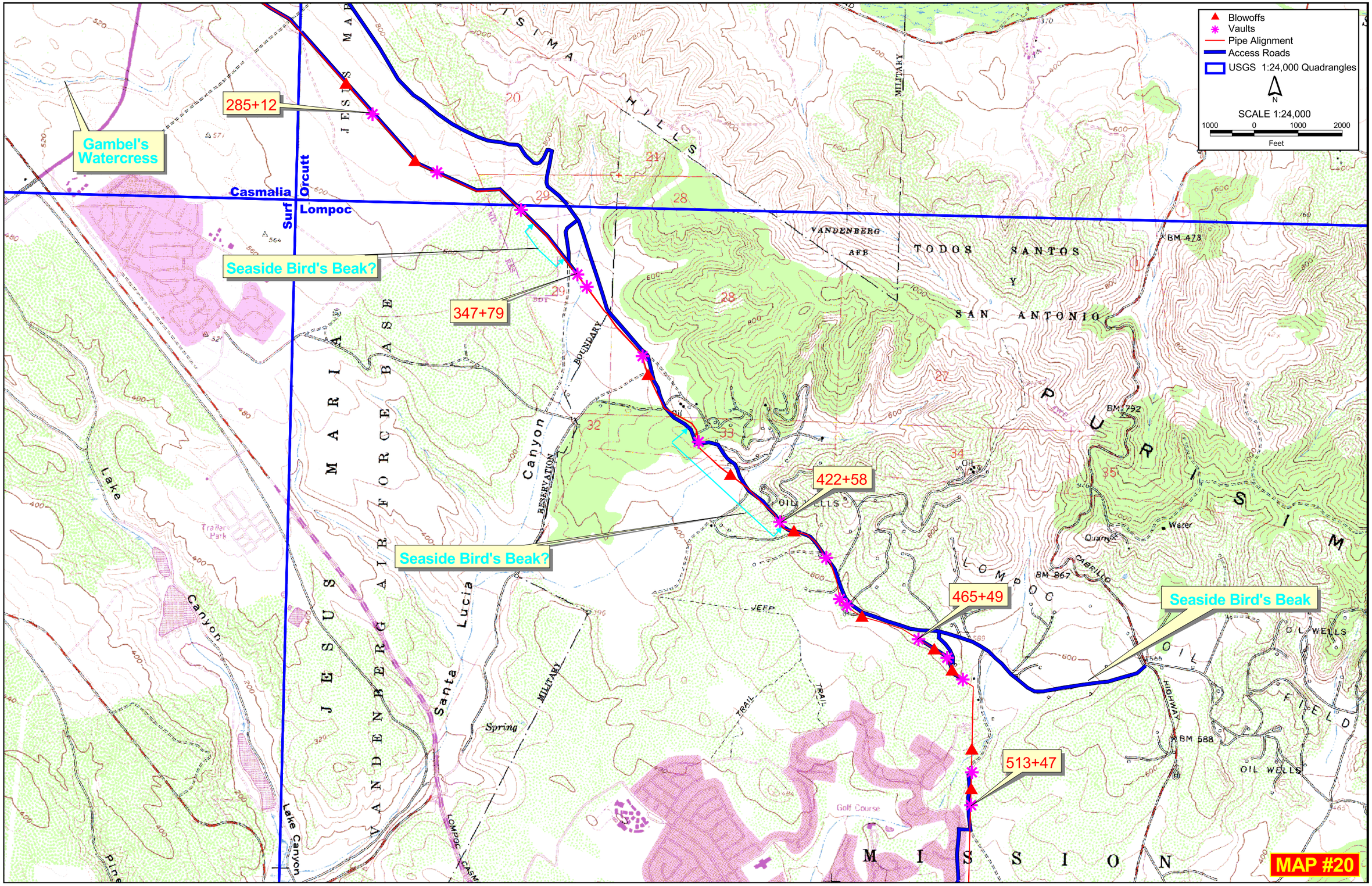
Blowoffs
Vaults
Pipe Alignment
Access Roads
USGS 1:24,000 Quadrangles
N
SCALE 1:24,000
1000 0 1000 2000
Feet
285+12
347+79
422+58
465+49
513+47
Gambel's Watercress
Seaside Bird's Beak?
Seaside Bird's Beak?
Seaside Bird's Beak
Casmalia
Lompoc
Surf
Orcutt
JESUS MARIA
VANDENBERG AIR FORCE BASE
VANDENBERG AFB
TODOS SANTOS Y SAN ANTONIO
LOMPOC OIL FIELD
MISSION
Santa Lucia Canyon
Lake Canyon
Golf Course
MAP #20
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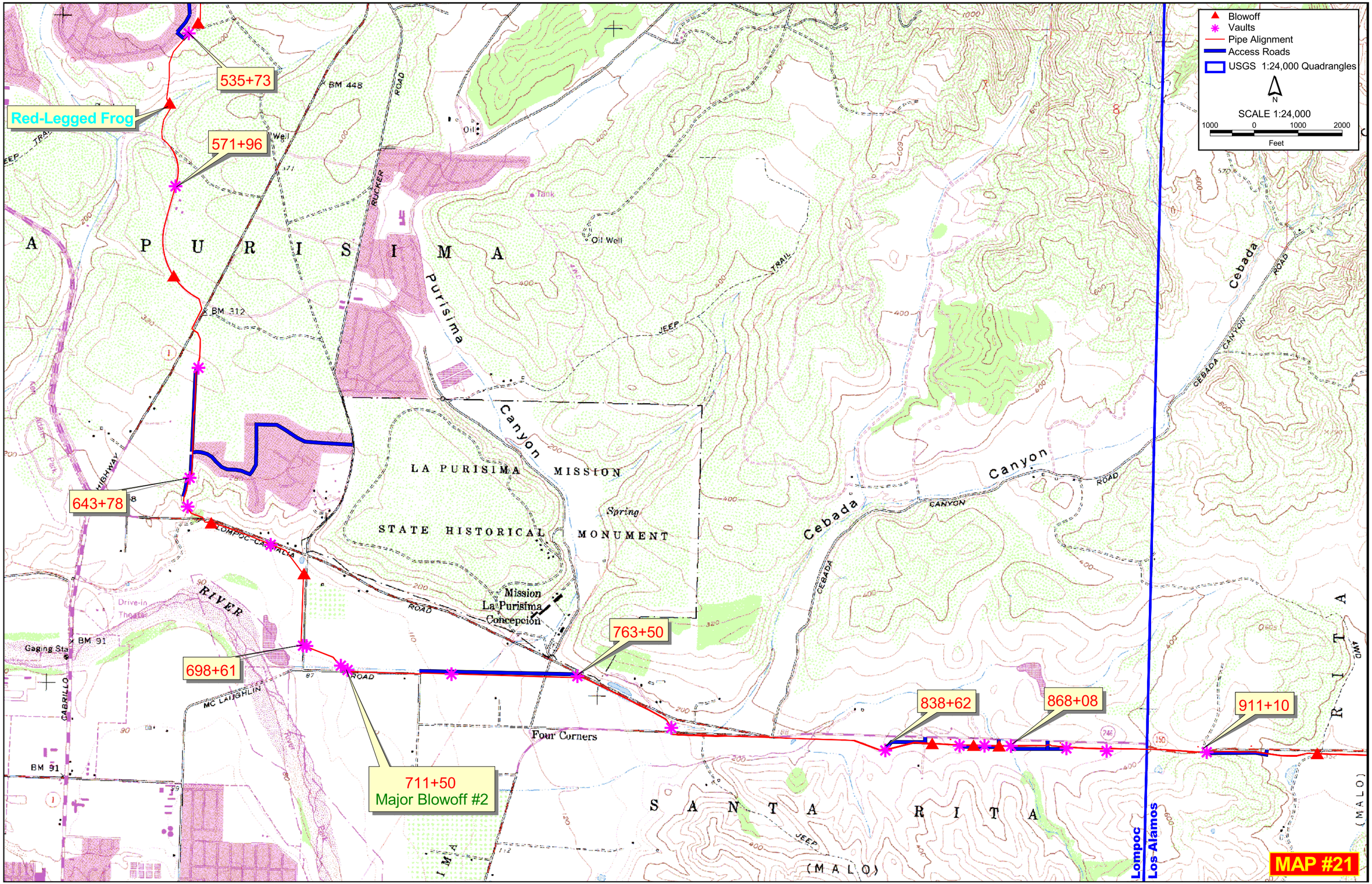
Blowoff
Vaults
Pipe Alignment
Access Roads
USGS 1:24,000 Quadrangles
N
SCALE 1:24,000
1000 0 1000 2000
Feet
535+73
Red-Legged Frog
571+96
643+78
698+61
711+50
Major Blowoff #2
763+50
838+62
868+08
911+10
A P U R I S I M A
LA PURISIMA MISSION
STATE HISTORICAL MONUMENT
Mission La Purisima Concepción
Four Corners
S A N T A R I T A
Purisima Canyon
Cebada Canyon
Cebada Canyon Road
Lompoc Los Alamos
MAP #21
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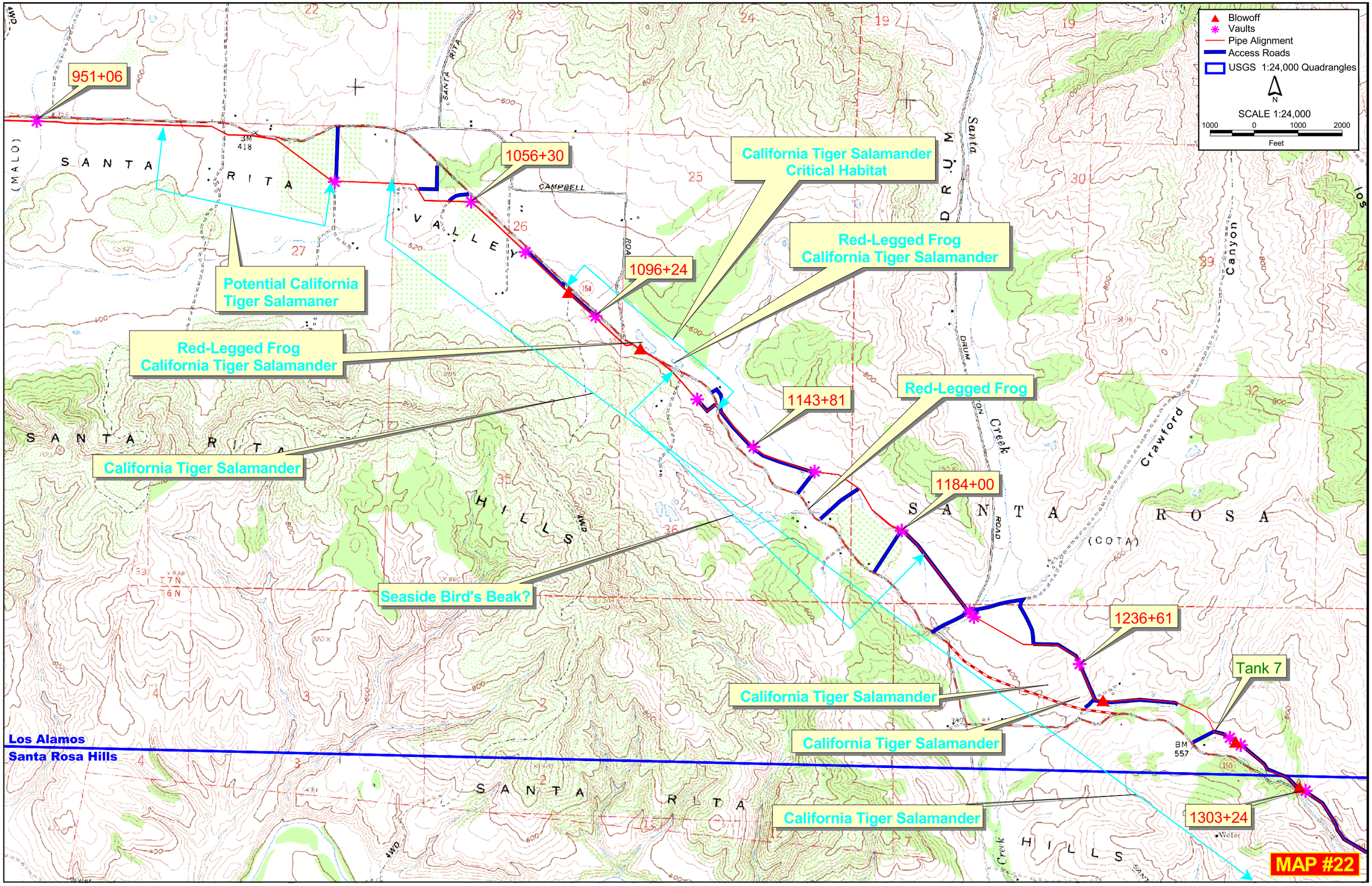

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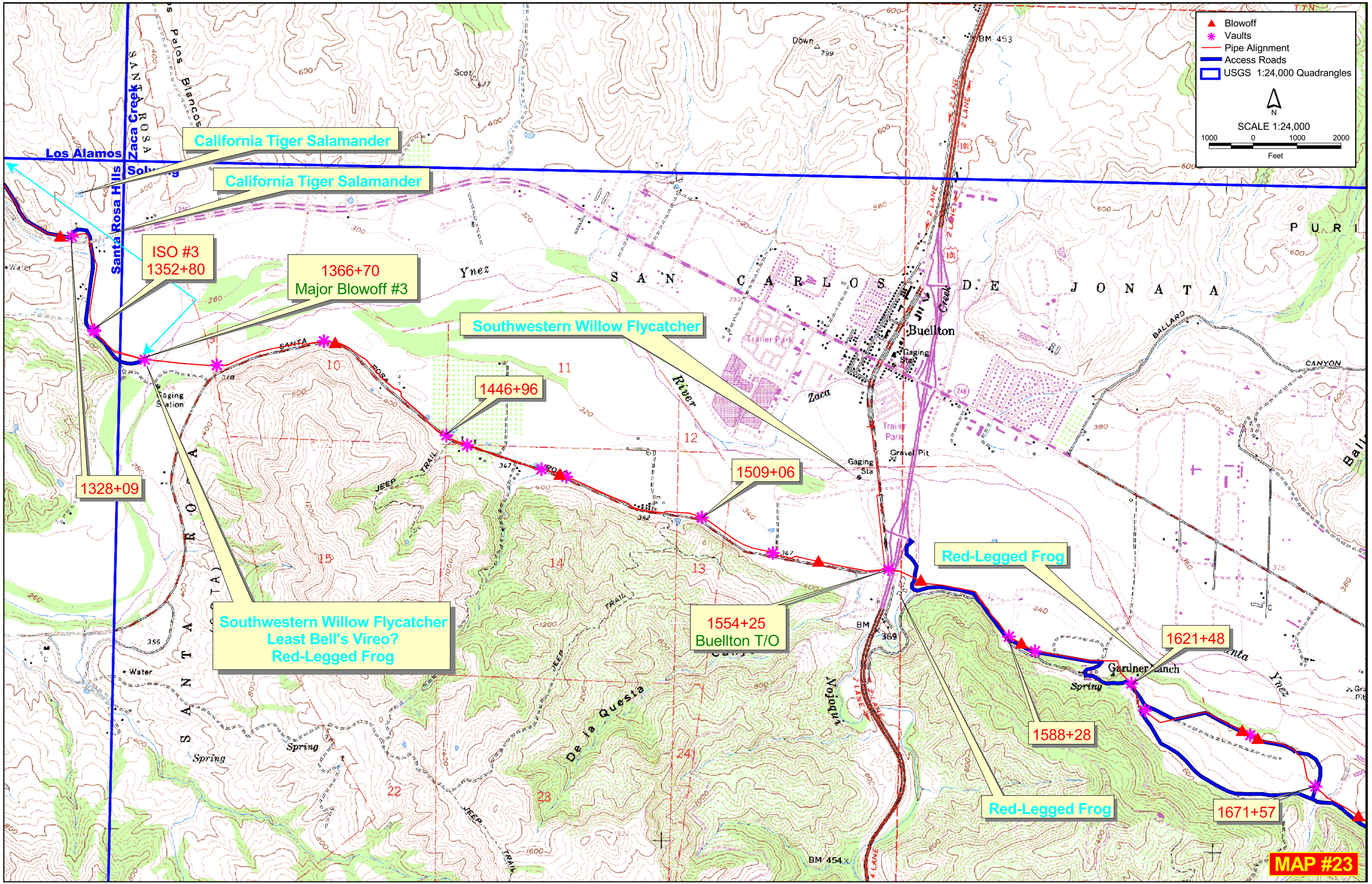

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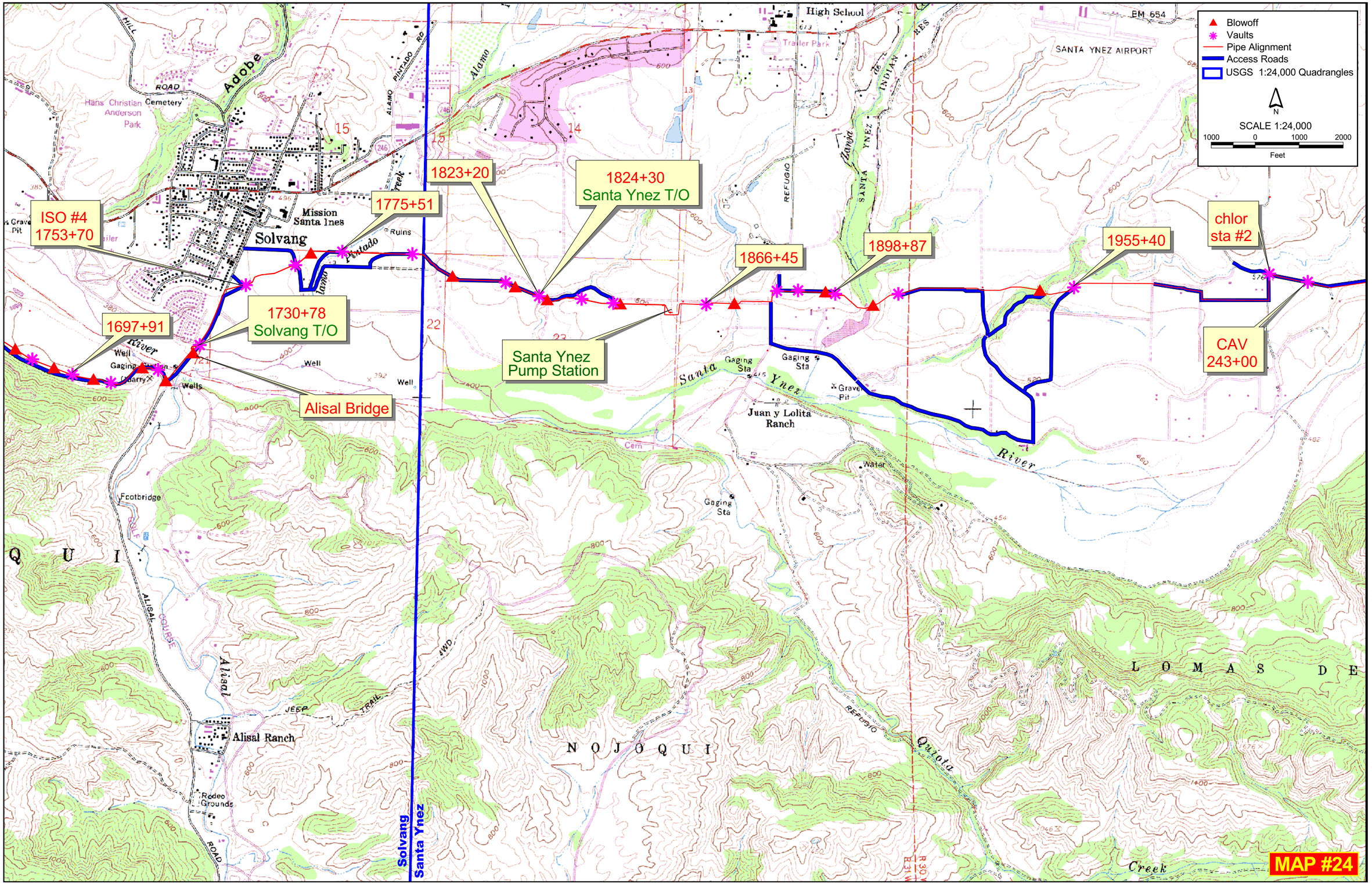

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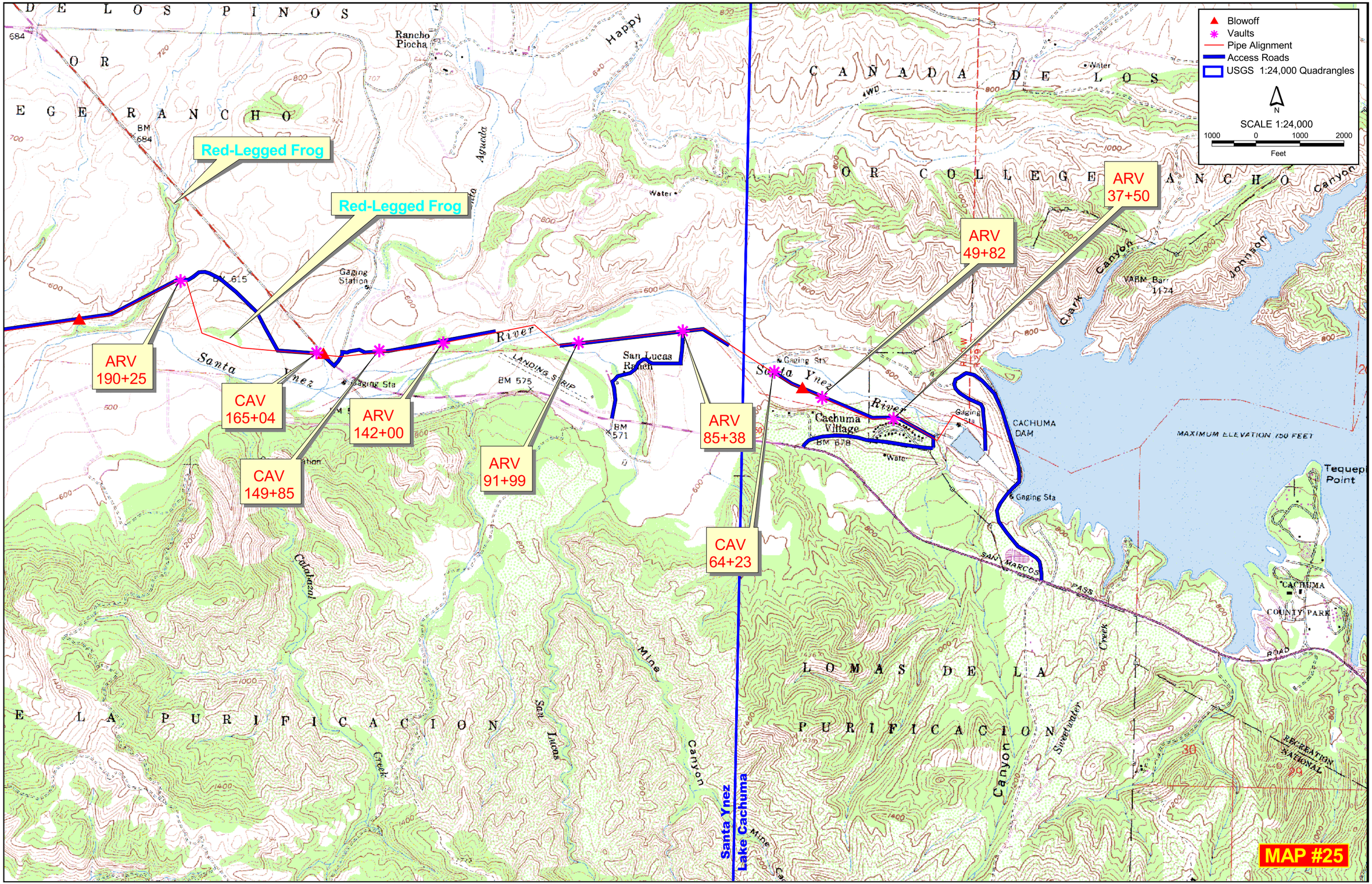

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HCP APPENDIX C

Dewatering Plan

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APPENDIX C
O&M DEWATERING PLAN

Water can be released from the pipeline during O&M through either (1) controlled releases or (2) uncontrolled releases. In nearly all cases, the releases will be controlled; however, accidents could occur that would result in an uncontrolled release.

Controlled Release

Definition: when water is released from the pipeline via a valve that allows control over the release. The release is planned such that necessary equipment and supplies are on hand and in place prior to starting. A controlled release may provide relief for an uncontrolled release (i.e., the release of water at one point in order to relieve pressure at another location).

Protocol

Prior to releasing water into the environment, the operator shall take those measures necessary to prevent environmental damage such as erosion of hillsides or stream banks, deposition of sediments into water bodies (ponds, flowing streams, or dry drainages), or mortality of aquatic species due to disinfectants in the water. The following steps shall be taken to prevent environmental damage during discharge operations:

- Water shall be spread onto adjacent landowner property whenever feasible, particularly in Reach 2 and Reach 3.
- Sprinklers shall be used over uplands adjacent to the blowoff or dewatering structure where feasible.
- Water entering or having the potential to enter any stream habitat shall be continuously dechloraminated at the point of discharge using portable units designed for this task.
- Erosion control measures shall be installed, with back-up materials present.
- Discharges directly to the ground shall have temporary energy dissipation measures installed to prevent erosion (see Attachment 1 for example). These can include hoses, diffusers, silt bags, plastic sheeting, straw bales, and sandbags.
- Silt fence/straw wattles may be used to contain small amounts of sediment but shall not be used to contain or divert water flows.
- Hoses used shall be directed to stable surfaces (e.g., rock or culverts) or have energy dissipation measures installed at their discharge ends.
- The rate of release shall be moderated so as not to overwhelm structures designed to control erosion, including slow ramp up and down to protect listed species.
- Discharge shall be monitored for erosion and the flow rate reduced or halted if erosion becomes evident. Monitoring shall extend from the point of discharge to at least where the flow enters an existing stream.

- Water shall be tested every 15 minutes for chlorine, temperature, and pH at the point of discharge at regular intervals.

- Discharges directly to surface waters shall not alter the **receiving water** by:

  - an increase of more than 5° F, or raising the temperature above 68° F (20° C) [Note: If discharge water temperature is above 68° F (20° C) or more than 5° F above the receiving water temperature, release methods will be modified so that receiving water temperature is not changed beyond these limits.]

  - changing pH more than 0.5 unit or exceeding the range of 7.0 to 8.5 units

  - increasing turbidity relative to natural turbidity (NT) as measured upstream of the discharge point by

    5 NTU where NT is <25 NTU
    20% where NT is 25-50 NTU
    10 NTU where NT is 50-100 NTU
    10% where NT is >100 NTU

- Turbidity and temperature shall be monitored up and downstream of the discharge for all releases entering a water body.

- Check environmental maps/database for presence of covered species, prior to discharge.

- Avoid temporary rapid raising or lowering of water levels in habitats where covered species (adult, larvae, or eggs) could become stranded or exposed.

- If covered species are present that could be affected by the discharge, monitoring shall extend downstream to where effects on water quality and flow are minimal.

- Have a contingency plan to address erosion, turbidity, temperature, and failure of equipment to remove disinfectants from water before it is released into habitats used by covered species.

Uncontrolled Release

Definition: release of water where the operator has no control over the rate of flow or the location of the release. These result from leaks, malfunctions of appurtenant facilities, or other emergency situations (e.g., pipeline rupture).

Protocol

Actions shall be taken as soon as reasonably possible to bring an uncontrolled release under control. An evaluation of the severity of the release and the current and future effect on the environment shall be a priority. Actions that may be taken to reduce impacts at the site include closing upstream valves, storing additional water in system storage tanks, releasing water elsewhere along the line, and using equipment and/or materials to divert or dam the flow of water to avoid sensitive areas. These actions, however, could have impacts to the environment, including covered species, on their own and shall be done in a controlled and coordinated manner. The following steps shall be taken in the event of an uncontrolled release:

- Evaluate the accident scene for environmental damage that has occurred and that could occur in the future. Check database for potential presence of covered species and call in environmental specialists if necessary. Prepare a preliminary damage assessment for the project files.
- Determine the extent of the release.
- Determine what is necessary to halt the flow.
- Take immediate actions to protect environmental resources such as:
    - Start decloramination immediately.
    - Divert flow to less vulnerable areas using straw bales, sandbags, waterbars, etc.
    - Install sediment containment structures using silt fence, straw bale, or sandbag barriers.
    - Create earthen dams, dikes, or sediment basins.
- Reduce pressure by releasing water elsewhere along the line in a controlled manner.
- If flow is entering a stream or pond, (1) measure temperature, chlorine, and pH in the flow prior to entry into the water body; (2) estimate turbidity increase above background in the water body; and (3) record any mortality of aquatic species (including size and number individuals of each species).

Notifications

Reporting requirements for effects on covered species are described in Sections 6.2 and 7.3 of the HCP. Regulatory agencies will need to be notified by CCWA immediately under the following conditions, as determined through the above procedures:

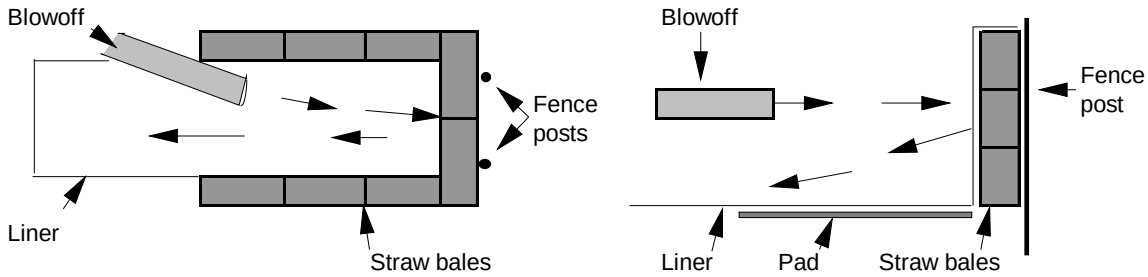
CDFG	if any state-listed or special concern species have been or could be affected or if any stream habitat is affected
USFWS	if any covered species have been or could be affected
RWQCB	if water quality is adversely affected (e.g., turbidity, pH, temperature, chloramines, etc.)
U.S. Army Corps of Engineers	if accident occurred as part of work in an area under Corps jurisdiction (i.e., a wetland or water of the United States)

ATTACHMENT 1

Temporary Energy Dissipation Example

For discharge from a blowoff onto a stream bank or into the stream bed (see diagrams below):

- Install a straw bale barrier (U-shaped), 1 to 3 bales high, around the discharge area and line with a tarp (over bales and ground inside U).
- If tarp will lay on a rough (e.g., rocky) surface, place a pad such as carpet over the ground under the tarp to prevent abrasion by water force.
- Extend the tarp liner downstream or downslope about 10 feet (or more if necessary) to prevent scour of the bank or bed.



Plan View

Profile

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HCP APPENDIX D

Habitat Restoration Plans

Plant Community Revegetation Technical Manual for the Santa Ynez Extension and Mission Hills Extension

Plant Community Revegetation Technical Manual for Reaches 5B and 6 and Tank 5 of the Coastal Branch, Phase II

Coastal Branch, Phase II Restoration Plan for Reaches 1 through 5A

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REVISED FINAL

PLANT COMMUNITY REVEGETATION TECHNICAL MANUAL

FOR THE SANTA YNEZ EXTENSION

AND MISSION HILLS EXTENSION

LOCAL FACILITIES OF THE COASTAL AQUEDUCT, PHASE II

July 1995

Prepared for

Central Coast Water Authority
255 Industrial Way
Buellton, California 93427

Prepared by

Science Applications International Corporation
816 State Street, Suite 500
Santa Barbara, California 93101

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PLANT COMMUNITY REVEGETATION TECHNICAL MANUAL

1.0 INTRODUCTION

This manual provides the methodology to be used for revegetation of areas disturbed during construction of the Mission Hills/Santa Ynez Extension of the State Coastal Branch, Phase II, and criteria for use in evaluating the success of the revegetation program. Section 2 describes general approaches to revegetation, maintenance, and monitoring that are common to several plant communities. Section 3 describes the methodology for revegetation of plant communities specific to this project, and section 4 contains revegetation procedures for selected plant species. The contents of this plan will be used to develop specifications to be used by the revegetation contractor and criteria to be used by compliance monitors.

2.0 GENERAL APPROACHES TO REVEGETATION

A key aspect to the success of this revegetation program has been the minimization of the area requiring replanting by minimizing the disturbed area, and by avoiding, to the greatest extent possible, disturbance to sensitive and difficult-to-restore resources, including oaks, Burton Mesa chaparral, and riparian and wetland areas. Through a combination of mitigation-by-avoidance and providing financial incentives to contractors to minimize disturbance, the potential impacts to Burton Mesa chaparral and oaks has been dramatically reduced compared to the original projections.

Sources of Seeds and Plant Materials

To preserve the integrity of local gene pools, ensure adaptation to site-specific conditions, and to avoid inadvertent introduction of inappropriate species or pathogens, all seed and plant materials (cuttings, bulbs, etc.) of native species to be used for revegetation will be collected in the project area. Because the pipeline passes through two zones that are somewhat dissimilar ecologically, the site-specific seed collection area has been divided corresponding to those zones (Figure 1). Zone 1 covers the northern part of the route from Tank 5 to Purisima Road. This portion of the pipeline alignment corresponds to Schedule A in the construction documents. Zone 2 covers the area between Purisima Road and the ID#1 pipeline connection near Santa Ynez. This portion of the pipeline alignment corresponds to Schedules B and C. Seed and plant materials for the two different zones will be collected in the corresponding zone and stored separately. Appropriate areas for seed collection within these zones will be defined in the field, taking into account the following:

- Ecological similarity to the area to be reseeded
- Proximity to the pipeline
- Land ownership
- Accessibility
- Abundance and collectability of target species
- Need to ensure genetic diversity of source material (i.e., seed should be collected from a diverse sample of the parent plants within the collection zone)

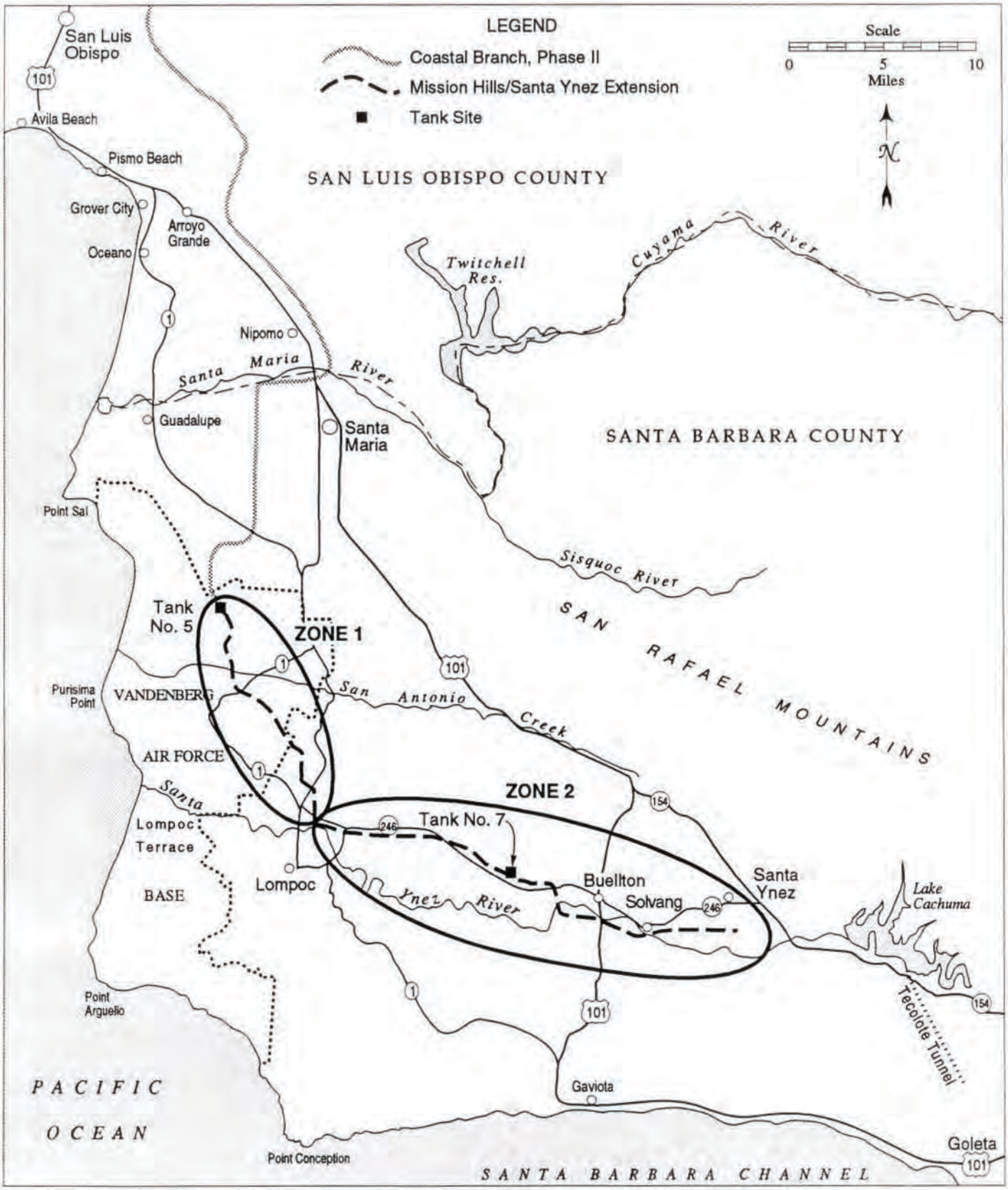

Figure 1

SEED COLLECTION ZONES FOR THE STATE WATER PIPELINE

Planting Methods

Planting methods will vary depending on community type and species to be planted. For a given plant community, planting methods will be the same for Schedules A, B, and C except that local seed and plant materials will be used.

Revegetation of chaparral and scrub communities will use the broadcast seeding method which allows a large number of species having a variety of seed morphologies to be planted. The seed mix to be used will be prepared and bagged in half-acre lots and broadcast over the ROW followed by incorporation into the soil by raking, dragging a chain, or similar means following post-construction site cleanup and surface restoration. Additional species may be added later using other planting methods to reflect natural vegetation patterns. Other planting methods will be discussed under plant community revegetation methods in Section 3.0 below.

Monitoring, Maintenance, and Weed Control

After construction and prior to planting, a survey of the pipeline corridor will be conducted to inspect the integrity of the soil surface and to ensure that erosion control methods (water bars, straw, erosion control fabric, etc.) are in place. After planting, the objectives of monitoring will be to document establishment and growth of planted species, to identify the need for maintenance (including erosion and/or weed control), and to identify incipient weed problems. Incipient weed problems are defined as establishment on the treatment area of weedy species not abundant in adjacent areas that might, by establishment on the treatment areas, interfere with revegetation by native species or threaten to invade adjacent undisturbed habitats. Specifics are discussed under performance criteria for individual plant communities. Maintenance will be conducted as necessary to ensure that revegetation goals can met in a timely manner.

Monitoring, maintenance, and weed control methods and timing specific to the revegetation of the plant communities within the pipeline ROW are discussed in Section 3.0 below. Table 1 depicts a general monitoring schedule for each of the plant communities. Seed planting will generally be done during the fall or early winter (1994) and monitoring will begin during that growing season. For this reason, 1995 is generally assumed to be the first year of the revegetation monitoring effort. This schedule is preliminary and may be modified by the revegetation specialist or as necessary depending on site-specific conditions. Substantive changes in the schedule, such as a recommendation to omit a particular activity because it appears unnecessary, would be submitted to the California Department of Fish and Game (CDFG) for approval prior to implementation. In addition, while minor maintenance can be accomplished during monitoring, major maintenance efforts (such as erosion and weed control, supplemental irrigation, reseeding, or replanting, etc.) will be scheduled, as necessary.

Erosion Control

Clean, weed-free straw (wheat, barley, or rice) will be applied to the ROW at a rate that provides complete cover of the soil (up to 2 tons per acre) and will be held in place by punching, crimping, fiber netting, or other means. The construction contractor is preparing a Stormwater Pollution Prevention Plan, which includes an Erosion Control and Wastewater Disposal Plan. These plans are subject to approval by CDFG.

Performance Criteria

Performance criteria are designed to ensure that a self-regenerating ecosystem is reestablished in the area of disturbance that is effective in erosion control and does not pose a threat to adjoining plant communities as a source of weeds or non-local genotypes of native species. The

Table 1
General Revegetation Monitoring Schedule

	1994	Year 1 1995	Year 2 1996	Year 3 1997	Year 4 1998	Year 5 1999
Chaparral	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Mar/Apr[2] Oct[3]	May/Jun[3] Oct[4]	May/Jun[2] Oct[4]	May/Jun[2] Oct[5]
Riparian Communities	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[4]	Jun[2] Oct[4]	Apr/May[3] Sept[4]	Sept[4]	Sept[5]
Lucian Central Coast Scrub	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Mar/Apr[2] Jun[5]			
Venturan Coastal Scrub	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Mar/Apr[2] Jun[5]			
Non-Native Grassland	Oct[1]	Feb/Mar[2] May[3]	May[5]			
Native Grasses and Herbs	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Apr/May[5]			
Freshwater Marsh	Oct[1]	Mar/Apr[3] Sept/Oct[3]	Jun[4]			
Oak Communities (Oak trees)	Oct[1]	Feb/Mar[2] May[3] Oct[4]	May[3] Jul/Aug[2] Oct[4]	May[3] Jul/Aug[2] Oct[4]	May[3] Oct[4]	May[3] Oct[5]

Notes:

1. Inspection -- done by CCWA (after completion of construction).
2. Visual surveys focusing on establishment of planted species and identifying potential weed problems.
3. Walk through and documentation of plant species establishment, vigor, and presence of weeds.
4. Inspect planted trees and shrubs for survival and vigor; possible need for replanting
5. Vegetation surveys to verify that performance criteria are met.

This schedule is subject to change depending upon a number of factors including: seasonal climate conditions; survival rate of planted species; rate and level of effort of maintenance activities; and as determined by the revegetation specialist.

Maintenance activities associated with the revegetation effort (such as erosion and weed control, protective devices, supplemental irrigation, replanting or reseeding, etc.), will also be scheduled and performed, as necessary, apart from this monitoring schedule.

ultimate goal in areas of predominantly native plant communities is to return the disturbed area to a native plant community characteristic of the site prior to disturbance. Performance criteria are specific to community and species composition and are discussed in Section 3.0 below.

Remedial Action

Whenever the performance criteria are not met or when monitoring indicates that additional erosion control or weed control actions are necessary, the project restoration specialist in consultation with the PEPM shall determine what measures are required and make sure that they are implemented.

Monitoring Plan and Reporting

A revegetation/restoration monitoring plan shall be prepared by CCWA and shall be submitted to CDFG for review and approval by 1 October 1994. This plan shall include but shall not be limited to:

- a description of proposed monitoring activities at sensitive riparian areas such as Zanja de Cota Creek
- proposed sampling techniques and sampling locations
- monitoring frequencies
- proposed data presentation
- methodology for evaluating progress toward and achievement of performance criteria.

The monitoring program for Burton Mesa Chaparral shall provide data sufficient to allow an objective evaluation of the reestablishment of different species from (1) resprouting of shrubs cut just above ground level, (2) transplants vs seedings (for oaks), (3) conserved seedbank (i.e., topsoil salvage and replacement), and (4) directly applied seed. This will require leaving small representative areas within the chaparral community unseeded.

Annual progress reports shall be submitted to CDFG by 1 January of each year during active restoration of monitoring. Reports shall provide a narrative description of the progress of the revegetation and shall provide qualitative and quantitative results of the monitoring. The report shall include an analysis of the monitoring data, recommendations, and identification of remedial actions, if necessary.

Any substantive deviations from the approved plan proposed by CCWA, the PEPM, or the project revegetation specialist, shall be submitted to CDFG for approval prior to implementation.

CCWA may institute emergency changes of a substantive nature under exigent conditions but shall so notify CDFG within 5 days of said changes. No changes shall be made which could affect threatened, endangered, or rare species, or species of special concern without prior notification to and written approval from CDFG.

3.0 PLANT COMMUNITY REVEGETATION METHODS

3.1 Chaparral

The chaparral community affected by the project, known as Burton Mesa chaparral, is considered to be a sensitive plant community. This maritime chaparral is present on limited portions of Vandenberg Air Force Base and adjacent areas of western Santa Barbara County, especially north and west of Lompoc. Remarkably, this chaparral includes as dominant species two manzanita species and two species of ceanothus whose entire distribution is confined to portions of western Santa Barbara and adjacent San Luis Obispo counties and includes a number of additional species recognized as rare, threatened, or endangered. Prevalent species in the Burton Mesa chaparral community include *Arctostaphylos purissima* (La Purisima manzanita), *A. rudis* (sand mesa or shagbark manzanita), *Ceanothus impressus* (Santa Barbara ceanothus), *Ceanothus cuneatus* var. *fascicularis* (coast ceanothus), *Toxicodendron diversilobum* (poison oak), *Salvia mellifera* (black sage), *Quercus agrifolia* (coast live oak), *Adenostoma fasciculatum* (chamise), and *Rhamnus californica* (California coffeeberry). Most of the native shrubs (including coast live oak and sand mesa manzanita) are perennials that have the capacity to resprout after fire or cutting. After fire or soil disturbance to the chaparral community, a large variety of native annuals and fast-growing, short-lived perennials germinate from seed or dormant bulbs stored in the soil providing erosion control and food and cover for wildlife.

To maximize natural regeneration of the community (resprouting of shrubs and germination of the existing seedbank), disturbance to sites supporting Burton Mesa chaparral communities will be minimized. Instead of bulldozing to remove all vegetation, sites will be prepared for construction by cutting the vegetation at ground level, minimizing disturbance to the burls, root systems, and the existing seedbank. This will be standard practice except directly over the trench or in areas requiring grading prior to construction. Where grading or trenching occurs, the seedbank and topsoil will be salvaged and replaced.

Natural regeneration from resprouting and from native seedbank will be augmented by application of a seed mix consisting of native successional species. The seed mix for the chaparral community is designed to promote rapid establishment of native vegetative cover, providing long-term erosion control and wildlife habitat values and inhibiting establishment of invasive exotic species such as pampas grass. The seed mix will be composed primarily of successional perennials. These typically are fast-growing shrubs or sub-shrubs that characteristically appear in the first growing seasons following fire or other disturbance to chaparral. Many of these species are also found in coastal scrub communities, where they may be dominant species. These successional species are gradually overtaken by longer-lived and generally larger shrubs characteristic of the mature chaparral community. Replacement of the initial vegetative cover by longer-lived chaparral shrubs becomes evident beginning 2 to 3 growing seasons after disturbance and continues rapidly for 5 to 10 years more with gradual changes thereafter.

The anticipated result of using the proposed mix of successional species in combination with saving the seedbank and underground plant structures is greater native shrub cover in less time, minimizing the potential for erosion and weed establishment, and facilitating gradual reestablishment of the longer-lived chaparral species.

To meet specific regulatory requirements for replanting species such as coast live oak and sand mesa manzanita, plantings of these species will be made in the corridor beginning during the second growing season after construction. Outplanting these species during the second growing season after construction will minimize trampling of the reseeded ROW during the critical first growing season as seedlings and crownsprouts are beginning growth and are most vulnerable.

Location

The Burton Mesa chaparral within the pipeline corridor has been subdivided into three classes. Class 1 chaparral (BMC1) includes areas that have very little evidence of disturbance (excluding fire) and are continuous with larger areas, covering several hundred square feet. Class 2 chaparral (BMC2) includes areas that are somewhat disturbed (i.e., have roads, trails, or populations of non-native species) or smaller fragments, but still have a high proportion of established chaparral species. Class 3 chaparral (BMC3) includes those areas that are either very small and isolated, or that support a low cover of typical Burton Mesa chaparral dominants.

Approximately 1.3 acres of class 1 chaparral, 1.6 acres of class 2 chaparral, and 1.2 acres of class 3 chaparral were cleared by construction of Schedule A of the Santa Ynez and Mission Hills Extensions. No chaparral was removed in schedule B or C. These totals were reduced from the preconstruction estimates by contractors who adopted construction methods to reduce the disturbance area in response to an innovative financial incentive structure developed by CCWA to reduce impacts on Burton Mesa chaparral. Approximately 9 acres of class 1 chaparral and 1 acre of class 3 chaparral will be cleared by construction of the Coastal Branch (including Tank 5). Contractor construction methods may minimize impacts reducing areas impacted.

Seeds to be Planted

A relatively large number of species having a variety of growth forms is included in the mix for chaparral (Table 2). Having a variety of species increases the chance of successful establishment in any particular year because of species-to-species differences in conditions required for germination and establishment, and seasonal variability in environmental factors.

Species were included in the mix based on their likely rate of establishment, prevalence in native communities in the local area (either as successional or dominant species), and erosion control and wildlife values. Species and application rates may be adjusted according to the availability of different species during the season of collection and new information that may develop. Selection of species to be added to the mix would be based on the criteria listed above.

Species and application rates are listed in Table 2. Specified seeding rates were based partially upon experience with these species in similar environments and take into account the measures being taken to preserve the existing seedbank. The application rate for each species was calculated from representative values of purity and germination for each species provided by S&S Seed (Guidelines for Seed Specifications, 1992 revision). Application rates may be reduced by up to 50% or more in areas not trenched, graded, or heavily compacted because chaparral species in these area are expected to resprout from underground burls and from the existing seedbank.

Planting Methods

As stated previously, the seed mix will be prepared in half-acre lots and broadcast over the ROW followed by incorporation into the soil by raking, dragging a chain, or similar means following post-construction site cleanup and surface restoration.

The seeds of large woody plants are not included in the mix and will not be uniformly broadcast over the length of the ROW in the chaparral. This is done to avoid creation of a long-lasting artificial pattern on the landscape and also because of generally low establishment rates of these species from direct seeding. These species are expected to reestablish by gradual invasion from adjoining areas, resprouting from cut bases, and germination from the pre-existing seed bank. The product of this more natural recovery process is expected to eventually mirror the pre-existing vegetation pattern.

Table 2
Preliminary Seeding Rates for Burton Mesa Chaparral

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	1.0	487,500
Ericameria ericoides	1.8	45,000
Eriodictyon traskiae	0.1	49,500
Eriogonum parvifolium	1.2	81,000
Eriophyllum confertiflorum	0.2	495,000
Helianthemum scoparium	0.2	783,000
Horkelia cuneata	0.3	75,400
Lotus scoparius	1.2	243,000
Mimulus auranticus	0.3	350,000
Phacelia ramosissima	0.4	400,000
Salvia mellifera	0.4	218,760

Note: 1. PLS = pure live seed

Selected woody plants, including coast live oak, sand mesa manzanita, and, possibly, La Purisima manzanita, and California coffeeberry, will be planted separately in aggregations at specific sites along the ROW where they can be efficiently monitored and maintained if necessary. None of these species will be planted directly over the pipeline, although individuals that volunteer (except oak trees that can become large) generally will be allowed to grow there unless they need to be removed to access the pipeline for maintenance or repair. Planting spots for coast live oak will be spaced 5 to 10 feet on center, with the closer spacing intended to result in a coppice or thicket-like growth similar to that present in the project area. For coast live oak and sand mesa manzanita, the planting approach includes both direct seeding and transplanting nursery-grown plants. Methods for oak planting are described under Coast Live Oak Woodland and Forest (section 3.9).

Other Types of Propagation to be Undertaken

Woody plants such as manzanita species and coffeeberry may be propagated in the nursery from cuttings for later transplanting if propagation of transplant stock from seeds is found to be impractical or unsuccessful.

Special Requirements of Plantings

Special measures such as providing mechanical protection of plantings from herbivory, use of shade cloth, and use of drip irrigation may be employed as recommended by the project restoration specialist for the establishment of coast live oak and other woody species.

The revegetation program for Burton Mesa chaparral should include a small-scale (pilot project) evaluation of charate application using techniques having the potential to be scaled up to large-scale application (for future projects or remedial action on this project) should it prove successful. The charate treatment should be applied to a representative unseeded area as well as to a seeded area and the results evaluated and reported. The proposed methodology for this

treatment shall be submitted to CDFG for review and approval prior to its implementation, which should coincide with, or immediately follow, the initial post-construction reseeding and soil stabilization activities.

Monitoring and Maintenance

During the first year after planting, monitoring will be conducted in February/March, May/June, and October (see Table 1) or more frequently as judged necessary by the project revegetation specialist. Additional visits may be required to detect and correct erosion following significant rainstorms. Subsequently, scheduled monitoring will be conducted generally in May/June and October. This schedule is preliminary and may be modified by the revegetation specialist with substantive proposed changes submitted to CDFG for review and approval.

The objectives of monitoring will be to document germination and growth of natives and to identify the need for maintenance (e.g., erosion control, weed eradication) or replanting. Establishment of plants from seed vs. resprouting will be documented by species, and a representative area will be left unseeded to determine the contribution of seeding to overall restoration success. Supplemental irrigation, if employed, will be stopped three years prior to the end of the monitoring period. Maintenance will be conducted as necessary for erosion control and eradication of serious problem weeds.

Weed control will focus on species that (1) have the potential to interfere with the reestablishment of native vegetation in the ROW (as used here ROW is synonymous with construction corridor and includes actual trenched areas as well as adjacent areas where preexisting vegetation has been removed by construction) and (2) that are not already so prevalent in areas immediately adjacent to the ROW as to preclude reestablishment of a long-term, self regenerating native vegetation cover. Weeds will be removed manually where practical. Herbicides will be used to control larger weeds or infestations. All herbicide use will be monitored by a qualified biologist and appropriate precautions will be taken to prevent incidental damage to natives. These precautions include directional spraying to avoid natives and stopping spraying when wind speeds exceed 5 mph, potentially causing drift. Weed control will focus on the following species that have proven to be invasive in chaparral in this region: veldt grass *(Ehrharta calycina)*, iceplant (*Carpobrotus edulis*), narrow-leaved iceplant (*Conicosia pugioniformis*), and jubata grass or pampas grass (*Cortaderia jubata, C. selloana*). Surveys and treatment will be timed to prevent or minimize seed set of these species. Other weed species such as mustards and thistles will be removed as recommended by the project restoration specialist to ensure successful revegetation.

Oaks and sand mesa manzanita will be monitored in May/June and October for a minimum of 5 years, including 3 years after cessation of supplemental irrigation (if any). Transplants, seedlings, and resprouts from cut plants will be specifically inspected and evaluated for size and vigor, condition of protective devices (if any) and irrigation system (if any), and presence of competitive weeds or other factors such as gophers or insect infestations that might affect their survival. For plants not exhibiting normal growth and vigor, remedial action will be taken as judged necessary by the project restoration specialist in consultation with the Project Environmental Program Manager (PEPM).

Aerial photographic surveys shall be conducted for portions of the pipeline corridor located within Burton Mesa chaparral to evaluate the progress of restoration. Such surveys shall be conducted during the first, third, fifth, seventh, and tenth years after commencing restoration. Results from these surveys shall be evaluated and information on progress extrapolated using "ground truth" information from terrestrial monitoring activities.

Since the Burton Mesa chaparral community may not have recovered fully by year 5, the designated sampling stations shall be resurveyed once at year 7 and at year 10, and the results shall be reported to CDFG.

Performance Criteria

1. Chaparral

Goal: Establish self-regenerating chaparral ecosystem within the ROW that is effective in long-term slope stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds or of non-local genotypes of native species. The vegetation should gradually develop the characteristics of the adjacent undisturbed chaparral communities, except directly over the pipeline, where large woody plants may be absent but the other criteria described in the following paragraphs should be met.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.
- Percent ground cover by native perennial vegetation is 40 percent at the end of 5 growing seasons (alternatively, native vegetative cover equals that on a nearby ecologically equivalent reference area identified at the outset of the program); native shrub density shall generally exceed 1 per square meter. (These values shall be estimated using an objective technique on representative sample areas.)
- A minimum of six native perennial plant species can be found in a representative 1-meter wide belt transect conducted across the ROW (diagonally where ROW is narrower than 30 meters), except where adjacent areas of undisturbed vegetation have fewer native perennial species in a comparable area, and native shrub density meets the above criterion. This determination will be made at a minimum of 10 transects located in representative areas of chaparral (primarily BMC1 and BMC 2). Transect locations shall be recorded on the Environmental Drawings.
- No concentrations of weeds are present that would threaten to invade adjoining native habitats. Examples of weeds that would pose a threat to adjoining habitats include veldt grass, jubata grass or pampas grass, iceplant, and narrow-leaved iceplant. The abundance of these species on the ROW must be no greater than on adjacent areas of chaparral not disturbed by construction and should not threaten continued recovery of native vegetation, after year 5, toward equivalency with adjoining vegetation not disturbed by the project.

At acceptance, the first objective listed above must have been met for 3 consecutive years.

2. Oaks within Chaparral

Goal: Planted oaks and oak resprouts should be able to survive indefinitely without further protection or maintenance. Young oaks must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially deer.

Objectives: Within approximately 5 years, planted oaks and resprouts should meet the following criteria:

- Have a vigorous appearance.

- Be a minimum of 1 inch in basal diameter.
- Be a minimum of 3 feet tall.
- Have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

These objectives apply to the shrubby coast live oaks that are locally present in the Burton Mesa Chaparral Community (see section 3.9 for performance criteria for oaks in Coast Live Oak Woodland and Forest). At acceptance, the number of planted and resprouted oaks should equal the number of oaks removed by construction and meet the above-outlined criteria, which apply equally to plants developing from direct-seeded acorns, from transplants, or from surviving root crowns. The success of oak reestablishment by each of these methods will be documented. These criteria will be evaluated during monitoring and may be revised to take into account any unusual climatic conditions, such as drought, and to incorporate the latest standards generally acceptable to the local scientific community. Any proposed changes to these criteria shall be submitted to the CDFG for approval prior to implementation. During drought years, irrigation may be provided during the normal rainy season (November through April) to make up for precipitation deficits and ensure continued growth and survival of the plants.

3. Sand Mesa Manzanita

Goal: Plants must be established and have the potential to live and reproduce through a normal life span. Young plants must have demonstrated the ability to withstand seasonal drought and herbivore pressure.

Objectives: The above-stated goals are considered to have been met if:

- The plant has survived on site for a minimum of 4 years, including at least 3 years without supplemental irrigation and two years without protection.
- It exhibits normal form and morphology and is in vigorous condition.

At acceptance the number of plants established by resprouting from preserved root crowns, from direct planting (seed to transplanting), and from seedbank should equal the number of plants removed by construction and meet the above-listed criteria that apply equally to plants from seed, transplants (if used), and resprouts. The success of reestablishment by each method will be documented.

Other Considerations

Restoration of the entire width of the pipeline corridor will accomplish part of the required mitigation for chaparral. The remainder will be accomplished off site but near the pipeline, probably within the state-owned Burton Mesa Management Area. Off-site mitigation may consist of the one or more of the following types of action:

1) Restoration of disturbed annual grassland or scrub communities (that were formerly chaparral) back to chaparral.

2) Controlling exotic species such as jubata grass, pampas grass, or iceplant within Burton Mesa chaparral, replanting as necessary to restore the site.

3) Restoration of fuelbreak areas.

Details of these methods will be developed as sites for restoration are identified in consultation with CDFG and landowners/managers (e.g., State Lands Commission, Santa Barbara County, and Vandenberg AFB). Off-site mitigation areas will be monitored as described for the pipeline corridor, and measures to prevent damage of the restoration sites by human intrusion (e.g., hiking, ORVs, etc.) will be taken. The specific locations, replacement ratios, and restoration methods will be described in a Replacement Lands Report.

3.2 Southern Cottonwood-Willow Riparian Forest, Southern Willow Riparian Scrub, and Coast Live Oak Riparian Forest

Due to similarities in monitoring and maintenance requirements these three riparian communities are discussed together.

Southern Cottonwood-Willow Riparian Forest has been identified only at a few locations along the pipeline route and varies in species composition and cover. These forests are typically dominated by one or more of the following willows, *Salix lasiolepis* (arroyo willow), *S. laevigata* (red willow), and *S. goodingii* (Gooding's black willow) and by black cottonwood (*Populus balsamifera* ssp. *trichocarpa*). In some areas black cottonwood is replaced by *Acer negundo* (boxelder). The route has been realigned around or will be bored under this community in most locations avoiding impacts to all but 0.05 acre of this habitat. Specific methods discussed in the text that follows have been revised to reflect this.

The *Southern Willow Riparian Scrub* community occurs at many of the small drainages crossed by the pipeline. In most locations, it is a thicket of *Salix laevigata* (Schedules B & C) or *Salix lasiolepis* (Schedule A), although *Baccharis salicifolia* (mulefat) dominates in a few areas. Some thickets are tall and virtually impenetrable, while others are sparsely vegetated and open. In older stands, there is a dense understory of *Toxicodendron diversilobum* (poison oak) or *Rubus ursinus* (California blackberry).

Coast Live Oak Riparian Forest has been identified at one location along the pipeline route where it consists essentially of an oak woodland following the course of a deeply incised intermittent stream through an area of grassland.

Most of the trees, shrubs, and perennial herbs in the Southern Cottonwood-Willow Riparian Forest and Southern Willow Riparian Scrub communities are impractical to establish from a broadcast seed mix for one or more of the following reasons: seed viability is short-lived (cottonwoods and willows); seeds require scarification or stratification to break dormancy (elderberry, blackberry); seeds are relatively scarce or difficult to collect (considering the amount of seed necessary for broadcast seeding methods). As described below under "Other Types of Propagation," these plants can be established from direct cuttings, as transplants started from cuttings or seed, or from salvaged plants. Transplants would be nursery grown from seed (less seed is required than in the broadcast seeding method) or propagated from cuttings and transplanted bare-root. Cuttings from cottonwoods and willows would be treated with a root growth hormone and directly planted onsite. As described below, certain plants would be salvaged, maintained in a viable condition during the construction process, and replanted at or close to their original location, where feasible. Because of site to site differences, site-specific adaptations to this plan will be developed for individual sites once the extent of disturbance and vegetation removal is known.

See Coast Live Oak Woodland (section 3.9) for planting methods applicable to the area identified as Coast Live Oak Riparian Forest.

Location

Southern Willow Riparian Scrub (3 acres in Schedule A and 0.5 acre each in Schedule B and Schedule C) has been identified at many of the crossings of intermittent streams. Coast Live Oak Riparian Forest (0.4 acre in Schedule B) was identified adjacent to an unnamed drainage adjacent to Tank 7 (west side). Southern Cottonwood-Willow Riparian Forest (0.05 acre in Schedule C) occurs in the corridor between Buellton and Solvang.

Seeds to be Planted

No broadcast seed mixes will be used in the riparian zone, in part to prevent introduction of a species not present in a particular drainage.

Planting Methods and Other Types of Propagation to be Undertaken

- Willows to be propagated by direct planting of dormant stem cuttings.
- California box-elder to be propagated by seed for bare-root transplanting just prior to leaf emergence at Santa Lucia Creek.
- Mexican elderberry to be propagated from stem cuttings for transplanting prior to leaf emergence.
- California blackberry to be propagated from stem cuttings for transplanting during late-winter/early spring declining streamflows, at Unnamed ST (pipeline station 50+00) and Unnamed A.
- California wildrose to be propagated from bare-root plants salvaged from ROW, at Unnamed A.
- Indian rush (*Juncus textilis*) to be salvaged from ROW and replanted after construction, at Unnamed A.
- Other species may be salvaged or propagated from site-specific materials.
- No deliberate attempt will be made to establish poison-oak and giant creek nettle; however, these species will be allowed to naturally recolonize the disturbed area.

Special Requirements of Plantings

Cuttings and transplants planted near stream inverts need to be installed in moist soil during declining water flows (i.e., after the period of major winter storms) so that the risk of being washed out is kept to a minimum.

Monitoring and Maintenance

During the first growing season, monitoring will be conducted in February/March, May/June, and October (Table 1). Monitoring will include evaluation of the need for weed control, irrigation, protection from herbivory by domestic livestock or wildlife, replanting, or additional erosion control activities. Irrigation, if employed, will be a temporary drip system. Protection from livestock or wildlife, if judged necessary, would be worked out with the landowner. Monitoring in subsequent years will generally be conducted as depicted in Table 1. Maintenance will be conducted, as necessary, in conjunction with monitoring. The frequency of monitoring

and maintenance may be adjusted by the PEPM in consultation with the project restoration specialist.

Persistent perennial weeds (e.g., tamarisk, castor bean, and poison-hemlock) that would interfere with revegetation goals will be the focus of weed control efforts. Individual tamarisk and castor bean will be removed annually; poison-hemlock will be treated at least annually by herbicidal or manual means to minimize its competitive effect on reestablishing vegetation. Annual and non-persistent perennial weeds, such as sweetclovers (*Melilotus* spp.) and rabbitsfoot grass (*Polypogon monspeliensis*), may be cut back as judged necessary by the restoration specialist to minimize competition with plantings.

Trees will be evaluated in the fall, prior to the dormant season, for 5 years, in conjunction with the normal monitoring and maintenance. Plantings, seedlings, and resprouting from cut plants will be specifically inspected and evaluated for size and vigor, condition of protective devices (if any) and irrigation system (if any), presence of competitive weeds or other factors such as gophers or insect infestations, that might affect their survival. Remedial action will be taken as judged necessary by the project restoration specialist in consultation with the Project Environmental Program Manager (PEPM).

Performance Criteria

1. Riparian Habitat Restoration

Goal: Restore suitable areas previously disturbed by construction to riparian habitat having species composition and habitat value equivalent to predisturbance conditions except directly over the pipeline (20-foot wide zone).

Objectives: Within approximately 5 years the site shall have the following characteristics:

- Well-established ground cover appropriate for the site. This may consist of native riparian understory species, such as mugwort, California blackberry, California wildrose, seep willow, etc, and freshwater marsh species. The understory and marsh species should cover all habitat that would normally support understory (may be absent from stream bottom, fresh bars, and steep cut-banks). Ground cover must be in vigorous condition and be stable or increasing in trend. It is noted that many stream crossings lack native riparian groundcover and would not be expected to develop it after restoration.

- Established saplings of tree species present onsite before construction in suitable positions to eventually (and without additional protection or maintenance) form a canopy over the stream and adjacent habitat equivalent to that of adjacent areas. Coast live oak will be planted, where applicable, above the normal limit of flooded soil, along stream terraces and above stream banks. At acceptance, trees must meet criteria stated below under "Trees."

- Cover by weedy species shall be at a minimum. In particular, the site must be completely free of perennial exotic species such as tamarisk and castor bean that would substantially interfere with continued development of the riparian habitat. At acceptance, the total ground cover by weeds must meet one or more of the following conditions: (1) be less than ten percent of the habitat area; (2) be of equivalent (or lower) density to that in adjoining habitat areas not disturbed by construction; or (3) be composed of species that are typical of early successional riparian habitats but that are gradually eliminated as the riparian

habitat develops. Weeds must be in a decreasing or stable condition based upon a year-to-year comparison.

Acceptance would require a demonstration that the above-mentioned criteria have been met. Prior to acceptance, the site must have demonstrated survival for 3 years without supplemental irrigation.

2. *Trees*

Goal: Planted trees should be able to survive indefinitely without further protection or maintenance. Young trees must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially deer. Riparian trees should be situated in such a way as to be able to survive normal seasonal flooding.

Objectives: Within a minimum of approximately 5 years, planted trees should meet the following criteria:

- have vigorous appearance
- be a minimum of 2 inches in basal diameter
- meet size and/or cover criteria specified in Conditions 30 and 31 of Streambed Alteration Agreements 5-012-94 and 5-160-94:

30. In order to determine if the revegetation techniques used have been successful, any plant species required that are listed below shall achieve the minimum growth and cover at the end of 3 to 5 years (designated below). If the minimum growth is not achieved, then the Operator shall be responsible for taking the appropriate corrective measures as determined by Department representatives. The Operator shall be responsible for any cost incurred during the revegetation or in subsequent corrective measures.

Species	*Size at Planting*	*Planting Centers*	*Height*	
			3 years	*5 years*
Arroyo willow	1 gallon	8 feet	10 feet	15 feet
Sandbar willow	1 gallon	5 feet	4 feet	6 feet
Red willow	1 gallon	8 feet	9 feet	15 feet
Sycamore	1 gallon	20 feet	5 feet	9 feet
Cottonwood	1 gallon	*	7 feet	12 feet
All shrub species	1 gallon	**		

* Depending if used as supplemental species (40 feet on center) or if dominant species (15 feet on center).

** Plant in naturalized clumps and randomly scattered.

31. Density and growth of plantings shall meet or exceed the standards specified in Condition Number 30 5 years after planting and/or shall attain 75 percent of pre-project cover after 3 years and 90 percent of the pre-project cover after 5 years from the date of planting. If the survival and cover requirements have not been met, the Operator shall be responsible for replacement planting to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements for 5 years after planting.

- be a minimum of 6 feet tall for tree species not covered in the Streambed Alteration Agreements
- have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

At acceptance, the required number and species mix of planted trees shall have met the above-outlined criteria. These criteria will be evaluated during monitoring and may be revised to take into account any unusual climatic conditions, such as droughts, and to incorporate the latest standards generally acceptable to the local scientific community. Any proposed changes shall be submitted to the CDFG for approval prior to implementation.

If substantial replanting is necessary during the program, the monitoring program will be extended in consultation with CDFG.

Other Considerations

Replacement of any permanent loss of riparian/wetland habitat suitable for the least Bell's vireo and southwestern willow flycatcher will be accomplished off site, probably within the Burton Mesa Management Area although some replacement in Barka Slough on VAFB is also a possibility. The amount of permanent loss will be determined through final pre-construction surveys for sensitive species and computer planimetry of riparian/wetland habitats on the final Environmental Mitigation Drawings. Specific locations for offsite mitigation will be established by CCWA, after approved by CDFG, and appropriate revegetation maps will be provided to the revegetation contractor. The offsite location(s) and restoration methods will be described in a Replacement Lands Report.

3.3 Lucian Central Coast Scrub

Lucian central coast scrub is a diverse and variable plant community, well represented along the northern portions of the pipeline alignment. Common plant species in Schedule A include *Ericameria ericoides* (mock heather), *Rhamnus californica* (coffeeberry), *Artemisia californica* (California sagebrush), *Lotus scoparius* (California broom or deerweed), *Phacelia ramosissima* (branching phacelia), *Mimulus aurantiacus* (orange bush monkeyflower), *Toxicodendron diversilobum* (poison oak), *Baccharis pilularis* (coyote brush), *Salvia mellifera* (black sage), *Eriophyllum confertiflorum* (golden yarrow), *Horkelia cuneata* (wedge-leaved horkelia), *Lupinus arboreus* (tree lupine), and *Helianthemum scoparium* (peak rush-rose).

There are two areas of central coast scrub in Schedule B. These are on the Mendez and Campbell properties and are comparatively simple in composition. The soils at these locations are very sandy. *Ericameria ericoides*, *Baccharis pilularis*, *Artemisia californica*, and *Salvia mellifera* dominate although scattered individuals of a few chaparral species including *Adenostoma fasciculatum* (chamise) and *Cercocarpus betuloides* (mountain mahogany) are present. A few oaks present in and adjacent to the ROW are outliers of nearby dense stands of oak woodlands.

Location

This is a relatively common plant community in Schedule A and is found in only two localized patches on Schedule B. About 55.7 acres will need to be revegetated in Schedule A and 2.3 acres in Schedule B.

Seeds to be Planted

Tables 3 and 4 list the seed mixes for Lucian central coast scrub in Schedules A and B, respectively. The differences in the seed mixes reflect differences in species composition between representations of this community in the two areas. The seed mixes were developed using the approach described above for chaparral.

Table 3
Preliminary Seeding Rates for Lucian Central Coast Scrub, Schedule A

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	1.0	487,500
Ericameria ericoides	1.8	45,000
Eriodictyon traskiae	0.1	49,500
Eriogonum parvifolium	1.2	81,000
Eriophyllum confertiflorum	0.2	495,000
Helianthemum scoparium	0.2	783,000
Horkelia cuneata	0.3	75,400
Lotus scoparius	1.2	243,000
Mimulus auranticus	0.3	350,000
Phacelia ramosissima	0.4	400,000
Salvia mellifera	0.4	218,760

Note: 1. PLS = pure live seed

Table 4
Preliminary Seeding Rates for Lucian Central Coast Scrub, Schedule B

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	1.4	487,500
Ericameria ericoides	2.0	45,000
Lupinus arboreus	5.0	8,600
Mimulus auranticus	0.4	350,000
Salvia mellifera	1.0	218,760

Note: 1. PLS = pure live seed

Planting Methods

The seed mix will be bagged in approximately half-acre lots, broadcast over the ROW, and incorporated into the soil by raking, dragging a chain, or similar means following post-construction site cleanup and surface restoration.

Other Types of Propagation to be Undertaken

Not applicable.

Special Requirements of Plantings

Not applicable.

Monitoring and Maintenance

Monitoring will be conducted in February/March, May/June, and October during the first growing season (see Table 1). Additional visits may be required to detect and correct erosion following significant rainstorms. Thereafter visits will be conducted generally in early spring, in time to detect and take action against potential weed problems and late spring to verify weed control activities and qualitatively determine the extent of growth and cover. This schedule is preliminary and may be modified by the revegetation specialist. The objectives of monitoring will be to document establishment and growth of natives and to identify the need for maintenance (e.g., erosion control, weed eradication) or replanting.

Weed control methods and timing will be the same as those described for chaparral in section 3.1.

Performance Criteria

Goal: Establish self-regenerating shrub-dominated ecosystem within the ROW that is effective in long-term soil stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds or of non-local genotypes of native species. The vegetation should gradually develop the characteristics existing on the site prior to project disturbance.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.
- Density of native perennial plant species is equivalent to adjacent areas; native perennial plant species are in vigorous condition and show evidence of active growth during appropriate growing seasons.
- Number of native perennial plant species generally encountered in a representative transect across the ROW is no fewer than four species, except where equivalent adjacent areas not disturbed by the project have fewer native perennial species in a comparable area.
- No concentrations of weeds are present that would threaten to invade adjoining native habitats. Examples of weeds that would pose a threat to adjoining habitats include veldt grass, jubata grass or pampas grass, iceplant, and narrow-leaved iceplant. The abundance of these species on the ROW must be no greater than on adjacent areas of Lucian central coast scrub not disturbed by construction and should not threaten continued recovery of native vegetation after year 2 toward equivalency with adjoining vegetation not disturbed by the project.

These criteria will be evaluated during monitoring and may be revised to take into account any unusual conditions, such as drought, and to incorporate the latest standards generally acceptable

to the local scientific community. Measurements documenting achievement or non-achievement of objectives shall be taken in representative locations, to be recorded on the Environmental Drawings, using an objective method (e.g., transects or quadrats). The method(s) selected and any proposed changes to the objectives shall be submitted to CDFG for approval prior to implementation.

Other Considerations

Coast live oaks will be planted at appropriate sites within areas treated with Lucian Central Coast Scrub, including portions of the Campbell and Mendez properties. These locations are shown on the revegetation drawings.

3.4 Venturan Coastal Scrub

As represented in the project area, Venturan coastal scrub is a simple shrub community dominated by either *Baccharis pilularis* (coyote brush) or *Artemisia californica* (coastal sagebrush) or by a combination of the two species. Venturan Coastal Scrub exists along the ROW in scattered patches (most of them small) in heavily grazed areas or on slopes leading into intermittent drainages within areas of introduced grassland. Associated species are introduced annual grasses and native and introduced herbs typically found in areas of introduced annual grassland. Shrub cover ranges from sparse (less than 20 percent) to locally relatively dense (70 to 80 percent). The shrubs in some cases appear to have colonized previously disturbed rangeland or agricultural sites, or, in the case of slopes along intermittent drainages, the shrubs appear to be remnants which have escaped ranch management attempts to promote grass and discourage shrub growth.

Location

Approximately 9 acres will be revegetated in Schedules B and C, primarily on the banks of drainages. Small scattered patches dominated by coyote brush that occur in heavily grazed grassland or along fences will not be revegetated with scrub species (see Other Considerations section below).

Seeds to be Planted

Artemisia californica is added to the grassland mix (Table 5).

Table 5
Preliminary Seeding Rates for Venturan Coastal Scrub

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	1.6	487,500
Bromus hordeaceus	6.5	218,000
Trifolium hirtum or *T. incarnatum*	1.0	129,200
Vulpia myuros	2.5	594,000

Note: 1. PLS = pure live seed

Methods of Seed Planting

As described above for chaparral (see section 3.1).

Other Types of Propagation to be Undertaken

Not applicable.

Special Requirements of Plantings

Not applicable.

Monitoring and Maintenance

Monitoring and maintenance will be the same as described above for Lucian Central Coast Scrub (see section 3.3). Monitoring schedule will be as described in Table 1.

Weed control methods and timing will be as described above for chaparral (section 3.1) except that noxious weeds commonly associated with annual grasslands, such as thistles and mustards, could be a problem in this community. Depending on the nature and timing of the infestation, mowing, weed whacking, or herbicidal control may be effective and the choice of method will be made by the project restoration specialist. Where serious weed infestations exist on or adjacent to the ROW prior to construction, weed control efforts will be directed at tipping the balance toward reestablishing native vegetation, but extraordinary efforts will not be made to keep the area weed free.

Performance Criteria

Goals and objectives for this community listed below are as described for Lucian Central Coast Scrub with modifications made to reflect that grasses and annual herbs are expected to make up a substantial part of the ground cover and that shrub composition in this community is limited to one or two species.

Goal: Establish self-regenerating shrub-grassland ecosystem within the ROW that is effective in long-term soil stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds or of non-local genotypes of native species. The vegetation should gradually develop the characteristics existing on the site prior to project disturbance.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.
- Percent ground cover by vegetation (including non-native annuals) exceeds 50 percent after the second growing season. Density of native perennial plant species is equivalent to adjacent areas; native perennial plant species are in vigorous condition and show evidence of active growth during appropriate growing seasons. Bare patches exceeding 1 square foot in area are generally absent (except where caused by recent animal activity).
- No concentrations of weeds are present that would threaten to invade adjoining native habitats. Examples of weeds that would pose a threat to adjoining habitats include various thistles and mustards, where they are not well-established off the ROW. The abundance of these species on the ROW must be no greater than on adjacent areas of Venturan Coastal Sage Scrub not disturbed

by construction and should not threaten continued recovery of native vegetation after the end of the monitoring period toward equivalency with adjoining vegetation not disturbed by the project.

These criteria will be evaluated during monitoring and may be revised to take into account any unusual conditions, such as drought, and to incorporate the latest standards generally acceptable to the local scientific community. Any proposed changes shall be submitted to the CDFG for approval prior to implementation.

Other Considerations

In many areas this community is represented by sparse stands of coyote brush, where the coyote brush appears to be colonizing introduced grasslands. Such areas have been designated for revegetation using the same treatment as for introduced grassland and are not included in the acreage of Venturan coastal scrub to be revegetated. In these areas, the coyote brush will not be deliberately included in the seed mix but is expected to colonize the ROW rapidly by seed that disperses from adjoining areas beginning in the first rainy season. Small occurrences of communities dominated by coastal sagebrush and/or coyote brush judged to be low quality habitat (e.g., where the ROW is adjacent to a fenceline and is bordered by this community) will be treated as grassland and allowed to revert gradually to shrub domination by recolonization from adjoining areas.

3.5 Non-Native Grassland

Non-native grasslands are the most common plant community along the pipeline corridor. Grasslands occur abundantly in the ROW along Highway 246 and eastward, in a region used for cattle grazing (Schedules B and C). They are dominated by species of non-native annuals such as *Bromus diandrus* (ripgut brome), *B. hordeaceus* (soft chess), *Avena fatua* (wild oat), and *Vulpia myuros* (rattail fescue). There are patches of grasslands along Schedule A in areas that were formerly Burton Mesa chaparral that have been cleared. Non-native grasslands in Schedule A are commonly dominated by *Ehrharta calycina* (veldt grass), and sometimes *Bromus hordeaceus* and *Vulpia myuros*.

Location

Along much of the route in Schedules B and C (62 and 84 acres, respectively) and occasionally in Schedule A (64 acres).

Seeds to be Planted

The revegetation contractor will apply 10 lbs/acre of grassland seed mix for drill seeding, or 20 lbs/acre for other application methods, to the entire work area, prior to spreading mulch or weed-free straw for erosion control, at locations the construction contractor did not seed (see revegetation drawings). Acceptable methods of seed application include hydroseeding, drill seeding, and hand broadcasting with raking to mix into soil surface. Seed to be used is commercially available, not locally harvested.

Species and application rates are 65 percent (by weight) *Bromus hordeaceus* (= *B. mollis*), 25 percent *Vulpia myuros* (= *Festuca megalura*, Zorro fescue), and 10 percent *Trifolium hirtum* or *T. incarnatum* (rose or crimson clover). These application rates are provided in Table 6.

The species specified in the mix are commonly used in erosion control plantings and in revegetating non-native grassland habitats and are widely naturalized in the region including

along the pipeline corridor (*Bromus* and *Vulpia*), or have little likelihood of persisting and invading undisturbed habitats off of the corridor (*Trifolium*).

Table 6
Preliminary Seeding Rates for Non-Native Grasslands

Species	*Application Rate PLS Pounds/Acre*
Bromus hordeaceus (=*B. mollis*)	6.5
Trifolium hirtum or *T. incarnatum*	1.0
Vulpia myuros	2.5

Other Types of Propagation to be Undertaken

Not applicable.

Special Requirements of Plantings

Not applicable

Monitoring and Maintenance

During the first year following construction, monitoring will be conducted February/March and May (Table 1), or more frequently at the discretion of the revegetation specialist. In subsequent years monitoring will be conducted annually in the spring. Monitoring will be conducted with sufficient frequency to enable timely reseeding and slope repair, as necessary, and to detect incipient weed problems.

The objectives of monitoring are to document cover by desirable species (planted species, native herbs and grasses, and non-native grasses that are not considered noxious weeds) and to identify the need for maintenance (e.g., erosion control, weed management, or reseeding). Maintenance will be conducted as necessary for erosion control and control of serious problem weeds.

Weed control efforts will focus on noxious weeds not well established in adjacent areas and will target black mustard (*Brassica nigra*), and a variety of non-native thistles such as *Cirsium vulgare*, *Carduus pycnocephalus*, *Silybum marianum*, sp., *Centaurea* spp. as well as the species described above under chaparral. Efforts will focus on tipping the balance toward a healthy cover of desirable grasses and herbs by selective mowing or weed whacking or spot treatment with non-persistent herbicides rather than attempting complete eradication of target species.

Performance Criteria

Goal: Establish self-regenerating grassland ground cover that is effective in long-term slope stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.

- Percent ground cover by desirable (as defined above under Monitoring and Maintenance) vegetation is approximately 60 percent or, if less, is equal to or greater than preproject conditions.

- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction. Examples of weeds that would pose a threat to adjoining habitats include veldt grass (where it is not already well-established), jubata grass or pampas grass, iceplant, narrow-leaved iceplant, russian-thistle, thistles, and black mustard. The abundance of these species on the ROW must not be substantially greater than on adjacent areas not disturbed by construction.

Other Considerations

Not applicable

3.6 Native Grasses and Herbs

Native perennial grasses particularly *Nassella (=Stipa) pulchra* (purple needlegrass) and *Hordeum brachyantherum* (meadow barley) occur in dense to scattered patches along the pipeline route in larger areas of non-native grasslands. In mapped areas of denser establishment of native grasses, plants will be salvaged from the area to be trenched and replanted after construction at the same location. Alternatively, transplants may be grown from site-specific seed collections. Care will be taken to minimize damage to native grasses outside the trenched area so that they will be able to resprout after construction.

In some areas there are wild flowers including such species as *Castilleja exserta* (purple owl's clover), *Sisyrinchium bellum* (blue-eyed grass), *Cryptantha* spp. (popcorn flower), *Amsinckia* spp. (fiddleneck), and *Lupinus* spp. (lupines) in some years. These species will not be collected and redistributed where they occur because success of revegetation by seeding is expected to be negligible compared the very high cost of such an effort. The salvage and replacement of topsoil are expected to preserve much of the seedbank, rhizomes, and bulbs. Loss of or damage to seed in areas that are not trenched is expected to be minimal. Due to the linear nature of the disturbance, seeds of native herbs are also expected to colonize from adjacent areas following construction.

Scattered locations along the route support patches of native hydrophytic vegetation, dominated by *Juncus phaeocephalus* (brown-headed rush). These patches, which range in size from less than 100 square feet to less than 0.25 acre, are presumed to be associated with slight depressions or poorly drained soils and are typically surrounded by non-native grasslands.

Location

In small patches along Schedules B and C and occasionally in Schedule A (about 0.8 acre total).

Seeds to be Planted

The grassland seed mix (see section 3.5) will be applied at 20% of the rate for non-native grasslands to areas indicated as G&N in the revegetation drawings. Acceptable methods of seed application include hydroseeding, drill seeding, and hand broadcasting with raking to mix seed into the soil surface. Seed mixes to be used are commercially available. Seed will not be applied to areas of hydrophytic vegetation.

Other Types of Propagation to be Undertaken

Prior to construction at locations shown on drawings, density of plants within the area to be trenched will be determined, and plugs or whole plants of native grasses will be salvaged. These will be transported to a nursery for maintenance and replanted in the same area after construction. Plants from separate populations along the corridor will be labeled and keyed to the area from which they were removed, so they can be replanted in the same area. Alternatively, seedlings will be grown from site-specific seed collections for outplanting the following fall/winter.

Grasses will be replanted and watered in during the fall after the soils have been saturated by seasonal rainfall.

In patches of hydrophytic vegetation (brown-headed rush), the top 12 inches of soil will be salvaged and stockpiled for replacement on the ROW after construction. The construction contractor will attempt to restore the topsoil and topographic conditions at these sites (see construction specifications). Brown-headed rush and associated species, if present, are expected to resprout from perennial rhizomes, seed, or other plant parts contained within the top 12 inches of soil.

Special Requirements of Plantings

Supplemental watering for native grasses may be necessary during dry spells during the first growing season. The revegetation specialist will determine when and where supplemental water will be provided. Temporary fencing may be erected around native grass plantings for a minimum of one rainy season to exclude cattle where plantings occur on grazed lands.

Monitoring and Maintenance

During the first year following construction, monitoring will be conducted in February/March, May/June, and October (Table 1). Subsequent monitoring will be conducted annually or more frequently as deemed necessary by the revegetation specialist.

The objectives of monitoring will be to document cover by desirable species (planted species, native herbs and grasses, and naturalized non-native grasses that are not considered noxious weeds), to document survival of native grasses, and to identify the need for maintenance (e.g., erosion control, weed eradication, or reseeding). Maintenance will be conducted as necessary for erosion control and eradication of serious problem weeds.

Weed control methods and timing will be as described above for non-native grassland (section 3.5), except that special attention will be paid to suppressing weed growth around the reestablishing native grasses.

Performance Criteria

1. Native Grasses

Goal: Establish self-regenerating native grass populations within non-native grassland. Overall ground cover (native grasses as well as non-native grassland species) must be effective in long-term slope stabilization and erosion control and must not pose a threat to adjoining plant communities as a source of weeds or non-local genotypes of native species.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.

- Native grasses are well-established, exhibiting vigorous growth and producing seed.

- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction. Examples of weeds that would pose a threat to adjoining habitats include veldt grass (where not already thoroughly established), jubata grass or pampas grass, iceplant, narrow-leaved iceplant, thistles, and mustard. The abundance of these species on the ROW must be no greater than on adjacent areas not disturbed by construction.

2. *Brown-headed Rush*

Goal: Establish self-regenerating vegetative cover dominated by brown-headed rush that is effective in long-term slope stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds or non-local genotypes of native species.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.

- Cover of hydrophytic vegetation, especially *Juncus phaeocephalus* and *Juncus bufonius* is sufficient to exclude dominance by non-native grasses.

- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction.

Other Considerations

If preproject soil and hydrologic conditions are not successfully restored in areas dominated by hydrophytic vegetation prior to construction, performance criteria will be as for non-native grassland. If hydrology is restored, but regrowth of natives is unsuccessful, rhizomes of *Juncus phaeocephalus* will be transplanted from neighboring sites as directed by the revegetation specialist.

Volunteer organizations will be contacted to help with some of the labor-intensive work associated with reestablishing native plant communities. A qualified biologist will be present and supervise all volunteer activities.

3.7 Freshwater Marsh

Only one freshwater marsh area is crossed by the ROW. This is located at Zanja de Cota Creek. The marsh is less than 1 acre in area, established by siltation at the upper end of a man-made impoundment. The marsh is dominated by three species: *Scirpus* sp. (bulrush), *Anemopsis californica* (yerba mansa) and *Typha* sp. (cattail). *Rubus ursinus* (blackberry) and *Salix* sp. (willow) are also present in small patches. An area up to 60 feet wide centered on the pipeline will not be graded to preproject contours. This swath will be left 2-3 feet deeper than the adjacent sediment-filled marsh to act as a sedimentation basin. This area will be maintained by the landowner under permit from CDFG.

Location

About 0.8 acre was disturbed during construction near the eastern edge of Schedule C plus 0.2 acre each in schedules A and B.

Seeds to be Planted

Not applicable.

Other Types of Propagation to be Undertaken

The top 12 inches of soil will be salvaged and replaced and the original contours will be restored (except for a maximum of 60 feet wide swath over the pipe as described above. Native vegetation is expected to resprout from perennial rhizomes and rootstocks contained within the top 12 inches of soil.

Special Requirements of Plantings

Not applicable.

Monitoring and Maintenance

During the first year following construction, monitoring will be conducted in March/April and September/October (see Table 1). Subsequent monitoring will be conducted annually during the spring, unless more frequent monitoring is judged necessary by the revegetation specialist. The objectives of monitoring will be to document cover by native hydrophytic species and to identify the need for maintenance (e.g., erosion control, weed eradication, or replanting).

Maintenance will be conducted as necessary for erosion control and eradication of serious problem weeds. Persistent perennial weeds (e.g., tamarisk and castor bean) that would interfere with revegetation goals will be removed annually. Poison-hemlock will be treated at least once annually with herbicide or manual treatment to minimize its competitive effect. Annual and non-persistent perennial weeds, such as rabbitsfoot grass (*Polypogon monspeliensis*), may be cut back or removed, as determined necessary by the project revegetation specialist.

Performance Criteria

Goal: Establish long-term, self-regenerating marsh cover.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to water erosion.
- Cover of native marsh vegetation is approximately the same as preproject, except in ponded area (sedimentation basin).
- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction.

Other Considerations

Not applicable.

3.8 Valley Oak Woodland

Replanting will be required to mitigate unavoidable loss or damage to a few valley oaks in Schedule C adjacent to Zanja de Cota Creek. Replanting will be as described below for coast live oaks (section 3.9). These will be planted in introduced grassland in the same area.

3.9 Coast Live Oak Woodland and Coast Live Oak Forest

Coast Live Oak Woodland and Forest communities are dominated by the woody evergreen species *Quercus agrifolia* (coast live oak). Oak trees are slow growing and live to ages well over 100 years; peculiar multi-trunked forms of coast live oak dominate oak communities in the Burton Mesa area. Coast live oak woodland and forest are similar communities and differ essentially in the spacing of the trees. In woodland communities, the tree canopies generally meet one another but do not overlap, whereas in the denser oak forest communities the canopies tend to overlap.

Oak trees that are removed will be replaced using one or more of the planting methods described below. Oaks will be planted along the ROW adjacent to, but not directly over the pipeline, and in ecologically appropriate sites within or adjacent to existing Coast Live Oak Woodland or Forest. Oaks will not be planted directly over the pipeline to avoid damage to the pipeline and due to the possibility of future inspection, maintenance or repair activities related to the pipeline. Oaks that become established over the pipeline as a result of natural reseeding may be removed by CCWA as it deems necessary and appropriate.

Location

Coast live oak woodland and forest communities occupy 4.5 acres in Schedule A, 1.6 acres in Schedule B, and 1.6 acres in Schedule C.

Seeds to be Planted

Acorns (seeds) will be collected from a number of healthy individual trees located in the immediate vicinity of the trees which were removed. Collection will occur in the fall when the acorns are ripe. Acorns will be float-tested for viability, those acorns that float in water are usually discarded, but may be used if a shortage exists. Acorns will be stored until planting in moist peat moss in sealed plastic bags in a dark refrigerator for up to 6 months. Planting will be conducted as soon as soils become saturated from seasonal rainfall.

Grassland, coastal scrub, or chaparral seed mixes will be applied as appropriate to form a matrix vegetation. Shade loving species typical of coast live oak understory will not be planted. These are expected to gradually invade from adjacent areas as the planted and resprouting oaks get large enough to provide appropriate conditions. We also expect some resprouting of these species from preserved below-ground structures and the seedbank.

Methods of Planting

Seed for the matrix vegetation will be broadcast and incorporated into the soil as described for chaparral, Lucian Central Coast Scrub, or non-native grassland. Acorns will be planted in prepared "planting spots" at which the soil has been loosened. Protection from burrowing and browsing mammals will be provided as described below and in Section 4. Generally 5 acorns will be planted at each spot. Spacing between spots will range from 5 feet (when a coppice like growth of oaks is desired, as in Burton Mesa chaparral) to 15 feet (when a more open woodland is desired).

Other Types of Propagation to be Undertaken

Acorns will be contract-grown by a qualified commercial grower in appropriate deep tube containers, using accepted precautions to prevent root-coiling. These oaks will be outplanted during the second growing season after construction, after the soil has become saturated by seasonal rainfall.

Special Requirements of Plantings

Plant spots and/or seedlings will be grouped in naturalistic arrangements where feasible and enclosed in a 42-inch high protection fence. At the revegetation specialist's discretion, in consultation with the PEPM, fencing may be used to exclude large animals from an entire oak planting area with individual protection against smaller animals supplied at each planting spot or robust protective devices will be placed at each spot. The fence will protect growing seedlings from being trampled by wildlife and will help to minimize browsing of the seedlings by ruminant animals. Shade cloth may be used in conjunction with the protective structure. Additional protection within the larger fenced area will be provided against rodents and burrowing animals. Mulch will be provided to discourage weed growth. Drip irrigation may be used to supplement natural rainfall for up to 2 years or as judged necessary by the project restoration specialist.

Monitoring and Maintenance

Monitoring of the matrix vegetation in the oak woodland and forest communities will be conducted as appropriate dependent upon the seed mix used. Trees will be evaluated in May and October for 5 years (see Table 1), with additional visits in the summer of early years to determine the need to initiate supplemental irrigation (if not already in place). Acorn plantings and oak seedlings will be specifically inspected and evaluated for size and vigor, condition of the basin and protective fencing, need for continued irrigation, weed growth near seedling, insect infestations, and other factors (e.g., presence of grazing animals or gophers) that might affect their survival. Oaks present along the pipeline ROW that were saved or trimmed with the intent to save them shall also be inspected to ensure health and/or recovery. The frequency of inspection and maintenance may be adjusted by the PEPM in consultation with the project restoration specialist.

Maintenance for oaks will consist of weeding the vicinity of the planting spots, repairing the protective structures, and supplementing rainfall with drip irrigation or by hand watering. Fences or protective structures will be removed after three years or when, in the revegetation specialist's judgment, the plants are large enough and vigorous enough to withstand herbivorous animals. Fence height may be augmented should deer browsing become a problem.

Weeds will be controlled by a combination of approaches depending upon site characteristics, accessibility, and site-specific efficacy. Mechanical/manual means of weed control (weed whacking, hoeing, or hand pulling); non-persistent herbicide; and synthetic weed mat (a woven mat permeable to water and air but which tends to choke germinating weeds) may be used in combination with a mulch covering to suppress weed growth in the vicinity of planting spots.

Remedial action will be taken as judged necessary by the project restoration specialist in consultation with the Project Environmental Program Manager (PEPM).

Performance Criteria

1. Oak Forest and Woodland Habitat Restoration

The performance criteria will be as appropriate for the seed mix used to establish the matrix vegetation (e.g., grassland, Lucian Central Coast Scrub) for these communities.

2. Oaks

Goal: At acceptance, planted oaks should be able to survive indefinitely without further protection or maintenance. Young trees must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially deer. Oaks planted near streams should be situated in such a way as to be able to survive normal seasonal flooding.

Objectives: Within approximately 5 years, planted trees should meet the following criteria:

- have vigorous appearance
- be a minimum of 2 inches in basal diameter
- be a minimum of 6 feet tall
- have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

At acceptance, the required number of planted oak trees, an average of five saplings (5 years after planting) per tree lost (with a trunk diameter of 2 inches or more) shall have met the above-outlined criteria. These criteria will be evaluated during monitoring and may be revised to take into account any unusual climatic conditions, such as drought, and the latest standards generally acceptable to the local scientific community. During drought years, irrigation may be provided during the normal rainy season (November through April) to make up for precipitation deficits and ensure continued growth and survival of the plants. Any changes shall be submitted to CDFG for approval prior to implementation.

Other Considerations

Not applicable.

3.10 Impoundments and Disturbed Areas

Areas mapped with these designations will be revegetated as for non-native grasslands unless (1) other arrangements have been made with the landowners or (2) the area is paved or otherwise inhospitable to plants (e.g., gravel road surface).

3.11 Agriculture and Introduced Forest

Areas mapped with these designations will receive no revegetation treatment.

4.0 SENSITIVE SPECIES REVEGETATION METHODS

4.1 Sand Mesa (Shagbark) Manzanita

Sand mesa manzanita will be revegetated with Burton Mesa chaparral as described in section 3.1, Chaparral.

4.2 Purisima Manzanita

La Purisima manzanita may be propagated from cuttings or seed for replanting at specific sites along the pipeline corridor that can be easily accessed for monitoring or maintenance. It may also be directly seeded at specific sites along the ROW.

4.3 Hoover's Bentgrass

No revegetation is recommended for Hoover's bentgrass because its presence along the corridor is limited to a few individuals in one location.

4.4 Parry's Delphinium

No revegetation is recommended for Parry's delphinium because it is not expected to be impacted in the areas outside the trench (rhizomes will survive underground and come back up in subsequent years).

4.5 Black-Flowered Figwort

Seed from individual black-flowered figwort plants encountered at two locations along the ROW was collected and reseeded in the same location after construction. Both this and the widespread California figwort (*Scrophularia californica*), which is common along the corridor and with which the black-flowered figwort hybridizes, are expected to regenerate readily and rapidly after construction from the seedbank and possibly from the bases of pre-existing plants.

4.6 Coast Live Oak

Direct Planting: Viable acorns will be planted directly in the ground after soils have become saturated by seasonal rainfall. Acorns will be planted in "planting spots" of 5 acorns each. Soil will be loosened, if hard, and acorns will be placed on their sides and pressed into the soil. A covering of tree chippings, commercial mulch, and/or a synthetic weed mat may be used to lightly cover the plant spots.

Transplant: Acorns will be planted immediately after collection in 1-gallon size, long tube containers. The seedlings are then container grown for one full year prior to planting in the field. The seedlings will be transplanted to larger, long tube containers as necessary to ensure healthy tap root formations and to guard against plants becoming "root-bound."

A variation of this method is to hold the acorns under refrigeration in moist peat moss for 4 to 6 months to inhibit germination until early spring. At this time, the acorns will be planted in 1-gallon size, long tube containers. Acorns under refrigeration will be checked regularly and any acorns which have germinated early will be planted in containers immediately. The acorns will be allowed to grow in these containers for 6 to 8 months prior to being planted in the field. This method is based on the reasoning that smaller container grown seedlings with only six to eight months growth should be able to establish themselves more successfully when planted in the field than seedlings grown for longer periods of time in containers.

The container grown seedlings are planted in the field in plant holes that are twice the diameter of the container and a minimum 6 inches deeper. Planting holes are backfilled with native soil and a basin 18" in diameter with a 3-inch high earth berm is constructed around each seedling. Basins will be lightly covered with tree chippings or commercial leaf mulch. A synthetic weed mat will be used in conjunction with mulch at selected locations.

Acorn planting spots and transplanted seedlings will be protected using a number of alternative methods dependent upon site-specific conditions. Methods that may be employed will be consistent with recommendations from the California Integrated Hardwood Range Management Program.

4.7 Valley Oak

Revegetation for valley oaks will be the same as for coast live oaks.

5.0 REVEGETATION MONITORING PLAN

5.1 Introduction

This revegetation monitoring plan augments the monitoring described in section 3.0 and is to be used in conjunction with that monitoring. The monitoring plan has been developed to fulfill the California Department of Fish and Game (CDFG) conditions of approval for the Revegetation Plan. In addition to the monitoring described below, CCWA will develop specific notes for the revegetation monitors and place them on the revegetation drawings for use in the field.

5.2 Chaparral Special Studies

Several experimental studies will be performed to determine the effectiveness of vegetation protection measures implemented by the contractor during construction and of revegetation methods required by CDFG.

The chaparral special studies include assessing the effectiveness of (1) cutting chaparral shrubs in areas not trenched or graded, but where topsoil and spoil were stored, to allow resprouting, (2) reseeding, and (3) charate application to enhance seed germination. (Charate is material leached from charred chaparral shrub wood that has been shown in laboratory experiments to stimulate germination of native chaparral fire-following species.) The experimental studies will be conducted in blocks across the pipeline corridor as described below.

Two blocks approximately 100 feet long (parallel to the pipeline) and the width of the pipeline corridor have been set up in chaparral areas (Figure 2). Half of each block (divided perpendicular to the pipeline) will be seeded with the prescribed seed mix and the other half will not be seeded. There will be a strip 5 to 25 feet wide in both the seeded and unseeded plots onto which a charate will be applied. Blocks and plots within them will be clearly marked and labeled.

Blocks have been established in areas where Burton Mesa chaparral exists on both sides of the pipeline right-of-way (ROW) in relatively flat areas to limit the potential for erosion problems. Based on these criteria, locations that were not seeded are at station 14+70 to 15+30 and 317+40 to 318+00.

The experimental plots in the ROW cleared of chaparral and adjacent uncleared areas (reference locations) will be visited annually during the regularly scheduled revegetation monitoring and evaluated. Information on quantity and cover of plants from seed and resprouting shrubs will be recorded from each plot. If the unseeded areas appear to be poorly vegetated after 2 years of monitoring and erosion problems in future are likely, remedial measures such as seeding and installation of erosion control devices will be undertaken.

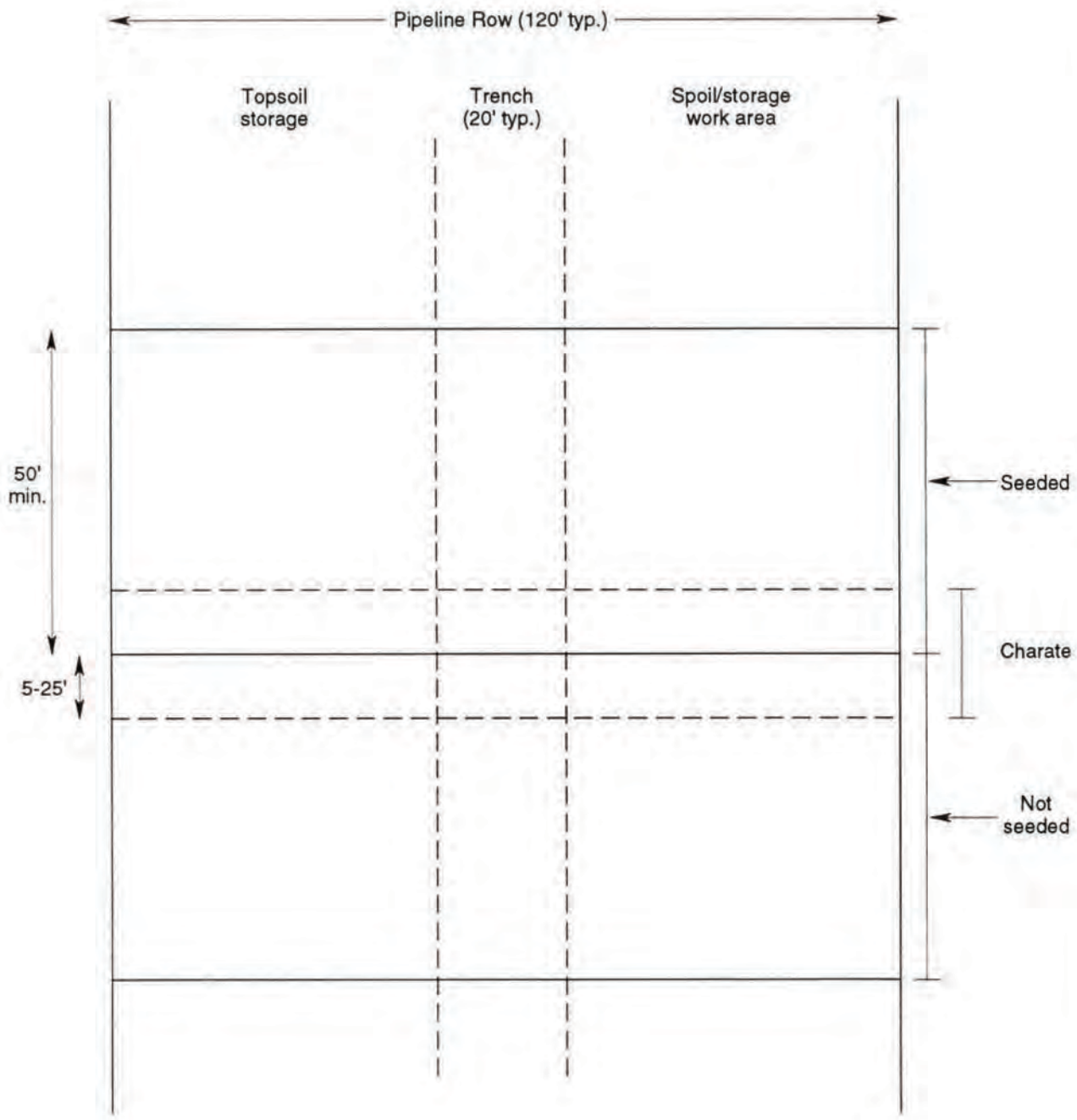

Figure 2

SCHEMATIC DRAWING OF CHAPARRAL SPECIAL STUDIES BLOCK

5.3 Chaparral and Scrub Monitoring

Three 1-meter wide belt transects have been established across the ROW (outside the special study areas) in Burton Mesa chaparral at approximately stations 14+00, 317+00, and 476+50 plus 477+50. The latter two transects cross the ROW where it has been narrowed and where it burned on 10 October 1994. Six transects were established in coastal scrub at approximately stations 262+00, 335+00, 401+00, 465+00, 912+00, and 1109+00. These transects will be perpendicular to or diagonally across the ROW so that the minimum length is 30 meters, and they will extend into the undisturbed vegetation outside the ROW. The exact locations for the transects have been selected in the field to take into account as built conditions. More transects are set up in the coastal scrub than in Burton Mesa chaparral because two types of coastal scrub are present in relatively large patches while Burton Mesa chaparral areas within the corridor large enough to accommodate a transect are limited. The transects will be marked for reference during the entire monitoring period (3 to 5 years), and the locations will be mapped on the revegetation drawings. In addition, shorter transects (generally 20 meters or less in length) or plots (1 to 10 meters on a side) will be established within some of the Burton Mesa chaparral patches that are too small for the 30-meter long transects. The locations of these sampling locations will be selected using as built vegetation maps since the construction contractor has been able to narrow the corridor in many locations. All shrubs within each transect, or plot, will be mapped and cover by each species will be determined.

All resprouts of sand mesa manzanita (*Arctostaphylos rudis*) from the locations recorded in the Preconstruction Survey Report will be recorded and monitored for growth. Those not resprouting or lost due to trenching will be replanted during the fall of 1995 from plants grown in a nursery from locally collected cuttings and/or seed. The planting ratio will be sufficient to ensure a 1:1 replacement at the end of 5 years.

Ceanothus shrubs were abundant within the ROW only in the chaparral near Bishop Road. Seedlings germinated from the topsoil seedbank will be recorded for the chaparral between station 10+00 and 15+00.

5.4 Riparian Areas

Riparian areas such as at Unnamed A, Zanja de Cota, and Santa Rosa Creek that supported riparian shrubs and trees or freshwater marsh will be monitored regularly. Height, cover, vigor, and DBH of trees and shrubs will be measured and recorded at least annually in the fall. Cover and vigor of other native species and of weeds will be recorded as well, and any weed infestations, particularly invasive species like giant cane (*Arundo donax*) or castor bean (*Ricinus communis*), will be eradicated. The sites will be photographed.

5.5 Monitoring Frequency and Schedule

The entire pipeline route will be monitored as presented in Table 1. This includes monitoring for erosion and weed infestation. Any changes to this schedule will be at the discretion of the revegetation specialist. Substantive changes will be forwarded to CDFG for approval. Some situations that could lead to changes in the monitoring schedule include frequent heavy rains (requiring additional field visits to determine the effectiveness of erosion control devices) or an unusually late rainy season (requiring spring monitoring to occur later than originally scheduled).

5.6 Performance Criteria Assessment

Field monitors will record key revegetation information such as species present, cover of individual species, overall cover, and presence and abundance of weeds. The data collected will

be entered into a database and then be compared to the performance criteria to determine if attainment has been reached and, if not, to estimate the additional time required to meet the criteria.

Oaks (both in Burton Mesa chaparral and in oak woodlands) will be replanted as directed in sections 3.9 and 4.6. The locations of all plantings will be marked on a copy of the plans. Each seedling, or planting location for acorns, will be assigned a permanent reference number. The type of cages, type of planting (acorns vs. seedlings), species, date of planting, and any other pertinent information will be recorded in a computer database. These sites will be periodically revisited during the regular revegetation monitoring to determine success of acorns and transplants, which will be recorded separately. Effectiveness of cages and weeding will be noted, and growth (height and trunk diameter) will be measured. If trees are shorter than 4.5 feet, basal diameter will be measured.

5.7 REPORTING

The annual reports will summarize data collected during the prior year, including the transect data from both coastal scrub and Burton Mesa chaparral, in graphical and/or tabular form, the plot data from Burton Mesa chaparral, growth and success of oak plantings and transplants, photographs of stream crossings, and tabular data on riparian tree/shrub survival and growth.

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FINAL

PLANT COMMUNITY REVEGETATION TECHNICAL MANUAL FOR REACHES 5B AND 6 AND TANK 5 OF THE COASTAL BRANCH, PHASE II

July 1995

Prepared for

Central Coast Water Authority
255 Industrial Way
Buellton, California 93427

Prepared by

Science Applications International Corporation
816 State Street, Suite 500
Santa Barbara, California 93101

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PLANT COMMUNITY REVEGETATION TECHNICAL MANUAL

1.0 INTRODUCTION

This manual provides the methodology to be used for revegetation of areas disturbed during construction of Reaches 5b and 6 and Tank 5 of the State Coastal Branch, Phase II, and criteria for use in evaluating the success of the revegetation program. Section 2 describes general approaches to revegetation, maintenance, and monitoring that are common to several plant communities. Section 3 describes the methodology for revegetation of plant communities specific to this project, and Section 4 contains revegetation procedures for selected plant species. The contents of this plan will be used to develop specifications to be used by the revegetation contractor and criteria to be used by compliance monitors.

2.0 GENERAL APPROACHES TO REVEGETATION

A key aspect to the success of this revegetation program has been the minimization of the area requiring replanting by minimizing the disturbed area, and by avoiding, to the greatest extent feasible, disturbance to sensitive and difficult-to-restore resources, including oaks, Burton Mesa chaparral, Nipomo Mesa chaparral, and riparian and wetland areas. Through a combination of mitigation-by-avoidance and providing financial incentives to contractors to minimize disturbance, the potential impacts to Burton Mesa chaparral, Nipomo Mesa chaparral, and oaks have been dramatically reduced compared to the original projections.

Sources of Seeds and Plant Materials

To preserve the integrity of local gene pools, ensure adaptation to site-specific conditions, and avoid inadvertent introduction of inappropriate species or pathogens, all seed and plant materials (cuttings, bulbs, etc.) of native species to be used for revegetation will be collected in the project area. Because the pipeline passes through two zones that are somewhat dissimilar ecologically, the site-specific seed collection area has been divided corresponding to those zones (Figure 1). Zone 1 covers the northern part of the route from near Arroyo Grande, San Luis Obispo County, to the south side of the Santa Maria River, Santa Barbara County. Zone 2 covers the area between the Santa Maria River and Tank 5 near Bishop Road on Vandenberg Air Force Base (VAFB). Seed and plant materials for the two different zones will be collected in the corresponding zone and stored separately. Appropriate areas for seed collection within these zones will be defined in the field, taking into account the following:

- Ecological similarity to the area to be reseeded
- Proximity to the pipeline
- Land ownership
- Accessibility
- Abundance and collectability of target species
- Need to ensure genetic diversity of source material (i.e., seed should be collected from a diverse sample of the parent plants within the collection zone)

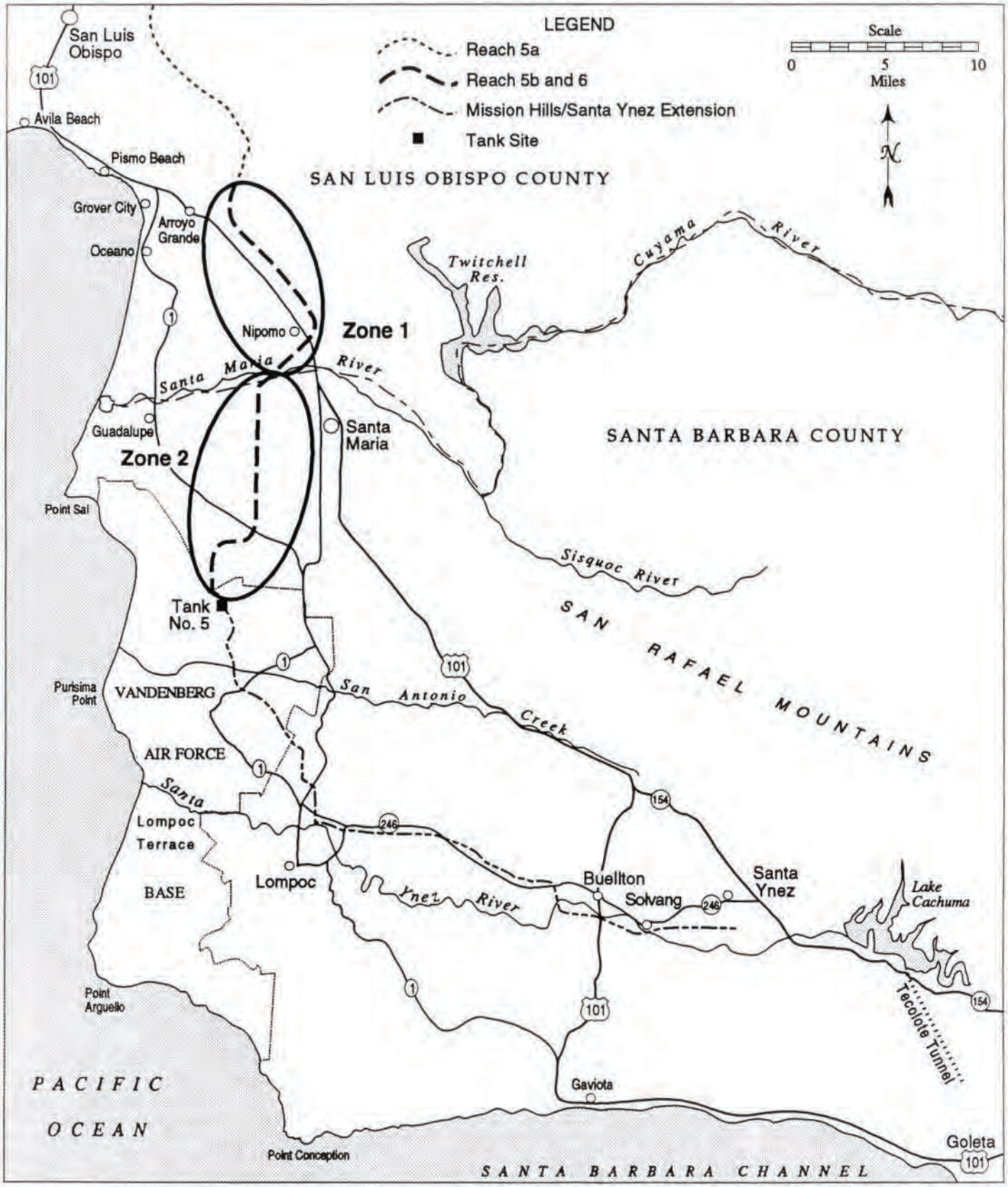

Figure 1

SEED COLLECTION ZONES FOR REACH 5B AND 6

Seed Mixes

Acreages presented in the text for each plant community represent the actual acreages calculated from preconstruction survey mapping. Acreages used to calculate seed for collection deviate from these numbers slightly because small patches of one vegetation type within a much greater expanse of another vegetation type will be revegetated as the more prevalent type. For example, small patches of grassland and individual oak trees within a much greater area of coastal scrub will all be revegetated as coastal scrub, with individual oaks planted into it.

Since relatively few areas have a predominance of native woody vegetation (e.g., oak woodland and chaparral), specific seed mixes have been formulated for each location. Each seed mix will be applied to all woody vegetation types in that location and form a "matrix" vegetation.

Planting Methods

Planting methods will vary depending on community type and species to be planted. For a given plant community, planting methods will be the same for Zones 1 and 2 except that local seed and plant materials will be used.

Revegetation of chaparral and scrub communities will use broadcast seeding methods (e.g., hydroseeding or hand broadcasting), which allows a large number of species having a variety of seed morphologies to be planted. The seed mix to be used will be prepared and bagged in half-acre lots and broadcast over the pipeline construction right-of-way (ROW) followed by incorporation into the soil by raking, dragging a chain, or similar means if not hydroseeded following post-construction site cleanup and surface restoration. Additional species may be added later using other planting methods to reflect natural vegetation patterns. Other planting methods will be discussed under plant community revegetation methods in Section 3.0 below.

Grasslands will be drill seeded.

Monitoring, Maintenance, and Weed Control

After construction and prior to planting, a survey of the pipeline corridor will be conducted to inspect the integrity of the soil surface and to ensure that erosion control methods (water bars, straw, erosion control fabric, etc.) are in place. After planting, the objectives of monitoring will be to document establishment and growth of planted species, to identify the need for maintenance (including erosion and/or weed control), and to identify incipient weed problems. Incipient weed problems are defined as establishment on the treatment area of weedy species not abundant in adjacent areas that might, by establishment on the treatment areas, interfere with revegetation by native species or threaten to invade adjacent undisturbed habitats. Specifics are discussed under performance criteria for individual plant communities. Maintenance will be conducted as necessary to ensure that revegetation goals can met in a timely manner.

Monitoring, maintenance, and weed control methods and timing specific to the revegetation of the plant communities within the pipeline ROW are discussed in Section 3.0 below. Table 1 depicts a general monitoring schedule for each of the plant communities. The entire pipeline ROW and Tank 5 site will be monitored according to this schedule. Monitoring of specific areas will cease, however, when performance criteria are met. Seed planting will generally be done during the fall or early winter (1995) and monitoring will begin during that growing season. For this reason, 1996 is generally assumed to be the first year of the revegetation monitoring effort. For areas where construction is not complete prior to about April 1996, the first year of revegetation monitoring will be 1997. This schedule may be modified by the revegetation specialist or as necessary depending on site-specific conditions. Substantive changes in the

Table 1
General Revegetation Monitoring Schedule

	Post Construction	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Chaparral	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Mar/Apr[2] Oct[3]	May/Jun[3] Oct[4]	May/Jun[2] Oct[4]	May/Jun[2] Oct[5]
Riparian Communities	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[4]	Jun[2] Oct[4]	Apr/May[3] Sept[4]	Sept[4]	Sept[5]
Lucian Central Coast Scrub	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Mar/Apr[2] Jun[5]			
Venturan Coastal Scrub	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Mar/Apr[2] Jun[5]			
Non-Native Grassland	Oct[1]	Feb/Mar[2] May[3]	May[5]			
Native Grasses and Herbs	Oct[1]	Feb/Mar[2] May/Jun[3] Oct[2]	Apr/May[5]			
Freshwater Marsh	Oct[1]	Mar/Apr[3] Sept/Oct[3]	Jun[4]			
Oak Communities (Oak trees)	Oct[1]	Feb/Mar[2] May[3] Oct[4]	May[3] Jul/Aug[2] Oct[4]	May[3] Jul/Aug[2] Oct[4]	May[3] Oct[4]	May[3] Oct[5]

Notes:

1. Inspection -- done by CCWA (after completion of construction).
2. Visual surveys focusing on establishment of planted species and identifying potential weed problems.
3. Walk through and documentation of plant species establishment, vigor, and presence of weeds.
4. Inspect planted trees and shrubs for survival and vigor; possible need for replanting
5. Vegetation surveys to verify that performance criteria are met.

This schedule is subject to change depending upon a number of factors including: seasonal climate conditions; survival rate of planted species; rate and level of effort of maintenance activities; and as determined by the revegetation specialist.

Maintenance activities associated with the revegetation effort (such as erosion and weed control, protective devices, supplemental irrigation, replanting or reseeding, etc.), will also be scheduled and performed, as necessary, apart from this monitoring schedule.

schedule, such as a recommendation to omit a particular activity because it appears unnecessary, will be submitted to the California Department of Fish and Game (CDFG) for approval prior to implementation. In addition, while minor maintenance can be accomplished during monitoring, major maintenance efforts (such as erosion and weed control, supplemental irrigation, reseeding, or replanting, etc.) will be scheduled, as necessary.

Erosion Control

Clean, weed-free straw (wheat, barley, or rice) will be applied to the ROW, except in hydroseeded areas, at a rate that provides complete cover of the soil (up to 2 tons per acre) and will be held in place by punching, crimping, fiber netting, or other means. The construction contractor is preparing a Stormwater Pollution Prevention Plan, which includes an Erosion Control Sedimentation and Restoration Plan. These plans are subject to approval by the California Department of Fish and Game (CDFG).

Performance Criteria

Performance criteria are designed to ensure that a self-regenerating ecosystem is reestablished in the area of disturbance that is effective in erosion control and does not pose a threat to adjoining plant communities as a source of weeds or non-local genotypes of native species. The ultimate goal in areas of predominantly native plant communities is to return the disturbed area to a native plant community characteristic of the site prior to disturbance. Performance criteria are specific to community and species composition and are discussed in Section 3.0 below.

Field monitors will record key revegetation information such as species present, cover of individual species, overall cover, and presence and abundance of weeds. The data collected will be entered into a database and then be compared to the performance criteria to determine if attainment has been reached and, if not, to estimate the additional time required to meet the criteria.

Oaks (both in Burton Mesa chaparral and in oak woodlands) will be replanted as directed in sections 3.9 and 4.6. The locations of all plantings will be marked on a copy of the plans. Each seedling, or planting location for acorns, will be assigned a permanent reference number. The type of cages, type of planting (acorns vs. seedlings), species, date of planting, and any other pertinent information will be recorded in a computer database. These sites will be periodically revisited during the regular revegetation monitoring to determine success of acorns and transplants, which will be recorded separately. Effectiveness of cages and weeding will be noted, and growth (height and trunk diameter) will be measured. If trees are shorter than 4.5 feet, basal diameter will be measured.

Remedial Action

Whenever the performance criteria are not met or when monitoring indicates that additional erosion control or weed control actions are necessary, the project restoration specialist in consultation with the Project Environmental Program Manager (PEPM) shall determine what measures are required and make sure that they are implemented.

Reporting

Annual progress reports shall be submitted to CDFG by 1 January of each year during active restoration of monitoring. Reports shall provide a narrative description of the progress of the revegetation and shall provide qualitative and quantitative results of the monitoring. The report shall include an analysis of the monitoring data, recommendations, and identification of remedial actions, if necessary. Transect data and tree growth data shall be summarized in

graphical and/or tabular form. Photographs of stream crossings and other locations representative of specific plant community revegetation will be included in the reports.

Any substantive deviations from the approved plan proposed by the Central Coast Water Authority (CCWA), the PEPM, or the project revegetation specialist, shall be submitted to CDFG for approval prior to implementation.

CCWA may institute emergency changes of a substantive nature under exigent conditions but shall so notify CDFG within 5 days of said changes. No changes shall be made which could affect threatened, endangered, or rare species, or species of special concern without prior notification to and written approval from CDFG.

3.0 PLANT COMMUNITY REVEGETATION METHODS

3.1 Chaparral

The chaparral communities affected by the project, known as Burton Mesa chaparral and Nipomo Mesa chaparral, are considered to be sensitive plant communities. These maritime chaparrals are present on VAFB and in southern San Luis Obispo County, respectively. Remarkably, the dominant species within Burton Mesa chaparral includes two manzanita species and two species of ceanothus whose entire distribution is confined to portions of western Santa Barbara and adjacent San Luis Obispo counties and includes a number of additional species recognized as rare, threatened, or endangered. Prevalent species in the Burton Mesa chaparral community include *Arctostaphylos purissima* (La Purisima manzanita), *A. rudis* (sand mesa or shagbark manzanita), *Ceanothus impressus* (Santa Barbara ceanothus), *Ceanothus cuneatus* var. *fascicularis* (coast ceanothus), *Toxicodendron diversilobum* (poison oak), *Salvia mellifera* (black sage), *Quercus agrifolia* (coast live oak), *Adenostoma fasciculatum* (chamise), and *Rhamnus californica* (California coffeeberry). The two manzanita species in Burton Mesa chaparral are replaced by *Arctostaphylos wellsii* (Wells' manzanita) in Nipomo Mesa chaparral. Most of the native shrubs (including coast live oak and sand mesa manzanita) are perennials that have the capacity to resprout after fire or cutting. After fire or soil disturbance to the chaparral community, a large variety of native annuals and fast-growing, short-lived perennials germinate from seed or dormant bulbs stored in the soil providing erosion control and food and cover for wildlife.

To maximize natural regeneration of the community (resprouting of shrubs and germination of the existing seedbank), disturbance to sites supporting chaparral communities will be minimized. Instead of bulldozing to remove all vegetation, sites will be prepared for construction by cutting the vegetation at ground level or by "track-walking" it (flattening vegetation by driving a tracked vehicle over it), thereby minimizing disturbance to the burls, root systems, and the existing seedbank. This will be standard practice except directly over the trench or in areas requiring grading prior to construction. Where grading or trenching occurs, the topsoil will be salvaged and replaced.

Natural regeneration from resprouting and from native seedbank will be augmented by application of a seed mix consisting of native successional species. The seed mix for each chaparral community is designed to promote rapid establishment of native vegetative cover, provide long-term erosion control and wildlife habitat values, and inhibit establishment of invasive exotic species such as pampas grass and veldt grass. The seed mix will be composed primarily of successional perennials. These typically are fast-growing shrubs or sub-shrubs that characteristically appear in the first growing seasons following fire or other disturbance to chaparral. Many of these species are also found in coastal scrub communities, where they may be dominant species. These successional species are gradually overtaken by longer-lived and generally larger shrubs characteristic of the mature chaparral community. Replacement of the

initial vegetative cover by longer-lived chaparral shrubs becomes evident beginning 2 to 3 growing seasons after disturbance and continues rapidly for 5 to 10 years more with gradual changes thereafter.

The anticipated result of using the proposed mixes of successional species in combination with saving the seedbank and underground plant structures is greater native shrub cover in less time, minimizing the potential for erosion and weed establishment, and facilitating gradual reestablishment of the longer-lived chaparral species.

To meet specific regulatory requirements for replanting species such as coast live oak, Wells' manzanita, and sand mesa manzanita, plantings of these species will be made in the corridor beginning during the second growing season after construction. Outplanting these species during the second growing season after construction will minimize trampling of the reseeded ROW during the critical first growing season as seedlings and crownsprouts are beginning growth and are most vulnerable.

Location

The chaparral within the pipeline corridor has been subdivided into three classes. Class 1 chaparral (BMC1, or C1) includes areas that have very little evidence of disturbance (excluding fire) and are continuous with larger areas, covering several hundred square feet. Class 2 chaparral (BMC2, or C2) includes areas that are somewhat disturbed (i.e., have roads, trails, or populations of non-native species) or smaller fragments, but still have a high proportion of established chaparral species. Class 3 chaparral (BMC3, or C3) includes those areas that are either very small and isolated, or that support a low cover of typical chaparral dominants.

Approximately 0.6 acre of Class 1 Nipomo Mesa chaparal and 1.5 acres of Class 1 Burton Mesa chaparral will be cleared by construction of Reaches 5b and 6. Construction of Tank 5 will result in clearing of 7.0 acres of BMC1 and 0.9 acre of BMC3. Permanent losses at the tank site are estimated to be 1.8 acres of BMC1 and 0.5 acre of BMC3. These totals may be further reduced by contractors who may adopt construction methods further reducing the disturbance area in response to an innovative financial incentive structure developed by CCWA to reduce impacts on chaparral.

Seeds to be Planted

A relatively large number of species having a variety of growth forms is included in the mixes for chaparral (Tables 2 and 3). Having a variety of species increases the chance of successful establishment in any particular year because of species-to-species differences in conditions required for germination and establishment, and seasonal variability in environmental factors.

Species were included in the mixes based on their likely rate of establishment, prevalence in native communities in the local area (either as successional or dominant species), and erosion control and wildlife values. Species and application rates may be adjusted according to the availability of different species during the season of collection and new information that may develop. Selection of species to be added to the mixes would be based on the criteria listed above.

Species and application rates are listed in Tables 2 and 3. Specified seeding rates were based partially upon experience with these species in similar environments and take into account the measures being taken to preserve the existing seedbank. The application rate for each species was calculated from representative values of purity and germination for each species provided by S&S Seed (Guidelines for Seed Specifications, 1992 revision). Application rates may be reduced by up to 50% or more in areas not trenched, graded, or heavily compacted because chaparral

species in these area are expected to resprout from underground burls and from the existing seedbank.

Construction of the Tank 5 facility is expected to take approximately 12 months. Topsoil salvaged from the site will be stored separate from subsoils excavated during construction of the partially buried tanks. To minimize loss of stored soils, a cover crop of 100 lbs/acre of commercial barley will be seeded on the storage piles, and mulch (2,000 lbs/acre) will also be applied to the piles. Alternatively, the piles may be covered with a material that will prevent erosion. Site cleanup and restoration will include removal of topsoil and spoil storage piles. The berm around the tanks will be covered with topsoil and planted with the same seed mix used for Burton Mesa chaparral. Seeding will occur in the late summer or fall of 1996.

Seeding of the pipeline will likely occur in the winter (1995-96) after construction is complete. If completion of construction is delayed until the summer of 1996, seeding will occur in the fall along with seeding of the Tank 5 site.

Planting Methods

As stated previously, the seed mixes will be prepared in half-acre lots and broadcast over the ROW followed by incorporation into the soil by raking, dragging a chain, or similar means, or applied in a hydromulch matrix following post-construction site cleanup and surface restoration.

For the most part, the seeds of large woody plants are not included in the mix and will not be uniformly broadcast over the length of the ROW in the chaparral. This is done to avoid creation of a long-lasting artificial pattern on the landscape and also because of generally low establishment rates of these species from direct seeding. These species are expected to reestablish by gradual invasion from adjoining areas, resprouting from cut bases, and germination from the pre-existing seed bank. The product of this more natural recovery process is expected to eventually mirror the pre-existing vegetation pattern.

Table 2
Preliminary Seeding Rates for Burton Mesa Chaparral

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Ericameria ericoides	1.8	45,000
Artemisia californica	3.2	487,500
Lotus scoparius	2.0	243,000
Mimulus aurantiacus	2.0	350,000
Salvia mellifera	1.5	218,760
Eriophyllum confertiflorum	0.2	495,000
Nasella (= Stipa) pulchra	1.0	17,000
Eriogonum parvifolium	2.0	81,000
Lupinus spp. (annual)	1.0	N/A
Total	14.7	

Table 3
Preliminary Seeding Rates for Nipomo Mesa Chaparral

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Nasella (= Stipa) pulchra	3.0	17,000
Nasella (= Stipa) lepida	1.0	N/A
Rhamnus crocea	0.5	18,000
Mimulus aurantiacus	3.0	350,000
Artemisia californica	4.0	487,500
Lotus scoparius	2.0	243,000
Salvia mellifera	3.6	218,760
Eriogonum fasciculatum	5.0	29,250
Total	22.1	

Note: 1. PLS = pure live seed

Selected woody plants, including coast live oak, sand mesa manzanita, and Wells' manzanita will be planted separately in aggregations at specific sites along the ROW where they can be efficiently monitored and maintained if necessary. None of these species will be planted directly over the pipeline, although individuals that volunteer (except oak trees that can become large) generally will be allowed to grow there unless they need to be removed to access the pipeline for maintenance or repair. Planting spots for coast live oak will be spaced 5 to 10 feet on center, with the closer spacing intended to result in a coppice or thicket-like growth similar to that present in the project area. For coast live oak and sand mesa manzanita, the planting approach includes both direct seeding and transplanting nursery-grown plants. Methods for oak planting are described under Coast Live Oak Woodland and Forest (Section 3.9).

Other Types of Propagation to be Undertaken

Woody plants such as manzanita species and coffeeberry may be propagated in the nursery from cuttings for later transplanting if propagation of transplant stock from seeds is found to be impractical or unsuccessful.

Special Requirements of Plantings

Special measures such as providing mechanical protection of plantings from herbivory, use of shade cloth, and use of drip irrigation may be employed as recommended by the project restoration specialist for the establishment of coast live oak and other woody species.

Monitoring and Maintenance

During the first year after planting, monitoring will be conducted in February/March, May/June, and October (see Table 1) or more frequently as judged necessary by the project revegetation specialist. Additional visits may be required to detect and correct erosion following significant rainstorms. Subsequently, scheduled monitoring will be conducted generally in May/June and October. This schedule is preliminary and may be modified by the revegetation specialist with substantive proposed changes submitted to CDFG for review and approval.

Two 1-meter-wide belt transects will be established across the ROW in Burton Mesa chaparral at approximately stations 5323+00 and 5326+00. For the Tank 5 site, a minimum of one transect will be established across the spoil and topsoil storage areas, including across the areas trenched for yard piping. Revegetation of the berm around the tanks will be monitored through use of transects or plots. The transects (or plots) will be marked for reference during the entire monitoring period (5 years) and the locations will be mapped on the Revegetation Drawings. All shrubs within each transect or plot will be mapped, and cover by each species will be determined. Resprouts of chaparral shrubs will be recorded and monitored for growth.

The objectives of monitoring will be to document germination and growth of natives and to identify the need for maintenance (e.g., erosion control, weed eradication) or replanting. Establishment of plants from seed vs. resprouting will be documented by species. Supplemental irrigation, if employed, will be stopped three years prior to the end of the monitoring period. Maintenance will be conducted as necessary for erosion control and eradication of serious problem weeds.

Weed control will focus on species that (1) have the potential to interfere with the reestablishment of native vegetation in the ROW (as used here ROW is synonymous with construction corridor and includes actual trenched areas as well as adjacent areas where preexisting vegetation has been removed by construction) and (2) that are not already so prevalent in areas immediately adjacent to the ROW as to preclude reestablishment of a long-term, self regenerating native vegetation cover. Weeds will be removed manually where practical. Herbicides will be used to control larger weeds or infestations. All herbicide use will be monitored by a qualified biologist and appropriate precautions will be taken to prevent incidental damage to natives. These precautions include directional spraying to avoid natives and stopping spraying when wind speeds exceed 5 mph, potentially causing drift. Weed control will focus on the following species that have proven to be invasive in chaparral in this region: *Ehrharta calycina* (veldt grass), *Carpobrotus edulis* (iceplant), *Conicosia pugioniformis* (narrow-leaved iceplant), and *Cortaderia jubata* or *C. selloana* (jubata grass or pampas grass). Surveys and treatment will be timed to prevent or minimize seed set of these species. Other weed species such as mustards and thistles will be removed as recommended by the project restoration specialist to ensure successful revegetation.

Oaks, sand mesa manzanita, and Wells' manzanita will be monitored in May/June and October for a minimum of 5 years, including 3 years after cessation of supplemental irrigation (if any). Transplants, seedlings, and resprouts from cut plants will be specifically inspected and evaluated for size and vigor, condition of protective devices (if any) and irrigation system (if any), and presence of competitive weeds or other factors such as gophers or insect infestations that might affect their survival. For plants not exhibiting normal growth and vigor, remedial action will be taken as judged necessary by the project restoration specialist in consultation with the PEPM.

Aerial photographic surveys shall be conducted for portions of the pipeline corridor located within Burton Mesa chaparral and for the Tank 5 site to evaluate the progress of restoration. Such surveys shall be conducted at the same time as those for the CCWA pipeline extending south and east from Tank 5. These will correspond with the second, fourth, sixth, and ninth years after commencing restoration. Results from these surveys shall be evaluated and information on progress extrapolated using "ground truth" information from terrestrial monitoring activities.

Since the Burton Mesa chaparral community may not have recovered fully by year 5, the designated sampling stations shall be resurveyed once at year 7 and at year 10, and the results shall be reported to CDFG.

Performance Criteria

1. Chaparral

Goal: Establish self-regenerating chaparral ecosystem within the ROW that is effective in long-term slope stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds or of non-local genotypes of native species. The vegetation should gradually develop the characteristics of the adjacent undisturbed chaparral communities, except directly over the pipeline, where large woody plants may be absent but the other criteria described in the following paragraphs should be met.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.
- Percent ground cover by native perennial vegetation is 40 percent at the end of 5 growing seasons (alternatively, native vegetative cover equals that on a nearby ecologically equivalent reference area identified at the outset of the program); native shrub density shall generally exceed 1 per square meter. (These values shall be estimated using an objective technique on representative sample areas.)
- A minimum of six native perennial plant species can be found in a representative 1-meter wide belt transect conducted across the ROW (diagonally where ROW is narrower than 30 meters), except where adjacent areas of undisturbed vegetation have fewer native perennial species in a comparable area, and native shrub density meets the above criterion. Transect locations shall be recorded on the Revegetation Drawings.
- No concentrations of weeds are present that would threaten to invade adjoining native habitats. Examples of weeds that would pose a threat to adjoining habitats include veldt grass, jubata grass or pampas grass, iceplant, and narrow-leaved iceplant. The abundance of these species on the ROW must be no greater than on adjacent areas of chaparral not disturbed by construction and should not threaten continued recovery of native vegetation, after year 5, toward equivalency with adjoining vegetation not disturbed by the project.

At acceptance, the first objective listed above must have been met for 3 consecutive years.

2. Oaks within Chaparral

Goal: Planted oaks and oak resprouts should be able to survive indefinitely without further protection or maintenance. Young oaks must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially deer.

Objectives: Within approximately 5 years, planted oaks and resprouts should meet the following criteria:

- Have a vigorous appearance.
- Be a minimum of 1 inch in basal diameter.
- Be a minimum of 3 feet tall.

- Have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

These objectives apply to the shrubby coast live oaks that are locally present in the Burton Mesa Chaparral Community (see Section 3.9 for performance criteria for oaks in Coast Live Oak Woodland and Forest). At acceptance, the number of planted and resprouted oaks should equal the number of oaks removed by construction and meet the above-outlined criteria, which apply equally to plants developing from direct-seeded acorns, from transplants, or from surviving root crowns. The success of oak reestablishment by each of these methods will be documented. These criteria will be evaluated during monitoring and may be revised to take into account any unusual climatic conditions, such as drought, and to incorporate the latest standards generally acceptable to the local scientific community. Any proposed changes to these criteria shall be submitted to the CDFG for approval prior to implementation. During drought years, irrigation may be provided during the normal rainy season (November through April) to make up for precipitation deficits and ensure continued growth and survival of the plants.

3. Sand Mesa Manzanita and Wells' Manzanita

Goal: Plants must be established and have the potential to live and reproduce through a normal life span. Young plants must have demonstrated the ability to withstand seasonal drought and herbivore pressure.

Objectives: The above-stated goals are considered to have been met if:

- The plant has survived on site for a minimum of 4 years, including at least 3 years without supplemental irrigation and two years without protection.

- It exhibits normal form and morphology and is in vigorous condition.

At acceptance the number of plants established by resprouting from preserved root crowns, from direct planting (seed to transplanting), and from seedbank should equal the number of plants removed by construction and meet the above-listed criteria that apply equally to plants from seed, transplants (if used), and resprouts. The success of reestablishment by each method will be documented.

Other Considerations

Restoration of the entire width of the pipeline corridor will accomplish part of the required mitigation for chaparral. The remainder will be accomplished off site within the state-owned Burton Mesa Management Area. Off-site mitigation may consist of the one or more of the following types of action:

1) Restoration of disturbed annual grassland or scrub communities (that were formerly chaparral) back to chaparral.

2) Controlling exotic species such as jubata grass, pampas grass, or iceplant within Burton Mesa chaparral, replanting as necessary to restore the site.

3) Restoration of fuelbreak or road areas.

Details of these methods will be developed as sites for restoration are identified in consultation with CDFG State Lands Commission, Santa Barbara County, and Vandenberg AFB. Off-site mitigation areas will be monitored as described for the pipeline corridor, and measures to prevent damage of the restoration sites by human intrusion (e.g., hiking, ORVs, etc.) will be

taken. The specific locations, replacement ratios, and restoration methods will be described in a Replacement Lands Report.

3.2 Riparian Forest and Willow Riparian Scrub

Due to similarities in monitoring and maintenance requirements these three riparian communities are discussed together.

Riparian Forest has been identified only at a few locations along the pipeline route and varies in species composition and cover. These forests are typically dominated by *Salix lasiolepis* (arroyo willow), and occasionally by *Platanus racemosa* (western sycamore). The route has been narrowed through this community, avoiding impacts to all but 0.2 acre of this habitat.

The *Willow Riparian Scrub* community occurs at many of the small drainages crossed by the pipeline. In most locations, it is a thicket of *Salix lasiolepis*. Some thickets are tall and virtually impenetrable, while others are sparsely vegetated and open.

Most of the trees, shrubs, and perennial herbs in the Riparian Forest and Willow Riparian Scrub communities are impractical to establish from a broadcast seed mix for one or more of the following reasons: seed viability is short-lived (willows); seeds require scarification or stratification to break dormancy (elderberry, blackberry); seeds are relatively scarce or difficult to collect (considering the amount of seed necessary for broadcast seeding methods). As described below under "Other Types of Propagation," these plants can be established from direct cuttings, as transplants started from cuttings or seed, or from salvaged plants. Transplants would be nursery grown from seed (less seed is required than in the broadcast seeding method) or propagated from cuttings and transplanted bare-root. Cuttings from willows would be treated with a root growth hormone and directly planted on site. As described below, certain plants would be salvaged, maintained in a viable condition during the construction process, and replanted at or close to their original location, where feasible. Because of site to site differences, site-specific adaptations to this plan will be developed for individual sites once the extent of disturbance and vegetation removal is known.

Location

Willow Riparian Scrub (3.3 acres) has been identified at many of the crossings of intermittent streams. Riparian Forest occurs in the corridor at Tar Spring Creek and Los Berros Creek. No mature trees will be removed at Los Berros Creek, but two will be pruned substantially.

Seeds to be Planted

No broadcast seed mixes will be used in the riparian zone, in part to prevent introduction of a species not present in a particular drainage.

Planting Methods and Other Types of Propagation to be Undertaken

- Willows to be propagated by direct planting of dormant stem cuttings.
- Mexican elderberry to be propagated from stem cuttings for transplanting prior to leaf emergence.
- California blackberry to be propagated from stem cuttings for transplanting during late-winter/early spring declining streamflows, at Tar Spring Creek, Unnamed OC-2, and Los Berros Creek.

- California wildrose to be propagated from bare-root plants salvaged from ROW, at Unnamed OC-6 and OC-4.

- Other species may be salvaged or propagated from site-specific materials.

- No deliberate attempt will be made to establish poison-oak and giant creek nettle; however, these species will be allowed to naturally recolonize the disturbed area.

Special Requirements of Plantings

Cuttings and transplants planted near stream inverts need to be installed in moist soil during declining water flows (i.e., after the period of major winter storms) so that the risk of being washed out is kept to a minimum.

Monitoring and Maintenance

During the first growing season, monitoring will be conducted in February/March, May/June, and October (Table 1). Monitoring will include evaluation of the need for weed control, irrigation, protection from herbivory by domestic livestock or wildlife, replanting, or additional erosion control activities. Irrigation, if employed, will be a temporary drip system. Protection from livestock or wildlife, if judged necessary, would be worked out with the landowner. Monitoring in subsequent years will generally be conducted as depicted in Table 1. Maintenance will be conducted, as necessary, in conjunction with monitoring. The frequency of monitoring and maintenance may be adjusted by the PEPM in consultation with the project restoration specialist.

Persistent perennial weeds (e.g., artichoke thistle, tamarisk, castor bean, and poison-hemlock) that would interfere with revegetation goals will be the focus of weed control efforts. Individual tamarisk, castor bean, and artichoke thistle will be removed annually; poison-hemlock will be treated at least annually by herbicidal or manual means to minimize its competitive effect on reestablishing vegetation. Annual and non-persistent perennial weeds, such as *Melilotus* spp. (sweetclovers) and *Polypogon monspeliensis* (rabbitsfoot grass), may be cut back as judged necessary by the restoration specialist to minimize competition with plantings.

Trees will be evaluated in the fall, prior to the dormant season, for 5 years, in conjunction with the normal monitoring and maintenance. Plantings, seedlings, and resprouting from cut plants will be specifically inspected and evaluated for size and vigor, condition of protective devices (if any) and irrigation system (if any), presence of competitive weeds or other factors such as gophers or insect infestations, that might affect their survival. Remedial action will be taken as judged necessary by the project restoration specialist in consultation with the PEPM. The sites will be photographed annually.

Performance Criteria

1. Riparian Habitat Restoration

Goal: Restore suitable areas previously disturbed by construction to riparian habitat having species composition and habitat value equivalent to predisturbance conditions.

Objectives: Within approximately 5 years the site shall have the following characteristics:

- Well-established ground cover appropriate for the site. This may consist of native riparian understory species, such as mugwort, California blackberry,

California wildrose, seep willow (mulefat), etc., and freshwater marsh species. The understory and marsh species should cover all habitat that would normally support understory (may be absent from stream bottom, fresh bars, and steep cut-banks). Ground cover must be in vigorous condition and be stable or increasing in trend. It is noted that many stream crossings lack native riparian groundcover and would not be expected to develop it after restoration.

- Established saplings of tree species present onsite before construction in suitable positions to eventually (and without additional protection or maintenance) form a canopy over the stream and adjacent habitat equivalent to that of adjacent areas. Coast live oak will be planted, where applicable, above the normal limit of flooded soil, along stream terraces and above stream banks. At acceptance, trees must meet criteria stated below under "Trees."

- Cover by weedy species shall be at a minimum. In particular, the site must be completely free of perennial exotic species such as tamarisk, artichoke thistle, giant cane, and castor bean that would substantially interfere with continued development of the riparian habitat. At acceptance, the total ground cover by weeds must meet one or more of the following conditions: (1) be less than ten percent of the habitat area; (2) be of equivalent (or lower) density to that in adjoining habitat areas not disturbed by construction; or (3) be composed of species that are typical of early successional riparian habitats but that are gradually eliminated as the riparian habitat develops. Weeds must be in a decreasing or stable condition based upon a year-to-year comparison.

Acceptance would require a demonstration that the above-mentioned criteria have been met. Prior to acceptance, the site must have demonstrated survival for 3 years without supplemental irrigation.

2. Trees

Goal: Planted trees should be able to survive indefinitely without further protection or maintenance. Young trees must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially deer. Riparian trees should be situated in such a way as to be able to survive normal seasonal flooding.

Objectives: Within a minimum of approximately 5 years, planted trees should meet the following criteria:

- have vigorous appearance

- be a minimum of 2 inches in basal diameter

- meet size and/or cover criteria specified in Conditions 30 and 31 of Streambed Alteration Agreements 251-95 and 252-95:

  30. In order to determine if the revegetation techniques used have been successful, any plant species required that are listed below shall achieve the minimum growth and cover at the end of 3 and 5 years. If the minimum growth is not achieved, then the Operator shall be responsible for taking the appropriate corrective measures as determined by Department representatives. The Operator shall be responsible for any cost incurred during the revegetation or in subsequent corrective measures.

Species	Size at Planting	Planting Centers	Height 3 years	Height 5 years
Arroyo willow	1 gallon	8 feet	10 feet	15 feet
Sandbar willow	1 gallon	5 feet	4 feet	6 feet
Red willow	1 gallon	8 feet	9 feet	15 feet
Sycamore	1 gallon	20 feet	5 feet	9 feet
Cottonwood	1 gallon	*	7 feet	12 feet
All shrub species	1 gallon	**		

* Depending if used as supplemental species (40 feet on center) or if dominant species (15 feet on center).

** Plant in naturalized clumps and randomly scattered.

31. Density and growth of plantings shall meet or exceed the standards specified, 5 years after planting and/or shall attain 75 percent pre-project cover after 3 years and 90 percent pre-project cover after 5 years from the date of planting. If the survival and cover requirements have not been met, the Operator is responsible for replacement planting to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements for 5 years after planting.

- be a minimum of 6 feet tall for tree species not covered in the Streambed Alteration Agreements
- have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

At acceptance, the required number and species mix of planted trees shall have met the above-outlined criteria. These criteria will be evaluated during monitoring and may be revised to take into account any unusual climatic conditions, such as droughts, and to incorporate the latest standards generally acceptable to the local scientific community. Any proposed changes shall be submitted to the CDFG for approval prior to implementation.

If substantial replanting is necessary during the program, the monitoring program will be extended in consultation with CDFG.

Other Considerations

Replacement of any temporary or permanent loss of riparian/wetland habitat suitable for the least Bell's vireo and willow flycatcher will be accomplished off site after construction activities have ceased and the amount of habitat affected is determined through consultation with CDFG. Specific locations for off-site mitigation acceptable to CDFG will be established and appropriate revegetation specifications will be provided to the revegetation contractor. The off-site location(s) and restoration methods will be described in a Replacement Lands Report. Monitoring of these sites will be as described above for riparian habitats.

Tar Spring Creek

Tar Spring Creek is crossed by the pipeline corridor in the northern part of Reach 5b. This stream is considered sensitive by CDFG, and specific measures for revegetation are included here. The creek is deeply incised (about 16 feet) with steep banks. *Salix lasiolepis* dominates the riparian vegetation. The trees are growing on the lower portion of the banks where the slope is

moderate and where high water inundation occurs. The higher, steep portions of the banks are not vegetated or only sparsely so with *Rubus ursinus* and weeds. The tops of the banks support weedy vegetation (e.g., poison hemlock and mustard) on the north side of the creek, and blackberry in addition to other weedy vegetation on the south side of the creek.

The primary goal for revegetation is erosion control followed by establishment of native vegetation, especially willows. The methodology and performance criteria will be generally as described above for other riparian areas. Figure 2 illustrates the general planting plan for the creek following construction. A hydromulch containing 10 lbs per acre of barley will be applied over jute netting on the slopes to control erosion. The top of the bank to approximately 12 vertical feet down the bank will be replanted with *Rubus ursinus* cuttings at 5-foot centers. Cuttings of *Salix lasolepis* will be planted within the bottom 4 vertical feet of the bank slope (excluding the stream channel). Planting of cuttings will take place when the soil is sufficiently moist to support them but after the main threat of flood waters that could wash out the cuttings.

3.3 Coastal Scrub

Coastal scrub is a diverse and variable plant community. Common plant species include *Ericameria ericoides* (mock heather), *Rhamnus californica* (coffeeberry), *Artemisia californica* (California sagebrush), *Lotus scoparius* (California broom or deerweed), *Mimulus aurantiacus* (orange bush monkeyflower), *Toxicodendron diversilobum* (poison oak), *Baccharis pilularis* (coyote brush), *Salvia mellifera* (black sage), *Eriophyllum confertiflorum* (golden yarrow), *Horkelia cuneata* (wedge-leaved horkelia), and *Helianthemum scoparium* (peak rush-rose).

Location

This plant community is present in Reach 5b near Los Berros Creek and on the Nipomo Mesa bluff leading to the Santa Maria River floodplain. The oak forest on the north-facing bluff adjacent to Newsom Canyon Creek also contains coastal scrub species in the understory and will be reseeded as such. In Reach 6, coastal scrub occurs on VAFB near Lompoc-Casmalia Road. The oak forest on the north-facing slope near Tank 5 will be seeded with a scrub mix to establish the understory. Approximately 9.8 acres of coastal scrub will be cleared during pipeline construction. The two oak forest slopes to be seeded with coastal scrub comprise 1.7 acres.

Seeds to be Planted

Tables 4, 5, 6, 7, and 8 list the seed mixes for coastal scrub in Reaches 5b and 6. The differences in the seed mixes reflect differences in species composition among representations of this community in the five areas. The seed mixes were developed using the approach described above for chaparral.

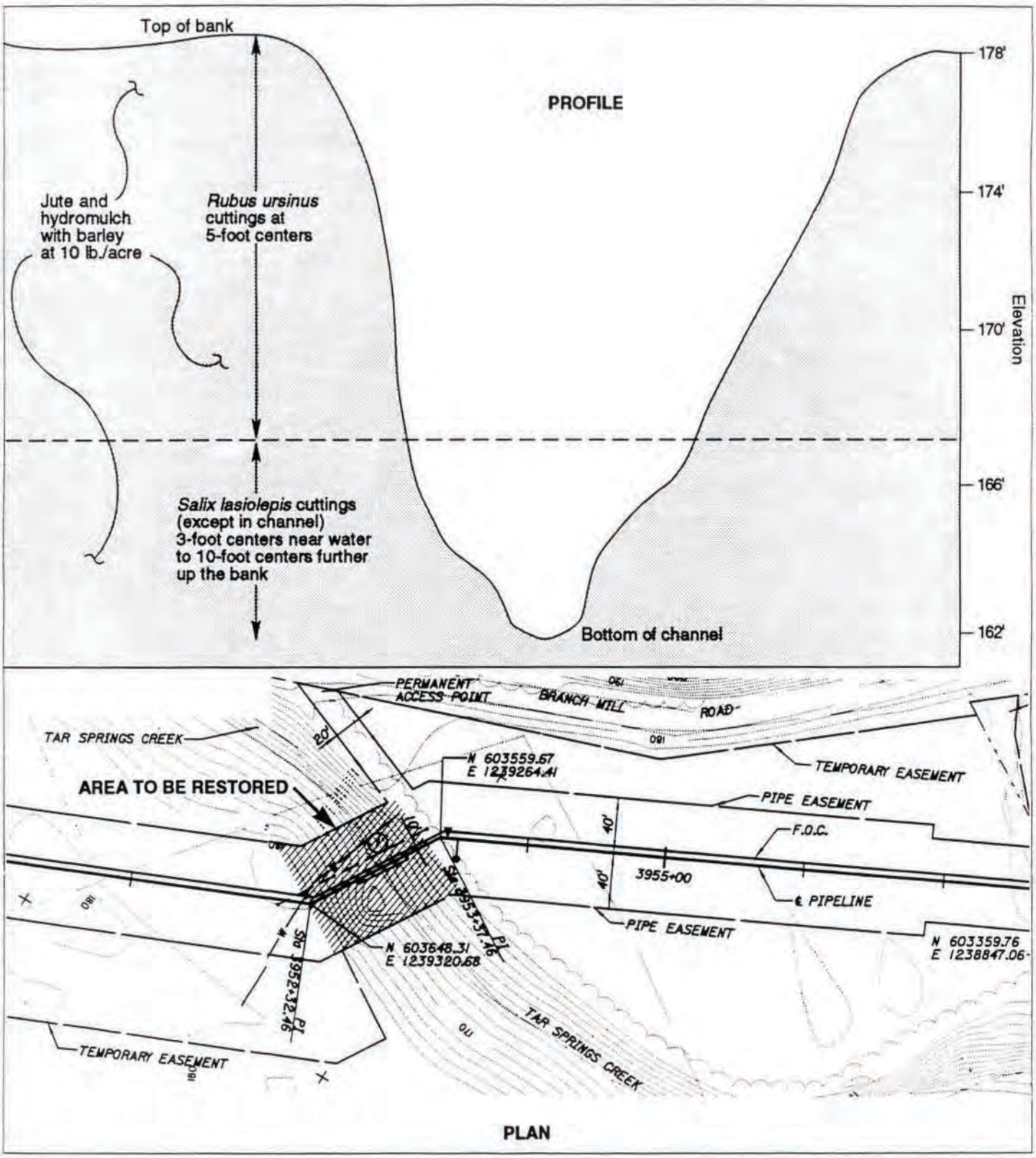

Figure 2

TAR SPRINGS CREEK REVEGETATION DIAGRAM

Table 4
Seeding Rates for Coastal Scrub on Hill Adjacent to Newsom Canyon Creek

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	4.0	487,500
Artemisia douglasiana	0.8	200,000
Heteromeles arbutifolia	2.0	25,840
Keckiella cordifolia	0.8	N/A
Leymus (= Elymus) condensatus	2.0	86,800
Lotus scoparius	2.0	243,000
Mimulus aurantiacus	2.0	350,000
Nasella (= Stipa) pulchra	1.0	17,000
Prunus ilicifolia	2.0	N/A
Rhamnus crocea	0.8	18,000
Scrophularia californica	0.6	2,300,000
TOTAL	18.0	

Note: 1. PLS = pure live seed

Table 5
Seeding Rates for Coastal Scrub near Los Berros Creek

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	4.0	487,500
Eriogonum fasciculatum	5.0	N/A
Lotus scoparius	2.0	243,000
Mimulus aurantiacus	3.0	350,000
Nasella (= Stipa) pulchra	3.0	17,000
Nasella (= Stipa) lepida	1.0	N/A
Rhamnus crocea	0.5	18,000
Salvia mellifera	3.6	218,760
TOTAL	22.1	

Note: 1. PLS = pure live seed

Table 6
Seeding Rates for Coastal Scrub on Nipomo Mesa Bluff

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Lupinus arboreus	0.5	8,624
Artemisia californica	4.0	487,500
Baccharis pilularis	2.0	40,000
Encelia californica	5.0	42,000
Lotus scoparius	1.8	243,000
Total	13.3	

Note: 1. PLS = pure live seed

Table 7
Seeding Rates for Coastal Scrub on VAFB

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Scrophularia atrata	1.0	2,300,000
Artemisia californica	3.0	487,500
Baccharis pilularis	4.0	40,000
Ceanothus impressus	0.2	110,000
Encelia californica	3.0	42,000
Mimulus aurantiacus	2.0	350,000
Lotus scoparius	1.5	243,000
Leymus (= Elymus) condensatus	2.0	86,800
Nasella (= Stipa) pulchra	2.0	17,000
Total	18.7	

Note: 1. PLS = pure live seed

Table 8
Seeding Rates for Coastal Scrub on VAFB Oak Forest Hill

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Artemisia californica	3.0	487,500
Mimulus aurantiacus	2.0	350,000
Baccharis pilularis	2.0	40,000
Salvia mellifera	3.0	218,760
Lotus scoparius	1.2	243,000
Leymus (= Elymus) condensatus	2.5	86,800
Nasella (= Stipa) pulchra	1.5	17,000
Total	15.2	

Note: 1. PLS = pure live seed

Planting Methods

The seed mix will be bagged in approximately half-acre lots, broadcast over the ROW, and incorporated into the soil by raking, dragging a chain, or similar means, or applied in a hydromulch matrix following post-construction site cleanup and surface restoration.

Other Types of Propagation to be Undertaken

Not applicable.

Special Requirements of Plantings

Not applicable.

Monitoring and Maintenance

Monitoring will be conducted in February/March, May/June, and October during the first growing season (see Table 1). Additional visits may be required to detect and correct erosion following significant rainstorms. Thereafter, visits will be conducted generally in early spring, in time to detect and take action against potential weed problems and late spring to verify weed control activities and qualitatively determine the extent of growth and cover. This schedule is preliminary and may be modified by the revegetation specialist. The objectives of monitoring will be to document establishment and growth of natives and to identify the need for maintenance (e.g., erosion control, weed eradication) or replanting.

Weed control methods and timing will be the same as those described for chaparral in Section 3.1.

Performance Criteria

Goal: Establish self-regenerating shrub-dominated ecosystem within the ROW that is effective in long-term soil stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds or of non-local genotypes of native species. The

vegetation should gradually develop the characteristics existing on the site prior to project disturbance.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.
- Density of native perennial plant species is equivalent to adjacent areas; native perennial plant species are in vigorous condition and show evidence of active growth during appropriate growing seasons.
- No concentrations of weeds are present that would threaten to invade adjoining native habitats. Examples of weeds that would pose a threat to adjoining habitats include veldt grass, jubata grass or pampas grass, iceplant, and narrow-leaved iceplant. The abundance of these species on the ROW must be no greater than on adjacent areas of coastal scrub not disturbed by construction and should not threaten continued recovery of native vegetation after year 2 toward equivalency with adjoining vegetation not disturbed by the project.

These criteria will be evaluated during monitoring and may be revised to take into account any unusual conditions, such as drought, and to incorporate the latest standards generally acceptable to the local scientific community.

Other Considerations

Coast live oaks will be planted at appropriate sites within areas treated with coastal scrub, particularly on the two oak forest hills. These locations are shown on the revegetation drawings.

3.4 Non-Native Grassland

Non-native grasslands are the most common plant community along the pipeline corridor. Grasslands occur abundantly in the ROW along U.S. Highway 101 in a region used for cattle grazing. They are dominated by species of non-native annuals such as *Bromus diandrus* (ripgut brome), *B. hordeaceus* (soft chess), *Avena fatua* (wild oat), and *Vulpia myuros* (Zorro fescue).

Location

Grasslands occur along much of the route paralleling U.S. Highway 101 in Reach 5b. In Reach 6, grasslands are common south of the U.S. Highway 101 crossing and from Highway 1 to VAFB. Approximately 112.5 acres of non-native grassland will be affected by the project.

Seeds to be Planted

Grassland seed mix will be applied at 10 lbs/acre for drill seeding, or 20 lbs/acre for other application methods, to the entire work area, prior to spreading mulch or weed-free straw for erosion control. Acceptable methods of seed application include hydroseeding, drill seeding, and hand broadcasting with raking to mix into soil surface. Seed to be used is commercially available, not locally harvested.

Species and application rates are 65 percent (by weight) *Bromus hordeaceus* (= *B. mollis*), 25 percent *Vulpia myuros* (= *Festuca megalura*), and 10 percent *Trifolium hirtum* or *T. incarnatum* (rose or crimson clover). These application rates are provided in Table 9.

The species specified in the mix are commonly used in erosion control plantings and in revegetating non-native grassland habitats and are widely naturalized in the region including along the pipeline corridor (*Bromus* and *Vulpia*), or have little likelihood of persisting and invading undisturbed habitats off of the corridor (*Trifolium*).

Table 9
Preliminary Seeding Rates for Non-Native Grasslands

Species	*Application Rate PLS Pounds/Acre*
Bromus hordeaceus (=*B. mollis*)	6.5
Vulpia myuros	2.5
Trifolium hirtum or *T. incarnatum*	1.0

Other Types of Propagation to be Undertaken

Not applicable.

Special Requirements of Plantings

Not applicable

Monitoring and Maintenance

During the first year following construction, monitoring will be conducted in February/March and May (Table 1), or more frequently at the discretion of the revegetation specialist. In subsequent years monitoring will be conducted annually in the spring. Monitoring will be conducted with sufficient frequency to enable timely reseeding and slope repair, as necessary, and to detect incipient weed problems.

The objectives of monitoring are to document cover by desirable species (planted species, native herbs and grasses, and non-native grasses that are not considered noxious weeds) and to identify the need for maintenance (e.g., erosion control, weed management, or reseeding). Maintenance will be conducted as necessary for erosion control and control of serious problem weeds.

Weed control efforts will focus on noxious weeds not well established in adjacent areas and will target *Brassica nigra* (black mustard), and a variety of non-native thistles such as *Cirsium vulgare*, *Carduus pycnocephalus*, *Silybum marianum*, and *Centaurea* spp. as well as the species described above under chaparral. Efforts will focus on tipping the balance toward a healthy cover of desirable grasses and herbs by selective mowing or weed whacking or spot treatment with non-persistent herbicides rather than attempting complete eradication of target species.

Performance Criteria

Goal: Establish self-regenerating grassland ground cover that is effective in long-term slope stabilization and erosion control and that does not pose a threat to adjoining plant communities as a source of weeds.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.

- Percent ground cover by desirable (as defined above under Monitoring and Maintenance) vegetation is approximately 60 percent or, if less, is equal to or greater than similar adjacent areas identified at the outset of the program.

- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction. Examples of weeds that would pose a threat to adjoining habitats include veldt grass (where it is not already well-established), jubata grass or pampas grass, iceplant, narrow-leaved iceplant, russian-thistle, thistles, and black mustard. The abundance of these species on the ROW must not be substantially greater than on adjacent areas not disturbed by construction.

Other Considerations

Land in the Conservation Reserve Program (Station 40351+90 to 4072+80 on Reach 5b) has been taken out of crop production to prevent erosion. The following specific measures to minimize the potential erosion from this project have been recommended by the Natural Resources Conservation Service. Seed application will be conducted within 2 weeks of surface restoration. If construction is completed between 1 April and 15 November, double the normal grassland seed mix will be applied. If construction is completed between 15 November and 1 April, 150 lbs/acre of commercial barley will be applied instead, followed by the normal grassland seed mix the subsequent fall.

For the grassland from Station 3840 to 3851 in Reach 5b, commercial pasture mix seed is to be applied in accordance with the landowner easement agreement.

3.5 Native Grasses and Herbs

Native perennial grasses particularly *Nassella (=Stipa) pulchra* (purple needlegrass) and *Hordeum brachyantherum* (meadow barley) occur in dense to scattered patches along the pipeline route. *Nasella pulchra* occurs throughout some grasslands while *Horedeum brachyantherum* is restricted to swales in the same area. In areas with moderate to dense establishment of native grasses, native grass seeds will be directly applied to the pipeline corridor. Care will be taken to minimize damage to native grasses outside the trenched area so that they will be able to resprout after construction.

In some areas there are wild flowers including such species as *Amsinckia* spp. (fiddleneck), *Lupinus bicolor* (miniature lupine) and *L. nanus* (sky lupine) in some years. These species will not be collected and redistributed where they occur because lupines and fiddlenecks can be harmful to livestock. The salvage and replacement of topsoil are expected to preserve much of the seedbank, rhizomes, and bulbs. Loss of or damage to seed in areas that are not trenched is expected to be minimal. Due to the linear nature of the disturbance, seeds of native herbs are also expected to colonize from adjacent areas following construction.

Scattered locations along the route support patches of native hydrophytic vegetation, dominated by *Juncus phaeocephalus* (brown-headed rush). These patches, which are generally very small (less than 100 square feet), are presumed to be associated with slight depressions or poorly drained soils and are typically surrounded by non-native grasslands.

Location

Locations of native grassland will be included on the revegetation drawings. Approximately 11.1 acres of native grassland occur in Reach 5b, and approximately 13.7 acres occur in Reach 6.

Seeds to be Planted

The native grassland seed mix (see Table 10) will be drill-seeded in areas indicated in the revegetation drawings. *Horedeum brachyanthereum* will be applied at approximately 2 lbs/acre for swale areas in native grasslands on Reach 5b.

Table 10
Preliminary Seeding Rates for Native Grasslands

Species	*Application Rate Pounds Bulk Seed/Acre*	*Minimum PLS[1]/lb in Bulk Seed*
Nasella pulchra	4.0	17,000
Vulpia myuros	0.5	594,000
Bromus hordeaceus (= B. mollis)	1.3	218,025
Trifolium hirtum or *T. incarnatum*	1.0	129,200

Note: 1. PLS = pure live seed

Other Types of Propagation to be Undertaken

Any excess native grass seed will be stored for reseeding areas with erosion problems or areas disturbed during installation of the fiber optic cable. The remaining seed may be grown in a nursery for replanting along the corridor in the event direct seeding fails in some areas.

In patches of hydrophytic vegetation (brown-headed rush), the top 12 inches of soil will be salvaged and stockpiled for replacement on the ROW after construction. The construction contractor will attempt to restore the topsoil and topographic conditions at these sites (see construction specifications). Brown-headed rush and associated species, if present, are expected to resprout from perennial rhizomes, seed, or other plant parts contained within the top 12 inches of soil.

Special Requirements of Plantings

Supplemental watering for native grasses may be necessary during dry spells during the first growing season. The revegetation specialist will determine when and where supplemental water will be provided. Temporary fencing may be erected around native grass plantings for a minimum of one rainy season to exclude cattle where plantings occur on grazed lands.

Monitoring and Maintenance

During the first year following construction, monitoring will be conducted in February/March, May/June, and October (Table 1). Subsequent monitoring will be conducted annually or more frequently as deemed necessary by the revegetation specialist.

The objectives of monitoring will be to document cover by desirable species (planted species, native herbs and grasses, and naturalized non-native grasses that are not considered noxious weeds), to document survival of native grasses, and to identify the need for maintenance (e.g., erosion control, weed eradication, or reseeding). Maintenance will be conducted as necessary for erosion control and eradication of serious problem weeds.

Weed control methods and timing will be as described above for non-native grassland (Section 3.5), except that special attention will be paid to suppressing weed growth around the reestablishing native grasses.

Performance Criteria

Goal: Reestablish self-regenerating native grass populations. Overall ground cover (native grasses as well as non-native grassland species) must be effective in long-term slope stabilization and erosion control and must not pose a threat to adjoining plant communities as a source of weeds or non-local genotypes of native species.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to wind and water erosion.
- Native grasses are well-established, exhibiting vigorous growth and producing seed.
- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction. Examples of weeds that would pose a threat to adjoining habitats include veldt grass, jubata grass or pampas grass, iceplant, narrow-leaved iceplant, thistles, and mustard. The abundance of these species on the ROW must be no greater than on adjacent areas not disturbed by construction.

Other Considerations

If native grasses do not reestablish as expected in some areas, individual plugs will be grown from seed and replanted over the corridor.

3.6 Freshwater Marsh

Only four freshwater marshes are crossed by the ROW. One, located on VAFB, is formed by a natural seep and is colonized by a variety of native herbs. A second marsh, located near the intersection of Black Road and Point Sal Road, near the town of Casmalia, is dominated by *Juncus* sp. (rushes), *Frankenia salina* (alkali heath), *Leymus triticoides* (alkali rye), and *Rumex* sp. (dock). Another marsh, located near Dutard Road, approximately 1/4 mile northeast of Orcutt Creek, contains *Scirpus californicus* (California bulrush). A fourth marsh, located north of Nipomo along Thompson Road, is dominated by alkali rye, rushes, and dock.

Location

About 0.5 acres in Reach 6 may be disturbed during construction in Reach 5b and 5.5 acres.

Seeds to be Planted

Not applicable.

Other Types of Propagation to be Undertaken

The top 12 inches of soil will be salvaged and replaced and the original contours will be restored. Native vegetation is expected to resprout from perennial rhizomes and rootstocks contained within the top 12 inches of soil.

Special Requirements of Plantings

Not applicable.

Monitoring and Maintenance

During the first year following construction, monitoring will be conducted in March/April and September/October (see Table 1). Subsequent monitoring will be conducted annually during the spring, unless more frequent monitoring is judged necessary by the revegetation specialist. The objectives of monitoring will be to document cover by native hydrophytic species and to identify the need for maintenance (e.g., erosion control, weed eradication, or replanting).

Maintenance will be conducted as necessary for erosion control and eradication of serious problem weeds. Persistent perennial weeds (e.g., tamarisk and castor bean) that would interfere with revegetation goals will be removed annually. Poison-hemlock will be treated at least once annually with herbicide or manual treatment to minimize its competitive effect. Annual and non-persistent perennial weeds, such as *Polypogon monspeliensis* (rabbitsfoot grass), may be cut back or removed, as determined necessary by the project revegetation specialist.

Performance Criteria

Goal: Establish long-term, self-regenerating marsh cover.

Objectives: At acceptance the following objectives must have been met:

- Topsoil is stable and not being lost to water erosion.
- Cover of native marsh vegetation is approximately the same as preproject.
- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction.

Other Considerations

Not applicable.

3.7 Coast Live Oak Woodland and Coast Live Oak Forest

Coast Live Oak Woodland and Forest communities are dominated by the woody evergreen species *Quercus agrifolia* (coast live oak). Oak trees are slow growing and live to ages well over 100 years; peculiar multi-trunked forms of coast live oak dominate oak communities in the Burton Mesa and Nipomo Mesa areas. Coast live oak woodland and forest are similar communities and differ essentially in the spacing of the trees. In woodland communities, the tree canopies generally meet one another but do not overlap, whereas in the denser oak forest communities the canopies tend to overlap.

Oak trees that are removed will be replaced using one or more of the planting methods described below. Oaks will be planted along the ROW adjacent to, but not directly over the

pipeline, and in ecologically appropriate sites within or adjacent to existing Coast Live Oak Woodland or Forest. Oaks will not be planted directly over the pipeline to avoid damage to the pipeline and due to the possibility of future inspection, maintenance or repair activities related to the pipeline. Oaks that become established over the pipeline as a result of natural reseeding may be removed by CCWA as it deems necessary and appropriate.

Location

Coast live oak woodland and forest communities occupy 3.0 acres in Reach 5b and 0.8 acre in Reach 6.

Seeds to be Planted

Acorns (seeds) will be collected from a number of healthy individual trees located in the immediate vicinity of the trees which were removed. Collection will occur in the fall when the acorns are ripe. Acorns will be float-tested for viability, those acorns that float in water are usually discarded, but may be used if a shortage exists. Acorns will be stored until planting in moist peat moss in sealed plastic bags in a dark refrigerator for up to 6 months. Planting will be conducted as soon as soils become saturated from seasonal rainfall.

Grassland, coastal scrub, or chaparral seed mixes will be applied as appropriate to form a matrix vegetation. Shade loving species typical of coast live oak understory will not be planted. These are expected to gradually invade from adjacent areas as the planted and resprouting oaks get large enough to provide appropriate conditions. We also expect some resprouting of these species from preserved below-ground structures and the seedbank.

Methods of Planting

Seed for the matrix vegetation will be broadcast and incorporated into the soil as described for chaparral, coastal scrub, or non-native grassland. Acorns will be planted in prepared "planting spots" at which the soil has been loosened. Protection from burrowing and browsing mammals will be provided as described below and in Section 4. Generally 5 acorns will be planted at each spot. Spacing between spots will range from 5 feet (when a coppice like growth of oaks is desired, as in Burton Mesa chaparral) to 15 feet (when a more open woodland is desired).

Other Types of Propagation to be Undertaken

Acorns will be contract-grown by a qualified commercial grower in appropriate deep tube containers, using accepted precautions to prevent root-coiling. These oaks will be outplanted during the second growing season after construction, after the soil has become saturated by seasonal rainfall. Locations of oak plantings will be recorded on the revegetation drawings.

Special Requirements of Plantings

Plant spots and/or seedlings will be grouped in naturalistic arrangements where feasible and enclosed in a 42-inch high protection fence. At the revegetation specialist's discretion, in consultation with the PEPM, fencing may be used to exclude large animals from an entire oak planting area with individual protection against smaller animals supplied at each planting spot or robust protective devices will be placed at each spot. The fence will protect growing seedlings from being trampled by wildlife and will help to minimize browsing of the seedlings by ruminant animals. Shade cloth may be used in conjunction with the protective structure. Additional protection within the larger fenced area will be provided against rodents and burrowing animals. Mulch will be provided to discourage weed growth. Drip irrigation may be used to supplement natural rainfall for up to 2 years or as judged necessary by the project restoration specialist.

Monitoring and Maintenance

Monitoring of the matrix vegetation in the oak woodland and forest communities will be conducted as appropriate dependent upon the seed mix used. Trees will be evaluated in May and October for 5 years (see Table 1), with additional visits in the summer of early years to determine the need to initiate supplemental irrigation (if not already in place). Acorn plantings and oak seedlings will be specifically inspected and evaluated for size and vigor, condition of the basin and protective fencing, need for continued irrigation, weed growth near seedling, insect infestations, and other factors (e.g., presence of grazing animals or gophers) that might affect their survival. Oaks present along the pipeline ROW that were saved or trimmed with the intent to save them shall also be inspected to ensure health and/or recovery. The frequency of inspection and maintenance may be adjusted by the PEPM in consultation with the project restoration specialist.

Maintenance for oaks will consist of weeding the vicinity of the planting spots, repairing the protective structures, and supplementing rainfall with drip irrigation or by hand watering. Fences or protective structures will be removed after three years or when, in the revegetation specialist's judgment, the plants are large enough and vigorous enough to withstand herbivorous animals. Fence height may be augmented should deer browsing become a problem.

Weeds will be controlled by a combination of approaches depending upon site characteristics, accessibility, and site-specific efficacy. Mechanical/manual means of weed control (weed whacking, hoeing, or hand pulling); non-persistent herbicide; and synthetic weed mat (a woven mat permeable to water and air but which tends to choke germinating weeds) may be used in combination with a mulch covering to suppress weed growth in the vicinity of planting spots.

Remedial action will be taken as judged necessary by the project restoration specialist in consultation with the PEPM.

Performance Criteria

1. Oak Forest and Woodland Habitat Restoration

The performance criteria will be as appropriate for the seed mix used to establish the matrix vegetation (e.g., grassland, coastal scrub) for these communities.

2. Oaks

Goal: At acceptance, planted oaks should be able to survive indefinitely without further protection or maintenance. Young trees must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially deer. Oaks planted near streams should be situated in such a way as to be able to survive normal seasonal flooding.

Objectives: Within approximately 5 years, planted trees should meet the following criteria:

- have vigorous appearance
- be a minimum of 2 inches in basal diameter
- be a minimum of 6 feet tall
- have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

At acceptance, the required number of planted oak trees, an average of five saplings (5 years after planting) per tree lost (with a trunk diameter of 2 inches or more) shall have met the above-outlined criteria. These criteria will be evaluated during monitoring and may be revised to take into account any unusual climatic conditions, such as drought, and the latest standards generally acceptable to the local scientific community. During drought years, irrigation may be provided during the normal rainy season (November through April) to make up for precipitation deficits and ensure continued growth and survival of the plants. Any changes shall be submitted to CDFG for approval prior to implementation.

Other Considerations

Not applicable.

3.8 Impoundments and Disturbed Areas

Areas mapped with these designations will be revegetated as for non-native grasslands unless (1) other arrangements have been made with the landowners or (2) the area is paved or otherwise inhospitable to plants (e.g., gravel road surface).

3.9 Agriculture and Introduced Forest

Areas mapped with these designations will receive no revegetation treatment.

4.0 SENSITIVE SPECIES REVEGETATION METHODS

4.1 Sand Mesa (Shagbark) Manzanita

Sand mesa manzanita will be revegetated with Burton Mesa chaparral as described in Section 3.1, Chaparral.

4.2 Wells' Manzanita

Wells' manzanita may be propagated from cuttings or seed for replanting at specific sites along the pipeline corridor that can be easily accessed for monitoring or maintenance. It may also be directly seeded at specific sites along the ROW.

4.3 Black-Flowered Figwort

Several hundred *Scrophularia atrata* (black-flowered figworts) will be removed for construction of Reach 6, at two different locations. One location is on VAFB near the crossing of Lompoc-Casmalia Road. The other population is about 2 miles north. Seed from black-flowered figwort populations will be collected and stored separately for each population and will be reseeded in the same area at 1 lb/acre after construction. Both this and the widespread *Scrophularia californica* (California figwort), which is common along the corridor and with which the black-flowered figwort hybridizes, are expected to regenerate readily and rapidly after construction from the seedbank and possibly from the bases of pre-existing plants.

4.4 Coast Live Oak

Direct Planting: Viable acorns will be planted directly in the ground after soils have become saturated by seasonal rainfall. Acorns will be planted in "planting spots" of 5 acorns each. Soil will be loosened, if hard, and acorns will be placed on their sides and pressed into the soil. A covering of tree chippings, commercial mulch, and/or a synthetic weed mat may be used to lightly cover the planting spots.

Transplant: Acorns will be planted immediately after collection in 1-gallon size, long tube containers. The seedlings are then container grown for up to one full year prior to planting in the field. The seedlings will be transplanted to larger, long tube containers as necessary to ensure healthy tap root formations and to guard against plants becoming "root-bound."

A variation of this method is to hold the acorns under refrigeration in moist peat moss for 4 to 6 months to inhibit germination until early spring. At this time, the acorns will be planted in 1-gallon size, long tube containers. Acorns under refrigeration will be checked regularly and any acorns which have germinated early will be planted in containers immediately. The acorns will be allowed to grow in these containers for 6 to 8 months prior to being planted in the field. This method is based on the reasoning that smaller container grown seedlings with only six to eight months growth should be able to establish themselves more successfully when planted in the field than seedlings grown for longer periods of time in containers.

The container grown seedlings are planted in the field in plant holes that are twice the diameter of the container and a minimum 6 inches deeper. Planting holes are backfilled with native soil and a basin 18" in diameter with a 3-inch high earth berm is constructed around each seedling. Basins will be lightly covered with tree chippings or commercial leaf mulch. A synthetic weed mat will be used in conjunction with mulch at selected locations.

Acorn planting spots and transplanted seedlings will be protected using a number of alternative methods dependent upon site-specific conditions. Methods that may be employed will be consistent with recommendations from the California Integrated Hardwood Range Management Program.

4.5 Blochman's Leafy Daisy

Approximately 160 colonies/individuals of *Erigeron blochmaniae* (Blochman's leafy daisy) occur within the ROW north of the intersection of Black Road and Betteravia Road near Santa Maria. Vegetation in the ROW at that location will be cut near ground level by monitors prior to construction. This may enable plants outside the trenched area to resprout following construction. Tests are currently being conducted with cuttings to determine survival. If that is unsuccessful, seed will be collected from plants over the corridor and replanted following construction. Restoration goals will be to establish 160 plants.

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COASTAL BRANCH, PHASE II

RESTORATION PLAN FOR REACHES 1 THROUGH 5A

February 2001

Prepared for

Central Coast Water Authority
255 Industrial Way
Buellton, CA 93427

Prepared by

Science Applications International Corporation
816 State Street, Suite 500
Santa Barbara, CA 93101

Acknowledgements

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RESTORATION PLAN FOR COASTAL BRANCH, PHASE II REACHES 1 THROUGH 5A

1.0 INTRODUCTION

This document presents the plans and technical information for restoring vegetation in areas disturbed by construction of Coastal Branch, Phase II, Reaches 1 through 5A as well as by operation and maintenance (O&M) activities over the life of the project. The plan describes the steps to be taken to establish self-sustaining plant communities and wildlife habitat on areas disturbed by such activities. The Department of Water Resources (DWR) will operate and maintain the raw water portion of the project from Devils Den in northwestern Kern County to Tank 1 in northeastern San Luis Obispo County. The Central Coast Water Authority (CCWA) will operate and maintain the treated water portion of the project from tank 1 to Tank 5 in Santa Barbara County.

Section 2 lists the authorities under which this plan has been prepared. Section 3 describes general approaches to restoration, maintenance, and monitoring that are common to several plant communities. Section 4 describes each reach and sensitive resources within the reach, and Section 5 describes the methodology for restoration of plant communities specific to this project.

2.0 AUTHORITIES

Restoration activities for the Coastal Branch, Phase II were proposed in the Final Environmental Impact Report (FEIR) as mitigation measures and required in the Statement of Findings and Notice of Determination issued for the project. A General Biological Mitigation Plan (GBMP) further defined the restoration, and DWR entered into an agreement with the Department of Fish and Game (DFG) to carry out the GBMP. The Biological Opinions issued by DFG and U.S. Fish and Wildlife Service (USFWS) list restoration requirements applicable to endangered species habitat. The Stream and Lake Bed Alteration Agreements between DFG and DWR, the Army Corps of Engineers Nationwide Permits, and the waiver of water quality certification by Regional Water Quality Control Boards contain additional restoration requirements. These requirements have been included in the restoration plans for each reach and are presented below.

3.0 GENERAL APPROACH TO RESTORATION

The components of the restoration program for the Coastal Branch, Phase II project include the program objectives, an evaluation of the condition of the pipeline right-of-way and facilities after initial construction, implementation of restoration and revegetation measures, monitoring the progress of restoration, maintenance and remediation, and reporting to DFG as required.

3.1 Restoration Program Objectives

The objectives of the restoration program are:

- Maintain biodiversity and restore habitat values by reestablishing at each site a stable native or naturalized plant community similar to that present prior to construction.

- Have no net loss of habitat, population size, or viability for sensitive plant and animal species affected by the pipeline construction.
- Stabilize disturbed areas and prevent erosion.
- Prevent the spread of weedy exotic species into areas where they did not formerly occur.

3.2 Post Construction Evaluation

After construction, a survey of the construction easement will be conducted to determine the extent of restoration work required. Construction contract specifications include requirements to restore pre-construction contours, install erosion control best management practices (BMPs), and reseed. An interdisciplinary survey team will inspect the reach to evaluate soil surface conditions, contract reseeding success, condition of stream crossings, and status of erosion control BMPs. Other factors that will be included in the survey will include, but not be limited to, an evaluation of adjacent lands for habitat type and cover, and identification of potential erosional areas both for short-term and long-term problems that could affect restoration activities or the pipeline. The team will produce a report documenting establishment and growth of reseeded species, identifying areas where planting or additional seeding is needed to achieve habitat restoration goals, identifying the needs for maintenance (including reseeding and erosion and weed control), and make other recommendations for restoration activities as needed.

3.3 Implementing Restoration and Revegetation

Restoration and revegetation will be carried out as determined necessary in the post-construction evaluation as well as after O&M activities that remove vegetation. The DWR Environmental Support Unit will coordinate activities and supervise restoration work immediately after construction and in the raw water portion of Reach 1 during O&M. California Conservation Corps or other labor forces will be used to carry out the work that does not require heavy equipment. Work that requires heavy equipment will be administered by the Division of Engineering under the direction of the Environmental Support unit. From Tank 1 to Tank 5, CCWA and will be responsible for restoration and revegetation necessary during project O&M. Plant community revegetation measures and seed mixes are given in Section 5. In carrying out the restoration and revegetation work, the following general guidelines will apply.

Erosion Control

Site stabilization and water quality protection of surface waters will be achieved by controlling erosion and sediment runoff into water courses. Initial erosion control efforts by the construction contractors consisted of BMPs, as specified in DWR's Storm Water Pollution Prevention Plan (SWPPP). These included waterbars, straw mulch, erosion control fabric or jute netting, and riprap. These and other erosion control measures will be maintained or implemented as needed by DWR and CCWA. Other physical stabilization measures may include rock facing, willow poles, willow wattling, log barriers, sand-bag placement, reconfiguring slopes, etc. Installation of these measures is described in Appendix B.

Sources of Seeds and Plant Materials

Plant materials (cuttings, bulbs, etc.) to be used for revegetation will be collected in the project area and in specific collection zones when and where it is feasible. The seed in the mixes is specified as coming from central coastal California genetic sources. Appropriate areas for plant material collection have been or will be defined in the field, taking into account the following:

- Ecological similarity to the area to be reseeded.
- Proximity to the pipeline.
- Land ownership.
- Accessibility.
- Abundance and collectability of target species.
- Need to ensure genetic diversity of source material (i.e., seed has been or will be collected from a diverse sample of the parent plants).

Seed Mixes

Seed mixes have been developed for a variety of vegetation types on each construction reach. Site stabilization and erosion control as well as local vegetation composition were considered in selecting plant species used in the mixes. Mixes may be modified as approved by DFG to suit a particular location or landowner preference. Seed mixes are given in Section 5.

Seeding and Planting Methods

Two principal seeding methods were given in the contract specifications: rangeland drill seeding and hydroseeding. For small areas or inaccessible sites, remedial seeding will be done by using a small hand broadcast seeder, and raking the seed in by hand. Methods are described in Appendix A. Seeding will be done in fall or early winter months (September through January).

Seedlings and rooted cuttings will be grown from collected materials and transplanted. Container sizes will depend on the species. Deepot containers and supercells will be used in order to promote root development. Density of plantings and species planted will be specified in the post-construction recommendations for each site, or in the restoration plans for specific creek crossings. Installation methods for container plantings are discussed in detail in Appendix A. Transplanting will be done following the start of the winter rainy period when the ground is wet, generally before the end of February, depending upon yearly conditions. At sites where watering is feasible the planting season may be extended to April.

Oak trees may be propagated by planting acorns or by seedlings grown out in containers and transplanted to the site. Planting and propagation methods are given in Appendix A.

3.4 Monitoring, Maintenance, and Remediation

Table 1 depicts a general monitoring schedule for each of the plant communities. It is anticipated that the monitoring schedule will be refined as the monitoring program progresses, and changes made in the schedule will be in accordance with the success of vegetation

establishment and growth. Monitoring of specific areas will cease when performance criteria (Section 5) and regulatory requirements are met. Field monitors will conduct walk-through inspections to document plant establishment, erosion problems, and weed problems, as well as carry out vegetation sampling to determine the percent cover of vegetation and the presence and cover of native and non-native species.

Table 1. General Revegetation Monitoring Schedule

	Post Construction	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Nonnative grassland	As completed[1]	Feb/Mar[2] May/June[2]	May[2,5]	*	*	*
Native Grasses and Herblands	As completed[1]	Feb/Mar[2] May[2]	Apr/May[2,5]	*	*	*
Saltbush scrub	As completed[1]	Feb/Mar[2] May/June[2] Oct[2]	Mar/Apr [2] June[5]	*	*	*
Chamise Chaparral	As completed[1]	Feb/Mar[2] May/June[2] Oct[2]	Mar/Apr[2] Oct[5]	*	*	*
Oak Woodland/Forest**	As completed[1]	Twice monthly[2,3]	Monthly[2,3]	Monthly[2,3]	Monthly[2,3]	Monthly[5]
Intermittent Drainage	As completed[1]	Mar/Apr[2] Sep/Oct[2]	June [5]	*	*	*
Wetland Drainage/Swale	As completed[1]	Mar/Apr[2] Sep/Oct[2]	June [2]	June[2]	June[2]	June[5]
Riparian Forest and Willow Riparian Scrub	As completed[1]	Monthly[2,3,4]	Monthly[2,3,4]	Monthly[2,3]	Monthly[2,3]	Monthly[5]

Notes:
1. Post construction reach evaluation will be performed as construction is completed and will be repeated if necessary.
2. Walk through and documentation focusing on establishment of planted species, topsoil inspection, and identifying potential weed problems.
3. Inspect planted trees and shrubs for survival, growth, and need for replanting and irrigation needs.
4. Inspect pole cuttings and wattling for growth and stabilization.
5. Vegetation surveys to verify that performance criteria are met.

This schedule is subject to change depending upon a number of factors including seasonal climate conditions; survival rate of planted species; rate and level of effort of maintenance activities; and as determined by the revegation team. Monthly monitoring of woodlands may not be necessary the entire year, especially in years 3 through 5.

Maintenance activities associated with the restoration effort such as erosion and weed control, protective devices, supplemental irrigation, replanting or reseeding, etc., will also be scheduled and performed, as necessary, apart from this monitoring schedule.

Any replacement plantings will be monitored until performance criteria are met.

* Additional monitoring and restoration will be conducted if performance criteria are not met.
** Oaks must survive three years without irrigation and two years without browse protection. Additional monitoring years will be added if performance criteria are not met.

Maintenance requirements will be identified through the monitoring process. Areas where transplants require watering or where persistent problems such as weeds occur may be monitored on a more frequent basis than in Table 1. Erosion control measures will be monitored and maintained as needed.

Weed problems will be remediated using techniques appropriate to the situation and the species in question. Localized weed problems may be treated by hand pulling or hoeing; larger areas of weed outbreaks may be eradicated by mowing, ripping, using herbicides, or burning.

Whenever the performance criteria are not met or when monitoring indicates that additional erosion control or other actions are necessary, the DWR Environmental Support Unit Restoration Team and/or CCWA, in consultation with DFG where appropriate, will determine the measures required and make sure the measures are implemented.

General community monitoring will include visual surveys and documentation focusing on topsoil stability, desirability of plant cover, and weed problems. Vegetation sampling methods will be specific to each plant community and are described below. Field data sheets will be developed and will be used to record monitoring data which will be compiled into monitoring reports. Field data sheets are included in Appendix D.

Seed and seedling plantings in oak and riparian areas will be inspected once or twice monthly for the first year and monthly each year thereafter to determine survival, growth, and need to irrigate. Weeding around the planting basins will be done at least twice yearly in the spring and summer if necessary, or more often as needed.

3.5 Vegetation Sampling Methods

Quantitative sampling methods using belt transects 1 meter wide will be used for determining percent cover and species composition for native perennial plants in shrub and woodland vegetation types along the alignment. The transects will be located in representative areas of each vegetation type and permanently marked so that changes over time can be determined. Percent cover of native perennial species within the belt transects will be measured and the number of each such species will be counted. In woodland and forest, all planted trees will be accounted for annually. All trees planted in riparian zones will be accounted for annually, and percent cover, or height, and species composition will be measured for the restored riparian habitat.

3.6 Reporting

Annual progress reports will be submitted to DFG by 1 January of each year during active revegetation monitoring. Reports will provide a narrative description of the progress of the revegetation, and qualitative and quantitative results of the monitoring. The report will include an analysis of the monitoring data, recommendations, and identification of remedial actions. Photographs from designated stations will be included. Annual reports will be submitted to the Regional Water Quality Control Board in compliance with the SWPPP and other agencies as required in permits.

4.0 DESCRIPTION OF REACHES AND FACILITY SITES WITHIN THE REACH

This section briefly describes vegetation communities and sensitive resources within each project component to provide guidance in restoration activities. Easement area, vegetation, and areas of interest for the reaches are presented in Appendix C.

4.1 Reaches 1 and 2

Reaches 1 and 2 lie in the and interior of northeastern San Luis Obispo County and northwestern Kern County. Reach 1 extends from Devils Den to Davis Road near Cholame,

and Reach 2 continues from there to the Shedd Canyon Staging area. Reach 1 contains Devils Den, Bluestone, and Polonio Pass pumping plants and the Tank 1 complex.

Most of the route impacted non-native grassland and saltbush scrub vegetation communities. Some perennial bunchgrass stands and a few small wetland swales are the only sensitive vegetation types impacted within these reaches.

One federally listed threatened species, *Eriastrum hooveri*, is found on the alignment in Reach 1. *Delphinium recurvatum* (California Native Plant Society [CNPS] List 1B) and *Chorizanthe rectispina* (List 1B) also occur within these reaches. *Eriastrum hooveri* and *Delphinium gypsophilum*, also in the area, are limited distribution species (CNPS List 4).

Reach 1 to the Bluestone Pumping Plant is habitat for the blunt-nosed leopard lizard, a state and federally-listed endangered species. All of Reaches 1 and 2 is considered San Joaquin kit fox habitat (state listed as threatened, federally listed as endangered). A red-legged frog population, federally listed as threatened, exists at ponds near the Tank 1 access road. Other sensitive wildlife occurring or potentially occurring in this area include: American badger, golden eagle, burrowing owl, tricolored blackbird, California horned lizard, giant kangaroo rat (state and federally listed as endangered), short-nosed kangaroo rat, San Joaquin antelope squirrel (state listed as threatened), and the southwestern pond turtle.

Reach 1 contains 30 water bodies, and Reach 2 contains 25 water bodies that are within the jurisdiction of the Corps of Engineers. Drainages within Reach 1 are mostly annual or ephemeral, ranging from gullies to sandy washes. Reach 2 also contains drainages that support wetlands.

4.2 Reach 3

This construction reach lies in the interior of San Luis Obispo County in the rain shadow of the Santa Lucia Range. Construction Reach 3 begins at Shedd Canyon and extends just past Calf Canyon at approximately mile 46.3. Tank 2 is located in this reach.

Vegetation communities in this section include non-native grasslands, native grass and herblands, open blue oak and blue oak/digger pine woodlands, chamise chaparral, coast live oak woodlands, valley oak woodlands, and riparian willow scrub. A few areas are dry-farmed.

A number of plants of limited distribution (CNPS List 4) are found on the alignment: *Chorizanthe douglasii, Eriastrum luteum,* and *Calochortus simulans.*

Sensitive species occurring or potentially occurring on this reach are the American badger, California horned lizard, Arroyo toad, southwestern pond turtle, red-legged frog (federally listed as threatened), California tiger salamander, yellow warbler, white-tailed kite (black-shouldered kite) and Cooper's hawk, long-eared owl, and great blue heron.

Construction Reach 3 contains 43 water bodies that are within the jurisdiction of the Corps of Engineers. These include degraded drainages, mature riparian forests, and numerous wetlands.

4.3 Reach 4

Reach 4 extends from Calf Canyon Creek to the west side of Highway 101 near the north portal of Cuesta tunnel. Permanent facilities located within this reach are Calf Canyon tunnel and Cuesta tunnel.

Vegetation communities in this reach include non-native grasslands, native grass and herblands, open oak woodlands, and riparian communities including willow scrub and southern cottonwood willow riparian forest. A few areas are dry-farmed and soil was being prepared for vineyard installation adjacent to Trout Creek in early 2001.

One CNPS List 1B sensitive plant, *Chorizanthe rectispina*, occurs on this reach. A number of plants of limited distribution (CNPS List 4) are found on the alignment: *Chorizanthe douglasii, Eriastrum luteum, Calochortus simulans, Monardella palmeri*, and *Arctostaphylos obispoensis*.

Sensitive species occurring or potentially occurring are the American badger, southwestern pond turtle, red-legged frog (federally listed as threatened), yellow-legged frog, California tiger salamander (federally listed as endangered), yellow warbler, great blue heron, white-tailed kite (black shouldered kite), willow flycatcher (state and federally listed as endangered), yellow-breasted chat, long-eared owl, tricolored blackbird, and Cooper's hawk.

Reach 4 contains 50 water bodies that are within jurisdiction of the Corps of Engineers. Habitats consisting of riparian forests along with emergent and ephemeral wetlands occur throughout the reach.

4.4 Reaches 5A1 and 5A2

Reach 5A1 begins at the south portal of Cuesta Tunnel and extends to the energy dissipater just south of West Corral de Piedra Tunnel. Reach 5A2 continues to an area south of the Arroyo Grande Creek crossing. Located on the coastal side of the Santa Lucia Range, this area receives more rainfall than the interior sites, as well as summer coastal fog. Reach 5A1 is mostly composed of rough, hilly terrain. Reach 5A2 has relatively flat terrain containing high value agricultural operations and ranch homes. A special feature of this reach is the frequent occurrence of serpentine soils. Specific revegetation techniques are required in these sites due to unique conditions such as soil infertility, lack of topsoil, and an abundance of endemic sensitive species.

Permanent facilities within this reach include Chorro Valley Turnout, Johnson Ridge or West Corral de Piedra Tunnel, energy dissipater structure, and Lopez Turnout.

Most of this reach consists of grassland with riparian woodlands and willow thickets in the drainages. Areas of coast live oak woodland and chamise chaparral vegetation are also found within the alignment. Areas of perennial bunchgrass and serpentine bunchgrass occur below the Cuesta Tunnel and upper West Corral de Piedra Creek. Agricultural lands occur in the area south of the tunnel.

Sensitive plants occurring in this reach include: *Circium fontinale* var. *obispoense* (state and federally listed as endangered), *Arctostaphylos obispoensis, Dudleya abramsii* ssp. *murina*, and

Sanicula hoffinanii, Chorizanthe breweri (List 1B), *Calochortus clavatus* var. *clavatus, Calochortus obispoensis* (List 1B), and *Chorizanthe douglassii.*

Sensitive wildlife occurring or potentially occurring in this reach include: steelhead (federally listed as threatened), American badger, southwestern pond turtle, California red-legged frog (federally listed as threatened), California tiger salamander (federally listed as endangered), yellow warbler, willow flycatcher (state and federally listed as endangered), tricolored blackbird, Cooper's hawk, sharp shinned hawk, peregrine falcon (state and federally listed as endangered), burrowing owl, and golden eagle.

Construction Reach 5A contains 47 water bodies that are under the jurisdiction of the Corps of Engineers. Reach 5A1 consists of high value riparian forests, many of which are protected in inaccessible canyons. Reach 5A2 contains drainages affected by agricultural practices.

5.0 PLANT COMMUNITY RESTORATION

This section describes plant communities found along the Coastal Branch alignment, recommended seed mixes, and specific restoration goals to be met for each community. Appendix A contains specific restoration methodologies including recommended seeding techniques and specifications for container plantings.

5.1 Annual Grassland

This community is generally found on gentle slopes and rolling hills with fine textured soils. It is the most common plant community found within the pipeline corridor. The predominant land use is cattle grazing. Characteristic species include *Avena* spp., *Bromus* spp., *Brassica* spp., *Hordeum* spp., and *Erodium* spp. Also found within this habitat type are: *Castilleja exserta, Lotus* sp., *Lupinus succulentus,* and *Amsinckia intermedia. Gutierrezia californica,* and *Eschscholzia californica* should be locally collected and planted near the collection site.

Annual Grassland Seed Mix

Reach 1	***lbs PLS/acre***
Bromus arizonicus	8.0
Hordeum vulgare	10.0
Lupinus succulentus	3.0
Lupinus bicolor	2.0
Gutierrezia californica	0.05
Castilleja exserta	0.2
Eschscholzia californica	1.0
Lotus scoparius	3.0

Reach 2	***lbs PLS/acre***
Bromus arizonicus	3.5
Lupinus nanus	0.5
Lupinus bicolor	0.5
Gutierrezia californica	0.15
Trifolium hirtum	0.5
Eschscholzia californica	0.1
Bromus mollis	4.0
Lolium multiflorum	6.0
Vulpia myuros	1.0

Annual Grassland Seed Mix (continued)

Reach 3	*lbs PLS/acre*
Bromus carinatus	8.0
Erodium cicutarium	1.0
Eschscholzia californica	0.5
Lupinus bicolor	1.0
Lupinus microcarpus	2.0
Nassella pulchra	2.0
Castilleja exserta	0.1

Reach 4	*lbs PLS/acre*
Bromus carinatus	2.5
Bromus mollis	3.5
Lolium multiflorum	5.0
Nassella pulchra	0.2
Vulpia myuros	1.0
Lupinus microcarpus	0.4
Lupinus bicolor	0.4
Trifolium hirtum	1.5
Eschscholzia californica	0.1

Reaches 5A1 and 5A2	*lbs PLS/acre*
Bromus carinatus	8.0
Nassella pulchra	1.0
Castilleja exserta	0.05
Eschscholzia californica	0.5
Lupinus bicolor	1.0
Lupinus microcarpus	2.0

Performance criteria

- Topsoil is stable and not being lost to wind and water erosion.
- Percent cover by desirable plants is 80 percent or greater of the total vegetation or, if less, is equal to or greater than similar adjacent areas.
- Weeds are no more common on the R/W than on adjacent undisturbed habitats; no weeds are introduced into areas where they did not previously occur.

5.2 Perennial Grassland

Perennial grasslands are generally dominated by *Nassella pulchra* (coastal) and *N. cernua* (interior) with native and introduced annual and perennial companion species. Also present in this community may be other native grasses such as *Melica californica, Sitanion jubatum,* and *Nassella lepida.* This community usually occurs on fine-textured clay soils where cattle grazing has been carefully managed or where topographic features protect these species. A subgroup of native grasslands is the serpentine bunch-grass community. This community is considered sensitive because of limited occurrence, the difficulty of restoration, and other sensitive plant species commonly found within the community. These sensitive plant species include *Dudleya abramsii* ssp. *murina, Calochortus obispoensis, Calochortus clavatus* var. *clavatus,* and *Chorizanthe breweri.* Any sensitive plant species will be collected prior to construction, stored appropriately, and replanted during the site restoration.

Perennial Grassland Seed Mix

Reach 2	*lbs PLS/acre*
Bromus arizonicus	3.0
Bromus mollis	3.0
Lolium multiflorum	4.0
Vulpia myuros	0.8
Nassella cernua	2.0
Lupinus nanus	0.5
Lupinus bicolor	0.5
Trifolium hirtum	0.5
Eschscholzia californica	0.1

Reaches 5A1 and 5A2	*lbs PLS/acre*
Bromus carinatus	8.0
Eschscholzia californica	0.5
Lasthenia chrysostoma	0.3
Melica califomica	0.5
Nassella lepida	1.0
Nassella pulchra	2.0
Lupinus microcarpus	2.0
Lupinus succulentus	2.0

Reaches 3 and 4, Cuesta Tunnel (north portal)	*lbs PLS/acre*
Bromus carinatus	10.0
Eschscholzia californica	0.5
Lupinus bicolor	2.0
Lupinus microcarpus	4.0
Nassella pulchra	4.0
Castilleja exserta	0.1

In addition, *Nassella pulchra* plugs grown from seeds collected on-site may be planted along the R/W. Plugs will be planted by hand when the soil is moist, typically between December and March.

Through negotiations with California Polytechnic State University-San Luis Obispo, a special seed mix will be used on their property, in Reach 5A1.

Performance Criteria

- Topsoil is stable and not being lost to wind and water erosion.
- Percent cover of bunch grasses and other planted species is 60 percent or greater of the total vegetation or, if less, is equal to or greater than similar adjacent areas.
- Weeds are no more common on the R/W than on adjacent undisturbed habitats; no weeds are introduced into areas where they did not previously occur.

5.3 Saltbush Scrub

This habitat type occurs in the interior region on sandy-loamy soils with moderate alkalinity. Grazing may occur on this habitat type, but such areas generally are considered high value for wildlife. The dominant plant species include *Atriplex polycarpa, Atriplex lentiformis, Baccharis* sp., *Amsinckia intermedia,* and *Bromus* spp.

Saltbush Scrub Seed Mix

Reaches 1 and 2	*lbs PLS/acre*
Bromus arizonicus	10.0
Melica californica	1.0
Lupinus succulentus	2.0
Atriplex lentiformis	1.0
Atriplex polycarpa	2.0
Atriplex spinifera	2.0

Performance Criteria

- Topsoil is stable and not being lost to wind and water erosion.
- Percent cover of desired species is 60 percent or greater of the total vegetation or, if less, is equal to or greater than similar adjacent areas.
- Weeds are no more common on the R/W than on adjacent undisturbed habitats; no weeds are introduced into areas where they did not previously occur.

5.4 Chamise Chaparral and Venturan Coastal Sage Scrub

Chamise chaparral is almost completely dominated by *Adenostoma fasciculatum* (chamise) with a dense canopy cover. It occurs in very dry areas on slopes and is a fire adapted community. The soil is predominantly decomposed granite with moderate erodability. Diversity increases substantially after a fire occurrence.

Venturan coastal sage scrub occurs in small areas of Reach 5. Reseeding of Venturan coastal sage scrub will be with the chamise chaparral seed mix without *Adenostoma fasciculatum* seed.

Chamise Chaparral Seed Mix

Reaches 3 and 5	*lbs PLS/acre*
Adenostoma fasciculatum	1.0
Artemisia californica	1.0
Bromus carinatus	4.0
Eriogonum fasciculatum var. *foliolosum*	0.5
Lotus scoparius	1.0
Lupinus bicolor	1.0
Nassella pulchra (Reach 3)	0.5
Nassella lepida (Reach 5)	0.2

Performance criteria

- Topsoil is stable and not being lost to wind and water erosion.
- Percent cover by desirable plants is 60 percent or greater of the total vegetation or, if less, is equal to or greater than similar adjacent areas identified at the outset of the program.
- Weeds are no more common on the R/W than on adjacent undisturbed habitats; no weeds are introduced into areas where they did not previously occur.

5.5 Oak Woodland/Forest

Blue Oak Woodland

This community is dominated by *Quercus douglasii* but usually contains other oak species. The community structure varies from open with grassy understories to fairly dense woodlands with shrubby understories. It occurs on well drained, rocky soils mostly below 3,500 feet. Common understory plants are *Rhamnus californica, Ceanothus* spp., and *Adenostoma fasciculatum. Pinus sabiniana* also occurs within this habitat type.

Coast Live Oak Woodland

This community is dominated by *Quercus agrifolia*. It has an open canopy and typically occurs on north-facing slopes and in shaded ravines. Associated species include *Heteromeles arbutifolia, Rhamnus californica, Rhamnus crocea,* and annual and perennial grasses and herbs.

Coast Live Oak Riparian Forest

This community is dominated by *Quercus agrifolia* with a denser canopy cover and more dense understory than coast live oak woodland. Understory species include *Pteridium aquilinum, Salvia spathacea,* and *Toxicodendron diversilobum.*

On steep slopes, the annual grassland seed mix may be added to the oak woodland seed mix with 100 pounds per acre of fertilizer to enhance growth of grasses for erosion control.

Oak Woodland Understory Seed Mix

Reach 3	*lbs PLS/acre*
Achillea millefolium	0.1
Artemisia californica	1.0
Bromus carinatus	8.0
Eriogonum fasciculatum var. *foliolosum*	2.0
Lotus scoparius	1.0
Lupinus nanus	2.0
Poa scabrelia	0.05
Sitanion jubatum	0.5
Nassella pulchra	1.0

Reach 4	*lbs PLS/acre*
Achillea millefolium	0.1
Artemisia californica	0.1
Bromus carinatus	1.5
Eriogonum fasciculatum var. *foliolosum*	1.25
Lotus scoparius	1.5
Lupinus bicolor	0.5
Poa scabrelia	0.1
Nassella pulchra	0.2
Bromus mollis	3.0
Lolium multiflorum	2.0
Trifolium hirtum	1.0
Eschscholzia californica	0.1

Oak Woodland Understory Seed Mix (continued)

Reach 5A	*lbs PLS/acre*
Artemisia californica	0.01
Artemisia douglasiana	0.01
Bromus carinatus	8.0
Eriogonum fasciculatum var. *foliolosum*	0.5
Elymus condensatus	0.5
Lupinus succulentus	2.0
Nassella pulchra	1.0
Rhamnus californica	1.0

Performance Criteria

- Topsoil is stable and not being lost to wind and water erosion.
- Percent cover by desirable plants is 60 percent or greater of the total vegetation or, if less, is equal to or greater than similar adjacent areas.
- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless present prior to construction.

Oak Tree Planting

All trees removed during construction have been tallied by species (including non-oaks). A tree requiring mitigation was defined as any tree with a single trunk at or larger than 4 inches diameter at breast height (dbh). Due to the operations and maintenance concerns, large trees such as oaks will not be allowed to grow directly over the pipe. To compensate for this permanent loss of oak habitat, off-site acreage in an area with oak habitat will be purchased or put in a conservation easement. Trees will be planted at the off-site mitigation area(s) and at sites owned by state and local entities, as well as in the temporary and permanent easement areas on-site, as permitted by landowner concerns and access. The location and extent of off-site oak mitigation has not yet been determined. Details of the off-site oak replacement requirements will be determined through consultation with DFG for the Replacement Lands Report.

Acorns will be collected from healthy individual trees located in the immediate vicinity of the trees which were removed. Collection will occur in the fall when the acorns are ripe. Direct planting of acorns will occur in the fall and extend to no later than February. Acorns may also be grown to tree-pot size (4"x14") at the California Conservation Corps Nursery at Camp San Luis or other nursery facilities. Specific planting measures and techniques are discussed in Appendix A.

Performance Criteria

At acceptance, the following criteria shall be met:

- Have vigorous appearance.

- Be a minimum of 2 inches in basal diameter.
- Be a minimum of 6 feet tall.
- Have survived 3 years with no supplemental irrigation and 2 years with no protection from herbivores.

At acceptance, planted oaks should be able to survive without further protection or maintenance. Young trees must be readily able to withstand normal seasonal droughts and pressure from herbivores, especially cattle. Oaks planted near streams should be situated in such a way as to be able to survive normal seasonal flooding. The required number of planted coast live oak and blue oak trees, five saplings (5 years after planting) per tree lost (with a trunk diameter of 2 inches or more), shall have met the above-outlined criteria. Valley oaks will be planted so 10 saplings (5 years after planting) per tree lost shall meet the criteria.

Valley oaks and coast live oaks may meet the performance criteria in 5 years. It is anticipated that blue oaks will require a longer time to meet the criteria. Monitoring beyond 5 years (from time of planting, including replacement trees) will be reduced to once annually in the fall until all performance criteria are met.

5.6 Intermittent Drainage

For the purpose of this document, intermittent drainages are categorized as erosional features that are characterized by distinct bed and bank development and lack significant riparian vegetation. Vegetation is usually similar to the surrounding upland vegetation and the seed mix for those upland areas will be used at the drainages. Additional stabilization measures will be used as needed including sand bags, rock facing, additional erosion control blankets, etc.

Performance Criteria

- Topsoil is stable for site conditions and not being lost to water or wind erosion.
- Hydrology (topographic characteristics) is restored and system is functioning as close to preproject as possible.
- Cover of vegetation is approximately the same as preproject and/or portion of feature undisturbed by project.

5.7 Wetland Drainage/Swale

Wetland drainages or swales are Corps of Engineers jurisdictional wetlands that either occur as all or part of a waters of the United States with bed and bank development or a defined wetland without bed and bank development. These features are typically characterized by hydrophytic plant species such as: *Juncus bufonius, J. tenuis, Mimulus floribundus, M. guttatus, Polypogon maritimus, Rumex salicifolius, Cotula coronopifolia,* and others.

Native vegetation is expected to resprout from perennial rhizomes, rootstocks, and the seedbank contained within the top 12 inches of the soil. In addition, it is expected that seeds from the adjacent undisturbed portion of the wetlands will colonize the disturbed area. If this does not occur within one season, seeds from desirable native plant species will be collected

from adjacent wetlands and raked into the disturbed wetland areas, or plugs from adjacent areas will be taken and planted in the disturbed area.

Performance Criteria

- Topsoil is stable and not being lost to wind or water erosion.
- Hydrology (topographic characteristics) is intact and system is functioning as close to preproject as possible.
- Cover of native marsh vegetation is approximately the same as preproject and/or portion of feature undisturbed by project.

5.8 Riparian Forest and Willow Riparian Scrub

Riparian forest and willow scrub habitats are biologically important resources. The thick vegetative cover types, diverse assemblage of plant and wildlife species, and the dynamics of the aquatic ecosystem are combined to form a valuable habitat. The major riparian systems impacted by this project are as follows:

East Branch Huerhuero Creek	Reach 3
Middle Branch Huerhuero Creek	Reach 3
Calf Canyon Creek*	Reach 3
Salinas River*	Reach 4
Trout Creek	Reach 4
Santa Margarita Creek*	Reach 4
North Fork Cuesta Tributary	Reach 5A1
Stenner Creek and tributaries	Reach 5A1
Miossi Creek	Reach 5A1
Reservoir Canyon Creek and tributaries	Reach 5A1
Hampton Creek	Reach 5A1
West Corral de Piedra Creek*	Reach 5A1
Arroyo Grande Creek*	Reach 5A2

*These sites have specific restoration plans.

All riparian habitats will be restored to adjacent non-disturbed conditions for species composition, habitat value, and site stability.

At impacted riparian sites, seeds and cuttings have been and will be collected from tree and shrub species including: *Platanus racemosa, Populus fremontii, Salix* spp., *Rhamnus* spp., *Rosa californica, Symphoricarpos mollis, Rubus ursinus*, and others. These will be grown to at least plug size and planted at or adjacent to the riparian sites where they were collected.

Erosion control/restoration measures which may be utilized at riparian crossings include: willow wattling, willow and cottonwood poles, erosion control blankets, rock armoring, and sandbags.

Riparian Understory Seed Mix

Reach 3	*lbs PLS/acre*
Artemisia douglasiana	0.01
Bromus carinatus	8.00
Elymus triticoides	1.50
Eriogonum fasciculatum var. *foliolosum*	0.10
Rhamnus californica	1.00

Reach 5A	*lbs PLS/acre*
Artemisia californica	0.01
Artemisia douglasiana	0.01
Bromus carinatus	8.00
Elymus condensatus	0.50
Nassella pulchra	1.00
Rhamnus californica	1.00

Reach 4	*lbs PLS/acre*
Achillea millefolium	0.1
Artemisia californica	0.1
Bromus carinatus	1.5
Eriogonum fasciculatum var. *foliolosum*	1.25
Lotus scoparius	1.5
Lupinus bicolor	0.5
Poa scabrelia	0.1
Nassella pulchra	0.2
Bromus mollis	3.0
Lolium multiflorum	2.0
Trifolium hirtum	1.0
Eschscholzia californica	0.1

Performance Criteria

- Topsoil is stable and not being lost to wind or water erosion.
- Hydrology (topographic characteristics) is intact and system is functioning as close to preproject as possible.
- No concentrations of weeds are present that would threaten to invade adjoining habitats, unless occurring in adjacent areas.
- Locations of wattling installation are stabilized.
- A minimum of 75 percent of the tree/shrub container plantings must survive by the end of the planting year.
- The following tree height criteria have been met:

Species	*Height*	
	3 years	*5 years*
Arroyo willow	10 feet	15 feet
Red willow	9 feet	15 feet
Sycamore	5 feet	9 feet
Cottonwood	7 feet	12 feet

Within approximately 5 years the site shall have the following characteristics:

- Well established ground cover appropriate for the site (similar to adjacent undisturbed area). This may consist of native riparian understory species such as annuals, perennials, marsh, shrub and tree seedlings.
- Tree and shrub cover equal to at least 90 percent of adjacent comparable areas.

APPENDIX A
SEED APPLICATION TECHNIQUES

In most areas throughout the easement a rangeland drill seeder will be used as described below. Some of the areas needing seed reapplication will be either too small or too steep to use a rangeland drill seeder. In the steep areas, seed will applied by hydroseeding as outlined below. At small isolated trouble spots, seed will be broadcast using a "coffeegrinder" broadcast seeder and raked or otherwise incorporated into the soil. This will be conducted under the supervision of the lead on-site environmental specialist.

All seed shall be of a quality that has a minimum pure live seed (PLS) content as specified (percent purity x percent germination) and weed seed shall not exceed 0.5 percent of the aggregate of PLS and other material.

Legume seed shall be pellet-inoculated with a viable bacteria compatible for use with that species of seed. Inoculated seed shall be labeled to show the weight of seed, the date of inoculation, and the weight and the source of inoculant materials. Inoculant shall be added at the rate of 2 pounds of inoculant per 100 pounds of legume seed.

Fertilizer may be used where necessary according to the discretion of the lead environmental specialist. Areas that may require fertilizer include those lacking topsoil.

The following methods will be modified as needed to fit specific site requirements. Seeding will generally be scheduled for fall application. Application may occur at other time to meet specific site conditions and workload scheduling. Seed application scheduling will be a consideration in choosing the seed application method.

Method 1 - Rangeland Drill Seeder Application

On slopes 3:1 or flatter and wherever possible the seed may be applied in three steps as follows:

Step 1. Areas previously seeded and mulched unsuccessfully may be cleared to bare topsoil by raking, burning, harrowing, etc. Seed shall be applied during suitable weather and not within 24 hours of predicted rain. Roads and/or soils compacted by equipment or vehicles shall be scarified to a depth of 3 inches. The seed shall then be applied using a native seed range drill that plants the seeds of various sizes 1/2 to 1 inch deep. The seed shall be applied at the rates given in the seed mix tables.

Step 2. After the seed has been sown in the ground with the seed drill, straw may be uniformly applied at a rate of up to 2,000 pounds per acre over the entire surface of the seeded area. The straw may be applied by hand blower or other suitable equipment within 24 hours after seeding. If the straw is applied with a blower, the straw shall have a minimum length of six inches. Straw will be crimped into the soil if Step 3 is not used.

Step 3. Stabilizer (tackifier) and mulch without seed may be applied with a hydroseeder over the straw. The stabilizer and mulch should be applied over the straw within 24 hours of placement of the straw. The stabilizer shall be applied as recommended by the manufacturer

and at a rate of 100 pounds of stabilizer per acre and 500 pounds of mulch per acre. The capabilities and capacities of the hydroseeder are specified below.

Method 2 - Hydroseeding Application

On slopes steeper than 3:1 where drilling is not possible, the seed may be applied as follows:

The seed and mulch may be applied as a slurry with a hydroseeder at a uniform rate of 2,000 pounds of mulch per acre. The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system which shall apply the mix to the ground at a continuous and uniform rate. Seed shall not remain in the slurry longer than 30 minutes. The slurry shall be applied at a rate that is non-erosive and minimizes runoff. On very steep slopes, the mulch may be increased up to 3,000 pounds per acre and a binder (75 gallons per acre) may be added in addition to a tackifier.

Installation of Container Plants and Acorn Planting

Over-planting is recommended to give a competitive edge to the desired native plant species, to assure complete vegetative cover for erosion control purposes, to meet standards with minimal remedial plantings, and to prevent weed invasion. In some cases an accelerated successional process is desired to quickly replace sensitive habitat or to give woody species a head start over the weeds and eventually shade them out. In these areas container planting will be used along with an appropriate system of irrigation (if needed) until plants are established.

Seeds and acorns will be collected on site and used directly for restoration or sent to the CCC Nursery at Camp San Luis or another facility to be grown to seedling size. All collected acorns will be float-tested for viability and those acorns that float in water will be discarded. Acorns may be stored until planting in moist peat moss in sealed plastic bags in a dark refrigerator for up to 6 months. Seed and seedling plantings will be conducted between November and March.

Planting holes for each seedling will be augured or hand dug and then backfilled to the approximate depth of the root. A water basin will be constructed around each planting hole and may be soaked with water and allowed to drain before seedlings are planted. A slow-release, 12- to 24-month fertilizer tablet may be placed below the root zone of each plant.

For direct acorn plantings, acorns will be planted at a depth equal to approximately one to one-and-a-half times the acorn's diameter. Acorns will be placed on their sides and slow-release fertilizer tablets may be placed in each hole.

For the first three years (or longer if necessary), container and acorn plantings may be protected with various techniques to prevent herbivore and weed problems. Materials for the plant protection will be purchased in bulk and constructed on-site.

For the first two years, (or longer if necessary) planted seedlings may be irrigated in the summer and fall. Plants showing evidence of healthy growth without irrigation will not be irrigated. When watering, the soil should be saturated to a depth of at least 2 inches below the roots of the planted vegetation. Water shall be applied in a manner that does not cause erosion.

APPENDIX B
SITE STABILIZATION TECHNIQUES

The techniques described in this section will be used as tools by the restoration team to control erosion and sediment. Other erosion and sediment control methods and techniques are available and will be used by the restoration team as needed. These and other techniques will be implemented in conjunction with the revegetation/restoration and other stabilization measures that have been outlined in this plan. All appropriate permits will be obtained prior to working in stream or wetland habitats, including Corps of Engineers and DFG.

WILLOW WATTLING

This measure is used as a biotechnical stabilization technique for the banks of stream channels. Willow wattling will be installed at sites that naturally support willows. They may be used on slope toes where conditions along the slope are unstable.

Installation

1. Wattling bundles will be constructed from local, live, dormant, willow cuttings.

2. The length of wattling bundles will range from 7 to 9 feet, depending on available stock. The ends of the bundle are to be tapered. The butt-end of cutting will be approximately 1/2 inch in diameter.

3. Bundles are constructed with stems placed alternately so half the butt-ends are at each end of the bundle.

4. Bundles shall be compressed firmly and tied every 12 to 15 inches with at least two wraps of binder twine (or heavier) with non-slipping knots. Each bundle when tied is to be approximately 8 inches in diameter.

5. Wattling bundles must be installed within 24 hours of collection and preparation.

6. Set bottom/guide stakes every 24 to 36 inches on the contour to a depth of 18 inches. Stakes are live willow cuttings greater than 1/2 inch in diameter or construction stakes (2 X 4 X 24 or 2 X 4 X 36).

7. Trench above guide stakes, following slope contour and dig approximately 4 inches deep.

8. Place bundles in trenches with ends overlapping 12 inches so each bundle overlaps at the last tie, leaving approximately one-third of the bundle above grade.

9. Stake through bundles on the downhill side every 24 to 36 inches. Join the overlapping bundles with a stake inside end ties. Drive the stakes to a depth of 18 inches.

10. If 24-inch stakes do not secure bundles, use 36-inch stakes.

STRAW MULCH

Straw mulch may be used in areas where vegetation has not yet been established and existing straw mulch has been lost.

OTHER MEASURES

Mechanized erosion control measures may be implemented as deemed necessary by the supervising Environmental Specialist. These could include, but not be limited to, rock gabions, rock dikes, culvert installation, recontouring, retaining walls, terracing, large-scale seeding operations, etc. Sites requiring mechanized equipment would be evaluated by the Environmental Specialist and implemented by the DWR Division of Engineering (raw water segment) or CCWA (treated water segment).

Appendix C

Estimates of Easement Area, Vegetation Totals and Areas of Interest for Coastal Branch, Phase II

Reaches 1 through 5A for Restoration Planning

(Tables 2 through 6)

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
1	3	35	Devil's Den Pumping Plant & Staging Area to hilltop fenceline above Devil's Den Pumping Plant	0.6	59.8	14.7		2.9	17.5	41.2		1.1	42.3
2	36	129	Fenceline (near hilltop above Devil's Den P.P.) to manhole @ junction of pipeline & Bluestone Pumping Plant Access Road	1.8	39.4	25.9			25.9	13.5			13.5
3	130	227	Junction of pipeline & Bluestone Pumping Plant Access Road to perimeter of Bluestone Pumping Plant	1.9	39.9	18.7		6.5	25.2	11.3		3.4	14.7
4	228	332	From Bluestone Pumping Plant perimeter to junction of Hwy. 46 access road (at Barber property fenceline) with pipeline alignment	2.0	39.1	14.8			14.8	24.3			24.3
5	333	481	From junction of Hwy. 46 access road (at Barber property fenceline) with alignment to eucalyptus at Union Oil Company	2.8	48.6	23.9			23.9	24.7			24.7
6	482	561	Union Oil Company to Hwy. 46 crossing	1.5	21.7	11.4			11.4	10.3			10.3
7	562	633	Hwy. 46 crossing to Polonio Pass Pumping Plant	1.4	39.5	7.5	10.0		17.5	4.7	17.3		22.0
8	634	681	From northwestern perimeter of Polonio Pass Pumping Plant to Tank 1 eastern perimeter	0.9	14.5	6.2			6.2	8.2			8.2
9	682	710	Tank 1	0.5	191.4	114.0			114.0	77.4			77.4
10	711	775	Tank western 1 perimeter to fenceline @ Station 776 (near manhole on last hilltop east of Davis Road)	1.2	21.1	10.5			10.5	10.6			10.6
11	776	871	Fenceline @ Station 776 (near manhole on last hilltop east of Davis Road) to manhole @ Station 871+80 (manhole adjacent to San Andreas Fault crossing)	1.8	30.3	14.3			14.3	16.0			16.0
			Total for Reach 1	**16.5**	**545.3**	**262.0**	**10.0**	**9.3**	**281.3**	**242.2**	**17.3**	**4.5**	**263.9**

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
1	3	35	**Devil's Den Pumping Plant & Staging Area to hilltop fenceline above Devil's Den Pumping Plant**	0.6	59.8	14.7		2.9	17.5	41.2		1.1	42.3
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	3	35	Habitat for blunt-nosed leopard lizards, San Joaquin kit fox, and American badgers										
	3	17	Four spoil piles and berms have 2:1 slopes										
	20	24	Low to moderate erosion potential on hill slope; slope varies from 10% to 20%										
	18	27	Eriastrum hooveri (Erho) population site and probable replanting site										
	25	31	Medium to high erosion potential on hill slope; slope varies from 20% to 45%, slope length =750 feet, easement area =										
	32	34	Permanent cut in hill top with 2:1 slopes, approximately 500 feet long, maximum slope length = 40 feet, average slope length =25 feet, slope area =										
2	36	129	**Fenceline (near hilltop above Devil's Den P.P.) to manhole @ junction of pipeline & Bluestone Pumping Plant Access Road**	1.8	39.4	25.9			25.9	13.5			13.5
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	36	129	Habitat for blunt-nosed leopard lizards, San Joaquin kit fox, and American badgers										
	36	37	Spoil pile north of pipeline alignment with access road to hilltop										
	36	38	Low erosion potential on hill slope; slope varies from 13% to 16%										
	55	58	Low erosion potential on portions of hill slope; slope varies from 10% to 13%										
	101		Low erosion potential on portions of ridge slope; slope =10%										
	102	103	Moderate erosion potential on upper portion of ridge slope, slope = 25%										
	104	106	Low erosion potential on portions of ridge slope; slope =10%										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
3	130	227	**Junction of pipeline & Bluestone Pumping Plant Access Road to perimeter of Bluestone Pumping Plant**	1.9	39.9	18.7		6.5	25.2	11.3		3.4	14.7
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	130	227	Habitat for blunt-nosed leopard lizards, San Joaquin kit fox, and American badgers										
	136		24" corrugated metal pipe (CMP) culvert under access road										
	137		24" CMP culvert under road										
	140		18" CMP culvert under road, earth dike north of road										
	146		24" CMP culvert under access road										
	154	155	U.S. Waters: SR 0.1; erosion potential medium to high along banks, 36" CMP culvert under access road										
	160		30" CMP culvert under road, earth dike north of road										
	163		18" CMP culvert under access road										
	166	169	Potential site for Amsinckia fucata (Amfu) population										
	167		24" CMP culvert under access road, earth dike north of road										
	172		24" CMP culvert under access road, earth dike north of road										
	180		24" CMP culvert under access road, earth dike north of road										
	184		30" CMP culvert under access road, earth dike north of road										
	190		U.S. Waters: SR 0.5										
	194	197	Potential Delphinium recurvatum (Dere) population site										
	194	200	U.S. Waters: SR 1.0; low to moderate erosion potential along banks, ford across access road at Stn. 195 and Stn. 200, earth dike north of road at Stn. 200										
	212		U.S. Waters: SR 2.0; 42" CMP culvert under access road										
	218		48" CMP culvert under access road										
	219	227	U.S. Waters: SR 2.5; low erosion potential along banks, 42" CMP culvert under access road, earth dike north of road										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
4	228	332	**From Bluestone Pumping Plant perimeter to junction of Hwy. 46 access road (at Barber property fenceline) with pipeline alignment**	2.0	#REF!	14.8			14.8	24.3		###	#REF!
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	228	332	Habitat for San Joaquin kit fox and American badger										
	228	240	U.S. Waters: SR 3.0, moderate erosion potential along banks										
	228	231	Spoil pile with 2:1 slopes										
	228	235	U.S. Waters: SR 2.5; low erosion potential along banks										
	229	235	Cut and fill slopes around power plant have 2:1 slopes										
	254	255	U.S. Waters: SR 3.1										
	251	258	Low erosion potential along base of hill slope; slope = 11% to 19%										
	259	262	Moderate erosion potential along base of hill slope; slope = 19% to 27%										
	263	267	Low erosion potential along base of hill slope; slope = 11% to 16%										
	264	276	U.S. Waters: SR 3.1, 3.2, 3.4										
	287	292	Low erosion potential along base of hill slope; slope = 13% to 17%										
	293	294	Moderate erosion potential near top of slope; slope = 21% to 27%										
	295	300	Low erosion potential along hill slopes; slope = 13% to 17%; moderate erosion potential due to 22% slope at Stn. 300 in drainage (U.S. Waters: SR 5.0)										
	301	304	Low erosion potential along hill slope; slope = 12% to 18%										
	306	308	Low erosion potential along hill slope; slope = 11% to 13%										
	312		Low erosion potential along hill slope; slope = 15%										
	313	315	Moderate erosion potential along base of hill slope; slope = 20% to 25%, slope length = 125 feet(?)										
	316		Low erosion potential along hill slope; slope = 14%										
	319		U.S. Waters: SR 5.1										
	327		Low erosion potential along hill slope; slope = 10%										
	331		U.S. Waters: SR 6.0										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
5	333	481	**From junction of Hwy. 46 access road (at Barber property fenceline) with alignment to eucalyptus at Union Oil Company**	2.8	48.6	23.9			23.9	24.7			24.7
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	333	481	Habitat for San Joaquin kit fox and American badger										
	343		U.S. Waters: SR 6.5										
	351	353	U.S. Waters: SR 6.6										
	361	362	U.S. Waters: SR 7.0										
	370	373	Low erosion potential on hill slopes, slope = 13% to 16%										
	375	378	Moderate erosion potential on hill slope; slope = 18% at top of hill, 21% to 28% on middle to lower portions of slope, slope width = 150 feet (?)										
	378		U.S. Waters: OP 1.0										
	379		Low erosion potential along hill slope; slope = 12%										
	391	392	U.S. Waters: OP 2.0; High erosion potential along banks										
	412	413	Moderate erosion potential (22% slope, 50 foot length) and low erosion potential (18% slope) on hill slope; U.S. Waters: OP 2.1										
	414	416	Low erosion potential on hill slopes; slope = 10% to 17%, slope length = 280 feet										
	417	421	Low erosion potential on hill slopes; slope = 10% to 18%, slope length = 280 feet										
	426	429	Low erosion potential along hill slope; slope = 10%										
	429	430	U.S. Waters: OP 2.2										
	438	439	U.S. Waters: OP 2.3; low erosion potential along banks										
	461	467	Highway 46 Staging Area										
6	482	561	**Union Oil Company to Hwy. 46 crossing**	1.5	21.7	11.4			11.4	10.3			10.3
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	482	561	Habitat for San Joaquin kit fox and American badger										
	518		Low erosion potential along hill slope; slope = 10%										
	519	522	Moderate to High erosion potential; slope= 22% to 32%, slope length = 120 feet										
	532	536	Low erosion potential along hill slope; slope = 10%										
	523		Low erosion potential along hill slope; slope = 10%										
	548		Low erosion potential along hill slope; slope = 11%										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
7	562	633	**Hwy. 46 crossing to Polonio Pass Pumping Plant**	1.4	39.5	7.5	10.0		17.5	4.7	17.3		22.0
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	562	633	Habitat for San Joaquin kit fox and American badger										
	566		U.S. Waters: OP 3.0										
	589		U.S. Waters: OP 4.0										
	598		U.S. Waters: OP 5.0; low erosion potential along banks										
	620	633	U.S. Waters: OP 6										
	621	625	Spoil pile (southeast of pumping plant) and berm (north of pumping plant) have 2:1 slopes										
	622	628	Drainage south of pumping plant diverted into culvert along access road, and diverges into drainage OP 6 near spoil pile										
8	634	681	**From northwestern perimeter of Polonio Pass Pumping Plant to Tank 1 eastern perimeter**	0.9	14.5	6.2			6.2	8.2			8.2
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	634	681	Habitat for San Joaquin kit fox and American badger										
	647	651	Low erosion potential along hill slope; slope = 14% to 20%; U.s. Waters: OP 6.5A with moderate erosion potential along banks										
	652	655	Moderate erosion potential along hill slope and banks of U.S. Waters: OP 6.5B										
	660	666	High erosion potential on slope of hill; slope = 11% at base of hill, 20% to 43% in middle of slope, and 20% to 24% near top of slope; total slope length = 740 feet										
	667	671	Moderate erosion potential on upper slope and side slopes of hill; slope = 14% to 24%										
	672	678	Alignment on top of flat ridge top but easement area may be disturbed in areas with moderate erosion potential; slopes on ridge may be as much as 24%										
	677	683	Oak grove adjacent to pipeline alignment (count trees to determine losses)										
	679	681	Moderate erosion potential along pipeline alignment; slope = 21% to 28%; slopes adjacent to alignment are steep and extent of disturbance in area near Tank 1 facility is unknown										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
9	**682**	**710**	**Tank 1**	**0.5**	**191.4**	**114.0**			**114.0**	**77.4**			**77.4**
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	682	710	Habitat for San Joaquin kit fox and American badger										
			Tank 1 Access Road from 160 degree curve in road to Tank 1 perimeter gate: 5 C.M.P. culverts under access road, 3 turnouts on north side of road, and drainage ditches on south side of road										
			From Tank 1 perimeter gate along north side of perimeter to spoil pile area: 3 turnouts on north side of road and 2 C.M. P. culverts under road										
			Spoil pile area (Northwest face): 2:1 fill slopes, drainage ditch connection (from 895 foot bench) to hillside and flow down hillside, oak tree below spoil pile										
			Spoil pile (North face): 2:1 fill slopes, drainage ditch connections (from 895 foot bench, 1855 foot bench, and 1815 bench) to hillside and flow down hillside, and wetland area at toe of spoil pile										
			Spoil pile (East face): 2:1 fill slopes										
			East perimeter of Tank 1 along Tank 1 Access Road: 2:1 fill slopes on access road fill area (between spoil pile and oak grove), turnout connection from fill area to hillside, turnout connection from access road to hillside, oak grove										
			East perimeter of Tank 1 along East Access Road: 2:1 fill slopes along access road, turnout (located at north end of fill area) connection with hillside, 2 12" C.M.P. i fill opposite Entrance Chamber, 1 12" C.M.P. in fill at southeast corner near Tank 1										
			South perimeter: turnout connection with hillside near Tank 1										
			West perimeter adjacent to raw water Tanks 2 & 3: 2:1 cut and fill slopes, Outlet Structure #1, 2 24" culvert outlets, 1 turnout from East Access Road										
			West perimeter adjacent to treated water Tanks 4 & 5: 2:1 fill slopes, 1 24" culvert outlet near west end of treatment plant, 2 24" culvert outlets near Tank 4, Outlet Structure #2, 2 12" C.M.P. outlets										
			West perimeter along relocated private access road: 48" C.M.P. and 1.5:1 slopes at drainage crossing										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
10	711	775	Tank 1 perimeter to fenceline @ Station 776 (near manhole on last hilltop east of Davis Road)	1.2	21.1	10.5			10.5	10.6			10.6
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	711	775	Habitat for San Joaquin kit fox and American badger										
	711	716	Low erosion potential along hill slope; slope = 10% to 12%										
	719	722	Low erosion potential along hill slope (slope = 10% to 12%) with moderate to high erosion potential along banks of drainage U.S. Waters: OP 7										
	726		Low erosion potential along hill slope; slope = 12%										
	728	729	Wetland: OP 8										
	728	745	Low erosion potential along hill slopes; slope = 10% to 19%										
	736		Riparian wetland: OP 9										
	746	756	Moderate to high erosion potential on hill slope; slope varies from 8% to 18% at top of hill, 25% above road that crosses alignment at Stn. 751+67, 36% below road; U.S. Waters: OP 8 at base of hill										
	757	759	High erosion potential on hill slope; slope varies from 40% at base of slope to 27% near middle of slope and 11% at top of slope; slope length = 235 feet										
	761	764	High erosion potential on hill slope; slope varies from 28% at top of slope to 37% near middle of slope, and 21% to 38% near base of slope; U.S. Waters: OP 9 at base of slope										
	765	767	Moderate to high erosion potential on hill slope; slope varies from 36% at base of slope to 28% near middle of slope and 14% near top of slope										
	769	775	Low erosion potential on hill slopes; slope varies from 12% to 16%										

REACH 1: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (mi.)	Total Acres	Acres Of Vegetation Community Found In Permanent Easement				Acres Of Vegetation Community Found In Temporary Easement			
						Grassland	Agricul.	Saltb. Scrub	Total	Grassland	Agricul.	Saltb. Scrub	Total
11	776	871	**Fenceline @ Station 776 (near manhole on last hilltop east of Davis Road) to manhole @ Station 871+80 (adjacent to San Andreas Fault crossing)**	1.8	30.3	14.3			14.3	16.0			16.0
			Notable Features & Potential Trouble Spots Within This Segment Of Reach 1:										
	776	871	Habitat for San Joaquin kit fox and American badger										
	776	778	Moderate erosion potential on hill slope; slope varies from 26% near top of slope to 15% in Stn. 778										
	785	786	Low erosion potential on hill slopes; slope varies from 13% to 15%										
	790	796	Low erosion potential on hill slopes; slope varies from 14% to 10%										
	798		U.S. Waters: OP 10, with low erosion potential along banks										
	799	804	Low erosion potential on hill slopes; slope varies from 10% to 12%										
	816	820	Low erosion potential on hill slopes; slope varies from 9% to 15%										
	823	828	Low erosion potential on hill slopes; slope varies from 10% to 16%										
	832	835	Low erosion potential on hill slopes; slope varies from 11% to 18%										
	841	843	Low erosion potential on hill slopes; slope varies from 9% at top of slope to 11% near base										
	848		U.S. Waters: C 2										
	853	855	Low erosion potential on hill slopes; slope varies from 10% to 13%										

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
1	872	964	San Andreas Fault, Davis Road, to Bitterwater Road	1.8	43.7	17.1				17.1	26.6				26.6
2	965	1087	Bitterwater Road to Lucy Brown Road	2.3	46.5	9.7	14.0			23.7	9.8	12.9			22.8
3	1088	1232	Lucy Brown Road to intersection of Hwy. 41 & San Juan Road (McMillan/Halpin fenceline)	2.6	27.6	1.8	66.5			68.2	2.3	67.1			69.3
4	1233	1400	Intersection of Hwy. 41 & San Juan Road (McMillan/Halpin fenceline) to Truesdale Road	3.2	41.3	0.1	13.7	0.9	3.8	18.5	0.5	20.0	0.0	2.2	22.8
5	1401	1544	Truesdale Road to blowoff at southernmost junction of Truesdale access road with pipeline alignment (approximately 2000 feet south of Kuhnle/t. M. Jaureguy fence line)	2.7	24.7	5.6	2.9			8.5	7.1	9.0			16.2
6	1545	1617	Blowoff at southernmost junction of Truesdale access road with pipeline alignment (approximately 2000 feet south of Kuhnle/St. M. Jaureguy fence line) to blowoff at sharp curve in alignment (near Hansen/St.M.Jaureguy fence line)	1.4	13.6	7.1	0.0			7.1	6.5	0.0			6.5
7	1618	1753	Blowoff at sharp curve in alignment at base of hill to Reach2/Reach 3 Staging Area in Shedd Canyon	3.2	41.3	13.1	0.6			13.6	13.4	0.6			14.0
			Total for Reach 2	**17.1**	**238.6**	**54.4**	**97.6**	**0.9**	**3.8**	**156.8**	**66.2**	**109.6**	**0.0**	**2.2**	**178.1**

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
1	872	964	**San Andreas Fault, Davis Road, to Bitterwater Road**	**1.8**	**43.7**	**17.1**	**0.0**			**17.1**	**26.6**	**0.0**			**26.6**
			Notable Features & Potential Problems Within This Segment of Reach 2:												
	872	964	Potential habitat for San Joaquin kit fox and American badger												
	873		U.S. Waters: C3; check outlet of culvert that drains San Andreas Fault crossing structure												
	874	881	Potential habitat for prairie falcon, northern harrier, ferruginous hawk, & golden eagle												
	874	888	San Andreas Fault crossing: check 2:1 slopes of cut slopes and berm, check water flow path from and along berms to drainages, check water flow path within pipe area												
	876	882	Check Davis Road staging area and road detour areas												
	876		Low erosion potential on 11% slope adjacent to San Andreas Fault crossing's earthwork structures												
	880	•	Check water flow path into and from culvert under Davis Road												
	880	900	Check wetland adjacent to access toad from Davis Road												
	882	895	Moderate erosion potential on slopes above and adjacent to San Andreas Fault crossing's structures; slope is 28% at base, declining to 10% immediately above base, increasing to 22% - 27% in middle portion of slope, and moderating to 15% on upper slope												
	885		Wetland: C4												
	889		Wetland: C5												
	896	899	Alignment crosses 14% slope transversely and climbs 10% - 15% to summit of hill												
	900	904	Low erosion potential-- alignment crosses transversely across 12% to 18% slopes												
	905	922	Alignment descends hillside with moderate to low erosion potential; slopes are 9% to 17% on upper hillside, 20% to 24% in middle of hillside, and 14% to 24% on lower third; slope length = 1820 feet												
	926	966	Cholame Creek vicinity: Potential habitat for tri-colored blackbird, red-legged frog, California horned lizard, southwestern pond turtle, and California tiger salamander												
	929	927	U.S. Waters: C7												
	955	956	U.S. Waters: C8												

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
2	965	1087	**Bitterwater Road to Lucy Brown Road**	2.3	46.5	9.7	14.0			23.7	9.8	12.9			22.8
			Notable Features & Potential Problems Within This Segment of Reach 2:												
	966	969	Check Bitterwater Road detour area												
	966	1001	Cholame Creek vicinity: Potential habitat for tricolored blackbird, red-legged frog, southwestern pond turtle, California tiger salamander, ferruginous hawk; also habitat for San Joaquin kit fox, burrowing owl, and American badger												
	966	1112	Habitat for San Joaquin kit fox, burrowing owl, California horned lizard, and American badger												
	970	976	Moderate to low erosion potential on transverse cut along slope at base of hill; slope 21% to 24% east of junction of access road and pipeline alignment, 12% to 16% west of junction												
	978	979	Wetland: C 8.175												
	985	•	Low erosion potential on 10% transverse slope at base of hill												
	986	990	U.S. Waters: C 8.2												
	988	990	Low erosion potential on slopes of 8% to 12%												
	995	996	Low erosion potential with slopes 8% to 16%												
	1001	1017	Alignment climbs slope obliquely from base to manhole; erosion potential is moderate with slope varying from 12% to 27%; length of disturbed slope is probably 160 feet												
	1006	1007	U.S. Waters: C 8.3												
	1017	1023	Moderate erosion potential on slope; upper portion has 22% to 29% slope, lower portion varies from 10% to 23%												
	1029	1030	U.S. Waters: C 9												
	1031	1037	Alignment crosses slope transversely and obliquely; slope varies from 12% to 20%; erosion potential is low to moderate												
	1049	1059	Alignment obliquely climbs hill; low erosion potential on slope below blowoff adjacent to gully; slope varies from 9% to 18%												
	1059	1060	U.S. Waters: C 9.1												
	1060	1062	High erosion potential at crossing of steep-walled gully and slope above gully; gully sides have slope of 45% and slope above gully is 17%												
	1063	1075	Alignment crosses transversely across slopes; erosion potential is low for first 700 feet with slopes of 8% to 13% but erosion potential is moderate with 19% to 29% slopes within 500 feet of next blowoff												
	1075		U.S. Waters: C 9.2												
	1075	1082	Moderate to high erosion potential on slopes of 30% to 36% from gully to midslope and 8% to 20% on upper slope												

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
3	1088	1232	Lucy Brown Road to intersection of Hwy. 41 & San Juan Road (McMillan/Halpin fenceline)	2.6	27.6	1.8	66.5			68.2	2.3	67.1	0.0		69.3
			Notable Features & Potential Problems Within This Segment of Reach 2:												
	1088	1089	Check Lucy Brown Road detour area												
	1088	1099	Low to moderate erosion potential as alignment descends obliquely down hill and makes deep cut through small promitory; slope varies from 13% to 28%												
	1104		U.S. Waters: C 10												
	1112	1114	Low erosion potential with slopes of 12% to 16%												
	1129	1130	U.S. Waters: C 11												
	1137	1144	Low to moderate erosion potential from transverse cuts in base of hillside; slope varies from 12% to 28%												
	1148	1154	Low erosion potential as alignment cuts transversely across base of hillside; slope varies from 10% to 14%												
	1152	1232	potential habitat for prairie falcon, northern harrier, and ferruginous hawk												
	1158	1167	Check Highway 46 Staging Area												
	1165		U.S. Waters: C 12---- Check drainage from pipeline alignment easement through staging area and access road area												
	1167	1179	Alignment makes deep, wide cut in hillside; erosion potential is high; slope varies from 14% near base to 42% near midslope and 25% on upper slope; width of disturbance in approximately 170 feet												
	1193	1195	Low erosion potential; slope varies from 8% to 11%												

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
4	**1233**	**1400**	**Intersection of Hwy. 41 & San Juan Road (McMillan/Halpin fenceline) to Truesdale Road**	**3.2**	**41.3**	**0.1**	**13.7**	**0.9**	**3.8**	**18.5**	**0.5**	**20.0**	**0.0**		**22.8**
	1330	1336	Low erosion potential on slope varying from 9% to 11%												
	1339	1347	Alignment passes transversely along slope; erosion potential is low with 10% to 18% slope												
	1367	1373	Low erosion potential with slope varying from 6% to 14%												
	1370	1371	U.S. Waters: CC1												
	1398	1400	Check Truesdale Road detour area												

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
5	1401	1544	**Truesdale Road to blowoff at southernmost junction of Truesdale access road with pipeline alignment (approximately 2000 feet south of Kuhnle/t. M. Jaureguy fence line)**	2.7	24.7	5.6	2.9			8.5	7.1	9.0	0.0		16.2
			Notable Features & Potential Problems Within This Segment of Reach 2:												
	1401	1406	Check Truesdale Road Staging Area												
	1401	1521	Potential habitat for San Joaquin kit fox, burrowing owl, prairie falcon, northern harrier, ferruginous hawk, American badger, and California horned lizard												
	1409	1411	Low erosion potential on 10% slope												
	1413	1427	Alignment passes transversely along base of slope; erosion potential is low to moderate with slope varying from 8% to 28%												
	1428	1441	Alignment cuts through base of slope and travels transversely along hill; erosion potential is moderate with slope varying from 14% to 30%												
	1432	1438	U.S. Waters: SC 1												
	1442	1452	Alignment obliquely climbs slope to crest; erosion potential is moderate; slope varies from 15% to 32%												
	1457	1458	Alignment cuts through base of slope; erosion potential is low with slope = 13%												
	1461		U.S. Waters: SC 1.5												
	1461	1464	Alignment climbs obliquely down side of shallow canyon; erosion potential is low to moderate with slope varying from 10% to 27%												
	1465	1483	Alignment follows narrow, shallow canyon; erosion potential along base of canyon walls is low with slope varying from 8% to 24%												
	1484	1489	Alignment passes transversely along slopes with low erosion potential; slope varies from 9% to 13%												
	1491	1495	Low erosion potential; slope varies from 8% to 12%												
	1507	1509	Alignment passes transversely across slope; erosion potential is low; slope varies from 5% to 11%												
	1511	1513	Low erosion potential; alignment climbs slope of 12%												
	1516	1551	Low erosion potential; alignment descends, climbs, or passes transversely along slopes varying from 9% to 19%												

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
6	1545	1617	**Blowoff at southernmost junction of Truesdale access road with pipeline alignment (approximately 2000 feet south of Kuhnle/St. M. Jaureguy fence line) to blowoff at sharp curve in alignment (near Hansen/St.M.Jaureguy fence line)**	1.4	13.6	7.1	0.0			7.1	6.5	0.0	0.0		6.5
			Notable Features & Potential Problems Within This Segment of Reach 2:												
	1516	1551	Low erosion potential; alignment descends, climbs, or passes transversely along slopes varying from 9% to 19%												
	1552	1554	Alignment climbs slope; moderate erosion potential with slope varying from 22% at base to 9% near summit												
	1555	1557	Low erosion potential with transverse slopes of 9%												
	1559	1569	Alignment passes transversely along hill slope and then descends obliquely down hillside; erosion potential is low to moderate with 12% transverse slope near crest and 10% to 21% slope on lower portion of hill												
	1569	1570	U.S. Waters: SC 3												
	1570	1571	Moderate erosion potential on hillock; slope varies from 20% to 24%												
	1573		Low erosion potential; slope = 12%												
	1575	1576	Low erosion potential; slope = 10%												
	1578	1580	U.S. Waters: SC 4												
	1579	1580	Low erosion potential on slope north of drainage												
	1580	1584	Alignment climbs hill slope above drainage; erosion potential is moderate with 25% slope												
	1585	1587	Alignment passes transversely along slopes of 11% to 15%; erosion potential is low												
	1589	1595	Moderate erosion potential as alignment climbs obliquely up hill; slope varies from 23% to 23%												
	1596	1606	Moderate erosion potential as alignment descends down slope and passes transversely along hillslope; slope descending from hill crest is 17% to 29% and transverse slope is 8% to 20%												
	1608	1614	Alignment descends hill; erosion potential is low to moderate with slope varying from 12% to 20%												
	1613	1617	U.S. Waters: SC 4.75												
	1615	1616	Low erosion potential; alignment passes transversely along base of hill with 15% slope												

REACH 2: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement					Acres Of Vegetation Community Found In Temporary Easement				
						Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Total
7	**1618**	**1753**	**Blowoff at sharp curve in alignment at base of hill to Reach2/Reach 3 Staging Area in Shedd Canyon**	**3**	**41**	**13**	**1**			**14**	**13**	**1**			**14**
			Notable Features & Potential Problems Within This Segment of Reach 2:												
	1617	1642	Moderate to low erosion potential; alignment passes transversely or obliquely along base of hill; slope varies from 9% to 23%												
	1618	1643	U.S. Waters: SC 4.9												
	1651	1657	Low erosion potential; alignment passes transversely along slope at base of hill; slope varies from 8% to 14%												
	1663	1669	Low erosion potential; temporary construction easement on 10% 18% slopes												
	1669	1673	Low erosion potential; slope varies from 8% to 13%												
	1697	1702	High erosion potential on top of canyon wall; slope varies from16% to 36%; note that steep slope and construction disturbance continues down slope												
	1703	1706	High erosion potential in temporary construction easement area; slope varies from 16% to 30%												
	1706	1717	High erosion potential; slope along pipeline centerline varies from 9% to 17%, but slope in temporary construction easement varies from 18% to 32%												
	1719	1721	Low erosion potential in temporary construction easement; drainage cuts across easement and slope along edge of temporary easement varies from 20% to 26%												
	1720	1722	U.S. Waters: SC 7												
	1721	1726	Moderate erosion potential; alignment cuts obliquely across hillside slope; slope varies from 15% to 24%												
	1731	1732	U.S. Waters: SC 7.1												
	1750	1753	Check Shedd Canyon Staging Area												

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
1	1754	1858	Calf Canyon Staging Area to junction of Shedd Canyon access road and pipeline alignment	2.0	47.2	14.0	1.6				4.1			19.6	17.3	6.6				3.5			27.5
2	1859	1989	From junction of Shedd Canyon access road and pipeline alignment to La Panza Road	2.5	55.5	9.5					12.3			21.8	18.3					15.4			33.7
3	1990	2060	From La Panza road to blowoff near edge of agricultural field and oak woodland (on M. Ryan property)	1.3	26.3	0.2	11.0							11.1	0.2	14.9							15.1
4	2061	2142	From blowoff (near edge of agricultural field and oak woodland on M. Ryan property) to O'Donovan Road	1.6	36.0	0.1	0.7					15.0		15.9	0.2	0.8					19.0		20.1
5	2143	2260	From O'Donovan Road to Hodgin property fence line (adjacent to blowoff and junction of access road and pipeline alignment)	2.2	33.0			0.6		3.5		4.9	8.4	17.5			0.7		4.3			10.5	15.5
6	2261	2335	From Hodgin property fence line (near blowoff and junction of access road and pipeline alignment) to south gate of Tank 2 at Highway 229	1.4	26.5					11.5			0.3	11.8					14.3			0.4	14.7
7	2336	2417	From Highway 229 crossing (immediately south of Tank 2) to Highway 229 crossing near Highway 58 & Calf Canyon	1.6	43.9					9.1			14.0	23.5					4.6			15.8	20.4
8	2418	2447	From Highway 229 crossing near Highway 58 to Calf Canyon	0.6	8.8				2.3	6.3				8.6				0.0	0.2				0.2
			Total for Reach 3	13.1	277.0	23.8	13.3	0.6	2.3	30.4	16.4	20.0	22.8	129.9	36.1	22.4	0.7	0.0	23.3	18.9	19.0	26.7	147.1

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn	To Stn	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
1	1754	1858	Calf Canyon Staging Area to junction of Shedd Canyon access road and pipeline alignment	2.0	47.2	14.0	1.6				4.1			19.6	17.3	6.6				3.5			27.5

Notable Features & Potential Trouble Spots Within This Segment of Reach 3:

1754	2045	Habitat for San Joaquin kit fox, American badger, burrowing owl, prairie falcon, northern harrier, ferruginous hawk, and California horned lizard
1762		U.S. Waters: SC 7.25
1769	1771	Moderate to high erosion potential on hillslope; slope varies from 27% to 36%
1769		Check for Quercus shown on map in temporary easement
1775	1785	Low to moderate erosion potential; slopes vary from10% to 20%
1777		U.S. Waters: SC 7.5
1783	1794	Access road area includes U.S. Waters: WF 2 & 3
1785	1792	Moderate to high erosion potential along pipeline centerline and easement between centerline and access road; slope varies from 19% to 38%, maximum slope length = 160 feet
1786		U.S. Waters: SAC 8
1793	1796	Low erosion potential in temporary easement on hillslope; slope varies from 9% to 18%
1801	1807	Low erosion potential on hillslope; slope varies from 7% to 16%
1805		U.S. Waters: SC 8.5
1810	1834	Access road which parallels pipeline alignment includes U.S. Waters and wetlands: WF 5,6,7,8,9,10,11, & 12
1811	1812	Low erosion potential on hillslopes crossed transversely by pipeline alignment; slope; slope is 10% to 12%
1814	1820	Moderate to high erosion potential on hillside slopes; slope varies from 20% near Stn. 1815 to 36% at Stn. 1817 (near base of hill & blowoff) to 15% near summit of hill, maximum slope length = 185 feet
1816	1817	Wetlands: SC 9
1822	1824	Moderate erosion potential on hillslope; slope varies from 12% near summit to 21% near bottom of slope
1825	1827	Wide excavation through nose of hillside has moderate to high erosion potential; slope varies from 8% in flat areas to 20% near Stn. 1827 to 36% near Stn. 1826, maximum slope length = 105 feet
1825		Wetlands: SC 9.1
1827		Wetlands: SC 9.2
1828	1829	Moderate to low erosion potential on hillslope; slope varies from 22% near base to 17% near summit
1830	1842	Low erosion potential on hillslope that pipeline alignment crosses transversely; slope varies from 10% to 17%
1843	1854	Pipeline alignment transversely crosses base of hillside, with moderate to low erosion potential in permanent easement along base of slope and moderate erosion potential in temporary construction easement on upper slopes; slope varies from 18% to 24% within perma
1845	1847	U.S. Waters and wetland: SC 9.5

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
2	1859	1989	From junction of Shedd Canyon access road and pipeline alignment to La Panza Road	2.0	47.2	9.5					12.3			21.8	18.3					15.4			33.7

Notable Features & Potential Trouble Spots Within This Segment of Reach 3:

1859	1989	Habitat for San Joaquin kit fox and American badger
1858		U.S. Waters: SC 10
1859	1862	Moderate to low erosion potential on hillslope above U.S. Waters: SC 10; slope varies from 24% at base of slope near drainage to 12% near crest
1863	1865	Moderate to low erosion potential on hillslope; slope varies from 23% to 17%
1865	1868	U.S. Waters: SC 11
1869	1871	Moderate to low erosion potential on hillslopes that pipeline alignment crosses transversely; slope varies from 21% to 16%; U.S. Waters: SC 11.25
1871	1875	Temporary construction easement transversely crosses hillsides with low erosion potential; slopes vary from 11% to 16%
1876	1877	Wetland: SC 11.5
1876	1883	Low erosion potential; slope varies from 9% to 18%
1884	1892	Alignment crosses hillside transversely with moderate to low erosion potential; slope varies from13% to 17% near Stn. 1885 to 21% near Stn. 1891
1894	1895	U.S. Waters: SC 12
1894	1896	Moderate to low erosion potential on hillside; slope varies from 12% to 21%
1901	1903	Low erosion potential on slopes; slope varies from 9% to 12%
1906	1911	Low erosion potential on slopes of 12% to 18%
1914	1917	Moderate erosion potential on hillslopes, with slope varying from 18% to 30%
1918	1920	Low erosion potential along slopes of 10%
1923	1924	Low erosion potential on hillsides with slopes of 10% to 14%
1927	1949	Pipeline alignment passes transversely along base of hill but temporary easement passes higher on slopes and has low erosion potential; slope varies from 8% to 18%
1949	1950	U.S. Waters: SC 13
1981	1989	Check La Panza Road Staging Area
1988	1993	Check La Panza Road detour area, particularly oaks in southeast portion of detour area

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
3	1990	2060	From La Panza Road to blowoff near edge of agricultural field and oak woodland (on M. Ryan property)	1.3	26.3	0.2	11.0							11.1	0.2	14.9							15.1
			Notable Features & Potential Trouble Spots Within This Segment of Reach 3:																				
	1990	2015	Habitat for American badger																				
	1993	1996	Low erosion potential on slopes of 12% to 17%																				
	1998	2002	Low erosion potential near crest of hillock increasing to high erosion potential near wetland WC 1; slope 13% near crest, increasing to 26% near midslope and 38% near base																				
	2000	2007	Potential habitat for California tiger salamander																				
	2002	2003	Wetlands: WC 1																				
	2005	2011	Hill with high erosion potential slopes; slopes are 12% at base of hill, 36% to 51% near middle, and 20% to 28% near crest; slope length = 570 feet																				
	2011	2014	Moderate erosion potential on hill with slope varying from 28% to 15%																				
	2016	2032	Pipeline alignment transversely crosses slopes with low to moderate erosion potential; slopes vary from 14% to 26%																				
	2033	2034	Moderate erosion potential on slopes of 19% to 24%																				
	2035	2036	Moderate erosion potential on 20% to 24% slope																				
	2037	2044	Moderate erosion potential on slopes of 20% to 34% crossed transversely by pipeline alignment																				
	2045	2054	Moderate to low erosion potential on slopes; slope varies from 33% to 10%																				
	2055	2060	Moderate to low erosion potential with slopes varying from 14% to 22%																				

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
4	2061	2142	From blowoff (near edge of agricultural field and oak woodland on M. Ryan property) to O'Donovan Road	1.6	36.0	0.1	0.7					15.0		15.9	0.2	0.8					19.0		20.1

Notable Features & Potential Trouble Spots Within This Segment of Reach 3:

2061	2070	Hillside with low to moderate erosion potential with slope varying from 20% to 32% on lower half of slope and varying from 13% to 16% on the upper half of the slope
2071	2073	Slope with moderate erosion potential; slope varies from 20% to 26%
2074	2082	Pipeline alignment passes through narrow valley between taller hills; centerline area is relatively flat but temporary construction easement is on hillside slopes of 22% to 46% with high erosion potential
2092		Temporary construction easement area extends onto 12% slope with low erosion potential
2095	2096	Temporary construction easement extends into area with 10% to 12% slope and low erosion potential
2099	2100	Alignment crosses slopes of 12% to 18%, erosion potential is low
2101	2102	Historical site CA-SLO-1636H
2102	2105	Alignment cuts through nose of hill; erosion potential is low to moderate with slopes varying from 10% to 25%
2109	2110	U.S. Waters: WC 4
2111	2116	Pipeline climbs hillside with moderate to high erosion potential; slope varies from 20% to 26% near base and 21% to 32% near crest; maximum slope length is 260 feet
2112	2219	Erosion potential is moderate to high on hill slope; slope varies from 20% to 36%, slope length is 750 feet
2116	2119	Alignment makes deep and wide cut in hilltop with slopes varying from 27% to 35%; erosion potential is high
2120	2122	Pipeline descends steep hill slope; erosion potential is moderate to high with slopes varying from 21% to 31%
2130	2131	U.S. Waters: WC 5

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
5	2143	2260	'From O'Donovan Road to fenceline adjacent to blowoff and junction of access road and pipeline alignment on Hodgin property	2.2	33.0			0.6		3.5		4.9	8.4	17.5			0.7		4.3			10.5	15.5

Notable Features & Potential Trouble Spots Within This Segment of Reach 3:

2143	2144	Check O'Donovan Road detour area
2151		U.S. Waters: SMG 1
2151	2161	Alignment climbs hill slopes transversely or obliquely; erosion potential is moderate with slopes varying from 21% to 33%
2164	2167	Alignment descends slope with moderate erosion potential; slope varies from 20% to 30%
2165		Access road from O'Donovan Road to Ryan property has U.S. Waters: DTAR 1
2167	2168	U.S. Waters: SMG 2
2167	2169	Hillside with 20% slope has low to moderate erosion potential
2173	2175	U.S. Waters: SMG 2.5
2178	2181	Alignment climbs slope obliquely; low to moderate erosion potential with slopes varying from 16% to 20%
2185	2187	Temporary construction easement has low erosion potential at bottom of hill slope; slope varies from 9% to 15%
2193	2200	Moderate to low erosion potential' alignment obliquely crosses slopes of 13% to 18% and climbs slopes of 13% to 29%
2201	2203	Moderate erosion potential with slopes varying from29% near hill crest to 16% near base
2204		Low erosion potential; slope 18% in temporary construction easement
2206	2210	Low to moderate erosion potential on hill slopes above Middle Branch Huerhuero Creek; slope aries from 10% to 20% throughout most of slope, but there is a 50- foot long high erosion potential area with a 36% slope near Stn. 2210
2210	2213	East Branch Huerhuero Creek; potential habitat for southwestern pond turtle, red-legged frog, great blue heron, black-shouldered kite, yellow warbler, Cooper's hawk, and long-eared owl; U.S. Waters & wetland: SMG 3
2219	2222	Moderate erosion potential on hill; slope varies from 26% to 31%; slope length is 340 feet
2223	2234	Moderate to low erosion potential; alignment passes transversely along slopes of 11% to 24%
2226		U.S. Waters: SMG 3.5
2232	2234	Historical resources site CA-SLO-1314H located in temporary construction easement
2237	2240	Low erosion potential; slopes vary from 9% to 13%
2240		Wetland: SMG 4
2241	2447	U.S. Waters: SMG 9.8
2246	2249	Alignment obliquely climbs slope of 13% near base and 33% near crest; erosion potential is moderate to high
2250		High erosion potential; slope =41%
2251	2260	Low erosion potential; slope varies from 8% to 19%

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
6	2261	2335	From Hodgin property fence line to south gate of Tank 2 at Highway 229	1.4	26.5					11.5			0.3	11.8					14.3			0.4	14.7
			Notable Features & Potential Trouble Spots Within This Segment of Reach 3:																				
	2328	2411	Potential habitat for arroyo toad																				
	2261	2264	Historical cultural resources site: CA-SLO 1638H																				
	2261	2265	Alignment crosses hillock slope transversely; low erosion potential with slope varying from 10% to 18%																				
	2266	2272	Moderate erosion potential on hill slope with slope varying from 23% to 31%																				
	2272	2273	Slope has moderate erosion potential; slope varies from 24% to 34%																				
	2274	2275	Alignment makes deep cut through hillock; erosion potential low to moderate with slope 18% to 21%																				
	2277		Wetland: SMG 5																				
	2277	2280	Moderate erosion potential on oblique cut through hillock; slope varies from 13% to 25%																				
	2280		Wetland: SMG 5.1																				
	2281	2290	Low erosion potential on slopes of 10% to 21%																				
	2284	2285	Wetland SMG 5.4																				
	2291	2292	Alignment cuts transversely across 27% to 40% slopes; erosion potential is moderate to high																				
	2293	2294	Wetland: SMG 5.3																				
	2293	2294	Low erosion potential with slopes of 12%																				
	2295	2301	Alignment passes between hillocks, cutting transversely across slopes of 20% to 30%; erosion potential is moderate																				
	2302	2304	U.S. Waters: SMG 6																				
	2304	2307	Moderate to high erosion potential; slope varies from 22% to 36%																				
	2308	2310	Low erosion potential; slope varies from 13% to 19%																				
	2310		Wetland: SMG 7																				
	2314	2321	Low erosion potential on slopes varying from 10% to 20%																				
	2321	2323	Borrow and fill areas for Tank 2: check 2:1 cut and fill slopes, check path from cut & fill slopes to drainage																				
	2323		Northwest perimeter of Tank 2 (Hwy 229 north entrance to hillside cut slope near Tank 1): overside drain and 15" culvert on north side of driveway (including flow path to drainage below fill area; all 2:1 slopes on northwest perimeter fill areas; overside drain near inlet vault (including flow path down 36% slope to drainage below drain; stone slope protection below Drainage Structure, overside drain from Tank 1, and shotcreted ditch; flow path below stone slope protection																				
			Notable Features & Potential Trouble Spots-- Continued on next page																				

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
			Notable Features & Potential Trouble Spots-- Continued from previous page																				
	2323		Southwest perimeter of Tank 2 (from hillside cut slope near Tank 1 to Hwy 229 south entrance): 1:1 to 1.4:1 cut slopes in hillside, barrier or drain on hillside above cut slope, storm drain inlet protection down slopes to drainage ditch, stone slope protection near south Hwy. 229 entrance (below Drainage Structure and 15" culvert)																			
	2323		Eastern perimeter of Tank 2 (along Hwy. 229): 2:1 slopes on berm																				
	2323		Temporary stockpile area for Tank 2 (across Hwy. 229, opposite north entrance): check efforts to recontour to original topography, drainage patterns, slope stabilization																				

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
7	2336	2417	From Highway 229 crossing (immediately south of Tank 2) to Highway 229 crossing near Highway 58 & Calf Canyon	1.6	43.9					9.1			14.0	23.5					4.6			15.8	20.4

Notable Features & Potential Trouble Spots Within This Segment of Reach 3:

2336	2357	Habitat for American badger, burrowing owl, California horned lizard, and Cooper's hawk, and arroyo toad
2337	2344	Moderate to high erosion potential; alignment passes along base of hill with slopes varying from 20% to 35%
2345	2349	High erosion potential; slopes vary from 14% to 48% with two steep-sided gullies
2353	2354	High erosion potential, with slopes of gully = 68% and hillside slopes = 36%
2355	2357	Low erosion potential on side of hillock; slope varies from 11% to 16%
2359	2361	Moderate erosion potential on hillside slopes; slope varies from 20% to 28%
2360	2369	Hilltop cut 5 feet to 30 feet below original topography; potential moderate to high erosion potential with original slopes 10% to over 40%
2370	2416	High erosion potential; slopes vary from 20% to 55%
2390	2399	Fill area in temporary construction easement: moderate to high erosion potential on 2:1 fill slopes, check path of water flow from fill area to drainage
2394		U.S. Waters: SMG 7.5 & 7.6
2412	2413	U.S. Waters: SMG 7.8
2413	2414	U.S. Waters and wetland: SMG 8
2417		Wetland: SMG 8.5

REACH 3: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment						Acres Of Vegetation Community Found In Permanent Easement									Acres Of Vegetation Community Found In Temporary Easement								
Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal branch Facility	Length (miles)	Total Acres	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total	Grassland	Agric.	Ripar. Herb.	Cot.-Wil. Rip. For.	Live Oak Wd	Blue Oak Wd.	Dig. Pine-Oak Wd.	Cham. Chap.	Total
8	2418	2447	From Highway 229 crossing near Highway 58 to Calf Canyon	0.6	8.8				2.3	6.3				8.6				0.0	0.2				0.2

Notable Features & Potential Trouble Spots Within This Segment of Reach 3:

2418	2447	Potential habitat for red-legged frog, southwestern pond turtle, arroyo toad, yellow warbler, Cooper's hawk, black-shouldered kite, long-eared owl, and great blue heron
2418	2419	High erosion potential on 40% slopes; note that slope drains onto Highway 229
2420	2422	Alignment travels transversely across hill slope; high erosion potential with slopes varying from 40% to 64%
2423	2425	Moderate erosion potential on hillside; slope varies from 33% near crest of hill to 24% near base of slope; slope length = 240 feet
2425		U.S. Waters: SMG 9.25
2426	2428	Moderate erosion potential along base of hillside, slope = 20%
2429	2437	High erosion potential with alignment passing transversely along hill slope; slope varies from 37% to 52%
2435		U.S. Waters: SMG 9.5
2438		U.S. Waters: SMG 9.6
2438		U.S. Waters: SMG 9.6
2438		Moderate erosion potential; slope = 22%
2439	2445	High erosion potential with slopes varying from 32% to 40%

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
1	2448	2524	Calf Canyon to blowoff on hill immediately west of Salinas River (near access road descending to river)	1.5	16.9	0.0		0.5		7.8		8.2	2.0	2.0		4.4		8.7
2	2525	2606	From blowoff on hill immediately west of Salinas River (near access road descending to river) to Highway 58 crossing	1.8	28.7	6.2		1.0		2.3		9.5	6.3	2.0		4.4		12.6
3	2607	2699	From Highway 58 crossing to crest of first low hill southwest of Santa Margarita	1.8	28.7	8.9				2.4	1.0	12.4	8.7			6.5	1.0	16.3
4	2700	2746	First hill W of Santa Margarita to crest of first tall ridge(finished grade = 1465 feet)	0.9	14.2	0.0				2.2	5.5	7.6	0.0			1.9	4.7	6.5
5	2747	2786	Crest of first tall ridge to crest of tall ridge adjacent to Highway 101	0.8	8.1				6.9	1.4		0.0	0.0		6.4	1.7		8.1
6	2787	2824	Crest of tall ridge overlooking Highway 101 to North Portal of Cuesta Tunnel	0.7	15.7	0.6	1.0			6.1		9.5	0.0			5.2		6.2
			Total for Reach 4	**6.6**	**96.5**	**15.7**	**1.0**	**1.5**	**6.9**	**22.1**	**6.5**	**55.5**	**17.0**	**3.9**	**6.4**	**24.1**	**5.7**	**58.4**

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
1	2448	2524	**Calf Canyon to blowoff on hill immediately west of Salinas River (near access road descending to river)**	1.5	16.9	0.0		0.5		7.8		8.2	2.0	2.0		4.4		8.7

Notable Features & Potential Trouble Spots Within This Segment of Reach 4:

2448	2460	Potential habitat for red-legged frogs, southwestern pond turtle, California tiger salamander, black-shouldered kite, and great blue heron
2449	2452	Moderate erosion potential on slopes varying from 24% to 30%
2453	2458	Moderate to high erosion potential with slopes of 28% to 32% near upper part of slope and 35% near bottom of slope
2455	2456	U.S. Waters: SMG 9.8
2457	2460	Riparian wetlands: SMG 10 (also extends along access road to tunnel portal)
2459	2460	Moderate erosion potential in tunnel portal area, with slope of 30%
2494	2496	Low to moderate erosion potential: slope varies from 16% to 26%
2495	2500	Tunnel outlet staging area
2497		Low erosion potential with 12% slope
2498	2500	Alignment transversely crosses hill with 21% to 27% slopes; erosion potential is moderate
2501	2504	Moderate to high erosion potential on slopes adjacent to Salinas River; slope varies from18% to 39%
2504		Wetlands: SMG 10.5
2504	2508	Potential habitat for yellow warbler, willow flycatcher, yellow-breasted chat, black-shouldered kite, great blue heron, Cooper's hawk, long-eared owl, red-legged frog, and southwestern pond turtle
2505	2506	Wetlands and U.S. Waters: SMG 11
2507	2512	U.S. Waters: SMG 12
2507	2515	High erosion potential near Salinas River with 40% slope, moderate to low erosion potential higher on slope with slope = 13% to 32%
2513	2514	U.S. Waters: SMG 12.5
2518	2588	Habitat for American badger and burrowing owl

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
2	2525	2606	From blowoff on hill immediately west of Salinas River (near access road descending to river) to Highway 58 crossing	1.8	28.7	6.2		1.0		2.3		9.5	6.3	2.0		4.4		12.6
			Notable Features & Potential Trouble Spots Within This Segment of Reach 4:															
	2525	2606	Potential habitat for American badger, burrowing owl, and Cooper's hawk															
	2523	2526	Low to moderate erosion potential; slope ranges from 28% along banks of drainage to 14%															
	2525		Wetland: SMG 13															
	2539	2541	Low erosion potential on slopes crossed transversely by pipeline alignment; slope varies from 14% to 19%															
	2542	2545	Alignment crosses drainage U.S. Waters: SMG 14; moderate erosion potential along banks of drainage with 20% slopes and low erosion potential above drainage with 16% slope															
	2559	2560	Riparian wetland: SMG 15 with low erosion potential along banks: slope = 15%															
	2583	2588	Moderate to low erosion potential on slope above Trout Creek; slope varies from 9% to 26%															
	2590	2592	Trout Creek----Riparian wetland: SMG 16															
	2591	2592	Potential habitat for yellow warbler, great blue heron, red-legged frog, and yellow-legged frog															
	2597	2598	Low to moderate erosion potential with slope varying from 16% to 26%															
	2599	2604	Alignment transversely crosses hillock slope; low erosion potential with slope varying from 8% to 20%															

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
3	2607	2699	From Highway 58 crossing to crest of first low hill southwest of Santa Margarita	1.8	28.7	8.9				2.4	1.0	12.4	8.7			6.5	1.0	16.3

Notable Features & Potential Trouble Spots Within This Segment of Reach 4:

2607	2699	Potential habitat for American badger, burrowing owl, and Cooper's hawk
2607	2613	Highway 58 crossing
2614	2622	Low erosion potential with slopes 9% to 17%
2628	2631	Low erosion potential on slope; slope 8% to 14%
2641	2642	Wetland: SMG 17
2646	2655	Potential habitat for California tiger salamander
2648	2653	Wetland: SMG 18
2660		Wetland: SMG 18.5
2662		Yerba Buena Creek---- Riparian wetland: SMG 19
2680	2681	Wetland: SMG 20
2684		Wetland: SMG 20.5
2691	2698	Moderate to high erosion potential on hill slope; slope ranges from 10% at base to 27% at midslope and 18% to 36% near summit; maximum slope length is 400 feet

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
4	2700	2746	First hill W of Santa Margarita to crest of first tall ridge(finished grade =1465 feet)	0.9	14.2	0.0				2.2	5.5	12.4	0.0			1.9	4.7	6.5
			Notable Features & Potential Trouble Spots Within This Segment of Reach 4:															
	2700	2746	Potential habitat for American badger and Cooper's hawk															
	2699	2702	Moderate erosion potential with slope varying from 18% to 25%; drainage U.S. Waters: SMG 21 at base of slope															
	2702	2707	Alignment climbs transversely up hill with moderate erosion potential; slope varies from 22% to 31%															
	2709	2712	Alignment descends hill; erosion potential is high with slope varying from 32% near summit to 57% near base															
	2711	2712	Santa Margarita Creek															
	2713		Riparian wetland: SMG 22															
	2713	2721	Moderate erosion potential on transverse alignment across slope; slope varies from14% to 30%															
	2724	2729	Low erosion potential on slope, with slope varying from 10% to 18%															
	2730	2740	Moderate to high erosion potential on slopes of 9% to 23% that is below steep portion of high ridge															
	2737		Wetland: SMG 23															
	2741	2745	High erosion potential on ridge slope; slope varies from 37% to 45%															
	2742		U.S. Waters: SMG 24															
	2745	2746	Ridge top cut from1469 feet elevation to 1458 feet; check slopes and drainage of spoil area															

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
5	2747	2786	Crest of first tall ridge to crest of tall ridge adjacent to Highway 101	0.8	8.1	0.0			6.9	1.4		8.3	0.0		1.7			1.7

Notable Features & Potential Trouble Spots Within This Segment of Reach 4:

2747	2786	Potential habitat for American badger and Cooper's hawk
2746	2752	High erosion potential on slope of high ridge; slope varies from 21% near base of slope to 54% near midslope and 42% near summit; note ranch road crossing transversely across middle of slope
2752	2758	High erosion potential on ridge slope; slope varies from 31% to 40%
2756	2758	Riparian wetlands: SLO 0.5 & 1
2758	2760	Moderate erosion potential on slope above drainage; slope = 25%
2761		Alignment makes deep cut through hillock; erosion potential is low to moderate with 19% slope in temporary construction easement
2762		Riparian wetland: SLO 1.25
2762		High erosion potential, slope = 54% above drainage SLO 1.25
2762	2764	High erosion potential with slopes varying from 36% to 54%
2764	2769	Alignment transversely crosses steep slopes; erosion potential moderate with slopes varying from 10% to 28%
2768		Riparian wetland: SLO 1.5
2768	2770	U.S. Waters: SLO 1.75
2770	2771	Moderate to high erosion potential above drainage; slope varies from 18% to 32%
2772	2779	Alignment transversely crosses steep slopes at base of ridge; erosion potential is moderate with slopes varying from 8% to 40%
2773	2776	U.S. Waters: SLO 2
2780	2783	Steep ridge slope with high erosion potential; slope varies from 41% to 46%
2784	2786	Alignment passes along narrow summit of ridge; erosion potential is high with lateral slopes on ridge summit varying from 25% to 40%

REACH 4: EASEMENT AREA, VEGETATION TOTALS, & AREAS OF INTEREST

Segment #	Stn.	To Stn.	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Acres Of Vegetation Community Found Permanent Easement							Acres Of Vegetation Community Found In Temporary Easement					
						Grassland	Agric.	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total	Grassland	Cot.-Wil. Rip. For.	Live Oak Forest	Live Oak Wd	Blue Oak Wd.	Total
6	**2787**	**2824**	**Crest of tall ridge overlooking Highway 101 to North Portal of Cuesta Tunnel**	**0.7**	**15.7**	**0.6**	**1.0**			**6.1**		**7.7**	**0.0**					**1.7**

Notable Features & Potential Trouble Spots Within This Segment of Reach 4:

2787	2811	Potential habitat for American badger and Cooper's hawk
2786	2794	Alignment descends from ridge summit to SPRR tracks & U.S. 101 area; high erosion potential with slope varying from 29% to 40%
2795	2809	Alignment passes between SPRR tracks and base of steep ridge slope; erosion potential varies from low to high, with slopes varying from 13% to 42%
2810		Wetland: SLO 2.75
2811	2812	Potential habitat for yellow warbler and yellow-breasted chat
2817	2826	Southwestern pond turtle was found in area during construction; potential habitat for red-legged frog, Cooper's hawk, sharp-shinned hawk, long-eared owl
2817	2826	Check banks of creek (tributary to Santa Margarita Creek) and culverts
2819	2821	Check 2:1 slopes of spoil pile area above alignment, check drainage path from spoil area to drainage
2825	2827	Check stability of cut slopes and drainage path from slopes

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
1	2877	2971	Cuesta Tunnel (South Portal) to hilltop manhole on Kirschner property near Poly Canyon Staging Area and Kirschner/Cal Poly fence line	1.8	39.3	7.8	0.0	4.5	0.0	0.0	0.0	0.0	6.4	0.0	18.7	9.7	0.0	4.5	0.0	0.0	0.0	0.0	6.5	0.0	20.6
2	2972	3091	Hilltop manhole on Kirschner property (above Poly Canyon Staging Area and Kirschner/Cal Poly fence line) to U.S. 101	2.3	43.6	17.8	0.0	1.6	0.0	0.2	0.0	0.0	1.2	0.0	20.8	20.8	0.8	1.0	0.0	0.1	0.0	0.0	0.0	0.0	22.8
3	3092	3169	U.S. 101 to junction of access road and pipeline alignment (adjacent to manhole) on ridge above Wineman residence	1.5	32.9	10.9	0.0	0.4	1.7	0.4	0.0	0.0	0.3	0.0	13.8	15.1	0.0	0.5	2.6	0.4	0.0	0.0	0.5	0.0	19.1
4	3170	3223	Junction of access road and pipeline alignment on ridge above Wineman residence to manhole on hill crest on northwest side of Hampton Canyon (above upper Hampton Creek)	1.0	20.9	3.5	0.0	1.2	0.0	0.0	0.0	0.0	2.6	2.9	10.2	3.8	0.0	0.5	0.0	0.0	0.0	0.0	4.4	2.0	10.7
5	3224	3272	Hill crest northwest of upper Hampton Creek to upper West Corral de Piedra Creek	0.9	21.2	5.2	0.0	2.0	0.0	0.0	0.0	0.0	1.7	0.0	8.8	7.8	0.0	1.8	0.0	0.0	0.0	0.0	2.8	0.0	12.4
6	3305	3449	South Portal of West Corral de Piedra tunnel to junction of Orcutt Road and Righetti Road	2.7	51.7	15.5	6.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	22.0	17.3	11.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	29.7
7	3450	3647	Junction of Orcutt Road and Righetti Road to gate near Varian Ranch stables	3.8	64.2	14.0	15.2	0.0	0.0	0.2	0.2	0.0	0.1	0.0	29.7	15.8	18.1	0.0	0.0	0.1	0.0	0.4	0.1	0.0	34.5
8	3648	3832	Gate near Varian Ranch stables to Talley Farms	3.5	87.7	12.9	8.8	2.0	2.1	1.0	0.0	2.9	11.9	0.0	41.6	14.4	20.9	0.0	0.9	0.9	1.0	1.1	7.0	0.0	46.2
			Total for Reach	17.5	361.6	87.7	30.3	11.8	3.8	1.8	0.2	2.9	24.2	2.9	165.6	104.6	51.5	9.1	3.5	1.5	1.0	1.5	21.3	2.0	196.0

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
1	2877	2971	**Cuesta Tunnel (South Portal) to hilltop manhole on Kirschner property near Poly Canyon Staging Area and Kirschner/Cal Poly fence line**	**1.8**	**39.3**	**7.8**	**0.0**	**4.5**	**0.0**	**0.0**	**0.0**	**0.0**	**6.4**	**0.0**	**18.7**	**9.7**	**0.0**	**4.5**	**0.0**	**0.0**	**0.0**	**0.0**	**6.5**	**0.0**	**20.6**
			Notable Features & Potential Problems Within This Segment of Reach 5A:																						
	2877	2880	Cuesta Tunnel South Portal Adit: High erosion potential, slope varies from 34% to 60%																						
	2880	2884	Riparian forest: SLO 3.5																						
	2880	2884	Potential habitat for red-legged frog, yellow warbler, Cooper's hawk, American badger																						
	2880	2886	Potential habitat for Sanicula hoffmani and Arctostaphylos obispoensis																						
	2881	2885	High erosion potential on hillside slope above access road alignment of pipeline; slope varies from 40% to 80%																						
	2886	2888	Low erosion potential: slope varies from 14% to 24%																						
	2889	2903	Alignment descends from access road down hillside to SPRR tracks; high erosion potential with slope varying from 22% to 44%; note gully near manhole @ Stn. 2890																						
	2894	2896	Potential habitat for red-legged frog, yellow warbler, Cooper's hawk																						
	2902	2906	Southern Pacific RR jacking site: check slope stability and drainage patterns																						
	2905	2906	High erosion potential: alignment transversely crosses 45% slope at jacking site																						
	2907	2909	High erosion potential on 33% slope above drainage																						
	2909	2911	U.S. Waters & Wetland: SLO 4																						
	2910	2915	High erosion potential in area between (& above) Stenner Creek and 2 tributaries; alignment crosses transversely across steep hillside with																						
	2914	2915	46% slope near Stenner Creek and continues down to cross 20% slope near confluence of tributaries & Stenner Creek																						
	2913	2915	U.S. Waters: SLO 4.5																						
	2914	2915	Wetland: SLO 5																						
	2915	2918	Moderate erosion potential: alignment climbs transversely up slope of 24%																						
	2915		High erosion potential on steep banks of two Stenner Creek tributaries																						
	2919	2920	High erosion potential on slope above drainage; slope varies from 15% on upper near crest of slope to 32% near base of slope																						
	2919	2921	U.S. Waters: SLO 6																						
	2919	2923	U.S. Waters: SLO 6 includes two access road crossings																						
	2920		High erosion potential at confluence of two tributaries of Stenner Creek; slope = 26%																						
	2920	2921	U.S. Waters: SLO 7.1																						

(Continued on next page)

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
2	**2972**	**3091**	**Hilltop manhole on Kirschner property (above Poly Canyon Staging Area and Kirschner/Cal Poly fence line) to U.S. 101**	**2.3**	**43.6**	**17.8**	**0.0**	**1.6**	**0.0**	**0.2**	**0.0**	**0.0**	**1.2**	**0.0**	**20.8**	**20.8**	**0.8**	**1.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**22.8**

Notable Features & Potential Problems Within This Segment of Reach 5A:

2972	2978	Moderate to high erosion potential on slope varying from 30% to 40% near summit to 14% near base
2977	2981	Check Poly Canyon Staging Area
2980	2981	Low erosion potential on 10% slope
2987	3002	Moderate to high erosion potential on slope that varies from 12% to 34%
3003	3004	Potential habitat for steelhead trout and southwestern pond turtle
3003		U.S. Waters: SLO 11---- Brizziolari Creek; Moderate erosion potential on banks of creek; slope varies from 12% to 26%
3005	3087	Potential habitat for American badger, burrowing owl, Cooper's hawk, and other raptors
3005	3089	Miossi property: note prime stands of native bunchgrass community
3008	3011	High erosion potential on slope varying from 20% near base to 40% near summit
3015	3024	High erosion potential on slope varying from 17% near base to 16% near summit; slope length = 1020 feet
3025	3038	High erosion potential: alignment descends slope varying from 30% to 15% that parallels Miossi Creek and a tributary to creek, and crosses one creek tributary
3030	3071	Pipeline alignment is adjacent to Miossi Creek---- inspect area for potential impacts to creek
3039		Riparian wetland: SLO 14----- Low erosion potential on banks of drainage at confluence with Miossi Creek
3040	3047	Moderate erosion potential: alignment transversely crosses 24% slope above access road and Miossi Creek
3040	3070	Potential habitat for red-legged frog, southwestern pond turtle, and California tiger salamander
3048	3050	Cut in original grade: check cut and fill slopes and water flow path from slopes to drainages
3048		Low erosion potential on banks of drainage near confluence with Miossi Creek
3048		U.S. Waters: SLO 15
3049	3050	Check slopes of permanent cut in slope on east side of permanent easement
3050	3064	Low erosion potential: alignment crosses obliquely on 10% slope
3065	3066	Moderate erosion potential: alignment crosses transversely over 24% slope
3067	3069	Moderate to high erosion potential on 30% slope above drainage
3069		Wetland: SLO 16
3070	3079	Low erosion potential: alignment transversely crosses slope varying from 20% to 10%
3078		Wetland: SLO 17
3084	3088	Check Highway 101 Staging Area
3088	3089	Low erosion potential on 10% slope

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
			(Continued from previous page)																						
	2921	2924	Moderate erosion potential; alignment transversely crosses hill slope; slope varies from 14% to 26%																						
	2924	2926	U.S. Waters: SLO 7.2, 7.3, & 7.4																						
	2925	2926	High erosion potential at confluence of three tributaries of Stenner Creek; 30% slope above drainages																						
	2926	2935	High erosion potential on slope that alignment crosses transversely; slope varies from 30% for Stns. 2626 - 2932 to 14% near Stn. 2935																						
	2936	2941	Moderate to low erosion potential: alignment descends hill with 10% slope on upper portion and 30% slope near base of slope adjacent to drainage; note that access road crosses slope																						
	2940	2942	Wetland: SLO 7.8																						
	2941	2943	Pipeline design includes cut in original grade in area between two drainages; cut slopes are probably 2:1 to 3:1; check stability of cut slopes, check spoil site, check water flow path from cut and fill areas to adjacent drainages																						
	2944	2945	U.S. Waters & Wetland: SLO 8																						
	2944		U.S. Waters & Wetland: SLO 8 includes access road crossing above pipeline alignment																						
	2945	2949	Moderate erosion potential; alignment transversely climbs 20% slope																						
	2950	2953	High erosion potential; alignment descends slope that varies from 15% near crest to 33% near base above drainage; slope length = 340 feet																						
	2952	2953	Wetland: SLO 9																						
	2953	2954	Moderate to high erosion potential on 30% slope																						
	2953		Wetland: SLO 9 includes access road crossing below pipeline alignment																						
	2956	2959	Moderate to high erosion potential; slope varies from 15% near crest to 36% on banks above drainage at base of slope																						
	2958	2961	Portrero Creek: potential habitat for steelhead trout and southwestern pond turtle																						
	2959	2961	Wetland: SLO 10 (including tributaries adjacent to pipeline centerline)																						
	2959	2971	High erosion potential; alignment climbs hill with slopes that vary from 14% to 24% near base, 28% near middle, and 30% near summit; slope length = 1130 feet long																						

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
3	3092	3169	**U.S. 101 to junction of access road and pipeline alignment (adjacent to manhole) on ridge above Wineman residence**	1.5	32.9	10.9	0.0	0.4	1.7	0.4	0.0	0.0	0.3	0.0	13.8	15.1	0.0	0.5	2.6	0.4	0.0	0.0	0.5	0.0	19.1
			Notable Features & Potential Problems Within This Segment of Reach 5A:																						
	3098	3169	Potential habitat for long-eared owl, Cooper's hawk, sharp-shinned hawk, and American badger																						
	3099	3100	U.S. Waters: SLO 18																						
	3099	3118	Potential habitat for yellow warbler and willow flycatcher																						
	3099		Low erosion potential on 13% slope above drainage																						
	3100	3102	Low erosion potential on slope that varies from 11% to 19%																						
	3108	3109	Low to moderate erosion potential on slope that varies from 10% to 21%																						
	3110	3111	U.S. Waters: SLO 19																						
	3110	3117	San Luis Obispo Creek jacking site: check cut and fill slopes, creek banks, and damage to riparian trees																						
	3113	3114	Riparian wetland: SLO 20---- San Luis Obispo Creek																						
	3114	3118	Moderate erosion potential on bank below Reservoir Canyon Road; slope varies from 22% to 32%																						
	3119	3139	Low erosion potential; alignment transversely crosses slopes that vary from 11% to 20%																						
	3126	3129	Check Reservoir Canyon Staging Area																						
	3139	3140	U.S. Waters: LM 3																						
	3141	3144	Moderate erosion potential on slope of 22%																						
	3144	3145	Permanent cut in hilltop; check spoil slope and water flow pattern																						
	3153	3159	Moderate to high erosion potential: slope varies from 11% at base to 39% near summit																						
	3159	3160	Moderate erosion potential: alignment passes transversely along top of hill on slope of 12%																						
	3161	3169	High erosion potential: Alignment climbs obliquely up slope that varies from 15% near base to 30% near midslope and 24% near summit																						

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
4	3170	3223	**Junction of access road and pipeline alignment on ridge above Wineman residence to manhole on hill crest on northwest side of Hampton Canyon (above upper Hampton Creek)**	1.0	20.9	3.5	0.0	1.2	0.0	0.0	0.0	0.0	2.6	2.9	10.2	3.8	0.0	0.5	0.0	0.0	0.0	0.0	4.4	2.0	10.7

Notable Features & Potential Problems Within This Segment of Reach 5A:

3170	3179	High erosion potential: alignment descends obliquely down slope that varies from 34% to 22%; note that access road crosses alignment at base of slope-- check impacts of potential road widening
3177	3178	Cultural resources site SLO-1666 adjacent to east side of permanent easement: DO NOT DISTURB SITE!
3180	3182	Alignment makes deep cut in hill between two drainages: check slope stability
3180		U.S. Waters and Wetland: LM 4
3182	3187	High erosion potential on slope that varies from 35% near base to 22% near summit; note that access road crosses midway up slope-- check impacts of potential road widening
3182		U.S. Waters: LM 5
3188	3189	Low to moderate erosion potential: alignment proceeds along hilltop with steep sides; slope in temporary easement is 24% to 42%
3190	3195	High erosion potential on slope that varies from 19% near access road at base of slope to 40% near summit; note that recontoured slope may drain water in two directions
3196	3199	High erosion potential on hilltop; slope on hillside varies from 30% to 46%
3200	3203	Moderate to high erosion potential; slope varies from 44% near summit to 18% near base of slope
3203	3214	Moderate erosion potential: slope varies from 24% near base to 10% near midslope and 30% near summit
3216	3218	Low to moderate erosion potential on 19% slope
3218	3220	Wetlands: LM 6
3219	3223	High erosion potential on slope that varies from 19% to 29%; note that access road crosses alignment near midslope--- check for impacts of potential road widening

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
5	3224	3272	**Hill crest northwest of upper Hampton Creek to upper West Corral de Piedra Creek**	**0.9**	**21.2**	**5.2**	**0.0**	**2.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.7**	**0.0**	**8.8**	**7.8**	**0.0**	**1.8**	**0.0**	**0.0**	**0.0**	**0.0**	**2.8**	**0.0**	**12.4**

Notable Features & Potential Problems Within This Segment of Reach 5A:

3224	3229	High erosion potential: alignment descends obliquely down slope above Hampton Creek, crossing two tributaries before reaching creek; slope varies from 30% to 36%; note that new access road will be constructed to blowoff located near midslope
3229		U.S. Waters: LM 7---- Hampton Creek
3229	3235	High erosion potential with slope varying between 30% and 40%
3236	3237	Low erosion potential on slope varying from 10% to 14%
3239	3240	Low erosion potential on 12% slope; note that slope is steeper in temporary construction easement
3242	3246	High to moderate erosion potential: alignment descends obliquely down slope that varies from 40% near summit to 18% at midslope to 56% at banks of Reservoir Canyon Creek; note that access road crosses alignment on upper part of slope--- check for impacts of potential road widening
3246		U.S. Waters: LM 8---- Reservoir Canyon Creek
3246	3249	High erosion potential on slope varying from 36% near base to 24% near summit; note that access road crosses alignment at midslope-- check for potential impacts of road widening
3250	3253	Low erosion potential on slope varying from 8% to 14%; slope is greater in temporary construction easement
3254	3257	Moderate to high erosion potential: slope varies from 13% near summit to 40% near drainage at base of slope
3258	3271	Low erosion potential with slope varying from 11% to 21%
3272		U.S. Waters: LM 9---- upper West Corral de Piedra Creek

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
6	3305	3449	**South Portal of West Corral de Piedra tunnel to junction of Orcutt Road and Righetti Road**	**2.7**	**51.7**	**15.5**	**6.3**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**22.0**	**17.3**	**11.6**	**0.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**29.7**

Notable Features & Potential Problems Within This Segment of Reach 5A:

3372	3374	Low erosion potential on slope of 11% to 13%
3376	3386	Check Fiscalini Staging Area
3379	3381	U.S. Waters and Wetland: AGN 1---- Fiscalini Creek
3379	3382	Fiscalini Creek: potential steelhead habitat
3392		Low erosion potential on 10% slope
3394		Low to moderate erosion potential on slope that originally was 18%; post-construction slope in permanent easement will be approximately 13%
3399	3401	Low erosion potential; slope = 11%
3408		U.S. Waters: AG 2
3408		Low erosion potential on road bank; slope = 14%
3425	3505	Cultural resources site: SLO-1713
3425		Low erosion potential on 12% slope above drainage
3426	3427	Wetland: AC 3
3427		Low erosion potential on 14% slope above drainage
3427	3430	Moderate erosion potential on 3:1 (33%) cut slope along alignment; slope height = 14 feet at highest point; check water flow path to adjacent drainage and potential for revegetation of cut slope
3434		Wetland: AG 4.5---- Low erosion potential on 13% slope above drainage
3434	3435	Low erosion potential on 18% slope
3442		Low erosion potential on 11% slope
3444		Wetland: AG 4.5

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
7	3450	3647	**Junction of Orcutt Road and Righetti Road to gate near Varian Ranch stables**	**3.8**	**64.2**	**14.0**	15.2	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.1**	**0.0**	29.7	**15.8**	**18.1**	**0.0**	**0.0**	**0.1**	**0.0**	**0.4**	**0.1**	**0.0**	34.5
			Notable Features & Potential Problems Within This Segment of Reach 5A:																						
	3489	3492	West Corral de Piedra Creek: potential steelhead habitat																						
	3488	3492	U.S. Waters: AG 5 (West Corral de Piedra Creek @ Orcutt Road)---- moderate erosion potential on creek banks																						
	3492		Moderate erosion potential on banks of West Corral de Piedra Creek																						
	3525		U.S. Waters: AG 6 (East Corral de Piedra Creek)---- Moderate erosion potential on banks; slope approximately 50%																						
	3567		U.S. Waters: AG 8---- Moderate erosion potential; bank slopes approximately 38%																						
	3568	3582	Check Orcutt Road Staging Area																						
	3583	3584	Moderate erosion potential; slope varies from 24% near base to 9 % near summit																						
	3584		High erosion potential on steep slope (wall???)																						
	3598	3600	Moderate erosion potential: alignment crosses transversely across hillock; slope = 25%																						
	3607		High erosion potential on steep-sided ditch																						
	3607		Riparian wetland: AG 11																						
	3608		Low erosion potential on 12% slope																						
	3613	3614	Low erosion potential on 15% slope																						
	3615	3616	Low erosion potential on 10% slope																						
	3628	3630	Low erosion potential on slope varying from 11% to 19%																						
	3628	3629	U.S. Waters: AG 13																						
	3633	3634	Low erosion potential on slope of 11% to 15%																						
	3635	3636	Low erosion potential on slope varying from 16% to 11%																						
	3637		Riparian wetland: AG 14																						
	3642	3643	Low erosion potential on slope varying from 8% to 14%																						
	3645		Low erosion potential on 14% slope																						

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
8	3648	3832	Gate near Varian Ranch stables to Talley Farms	3.5	87.7	12.9	8.8	2.0	2.1	1.0	0.0	2.9	11.9	0.0	41.6	14.4	20.9	0.0	0.9	0.9	1.0	1.1	7.0	0.0	46.2

Notable Features & Potential Problems Within This Segment of Reach 5A:

2699	3770	Potential habitat for Cooper's hawk, sharp-shinned hawk, and American badger
2699	3701	Low erosion potential on slope varying from 8% to 20%
3650	3653	Riparian wetland: AG 16
3655		Low erosion potential on 17% slope
3655	3661	High erosion potential on permanent cut 2:1 slopes (50% slope); maximum slope length = 55 feet
3661	3679	Low erosion potential: alignment transversely crosses slope of 8% to 19%
3668		U.S. Waters: AG 17
3679	3682	High erosion potential on permanent 2:1 (50% slope) cut into hillside; maximum slope length = 18 feet
3682		Moderate erosion potential on 20%slope crossed obliquely by alignment
3690	3692	Low erosion potential on 18% slope
3692	3698	Low to moderate erosion potential on transverse slope varying from 9% to 20%
3701	3706	Moderate to high erosion potential: alignment transversely crosses slope varying from 22% to 36%
3706		U.S. Waters: AG 19
3707	3709	High erosion potential on permanent 2:1 (50% slope) cut into hillside; maximum slope length = 32 feet; check slope stability, potential for
3707	3709	revegetation, and water flow path from hillside and permanent cut to adjacent drainages
3710	3755	Potential habitat for Cooper's hawk and sharp-shinned hawk
3710		Moderate erosion potential on 20% slope adjacent to drainage
3711	3714	Moderate to high erosion potential; alignment transversely crosses hillside with slope varying from 22% to 40%
3716		Moderate erosion potential on transverse slope of 30%
3717	3724	High erosion potential on transverse slope varying 24% to 36% and permanent 2:1 (50% slope) cuts into hillside; check potential for
3717	3724	revegetation and water flow path from hillside (above cuts) and 2:1 slopes to drainages
3720	3750	Potential habitat for red-legged frog and southwestern pond turtle
3725		High erosion potential on 50% slope west of centerline
3726	3730	High erosion potential on permanent 2:1 (50% slopes) cut slopes on hillside; maximum slope length = 28 feet; check potential for revegetation and
3726	3730	water flow path on hillside and from cut slopes to drainage below slope
3731	3743	Moderate erosion potential on transverse slope varying from 19% to 31%
3732	3733	Wetland: AG 20

(Continued on next page)

REACH 5A: PROJECT RIGHT-OF-WAY & VEGETATION TOTALS

Segment	Station	To Station	Terrain Feature, Property Owner, or Coastal Facility	Length (miles)	Total Acres	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total	Grassland	Agricultural	Live Oak Rip. For.	Cot.-Wil. Rip. For.	Riparian scrub	V. Cs. Sage Scrub	Live Oak Forest	Live Oak Wdland.	Chamise Chaparral	Total
			(Continued from previous page)																						
	3743	3744	Low erosion potential on transverse slope of 15%																						
	3745		Moderate to high erosion potential on slopes of permanent fill area; maximum slope height = 9 feet (?); slope probably 2:1(?)																						
	3746	3752	High to moderate erosion potential on transverse slopes varying from 44% to 24%																						
	3753	3757	Moderate to low erosion potential on transverse slopes varying from 12% to 21%																						
	3758	3760	Low to moderate erosion potential on slope varying from 15% to 24%																						
	3761	3762	Moderate erosion potential: slope along centerline is 9% but transverse slopes along edge of permanent easement and in temporary easement are 25%																						
	3763	3767	Low erosion potential on transverse slopes of 12% to 17%																						
	3766		Check oaks adjacent to Lopez Turnout & Orcutt Road																						
	3768	3820	Potential habitat for steelhead trout, willow flycatcher, yellow warbler, sharp-shinned hawk, Cooper's hawk, long-eared owl, and southwestern pond turtle																						
	3768		Moderate erosion potential on transverse 28% slope																						
	3770		U.S. Waters & riparian wetland: AG 21---- Arroyo Grande Creek; high erosion potential; bank slopes are >75%																						

Appendix D

Field Data Sheets

Additional data sheets will be prepared for other vegetation types as necessary.

STATE WATER REVEGETATION SURVEY FORM

Non-native Grasslands

Date: _____ Station(s): _____ Page _____ of _____

Observers: _____

Common Species (Relative Abundances)

_____

_____

_____

_____

_____

_____

Performance Criteria Check-off

Topsoil stable Y N (explain) Erosion problems Y N (explain)

Total percent cover of desirable species: In ROW _____ Adjacent _____

Weed species present	Percent cover	Linear distance with cover by weeds > than adjacent

Total linear distance of ROW with weeds greater than adjacent areas_____

Weed species are likely _____ unlikely _____ to invade adjacent habitats.

Performance criteria met _____ not met _____

Notes and Explanations (additional information can be written on back of page)

Suggested remedial measures: _____

_____

STATE WATER REVEGETATION SURVEY FORM

Riparian Habitats

Date: _____ Station(s): _____ Page _____ of _____

Observers: _____

Common Species (Relative Abundance/Percent Cover)

_____

_____

_____

_____

_____

_____

Weed species present	Percent cover	Linear distance with cover by weeds > than adjacent

Total linear distance of ROW with weeds greater than adjacent areas_____

Weed species are likely _____ unlikely _____ to invade adjacent habitats.

Performance criteria met _____ not met _____

Supplemental irrigation present Y N

Notes and Explanations (additional information can be written on back of page)

Suggested remedial measures: _____

_____

Note: there is a separate form for trees.

STATE WATER REVEGETATION SURVEY FORM

Tree and Shrub Plantings

Date: _____ Observer(s): _____

Planting Area	Tree # (or resprout)	Height (trees)	Basal Diameter (trees)	Cage (Y/N)	Irrigation (Y/N)	Condition

Notes: _____

_____

_____

STATE WATER REVEGETATION SURVEY FORM

Chaparral

Date: _____ Station(s): _____ Page _____ of _____

Observers: _____

Common Species (Relative Abundance)

_____

_____

_____

_____

_____

_____

Performance Criteria Check-off

Topsoil stable Y N (explain) Erosion problems Y N (explain)

Percent cover by native perennial vegetation _____ Approximate native shrub density _____/m^2

Weed species present	Percent cover	Linear distance with cover by weeds > than adjacent

Total linear distance of ROW with weeds greater than adjacent areas_____

Weed species are likely _____ unlikely _____ to invade adjacent habitats.

Performance criteria met _____ not met _____

Notes and Explanations (additional information can be written on back of page)

Suggested remedial measures: _____

_____

Note: there are separate forms for oaks and sand mesa manzanita.

STATE WATER REVEGETATION SURVEY FORM

Coastal Scrub

Date: _____ Station(s): _____ Page _____ of _____

Observers: _____

Common Species (Relative Abundance)

_____

_____

_____

_____

_____

_____

Performance Criteria Check-off

Topsoil stable Y N (explain) Erosion problems Y N (explain)

Density of native perennials (#/m²) In ROW _____ Adjacent _____

General condition of native perennial plants _____
Signs of growth of native perennials Y N

Weed species present	Percent cover	Linear distance with cover by weeds > than adjacent

Total linear distance of ROW with weeds greater than adjacent areas_____
Weed species are likely _____ unlikely _____ to invade adjacent habitats.

Performance criteria met _____ not met _____

Notes and Explanations (additional information can be written on back of page)

Suggested remedial measures: _____

_____

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HCP APPENDIX E

CCWA O&M Manual Environmental Requirements

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SECTION 2
ENVIRONMENTAL REQUIREMENTS
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SECTION 2

ENVIRONMENTAL REQUIREMENTS

INTRODUCTION

The Central Coast Water Authority (CCWA) is committed to maintaining the environment in which it works. Facilities construction methods incorporated steps to save and maintain as much of the natural landscape as possible. In areas where habitat alteration occurred, both on site and off site mitigation provided an overall benefit to the environment. It is essential that all CCWA employees respect this commitment and continue specific practices in relation to continuing work along the right-of-way.

The initial reference document for environmental requirements applicable to all work within the right-of-way is the Mitigation Program for the Coastal Branch Phase II Extension of the State Water Project**.** It was prepared to specify the measures necessary to mitigate impacts that were identified in the environmental impact reports (EIRs) for the project (DWR 1991; SAIC 1991). The goal of the mitigation program is to reduce the project caused impacts to a level not considered significant. A Habitat Conservation Plan (Section 10 Permitting) is currently being processed by The Federal Fish and Wildlife Service (The Service) and will also be incorporated into any plans where environmental disturbance is a possibility.

ACCESS TO STRUCTURES ALONG THE PIPELINE

Access restrictions are intended to allow the pipeline right-of-way to return to its pre-pipeline disturbance condition to the maximum extent feasible. While it is understood that inspections and preventive maintenance are integral to the successful operation of the pipeline; extreme care must be exercised in order to maintain the natural habitat. Access control measures must be implemented to prevent the right-of-way from becoming a new travel corridor to unauthorized persons. All gates providing access to the easement will remain closed and locked when not in use or under the conditions requested by the property landowner were applicable.

All access to specific structures will only be along approved routes. These routes will be laid out on maps found in each CCWA vehicle and will be updated annually. Vehicle traffic will be on previously established roads and tracks only. No cross country driving or short cuts between structures will be permitted. If access to a particular portion of the pipeline is in question, refer to:

1. Approved route maps for each reach.
2. CCWA's Regulatory Specialist.
3. CCWA's Distribution Supervisor.

Inspections and routine preventive maintenance travel on the right-of-way will be done in four wheel drive vehicles. During abnormally wet years or along certain sections of the right-of-way, access may be by alternative means such as the use of quad style vehicles or by small four- wheel drive tractor type off road vehicles. Aerial surveillance by fixed wing air craft or by helicopter will be done on an annual basis during the summer months to look for "green" areas that may signify a leak.

If new access routes must be developed for specific repairs, all plans will be drawn and access times scheduled, in consultation with CCWA's Regulatory Specialist who in turn may consult with a contracted environmental consultant to avoid or minimize disturbance to sensitive species and habitats.

VEGETATION CONTROL

Maintenance of the right-of-way to allow regular inspections for leaks and prevent pipeline damage may require periodic removal of trees and other large growing, deep rooted plants within a narrow strip (approximately 20 feet wide) over the pipeline. Routine maintenance and emergency repairs may also require vegetation removal or disturbance in localized areas. All such activities (other than emergency repairs) will be designed and scheduled, in consultation with CCWA's Regulatory Specialist, to avoid or minimize disturbance to sensitive species and habitats.

Vegetation removal may take place in the areas immediately surrounding above ground vaults and structures, but only to the extent necessary to provide proper access and maintenance. Mechanical methods of removal (e.g., weed whacker and flail mowers) will be used to the extent feasible.

Use of herbicides within non-agriculture areas of the right-of-way will be minimized to the extent feasible and consistent with weed control measures specified in the Revegetation Plan. CCWA's Pesticide program will be administered by the Regulatory Specialist who will be certified through the California Department of Pesticide Regulation. Herbicides are to be used only where necessary to control invasive weedy species that can exclude colonization by native species and immediately surrounding (six feet) above-ground vaults and structures. Only approved chemicals (CAL-EPA registered) will be used according to label requirements and restrictions. No pesticide use will occur in a manner that would affect sensitive species.

MAINTENANCE/REPAIRS INVOLVING EARTH WORK

Vegetation Removal

If clearing of vegetation from the right-of-way is required during operation of the project, the mitigation measures will include but not be limited to:

- Operators and workers will first receive environmental training specific to the areas to be cleared (e.g., chaparral and riparian woodlands).

- The work area to be cleared for the necessary operation, maintenance, repair or replacement activity will be flagged prior to work and all activities will be confined to the flagged area.
- Sensitive habitats adjacent to the work area shall be clearly marked/identified and isolated to avoid damage or disturbance.
- Existing access roads to the right-of-way are to be used to the extent feasible.
- If necessary, before vegetation clearing, CCWA's Regulatory Specialist will identify any sensitive species that may be found within the immediate or adjacent work area. If the required activity can be feasibly conducted while avoiding the sensitive species, avoidance measures will be used. Hand tools are to be used unless other methods are necessary and such use has been approved by the Regulatory Specialist with consultation with CCWA's Environmental Consultant and/or a representative of the Fish and Wildlife Service. Relocation of any sensitive species will only be done by a proper licensed and certified biologist.
- Revegetation shall be conducted in accordance with the guidelines set for the particular plant community/species in the Biological Resources Mitigation Plan or the Habitat Conservation Plan, including monitoring until performance criteria are met.

Topsoil Salvage and Handling

In order to successfully revegetate disturbed areas along the right-of-way, topsoil must be separately removed, stored and restored to all work sites. Most commonly, topsoil will be saved by removing the surface material (6" to 18" in depth) from the excavation and placing it separately to one side of the work area. Spoil material from the rest of the excavation will be stored away from the surface material (e.g., on the other side of the excavation). The materials are replaced in the excavated area in the reverse order removed. In agricultural areas, input from the landowners regarding any special techniques for handling agricultural soils on their properties will be considered and implemented if found to be reasonable. All practical and necessary techniques will be implemented.

Topsoil storage areas must be protected form loss through wind and/or water erosion, especially during the rainy season, and from inadvertent mixing with sub-soils. The top layer of soil form native plant communities must be kept cool and dry by covering to protect the seed bank if restoration efforts will be delayed or prolonged. Except where erosion control considerations prevent it or a gently graded bench is required for access along the pipeline, all areas are to be graded back to approximated original contours.

Erosion Control

The Coastal Branch of The State Water pipeline passes through areas with highly erodible soils. During any repairs or routine maintenance, if vegetation will be cleared, exposed soil can be eroded by winds and water if appropriate erosion control is not

installed. All earth-work will conform to the conditions set and enforced by the Central Coast Regional Water Quality Control Board. Best management practices will be implemented in conjunction with all soil disturbances. This will include use of temporary erosion control measures during the rainy season and routine preventive maintenance of erosion control measures until the affected soils are stable.

Cleanup and Restoration

After the maintenance or emergency repairs have been completed, a final cleanup will include removal of stakes, lath, flagging, barrels, cans, drums, hazardous materials, contaminated soils and any other trash, debris, refuse, or wastes generated by or during the disturbance activities.

When work is complete, the site must be contoured to approximately the original topography. Heavily compacted soils shall be loosened by a cultivator or similar device. Stockpiled topsoil must be replaced on the surface of the excavation. With replacement of the topsoil, rock and natural plant debris must be placed in areas where such material was originally found to the degree practical. Contouring to natural grade must be done without disruption to adjacent undisturbed areas. Sediment collected in any sediment traps must be removed and deposited at a site where it will not erode back into a water course.

All areas where vegetation is removed and not covered with permanent facilities must be revegetated to restore the plant community that was present prior to the work. Erosion control through soil stabilization or revegetation will be required immediately after disturbance activities are completed. Any temporary cover crops used must be annual species that have minimal competition with recolonizing native species or with efforts to reestablish native vegetation.

Environmental Surveys

Where earth disturbance, vegetation removal or dewatering is proposed in areas where sensitive species or cultural resources could be present, surveys shall first be conducted by CCWA's Regulatory Specialist. The appropriate and qualified environmental monitors for the particular species found must be present if the sensitive resources could be affected during the work. The monitor has the authority to stop all work related activities if any sensitive species is being harassed.

No intentional intrusions upon, killing or collection of plants or animals at or around CCWA work sites will be permitted, except as provided for in the Biological Resources Mitigation Plan and the Habitat Conservation Plan. If sensitive wildlife species are found within a work area, they will be relocated, if necessary, by a contract professional who are qualified to handle these species and who possess the appropriate permits. The Service will be notified as required by the HCP.

No collection of prehistoric or historic cultural resource artifacts will be permitted at any CCWA work site except as specified in the Cultural Resources Mitigation Plan. If artifacts are found within work areas, (this would be highly unlikely since work areas have been previously disturbed) they will be removed by contract professional personnel who are familiar with the procedures for handling these materials.

Certain emergency repairs may preclude preconstruction surveys. Still, CCWA's Regulatory Specialist must be called to assist in the restoration process. Environmental monitors must also be present if the work area contains sensitive resources that could be affected during the work.

HAZARDOUS MATERIALS

Hazardous materials most likely to be used in a work area include fuels, lubricants, solvents and chemicals used in the water treatment process. Storage of these materials must be in designated staging areas away from drainages, wetlands and stream beds. Servicing of equipment and refueling must occur within the approved work area but will not be allowed within 100 feet of any sensitive resource, stream bed, wetland or drainage unless expressly approved by CCWA's Regulatory Specialist. Sorbent materials must be maintained on site for use in cleaning up minor spills. Any such spills must be cleaned up immediately. All outside contractors must prepare a spill response plan for review and approval by CCWA's Regulatory Specialist. The plan must specify excavation and transportation procedures for spills that contact natural soils, regulatory compliance and documentation procedures, and designation of a destination for proper treatment and/or disposal of contaminated materials. Storage or use of hazardous materials in or near streams shall be consistent with the California Department of Fish and Game regulations. All water containing a chlorine or chloramine residual that is drained from the pipeline into a body of water, must be neutralized. A Low Threat Discharge Permit issued by the State Regional Water Quality Control Board will be followed and an annual report of discharge activities will be submitted to the Board each January.

FIRE CONTROL PROCEDURES

No open flame type fires (camp fires, barbeques) are permitted along the CCWA right-of-way or in the work areas. Smoking is allowed only in designated areas or in enclosed non-CCWA vehicles. Smoking is prohibited in all CCWA facilities and vehicles. All construction equipment and workers' vehicles must be equipped with appropriate spark arrestors. Fire extinguishers must be available at all construction and on all work-related vehicles. CCWA's Regulatory Specialist will maintain contact with local firefighting agencies throughout the dry season to be updated on fire conditions. Fire condition will be communicated to all work personnel. Vehicles are restricted to the right-of-way and work areas. All contractors will prepare and implement a CCWA approved fire protection and control plan before beginning work.

HCP APPENDIX F

Survey Protocols

San Joaquin Kit Fox

California Red-legged Frog

California Tiger Salamander

Southwestern Willow Flycatcher

Least Bell's Vireo

Arroyo Toad

Declining Amphibian Fieldwork Code of Practice

Botanical Inventories for Federally Listed, Proposed, and Candidate Species

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-99-TA-1534

February 15, 2001

Memorandum

To: Distribution

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Dissemination of Standard Recommendations for the Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance

The U.S. Fish and Wildlife Service (Service) provides the attached standard recommendations for the protection of the San Joaquin kit fox (*Vulpes macrotis mutica)* prior to or during ground disturbing activities. The attached standard recommendations are subject to revision by the Service at any time. Successful implementation of the standard recommendations will require ongoing contact with the Service before and during the ground disturbance. Questions regarding this guidance may be addressed to Sheila Larsen or Susan Jones of the Sacramento Fish and Wildlife Office at (916) 414-6600.

Wayne S. White

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U.S. FISH AND WILDLIFE SERVICE
STANDARDIZED RECOMMENDATIONS
FOR PROTECTION OF THE SAN JOAQUIN KIT FOX
PRIOR TO OR DURING GROUND DISTURBANCE

Prepared by the Sacramento Fish and Wildlife Office
June 1999

INTRODUCTION

The following document includes many of the San Joaquin kit fox (*Vulpes macrotis mutica*) protection measures typically recommended by the U. S. Fish and Wildlife Service (Service), prior to and during ground disturbance activities. However, incorporating relevant sections of these guidelines into the proposed project is not the only action required under the Endangered Species Act of 1973, as amended (Act). Project applicants should contact the Service in Sacramento to determine the full range of requirements that apply to your project; the address and telephone number are given at the end of this document. Formal authorization for the project may be required under either section 7 or section 10 of the Act. Implementation of the measures presented in this document may be necessary to avoid violating the provisions of the Act, including the prohibition against "take" (defined as killing, harming, or harassing a listed species, including actions that damage or destroy its habitat). Such protection measures may also be required under the terms of a biological opinion pursuant to section 7 of the Act resulting in incidental take authorization (authorization), or an incidental take permit (permit) pursuant to section 10 of the Act. The specific measures implemented to protect kit fox for any given project shall be determined by the Service based upon the applicant's consultation with the Service.

The purpose of this document is to make information on kit fox protection strategies readily available and to help standardize the methods and definitions currently employed to achieve kit fox protection. The measures outlined in this document are subject to modification or revision at the discretion of the Service.

All surveys, den destructions, and monitoring described in this document must be conducted by a qualified biologist. A qualified biologist (biologist) means any person who has completed at least four years of university training in wildlife biology or a related science and/or has demonstrated field experience in the identification and life history of the San Joaquin kit fox. In addition, biologist(s) must be able to identify coyote, red fox, gray fox, and kit fox tracks, and to have seen a kit fox in the wild, at a zoo, or as a museum mount.

SMALL PROJECTS

Small projects are considered to be those projects with small foot prints such as an individual in-fill oil well, communication tower, or bridge repair. These projects must stand alone and not be part of, or in any way connected to larger projects (i.e., bridge repair or improvement to serve a

future urban development). The Service recommends that on these small projects, the biologist survey the proposed project boundary and a 200-foot area outside of the project footprint to identify habitat features, and make recommendations on situating the project to minimize or avoid impacts. If habitat features cannot be completely avoided, then preconstruction surveys should be conducted.

Preconstruction/preactivity surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any project activity likely to impact the San Joaquin kit fox. Surveys should identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens should be determined and mapped (see Survey Protocol).

Written results of preconstruction/preactivity surveys must be received by the Service within five days after survey completion and prior to the start of ground disturbance and/or construction activities. If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the Service shall be immediately notified. If the preconstruction/preactivity survey reveals an active natal pupping or new information, the project applicant should contact the Service immediately to obtain the necessary take authorization/permit.

If take authorization/permit has already been issued, then the biologist may proceed with den destruction within the project boundary, except natal/pupping dens (active or inactive). Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can be demarcated, see den destruction section).

OTHER PROJECTS

It is likely that all other projects occurring within kit fox habitat will require a take authorization/permit from the Service. This determination would be made by the Service during the early evaluation process (see Survey Protocol). These other projects would include, but are not limited to: linear projects; projects with large footprints such as urban development; and projects which in themselves may be small but have far reaching impacts (i.e., water storage or conveyance facilities that promote urban growth or agriculture, etc.).

The take authorization/permit issued by the Service may incorporate some or all of the protection measures presented in this document. The take authorization/permit may include measures specific to the needs of the project, and those requirements supersede any requirements found in this document.

EXCLUSION ZONES

The configuration of exclusion zones around the kit fox dens should have a radius measured outward from the entrance or cluster of entrances. The following radii are minimums, and if they cannot be followed the Service must be contacted:

Potential den	50 feet
Known den	100 feet
Natal/pupping den (occupied and unoccupied)	Service must be contacted
Atypical den	50 feet

Known den: To ensure protection, the exclusion zone should be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Exclusion zone fencing should be maintained until all construction related or operational disturbances have been terminated. At that time, all fencing shall be removed to avoid attracting subsequent attention to the dens.

Potential and Atypical dens: Placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

Construction and other project activities should be prohibited or greatly restricted within these exclusion zones. Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any other type of surface-disturbing activity should be prohibited within the exclusion zones.

DESTRUCTION OF DENS

Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Protection provided by kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed. The value to kit foxes of potential, known, and natal/pupping dens differ and therefore, each den type needs a different level of protection. **Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the Service**.

Natal/pupping dens: Natal or pupping dens which are occupied will not be destroyed until the pups and adults have vacated and then only after consultation with the Service. Therefore, project activities at some den sites may have to be postponed.

Known Dens: Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the biologist. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. The Service encourages hand excavation, but realizes that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.

Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgement of the biologist, the animal has escaped from the partially destroyed den.

Potential Dens: If a take authorization/permit has been obtained from the Service, den destruction may proceed without monitoring, unless other restrictions were issued with the take authorization/permit. If no take authorization/permit has been issued, then potential dens should be monitored as if they were known dens. If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then destruction shall cease and the Service shall be notified immediately.

CONSTRUCTION AND OPERATIONAL REQUIREMENTS

Habitat subject to permanent and temporary construction disturbances and other types of project-related disturbance should be minimized. Project designs should limit or cluster permanent project features to the smallest area possible while still permitting project goals to be achieved. To minimize temporary disturbances, all project-related vehicle traffic should be restricted to established roads, construction areas, and other designated areas. These areas should also be

included in preconstruction surveys and, to the extent possible, should be established in locations disturbed by previous activities to prevent further impacts.

1. Project-related vehicles should observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.

2. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under number 13 of this section must be followed.

3. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.

4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.

5. No firearms shall be allowed on the project site.

6. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets should be permitted on project sites.

7. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the Service. If rodent control

must be conducted, zinc phosphide should be used because of proven lower risk to kit fox.

8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the Service.

9. An employee education program should be conducted for any project that has expected impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and agency personnel involved in the project. The program should include the following: a description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site.

10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, California Department of Fish and Game (CDFG), and revegetation experts.

11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.

12. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.

13. The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during

project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers given below. The CDFG contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, California 95814, (916) 654-4262.

Any project-related information required by the Service or questions concerning the above conditions or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at:

Endangered Species Division
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846
(916) 414-6620

"Take" - Section 9 of the Endangered Species Act of 1973, as amended (Act) prohibits the "take" of any federally listed endangered species by any person (an individual, corporation, partnership, trust, association, etc.) subject to the jurisdiction of the United States. As defined in the Act, take means " . . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Thus, not only is a listed animal protected from activities such as hunting, but also from actions that damage or destroy its habitat.

"Dens" - San Joaquin kit fox dens may be located in areas of low, moderate, or steep topography. Den characteristics are listed below, however, the specific characteristics of individual dens may vary and occupied dens may lack some or all of these features. Therefore, caution must be exercised in determining the status of any den. Typical dens may include the following: (1) one or more entrances that are approximately 5 to 8 inches in diameter; (2) dirt berms adjacent to the entrances; (3) kit fox tracks, scat, or prey remains in the vicinity of the den; (4) matted vegetation adjacent to the den entrances; and (5) manmade features such as culverts, pipes, and canal banks.

"Known den" - Any existing natural den or manmade structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox. The Service discourages use of the terms ”active” and “inactive” when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly.

"Potential Den" - Any subterranean hole within the species’ range that has entrances of appropriate dimensions for which available evidence is insufficient to conclude that it is being used or has been used by a kit fox. Potential dens shall include the following: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use.

"Natal or Pupping Den" - Any den used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two, therefore, for purposes of this definition either term applies.

"Atypical Den" - Any manmade structure which has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

U.S. Fish and Wildlife Service

Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog

August 2005

I. Introduction

The U.S. Fish and Wildlife Service (Service) issued guidance on conducting site assessments and surveys for the California red-legged frog (*Rana aurora draytonii*) (CRF) on February 18, 1997 (1997 Guidance). Since then, the Service has reviewed numerous CRF site assessments and surveys results, accompanied wildlife biologists in the field during the preparation and performance of site assessments and CRF surveys, and consulted with species experts on the effectiveness of the 1997 Guidance. Based on our review of the information, the Service has determined that the survey portion of the 1997 Guidance is less likely to accurately detect CRF than previously thought, especially in certain portions of the species range and particularly where CRF exist in low numbers. In response to the need for new guidance, the Service has prepared this *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* (Guidance).

Similar to the 1997 Guidance, two procedures are recommended in the new Guidance to accurately assess the likelihood of CRF presence in the vicinity of a project site: (1) an assessment of CRF locality records and potential CRF habitat in and around the project area and, (2) focused field surveys of breeding pools and other associated habitat to determine whether CRF are likely to be present.

Because CRF are known to use aquatic, riparian, and upland habitat, they may be present in any of these habitat types, depending on the time of year, on any given property. For sites with no suitable aquatic breeding habitat, but where suitable upland dispersal habitat exists, it is difficult to support a negative finding with the results of any survey guidance. Therefore, this Guidance focuses on site assessments and surveys conducted in and around aquatic and riparian habitat.

This Guidance was developed by the Service's Sacramento Fish and Wildlife Office in coordination with the Ventura Fish and Wildlife Office. Input by field biologists and scientists experienced in surveying for the CRF was also used in the development of this Guidance.

If the following Guidance is followed in its entirety, the results of the site assessments and surveys will be considered valid by the Service for two (2) years, unless determined otherwise on a case-by-case basis by the appropriate Service Fish and Wildlife Office. After two (2) years, new surveys conducted under the most current Service Guidance may be required, if deemed necessary by the appropriate Service Fish and Wildlife Office.

Modifications of this Guidance for specific projects or circumstances may be approved by the appropriate Fish and Wildlife Office; however, we strongly recommend that all modifications be reviewed and approved by the Service prior to implementation.

II. Permit Requirements

Unless otherwise authorized, individuals participating in site assessments and surveys for CRF may **NOT** take the California red-legged frog during the course of site assessments or survey activities. Take may only be authorized via section 7 or section 10 of the Endangered Species Act of 1973, as amended. Typically, take associated with survey activities is authorized via issuance of section 10(a)(1)(A) permits. For reference, an application for a section 10(a)(1)(A) permit is available through the appropriate Fish and Wildlife Office or online at: http://forms.fws.gov/3-200-55.pdf.

The site assessment and survey methods recommended in this Guidance do NOT require the surveyor to have a permit. As stated below, the surveyor must be otherwise qualified to conduct the surveys.

It is the responsibility of the surveyor to ensure all other applicable permits are obtained and valid (*e.g.*, state scientific collection permits), and that permission from private landowners or land managers is obtained prior to accessing a site and beginning site assessments and surveys.

III. Site Assessments

To prevent any unnecessary loss of time or use of resources, it is essential that completed site assessments be submitted to the appropriate Service Fish and Wildlife Office for review in order to obtain further guidance from the Service before conducting surveys.

Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting a site assessment to prevent the spread of parasites and diseases to CRF and other amphibians.

Careful evaluation of the following information about CRF and their habitats in the vicinity of a project or other land use activities is important because this information indicates the likelihood of the presence of CRF. This information will help determine whether it is necessary to conduct field surveys.

To conduct a site assessment for CRF, complete the data sheet in Appendix D and return it with any necessary supporting documentation to the appropriate Service Fish and Wildlife Office for review prior to initiating surveys. The following information is critical to completing a proper site assessment:

1. Is the site within the current or historic range of the CRF?

Since knowledge of the distribution of the CRF is likely to change as new locality information becomes available, biologists are expected to contact the appropriate Fish and Wildlife Office (see section IV below) to determine if a project site is within the range of this species.

2. Are there known records of CRF at the site or within a 1.6-kilometer* (1-mile) radius of the site?

The biologist should consult the California Natural Diversity Data Base (CNDDB) maintained by the California Department of Fish and Game's (CDFG) Natural Heritage Division as a starting point to determine if there are reported localities of CRF within a 1.6-kilometer (1-mile) radius of the site. Information on the CNDDB is attached to the end of this document. Data entry into the CNDDB is not always current nor do all surveyors submit reports to the CNDDB, thus it is essential that other information sources on local occurrences of CRF be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resource managers and biologists from municipal, State, and Federal agencies, environmental groups, and herpetologists at museums and universities. The biologist should report to the Service all known CRF records at the project site and within a 1.6-kilometer (1-mile) radius of the project boundaries. One-point-six (1.6) kilometers (1 mile) was selected as a proximity radius to a project site based on telemetry data collected by Bulger *et al.* (2003), rounded to the nearest whole mile. This distance may be subject to change when new data becomes available, or based on site-specific conditions, so it is advised that surveyors check with the appropriate Service Fish and Wildlife Office to ensure they are using the most up-to-date information.

> *** IMPORTANT**: One-point-six (1.6) kilometers (1 mile) radius is a general guideline. The appropriate Service Fish and Wildlife Office will advise surveyors of the most appropriate distance for each specific project location on a case-by-case basis.

3. What are the habitats within the project site and within 1.6 kilometers* (1 mile) of the project boundary?

In order to properly characterize the habitat within 1.6 kilometers (1 mile) of the project site, individuals conducting site assessments must visit the project site and as much of the surrounding habitat within 1.6 kilometers (1 mile) of the project site as possible. Aerial photographs, maps, and other resources should be consulted as well to ensure all possible accessible habitats are considered. Based on this reconnaissance assessment, the surveyor shall describe the upland and aquatic habitats within the project site and within 1.6 kilometers (1 mile) of the project boundary. The aquatic habitats should be mapped and characterized (*e.g.*, ponds vs. creeks, pool vs. riffle, ephemeral vs. permanent (if ephemeral, give date it goes dry), vegetation (type, emergent, overhanging), water depth at the time of the site assessment, bank full depth, stream gradient (percent slope), substrate, and description of bank). The presence of

bullfrogs (*Rana catesbeiana*) and other aquatic predators such a centrarchid fishes (bass, perch, sunfish) should be documented even though their presence does not negate the presence of CRF. Upland habitats should be characterized by including a description of upland vegetation communities, land uses, and any potential barriers to CRF movement. The information provided in Appendix A serves as a guide to the features that will indicate possible CRF habitat.

4. Report the results of the site assessment

A site assessment report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1) Copies of the data sheet provided at Appendix D;

2) Copies of field notes and all other supporting documentation including:

   A. A list of all known CRF localities within 1.6 kilometers* (1 mile) of the project site boundaries;
   B. Photographs of the project site (photopoints shall be indicated on an accompanying map);
   C. A map of the site showing all of the habitat types and other important features as well as the location of any species detected during the site assessment within 1.6 kilometers (1 mile) of the project site boundaries. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;
   D. A description of the project and/or land use that is being proposed at the site.

Based on the information provided in the site assessment report, the Service will provide guidance on how CRF issues should be addressed, including whether field surveys are appropriate, where the field surveys should be conducted, and whether incidental take authorization should be obtained through section 7 consultation or a section 10 permit pursuant to the Endangered Species Act.

IV. Field Surveys

<u>Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting surveys to prevent the spread of parasites and diseases to CRF and other amphibians.</u>

To avoid and minimize the potential of harassment or harm to CRF, no additional surveys will be conducted in an area once occupancy has been established, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

<u>The Service should be notified in writing (*e.g.*, email) by the surveyor within three (3) working</u>

days once a CRF is detected. The Service will provide guidance to the surveyor regarding the need to collect additional information such as population size, age class, habitat use, *etc*.

A. Qualifications of Surveyors

Surveyors must be familiar with the distinguishing physical characteristics of all life stages of the CRF, other anurans of California, and with introduced, exotic species such as the bullfrog and the African clawed frog (*Xenopus Laevis*) prior to conducting surveys according to this Guidance.

Surveyors must submit their qualifications to the Service along with their survey results.

A field guide should be consulted (*e.g.*, Wright and Wright 1949; Stebbins 2003) to confirm the identification of amphibians encountered during surveys. Surveyors also should be familiar with the vocalizations of the CRF and other amphibians found in California. Recordings of these vocalizations are available through various sources (*e.g.*, Davidson 1995). Surveyors that do not have experience with the species are required to obtain training on locating and identifying CRF adult, larval and egg stages before survey results are accepted. Training may include attendance at various workshops that have an emphasis on the biology of the California red-legged frog, accompanied by an appropriate level of field identification training; field work with individuals who possess valid 10(a)(1)(A) permits for the CRF; and experience working with ranids and similar taxa.

In some localities more intensive surveys (*e.g*., dip-netting larvae and adults) may be desirable to document the presence of CRF. In order to conduct such focused surveys a valid section 10(a)(1)(A) permit is required (refer to introduction section for information on how to apply for a section 10(a)(1)(A) permit). Applicants will be considered qualified for a section 10(a)(1)(A) permit if they meet the Service's most current qualification requirements. At a minimum, prospective applicants must:

1) Possess a Baccalaureate degree in biology, ecology, a resource management-related field, or have equivalent relevant experience;
2) Have completed course work in herpetology and study-design/survey-methodology or have equivalent relevant experience;
3) Have verifiable experience in the design and implementation of amphibian surveys or research or have equivalent relevant experience;
4) Have verifiable experience handling and identifying a minimum of 10 CRF, or similar ranid species, comprised of a minimum of 5 adults and a combination of larva and juveniles;
5) Obtain a minimum of 40 hours of field experience through assisting in surveys for the CRF during which positive identification is made;
6) Have familiarity with suitable habitats for the species and be able to identify the major vegetative components of communities in which California red-legged frog surveys or

research may be conducted.

7) Have familiarity with and be able to identify native and non-native amphibians that may co-occur with the listed species.

B. Survey Periods

Surveys may begin anytime during January and should be completed by the end of September. Multiple survey visits conducted throughout the survey-year (January through September) increases the likelihood of detecting the various life stages of the CRF. For example, adult frogs are most likely to be detected at night between January 1 and June 30, somewhere in the vicinity of a breeding location, whereas, sub-adults are most easily detected during the day from July 1 through September 30.

Due to the geographic and yearly variation in egg laying dates, it is not possible to specify a range of dates that is appropriate for egg surveys throughout the range of the CRF. The following table summarizes the best approximated times to survey for CRF egg masses.

Geographic Area	Best Survey Period*
Northern California along the coast and interior to the Coast Range (north of Santa Cruz County)	January 1 and February 28
Southern California along the coast and interior through the Coast Range (south of, and including Santa Cruz County)	February 25 and April 30
Sierra Nevada Mountains and other high-elevation locations	Should not begin before April 15

Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval prior to conducting the surveys.

Survey Methodology

This Guidance recommends a total of **up to** eight (8) surveys to determine the presence of CRF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (*i.e.*, the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1 and September 30.

If CRF are identified at any time during the course of surveys, no additional surveys will be conducted in the area, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

The following methodology shall be followed unless otherwise specified, or approved by the

appropriate Service Fish and Wildlife Office:

1) Upon arrival at the survey site, surveyors should listen for a few minutes for frogs calling, prior to disturbing the survey site by walking or looking for eye shine using bright lights. If CRF calls are identified, the surveyor should note this information on the survey data sheet and note the approximate location of the call. Once the survey begins, the surveyor should pay special attention to the area where the call originated in an attempt to visually identify the frog.

2) The most common method of surveying for CRF is the visual-encounter survey. This survey is conducted either during daylight hours or at night by walking entirely around the pond or marsh or along the entire length of a creek or stream while repeatedly scanning for frogs. This procedure allows one to scan each section of shore from at least two different angles. Surveyors should begin by first working along the entire shoreline, then by entering the water (if necessary and no egg masses would be crushed or disturbed), and visually scanning all shoreline areas and all aquatic habitats identified in the site assessment. Generally, surveyors shall focus on all open water to at least 2 meters (6.5 feet) up the bank. When wading, surveyors must take maximum care to avoid disturbing sediments, vegetation, or larvae. When walking on the bank, surveyors shall take care to not crush rootballs, overhanging banks, and stream-side vegetation that might provide shelter for frogs. Surveys must cover the entire area, otherwise the remaining survey area must be surveyed the next day/night that weather conditions allow (both visits would constitute one day/night survey).

3) Day surveys may be conducted on the same day as a night survey.

   The main purpose of day surveys during the breeding season is to look for larvae, metamorphs, and egg masses; the main purpose of day surveys during the non-breeding season is to look for metamorphosing sub-adults, and non-breeding adults. Daytime surveys shall be conducted between one hour after sunrise and one hour before sunset.

4) Night surveys

   The main purpose of night surveys is to identify and locate adult and metamorphosed frogs. Conditions and requirements for conducting night surveys are as follows:

   A. Night surveys must commence no earlier than one (1) hour after sunset.
   B. Due to diminished visibility, surveys should not be conducted during heavy rains, fog, or other conditions that impair the surveyor's ability to accurately locate and identify frogs.
   C. Nighttime surveys shall be conducted with a Service-approved light such as a Wheat Lamp, Nite Light, or sealed-beam light that produces less than 100,000 candle watt. Lights that the Service does not accept for surveys are lights that are either too dim or too bright. For example, Mag-Light-type lights and other

types of flashlights that rely on 2 or 4 AA's/AAA's, 2 C's or 2 D batteries. Lights with 100,000 candle watt or greater are too bright and also would not meet Service requirements.

D. The Service approved light must be held at the surveyor's eye level so that the frog's eye shine is visible to the surveyor.
E. The use of binoculars is a must in order to effectively see the eye shine of the frogs. Surveys conducted without the use of binoculars may call in to question the validity of the survey.

5) Weather conditions.

Weather and visibility conditions must be consistent throughout the duration of the survey; if weather conditions become unsuitable, the survey must be completed at another time when conditions are better suited to positively locating and identifying frogs. Suitable conditions are as follows:

A. Air temperature at the survey site must be at least 10 degrees Celsius (50 degrees Fahrenheit). Frogs are less likely to be active when temperatures are below 10 degrees Celsius (50 degrees Fahrenheit).
B. Wind speed must not exceed 8 kilometers/hour (5 miles/hour) at the survey site. High wind speeds affect temperatures and the surveyor's ability to hear frogs calling.
C. Surveys must be conducted under clear to partly cloudy skies (high clouds are okay) but not under dense fog or during heavy rain, as stated above. Surveys may be conducted during light rains.

Surveyors should carefully consider weather conditions prior to initiating a survey. Ask yourself, "Can I collect accurate, reliable data under the existing weather conditions" prior to proceeding with the survey. Weather conditions will be taken into account when the data is reviewed by the appropriate Service Fish and Wildlife Service Office.

6) Decontamination of equipment

In an effort to minimize the spread of terrestrial and aquatic pathogens, all aquatic survey equipment including chest waders, wet suits, float tubes, kayaks, shall be decontaminated before entering potential CRF habitat using the guidelines in Appendix B. Careful attention shall be taken to remove all dirt from boots, chest waders, wetsuits, float tubes, kayaks, and other equipment before placing equipment into the water.

7) Unidentified larvae, sub-adults, and adults

If the larval life stage is the only life stage detected and the larvae are not identified to species (or similarly, if sub-adult or adult frogs are observed but not identified to

species), the surveyor must either return to the habitat to identify the frog in another life stage or obtain the appropriate permit (*e.g.*, section 10(a)(1)(A) permit) authorization allowing the surveyor to handle CRF and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

8) Reporting results of the surveys

A species survey report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1. Copies of the data sheets provided at Appendix E;

2. Copies of field notes and all other supporting documentation including:

   A. Photographs of all CRF observed during the survey and of the habitat where each individual was located, if possible without harming or harassing the individual;
   B. A map of the site showing the location of any species detected during the survey. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;

Based on the information provided in the site assessment report and the survey results, the Service will provide guidance on how CRF issues should be addressed through the section 7 or section 10 processes.

All information on CRF distribution resulting from field surveys shall be sent to the California Natural Diversity Database (CNDDB). CNDDB forms shall be completed, as appropriate, for each listed species identified during the survey(s) and submitted to the California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1807 13th Street, Suite 202, Sacramento, California 95814, with copies submitted to the appropriate Service Fish and Wildlife Office. Each form sent to the CDFG shall have an accompanying 1:24,000 scale USGS map (or an exact scale photocopy of the appropriate portion(s) of the map) -or- Global Information System (GIS) data coverage of the site. Copies of the form can be obtained from the CDFG at the above address (telephone: 916-324-3812) or online at: http://www.dfg.ca.gov/whdab/html/animals.html. Additional information about the CNDDB is available in Appendix C.

The Service may not accept the results of field surveys conducted under this Guidance for any of the following reasons:

A. if the appropriate Service Fish and Wildlife Office was not contacted to review the results of the site assessment prior to field surveys being conducted;
B. if field surveys were conducted in a manner inconsistent with this Guidance or with

survey methods not previously approved by the Service;

C. if field surveys were incomplete;
D. if surveyors were not adequately qualified to conduct the surveys;
E. if the reporting requirements, including submission of CNDDB forms, were not fulfilled.

IV. Service Contacts

There are three Service Fish and Wildlife Offices within the range of the CRF (see Map 1). The appropriate office to contact regarding site assessments or survey authorization depends on the location where the surveys are to be conducted.

For project sites and land use activities in Santa Cruz, Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura Counties, portions of Los Angeles and San Bernardino Counties outside of the Los Angeles Basin, and portions of Kern, Inyo and Mono Counties east of the Sierra Crest and south of Conway Summit, contact:

Ventura Fish and Wildlife Office,
2493 Portola Road, Suite B
Ventura, California, 93003
(805/644-1766).

For project sites and land use activities in all other areas of the State south of the Transverse Ranges, contact:

Carlsbad Fish and Wildlife Office
Attn: Recovery Permit Coordinator
6010 Hidden Valley Road
Carlsbad, California, 92009
(760/431-9440).

For project sites and land use activities in all other areas of the State, contact:

Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825
(916/414-6600).
(916/414-6713, fax)

For information on section 10(a)(1)(A) recovery permits, contact:

Regional Office,
Eastside Federal Complex
911 N.E., 11th Avenue
Portland, Oregon 97232-4181
(503/231-6241)

* These are independent offices overlapping with the Sacramento Fish and Wildlife Office. Their work primarily focuses on salmonid restoration, fishery monitoring and Forest Plan Implementation.

Map 1. Map of California showing jurisdictional boundaries of Service Fish and Wildlife Offices.

References

Davidson, C. 1995. Frog and toad calls of the Pacific Coast: Vanishing Voices. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York. 27 pp. +1 cassette.

Stebbins, R.C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, New York, New York. 533 pp.

Wright, A.H. and A.A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Third Edition. Comstock Publishing Company, Ithaca, New York. xii+640 pp.

Appendix A.
California red-legged frog identification and ecology.

1. Identification

The following information may aid surveyors in the identification of California red-legged frogs and similar species. However, all surveyors are expected to consult field guides (Wright and Wright 1949; Davidson 1995; Stebbins 2003) for further information.

General Description
The California red-legged frog (*Rana aurora draytonii*), is a relatively large aquatic frog ranging from 4 to 13 centimeters (1.5 to 5 inches) from the tip of the snout to the vent. From above, the California red-legged frog can appear brown, gray, olive, red or orange, often with a pattern of dark flecks or spots. The skin usually does not look rough or warty. The back of the California red-legged frog is bordered on either side by an often prominent dorsolateral fold of skin running from the eye to the hip. The hindlegs are well-developed with large webbed feet. A cream, white, or orange stripe usually extends along the upper lip from beneath the eye to the rear of the jaw. The undersides of adult California red-legged frogs are white, usually with patches of bright red or orange on the abdomen and hindlegs. The groin area can show a bold black mottling with a white or yellow background.

Adults
Positive diagnostic marks should be used to accurately distinguish California red-legged frogs from other species of frogs that may be observed. A positive diagnostic mark is an attribute of the animal that will not be found on any other animal likely to be encountered at the same locality. The following features are positive diagnostic marks that, if observed, will distinguish California red-legged frogs from foothill yellow-legged frogs (*Rana boylii)* and bullfrogs *(Rana catesbeiana)*:

a. Prominent dorsolateral folds (thick upraised fold of skin running from eye to hip) on any frog greater than 5 centimeters (2 inches) long from snout to vent. Young yellow-legged frogs can show reddish folds; these usually fade as the frogs mature.

b. Bright red dorsum.

c. Well defined stripe as described above running along upper lip.

Since California red-legged frogs are often confused with bullfrogs, surveyors should note those features that might be found on bullfrogs that will rarely be observed on California red-legged frogs. These features are:

a. Absence of the dorsolateral fold.
b. Bright yellow on throat.
c. Uniform bright green snout.
d. Tympanum (ear disc) distinct and much larger than eye.

Please note that some frogs may lack all of the above characteristics given for both California red-legged frogs and bullfrogs. Surveyors should regard such frogs as unidentified, unless it is clearly identified as another species.

California red-legged frogs are cryptic because their coloration tends to help them blend in with their surroundings, and they can remain immobile for great lengths of time. When an individual California red-legged frog is disturbed, it may jump into the water with a distinct "plop." The California red-legged frog may do this either when the surveyor is still distant or when a surveyor is very near. Bullfrogs exhibit similar behavior but will often emit a "squawk" as they dive into the water. Because a California red-legged frog is unlikely to make such a sound, a "squawk" from a fleeing frog will be considered sufficient to positively identify the frog as a bullfrog.

Larvae
Tadpoles may be trapped and handled only by those with a valid 10(a)1(A) permit. California red-legged frog larvae range from 14 to 80 millimeters (0.5 to 3.25 inches) in length. They are greenish to generally brownish color with darker marbling and lack distinct black or white spotting or speckling. Large California red-legged frog larvae often have a wash of red coloration on their undersides and a very small single row of evenly spaced whitish or gold flecks along the side where the dorsolateral fold will develop. Other features to look for to identify California red-legged frog larvae include: eyes set well in from the outline of the head (contrasts with treefrogs (*Hyla* spp.)), oral papillae on both the sides of the mouth and the bottom of the mouth (contrasts with *Bufo* spp.), well developed oral papillae on the sides of the mouth (contrasts with other subspecies of red-legged frogs (*Rana aurora* spp.) and spadefoot toads (*Scaphiopus* spp.)), generally mottled body and tail with few or no distinct black spots on tail fins (contrasts with bullfrogs), and two to three tooth rows on the top and bottom (contrasts with foothill yellow-legged frogs).

Eggs
California red-legged frogs breed during the winter and early spring from as early as late November through April and May. Adults engage in courtship behaviors that result in the female depositing from 2,000 to 6,000 eggs, each measuring between 2 and 3 millimeter (0.1 inches). California red-legged frog eggs are typically laid in a mass attached to emergent vegetation near the surface of the water, where they can be easily dislodged. However, egg masses have been detected lying on the bottom of ponds. The egg mass is well defined and

about the size of a softball. Eggs hatch within 6 to 14 days after deposition at which time the newly hatched larvae are delicate and easily injured or killed. California red-legged frog larvae transform into juvenile frogs in 3.5 to 7 months.

During the time that red-legged frog egg surveys are conducted, other amphibian eggs may be found including those of Pacific treefrogs, spadefoot toads, California tiger salamanders, and newts. Bullfrogs and foothill yellow-legged frogs lay their eggs later in the season. Field guides should be consulted for additional information on egg identification.

2. Habitat

California red-legged frogs occur in different habitats depending on their life stage, the season, and weather conditions. Rangewide, and even within local populations, there is much variation in how frogs use their environment; in some cases, they may complete their entire life cycle in a particular habitat (*i.e.,* a pond is suitable for all life stages), and in other cases, they may seek multiple habitat types (U.S. Fish and Wildlife Service 2002).

Breeding habitat
All life history stages are most likely to be encountered in and around breeding sites, which are known to include coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds. California red-legged frog eggs are usually found in ponds or in backwater pools in creeks attached to emergent vegetation such as *Typha* and *Scirpus*. However, they have been found in areas completely denuded of vegetation. Creeks and ponds where California red-legged frogs are found most often have dense growths of woody riparian vegetation, especially willows (*Salix* spp.) (Hayes and Jennings 1988). The absence of *Typha*, *Scirpus*, and *Salix* at an aquatic site does not rule out the possibility that the site provides habitat for California red-legged frogs, for example stock ponds often are lacking emergent vegetation yet they provide suitable breeding habitat. California red-legged frog larvae remain in these habitats until metamorphosis in the summer months (Storer 1925; Wright and Wright 1949). Young California red-legged frogs can occur in slow moving, shallow riffle zones in creeks or along the margins of ponds.

Summer habitat
California red-legged frogs often disperse from their breeding habitat to forage and seek summer habitat if water is not available. In the summer, California red-legged frogs are often found close to a pond or a deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter from predators. California red-legged frogs may also take shelter in small mammal burrows and other refugia on the banks up to 100 meters from the water any time of the year and can be encountered in smaller, even ephemeral bodies of water in a variety of upland settings (Jennings and Hayes 1994; U.S. Fish and Wildlife Service 2002).

Upland habitat
California red-legged frogs are frequently encountered in open grasslands occupying seeps and

springs. Such bodies may not be suitable for breeding but may function as foraging habitat or refugia for dispersing frogs. During periods of wet weather, starting with the first rains of fall, some individuals make overland excursions through upland habitats (U.S. Fish and Wildlife Service 2002).

3. Movement

California red-legged frogs may move up to 3 kilometers (1.88 miles) up or down drainages and are known to wander throughout riparian woodlands up to several dozen meters from the water (Rathbun *et al.* 1993). Dispersing frogs have been recorded to cover distances from 0.40 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger 1998). California red-legged frogs have been observed to make long-distance movements that are straight-line, point to point migrations rather than using corridors for moving in between habitats. Dispersal distances are considered to be dependent on habitat availability and environmental conditions. On rainy nights California red-legged frogs may roam away from aquatic sites as much as 1.6 kilometers (1 mile). California red-legged frogs will often move away from the water after the first winter rains, causing sites where California red-legged frogs were easily observed in the summer months to appear devoid of this species. Additionally, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year.

References for Appendix A

Bulger, J. 1998. Wet season dispersal and habitat use by juvenile California red-legged frogs (*Rana aurora draytonii*) in forest and rangeland habitats of the Santa Cruz Mountains. Research proposal.

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Rathbun, G.B., M.R. Jennings, T.G. Murphy, and N.R. Siepel. 1993. Status and ecology of sensitive aquatic vertebrates in lower San Simeon and Pico Creeks, San Luis Obispo County, California. U.S. Fish and Wildlife Service, National Ecology Research Center, San Simeon, California. Prepared for the California Department of Parks and Recreation. 103 pp.

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Storer, T.1925. A synopsis of the Amphibia of California. University of California Publications in Zoology 27:1-342.

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Wright, A.H. and A.A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Third Edition. Comstock Publishing Company, Ithaca, New York. xii+640 pp.

Appendix B.
Recommended Equipment Decontamination Procedures

In an effort to minimize the spread of pathogens that may be transferred as result of activities, surveyors should follow the guidance outlined below for disinfecting equipment and clothing after entering a pond and before entering a new pond, unless the wetlands are hydrologically connected to one another:

i. All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. Cleaned items should be rinsed with clean water before leaving each study site.

ii. Boots, nets, traps, hands, *etc*. should be scrubbed with either a 75% ethanol solution, a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 6% sodium hypochlorite 3 solution. Equipment should be rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided (*e.g.*, clean in an area at least 100 feet from aquatic features). Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

iii. Used cleaning materials (liquids, *etc.*) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

iv. Additionally, the surveyors shall implement the following when working at sites with known or suspected disease problems: disposable gloves should be worn and changed between handling each animal. Gloves should be wetted with water from the site or distilled water prior to handling any amphibians. Gloves should be removed by turning inside out to minimize cross-contamination.

Appendix C.
General instructions for filling out CNDDB field survey forms

The Natural Diversity Data Base (NDDB) is the largest, most comprehensive database of its type in the world. It presently contains more than 33,000 site specific records on California's rarest plants, animals, and natural communities. The majority of the data collection effort for this has been provided by an exceptional assemblage of biologists throughout the state and the west. The backbone of this effort is the field survey form. We are enclosing copies of Natural Diversity Data Base (NDDB) field survey forms for species and natural communities. We would greatly appreciate you recording your field observations of rare, threatened, endangered, or sensitive species and natural communities
(elements) and sending them to us on these forms.

We are interested in receiving forms on elements of concern to us; refer to our free publications: *Special Plants Lis*t, *Special Animals List*, and *Natural Communities List* for lists of which elements these include. Reports on multiple visits to sites that already exist in the NDDB are as important as new site information as it helps us track trends in population/stand size and condition. Naturally, we also want information on new sites. We have enclosed an example of a field survey form that includes the information we like to see. It is especially important to include a xeroxed portion of a USGS topographic quad with the population/stand outlined or marked (see back of enclosed example).

Without the map, your information will be mapped less accurately, as written descriptions of locations are frequently hard to interpret. Do not worry about filling in every box on the form; only fill out what seems most relevant to your site visit. Remember that your name and telephone number are very important in case we have any questions about the form.

If you are concerned about the sensitivity of the site, remember that the NDDB can label your element occurrence "Sensitive" in the computer, thus restricting access to that information. The NDDB is only as good as the information in it, and we depend on people like you as the source of that information. Thank you for your help in improving the NDDB.

Copies of the NDDB form can be obtained from the CDFG at the above address (telephone: 916-324-3812) *or* online at: http://www.dfg.ca.gov/whdab/html/animals.html.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

This data sheet is to assist in the data collection of California red-legged frog habitat in the vicinity of projects or other land use activities, following the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance), issued by the U.S. Fish and Wildlife Service. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance.

The "Site Assessments" section of the Guidance details the data needed to complete a site assessment. When submitting a complete site assessment to the Service (one that has been done following the Guidance), one data sheet should be included for each aquatic habitat identified. If multiple aquatic habitats are identified within the project site, then multiple data sheets should be completed. A narrative description of the aquatic, riparian, and upland habitats should be provided to characterize the breeding habitat within the project site and the breeding and dispersal habitat within 1.6 kilometers (1 mile) of the project site. In addition to completing this data sheet, field notes, photographs, and maps should be provided to the appropriate Fish and Wildlife Service Office, as requested in the "Site Assessments" section of the Guidance.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

Site Assessment reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Site Assessment: _____
(mm/dd/yyyy)

Site Assessment Biologists: _____ _____
(Last name) (first name) (Last name) (first name)

_____ _____
(Last name) (first name) (Last name) (first name)

Site Location:_____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: _____
Brief description of proposed action:

1) Is this site within the current or historic range of the CRF (circle one)? YES NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES NO
If yes, attach a list of all known CRF records with a map showing all locations.

GENERAL AQUATIC HABITAT CHARACTERIZATION

(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)

POND:

Size: _____ Maximum depth: _____

Vegetation: emergent, overhanging, dominant species: _____
_____
_____

Substrate: _____
_____

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: _____

Appendix D.
<u>California Red-legged Frog Habitat Site Assessment Data Sheet</u>

STREAM:

Bank full width: _____
Depth at bank full: _____
Stream gradient: _____

Are there pools (circle one)? YES NO
If yes,
Size of stream pools: _____
Maximum depth of stream pools: _____

Characterize non-pool habitat: run, riffle, glide, other: _____
_____
_____
Vegetation: emergent, overhanging, dominant species: _____
_____
_____
Substrate: _____
_____
Bank description: _____
_____
_____

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: _____

Other aquatic habitat characteristics, species observations, drawings, or comments:

Necessary Attachments:

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix E.
California Red-legged Frog Survey Data Sheet

This data sheet is to assist in the data collection during surveys for California red-legged frogs in areas with potential habitat. This data sheet is intended to assist in the preparation of a final report on the field surveys as detailed in the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance) issued by the U.S. Fish and Wildlife Service (Service). Before completing this data sheet, a site assessment should have been conducted using the Guidance and the Service should have been contacted to determine whether surveys are required. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance. To avoid and minimize the potential of harassment to California red-legged frogs, all survey activities shall cease once an individual California red-legged frog has been identified in the survey area, unless prior approval has been received from the appropriate Service Fish and Wildlife Office. The Service shall be notified within three (3) working days by the surveyor once a California red-legged frog is detected, at which point the Service will provide further guidance. Surveys should take place in consecutive breeding/non-breeding seasons (*i.e.*, the entire survey period, including breeding and non-breeding surveys should not exceed 9 months). It is important that both the breeding and non-breeding survey be conducted during the time period specified in the Guidance. Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval. The survey consists of two (2) day and four (4) night surveys during the breeding season and one (1) day and one (1) night surveys during the non-breeding season.

All California red-legged frog life stages should be surveyed for. Surveyors may detect larvae but not be able to identify this life stage to species as handling any life stage of the California red-legged frog necessitates a valid 10(a)(1)(A) permit. If the larval life stage is the only life stage detected and the larvae are not identified to species, the surveyor must either return to the habitat to identify the frog in another life stage or have a valid 10(a)(1)(A) permit allowing the surveyor to handle California red-legged frogs and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: _____ **Survey Biologist:** _____
(mm/dd/yyyy) **(Last name) (first name)**
Survey Biologist: _____
(Last name) (first name)

Site Location:_____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: _____
Brief description of proposed action:

Type of Survey (circle one): **DAY NIGHT** **BREEDING NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time:_____ **End Time:**_____

Cloud cover:_____ **Precipitation:**_____

Air Temperature:_____ **Water Temperature:**_____

Wind Speed:_____ **Visibility Conditions:**_____

Moon phase:_____ **Humidity:**_____

Description of weather conditions: _____
_____

Brand name and model of light used to conduct surveys: _____

Were binoculars used for the surveys (circle one)**? YES NO**
Brand, model, and power of binoculars: _____

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	**# of indiv.**	**Observed (O) Heard (H)**	**Life Stages**	**Size Class**	**Certainty of Identification**

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____
_____
_____
_____
_____

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

U.S. Fish & Wildlife Service
California/Nevada Operations Office
2800 Cottage Way, Suite W-2606
Sacramento, California 95825

California Dept. of Fish & Game
Office of the Director
1416 Ninth Street, 12th Floor
Sacramento, California 95814

Phone: (916) 414-6464
Fax: (916) 414-6486

Phone: (916) 654-9980
Fax: (916) 653-3673

Subject: Interim Guidance on Conducting Site Assessments and Field Surveys for Determining Presence or A Negative Finding of the California Tiger Salamander

Dear Interested Party:

Enclosed is the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or A Negative Finding of the California Tiger Salamander. This interim guidance was developed by the U.S. Fish and Wildlife Service's (Service) Sacramento and Ventura Fish and Wildlife Offices in coordination with the California Department of Fish and Game (Department), and included input by field biologists and scientists experienced in surveying for the California tiger salamander (Ambystoma californiense). If implemented as described, the Service and Department will accept the results of surveys for determining the presence or a negative finding of California tiger salamanders. Modifications of this interim guidance for specific projects or circumstances may be accepted, but we strongly advise that any modifications be reviewed and approved by the Service and Department prior to implementation.

This interim guidance is subject to change upon receipt of new information. We will host a workshop during the summer of 2004 to solicit comments on this guidance for possible revision at that time. Prior to any attempt to finalize this interim guidance, the Service will provide an opportunity for public review.

This interim guidance recommends that surveys be initiated on October 15 each year. However, in light of the timing of making this guidance available for implementation this season, November 7 is considered an appropriate date for initiating surveys in 2003.

If you have any questions, please contact Dan Buford or Harry McQuillen with the Service in Sacramento at (916) 414-6600, Bridget Fahey with the Service in Ventura at (805) 644-1766, or contact the appropriate Department regional office which can be found at http://www.dfg.ca.gov/regions/regions.html.

Sincerely,

STEVE THOMPSON
Manager
U.S. Fish and Wildlife Service

ROBERT C. HIGHT
Director
California Department of Fish and Game

Enclosure

Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander
October 2003

The Santa Barbara County population of the California tiger salamander (Ambystoma californiense) was federally listed as endangered on September 21, 2000 (65 FR 57242). The Sonoma County Distinct Population Segment (DPS) of the California tiger salamander was listed as endangered on July 22, 2002 (67 FR 47727). The Central California DPS of the California tiger salamander was proposed for listing as threatened on May 23, 2003 (68 FR 28648). The Santa Barbara and Sonoma County DPSs were proposed for reclassification from endangered to threatened, on May 23, 2003 (68 FR 28648). The California Department of Fish and Game (Department) considers the California tiger salamander throughout its entire range to be a species of special concern.
(Special Animals List July 2003 http://www.dfg.ca.gov/whdab/html/lists.html)

The Service and Department have received numerous requests for guidance in planning for the protection of the California tiger salamander (CTS) at the sites of proposed and existing land use activities. This document provides interim guidance for two procedures to accurately assess the likelihood of CTS presence in the vicinity of a project site, including: (1) an assessment of CTS locality records and potential CTS habitat in and around the project area; and (2) focused field surveys of breeding pools and their associated uplands to determine whether CTS are likely to be present.

Because CTS use aquatic and upland habitats during their life cycle, they may be present in either or both habitats on a given property. For sites with suitable breeding habitat, two consecutive seasons of negative larval surveys and a negative upland drift fence study in the intervening fall/winter are recommended to support a negative finding. For sites with no suitable aquatic breeding habitat, but where suitable upland habitat exists, two consecutive seasons of negative upland drift fence studies are recommended to support a negative finding.

If the following Guidance is followed completely, the results of these site assessments and field surveys will be considered valid by the Service and Department. Results of the site assessments and field surveys should be reported to the appropriate Service's Field Office, if appropriate the Service's Regional Office in Portland, Oregon pursuant to the terms and conditions of the permittee's section 10(a)(1)(A) recovery permit, and to the Department and other agencies or offices as required. Details regarding the recommended content and/or format of reports are provided throughout the remainder of this document.

Surveyors must obtain permission of the landowner before implementing any surveys or research on the CTS. In locations where the CTS is federally listed surveyors should obtain a Recovery Permit for this species pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, prior to implementing the guidance. For surveys that may ultimately be used in support of a negative finding, it is recommended that surveyors consult with Service biologists on their study design before beginning work. If surveyors are working in areas with other federally listed species that are likely to be captured incidentally during CTS surveys, surveyors should also possess a valid 10(a)(1)(A) permit for these species (e.g., California red-legged frog, vernal pool tadpole shrimp, etc.). For all locations, the surveyor should hold an active Scientific Collecting Permit from the Department that specifically names CTS surveys as an authorized activity. Authorization Number 9, without explicit permission for handling CTS, is not adequate for CTS surveys.

Site Assessment for the California tiger salamander
Available information about CTS and their habitats in the vicinity of the project should be used to determine the likelihood that CTS may occur there and if field surveys are appropriate. The project proponent should compile and submit to the Service and the Department the following information:

Element 1. Is the project site within the range of the CTS?

The surveyor should review the attached maps or referenced weblink to determine if the project site is within the range of the CTS. For Sonoma County, refer to the attached county map. For Santa Barbara County, refer to http://ventura.fws.gov/Images/CTS_Range.jpg. For Monterey, San Benito, and San Luis Obispo counties, contact the Ventura Fish and Wildlife Office at the address provided below. For all other areas, refer to the attached map of California (Sonoma County (pdf), All of California (pdf)).

Element 2. What are the known localities of CTS within the project site and within 3.1 miles (5.0 kilometers) (km) of the project boundaries?

This is to place the project site in a regional perspective. The surveyor should consult the California Natural Diversity Data Base (CNDDB) maintained by the Department to determine known localities of the CTS. The Sacramento or Ventura Fish and Wildlife Offices should be contacted for localities within their respective jurisdictions. Other information sources on local occurrences of CTS should be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resources managers and biologists from municipal, state, and Federal agencies, environmental groups, and herpetologists at museums and universities. The surveyor should note in their report all known CTS localities within the project site and within 3.1 miles of the project boundaries; if there are no localities within 3.1 miles, the nearest locality should be noted.

Element 3. What are the habitats within the project site and within 1.24 miles (2 km) of the project boundaries?

This distance is based on the observed mobility of the species. Describe the upland and aquatic habitats within the project site and within 1.24 miles of the project boundaries. Characteristics of the site that should be recorded include acreage, elevation, topography, plant communities, presence and types of water bodies, fossorial mammal species and their burrows, current land use, a description of adjacent lands, and an assessment of potential barriers to CTS movement. Use of aerial photographs is necessary to characterize potential breeding habitats that are not part of the project site under consideration. The aquatic habitats should be mapped and characterized (e.g., natural vernal pools, stockponds, drainage ditches, creeks, types of vegetation, surface area, depth, approximate drying date). Suitable upland habitat, including locations of underground refugia, for CTS should be mapped as well, with a focus on areas where small mammal burrows are located or are most dense.

Reporting and interpretation of the site assessment
Site assessments should include, but are not limited to, the following information: (1) photographs of the project site(s); (2) survey dates and times; names of evaluator(s); (3) a description of the site assessment methods used; (4) a list of CTS localities, as requested above; and (5) a map of the site(s) showing habitat as requested above. Maps should be of similar nature to a U.S. Geological Survey (USGS) 7.5-minute (1:24,000) topographic maps -or- Geographic Information System (GIS) data depicting the site(s) and the area within 5 kilometers

(3.2 miles) of its boundaries. The report should be provided to the appropriate Service field office and Department regional office prior to initiating field surveys.

After completing items 1-3 of the site assessment (as above), send a report to the appropriate Service field office and Department regional office. Based on the information provided from the site assessment, the Service and Department will provide recommendations as to the appropriateness of field surveys. Surveys should not be initiated until recommended by the Service and Department.

Interim Presence/Negative Finding Survey Guidance for the California Tiger Salamander
Biological field surveys should be conducted for all sites with potential CTS habitat. Due to its unique life history, the CTS can be difficult to detect depending on weather and time of year. Aquatic sampling for larvae during spring months can be the most effective way to determine if CTS are present in a given area. However, especially if environmental conditions are unfavorable, CTS may not breed successfully in a given year. After metamorphosis CTS spend most of each year on land, emerging from refugia only occasionally, usually on rainy nights. CTS have been observed on land 1.24 miles from any potential breeding pool.

At sites that contain both upland habitat and potential breeding habitat (i.e., pools that contain standing water continuously for at least 10 weeks, extending into April), aquatic sampling during two breeding seasons and a drift fence study in the intervening winter should be conducted to support a negative finding. At sites that contain appropriate upland habitat only, but where there is a known or potential breeding site accessible within 1.24 miles, a two-year drift fence study should be conducted.

In years with little rainfall, upland emergence may be reduced and CTS may not breed. Field surveys conducted in years with at least 70% of average rainfall between September 1 and April 1, at the nearest National Oceanic and Atmospheric Administration climate station are most reliable. Data from survey seasons not meeting this criterion will also be considered; surveyors should provide strong justification that their data are reliable including but not limited to local climate (e.g., daily rainfall totals, pond filling date, pond drying date) and biological survey data (e.g., other species captured during each sampling interval).

Aquatic larval sampling
1. Aquatic larval surveys of potential breeding pools should be repeated three times each season. Surveys should be conducted once each in March, April, and May, with at least 10 days between surveys. If pools are likely to dry prior to the completion of three surveys, the sampling schedule should be shifted accordingly.

2. Captured CTS should remain in nets for the minimum amount of time necessary, but no longer than 5 minutes. During this time, larvae should not be kept out of water for more than 30 seconds. Photographs should document a representative sample of captured CTS.

3. Disruption to the pond's bottom should be minimized. Shallow areas where young larvae may occur should be traversed in the most direct and least disturbing manner possible.

4. Sampling should cease once presence has been determined to minimize disturbance of pool flora and fauna. If CTS are detected at a pond, subsequent visits to that pond are not necessary.

5. Ponds should be initially sampled using D-shaped or similar, long-handled dipnets with 1/8th inch (3.2mm) or finer mesh. If CTS larvae are not captured in the first 50 dipnet sweeps, covering representative portions of the pond, seines should be used.

6. If dipnetting has been unsuccessful, seines should be used to sample 100% of the surface area of ponds smaller than 1 acre and at least 30% of the surface area of larger pools, including a representative sample from different water depths and vegetated and non-vegetated areas. One eighth inch (3.2 mm) or finer mesh minnow seines with weights along the bottom and floats along the top edge should be used, with dowling or PVC pipe attached to the end of the seine so the bottom edge can be dragged along the bottom of the pool. Whenever possible, the seine should be pulled from one edge of the pond to the other.

7. Use of minnow traps will be considered on a case-by-case basis. Minnow trapping for CTS larvae should only be conducted in habitats that are too deep to adequately survey with dipnets and seines, or in which dense vegetation impedes normal dipnetting/seining activities. In these cases the surveyor should submit to the Service a written minnow trap sampling design based on the requirements detailed below. No minnow trapping should be conducted in ponds known to support state or federally threatened or endangered animals (e.g., California red-legged frogs (Rana aurora draytonii)). In areas where California red-legged frogs may occur, minnow trapping should be preceded by negative surveys following the Service guidelines for this species. To conduct minnow trap sampling in pools known to contain California red-legged frogs, surveyors must possess a valid Recovery Permit for this species pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended.

Minnow trapping should be conducted in the following manner:

a. Minnow traps should be monitored for three three-day intervals between March 1 and May 15 (for a total of nine days of trapping per site). Trapping intervals should be separated by at least ten days. Minnow trap surveys should immediately cease if CTS presence is determined.

b. Minnow trapping should be avoided during warm periods when air temperatures reach 80 degrees Fahrenheit or when water temperatures reach 70 degrees Fahrenheit or warmer, to prevent the possibility of mortality due to reduced oxygen availability.

c. Minnow traps should be deployed overnight and checked frequently enough to ensure that larvae are not killed or injured. Traps should be checked at least once per day.

d. A minimum of four traps should be placed in each pond. For larger ponds, traps should be distributed along the shoreline with no more than 75 ft (23 m) between traps. Each trap should be clearly marked with the name, telephone number, and State and Federal permit number of the surveyor. Traps should be anchored to stakes set near the shoreline. Steel braided fishing line or heavy cord works well for this purpose; galvanized wire and stainless steel wire should not be used because these wires may kink and break. If livestock are present, we recommend that the surveyor devise a method to anchor the trap in a manner to prevent entanglement of livestock. Brightly colored flagging should be affixed to each anchor point. For extra security, a float attached to each trap can aid in detection. If a minnow trap is lost, every effort should be made to recover it to avoid the possibility of leaving behind a trap that can kill a variety of species over time.

e. Traps should be deployed to the deepest parts of ponds and in shoreline areas with aquatic vegetation growth.

9. Data regarding the type and quality of each pool sampled should be recorded. At a minimum, these data should include the date and time, location, type of water body (e.g., vernal pool, seasonal wetland, artificial impoundment, etc.), dimension and depth of pond, water temperature, turbidity, presence of aquatic vegetation (submergent and emergent), and dominant invertebrates and all vertebrates observed. Photographs of pools and adjacent upland areas are helpful and copies should be included in the final report.

10. Surveyors should follow guidance below for disinfecting equipment and clothing after surveying a pond and before entering a new pond, unless the two ponds are hydrologically connected to one another. These recommendations are adapted from the Declining Amphibian Population Task Force's Code which can be found in their entirety at: http://www.mpm.edu/collect/vertzo/herp/daptf/fcode.html.

a. All dirt and debris, including mud, snails, plant material (including fruits and seeds), and algae, should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water. Cleaned items should be rinsed with clean water before leaving each study site.

b. Boots, nets, traps, etc., should then be scrubbed with either a 70 % ethanol solution, a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water), QUAT 128 (quaternary ammonium, use 1:60 dilution), or a 6% sodium hypochlorite 3 solution and rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided. Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

c. When working at sites with known or suspected disease problems, disposable gloves should be worn and changed between handling each animal.

d. Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

Upland Habitat Survey Methods

A drift fence study conducted during fall and winter is the primary method used to study CTS in upland habitats. To support a negative finding, an upland drift fence study should be included. Although less intrusive methods (see below) may also be used to determine presence of the CTS, these methods are less reliable and thus cannot be used to support a negative finding.

Because CTS have been observed to make breeding migrations of at least 0.6 miles (1 km), the project proponent or the Service may assume presence of CTS if a known breeding pond lies within 1 km and no significant barriers exist. Examples of significant physical barriers include high-density residential or urban development and Interstate Highways, while features such as golf courses, disked fields, and most paved roads are not considered barriers.

For sites with at least one accessible potential breeding pool, we recommend that a one-year drift fence study be conducted during the winter between two consecutive seasons of aquatic larval surveys (if presence of CTS was not established during the first season of aquatic sampling). We recommend that a two year drift fence study be conducted if: 1) a site has

suitable upland habitat and a potential breeding pool lies within 1.2 miles (2 km); 2) on-site ponds cannot be adequately sampled using aquatic methods (e.g., deep impoundments with known presence of California red-legged frogs); or 3) if non-native predators or poor water quality may preclude detection of CTS during larval sampling (i.e., due to mortality of the larvae).

1. We recommend that a proposal to conduct a drift fence study be submitted in writing to the Service and the Department. The results of studies not approved by the Service and Department may not be accepted in support of a negative finding. The proposal should include an aerial photograph of the study site indicating all potential on- and off-site breeding locations identified in the site assessment and an overlay with the proposed drift fence study design clearly delineated. We recommend that drift fence study designs incorporate the following:

> a. For sites with at least one suitable breeding pond (i.e., ponds that contain standing water for at least 10 continuous weeks in most years), the ponds should be surrounded by drift fences installed 10 - 50 ft from the high water line. Sections of drift fence should be spaced regularly around the pond, focusing on areas where salamanders are most likely to be captured. We recommend that each section of fence be at least 30 ft (9.2 m) long, and that the total distance between fence sections be no greater than the total length of installed fence (i.e., >50% of the circumference fenced). There should be no more than 33 ft (10 m) between pitfall traps, and drift fences should be constructed such that during periods when traps are closed, openings at least every 66 ft (20 m) allow animal passage.
>
> b. For all sites, we also recommend upland drift fences. Unless a strong rationale can be presented, drift fence equaling at least 90% of the site perimeter should be installed. The exact placement of fences should be selected to maximize the probability of capturing CTS (e.g., in grassland areas with high densities of mammal burrows; along site boundaries closest to identified potential breeding pools; with pitfalls situated away from areas where flooding is likely). Pitfalls should be spaced less than 33 ft apart. To the extent possible drift fences and pitfalls should be placed to minimize the number of flooded buckets. Each section of fence should be a minimum of 30 ft (9.2 m) long, unless topography, property lines, or other circumstances dictate. Upland drift fences should be constructed such that during periods when traps are closed, openings at least every 66 ft (20 m) allow animal passage.

2. Arrays should be approved and constructed by 15 October. Beginning on or before October 15, pitfall buckets should be opened before sunset if there was any rain during the day or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability (based on the nearest National Weather Service forecast - available at http://www.wrh.noaa.gov/Sacramento/). Traps should be open each night and checked each morning until no rain has fallen within the preceding 24 hours. Nights of high relative humidity (greater than 75% relative humidity) should be considered equivalent to rain events once onsite or nearby seasonal wetlands have become inundated with standing water, regardless of its depth, surface area, or duration. The above guidance should be followed until 20 nights of surveying under the proper conditions has been conducted. After 20 nights of surveying is completed, and until March 15, pitfall buckets should be opened before sunset if there was any rain during the day, or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability. Traps will be checked the next morning, and unless it is still raining or more rain is forecast, the traps can be closed until the next rain event.

3. Drift fences should be constructed from a material that is durable, weather resistant, and appropriate for the area in which it will be installed; proposals should describe the materials to be used. Examples include aluminum flashing, silt fencing, untreated wood particle board, shade cloth, window screen, Vexar plastic mesh, etc. Hardware cloth may be useful for short segments of fence that experience heavy overland water flow. Drift fences should be buried at least 3 inches (8 cm) underground and extend at least 1 ft (31 cm) above the ground. All drift fences require regular inspections and maintenance, especially after each significant storm event. If drift fences are installed incorrectly and/or have insufficient maintenance this may call into question the reliability of the data. Unless special authorization is received from the Service and Department to maintain drift fences through non-sampling months, drift fencing should be disassembled by April 1.

4. Pitfall traps should not be placed in a manner that will disturb or destroy rodent burrows or other refugia that could be used by CTS.

5. Excessive pitfall flooding may invalidate a study. To avoid flooding traps should be placed preferentially in slightly elevated locations where flooding is less likely. Pitfalls in locations likely to flood should be free of holes. If ground saturation forces a pitfall out of the soil it can be weighted down with cement, gravel or other suitable materials.

6. All pitfall traps should have a rigid lid that closes securely. When not in use, traps should be closed in a manner that precludes entry by CTS and other animals.

7. Pitfall traps should be cylindrical, non-galvanized, metal or plastic containers. They should be at least 2-gallons in size and 8 in (20 cm) deep.

8. Each pitfall trap should contain noncellulose sponges or other nontoxic absorbent material which should be kept moist at all times.

9. Each pitfall trap should have a rigid cover with legs one to two inches high to provide shade and shed water during extreme rain events.

10. When in use, pitfall traps should be checked as often as necessary, but at a minimum one time a day, with one of these checks occurring between one hour before sunrise and noon. Whenever possible, traps should be opened just before dark and checked and closed the following morning.

11. When not in use, the drift fence and pitfall traps should be inspected weekly to ensure the system has not been disturbed by vandals, wildlife, fallen trees, wind, etc. Repairs to fences should be completed prior to the next night of sampling.

12. Pitfall traps should be placed as far as possible from ant nests. If an ant nest develops within 10 feet of an existing pitfall trap, the pitfall trap should be moved, removed from the field, or closed.

13. Captured CTS should be released as near as possible to the point of capture, in a manner that maximizes their survival. CTS should be released into the mouth of a small mammal burrow or other suitable refugia. CTS should be watched after release to be sure that they are in a safe location and are not susceptible to increased predation risk.

14. Once a CTS is captured, all traps and drift fences should be emptied and removed within 24 hours, and holes in the ground which contain traps should be filled in.

15. In addition, to minimize mortality of small mammals that may become trapped during surveys, each pitfall trap should also incorporate either jute twine, as described in Karraker (2001; http://www.fs.fed.us/psw/rsl/projects/wild/karraker/karraker4.pdf), a rodent safe-house as described in Padgett-Flohr and Jennings (2001), or other material as approved by the Service and Department.

16. Each pitfall trap should be marked with the name, telephone number, and Department permit number.

Other methods

Other methods, such as visual egg surveys, night driving, nocturnal surveys, fiber optic scoping and cover-boards, may be used to determine presence of the CTS, but these techniques may not be accepted in support of a negative finding. Deviations from this guidance may be approved on a case-by-case basis if a strong rationale can be presented.

Reporting

If one or more CTS are captured or detected a representative sample of the embryo(s), larva(e), or transformed salamander(s) should be photographed. The Service and the Department should be contacted by telephone within 3 working days if CTS are captured. If any mortality of California tiger salamander occurs, specimens should be collected, preserved by freezing, and the Service and the Department contacted by telephone within 1 work day.

For each survey location, a final report detailing the survey results should be submitted to the Service and the Department within one month of the last site visit. The written report should include, but is not be limited to, the following information: names of surveyors and copies of permits and authorizations, a description and map at the appropriate resolution of the type and quality of upland and aquatic habitats and land uses at the site; a map indicating the location of water bodies sampled for larvae; a map indicating the location of drift fences and pitfalls. The survey report also should include survey methods used, the dates and times of surveys, rainfall totals by date, nightly minimum temperatures, number and length of dipnet sweeps made, number of passes with seine, total estimated area seined, records of upland and aquatic animals captured, and pond water temperature, turbidity, and maximum depth at each aquatic sampling. If CTS are detected on the site, the report should include a map indicating the precise location of all CTS observations and captures, the number of CTS egg masses, larvae, sub-adults and adults observed, and photographic verification of CTS from the site. Site photographs may also be helpful in interpreting survey results. For the Department, survey reports should also include CNDDB field locality forms. Locality information should be in the form of UTM or latitude/longitude (degree, minute, second) coordinates.

In the case of a negative finding including a season with 70% of average rainfall, additional information (e.g., pond filling/drying dates, quantity and timing of rainfall during each sampling interval, temperatures) supplied by the surveyor, may assist the Service and the Department in their decision whether or not to accept the data.

Contact Information:
U.S. Fish and Wildlife Service
For an application or guidance on how to obtain a Federal permit or for reporting, please contact:

For areas within the For hydrobasins south of and including
Great Valley hydrobasin:
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Attn: Permit Coordinator Attn: Permit Coordinator
2800 Cottage Way, W-2605
Sacramento, California 95825
(916) 414-6547

Santa Cruz County:
U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003
(805) 644-1766

http://endangered.fws.gov/permits/

Please refer to http://ventura.fws.gov/areas/responsibilities.html for a map showing U.S. Fish and Wildlife Office jurisdictions.
California Department of Fish and Game
For Department reporting or questions regarding land use activity guidance, a map of regional offices and telephone numbers is available at http://www.dfg.ca.gov/regions/regions.html

For State of California Scientific Collecting permit applications and information, please contact:
California Department of Fish and Game
License and Revenue Branch
3211 S Street
Sacramento, California 95816
(916) 227-2271

For additional State permit information, please refer to:

http://www.dfg.ca.gov/licensing/pdffiles/fg1547.pdf (How to Obtain a Scientific Collecting Permit)

http://www.dfg.ca.gov/hcpb/cegacesa/rsrchpermit/mou/whenneedmou.shtml (When is the MOU Required?)

http://www.dfg.ca.gov/licensing/pdffiles/fg1476.pdf (Scientific Collecting Regulations)

http://www.dfg.ca.gov/licensing/pdffiles/fg1379e.pdf (Scientific Collecting Permit Attachment)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Southwest Region
2800 Cottage Way, Suite W-2606
Sacramento, California 95825

In Response Reply To:
FWS/R8/ES/SWWF Protocol

JUN 22 2010

Dear Southwestern Willow Flycatcher permitted surveyors:

The U.S. Geological Survey (USGS) has updated its survey protocol for the southwestern willow flycatcher (*Empidonax traillii extimus*) throughout its range (southern California, Nevada, Arizona, New Mexico, Colorado, and Utah). The updated protocol and survey forms can be retrieved at the following web address (http://pubs.usgs.gov/tm/tm2a10/).

The fundamental principles of the methodology described in this updated protocol remain the same as the original protocols: the use of vocalization play-back, repeated site visits, and confirmation of flycatcher identity via the subspecies-characteristic song. It also incorporates the basic premise of our 2000 addendum that a minimum of five visits is recommended for all "project-related" sites to determine absence. However, it does include a small change in the timing of visits to increase the probability of detecting flycatchers and to help determine if they are breeders or migrants. This latest version also includes improved survey forms and the latest understanding of southwestern willow flycatcher natural history, threats, and habitat.

As before, this protocol is intended to determine if a habitat patch contains territorial southwestern willow flycatchers, and is not designed to establish the exact distribution and abundance of flycatchers at a site. Determining precise flycatcher numbers and locations requires more expertise, visits, and time observing individual bird behavior.

We recognize that this update has been published right before the beginning of the 2010 flycatcher breeding/survey season. However, the overall strategy, methodology, and number of visits are not different from the previous version. As a result, during this transition year, we do not anticipate conflicts with contracts that may have already been established. We request that surveyors begin using it this year.

If there are any questions about this update, please contact Daniel Marquez of our Pacific Southwest Region (Region 8) at 760-431-9440 extension 225, or your local U.S. Fish and Wildlife Service office.

Sincerely,

Michael M. Long

Acting Assistant Regional Director
Endangered Species

TAKE PRIDE IN AMERICA

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Prepared in cooperation with the Bureau of Reclamation and the U.S. Fish and Wildlife Service

A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher

Chapter 10 of
Section A, Biological Science
Book 2, Collection of Environmental Data

Techniques and Methods 2A-10

U.S. Department of the Interior
U.S. Geological Survey

Cover: Southwestern Willow Flycatcher. Photograph taken by Susan Sferra, U.S. Fish and Wildlife Service.

A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher

By Mark K. Sogge, U.S. Geological Survey; Darrell Ahlers, Bureau of Reclamation; and Susan J. Sferra, U.S. Fish and Wildlife Service

Chapter 10 of
Section A, Biological Science
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Techniques and Methods 2A-10

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2010

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Conversion Factors

Multiply	By	To obtain
centimeter (cm)	0.3937	inch (in.)
gram (g)	0.03527	ounce, avoirdupois (oz)
hectare (ha)	2.471	acre
kilometer (km)	0.6214	mile (mi)
meter (m)	3.281	foot (ft)
millimeter (mm)	0.03937	inch (in.)

Abbreviations and Acronyms

GPS	Global Positioning System
NDVI	Normalized Difference Vegetation Index
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher

By Mark K. Sogge, U.S. Geological Survey; Darrell Ahlers, Bureau of Reclamation; and Susan J. Sferra, U.S. Fish and Wildlife Service

Background

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*) has been the subject of substantial research, monitoring, and management activity since it was listed as an endangered species in 1995. When proposed for listing in 1993, relatively little was known about the flycatcher's natural history, and there were only 30 known breeding sites supporting an estimated 111 territories rangewide (Sogge and others, 2003a). Since that time, thousands of presence/absences surveys have been conducted throughout the historical range of the flycatcher, and many studies of its natural history and ecology have been completed. As a result, the ecology of the flycatcher is much better understood than it was just over a decade ago. In addition, we have learned that the current status of the flycatcher is better than originally thought: as of 2007, the population was estimated at approximately 1,300 territories distributed among approximately 280 breeding sites (Durst and others, 2008a).

Concern about the Southwestern Willow Flycatcher on a rangewide scale was brought to focus by Unitt (1987), who described declines in flycatcher abundance and distribution throughout the Southwest. *E. t. extimus* populations declined during the 20th century, primarily because of habitat loss and modification from activities, such as dam construction and operation, groundwater pumping, water diversions, and flood control. In 1991, the U.S. Fish and Wildlife Service (USFWS) designated the Southwestern Willow Flycatcher as a candidate category 1 species (U.S. Fish and Wildlife Service, 1991). In July 1993, the USFWS proposed to list *E. t. extimus* as an endangered species and to designate critical habitat under the Act (U.S. Fish and Wildlife Service, 1993). A final rule listing *E. t. extimus* as endangered was published in February 1995 (U.S. Fish and Wildlife Service, 1995); critical habitat was designated in 1997 (U.S. Fish and Wildlife Service, 1997). The USFWS Service released a Recovery Plan for the Southwestern Willow Flycatcher in 2002 (U.S. Fish and Wildlife Service, 2002), and re-designated critical habitat in 2005 (U.S. Fish and Wildlife Service, 2005).

In addition to its federal status, the Southwestern Willow Flycatcher is listed as an endangered species or species of concern in Arizona (Arizona Game and Fish Department, 2006), New Mexico (New Mexico Department of Game and Fish, 1996), California (California Department of Fish and Game, 1991), and Utah (Utah Division of Wildlife Resources, 1997).

Sound management and conservation of an endangered species like the Southwestern Willow Flycatcher requires current, detailed information on its abundance and distribution. This requires, among other things, identifying where flycatchers are and are not breeding, and annual monitoring of as many breeding areas as possible. Such efforts require effective, standardized survey protocols and consistent reporting, at both local and regional levels. However, the Willow Flycatcher is a difficult species to identify and survey for. Moreover, inconsistent or ineffective surveys are of limited value, can produce misleading information (including "false positives" and "false negatives"), hinder regional and rangewide analyses, and waste limited resources.

We developed this document to provide a standardized survey protocol and a source of basic ecological and status information on the flycatcher. The first section summarizes the current state of knowledge regarding Southwestern Willow Flycatcher natural history, based on a wide array of published and unpublished literature. Emphasis is given to information relevant to flycatcher conservation and management, and to conducting and interpreting surveys. The second section details a standard survey protocol that provides for consistent data collection, reporting, and interpretation. This protocol document builds on and supersedes previous versions, the most recent of which was Sogge and others (1997a). In this update, we incorporate over a decade of new science and survey results, and refine the survey methodology to clarify key points. Further, we update the standard survey data sheets and provide guidelines on how to fill in the requested information. Amidst these revisions, the basic approach of the survey protocol has remained unchanged—multiple surveys at each survey area within the same breeding season, the use of the call-playback technique using flycatcher vocalizations to increase the probability of detection, and verification of species identity through its diagnostic song.

Section 1. Natural History

Breeding Range and Taxonomy

The Willow Flycatcher is a widespread species that breeds across much of the conterminous United States (Sedgwick, 2000). Four subspecies commonly are recognized in North America, with each occupying a distinct breeding range (fig. 1): *E. t. adastus*, ranging across the northern Rocky Mountains and Great Basin; *E. t. brewsteri*, found west of the Sierra Nevada and Cascade Mountains along the Pacific Slope; *E. t. extimus*, the Southwestern Willow Flycatcher, which breeds across the Southwest; and *E. t. traillii*, ranging east of the northern Rocky Mountains. Although the overall subspecies' ranges are distinct, Sedgwick (2001) and Paxton (2008) noted interbreeding/gradation zones in the boundary area between *E. t. extimus* and *E. t. adastus*.

The breeding range of the Southwestern Willow Flycatcher includes southern California, Arizona, New Mexico, southwestern Colorado, and extreme southern portions of Nevada and Utah: specific range boundaries are delineated in the subspecies' recovery plan (U.S. Fish and Wildlife Service, 2002). Unitt (1987) included western Texas in the subspecies' range, but recent breeding records from western Texas are lacking. Records of probable breeding Southwestern Willow Flycatchers in Mexico are few and restricted to extreme northern Baja California and Sonora (Unitt, 1987; Wilbur, 1987). Although recent data are lacking, the USFWS does include parts of northern Mexico in its description of *E. t. extimus* breeding range (U.S. Fish and Wildlife Service, 2002).

Although they appear very similar to most observers, experienced taxonomist or those using specialized equipment (for example, an electronic colorimeter) can differentiate among the subspecies by subtle differences in color and morphology (for example, Unitt, 1987; Paxton, 2008). Despite the subtle level of differences, the taxonomic status of *E. t. extimus* has been critically reviewed and confirmed multiple times based on morphological, genetic, and song data (Hubbard, 1987; Unitt, 1987; Browning, 1993; Paxton, 2000; Sedgwick, 2001).

The Southwestern Willow Flycatcher was described by Phillips (1948) from a specimen collected along the San Pedro River in southeastern Arizona. The Southwestern Willow Flycatcher generally is paler than other Willow Flycatcher subspecies, although this difference is indistinguishable without considerable experience and training, and study skins as comparative reference material. The southwestern subspecies differs in morphology (primarily wing formula) but not overall size. The plumage and color differences between the Willow Flycatcher subspecies are so subtle that they should not be used to characterize birds observed in the field (Unitt, 1987; Hubbard, 1999; U.S. Fish and Wildlife Service, 2002).

Migration and Winter Range, Habitat, and Ecology

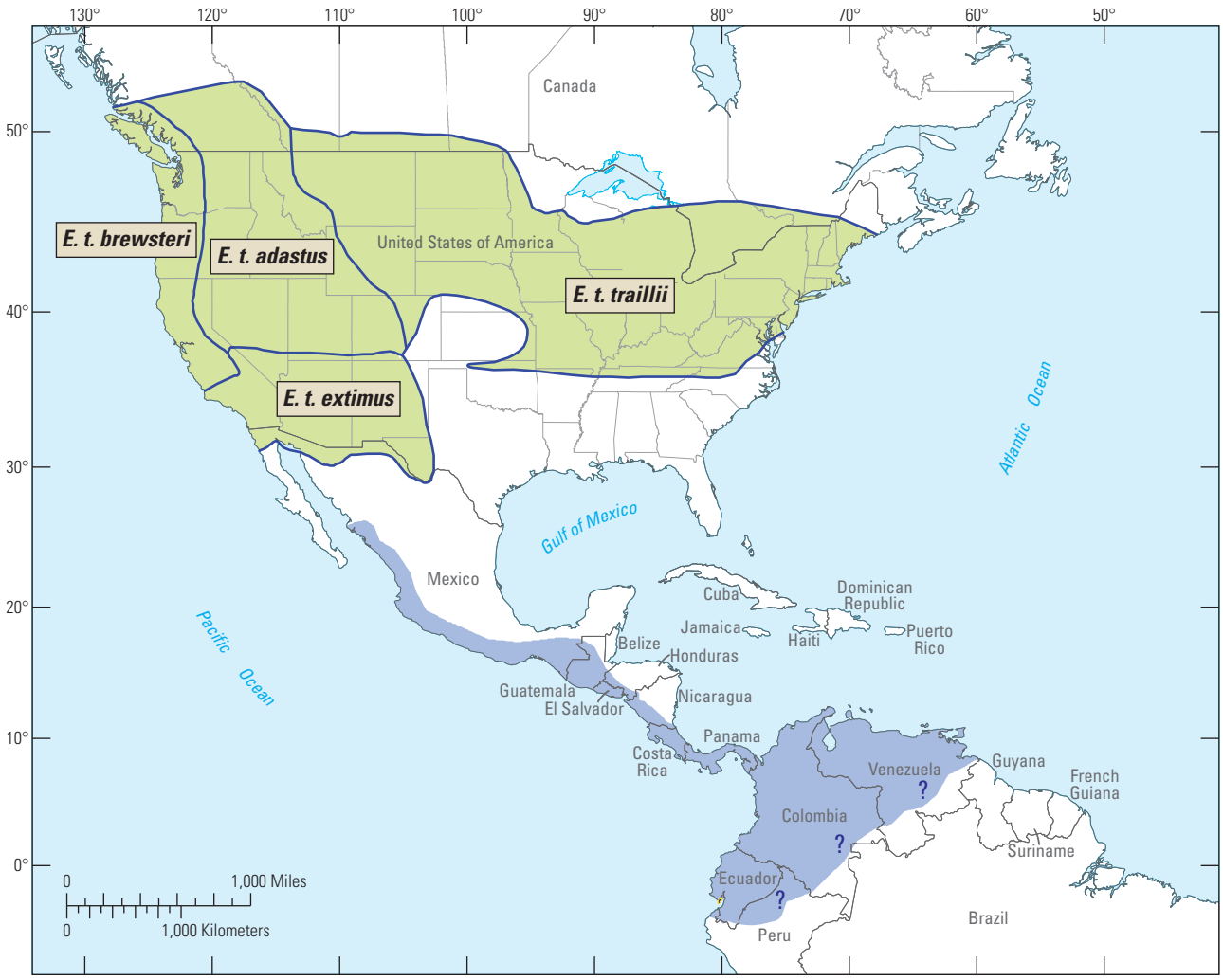
All Willow Flycatcher subspecies breed in North America but winter in the subtropical and tropical regions of southern Mexico, Central America, and northern South America (Sedgwick, 2000; Koronkiewicz, 2002; fig. 1). Most wintering birds are found in the Pacific slope lowlands in Mexico and Central America, and Caribbean slope lowlands in Mexico and Guatemala.

Because all Willow Flycatcher subspecies look very similar, determining specific wintering sites for the southwestern race has been challenging. However, recent genetic analysis of wintering birds (Paxton, 2008) suggests that the four subspecies occupy finite areas of the wintering grounds, but with overlapping ranges. The Southwestern Willow Flycatcher appears to be largely restricted to the center of the winter range (in the vicinity of Costa Rica), although Paxton (2008) suggests more research is needed to address this question.

On the wintering grounds, flycatchers primarily are found in habitats that have four main components: (1) standing or slow moving water and/or saturated soils, (2) patches or stringers of trees, (3) woody shrubs, and (4) open areas (Koronkiewicz and Whitfield, 1999; Koronkiewicz and Sogge, 2000; Lynn and others, 2003; Nishida and Whitfield, 2007; Schuetz and others, 2007). Based on surveys to date, the presence of water or saturated soils is almost universal, although tree heights and configurations, the presence of woody shrubs, and the amount of open space surrounding winter territories can vary considerably (Schuetz and others, 2007).

Male and female flycatchers hold separate, individual non-breeding territories, and defend those territories throughout the winter by using song, calls, and aggression displays. Fidelity to wintering territories and sites is high, as is survivorship over the wintering period (Koronkiewicz and others, 2006b; Sogge and others, 2007).

Willow Flycatchers travel approximately 1,500–8,000 km each way between wintering and breeding areas. During migration, flycatchers use a wider array of forest and shrub habitats than they do for breeding, although riparian vegetation may still be a preferred migration habitat type (Finch and others, 2000). Migration requires high energy expenditures, exposure to predators, and successful foraging in unfamiliar areas. Therefore, migration is the period of highest mortality within the annual cycle of the flycatcher (Paxton and others, 2007). Willow Flycatchers of all subspecies sing during northward migration, perhaps to establish temporary territories for short-term defense of food resources.



Basemap modified from U.S. Geological Survey and other agency digital data, various scales. Projection Mercator, World Geodetic System1984 datum.

EXPLANATION

Approximate range distribution of the Willow Flycatcher (*Empidonax traillii*)—Adapted from Unitt (1987), Browning (1993), and Paxton (2008)

Breeding range, including boundaries of the Willow Flycatcher subspecies

? Wintering range—Question marks reflect uncertainty of the location of the eastern boundary of the winter range

Figure 1. Approximate ranges of the Willow Flycatcher (*Empidonax traillii*) during breeding and non-breeding seasons.

Southwestern Willow Flycatchers typically arrive on breeding grounds between early May and early June (Ellis and others, 2008; Moore and Ahlers, 2009). Because arrival dates vary annually and geographically, northbound migrant Willow Flycatchers of multiple subspecies pass through areas where Southwestern Willow Flycatchers have already begun nesting. Similarly, southbound migrants in late July and August may occur where Southwestern Willow Flycatchers are still breeding (Unitt, 1987). This can make it challenging for an observer to differentiate local breeders from migrants. Other than timing, we still know relatively little about Southwestern Willow Flycatcher migratory behavior, pathways, or habitat use.

Breeding Habitat

Breeding Southwestern Willow Flycatchers are riparian obligates, typically nesting in relatively dense riparian vegetation where surface water is present or soil moisture is high enough to maintain the appropriate vegetation characteristics (Sogge and Marshall, 2000; U.S. Fish and Wildlife Service, 2002; Ahlers and Moore, 2009). However, hydrological conditions in the Southwest can be highly variable within a season and between years, so water availability at a site may range from flooded to dry over the course of a breeding season or from year to year.

The Southwestern Willow Flycatcher breeds in dense riparian habitats across a wide elevational range, from near sea level in California to more than 2,600 m in Arizona and southwestern Colorado (Durst and others, 2008a). Vegetation characteristics of Southwestern Willow Flycatcher breeding habitat generally include dense tree or shrub cover that is ≥ 3 m tall (with or without a higher overstory layer), dense twig structure, and high levels of live green foliage (Allison and others, 2003); many patches with tall canopy vegetation also include dense midstory vegetation in the 2–5 m range. Beyond these generalities, the flycatcher shows adaptability in habitat selection, as demonstrated by variability in dominant plant species (both native and exotic), size and shape of breeding patch, and canopy height and structure (U.S. Fish and Wildlife Service, 2002).

Southwestern Willow Flycatcher breeding habitat can be quantified and characterized in a number of ways, depending on the level of detail needed and habitat traits of interest. For many sites, detailed floristic composition, plant structure, patch size, and even characteristics such as Normalized Difference Vegetation Index (NDVI) have been described in agency reports and scientific journal articles (Allison and others, 2003; Hatten and Paradzick, 2003; Koronkiewicz and others, 2006a; Hatten and Sogge, 2007; Moore, 2007; Schuetz and Whitfield, 2007; Ellis and others, 2008). For purposes of this survey protocol, we take a relatively simple approach and broadly describe and classify breeding sites based on plant species composition and habitat structure. Clearly, these are not the only important components, but they are conspicuous to human perception and easily observed and recorded. Thus, they have proven useful in conceptualizing, selecting and evaluating suitable survey habitat, and in predicting where breeding flycatchers are likely to be found.

Breeding habitat types commonly used by Southwestern Willow Flycatchers are described below. The general categories are based on the composition of the tree/shrub vegetation at the site—native broadleaf, exotic, and mixed native/exotic. In the field, breeding habitats occur along a continuum of plant species composition (from nearly monotypic to mixed species) and vegetation structure (from simple, single stratum patches to complex, multiple strata patches). The images in figures 2–7 illustrate some of the variation in flycatcher breeding habitat, and other examples can be found in numerous publications and agency reports, and on the USGS photo gallery web site (http://sbsc.wr.usgs.gov/SBSCgallery/). The intent of the descriptions and photographs is to provide a general guide for identifying suitable habitat in which to conduct surveys.

Native broadleaf.—Southwestern Willow Flycatchers breed across a great elevational range, and the characteristics of their native broadleaf breeding sites varies between high elevation sites and those at low and mid-elevation sites.

High elevation sites (fig. 2) range from nearly monotypic dense stands of willow to mixed stands of native broadleaf trees and shrubs, 2–7 m in height with no distinct overstory layer; often associated with sedges, rushes, nettles, and other herbaceous wetland plants; usually very dense structure in lower 2 m; live foliage density is high from the ground to the canopy. Vegetation surrounding the patch can range from open meadow, to agricultural lands, to pines or upland shrub.

At low and mid-elevations (fig. 3), flycatcher breeding sites can be composed of single species (often Goodding's willow (*Salix gooddingii*), *S. exigua*, or other willow species) or mixtures of native broadleaf trees and shrubs including (but not limited to) cottonwood, willows, boxelder (*Acer negundo*), ash (*Fraxinus* spp.), alder (*Alnus* spp.), and buttonbush (*Cephalanthus* spp.), height from 3 to 15 m; characterized by trees of different size classes; often a distinct overstory of cottonwood, willow or other broadleaf tree, with recognizable subcanopy layers and a dense understory of mixed species; exotic/introduced species may be a rare component, particularly in the understory.

Monotypic exotic.—(fig. 4) Breeding sites also can include nearly monotypic, dense stands of exotics such as saltcedar (*Tamarix* spp.) or Russian olive (*Elaeagnus angustifolia*), 4–10 m in height forming a nearly continuous, closed canopy (with no distinct overstory layer); lower 2 m commonly very difficult to penetrate due to dense branches, however, live foliage density may be relatively low 1–2 m above ground, but increases higher in the canopy; canopy density uniformly high.

Aerial view of Little Colorado River near Greer, Arizona. Photograph by USGS, 1995.

Parkview Fish Hatchery, New Mexico. Photograph by USGS, 2000.

Tierra Azul, New Mexico. Photograph by USGS, 2005.

Little Colorado River near Greer, Arizona. Photograph courtesy of Arizona Game and Fish Department, 1996.

Rio Grande State Wildlife Area, Colorado. Photograph by USGS, 2002.

McIntyre Springs, Colorado. Photograph by USGS, 2002.

Figure 2. Examples of Southwestern Willow Flycatcher breeding habitat in native broadleaf vegetation at high-elevation sites.

Hassayampa River, Arizona. Photograph by USGS, 2003.

Santa Ynez River, California, Photograph by USGS, 1996.

San Luis Rey River, California. Photograph by USGS, 2005.

Kern River, California. Photograph by USGS, 1995.

Bosque del Apache, Rio Grande, New Mexico. Photograph courtesy of Bureau of Reclamation, 2008.

Kern River, California. Photograph by USGS, 1995.

Figure 3. Examples of Southwestern Willow Flycatcher breeding habitat in native broadleaf vegetation at low and mid-elevation sites.

Aerial view of Topock Marsh, Colorado River, Arizona. Photograph by USGS, 1996.

Topock Marsh, Colorado River, Arizona. Photograph by USGS, 1996.

Rio Grande, New Mexico. Photograph by USGS, 2005.

Salt River, Arizona. Photograph courtesy of Bureau of Reclamation, 1996.

Orrilla Verde, Rio Grande, New Mexico. Photograph by USGS, 2006.

Aerial view of Salt River, Arizona. Photograph by USGS, 1996.

Figure 4. Examples of Southwestern Willow Flycatcher breeding habitat in exotic vegetation.

Mixed native/exotic—(fig. 5) These sites include dense mixtures of native broadleaf trees and shrubs (such as those listed above) mixed with exotic/introduced species, such as saltcedar or Russian olive; exotics are often primarily in the understory, but may be a component of overstory; the native and exotic components may be dispersed throughout the habitat or concentrated as a distinct patch within a larger matrix of habitat; overall, a particular site may be dominated primarily by natives or exotics, or be a more-or-less equal mixture.

Regardless of the plant species composition or height, occupied sites almost always have dense vegetation in the patch interior (fig. 6). These dense patches are often interspersed with small openings, open water, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense.

Gila River, Arizona. Photograph by USGS, 2002.

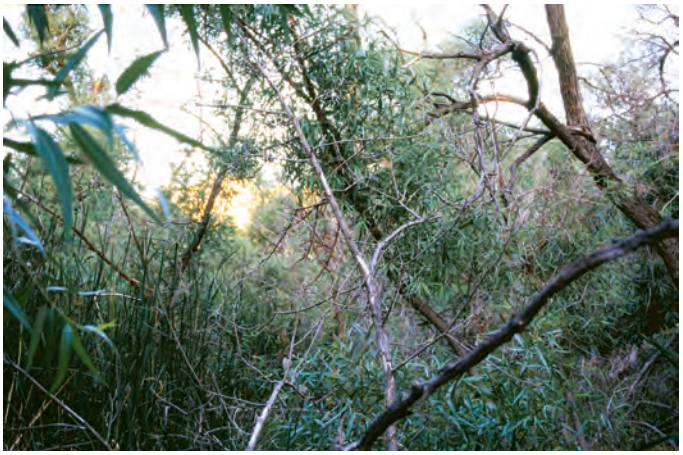
Roosevelt Lake, Arizona. Photograph by USGS, 1999.

Verde River River, Arizona. Photograph by USGS, 2002.

Virgin River, Utah. Photograph by USGS, 1997.

Figure 5. Examples of Southwestern Willow Flycatcher breeding habitat in mixed native/exotic vegetation.

Gila River, Arizona. Photograph by USGS, 2002.



Kern River, California. Photograph by USGS, 1999.

Rio Grande, New Mexico. Photograph by USGS, 2007.

Salt River, Arizona. Photograph by USGS, 1999.

Rio Grande, New Mexico. Photograph by USGS, 2007.

Rio Grande, New Mexico. Photograph by USGS, 2005.

Figure 6. Examples of dense vegetation structure within breeding habitats of Southwestern Willow Flycatcher.

Riparian patches used by breeding flycatchers vary in size and shape, ranging from a relatively contiguous stand of uniform vegetation to an irregularly shaped mosaic of dense vegetation with open areas. Southwestern Willow Flycatchers have nested in patches as small as 0.8 ha (for example, in the Grand Canyon) and as large as several hundred hectares (for example, at Roosevelt Lake, Ariz., or Elephant Butte Reservoir, New Mex.). They have only rarely been found nesting in isolated, narrow, linear riparian habitats that are less than 10 m wide, although they will use such linear habitats during migration.

Flycatcher territories and nests typically are adjacent to open water, cienegas, marshy seeps, or saturated soil, and within riparian areas rooted in standing water. However, in the Southwest, hydrological conditions at a site can vary remarkably within a season, between years, and among nearby sites (fig. 7). Surface water or saturated soil may only be present early in the breeding season (that is, May and part of June), especially in dry years. Similarly, vegetation at a patch may be immersed in standing water during a wet year, but be hundreds of meters from surface water in dry years (Ahlers and Moore, 2009). This is particularly true of reservoir sites, such as the Kern River at Lake Isabella, Calif., Tonto Creek and Salt River at Roosevelt Lake, and the Rio Grande near Elephant Butte Reservoir. Natural or human-caused river channel modifications and altered subsurface flows (for example, from agricultural runoff), can lead to a total absence of water or visibly saturated soil at a site for several years.

Other potentially important aspects of Southwestern Willow Flycatcher habitat include distribution and isolation of vegetation patches, hydrology, food base (arthropods), parasites, predators, environmental factors (for example temperature, humidity), and interspecific competition (U.S. Fish and Wildlife Service, 2002). Population dynamics

Rio Grande at San Marcial, New Mexico, with dry substrate. Photograph by USGS, 2007.

Rio Grande at San Marcial, New Mexico, with flowing water beneath the territories. Photograph by USGS, 2007.

Tonto Creek inflow to Roosevelt Lake, Arizona, during a dry year. Photograph by USGS, 2004.

Tonto Creek inflow to Roosevelt Lake, Arizona, during high-water year. Photograph by USGS, 2005.

Figure 7. Examples of the variable hydrologic conditions at breeding habitats of Southwestern Willow Flycatcher.

factors, such as demography (for example, survivorship rates, fecundity), distribution of breeding groups across the landscape, flycatcher dispersal patterns, migration routes, the tendency for adults and surviving young to return to their previous year breeding site, and conspecific sociality also influence where flycatchers are found and what habitats they use (U.S. Fish and Wildlife Service, 2002).

It is critically important to recognize that the ultimate measure of habitat suitability is not simply whether or not a site is occupied. Habitat suitability occurs along a gradient from high to poor to unsuitable; the best habitats are those in which flycatcher reproductive success and survivorship result in a stable or growing population. Some occupied habitats may be acting as population sources, while others may be functioning as population sinks (Pulliam, 1988). Therefore, it can take extensive research to determine the quality of any given habitat patch. Furthermore, productivity and survival rates can vary widely among years (Paxton and others, 2007; Ellis and others, 2008; Ahlers and Moore, 2009), so conclusions based on short-term datasets or data extrapolated from one area to another may be erroneous. It also is important to note that not all unoccupied habitat is unsuitable; some sites with suitable habitat may be geographically isolated or newly established, such that they are not yet colonized by breeding flycatchers. There also may simply not be enough flycatchers in a given area to fill all available habitat in particular locations (U.S. Fish and Wildlife Service, 2002). A better understanding of which habitats or sites are sinks or sources can be especially helpful in site conservation and restoration planning.

As described earlier, migrant Willow Flycatchers may occur in riparian habitats that are structurally unsuitable for breeding (for example, too sparse, smaller patch size, etc.), and in non-riparian habitats. Such migration stopover areas, even though not used for breeding, may be critically important resources affecting local and regional flycatcher productivity and survival (U.S. Fish and Wildlife Service, 2002, 2005).

Breeding Chronology and Biology

Unless otherwise noted, the information that follows and upon which the generalized breeding season chronology (fig. 8) is based comes from Unitt (1987), Whitfield (1990), Maynard (1995), Sogge and others (2003b), Paxton and others (2007), Schuetz and Whitfield (2007), and Ellis and others (2008). Extreme or record dates for any stage of the breeding cycle may vary by 1–2 weeks from the dates presented, depending on the geographic area, extreme weather events, yearly variation and other factors. Higher elevation areas, in particular, have delayed chronology (Ahlers and White, 2000).

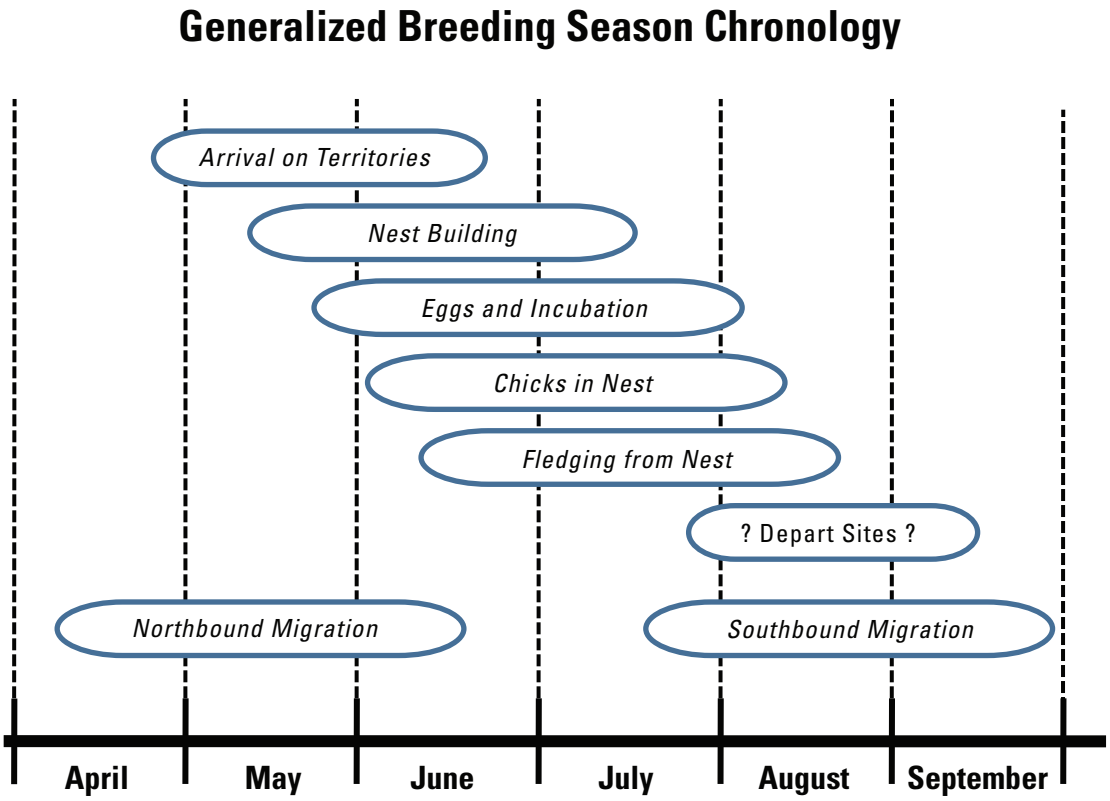


Figure 8. Generalized migration and breeding chronology for the Willow Flycatcher in the Southwest. Extreme or record dates may occur slightly earlier or later than indicated.

Both sexes can breed beginning in their second year. Male Southwestern Willow Flycatchers generally arrive at breeding areas first; older males typically arrive before younger ones. Although females usually arrive a few weeks after males, some older females are present at sites before late-arriving males. Adult flycatchers will sometimes wander extensively through large riparian sites before and after breeding, possibly as a way to evaluate potential breeding habitat (Cardinal and others, 2006).

Males establish and defend their territories through singing and aggressive interactions. Females settle on established territories, and may choose a territory more for its habitat characteristics than for the traits of its territorial male. Territory size tends to be larger when a male first arrives, then gets smaller after a female pairs with the male (Cardinal and others, 2006). Similarly, male song rate is very high early in the season, then declines after pairing (Yard and Brown, 2003). Not all males are successful in attracting mates in a given year, and as a result unpaired territorial males occur at many breeding sites. Unpaired males are usually a small percentage of any local population, but can comprise as much as 15–25 percent of the territories in some populations (Munzer and others, 2005; Ahlers and Moore, 2009).

Although the Willow Flycatcher as a species is considered predominantly monogamous during the breeding season (Sedgwick, 2000), some Southwestern Willow Flycatcher populations have a relatively high degree of polygyny whereby one male can have more than one breeding female in its territory. Polygynous males generally have two females in their territory, but up to four have been recorded (Davidson and Allison, 2003; Pearson and others, 2006). Polygyny rates can vary between sites, and among years at a given site. At some sites, polygynous males have much higher productivity than monogamous males (Paxton and others, 2007).

Nest building within the territory usually begins within a week or two after pair formation. Egg laying begins as early as mid-May, but more often starts in late May to mid-June. Chicks can be present in nests from late May through early August. Young typically fledge from nests from mid-June through mid-August; later fledglings are often products of re-nesting attempts. Breeding adults generally depart from their territories in early to mid-August, but may stay later if they fledged young late in the season. Males that fail to attract or retain mates, and males or pairs that are subject to significant disturbance, such as repeated nest parasitism or predation may leave territories by early July. Fledglings probably leave the breeding areas a week or two after adults, but few details are known.

Southwestern Willow Flycatcher territory size varies widely, probably due to differences in population density, habitat quality (including vegetation density and food availability), and nesting stage. Studies have reported estimated territory sizes ranging from 0.06 to 2.3 ha (Sogge and others, 1995; Whitfield and Enos, 1996; Bureau of Reclamation, 2009). At Roosevelt Lake, Ariz., measurements of home ranges, which include the defended territory and sometimes adjacent use areas, averaged 0.4 ha for actively breeding males; home range can be much larger for pre- and post-breeding males (Paxton and others, 2007). During incubation and nestling phases territory size, or at least the activity centers of pairs, can be very small. Flycatchers may increase their activity area after young are fledged, and use non-riparian habitats adjacent to the breeding area (Cardinal and others, 2006). This variability among sites, individual territories, and over time illustrates the challenge of defining a minimum habitat patch size for breeding flycatchers, or estimating the number of territories based simply on the size of a given breeding site.

At some breeding sites, non-territorial adult “floaters” will be present among the territorial population. Floaters are quieter and less aggressive than territorial adults, and therefore are harder to detect and frequently overlooked. Most floaters are young males, and float for only a single year. At Roosevelt Lake, floaters typically accounted for 3–8 percent of the known adult population, although the rate was much higher in drought years when habitat quality was lower (Paxton and others, 2007). The presence of floaters in a population may indicate that there is not enough high quality habitat to support all potentially territorial individuals present in a given breeding season.

Nests and Eggs

Historically, 75–80 percent of reported Southwestern Willow Flycatcher nests were placed in willows (Phillips, 1948; Phillips and others, 1964; Hubbard, 1987; Unitt, 1987). Southwestern Willow Flycatchers still commonly place their nests in native plants, but will often build nests in exotics, such as saltcedar and Russian olive (Sogge and Marshall, 2000; Stoleson and Finch, 2003; Durst and others, 2008a). In Arizona, most nests are in saltcedar or willows (Paradzick and Woodward, 2003; McLeod and others, 2007). In a unique situation in San Diego County, Calif., the flycatcher nests in coast live oak (*Quercus agrifolia*) along the San Luis Rey River (Haas, 2003), where oak became the dominant plant species adjacent to the river following willow removal in the 1950s. In another unusual situation, flycatchers in the Cliff-Gila Valley in New Mex. nest in tall boxelder (Stoleson and Finch, 2003). Southwestern Willow Flycatcher nests also have been found in buttonbush, black twinberry (*Lonicera involucrata*), Fremont cottonwood (*Populus fremontii*), alder (*Alnus* spp.), blackberry (*Rubus ursinus*), baccharis (*Baccharis* spp.), and stinging nettle (*Urtica* spp.). Overall, flycatcher nest site selection appears to be driven more by plant structure than by species composition.

Southwestern Willow Flycatchers build open cup nests approximately 8 cm high and 8 cm wide (outside dimensions), exclusive of any dangling material at the bottom. Females build the nest with little or no assistance from the males. Nests typically are placed in the fork of a branch with the nest cup supported by several small-diameter vertical stems. Nest height is highly variable and depends on the available plant structure within the territory; nests have been found from 0.6 m to approximately 20 m above ground. In any given habitat type or nest substrate, nests can be placed wherever suitable twig structure and vegetative cover are present.

Egg laying generally begins from mid-May through mid-June, depending on the geographic area and elevation. Willow Flycatcher eggs are buffy or light tan, approximately 18 mm long and 14 mm wide, with brown markings in a wreath at the blunt end. Clutch size is usually three or four eggs for first nests. Only the female develops a brood patch and incubates the eggs. Incubation lasts 12–13 days from the date the last egg is laid, and all eggs typically hatch within 24–48 hours of each other.

Flycatcher chicks are altricial and weigh only about 1–2 g at hatching, but grow rapidly and are ready to leave the nest at 12–15 days of age (Sedgwick, 2000; Paxton and Owen, 2002). The female provides most or all initial care of the young, although the role of the male increases with the age and size of nestlings. After Willow Flycatchers fledge at 12–15 days of age, they stay close to the nest and each other for 3–5 days, and adults continue feeding the fledged young for approximately 2 weeks. Recently fledged birds may repeatedly return to and leave the nest during this period (Spencer and others, 1996). Both male and female adults feed the fledged young, which give frequent, loud "*peep*" calls.

Southwestern Willow Flycatchers readily re-nest following an unsuccessful nesting attempt, although rarely more than once (Ellis and others, 2008). They also will sometimes nest again (double brood) following a successful nesting attempt, although this is more uncommon than re-nesting and varies between sites and years. From 2002 to 2008 at Elephant Butte Reservoir, approximately 13 percent of the pairs produced two successful nests per year (Ahlers and Moore, 2009). The productivity gains from pairs having successful second nests are important drivers of positive population growth (Paxton and others, 2007; Moore and Ahlers, 2009).

Replacement nests are built in the same territory, either in the same plant or at a distance of as much as 20 m from the previous nest. Reuse of old nests is uncommon, but does occur (Yard and Brown, 1999; Darrell Ahlers, Bureau of Reclamation, unpub. data, 2009). Replacement nest building and egg laying can occur (uncommonly) as late as the end of July or early August. Pairs may attempt a third nest if the second fails. However, clutch size, and therefore potential productivity, decreases with each nest attempt (Whitfield and Strong, 1995; Ellis and others, 2008).

Food and Foraging

The breeding season diet of Southwestern Willow Flycatchers is relatively well documented (DeLay and others, 2002; Drost and others, 2003; Durst, 2004; Wiesenborn and Heydon, 2007; Durst and others, 2008b). Breeding flycatchers are exclusively insectivorous, and consume a wide range of prey taxa ranging in size from small leafhoppers (Homoptera) to large dragonflies (Odonata). Major prey taxa include bugs (Hemiptera), bees and wasps (Hymenoptera), flies (Diptera), and leafhoppers; however, diet can vary widely between years and among different habitat types. There is no known differences in diet by sex, but there are differences between adult and nestling diet in the proportions of some arthropod groups. Differences in the composition of arthropods in flycatcher diet have been documented between native and exotic habitats, and between years within particular breeding sites; however, flycatchers appear able to tolerate substantial variation in relative prey abundance, except in extreme situations such as severe droughts (Durst and others, 2008b).

Willow Flycatchers of all subspecies forage primarily by sallying from a perch to perform aerial hawking and gleaning (Sedgwick, 2000; Durst, 2004). Males and females forage with similar maneuvers, although males may forage higher in the tree canopy than females. Foraging frequently takes place at external edges or internal openings within a habitat patch, or at the top of the upper canopy.

Site Fidelity and Survivorship

Based on studies of banded birds, most adult Southwestern Willow Flycatchers that survive from one year to the next will return to the same river drainage, often in proximity to the same breeding site (U.S. Fish and Wildlife Service, 2002; McLeod and others, 2007; Paxton and others, 2007). However, it is common for individual flycatchers to return to different sites within a breeding area, and even to move between breeding areas, from one year to the next. Some of this movement may be related to breeding success and habitat quality. At Roosevelt Lake, those birds that moved to different sites within a breeding area had on average higher productivity in the year following the move than in the year before the move (Paxton and others, 2007). At Roosevelt Lake and on the San Pedro and Gila Rivers, movement out of breeding patches also increased with the relative age of a patch, which may indicate a preference for younger riparian vegetation structure.

In addition to movements within a breeding site, long-distance movements within and between drainages have been observed (Paxton and others, 2007), at distances up to approximately 450 km. Dispersal of first-year flycatchers is more extensive than adult birds, as typical for most bird species.

Survivorship within the breeding season can be very high, averaging 97 percent at Roosevelt Lake (Paxton and others, 2007). Between-year survivorship of adults can be highly variable, but appears to be similar to that of most small passerine birds studied, with estimates generally ranging from approximately 55 to 65 percent (Stoleson and others, 2000; McLeod and others, 2007; Paxton and others, 2007; Schuetz and Whitfield, 2007). Males and females have similar survivorship rates.

Estimated survivorship of young birds (from hatching to the next breeding season) is highly variable, depending in part on how the estimates are generated (Stoleson and others, 2000). Generally reported as between 15 and 40 percent, juvenile survivorship typically is lower than adult survivorship (Whitfield and Strong, 1995; Stoleson and others, 2000; McLeod and others, 2007). Early fledging young have higher survivorship than those that leave the nest later in the season (Whitfield and Strong, 1995; Paxton and others, 2007). Most flycatchers survive for only 1–2 adult years, and mean life expectancy in Arizona was estimated to be 1.9 years following fledging. However, some individuals live much longer. The maximum reported ages of banded Southwestern Willow Flycatchers are 9–11 years (Sedgwick, 2000; Paxton and others, 2007).

Overall, the Southwestern Willow Flycatcher population appears to persist as one or more widely dispersed metapopulations (Busch and others, 2000; U.S. Fish and Wildlife Service, 2002), with movement of individuals, and thus genetic exchange, occurring across the landscape. However, the amount of movement and interchange is lower among sites that are farther apart or more isolated. Some sites serve as population sources while others may be sinks; some sites will be ephemeral over periods of years or decades. Flycatcher movement and dispersal among sites is important for initial site colonization and subsequent recolonization.

There are few general predictors for the persistence of breeding sites. Relatively large populations, such as the Kern River Preserve, San Pedro River, Elephant Butte Reservoir, and the Gila River have persisted for 10 or more years. However, such large sites can be subject to major changes in population numbers, and even potential extirpation, due to changes in local hydrology, site inundation, drought, etc. (Moore, 2005; Paxton and others, 2007). Although some small populations may be ephemeral and last only a few years (Durst and others, 2008a), others have remained occupied for much longer periods (Kus and others, 2003). Breeding populations also may reappear at unoccupied sites following 1–5 year absences. Suitable flycatcher habitat also can develop—and poor quality habitat can improve—relatively quickly in some sites, under favorable hydrological conditions. For example, at Roosevelt Lake and the San Pedro River (AZ), the age of riparian vegetation when first colonized was as young as 3 years (Paxton and others, 2007). In the same study, flycatchers moved back into older habitat patches when nearby younger, occupied habitat was inundated or scoured away.

Overall, the vegetation and flycatcher occupancy of a habitat patch or river drainage are often dynamic; few if any sites remain static over time. The amount of suitable flycatcher habitat can substantially increase or decrease in just a few years, at local and regional scales. Flycatchers can respond quickly to habitat changes, colonizing new sites if available and abandoning others. Therefore, one cannot assume that local, regional, or rangewide flycatcher population numbers will remain stable over time.

Threats to the Flycatcher and Habitat

The greatest historical factor in the decline of the Southwestern Willow Flycatcher is the extensive loss, fragmentation, and modification of riparian breeding habitat (U.S. Fish and Wildlife Service, 2002). Large-scale losses of southwestern wetlands have occurred, particularly the cottonwood-willow riparian habitats historically used by the Southwestern Willow Flycatcher (Unitt, 1987; General Accounting Office, 1988; Dahl, 1990; State of Arizona, 1990). Changes in the riparian plant community have frequently reduced, degraded, and eliminated nesting habitat for the flycatcher, curtailing its distribution and abundance.

Habitat losses and changes have occurred and continue to occur because of urban, recreational, and agricultural development, water diversion and impoundment, channelization, livestock grazing, and replacement of native habitats by introduced plant species (Marshall and Stoleson, 2000; U.S. Fish and Wildlife Service, 2002). Hydrological changes, natural or man-made, can greatly reduce the quality and extent of flycatcher habitat. Although riparian areas are often not considered as fire-prone, several Southwestern Willow Flycatcher breeding sites were destroyed by fire over the past decade (U.S. Fish and Wildlife Service, 2002), and others are at risk to similar catastrophic loss. Fire danger in these riparian systems may be exacerbated by increases in exotic vegetation, such as saltcedar, diversions or reductions of surface water, increased recreational activity, and drawdown of local water tables.

Although the degradation of many river systems and associated riparian habitat is a key cause of their absence, Southwestern Willow Flycatchers do not require free-running rivers or “pristine” riparian habitats. Most of the largest

Southwestern Willow Flycatcher populations in the last decade were found in reservoir drawdown zones, such as at Roosevelt Lake and Elephant Butte Reservoir. Many breeding populations are found on regulated rivers (Graf and others, 2002). In addition, the vegetation at many smaller flycatcher breeding sites is supported by artificial water sources such as irrigation canals, sewage outflow, or agricultural drainages (U.S. Fish and Wildlife Service, 2002). Although rising water levels could be detrimental to breeding flycatchers within a reservoir drawdown zone, reservoir fluctuations can simulate river dynamics with cycles of destruction and establishment of riparian vegetation, depositing rich sediments and flushing salt accumulations in the soil (Paxton and others, 2007). Therefore, managed and manipulated rivers and reservoirs have the potential to play a positive role by providing flycatcher breeding habitat. However, because rivers and reservoirs are not managed solely to create and maintain flycatcher habitat, the persistence of riparian vegetation in these systems—and any flycatchers breeding therein—is not assured.

Although the historic degradation and loss of native riparian negatively affected the Southwestern Willow Flycatcher, this species does not show an inherent preference for native vegetation. Instead, breeding habitat selection is based primarily on vegetation structure, density, size, and other stand characteristics, and presence of water or saturated soils (U.S. Fish and Wildlife Service, 2002). In fact, approximately 25 percent of known territories are found in habitat composed of 50 percent or greater exotic vegetative component—primarily saltcedar (Durst and others, 2008a). Saltcedar also can be an important habitat component in sites dominated by native vegetation (U.S. Fish and Wildlife Service, 2002, 2005). Despite suggestions that flycatchers breeding in saltcedar are suffering negative consequences and that removal of saltcedar is therefore a benefit (DeLoach and others, 2000; Dudley and DeLoach, 2004), there is increasing and substantial evidence that this is not the case. For example, Paxton and others (2007) found that flycatchers did not suffer any detectable negative consequences from breeding in saltcedar. This is consistent with the findings of Owen and others (2005) and Sogge and others (2006). Therefore, the rapid or large-scale loss of saltcedar in occupied flycatcher habitats, without rapid replacement of suitable native vegetation, could result in reduction or degradation of flycatcher habitat (U.S. Fish and Wildlife Service, 2002; Sogge and others, 2008).

In evaluating Southwestern Willow Flycatcher use of either native or exotic habitat, it is important to recognize that throughout the Southwest, there are many saltcedar-dominated and native-dominated habitats in which flycatchers do not breed (U.S. Fish and Wildlife Service, 2002; Sogge and others, 2006). Therefore, the use of any riparian patch—native or exotic—as breeding habitat will be site specific and will depend on the spatial, structural, and ecological characteristics of that particular patch and the potential for flycatchers to colonize and maintain populations within it.

Drought can have substantial negative effects on breeding flycatchers and their breeding habitat by reducing riparian vegetation vigor and density, and reducing prey availability (Durst, 2004; Paxton and others, 2007; Bureau of Reclamation, 2009). For example, the extreme drought of 2002 caused near complete reproductive failure of the large flycatcher population at Roosevelt Lake; among approximately 150 breeding territories, only two nests successfully fledged young in that year (Ellis and others, 2008). If future climate change produces more frequent or more sustained droughts, as predicted by many climate change models (for example, Seager and others, 2007), southwestern riparian habitats could be reduced in extent or quality. This scenario would present a challenge to the long-term sustainability of Southwestern Willow Flycatcher populations.

Brood parasitism by the Brown-headed Cowbird (*Molothrus ater*) was initially considered another significant threat to the Southwestern Willow Flycatcher (Whitfield, 1990; Harris, 1991; U.S. Fish and Wildlife Service, 1993, 1995; Whitfield and Strong, 1995; Sferra and others, 1997). Cowbirds lay their eggs in the nest of other species (the “hosts”), which raise the young cowbirds—often at the expense of reduced survivorship of their own young. Southwestern Willow Flycatchers seldom fledge any flycatcher young from nests that are parasitized by cowbirds (Whitfield and Sogge, 1999). Although parasitism negatively impacts some Southwestern Willow Flycatcher populations, especially at small and isolated breeding sites, it is highly variable and no longer considered among the primary rangewide threats to flycatcher conservation (U.S. Fish and Wildlife Service, 2002). Cowbird abundance, and therefore parasitism, tends to be a function of habitat type and quality, and the availability of suitable hosts, not specific to the flycatcher. Therefore, large-scale cowbirds control may not always be warranted unless certain impact thresholds are met (U.S. Fish and Wildlife Service, 2002; Rothstein and others, 2003; Siegle and Ahlers, 2004).

Section 2. Survey Protocol

The fundamental principles of the methodology described in this version have remained the same since the original Tibbitts and others (1994) and subsequent Sogge and others (1997a) protocols: the use of vocalization play-back, repeated site visits, and confirmation of flycatcher identity via the species-characteristic song. This newest protocol incorporates guidelines of the 2000 USFWS addendum, and includes changes based on our improved understanding of Willow Flycatcher biology and the significance of potential threats, and the availability of new survey technologies.

Several factors work together to make Southwestern Willow Flycatcher surveys challenging. Difficulties include the flycatcher's physical similarities with other species and subspecies; accessing the dense habitat they occupy; time constraints based on their breeding period; and vocalization patterns. Given these challenges, no methodology can assure 100-percent detection rates. However, the survey protocol described herein has proven to be an effective tool for locating flycatchers, and flycatchers generally are detectable when the protocol is carefully followed. Since 1995, hundreds of sites have been surveyed and thousands of flycatchers detected using the two previous versions of the survey protocol.

The Willow Flycatcher is 1 of 10 regularly occurring *Empidonax* flycatchers found in North America, all of which look very much alike. Like all *Empidonax*, Willow Flycatchers are nondescript in appearance, making them difficult to see in dense breeding habitat. Although the Willow Flycatcher has a characteristic *fitz-bew* song that distinguishes it from other birds (including other *Empidonax*), Willow Flycatchers are not equally vocal at all times of the day or during all parts of the breeding season. Because Southwestern Willow Flycatchers are rare and require relatively dense riparian habitat, they may occur only in a small area within a larger riparian system, thus decreasing detectability during general bird surveys. Migrating Willow Flycatchers (of all subspecies) often sing during their migration through the Southwest, and could therefore be confused with local breeders. In addition, Southwestern Willow Flycatchers are in breeding areas for only 3–4 months of the year. Surveys conducted too early or late in the year would fail to find flycatchers even at sites where they breed.

These life history characteristics and demographic factors influence how Southwestern Willow Flycatcher surveys should be conducted and form the basis upon which this protocol was developed. This protocol is based on the use of repeated call-playback surveys during pre-determined periods of the breeding season, to confirm presence or to derive a high degree of confidence regarding their absence at a site. Such species-specific survey techniques are necessary to collect reliable presence/absence information for rare species (Bibby and others, 1992).

The primary objective of this protocol is to provide a standardized survey technique to detect Southwestern Willow Flycatchers, determine breeding status, and facilitate consistent and standardized data reporting. The survey technique will, at a minimum, help determine presence or absence of the species in the surveyed habitat for that breeding season. Ultimately, the quality of the survey that is conducted will depend on the preparation, training, and in-the-field diligence of the individual surveyor.

This protocol is designed for use by persons who are non-specialists with *Empidonax* flycatchers or who are not expert birders. However, surveyors must have sufficient knowledge, training, and experience with bird identification and surveys to distinguish the Willow Flycatcher from other non-*Empidonax* species, and be able to recognize the Willow Flycatcher's primary song. A surveyor's dedication and attitude, willingness to work early hours in dense, rugged and wet habitats, and their ability to remain alert and aware of important cues also are important. Surveys conducted improperly or by unqualified, inexperienced, or complacent personnel may lead to inaccurate results and unwarranted conclusions.

Surveys conducted by qualified personnel in a consistent and standardized manner will enable continued monitoring of general population trends at and between sites, and between years. Annual or periodic surveys in cooperation with State and Federal agencies should aid resource managers in gathering basic information on flycatcher status and distribution at various spatial scales. Identifying occupied and unoccupied sites will assist resource managers in assessing potential impacts of proposed projects, avoiding impacts to occupied habitat, identifying suitable habitat characteristics, developing effective restoration management plans, and assessing species recovery.

The earlier versions of this protocol (Tibbitts and others, 1994; Sogge and others, 1997a) were used extensively and successfully for many years. Hundreds of flycatcher surveys conducted throughout the Southwest since 1994 revealed much about the usefulness and application of this survey technique. Three important lessons were: (1) the call-playback technique works and detects flycatchers that would have otherwise been overlooked; (2) multiple surveys at each site are important; and (3) with appropriate effort, general biologists without extensive experience with *Empidonax* can find and verify Willow Flycatcher breeding sites.

This revised protocol is still based on call-playback techniques and detection of singing individuals. However, it includes changes in the timing and number of surveys to increase the probability of detecting flycatchers and to help determine if they are breeders or migrants. It also incorporates the basic premise of the USFWS 2000 addendum to the 1997 protocol by requiring a minimum of five surveys in all "project-related" sites. A detailed description of surveys and

timing is discussed in section, "Timing and Number of Visits." Changes in the survey data sheets make them easier to use and submit, and allow reporting all site visits within a single year on one form. The new survey forms also are formatted such that the data on the respective forms can be easily incorporated into the flycatcher range-wide database.

This protocol is intended to determine if a habitat patch contains territorial Southwestern Willow Flycatchers, and is not designed establish the exact distribution and abundance of flycatchers at a site. Determining precise flycatcher numbers and locations requires many more visits and additional time observing the behavior of individual birds. This survey protocol also does not address issues and techniques associated with nest monitoring or other flycatcher research activities. Those efforts are beyond the scope usually needed for most survey purposes, and require advanced levels of experience and skills to gather useful data and avoid potential negative effects to the flycatcher. If nest monitoring is a required component of your study, refer to Rourke and others (1999) for appropriate nest monitoring techniques (available for download at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/reports.asp).

Biologists who are not expert birders or specialists with regard to *Empidonax* flycatchers can effectively use this protocol. However, users should attend a U.S. Fish and Wildlife Service-approved Southwestern Willow Flycatcher survey training workshop, and have knowledge and experience with bird identification, surveys, and ecology sufficient to effectively apply this protocol.

Permits

Federal endangered species recovery permits are required for surveys in all USFWS regions where the Southwestern Willow Flycatcher breeds (application forms can be downloaded at http://www.fws.gov/forms/3-200-55.pdf). State permits also may be required before you can survey within any of the States throughout the Southwestern Willow Flycatcher's range: be certain to check with the appropriate State wildlife agency in your area. It usually takes several months to receive permits, so apply early to avoid delays in starting your surveys. You also must obtain permission from government agencies and private landowners prior to conducting any surveys on their lands.

Pre-Survey Preparation

The degree of effort invested in pre-survey preparation will have a direct effect on the quality and efficiency of the surveys conducted. Pre-survey preparation is often overlooked, but can prove to be one of the more important aspects in achieving high-quality survey results.

Surveyors should study calls, songs, drawings, photographs, and videos of Willow Flycatchers. Several web sites describe life history requirements, and provide photographs and vocalizations. It is especially critical for surveyors to be familiar with Willow Flycatcher vocalizations before going in the field. Although the *fitz-bew* song is the basis of verifying detections using this protocol, Willow Flycatchers use many other vocalizations that are valuable in locating birds and breeding sites. We strongly encourage that all surveyors learn as many vocalizations as possible and refer to the on-line "Willow Flycatcher Vocalizations; a Guide for Surveyors" (available at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/wiflvocl.asp). Several commercial bird song recordings include Willow Flycatcher vocalizations, but these recordings typically have only a few vocalizations and the dialects may differ from those heard in the Southwest.

If possible, visit known Willow Flycatcher breeding sites to become familiar with flycatcher appearance, behavior, vocalizations, and habitat. Such visits are usually part of the standardized flycatcher survey workshops. All visits should be coordinated with USFWS, State wildlife agencies, and the property manager/owner, and must avoid disturbance to territorial flycatchers. While visiting these sites, carefully observe the habitat characteristics to develop a mental image of the key features of suitable habitat.

Surveyors must be able to identify, by sight and vocalizations, other species likely to be found in survey areas that may be confused with Southwestern Willow Flycatchers. These include Bell's Vireo (*Vireo bellii*), Western Wood-pewee (*Contopus sordidulus*), young or female Vermillion Flycatchers (*Pyrocephalus rubinus*), and other *Empidonax* flycatchers. At a distance, partial song or call notes of Bell's Vireo, Ash-throated Flycatchers (*Myiarchus cinerascens*) and some swallows can sound considerably like a *fitz-bew*. Surveyors also should be able to identify Brown-headed Cowbirds by sight and vocalizations. It is worthwhile to make one or more pre-survey trips to the survey sites or other similar areas to become familiar with the local bird fauna. You might consider obtaining a species list relative to your area and become familiar with those species by site and sound.

Prior to conducting any presence/absence surveys in your respective State or USFWS Region, contact the respective flycatcher coordinators to discuss the proposed survey sites and determine if the sites have been surveyed in prior years. If possible, obtain copies of previous survey forms and maintain consistency with naming conventions and site boundaries. Study the forms to determine if flycatchers have been previously detected in the site, record locations of any previous detections, and read the comments provided by prior surveyors. While surveying, be sure to pay special attention to any patches where flycatchers have previously been detected.

Familiarity with the survey site prior to the first surveys is the best way to be prepared for the conditions you will experience. Determine the best access routes to your sites and always have a back-up plan available in the event of unforeseen conditions (for example, locked gates, weather, etc.). Know the local property boundaries and where the potential hazards may be, including deep water, barbed wire fencing, and difficult terrain. Be prepared to work hard and remain focused and diligent in a wide range of physically demanding conditions. At many sites, these include heat, cold, wading through flowing or stagnant water, muddy or swampy conditions, crawling through dense thickets (often on hands and knees), and exposure to snakes, skunks, and biting insects.

It is imperative that all surveyors exercise the adage "safety first." Be aware of safety hazards and how to avoid them, and do not allow the need to conduct surveys to supersede common sense and safety. Inform your coworkers where you will be surveying and when you anticipate returning. Always take plenty of water and know how to effectively use your equipment, especially compass, Global Positioning System (GPS), and maps.

Equipment

The following equipment is necessary to conduct the surveys:

1. **USGS topographic maps of the area**: A marked copy is required to be attached to survey data sheets submitted at the end of the season. Be sure to always delineate the survey area and clearly mark any flycatcher detections. If the survey area differed between visits; delineate each survey individually.
2. **Standardized survey form**: Always bring more copies than you think you need.
3. **Lightweight audio player**: Be sure the player has adequate volume to carry well; use portable speakers if necessary. Several digital devices, such as CD players and MP3 players, are currently available and can be connected to external amplified speakers for broadcasting the flycatcher vocalizations. However, not all are equally functional or effective in field conditions; durability, reliability, and ease of use are particularly important. Talk to experienced surveyors for recommendations on particular models and useful features.
4. **Extra player and batteries**: In the field, dirt, water, dust, and heat often cause equipment failure, and having backup equipment helps avoid aborting a survey due to equipment loss or failure.
5. **Clipboard and permanent (waterproof) ink pen**: We recommend recording survey results directly on the survey data form, to assure that you collect and record all required data and any field notes of interest.
6. **Aerial photographs**: Aerial photographs can significantly improve your surveys by allowing you to accurately target your efforts, thus saving time and energy in the field. Previously, aerial images were often expensive and difficult to obtain. However, it is now easy to get free or low-cost images from sources, such as Google© Earth. Even moderate resolution images generally are better than none. For higher resolution aerial photographs, check with local planning offices and/or State/Federal land-management agencies for availability. Take color photocopies, not the original aerial photographs, with you in the field. Aerial photographs also are very useful when submitting your survey results but cannot be substituted in lieu of the required topographic map.
7. **Binoculars and bird field guide**: Although this protocol relies primarily on song detections to verify flycatcher presence, good quality binoculars are still a crucial field tool to help distinguish between possible Southwestern Willow Flycatchers and other species. Use a pair with 7–10 power magnification that can provide crisp images in poor lighting conditions. A good field guide also is essential for the same reason.
8. **GPS unit**: A GPS unit is needed for determining survey coordinates and verifying the location of survey plots on topographic maps. All flycatcher detections should be stored as waypoints and coordinates recorded on the survey form. A wide variety of fairly inexpensive GPS units are currently available. Most commercially available units will provide accuracy within 10 m, which is sufficient for navigating and marking locations.
9. **Compass**: Surveyors should carry a compass to help them while navigating larger habitat patches. This is an important safety back-up device, because GPS units can fail or lose power. Most GPS units have a feature to provide an accurate bearing to stored waypoints (for example, previous flycatcher detections, your parked vehicle, etc.); however, many units do not accurately display the direction in which the surveyor is traveling slowly through dense vegetation. A compass set to the proper bearing provides a more reliable method to navigate the survey site and relocate previously marked locations.

The following equipment also is recommended:

10. **Camera:** These are very helpful for habitat photographs, especially at sites where flycatchers are found. Small digital cameras are easily portable and relatively inexpensive.
11. **Survey flagging:** Used for marking survey sites or areas where flycatcher are detected. Check with the local land owner or management agency before flagging sites. Use flagging conservatively so as to not attract people or predators.
12. **Field vest:** A multi-pocket field vest can be very useful for carrying field equipment and personal items. We recommend muted earth-tone colors.

13. **Cell phone and/or portable radio**: In addition to providing an increased level of safety, cell phones or portable radios may be used by surveyors to assist each other in identifying territories and pairs in dense habitats, or where birds are difficult to hear.

In addition to the necessary equipment mentioned above, personal items, such as food, extra water or electrolyte drink, sunscreen, insect repellent, mosquito net, first-aid kit, whistle, and a light jacket, also should be considered. Being prepared for unforeseen difficulties, and remaining as comfortable as conditions allow while surveying are important factors to conducting thorough and effective surveys.

All survey results (both negative and positive) should be recorded directly on data forms when possible. These data forms have been designed to prompt surveyors to record key information that is crucial to interpretation of survey results and characterization of study sites. Even if no flycatchers are detected or habitat appears unsuitable, this is valuable information and should be recorded. Knowing where flycatchers are not breeding can be as important as knowing where they are; therefore, negative data are important. Standardized data forms are provided in appendix 1, or can be downloaded online. Always check for updated forms prior to each year's surveys.

Willow Flycatcher surveys are targeted at this species and require a great deal of focused effort. Surveyors must be constantly alert and concentrate on detecting a variety of flycatcher cues and responses. Therefore, field work, such as generalized bird surveys (for example, point counts or walking transects) or other distracting tasks, should not be conducted in conjunction with Willow Flycatcher surveys. Avoid bringing pets or additional people who are not needed for the survey. Dress in muted earth-tone colors, and avoid wearing bright clothing.

Willow Flycatcher Identification

The Southwestern Willow Flycatcher is a small bird, approximately 15 cm long and weighing about 11–12 g. Sexes look alike and cannot be distinguished by plumage. The upper parts are brownish-olive; a white throat contrasts with the pale olive breast, and the belly is pale yellow. Two white wing bars are visible (juveniles have buffy wing bars) and the eye ring is faint or absent. The upper mandible is dark and the lower mandible light. The tail is not strongly forked. When perched, the Willow Flycatcher often flicks its tail upward. As a group, the *Empidonax* flycatchers are very difficult to distinguish from one another by appearance. The Willow Flycatcher also looks very similar to several other passerine species you may encounter in the field.

Given that Willow Flycatchers look similar to other *Empidonax* flycatchers that may be present at survey sites, the most certain way to verify Willow Flycatchers in the field is by their vocalization. For the purpose of this protocol, identification of Willow Flycatchers cannot be made by sight alone; vocalizations are a critical identification criterion, and specifically the primary song *fitz-bew*. Willow Flycatchers have a variety of vocalizations (see Stein, 1963; Sedgwick, 2000), but two are most commonly heard during surveys or in response to call-playback:

1. ***Fitz-bew***. This is the Willow Flycatcher's characteristic primary song. Note that *fitz-bews* are not unique to the southwestern subspecies; all Willow Flycatchers sing this characteristics song. Male Willow Flycatchers may sing almost continuously for hours, with song rates as high as one song every few seconds. Song volume, pitch, and frequency may change as the season progresses. During prolonged singing bouts, *fitz-bews* are often separated by short *britt* notes. *Fitz-bews* are most often given by a male, but studies have shown female Willow Flycatchers also sing, sometimes quite loudly and persistently (although generally less than males). Flycatchers often sing from the top of vegetation, but also will vocalize while perched or moving about in dense vegetation.
2. ***Whitt***. This is a call often used by nesting pairs on their territory, and commonly is heard even during periods when the flycatchers are not singing (*fitz-bewing*). The *whitt* call appears to be a contact call between sexes, as well as an alarm call, particularly when responding to disturbance near the nest. *Whitt* calls can be extremely useful for locating Willow Flycatchers later in the season when *fitz-bewing* may be infrequent, but are easily overlooked by inexperienced surveyors. When flycatcher pairs have active nests and particularly once young have hatched, *whitts* may be the most noticeable vocalization. However, many species of birds *whitt*, and a *whitt* is not a diagnostic characteristic for Willow Flycatchers. For example, the "*whitt*" of the Black-headed Grosbeak (*Pheucticus melanocephalus*) and Yellow-breasted Chat (*Icteria virens*) are often confused with that of the flycatcher.

The *fitz-bew* and *whitt* calls are the primary vocalizations used to locate Willow Flycatchers. However, other less common Willow Flycatcher vocalizations can be very useful in alerting surveyors to the presence of flycatchers. These include twittering vocalizations typically given during interactions between flycatchers and sometimes between flycatchers and other birds, bill snapping, *britt*'s, and *wheeo*'s. Because these sounds can be valuable in locating territories (Shook and others, 2003), they should be studied prior to going in the field. Willow Flycatcher vocalization recordings are available from Federal and State agency contacts and online at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/. Standardized recordings of Southwestern Willow Flycatchers also are available online at http://www.naturesongs.com/tyrrcert.html#tyrr. Specifically, only *fitz-bews* and *britts* should be used for conducting surveys, to provide more robust comparative results among sites and years.

Willow Flycatcher song rates are highest early in the breeding season (late May–early June), and typically decline after eggs hatch. However, in areas with many territorial flycatchers or where an unpaired flycatcher is still trying to attract a mate, or where re-nesting occurs, singing rates may remain high well into July. Isolated pairs can be much quieter and harder to detect than pairs with adjacent territorial flycatchers. At some sites, pre-dawn singing (0330–0500 hours) appears to continue strongly at least through mid-July (Sogge and others, 1995). Singing rates may increase again later in the season, possibly coinciding with re-nesting attempts (Yard and Brown, 2003). The social dynamics of adjacent territories can strongly influence vocalization rates. A single "*fitz-bew*" from one flycatcher may elicit multiple responses from adjacent territories. When these interactions occur, it is a good opportunity to distinguish among territories and provides the surveyor with an estimate of territory numbers in the immediate area.

There are some periods during which Willow Flycatchers do not sing and even the use of call-playback sometimes fails to elicit any response. This can be particularly true late in the breeding season. Early and repeated surveys are the best way to maximize the odds of detecting a singing flycatcher and determining its breeding status.

Timing and Number of Visits

No survey protocol can guarantee that a Southwestern Willow Flycatcher, if present, will be detected on any single visit. However, performing repeated surveys during the early to mid-nesting season increases the likelihood of detecting flycatchers and aids in determining their breeding status. A single survey, or surveys conducted too early or late in the breeding cycle, do not provide definitive data and are of limited value.

For purposes of this survey protocol, we have divided the Southwestern Willow Flycatcher breeding season into three basic survey periods, and specified a minimum number of survey visits for each period (fig. 9). Although the Sogge and others (1997a) protocol recommended a minimum of one survey in each period, we now recommend a differing number of visits for general surveys versus project-related studies.

General surveys are conducted for the sole purpose of determining whether Willow Flycatchers are present or absent from a respective site, when there is no foreseeable direct or indirect impact to their habitat from a known potential project or change in site management. In such cases, a minimum of one survey visit is required in each of the three survey periods.

Project-related surveys are conducted to determine the presence or absence of Willow Flycatchers within a site when there is a potential or foreseeable impact to their habitat due to a potential project or change in site management. Additional surveys are required for project-related studies in order to derive a greater degree of confidence regarding the presence or absence of Willow Flycatchers.

All successive surveys must be at least 5 days apart; surveys conducted more closely are not considered to be separate surveys. Although a minimum of three or five surveys are required for general and project-related purposes, respectively, if the habitat patches are large, contiguous and extremely dense, additional surveys are strongly encouraged to ensure full coverage of the site.

If you are uncertain whether three general surveys or five project-related surveys are required for your respective study, contact your USFWS flycatcher coordinator. As noted earlier, this survey protocol will help determine if territorial flycatchers are present and their approximate locations; if your project requires fine-scale estimates of flycatcher numbers or distribution at a site, you may need to conduct more intensive efforts that include additional surveys, nest searches, and nest monitoring.

Survey Period 1: May 15–31.—For both general and project-related surveys: a minimum of one survey is required. The timing of this survey is intended to coincide with the period of high singing rates in newly arrived males, which tends to begin in early to mid-May. This is one of the most reliable times to detect flycatchers that have established their territories, so there is substantial value to conducting period 1 surveys even though not all territorial males may yet have arrived. Migrant Willow Flycatchers of multiple subspecies will likely be present and singing during this period. Because both migrant and resident Willow Flycatchers are present during this period, and relatively more abundant then in subsequent surveys, it is an excellent opportunity to hone your survey and detection skills and gain confidence in your abilities. Detections of flycatchers during period 1 also provide insight on areas to pay particular attention to during the next survey period.

Survey Period 2: June 1–24.—For general surveys: a minimum of one survey is required. For project-related surveys, a minimum of two surveys are required. Note that this differs from the minimum of one survey that was recommended in this period under the previous protocol (Sogge and others, 1997a). During this period, the earliest arriving males may already be paired and singing less, but later arriving males should still be singing strongly. Period 2 surveys can provide insight about the status of any flycatchers detected during survey period 1. For example, if a flycatcher is detected during survey period 1 but not survey period 2, the first detection may have been a migrant. Conversely, detecting a flycatcher at the same site during periods 1 and 2 increases the likelihood that the bird is not a migrant, although it does not necessarily confirm it. Survey period 2 also is the earliest time during which you are likely to find nesting activity by resident birds at most sites. Special care should be taken during this period to watch for activity that will verify whether the flycatchers that are present are attempting to breed. A little extra time and diligence should be spent at all locations where flycatchers were detected during survey period 1.

Survey Visit Timing, Numbers, and Detection Interpretation

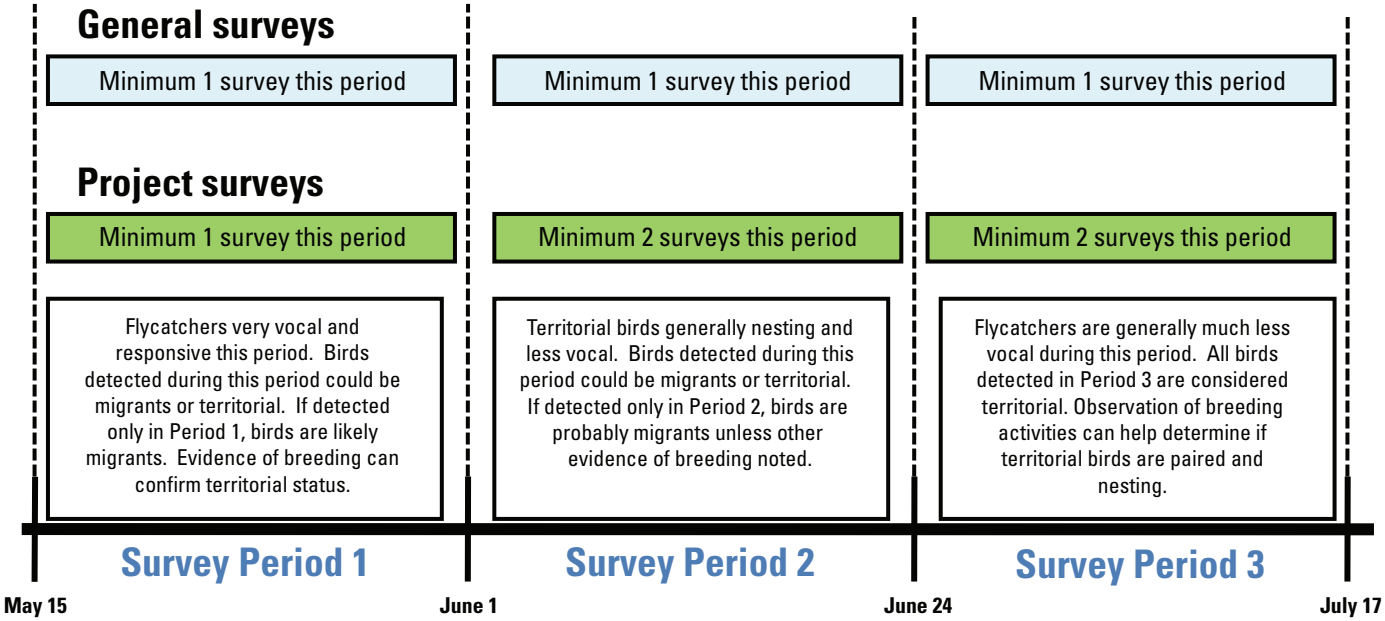


Figure 9. Recommended numbers and timing of visits during each survey period for general surveys and project surveys. General surveys are those conducted when there is no foreseeable direct or indirect impact to their habitat from a known potential project or change in site management. Project-related surveys are conducted when there is a potential or foreseeable impact to their habitat due to a potential project or change in site management.

Survey Period 3: June 25–July 17.—For general surveys, a minimum of one survey is required. For project-related surveys, a minimum of two surveys are required. Virtually all Southwestern Willow Flycatchers should have arrived on their territories by this time. Flycatcher singing rates probably have lessened, and most paired flycatchers will have initiated or even completed their first round of nesting activity. Migrant Willow Flycatchers should no longer be passing through the Southwest; therefore, any flycatchers that you detect are likely to be either territorial or nonbreeding floaters. Surveyors should determine if flycatchers detected during surveys in periods 1 or 2 are still present, and watch closely for nesting activity. Flycatchers that have completed a first nesting attempt may resume vigorous singing during this period. Extra time and diligence should be spent at all locations where flycatchers were detected during survey periods 1 or 2.

At high elevation sites (above 2,000 m), Southwestern Willow Flycatcher arrival and initiation of breeding activities may occur in early June, and possibly later in some years due to weather or migration patterns. Therefore, flycatcher breeding chronology may be delayed by 1 or 2 weeks at such sites, and surveys should be conducted in the latter part of each period.

It may not require multiple surveys to verify Southwestern Willow Flycatcher presence or breeding status. If, for example, Willow Flycatchers are observed carrying nest material during survey periods 1 or 2, this is conclusive verification they are breeders as opposed to migrants, regardless of what is found during period 3. However, it requires a minimum of three surveys for general studies and five surveys for project-related studies to determine with relative confidence that Southwestern Willow Flycatchers probably are not breeding at a site in that year, based on lack of detections.

We strongly encourage additional follow-up surveys to sites where territorial Southwestern Willow Flycatchers are verified or suspected. Extra surveys provide greater confidence about presence or absence of flycatchers at a site, as well as help in estimating the number of breeding territories or pairs, and determining breeding status and the outcome of breeding efforts. Pre-survey visits the evening before the survey or post-survey follow-up later in the morning can help confirm breeding status when surveyors are not under time constraints. However, avoid returning to a site so often as to damage the habitat, establish or enlarge trails, or cause undue disturbance to the flycatchers.

Survey Methods

The survey methods described below fulfill the primary objectives of documenting the presence or absence of Willow Flycatchers, and determining their status as territorial versus migrant. This protocol primarily is a call-playback technique, a proven method for eliciting response from nearby Willow Flycatchers (Seutin, 1987; Craig and others, 1992), both territorial and migrants. The premise of the call-playback technique is to simulate a territorial intrusion by another Willow Flycatcher, which generally will elicit a defensive response by the territorial bird, increasing its detectability. At each site, surveyors should broadcast a series of recorded Willow Flycatcher *fitz-bews* and *britts*, and look and listen for responses. In addition to maximizing the likelihood of detecting nearby flycatchers, this method also allows for positive identification by comparing the responding bird's vocalizations to the known Willow Flycatcher recording.

Documenting Presence/Absence—Begin surveys as soon as there is enough light to safely walk (about 1 hour before sunrise) and end by about 0900–1030 hours, depending on the temperature, wind, rain, background noise, and other environmental factors. Use your best professional judgment whether to conduct surveys that day based on local field conditions. If the detectability of flycatchers is being reduced by environmental factors, surveys planned for that day should be postponed until conditions improve. If observers are camped in or near potential Willow Flycatcher habitat, afternoons and evenings can be spent doing site reconnaissance and planning a survey strategy for the following morning. If camped immediately adjacent to survey sites, surveyors can awaken early and listen for flycatchers singing during the predawn period (0330–0500 hours), when territorial males often sing loudly.

Conduct surveys from within rather than from the perimeter of the sites, while limiting the breaking of vegetation or damaging the habitat. If surveys cannot be conducted from within the habitat, walk along the perimeter and enter the patch at intervals to broadcast the vocalizations and listen for responses. Flycatchers often respond most strongly if the recording is played from within the habitat and territory, rather than from the periphery. In addition, it can be surprisingly difficult to hear singing Willow Flycatchers that are even a short distance away amidst the noise generated by other singing and calling birds, roads, noisy streams, and other extraneous sounds. Therefore, it is preferable to survey from within the habitat, but always move carefully to avoid disturbing habitat or nests. Surveying from the periphery should not be conducted only for the sake of convenience, but is allowable for narrow linear reaches or when absolutely necessary due to safety considerations.

Because flycatchers may be clustered within only a portion of a habitat patch, it is critical to survey all suitable habitat within the patch. Small linear sites may be thoroughly covered by a single transect through the patch. For larger sites, choose a systematic survey path that assures complete patch coverage throughout the length and breadth of the site. This may require multiple straight transects, serpentine, zig-zag, or criss-cross routes. Aerial photographs and previous survey forms are valuable tools to help plan and conduct surveys, and to assure complete coverage. Always move carefully through the habitat to avoid disturbing vegetation or nests.

Initially approach each site and stand quietly for 1–2 minutes or longer, listening for spontaneously singing flycatchers. A period of quiet listening is important because it helps acclimate surveyors to background noises that can be quite loud due to roads, aircraft, machinery, waterways, and other sounds. It also allows surveyors to recognize and shift attention away from the songs and calls of other bird species, letting them focus on listening for flycatchers. Although it happens rarely, some singing Willow Flycatchers will actually stop vocalizing and approach quietly in response to a broadcast song, perhaps in an effort to locate what they perceive as an intruding male. Therefore, playing a recording before listening for singing individuals has at least some potential of reducing detectability.

If you do not hear singing flycatchers during the initial listening period, broadcast the Willow Flycatcher song recording for 10–15 seconds; then listen for approximately 1 minute for a response. Repeat this procedure (including a 10-second quiet pre-broadcast listening period) every 20–30 m throughout each survey site, more often if background noise is loud. The recording should be played at about the volume of natural bird calls, and not so loud as to cause distortion of the broadcast. We recommend that the playback recording include a series of *fitz-bews* interspersed with several *britts*.

Response to the broadcast call could take several forms. Early in the breeding season (approximately May–mid-June), a responding Willow Flycatcher will usually move toward the observer and *fitz-bew* or *whitt* from within or at the top of vegetation. Territorial Willow Flycatchers almost always vocalize strongly when a recording is played in their territory early in the season. If there are several flycatchers present in an area, some or all may start singing after hearing the recording or the first responding individual. Flycatchers can often hear the recording from far away but will not usually move outside of their territory, so listen for distant responses. Also, stay alert and listen for flycatchers vocalizing behind you that may not have responded when you were first in their territory. Another common flycatcher response is alarm calls (*whitts*) or interaction twitters from within nearby vegetation, particularly once nesting has begun. Willow Flycatchers will often sing after a period of *whitting* in response to a recording, so surveyors hearing *whitts* should remain in the area and quietly listen for *fitz-bews* for several minutes. Because some flycatchers may initially respond by approaching quietly, particularly during periods 2 and 3, it is critical to watch carefully for responding birds.

If you detect flycatchers that appear particularly agitated, it is possible that you are in close proximity to their nest. Agitated flycatchers may swoop down at the surveyor, snap their beaks, and otherwise appear distressed. Exercise extreme caution so as to not accidently disturb the nest, and move slowly away from the immediate area.

For the purpose of this protocol, detection of a *fitz-bew* song is essential to identify a bird as a Willow Flycatcher. Similar appearing species (including other *Empidonax* flycatchers) occur as migrants, and even breeders, at potential Willow Flycatcher sites. A few of these other species may even approach a broadcast Willow Flycatcher song and respond with vocalizations. In order to standardize interpretation of survey results and assure a high degree of confidence in surveys conducted by biologists of varying experience and skill, positive identification must be based on detection of the Willow Flycatcher's most unique characteristic—its song. It is important to remember that the *whitt* call is not unique to Willow Flycatchers, and therefore cannot serve as the basis of a positive identification. However, *whitts* are extremely useful for locating flycatchers and identifying areas needing follow-up visits. Loud, strong *whitting* may indicate a nearby nest, dictating that surveyors exercise extra caution moving through the area.

Whenever a verified or suspected Willow Flycatcher is detected, be careful not to overplay the song recording. Excessive playing could divert the bird from normal breeding activities or attract the attention of predators and brood parasites. Wildlife management agencies may consider overplaying the recording as "harassment" of the flycatcher, and this is not needed to verify species identification. Although flycatchers usually sing repeatedly once prompted, even a single *fitz-bew* is sufficient for verification. If you have played a recording several times and a bird has approached but has not *fitz-bewed*, do not continue playing the recording. If a potential Willow Flycatcher responds, approaches or *whitts* but does not sing, it is best to carefully back away and wait quietly. If it is a Willow Flycatcher, it probably will sing within a short time (5–10 minutes). Another option is to return to the same site early the following morning to listen for or attempt to elicit singing again. If you are still uncertain, record the location with your GPS, record comments on the survey form, and follow-up on the detection during subsequent surveys. If possible, request the assistance of an experienced surveyor to determine positive identification.

If more habitat remains to be surveyed, continue onward once a flycatcher is detected and verified. In doing so, move 30–40 m past the current detection before again playing the recording, and try to avoid double-counting flycatchers that have already responded. Willow Flycatchers, particularly unpaired males, may follow the broadcast song for 50 m or more.

Looking For and Recording Color Bands.—Several research projects have involved the capture and banding of Willow Flycatchers at breeding sites across the Southwest. In such projects, flycatchers are banded with one or more small colored leg bands, including a federal numbered band. As a result, surveyors may find color-banded individuals at their survey sites, and identification and reporting of the band combination can provide important data on flycatcher movements, survivorship, and site fidelity.

To look for bands, move to get a good view of the flycatcher's legs. This may be difficult in dense vegetation, but flycatchers commonly perch on more exposed branches at the edges of their territory or habitat patch. If bands are seen, carefully note the band colors. If there is more than one band on a leg, differentiate the top (farthest up the leg) from the bottom (closest to the foot), and those on the bird's left leg versus the right leg. If you are unsure of the color, do not guess. Instead, record the color as unknown. Incorrect color-band data are worse than incomplete data, so only record colors of which you are certain. The fact that a banded bird was seen, even without being certain of its color combination, is very important information. Record the color-band information on the survey form, and report the sighting to the appropriate State or Federal contact as soon as you return from the survey that day.

Determining the Number of Territories and Pairs.—Accurately determining the number of breeding territories and pairs can be more difficult than determining simple presence or absence. Flycatcher habitat is usually so dense that visual detections are difficult, and seeing more than one bird at a time is often impossible. Flycatchers sing from multiple song perches within their territories, and may be mistaken for more than one flycatcher. A flycatcher responding to or following a surveyor playing a recording may move considerable distances in a patch and thus be counted more than once. Territorial male flycatchers often sing strongly, but so do many migrants and some females, particularly in response to call-playback (Seutin, 1987; Unitt, 1987; Sogge and others, 1997b). Rangewide, many territorial male flycatchers are unmated, particularly those in small breeding groups. For these reasons, each singing flycatcher may not represent a territory or a mated pair. Following the established survey protocol and carefully observing flycatcher behavior can help determine if you have detected migrants, territorial birds, breeders, unmated birds, or pairs.

Given sufficient time, effort and observation, it is usually possible to approximate the number of territories and pairs. First, listen carefully for simultaneously singing flycatchers. Note the general location of each bird—especially concurrently singing individuals—on aerial photographs, map, or a site sketch. Spend some time watching each flycatcher to determine approximate boundaries of its territory, and how it interacts with other flycatchers. If one or more singing

birds stay primarily in mutually exclusive areas, they can be considered as separate territories. To determine if a flycatcher is paired, watch for interactions within a territory. Refer to the section, "Determining Breeding Status" for signs of pairing and breeding activity. Do not report a territorial male as a pair unless you observe one or more of the signs listed below. In some cases, it may be possible only to estimate the number of singing individuals. In other cases, it may take multiple site visits to differentiate territories or pairs.

Determining Breeding Status.—One way to determine if the flycatchers found at a particular site are migrants or territorial is to find out if they are still present during the "non-migrant" period, which generally is from about June 15 to July 20 (Unitt, 1987). A Willow Flycatcher found during this time probably is a territorial bird, although there is a small chance it could be a non-territorial floater (Paxton and others, 2007). If the management question is simply whether the site is a potential breeding area, documenting the presence of a territorial flycatcher during the non-migrant period may meet all survey objectives, and the site may not need to be resurveyed during the remainder of that breeding season.

However, in some cases, surveyors will be interested in knowing not only if territorial Southwestern Willow Flycatchers are present at a site, but also whether breeding or nesting efforts are taking place. Some males maintain territories well into July yet never succeed in attracting a mate, so unpaired males are not uncommon (McLeod and others, 2007; Ellis and others, 2008; Ahlers and Moore, 2009). Thus, an assumption that each singing male represents a breeding pair may not be well founded, especially in small populations. If it is important to determine whether a pair is present and breeding in that territory, move a short distance away from where the bird was sighted, find a good vantage point, and sit or lie quietly to watch for evidence of breeding. Signs of breeding activity include:

a. observation of another unchallenged Willow Flycatcher in the immediate vicinity (indicates possible pair);
b. *whitt* calls between nearby flycatchers (indicates possible pair);
c. interaction twitter calls between nearby flycatchers (indicates possible pair);
d. countersinging or physical aggression against another flycatcher or bird species (suggests territorial defense);
e. physical aggression against cowbirds (suggests nest defense);
f. observation of Willow Flycatchers copulating (verifies attempted breeding);
g. flycatcher carrying nest material (verifies nesting attempt, but not nest outcome);
h. flycatcher carrying food or fecal sac (verifies nest with young, but not nest outcome);
i. locating an active nest (verifies nesting). Recall that general survey permits do not authorize nest searching or monitoring, and see section, "Special Considerations";
j. observation of adult flycatchers feeding fledged young (verifies successful nesting).

You may be able to detect flycatcher nesting activity, especially once the chicks are being fed. Adults feed chicks at rates of as many as 30 times per hour, and the repeated trips to the nest tree or bush are often quite evident. Be sure to note on the flycatcher survey form any breeding activity that is observed, including detailed descriptions of the number of birds, and specific activities observed. Also note the location of breeding activities on an aerial photograph, map, or sketch of the area.

The number of flycatchers found at a site also can provide a clue as to whether they are migrants or territorial birds. Early season detections of single, isolated Willow Flycatchers often turn out to be migrants. However, discovery of a number of Willow Flycatchers at one site usually leads to verification that at least some of them remain as local breeders. This underscores the importance of completing a thorough survey of each site to be confident of the approximate number of flycatchers present.

In some cases, regardless of the time and diligence of your efforts, it will be difficult to determine the actual breeding status of a territorial male. In these instances, use your best professional judgment, or request the assistance of an experienced surveyor or an agency flycatcher coordinator to interpret your observations regarding breeding status.

Reporting Results.—There is little value in conducting formal surveys if the data are not recorded and submitted. Fill in all appropriate information on the Willow Flycatcher survey form while still in the field, and mark the location of detections on a copy of the USGS topographic map. Make a habit of reviewing the form before you leave any site—trying to remember specific information and recording it later can lead to missing and inaccurate data. Note the location of the sighting on an aerial photograph or sketch of the site. Attaching photographs of the habitat also is useful. Whenever a Willow Flycatcher territory or nest site is confirmed, notify the USFWS or appropriate State wildlife agency as soon as you return from the field. The immediate reporting of flycatcher detections or nests may differ among USFWS regions and States—discuss these reporting procedures with your respective State and USFWS flycatcher coordinators.

Complete a survey form (appendix 1) for each site surveyed, whether or not flycatchers are detected. "Negative data" (that is, a lack of detections) are important to document the absence of Willow Flycatchers and help determine what areas have already been surveyed. Make and retain a copy of each survey form, and submit the original or a legible copy. Electronic copies of the survey forms also are acceptable and are available online (http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/). All survey forms must be submitted to the USFWS and the appropriate State wildlife agency by the specified deadline identified in your permits. Timely submission of survey data is a permit requirement, and will ensure the information is included in annual statewide and regional reports.

Special Considerations

To avoid adverse impacts to Willow Flycatchers, follow these guidelines when performing all surveys:

1. Obtain all necessary Federal, State, and agency permits and permissions prior to conducting any surveys. Failure to do so leaves you liable for violation of the Endangered Species Act, various State laws, and prosecution for trespass.
2. Do not play the recording more than necessary or needlessly elicit vocal responses once Willow Flycatchers have been located and verified. This may distract territorial birds from caring for eggs or young, or defending their territory. If flycatchers are vocalizing upon arrival at the site, and your objective is to determine their presence or absence at a particular site—there is no need to play the recording. Excessive playing of the recording also may attract the attention of predators or brood parasites. Stop playing the survey recording as soon as you have confirmed the presence of a Willow Flycatcher, and do not play the recording again until you have moved 30–40 m to the next survey location.
3. Proceed cautiously while moving through Willow Flycatcher habitat. Continuously check the area around you to avoid disturbance to nests of Willow Flycatchers and other species. Do not break understory vegetation, even dead branches, to create a path through the surveyed habitat.
4. Do not approach known or suspected nests. Nest searches and monitoring require specific State and Federal permits, have their own specialized methodologies (Rourke and others, 1999), and are not intended to be a part of this survey protocol.
5. If you find yourself close to a known or suspected nest, move away slowly to avoid startling the birds or force-fledging the young. Avoid physical contact with the nest or nest tree, to prevent physical disturbance and leaving a scent. Do not leave the nest area by the same route that you approached. This leaves a “dead end” trail that could guide a potential predator to the nest/nest tree. If nest monitoring is a component of the study, but you are not specifically permitted to monitor the nest, store a waypoint with your GPS, affix flagging to a nearby tree at least 10 m away, and record the compass bearing to the nest on the flagging. Report your findings to an agency flycatcher coordinator or a biologist who is permitted to monitor nests.
6. If you use flagging to mark an area where flycatchers are found, use it conservatively and make certain the flagging is not near an active nest. Check with the property owner or land-management agency before flagging to be sure that similar flagging is not being used for other purposes in the area. Unless conducting specific and authorized/permitted nest monitoring, flagging should be placed no closer than 10 m to any nest. Keep flagging inconspicuous from general public view to avoid attracting people or animals to an occupied site, and remove it at the end of the breeding season.
7. Watch for and note the presence of potential nest predators, particularly birds, such as Common Ravens (*Corvus corax*), American Crows (*Corvus brachyrhynchos*), jays, and magpies. If such predators are in the immediate vicinity, wait for them to leave before playing the recording.
8. Although cowbird parasitism is no longer considered among the primary threats to flycatcher conservation it remains useful to note high concentrations of cowbirds in the comment section of the survey form. While conducting surveys, avoid broadcasting the flycatcher vocalizations if cowbirds are nearby, especially if you believe you may be close to an active flycatcher territory. The intent of not broadcasting flycatcher vocalizations is to reduce the potential for attracting cowbirds to a flycatcher territory or making flycatcher nests more detectable to cowbirds.
9. Non-indigenous plants and animals can pose a significant threat to flycatcher habitat and may be unintentionally spread by field personnel, including those conducting flycatcher surveys. Simple avoidance and sanitation measures can help prevent the spread of these organisms to other environments. To avoid being a carrier of non-indigenous plants or animals from one field site to another visually inspect and clean your clothing, gear, and vehicles before moving to a different field site. A detailed description on how to prevent and control the spread of these species is available by visiting the Hazard Analysis and Critical Control Point Planning for Natural Resource Management web site (http://www.haccp-nrm.org). One species of particular interest is the tamarisk leaf-beetle (*Diorhabda* spp.). If you observe defoliation of saltcedar while conducting flycatcher surveys and believe that *Diorhabda* beetles may be responsible, notify your USFWS coordinator immediately. Other non-native species of concern in survey locations are the quagga mussel (*Dreissena rostriformis bugensis*), cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens*), giant salvinia (*Salvinia molesta*), water milfoil (*Myriophyllum spicatum*), parrot’s feather (*M. aquaticum*), and amphibian chytrid fungus (*Batrachochytrium dendrobatidis*).

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Appendix 1. Willow Flycatcher Survey and Detection Form

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name_____ State_____ County _____
USGS Quad Name _____ Elevation _____ (meters)
Creek, River, Wetland, or Lake Name_____
Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? Yes___ No____

Survey Coordinates: Start: E_____ N_____ UTM Datum_____(See instructions)
Stop: E_____ N_____ UTM Zone _____
If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

***** Fill in additional site information on back of this page *****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s)	Date						# Birds	Sex	UTM E	UTM N
	Start									
	Stop									
	Total hrs ___									
Survey # 2 Observer(s)	Date						# Birds	Sex	UTM E	UTM N
	Start									
	Stop									
	Total hrs ___									
Survey # 3 Observer(s)	Date						# Birds	Sex	UTM E	UTM N
	Start									
	Stop									
	Total hrs ___									
Survey # 4 Observer(s)	Date						# Birds	Sex	UTM E	UTM N
	Start									
	Stop									
	Total hrs ___									
Survey # 5 Observer(s)	Date						# Birds	Sex	UTM E	UTM N
	Start									
	Stop									
	Total hrs ___									
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs_____		Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any Willow Flycatchers color-banded? Yes___ No ___ If yes, report color combination(s) in the comments section on back of form and report to USFWS.				

Reporting Individual _____ Date Report Completed_____ _____
US Fish and Wildlife Service Permit #_____State Wildlife Agency Permit #_____
Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual _____Phone # _____
Affiliation _____ E-mail _____
Site Name_____Date Report Completed _____

Did you verify that this site name is consistent with that used in previous years? Yes ____ No _____ Not Applicable ___
If site name is different, what name(s) was used in the past?_____
If site was surveyed last year, did you survey the same general area this year? Yes ____ No ____ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes ____ No ____ If no, summarize below.

Management Authority for Survey Area : Federal____ Municipal/County ____ State ____ Tribal ____ Private ____
Name of Management Entity or Owner (e.g., Tonto National Forest) _____

Length of area surveyed: _____ (meters)

Vegetation Characteristics: Mark the category that best describes the predominant tree/shrub foliar layer at this site (check one):

_____ Native broadleaf plants (entirely or almost entirely, > 90% native, includes high-elevation willow)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
_____

Average height of canopy (Do not include a range): _____ (meters)

Attach copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections.
Attach sketch or aerial photo showing site location, patch shape, survey route, location of any WIFLs or WIFL nests detected.
Attach photos of the interior of the patch, exterior of the patch, and overall site; describe any unique habitat features.

Comments (attach additional sheets if necessary)
_____
_____
_____
_____
_____
_____

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM N	UTM E	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Appendix 2. Willow Flycatcher Survey Continuation Sheet / Territory Summary Table

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher Survey Continuation Sheet

(For reporting additional detections and territories; append to Survey and Detection form)

Reporting Individual _____ Phone # _____
Affiliation _____ E-mail _____
Site Name_____ Date Report Completed _____

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Comments_____

Appendix 3. Instructions for Completing the Willow Flycatcher Survey and Detection Form and the Survey Continuation Sheet

These instructions are provided as guidance for completing the standard survey form. It is particularly important to provide the correct type and format of information for each field. Complete and submit your survey forms to both the appropriate State Willow Flycatcher coordinator and the U.S. Fish and Wildlife Service (USFWS) by September 1 of the survey year. You also may complete forms digitally (Microsoft© Word or Excel) and submit them via email with attached or embedded topographic maps and photographs.

Page 1 of Survey Form

Site Name. Standardized site names are provided by the flycatcher survey coordinators for each State and should be consistent with the naming of other sites that might be in the area. If the site is new, work with your State or USFWS flycatcher coordinator to determine suitable site names before the beginning of the survey season. If the site was previously surveyed, use the site name from previous years (which can be obtained from the State or USFWS flycatcher coordinator). If you are uncertain if the site was previously surveyed, contact your State or USFWS flycatcher coordinator.

USGS Quad Name. Provide the full quad name, as shown on the appropriate standard 7.5-minute topographic maps.

Creek, River, Wetland, or Lake Name. Give the name of the riparian feature, such as the lake or watercourse, where the survey is being conducted.

Survey Coordinates. Provide the start and end points of the survey, which will indicate the linear, straight-line extent of survey area, based on Universal Transverse Mercator coordinates (UTMs). California surveyors only: provide latitude/longitude geographic coordinates instead of UTMs in the UTM fields and identify them as such. If the start and end points of the survey changed significantly among visits, enter separate coordinates for each survey in the comments section on the back of the survey sheet. Note that we do not need the coordinates for the detailed path taken by the surveyor(s).

Datum. Indicate the datum in which the coordinates are expressed: NAD27, WGS84, or NAD83. The datum can be found in the settings of most GPS units. Note that Arizona prefers NAD27 and New Mexico prefers NAD83.

Zone. Provide the appropriate UTM zone for the site, which is displayed along with the coordinates by most GPS units. Zones for California are 10, 11, or 12. The zone for Arizona is 12. Zones for New Mexico are 12 or 13.

Survey #. Survey 1 – 5. See the protocol for an explanation of the number of required visits for each survey period. **Note:** A survey is defined as a complete protocol-based survey that occurs over no more than 1 day. If a site is so large as to require more than a single day to survey, consider splitting the site into multiple subsites and use separate survey forms for each. Casual site visits, pre-season or supplemental visits, or follow-up visits to check on the status of a territory should not be listed in this column, but should be documented in the Comments section on page 2 or in the survey continuation sheet.

Date. Indicate the date that the survey was conducted, using the format mm/dd/yyyy.

Start and **Stop.** Start and stop time of the survey, given in 24-hour format (e.g., 1600 hours rather than 4:00 p.m.).

Total hours. The duration of time (in hours) spent surveying the site, rounded to the nearest tenth (0.1) hour. For single-observer surveys, or when multiple observers stay together throughout the survey, total the number of hours from survey start to end. If two or more observers surveyed sections of the site concurrently and independently, sum the number of hours each observer spent surveying the site.

Number of Adult WIFLs. The total number of individual adult Willow Flycatchers detected during this particular survey. Do not count nestlings or recently fledged birds.

Number of Pairs. The number of breeding pairs. Do not assume that any bird is paired; designation of birds as paired should be based only on direct evidence of breeding behaviors described in the protocol. If there is strong evidence that the detected bird is unpaired, enter “0”. If it is unknown whether a territorial bird is paired, enter “–”. Note that the estimated number of pairs can change over the course of a season.

Number of Territories. Provide your best estimate of the number of territories, defined as a discrete area defended by a resident single bird or pair. This is usually evidenced by the presence of a singing male, and possibly one or more mates. Note that the estimated number of territories may change over the course of a season.

Nest(s) Found? Yes or No. If yes, indicate the number of nests. Renests are included in this total.

Comments about this survey. Describe bird behavior, evidence of pairs or breeding, evidence of nest building, evidence of nestlings/fledglings, nesting, vocalizations (e.g., interaction twitter calls, *whitts*, *britts*, *wheeos*, *fitz-bews*/countersinging), potential threats (e.g., livestock, cowbirds, saltcedar leaf beetles [*Diorhabda* spp.] etc.). If *Diorhabda* beetles are observed, contact your USFWS and State flycatcher coordinator immediately. Please be aware that permits are needed for nest monitoring.

GPS Coordinates for WIFL Detections. Provide the number of birds (e.g., unpaired, paired, or groups of birds) and corresponding UTMs. If known, provide the sex of individuals.

Overall Site Summary. For each of these columns, provide your best estimate of the overall total for the season. Do not simply total the numbers in each column. In some cases where consistent numbers were detected on each survey, the overall summary is easy to determine. In cases where numbers varied substantially among the different surveys, use professional judgment and logic to estimate the most likely number of adults, pairs, and territories that were consistently present. Be careful not to double count individuals. Record only territorial adult Southwestern Willow Flycatchers, do not include migrants, nestlings, or fledglings in the overall summary. In complex cases, consult with your State or USFWS flycatcher coordinator.

Total Survey Hours. The sum of all hours spent surveying the site.

Were any WIFLs color-banded? Circle or highlight "Yes" or "No". If yes, report the sighting and color combination (if known) in the comments section on back of form, and contact your USFWS coordinator within 48 hours after returning from the survey. Note that identifying colors of bands is difficult and might require follow-up visits by experienced surveyors.

Reporting Individual. Indicate the full first and last name of the reporting individual.

Date Report Completed. Provide the date the form was completed in mm/dd/yyyy format.

U.S. Fish and Wildlife Service Permit #. List the full number of the required federal permit under which the survey was completed.

State Wildlife Agency Permit #. If a State permit is required by the State in which the survey was completed, provide the full number of the State permit. State permits are required for Arizona and California. State permits are recommended for New Mexico.

Page 2 of Survey Form

Affiliation. Provide the full name of the agency or other affiliation (which is usually the employer) of the reporting individual.

Phone Number. Self-explanatory; include the area code.

E-mail. Self-explanatory.

Was this site surveyed in a previous year? Indicate "Yes", "No", or "Unknown."

Did you verify that this site name is consistent with that used in previous years? Indicate "Yes" or "No". This can be determined by checking survey forms from previous years or consulting with agency flycatcher coordinators.

If site name is different, what name(s) was used in the past? Enter the full site name that was used in previous years.

If site was surveyed last year, did you survey the same general area this year? Indicate "Yes" or "No". If no, indicate the reason and how the survey varied in the Comments section.

Did you survey the same general area during each visit to this site this year? If no, indicate the reason in the Comments section and delineate the differing route of each survey on the topographical map.

Management Authority for Survey Area. Mark the appropriate management authority.

Name of Management Entity or Owner (e.g., Tonto National Forest). Provide the name of the organization or person(s) responsible for management of the survey site.

Length of area surveyed. Estimate the linear straight-line distance of the length of the area surveyed, in kilometers. This is not an estimate of the total distance walked throughout the survey site. Do not provide a range of distances.

Vegetation Characteristics: Mark only one of the categories that best describes the predominant tree/shrub foliar layer at the site.

Native broadleaf habitat is composed of entirely or almost entirely (i.e., > 90%) native broadleaf plants.

Mostly native habitat is composed of 50–90% native plants with some (i.e., 10–50%) non-native plants.

Mostly exotic habitat is composed of 50–90% non-native plants with some (i.e., 10–50%) native plants.

Exotic/introduced habitat is composed entirely or almost entirely (i.e., > 90%) of non-native plants.

Identify the 2–3 predominant tree/shrub species in order of dominance. Identify by scientific name.

Average height of canopy. Provide the best estimate of the average height of the top of the canopy throughout the patch. Although canopy height can vary, give only a single (not a range) overall height estimate.

Attach the following: (1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections; (2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests; (3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments. Include the flycatcher territory number and GPS location. You also may include a compact disc of photographs.

Comments. Include any information that supports estimates of total territory numbers and breeding status. You may provide additional information on bird behavior, banded birds, evidence of pairs or breeding, nesting, potential threats (e.g., livestock, cowbirds, saltcedar leaf beetles [*Diorhabda* spp.] etc.), and changes in survey length and route throughout the season. Attach additional pages or use the continuation sheet if needed.

Table. If Willow Flycatchers are detected, complete the table at the bottom of the form. Identify flycatchers by territory number and include the dates detected, UTMs, whether or not pairs were detected, and whether or not nests were located. Also describe the observation. For example, the surveyor might have observed and heard a bird *fitz-bew* from an exposed perch, heard and observed two birds interacting and eliciting a twitter call, heard a bird *fitz-bew* while observing another carrying nesting material, heard birds from territory 1 and 2 countersinging, etc. This information provides supporting information for territory and breeding status. Use the continuation sheet if needed.

Appendix 4. Example of a Completed Willow Flycatcher Survey and Detection Form (with map)

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **DL-08** State: **New Mexico** County: **Socorro**

USGS Quad Name: **Paraje Well** Elevation: **1,356** (meters)

Creek, River, or Lake Name: **Rio Grande**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E **306,009** N **3,715,506** UTM Datum: **NAD 83** (See instructions)

Stop: E **304,339** N **3,711,922** UTM Zone: **13**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	5/24/2009						1	M	305,276	3,714,926
D. Savage	Start:					Suitable breeding habitat dispersed throughout site. WIFLs were very vocal, and covering large areas. No obvious signs of pairing were observed. Approximately 10 head of cattle were found within this site.	1	M	305,131	3,714,628
	5:45	5	0	5	N		1	M	305,191	3,714,778
	Stop:						1	M	305,394	3,715,009
	10:15						1	M	305,084	3,714,732
	Total hrs:									
	4.5									
Survey # 2	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/10/2009						1	M	305,276	3,714,926
S. Kennedy	Start:					Portions of site are flooded, 1-2 ft deep. Two males found during 1st survey appear unpaired. Three pairs confirmed based on nesting, and another pair suspected based on vocal interactions and nonaggressive behavior with another flycatcher. Two additional territories (1 pair and 1 unpaired male) found during this survey.	1	M	305,131	3,714,628
	6:00	11	4	7	Y (3)		2	M/F	305,191	714,778
	Stop:						2	M/F	305,394	3,715,009
	10:15						2	M/F	305,084	3,714,732
	Total hrs:						2	M/F	305,001	3,714,640
	4.3						1	M	305,010	3,714,524
Survey # 3	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/21/2009						1	M	305,276	3,714,926
S. Kennedy	Start:					Portions of site still flooded. All territories found in Survey 2 are still active. The two males found during Surveys #1 and #2, still believed to be unpaired. All other territories are believed to be paired. Several cows observed in vicinity of active territories.	1	M	305,131	3,714,628
	5:30	12	5	7	Y (4)		2	M/F	305,191	3,714,778
	Stop:						2	M/F	305,394	3,715,009
	10:00						2	M/F	305,084	3,714,732
	Total hrs:						2	M/F	305,001	3,714,640
	4.5						2	M/F	305,010	3,714,524
Survey # 4	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/1/2009						1	M	305,276	3,714,926
D. Moore	Start:					Site is no longer flooded, but saturated soils persist throughout most of site. No change in territory numbers or status. All SWFL pairs very quiet - only a few whits and fitz-bews. Light rain over night, vegetation was saturated early in the morning. Lots of mosquitos!	1	M	305,131	3,714,628
	6:00	12	5	7	Y (4)		2	M/F	305,191	3,714,778
	Stop:						2	M/F	305,394	3,715,009
	10:00						2	M/F	305,084	3,714,732
	Total hrs:						2	M/F	305,001	3,714,640
	4.0						2	M/F	305,010	3,714,524
Survey # 5	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/10/2009						1	M	305,131	3,714,628
D. Moore	Start:					Site beginning to dry out, some portions still muddy. One of the unpaired males could not be detected. It was hard to hear SWFLs due to breezy conditions early in the morning.	2	M/F	305,191	3,714,778
	5:30	11	5	6	Y (4)		2	M/F	305,394	3,715,009
	Stop:						2	M/F	305,084	3,714,732
	10:00						2	M/F	305,001	3,714,640
	Total hrs:						2	M/F	305,010	3,714,524
	4.5									
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.		Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No **X**				
Total survey hrs:	21.8	12	5	7	4	If yes, report color combination(s) in the comments section on back of form and report to USFWS.				

Reporting Individual: **Darrell Ahlers** Date Report Completed: **8/20/2009**

US Fish & Wildlife Service Permit #: **TE819475-2** State Wildlife Agency Permit #: **N/A**

Submit ***form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.***

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Darrell Ahlers** Phone # **(303) 445-2233**
Affiliation **Bureau of Reclamation** E-mail dahlers@usbr.gov
Site Name **DL-08** Date report Completed **8/20/2009**
Was this site surveyed in a previous year? Yes__x__ No____ Unknown____
Did you verify that this site name is consistent with that used in previous yrs? Yes x No ____ Not Applicable ____
If name is different, what name(s) was used in the past? **Not applicable**
If site was surveyed last year, did you survey the same general area this year? Yes x No ____ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes x No ____ If no, summarize below.

Management Authority for Survey Area: Federal X Municipal/County ____ State ____ Tribal ____ Private ____
Name of Management Entity or Owner (e.g., Tonto National Forest) **Bureau of Reclamation**

Length of area surveyed: **2.5** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix Gooddingii, Populus spp., Tamarix spp.

Average height of canopy (Do not include a range): **6** (meters)

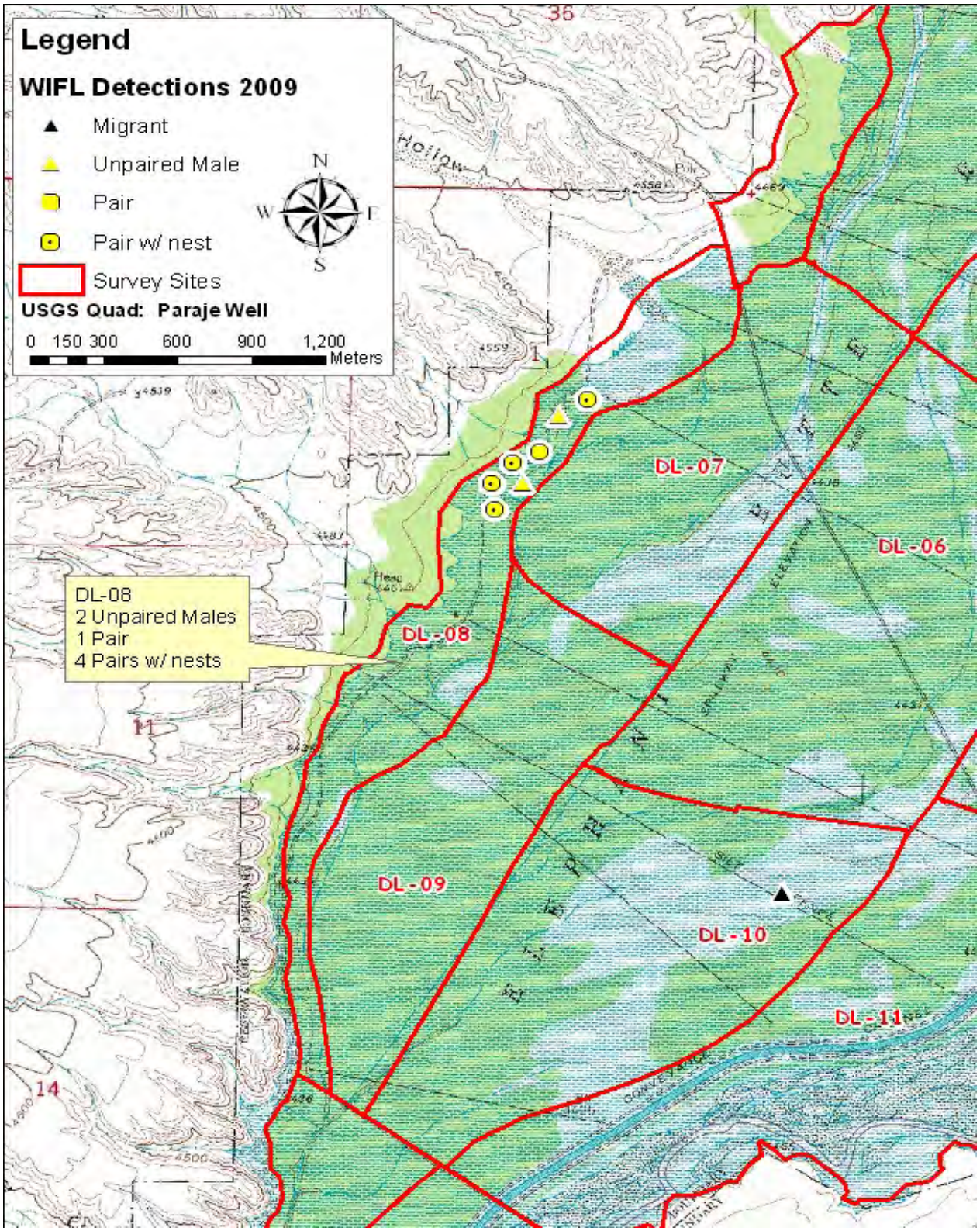
Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.
Great habitat with saturated or flooded soils throughout most of the site on 1st survey. Site began to dry by the end of the breeding season. SWFL territories are dominated by Gooddings willow, however Tamarix spp. tends to be increasing in density compared to previous years. Site is supported by flows from the Low Flow Conveyance Channel.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)
1 (Unpaired male)	5/24, 6/10,6/21,7/1	305,276	3,714,926	N	N	extended presence at site from 5/24 through 7/1, no evidence of pairing
2 (Unpaired male)	5/24, 6/10,6/21,7/1, 7/10	305,131	3,714,628	N	N	extended presence at site from 5/24 through 7/10, no evidence of pairing
3 (Pair)	5/24, 6/10,6/21,7/1, 7/10	305,191	3,714,778	Y	Y	Pair confirmed based on vocalizations and observation of unchallenged WIFL
4 (Pair w/nest)	5/24, 6/10,6/21,7/1, 7/10	305,394	3,715,009	Y	Y	Confirmed breeding status with nest
5 (Pair w/nest)	5/24, 6/10,6/21,7/1, 7/10	305,084	3,714,732	Y	Y	Confirmed breeding status with nest
6 (Pair w/nest)	6/10,6/21,7/1, 7/10	305,001	3,714,640	Y	Y	Confirmed breeding status with nest
7 (Pair w/nest)	6/10,6/21,7/1, 7/10	305,010	3,714,524	Y	N	Confirmed breeding status with nest

Attach additional sheets if necessary


Legend
WIFL Detections 2009
Migrant
Unpaired Male
Pair
Pair w/ nest
Survey Sites
USGS Quad: Paraje Well
0 150 300 600 900 1,200
Meters
N
W
E
S
DL-08
2 Unpaired Males
1 Pair
4 Pairs w/ nests
DL-06
DL-07
DL-08
DL-09
DL-10
DL-11

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For more information concerning the research in this report, contact
Mark Sogge
U.S. Geological Survey
2255 Gemini Drive,
Flagstaff, AZ 86001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

LEAST BELL'S VIREO SURVEY GUIDELINES

JAN 1 9 2001

The following suggested guidelines are provided to facilitate accurate assessments of the presence/absence of the State and federally endangered least Bell's vireo (*Vireo bellii pusillus*, vireo), to provide the Fish and Wildlife Service with sufficient information to adequately respond to requests for applicable Federal permits and licenses, and to fulfill our mandate to conserve and recover the species. Currently, a recovery permit pursuant to section 10(a)(1)(A) of the Endangered Species Act is not required to conduct presence/absence surveys for the vireo, as long as this protocol is utilized and vocalization tapes are not used. These guidelines include minor modifications to our February 1992 guidelines and provide clarification of what we have been verbally recommending.

1. Under normal circumstances, all riparian areas and any other potential vireo habitats should be surveyed at least eight (8) times during the period from April 10 to July 31. However, we may concur, on a case by case basis, with a reduced effort if unusual circumstances dictate that this is a prudent course of action. For instance, intensive surveys of small, marginal or extralimital habitats by experienced personnel may well result in defensible conclusions that eight (or more) individual survey are unnecessary. Under such unusual circumstances, we will consider requests for reductions in the prescribed number of individual surveys. In any case, site visits should be conducted at least 10 days apart to maximize the detection of, for instance, late and early arrivals, females, particularly "non vocal" birds of both sexes, and nesting pairs.

2. Although the period from April 10 to July 31 encompasses the period during which most vireo nesting activity occurs, eight surveys are generally sufficient to detect most (if not all) vireo adults in occupied habitats. Precise vireo censuses and estimations of home range likely will not be possible unless surveys are conducted outside of this time window. Although focused surveys conducted in accordance with these guidelines substantially reduce the risk of an unauthorized take* that could potentially occur as a result of land development or other projects, individual project proponents may wish to conduct surveys that are more rigorous than those that would otherwise result from strict adherence to these survey guidelines. If additional information (e.g., extent of occupied habitat, total numbers of adult and juvenile vireos in study area) is desired or necessary, surveys should be extended to August 31 and conducted in such a manner as to collect the data necessary to prepare reports that reflect the methods and standards established in the current scientific literature on this subject. In particular, information collected after July

15 will reflect a broader extent to the riparian habitat and other adjacent habitat types that the vireo typically utilizes during the latter phase of the breeding season, especially when the young become independent of the adults.

3. Surveys should be conducted by a qualified biologist familiar with the songs, whisper songs, calls, scolds, and plumage characteristics of adult and juvenile vireos. These skills are essential to maximize the probability of detecting vireos and to avoid potentially harassing the species in occupied habitats.

4. Surveys should be conducted between dawn and 11:00 a.m. Surveys should not be conducted during periods of excessive or abnormal cold, heat, wind, rain, or other inclement weather that individually or collectively may reduce the likelihood of detection.

5. Surveyors should not survey more than 3 linear kilometers or more than 50 hectares of habitat on any given survey day. Although surveyors should generally station themselves in the best possible locations to hear or see vireos, care should be taken not to disturb potential or actual vireo habitats and nests or the habitat of any sensitive or listed riparian species.

6. All vireo detections (e.g., vocalization points, areas used for foraging, etc.) should be recorded and subsequently plotted to estimate the location and extent of habitats utilized. These data should be mapped on the appropriate USGS quadrangle map.

7. Data pertaining to vireo status and distribution (e.g., numbers and locations of paired or unpaired territorial males, ages and sexes of all birds encountered) should be noted and recorded during each survey. In addition, surveyors should look for leg bands on vireo adults and juveniles if, in fact, it is possible to do so without disturbing or harassing the birds. If leg bands or other markers are observed, then surveyors should record and report the detection and associated circumstances to us by telephone, facsimile, or electronic mail as soon as possible. Reports should include the colors and relative locations of any and all bands detected, the age and sex of the marked bird, and the precise location of the detection.

8. The numbers and locations of all brown-headed cowbirds (*Molothrus ater*) detected within vireo territories should be recorded during each survey and subsequently reported to us. In addition, all detections of the State and federally endangered southwestern willow flycatcher (*Empidonax trallii extimus*, flycatcher) and State endangered yellow-billed cuckoo (*Coccyzus americanus*, cuckoo) should be recorded and reported. Any and all cuckoo and flycatcher adults, young, or nests should not be approached, and taped vocalizations of these species should not be used unless authorized in advance by scientific permits to take* issued by us (if appropriate) and the California Department of Fish and Game. Flycatcher presence/absence surveys require a recovery permit issued by us per section 10(a)(1)(A) of the Endangered Species Act.

9. To avoid the potential harassment of vireos, flycatchers, and cuckoos resulting from vireo surveys, other riparian species survey efforts, or multiple surveys within a given riparian habitat patch, detections of these three species should be reported to us as soon possible by telephone, facsimile, or electronic mail.

10. A final report (including maps) should be prepared that depicts survey dates and times and includes descriptions or accounts of the methods, locations, data and information identified in preceding sections.

11. This final report should be provided to us (at the letterhead address) and to the local office of the Department of Fish and Game within 45 calendar days following the completion of the survey effort. Additionally, a summary of all vireo survey efforts conducted during the calendar year should be submitted to each of the above offices by January 31 of the following year.

Should you have data or information to report, or have any questions regarding these survey guidelines, please contact Christine Moen (christine_moen@fws.gov), or Loren Hays (loren_hays@fws.gov) of my staff at (760) 431-9440 (facsimile 760-431-9624), or John Gustafson (jgustafs@hq.dfg.ca.gov) with the Department of Fish and Game at (916) 654-4260 (facsimile 916-653-1019).

Sincerely,

Andrew R. Yuen

Ken S. Berg
Acting Field Supervisor

* The term "take," as defined in Section 3, paragraph 18 of the Endangered Species Act of 1973 as amended (Act), means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. "Take" (specifically "harass") is further defined to mean "an act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, and sheltering" "Take" (specifically "harm") is further defined as an "act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding feeding or sheltering" (50 CFR 17.3). Please be advised that the take of the vireo and other listed species is prohibited by section 9 of the Act unless authorized by permits issued pursuant to section 7 or section 10 to the Act.

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SURVEY PROTOCOL FOR THE ARROYO TOAD

May 19,1999

The following guidelines are provided to facilitate accurate assessments of the presence or absence of the federally listed endangered arroyo toad (Bufo microscaphus californicus). Accurate survey data are needed to provide the U.S. Fish and Wildlife Service (Service) with sufficient information to respond to requests for Federal permits and licenses. Currently, surveys performed in accordance with these guidelines will not require a permit under section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended. However, permits to conduct arroyo toad surveys may be required in the future. In all cases, extreme care must be taken when conducting surveys to avoid inadvertently injuring or killing toads, or damaging their habitat. These guidelines are not meant to be used for long-term monitoring of projects or the overall status of populations; guidelines for such monitoring efforts should be developed with the assistance of the Service for specific cases.

The Service recommends that the following survey guidelines be used to determine if arroyo toads are present in the vicinity of proposed activities, but cautions that negative surveys during a year of severe weather (e.g., drought, extended rainy season, cold weather) may be inconclusive. Contact the appropriate field office (addresses and phone numbers below) before conducting surveys for additional information.

1) Areas within one kilometer (1 km) of arroyo toad sites (documented by the presence of eggs, larvae, juveniles, or adults) that have suitable habitat shall be presumed to have arroyo toads.

2) If the sole purpose of surveys is to determine the presence or absence of the arroyo toad, surveys shall cease immediately upon determination that arroyo toad eggs, larvae, juveniles, or adults are present in the survey area. The arroyo toad locations shall be recorded on a USGS 1:24,000 (7.5 minute) map

3) To be reasonably confident that arroyo toads are not present at a site, at least six (6) surveys must be conducted during the breeding season, which generally occurs from March 15 through July 1, with at least seven (7) days between surveys. Extreme weather conditions can cause variations in the breeding season; these conditions should be fully considered when developing a schedule of surveys. If uncertainty exists as to whether environmental conditions are suitable (see guideline #9 below), contact the appropriate field office for further information.

4) At least one survey shall be conducted per month during April, May, and June.

5) Surveys shall include both daytime and nighttime components conducted within the same 24-hour period (except when arroyo toads have been detected in the survey area).

6) Daytime surveys shall include an assessment and mapping of: a) arroyo toad habitat suitability, and b) the presence of arroyo toad eggs, larvae, or juveniles. Extreme caution must be used to avoid crushing arroyo toads that are burrowed into sand bars and banks, or lodged in depressions in the substrate (sand, gravel, soil). Arroyo toads will use trails and roads up to

several hundred meters from breeding sites while foraging; therefore, caution must be taken to not disturb, injure, or kill arroyo toads when using these roads and trails.

7) Daytime surveys shall be conducted by walking slowly along stream margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae, and juveniles. If necessary, surveyors may walk within the stream, taking care not to disturb or create silt deposits within breeding pools. If stream crossings are necessary, these should be on the downstream ends of potential breeding pools or in fast-flowing channels to minimize the likelihood of stirring up silt deposits. Arroyo toad eggs are usually laid in shallow water (less than four inches deep), and are susceptible to being smothered by silt that may be raised by walking in or across breeding pools.

8) Nighttime surveys (assuming eggs, larvae, and/or juveniles have not been detected) shall be conducted by walking slowly and carefully on stream banks. Surveyors should stop periodically and remain still and silent for approximately 15 minutes at appropriate sites to wait for arroyo toads to begin calling. The same cautions used for daytime surveys to avoid disturbing, injuring, or killing arroyo toads shall be incorporated.

9) Nighttime surveys must be conducted between one hour after dusk and midnight, when air temperature at dusk is 55 degrees Fahrenheit or greater. Surveys should not be conducted during nights when a full or near-full moon is illuminating the survey area or during adverse weather conditions such as rain, high winds, or flood flows.

10) Nighttime surveys must be conducted as silently as possible, because talking or other human-generated noises may cause arroyo toads to stop calling or leave the creek. Strong headlights or flashlights may be used to visually locate and identify adult arroyo toads, and flash photography may be used to document sightings of solitary individuals; otherwise lighting should be kept to a minimum.

11) Pairs of arroyo toads are very sensitive to disturbances, particularly waves or ripples (calling males are less easily disturbed). Therefore, surveyors must not enter the water near amplexing or courting pairs, and must immediately leave the vicinity upon their discovery.

12) A final report, to be submitted within 30 days of each field season or positive survey shall be prepared that includes survey dates and times, names of surveyor(s), air temperature, estimated wind speed, lighting conditions, a description of the survey methods used, and survey locations plotted on a USGS 1:24,000 (7.5 minute) map.

13) The results of a field survey may not be valid for any of the following reasons: a) surveys were conducted in a manner inconsistent with this protocol, b) surveys were incomplete, c) surveys were conducted during adverse conditions or during a season of severe weather conditions, or d) reporting requirements were not fulfilled. In such cases, the Service may request that additional surveys be conducted.

The final report should be provided to the appropriate Service field office:

For surveys in Monterey, San Luis Obispo, Santa Barbara, and Ventura Counties, Los Angeles County west of Highway 405, and the desert portions of Los Angeles and San Bernardino Counties, reports should be sent to the Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, California 93003 (phone: (805) 644-1766).

For surveys in Los Angeles County east of Highway 405 and south of the desert, Orange, Riverside, Imperial, San Diego, and montane and cismontane San Bernardino Counties, reports should be sent to the Carlsbad Fish and Wildlife Office, 2730 Loker Avenue West, Carlsbad, California 92008 (phone: (760) 431-9440).

If a surveyor thinks that a specific project warrants alterations in this protocol, the Service should be contacted prior to the onset of surveys to discuss and possibly grant permission for proposed modifications. We would appreciate receiving any comments or ideas on these guidelines or recommendations for their improvement. For additional information, please contact the Ventura Fish and Wildlife Office at (805) 644-1766 or the Carlsbad Fish and Wildlife Office at (760) 431-9440.

Diane K. Noda
Field Supervisor

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The Declining Amphibian Task Force Fieldwork Code of Practice

A code of practice, prepared by the Declining Amphibian Task Force (DAPTF) to provide guidelines for use by anyone conducting field work at amphibian breeding sites or in other aquatic habitats. Observations of diseased and parasite-infected amphibians are now being frequently reported from sites all over the world. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up unapparent infections of novel disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried in a variety of ways between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to novel localities containing species which have had little or no prior contact with such pathogens or parasites. Such occurrences may be implicated in some instances where amphibian populations have declined. Therefore, it is vitally important for those involved in amphibian research (and other wetland/pond studies including those on fish, invertebrates and plants) to take steps to minimize the spread of disease and parasites between study sites.

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires and all other surfaces. Rinse cleaned items with sterilized (e.g. boiled or treated) water before leaving each study site.

2. Boots, nets, traps, etc., should then be scrubbed with 70% ethanol solution (or sodium hypochlorite 3 to 6%) and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.

3. In remote locations, clean all equipment as described above upon return to the lab or "base camp". Elsewhere, when washing machine facilities are available, remove nets from poles and wash with bleach on a "delicates" cycle, contained in a protective mesh laundry bag.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolates species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately and the end of each field day.

5. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact between them (e.g. via handling, reuse of containers) or with other captive animals. Isolation from un-sterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

7. Used cleaning materials (liquids, etc.) should be disposed of safely and if necessary taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

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Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants

January, 2000

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed. or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

c. survey dates and survey methodology(ies)

d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

f. current and historic land uses of the habitat(s) and degree of site alteration

g. presence of target species off-site on adjacent parcels, if known

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include: a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors. c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports. d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base maintained by the Natural Heritage Division of the California Department of Fish & Game. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

HCP APPENDIX G

Hazardous Materials Spill Response Plan and Business Plans

Hazardous Materials Spill Response Plan

Hazardous Materials Disclosure Business Plan, Santa Ynez Pumping Station

Hazardous Materials Disclosure Business Plan, Polonio Pass Water Treatment Plant

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APPENDIX G
HAZARDOUS MATERIAL SPILL RESPONSE PLAN

1.0 INTRODUCTION

The contractor shall satisfy all federal, state, and local requirements for the handling, storage, transport, and disposal of hazardous materials and hazardous wastes. Applicable codes and regulations may include:

Title 42, U.S. Code, Section 6901 et seq.

Title 40, Code of Federal Regulations (CFR), Part 112, Part 260 et seq.

California Health and Safety Code, Sections 25130 et seq.

Title 22, California Code of Regulations (CCR), Division 4.5, Sections 66260-67786

Title 19, CCR, Chapter 4

Title 8, CCR, Sections 5192-5194

In some cases, the California state regulations and/or local regulations may be stricter than the federal requirements. In all cases, the more stringent requirements apply. Most maintenance and repair work during project O&M will involve minimal use of hazardous materials and thus will not require preparation of a Hazardous Material Business Plan (HMBP) as required under the California Health and Safety Code, Section 25500 and regulations of the Office of Emergency Services, Title 19, CCR Section 2620 as implemented under local (San Luis Obispo and Santa Barbara counties) guidelines or preparation of a Spill Prevention Control and Countermeasure Plan (SPCCP) as described under Title 40, CFR, part 112. If the work involves use of materials that require preparation of a HMBP/SPCCP, the contractor is directed to review the guidelines provided in Volume 1B of the CCWA Contract Documents for Reaches 5b and 6 and Tank 5 dated July 1995.

The following are guidelines, to be used as appropriate for the work planned, for a hazardous material spill response plan. The contractor remains responsible for complying with all applicable laws and regulations.

2.0 DEFINITIONS

The following definitions are based on state or federal regulations where noted by a citation in parentheses. They are the most common usage of the terms and should be used consistently throughout the plan.

Hazardous Material. Any material that because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. Hazardous material include, but not limited to hazardous substances, hazardous waste, and any material that a handler or the administering agency has reasonable basis for believing that it would be injurious (California Health and Safety Code, Chapter 6.95, Section 25501 k).

Hazardous Substance. Any substance or chemical product that meets any one of the following criteria: (1) the substance is listed on the "Director's List" from the Department of Industrial Relations pursuant to the Hazardous Substance Information and Training Act, (2) the substance is listed on the Department of Transportation Hazardous Materials List in 49 CFR Part 172, (3) the substance is listed as a radioactive material in 10 CFR, Attachment B of Chapter 1, or (4) the manufacturer is required to prepare a Material Safety Data Sheet (MSDS) for the product.

Hazardous Waste. A waste or combination of wastes that because of its quantity, concentration, or physical, chemical, or infectious characteristics may either (1) cause or significantly contribute to an increase in serious irreversible, or incapacitating reversible, illness or (2) pose a substantial present or potential hazard to human health or to the environment when improperly treated, stores, transported or disposed of, or otherwise managed (California Health and Safety Code, Section 25117).

Release. Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, unless permitted or authorized by a regulatory agency (California Health and Safety Code, Chapter 6.95, Section 25501 o).

Storage. The means of holding a hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed or, or stored elsewhere (40 CFR Part 260).

Threatened Release. A condition creating a substantial probability of harm, when the probability and potential extent of harm make it reasonably necessary to take immediate action to prevent, reduce, or mitigate damages to persons, property, or the environment (California Health and Safety Code, Chapter 6.95, Section 25501 q).

3.0 GENERAL REQUIREMENTS

Hazardous materials and hazardous wastes for the project are typically limited to fuels, oils, primers, paints, solvents, and empty containers or used oil spill absorbent materials. The contractor shall meet the following goals related to hazardous materials and hazardous waste management:

- Minimize the use of hazardous materials to the greatest extent feasible. Whenever feasible, nonhazardous or the least hazardous alternatives shall be selected.

- Take all responsible and reasonable preventative measures to avoid hazardous material spills or leaks, particularly in and around waterways, including dry drainages.

- Clean up all hazardous material spills and hazardous wastes on the job site promptly and completely.

- Arrange cleanup of any hazardous wastes dumped by third parties in the work area. The contractor shall contact CCWA, the property owner, the county environmental health department, and other appropriate regulatory agencies to report the discovery of illegally dumped hazardous wastes and determine the responsible party, if possible. CCWA will not be responsible for any such material brought to the site by the contractor, subcontractor, suppliers, or anyone else for whom the contractor is responsible.

- Plan for and implement hazardous waste recycling programs for all waste streams that can reasonably be recycled. A free directory of waste recyclers in California is available form California EPA Alternative Technology Division at 818-567-3000.

- Limit the storage and transfer of hazardous materials at the work site to the extent feasible.

4.0 SPILL PREVENTION AND CLEANUP MEASURES

The following measures shall be implemented as appropriate:

- No refueling within 100 feet of a stream or drainage channel, even if water is not present. Exceptions may be made if in compliance with all permits, CCWA gives approval, and precautions are taken to ensure that any spills do not reach the channel.

- Minimize equipment refueling and maintenance activities at the work site and use precautionary measures (e.g., lined basins or absorbent materials) when such activities are necessary.

- No washout of concrete trucks on site unless a temporary pit or bermed area is built for this and located a minimum of 100 feet from storm drains, open ditches, or water bodies. The contractor shall break up hardened concrete in the wash-out area and dispose of it appropriately.

- Check equipment for leaks or heavy surface oil, repair leaks, and clean off surface oil prior to work in waterways.

- Have appropriate spill response equipment on site during the work. This includes shovels (non-sparking), absorbent material, storage containers, fire-fighting equipment (see Fire Prevention Plan), first aid supplies, barrier tape, communication equipment, and a bung wrench (non-sparking).

- Clearly identify and secure storage areas for hazardous materials and wastes.

- Label all containers properly (identity, handling and safety instructions, and emergency contact).

- Keep all containers closed when not in use.

- Store incompatible materials separately.

- Cleanup and document all spills promptly and completely.

- Provide bermed and lined secondary containment adequate to hold 110 percent of the storage container's capacity plus maximum probable rainfall.

- Train employees in proper hazardous waste management.

- Report any release or threatened release of hazardous materials immediately to the appropriate agencies regardless of quantity.

- Contractor shall describe the recycling companies and treatment, storage, and disposal facilities it plans to use for hazardous wastes generated during the work or cleanup activities (e.g., soil contaminated with oil, fuel, solvents or paint).

- Maintain a list of hospitals, with addresses and phone numbers, near the project site.

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
FACILITY INFORMATION
BUSINESS OWNER/OPERATOR IDENTIFICATION

I. IDENTIFICATION

FACILITY ID# 1: 4 2 - 0 0 0 -	BEGINNING DATE 100: 12/01/09	ENDING DATE 101:	
BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3: Central Coast Water Authority	BUSINESS PHONE 102: (805)688-2292		
BUSINESS SITE ADDRESS 103: 2800 Mesa Verde Road	BUSINESS FAX 102a: (805)686-4700		
104: Santa Ynez	CA	ZIP CODE 105: 93460	COUNTY 108: Santa Barbara
DUN & BRADSTREET 106: 949598346	PRIMARY SIC 107: 4941	PRIMARY NAICS 107a:	
BUSINESS MAILING ADDRESS 108a: 255 Industrial Way			
BUSINESS MAILING CITY 108b: Buellton	STATE 108c: CA	ZIP CODE 108d: 93427	
BUSINESS OPERATOR NAME 109: Central Coast Water Authority	BUSINESS OPERATOR PHONE 110: (805)688-2292		

II. BUSINESS OWNER

OWNER NAME 111: Central Coast Water Authority	OWNER PHONE 112: (805)688-2292	
OWNER MAILING ADDRESS 113: 255 Industrial Way		
OWNER MAILING CITY 114: Buellton	STATE 115: Ca	ZIP CODE 116: 93427

III. ENVIRONMENTAL CONTACT

CONTACT NAME 117: Ron Cline	CONTACT PHONE 118: (805)688-2292 ext.234	
CONTACT MAILING ADDRESS 119: 255 Industrial Way	CONTACT EMAIL 119a: rwc@ccwa.com	
CONTACT MAILING CITY 120: Buellton	STATE 121: CA	ZIP CODE 122: 93427

IV. EMERGENCY CONTACTS

-PRIMARY-	-SECONDARY-
NAME 123: Tom Petersen	NAME 128: Ron Cline
TITLE 124: Distribution Supervisor	TITLE 129: Regulatory Specialist
BUSINESS PHONE 125: (805)688-2292 ext.237	BUSINESS PHONE 130: (805)688-2292 ext.234
24-HOUR PHONE 126: (805)463-2122	24-HOUR PHONE 131: (805)463-2122
CELL / PAGER # 127: (805)441-6811	CELL / PAGER # 132: (805)680-6726

ADDITIONAL LOCALLY COLLECTED INFORMATION: 133
Assessor's Parcel Number: _139_ - _250_ - _60

Office Use Only: Fire Agency | District | ☐ BP ☐ Gen ☐ UST ☐ AST

Certification: Based on my inquiry of those individuals responsible for obtaining the information, I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the information is true, accurate, and complete.

SIGNATURE OF OWNER/OPERATOR OR DESIGNATED REPRESENTATIVE	DATE 134: 12/01/09	NAME OF DOCUMENT PREPARER 135: Ron Cline
NAME OF SIGNER (print) 136: Ron Cline	TITLE OF SIGNER 137: Regulatory Specialist	

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
FACILITY INFORMATION
BUSINESS ACTIVITIES

I. FACILITY IDENTIFICATION

FACILITY ID # (Agency Use Only)	4 2 - 0 0 0 -	1	EPA ID # (Hazardous Waste Only) CAL000318767 2
BUSINESS NAME (Same as Facility Name of DBA-Doing Business As)	Central Coast Water Authority		3
BUSINESS SITE ADDRESS	2800 Mesa Verde Rd.		103
BUSINESS SITE CITY	Santa Ynez 104	CA	ZIP CODE 93460 105

II. ACTIVITIES DECLARATION

NOTE: If you check YES to any part of this list, please submit the Business Owner/Operator Identification page.

Does your facility...		If Yes, please complete these pages of the UPCF....
A. HAZARDOUS MATERIALS Have on site (for any purpose) at any one time, hazardous materials at or above 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for compressed gases (include liquids in ASTs and USTs); or the applicable Federal threshold quantity for an extremely hazardous substance specified in 40 CFR Part 355, Appendix A or B; or handle radiological materials in quantities for which an emergency plan is required pursuant to 10 CFR Parts 30, 40 or 70?	x YES ☐ NO 4	HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION
B. REGULATED SUBSTANCES Have Regulated Substances stored onsite in quantities greater than the threshold quantities established by the California Accidental Release prevention Program (CalARP)?	☐ YES x NO 4a	Coordinate with your local agency responsible for CalARP.
C. UNDERGROUND STORAGE TANKS (USTs) Own or operate underground storage tanks?	☐ YES x NO 5	UST FACILITY (Formerly SWRCB Form A) UST TANK (one page per tank) (Formerly Form B)
D. ABOVE GROUND PETROLEUM STORAGE Own or operate ASTs above these thresholds: Store greater than 1,320 gallons of petroleum products (new or used) in aboveground tanks or containers.	☐ YES x NO 8	Spill Prevention Control & Countermeasure (SPCC) should be submitted to CUPA.
E. HAZARDOUS WASTE Generate hazardous waste?	x YES ☐ NO 9	EPA ID NUMBER – provide at the top of this page
Recycle more than 100 kg/month of excluded or exempted recyclable materials (per HSC 25143.2)?	☐ YES x NO 10	RECYCLABLE MATERIALS REPORT (one per recycler)
Treat hazardous waste on-site?	☐ YES x NO 11	ON-SITE HAZARDOUS WASTE TREATMENT – FACILITY ON-SITE HAZARDOUS WASTE TREATMENT – UNIT (one page per unit)
Treatment subject to financial assurance requirements (for Permit by Rule and Conditional Authorization)?	☐ YES x NO 12	CERTIFICATION OF FINANCIAL ASSURANCE
Consolidate hazardous waste generated at a remote site?	☐ YES x NO 13	REMOTE WASTE / CONSOLIDATION SITE ANNUAL NOTIFICATION
Need to report the closure/removal of a tank that was classified as hazardous waste and cleaned on-site?	☐ YES x NO 14	HAZARDOUS WASTE TANK CLOSURE CERTIFICATION
Generate in any single calendar month 1,000 kilograms (kg) (2,200 pounds) or more of federal RCRA hazardous waste, or generate in any single calendar month, or accumulate at any time, 1 kg (2.2 pounds) of RCRA acute hazardous waste; or generate or accumulate at any time more than 100 kg (220 pounds) of spill cleanup materials contaminated with RCRA acute hazardous waste.	☐ YES x NO 14a	Obtain federal EPA ID Number, file Biennial Report (EPA Form 8700-13A/B), and satisfy requirements for RCRA Large Quantity Generator.
Household Hazardous Waste (HHW) Collection site?	x YES ☐ NO 14b	See CUPA for required forms.

F. Certification: I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the information is true, accurate, and complete. I further understand that Santa Barbara County Certified Program Agency and the local fire agency must be notified if the operations or procedures of the business change in any such a way to make the above statement inaccurate.

SIGNATURE OF OWNER/OPERATOR OR DESIGNATED REPRESENTIVE	DATE 134 12/30/09
NAME OF SIGNER (print) 136 Ron Cline	TITLE OF SIGNER 137 Regulatory Specialist

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
HAZARDOUS MATERIALS

HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area map)

x ADD ☐ DELETE ☐ REVISE 200 Page 1 Of 6

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Central Coast Water Authority

CHEMICAL LOCATION (On the facility site. It is not the facility address.) 201
Santa Ynez Pump Station

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES x NO

FACILITY ID # 4 2 - 0 0 0 - 1

MAP# ** (Required) 203: 1

GRID# ** (Required) 204: E-8

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Acetylene

TRADE SECRET ☐ Yes x No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Acetylene

EHS* ☐ Yes x No 208

CAS# 209
74-86-2

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) x a. PURE x b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes x No 212

CURIES 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID ☐ b. LIQUID x c. GAS 214

LARGEST CONTAINER 103 cu/ft 215

D HAZARD CATEGORIES (Check all that apply) x a. FIRE ☐ b. REACTIVE x c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH 216

AVERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
103 cu/ft	103 cu/ft	None	N/A

UNITS* (Check one item only) ☐ a. GALLONS x b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS 221
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
365

STORAGE CONTAINER
☐ a. ABOVEGROUND TANK ☐ e. PLASTIC/NONMETALLIC TANK ☐ i. FIBER DRUM ☐ m. GLASS BOTTLE ☐ q. RAIL CAR
☐ b. UNDERGROUND TANK ☐ f. CAN ☐ j. BAG ☐ n. PLASTIC BOTTLE ☐ r. OTHER
☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ k. BOX ☐ o. TOTE BIN
x d. STEEL DRUM ☐ h. SILO x l. CYLINDER ☐ p. TANK WAGON

STORAGE PRESSURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT 224

STORAGE TEMPERATURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC 225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 100% 226	Acetylene 227	☐ Yes x No 228	74-86-2 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

246

Office Use Only: ☐ Business Plan Fee Exempt ☐ < Threshold ☐ Retail Sales Exempt

**** Map Page Number and Grid Number are required by the CUPA**

If EPCRA, Please Sign Here

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
HAZARDOUS MATERIALS

HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area map)

x ADD ☐ DELETE ☐ REVISE 200 | Page 2 Of 6

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Central Coast Water Authority

CHEMICAL LOCATION (On the facility site. It is not the facility address.) 201
Santa Ynez Pump Station

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES x NO

FACILITY ID # 4 2 - 0 0 0 - 1

MAP# ** (Required) 203
1

GRID# ** (Required) 204
D9

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Hypochlorous Acid Salt

TRADE SECRET ☐ Yes x No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Sodium Hypochlorite

EHS* ☐ Yes x No 208

CAS# 209
7681-52-9

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
N/A

HAZARDOUS MATERIAL TYPE (Check one item only) ☐ a. PURE x b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes x No 212

CURIES 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID x b. LIQUID ☐ c. GAS 214

LARGEST CONTAINER 52 gal. 215

D HAZARD CATEGORIES (Check all that apply) ☐ a. FIRE x b. REACTIVE ☐ c. PRESSURE RELEASE x d. ACUTE HEALTH x e. CHRONIC HEALTH 216

AVERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
104 gal.	208 gal.	0	

UNITS* (Check one item only) x a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS 221
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
365

STORAGE CONTAINER
x a. ABOVEGROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC TANK
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ q. RAIL CAR
x r. OTHER
Plastic Drum

STORAGE PRESSURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT 224

STORAGE TEMPERATURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC 225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 12.5% 226	Sodium Hypochlorite 227	☐ Yes x No 228	7681-52-9 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

246

Office Use Only: ☐ Business Plan Fee Exempt ☐ < Threshold ☐ Retail Sales Exempt

**** Map Page Number and Grid Number are required by the CUPA**

If EPCRA, Please Sign Here

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
HAZARDOUS MATERIALS

HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area map)

☐ ADD ☐ DELETE x REVISE 200 | Page 3 Of 6

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Central Coast Water Authority

CHEMICAL LOCATION (On the facility site. It is not the facility address.) 201
Santa Ynez Pump Station

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES x NO

FACILITY ID # 4 2 - 0 0 0 - 1

MAP# ** (Required) 203
1

GRID# ** (Required) 204
G1/G2/G3

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Sodium Bisulfite

TRADE SECRET ☐ Yes x No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Sodium Acid Sulfite/Sodium Hydrogen Sulfite

EHS* ☐ Yes x No 208

CAS# 209
7631-90-5

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
N/A

HAZARDOUS MATERIAL TYPE (Check one item only) ☐ a. PURE x b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes x No 212

CURIES 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID x b. LIQUID ☐ c. GAS 214

LARGEST CONTAINER 3200 gal. 215

D HAZARD CATEGORIES (Check all that apply) ☐ a. FIRE x b. REACTIVE ☐ c. PRESSURE RELEASE x d. ACUTE HEALTH x e. CHRONIC HEALTH 216

AVERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
3200 gal.	6400 gal.	0	

UNITS* (Check one item only) x a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS 221
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
365

STORAGE CONTAINER
x a. ABOVEGROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC TANK
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ q. RAIL CAR
☐ r. OTHER

STORAGE PRESSURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT 224

STORAGE TEMPERATURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC 225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 15-40% 226	Sodium Bisulfite 227	☐ Yes x No 228	7631-90-5 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

Office Use Only: ☐ Business Plan Fee Exempt ☐ < Threshold ☐ Retail Sales Exempt 246

**** Map Page Number and Grid Number are required by the CUPA**

If EPCRA, Please Sign Here

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
HAZARDOUS MATERIALS

HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area map)

x ADD ☐ DELETE x REVISE 200 Page 4 Of 6

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Central Coast Water Authority

CHEMICAL LOCATION (On the facility site. It is not the facility address.) 201
Santa Ynez Pump Station

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES x NO

FACILITY ID # 4 2 - 0 0 0 - 1 | MAP# ** (Required) 203: 1 | GRID# ** (Required) 204: E-8

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Nitrogen

TRADE SECRET ☐ Yes x No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Nitrogen

EHS* ☐ Yes x No 208

CAS# 209
7727-37-9

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) x a. PURE x b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes x No 212

CURIES 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID ☐ b. LIQUID x c. GAS 214

LARGEST CONTAINER 215
228 cu/ft

D HAZARD CATEGORIES (Check all that apply) ☐ a. FIRE ☐ b. REACTIVE x c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH 216

AVERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
228 cu/ft	228 cu/ft	None	N/A

UNITS* (Check one item only) ☐ a. GALLONS x b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS 221
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
365

STORAGE CONTAINER
☐ a. ABOVEGROUND TANK ☐ e. PLASTIC/NONMETALLIC TANK ☐ i. FIBER DRUM ☐ m. GLASS BOTTLE ☐ q. RAIL CAR
☐ b. UNDERGROUND TANK ☐ f. CAN ☐ j. BAG ☐ n. PLASTIC BOTTLE ☐ r. OTHER
☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ k. BOX ☐ o. TOTE BIN
x d. STEEL DRUM ☐ h. SILO x l. CYLINDER ☐ p. TANK WAGON

STORAGE PRESSURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT 224

STORAGE TEMPERATURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC 225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 99% 226	Nitrogen 227	☐ Yes x No 228	7727-39-9 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

246

Office Use Only: ☐ Business Plan Fee Exempt ☐ < Threshold ☐ Retail Sales Exempt

**** Map Page Number and Grid Number are required by the CUPA**

If EPCRA, Please Sign Here

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
HAZARDOUS MATERIALS

HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area map)

☐ ADD ☐ DELETE x REVISE 200 Page 5 Of 6

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Central Coast Water Authority

CHEMICAL LOCATION (On the facility site. It is not the facility address.) 201
Santa Ynez Pump Station

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES x NO

FACILITY ID # 4 2 - 0 0 0 - 1 MAP# ** (Required) 203: 1 GRID# ** (Required) 204: C9

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Sodium Thiosulfate

TRADE SECRET ☐ Yes x No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Sodium Thiosulfate

EHS* ☐ Yes x No 208

CAS# 209
7772-98-7

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
N/A

HAZARDOUS MATERIAL TYPE (Check one item only) x a. PURE x b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes x No 212

CURIES 213

PHYSICAL STATE (Check one item only) x a. SOLID ☐ b. LIQUID ☐ c. GAS 214

LARGEST CONTAINER 55 lbs. 215

D HAZARD CATEGORIES (Check all that apply) ☐ a. FIRE x b. REACTIVE ☐ c. PRESSURE RELEASE d ☐. ACUTE HEALTH x e. CHRONIC HEALTH 216

AVERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
1155 lbs.	2310 lbs.	0	

UNITS* (Check one item only) x a. GALLONS ☐ b. CUBIC FEET x c. POUNDS ☐ d. TONS 221
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
365

STORAGE CONTAINER
☐ a. ABOVEGROUND TANK ☐ e. PLASTIC/NONMETALLIC TANK ☐ i. FIBER DRUM ☐ m. GLASS BOTTLE ☐ q. RAIL CAR
☐ b. UNDERGROUND TANK ☐ f. CAN x j. BAG ☐ n. PLASTIC BOTTLE ☐ r. OTHER
☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ k. BOX ☐ o. TOTE BIN
☐ d. STEEL DRUM ☐ h. SILO ☐ l. CYLINDER ☐ p. TANK WAGON

STORAGE PRESSURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT 224

STORAGE TEMPERATURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC 225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 99% 226	Sodium Thiosulfate 227	☐ Yes x No 228	7772-98-7 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

246

Office Use Only: ☐ Business Plan Fee Exempt ☐ < Threshold ☐ Retail Sales Exempt

**** Map Page Number and Grid Number are required by the CUPA**

If EPCRA, Please Sign Here

Santa Barbara County Fire Department
Certified Unified Program Agency

UNIFIED PROGRAM CONSOLIDATED FORM
HAZARDOUS MATERIALS

HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area map)

☐ ADD ☐ DELETE x REVISE 200 Page 6 Of 6

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Central Coast Water Authority

CHEMICAL LOCATION (On the facility site. It is not the facility address.) 201
Santa Ynez Pump Station

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES x NO

FACILITY ID # 4 2 - 0 0 0 - 1

MAP# ** (Required) 203
1

GRID# ** (Required) 204
E-9

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Waste Oil

TRADE SECRET ☐ Yes x No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Waste Oil

EHS* ☐ Yes x No 208

CAS# 209
64742-54-7

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
1

HAZARDOUS MATERIAL TYPE (Check one item only) ☐ a. PURE x b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes x No 212

CURIES 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID x b. LIQUID ☐ c. GAS 214

LARGEST CONTAINER 55 gal. 215

D HAZARD CATEGORIES (Check all that apply) x a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE x d. ACUTE HEALTH ☐ e. CHRONIC HEALTH 216

AVERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
55 gal.	110 gal.	110 gal.	221

UNITS* (Check one item only) x a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS 221
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
365

STORAGE CONTAINER
☐ a. ABOVEGROUND TANK ☐ e. PLASTIC/NONMETALLIC TANK ☐ i. FIBER DRUM ☐ m. GLASS BOTTLE ☐ q. RAIL CAR
☐ b. UNDERGROUND TANK ☐ f. CAN ☐ j. BAG ☐ n. PLASTIC BOTTLE ☐ r. OTHER
☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ k. BOX ☐ o. TOTE BIN
x d. STEEL DRUM ☐ h. SILO ☐ l. CYLINDER ☐ p. TANK WAGON

STORAGE PRESSURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT 224

STORAGE TEMPERATURE x a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC 225

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 97-98% 226	Waste Oil 227	☐ Yes x No 228	64742-54-7 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

246

Office Use Only: ☐ Business Plan Fee Exempt ☐ < Threshold ☐ Retail Sales Exempt

**** Map Page Number and Grid Number are required by the CUPA**

If EPCRA, Please Sign Here

Santa Barbara County Fire Department

Certified Unified Program Agency

EMERGENCY RESPONSE PLAN

or Hazardous Waste Contingency Plan

I.D. #

Date: 12/09

SECTION I-A: BUSINESS IDENTIFICATION DATA

Central Coast Water Authority		
BUSINESS NAME		
2800 Mesa Verde Road	Santa Ynez	93460
SITE ADDRESS	CITY	ZIP CODE
Santa Ynez Dechlorination & Pumping Plant		(805)686-4403
FACILITY UNIT		TELEPHONE NUMBER
255 Industrial Way	Buellton	93427
BUSINESS MAILING ADDRESS	CITY	ZIP CODE

If your business has a license or permit from any of the following agencies, please indicate the document number.

1. Hazardous Materials Underground Storage #	3. Air Pollution Control District #
2. Hazardous Waste Generator #	4. Responding Fire Dept & Permit #

Please provide the following information as it pertains to your business and its location. You are not required to notify these companies in the event of an emergency. This information is provided for your reference and to assist emergency response personnel in responding to a hazardous materials emergency at your facility. List the name and phone number of the utility company.

Electric Service	Pacific Gas & Electric	Telephone #	800-743-5000
Gas Service	N/A	Telephone #	N/A
Sanitation District	Health Sanitation Services (HSS)	Telephone #	800-727-5923
Water District	Santa Ynez River Water District ID#1	Telephone #	(805)68806015

SECTION I-B: OWNER CERTIFICATION OF DATA (Certify either 1 or 2)

1. This is a ☐ **NEW Plan** ☒ **UPDATED Existing Plan.** I have personally examined the information it contains and am familiar with the operation of the plan. (If you check either of the above two options, continue to complete the remained of the Emergency Response / Contingency Plan).

2. ☐ This plan **requires no change** and is on file with Santa Barbara County Hazardous Materials Unified Program and does not need any change. (If you check this section, please proceed directly to Form T, the Training Program.)

I certify under penalty of law that the above information is true and accurate.

Ron Cline		12/01/2009
PRINT NAME OF OWNER OR OPERATOR	SIGNATURE	DATE
Ron Cline		12/01/09
DOCUMENTS PREPARED BY	SIGNATURE	DATE

SECTION II: EMERGENCY RESPONSE PLANS AND PROCEDURES

Note: Complete all sections of this Emergency Response Procedure below. Use of terms such as "N/A" (Not Applicable) will not be accepted.

A. FIRE, SPILL OR RELEASE: The Fire Code requires immediate notification through dialing 911, by whomever first sights the incident. In the event of release or spill of hazardous materials, you must also notify:

1. **Santa Barbara County Hazardous Materials Unit (HMU) at (805) 686-8170. After business hours -- dial 9-1-1. CAER Spill Report forms can be faxed to (805) 686-8183**

2. **The State Office of Emergency Services -- (800) 852-7550 or (916) 262-1621.**

List the individuals responsible for verifying that these calls have been made and also indicate their position in your company.

FOR VERIFYING THE DIALING OF 911:

NAME	POSITION
Tom Petersen	Distribution Supervisor

Individual responsible for calling Santa Barbara County HMU and the State Office of Emergency Services: (Normally the Emergency Coordinator of your business.)

NAME	POSITION
Ron Cline	Regulatory Specialist

B. List the local emergency medical facilities that will be used by your business in the event of an accident or injury caused by a release or threatened release of hazardous materials.

NAME	ADDRESS	CITY	PHONE
Santa Ynez Cottage Hospital	700 Alamo Pintado Rd.	Solvang	(805)688-6431
Industrial Medical Group	3070 Skyway Drive #106	Santa Maria	(805)922-8282

C. List the Emergency Coordinator(s) at your facility.

NAME	TITLE	BUSINESS PHONE	24 HR PHONE	CELL #
Primary: John Brady	Operations Manager	(805)688-2292 x228	(805)463-2122	(805)680-2116
Secondary: Ron Cline	Regulatory Specialist	(805)688-2292 x234	(805)463-2122	(805)6802726

D. Does your business have an on-site emergency response team? ☐ Yes ☒ No If **yes**, describe procedures your business will follow to notify your on-site emergency response team in the event of a release or threatened release of hazardous materials.

E. List (by name and address) adjacent neighboring businesses and residences, schools, hospitals, etc. **Include sensitive facilities (schools, hospitals and rest homes) within 1,000 feet (straight line distance from your property line).** List telephone numbers for all businesses; for apartment buildings, list manager's phone. Do not list telephone numbers for private residences.

Clover Creek Ranch (Private residence) 243 N. Refugio Rd.

Sunstone Winery (Private residence) 125 N. Refugio Rd. – Winery/Tasting Room (688-9463)

Santa Ynez Valley Therapeutic Riding Program 195 Refugio Rd. (686-6739)

F. Briefly describe your standard operating procedures **in the event of a release or threatened release of hazardous materials**. Emergency response procedures must comply with all Federal, State and local regulations. (Use additional sheets if necessary. Use our format if computerized.)

1. **Prevention** -- Describe the accident / release potentials associated with the hazardous materials present at your facility. What actions would your business take to reduce accident / release potentials? Include description of safety, storage and containment procedures. ***Please Note: California Fire Code Section 8001.11 requires that hazardous material storage / handling areas be secured against unauthorized entry.***

Materials are stored within secondary containment vessels. Main potential for spill would be during the lading/unloading process. Chemical delivery drivers are required to monitor the unloading/loading process at all times. Spill kits are available To control and clean-up an spill that may occur. Notification to the proper regulatory body is covered in CCWA's Emergency Response Program (ERP). All storage sites are located within secure (locked) enclosures.

2. **Equipment** -- List the emergency response equipment at your facility (e.g. fire extinguishing systems, spill control equipment, decontamination equipment). **Include summary of maintenance procedures**.

Item	Use	Location	Maintenance Procedure
Chemical Spill Kit	Spill control	Map #1 (F5)	Monthly Inspection
Fire Extinguishers	Fire suppression	Map #1 (G4, G6, D6, D7, F8, B10)	Monthly Inspection & Annual service
Emergency Eye Wash & Shower	Flush & Wash	Map #1 (E4, G2)	Weekly Inspection and flow test
Heat & Smoke Detectors	Fire Alert		Remotely Operated by alarm company

3. **Evacuation** -- Describe how you will immediately notify and evacuate your facility. What communications or alarms are used? How will you operate these during power failure?

Facility will not be operated during power outage. Site is unmanned. All equipment is automated and monitored from a SCADA system monitored 24/7. Alarms will notify operator or page out to operator on call.

4. Shutdown -- Describe the shutdown for each site or facility.

Shut-off pumps, turn off chemical feed pumps, close chemical tank isolation valves, close forebay inlet sleeve valve.

5a. Response -- Describe what is done to lessen or mitigate the harm or damage to person(s), property, or the environment, and prevent the event from getting worse or spreading. What is your immediate response to:

Fire: Building is constructed of low combustible material, monitored by a fire system.

Explosion: N/A

Spill: Chemical tanks are situated within an ample secondary containment area. Spill occurring during delivery will be Contained using spill kit equipment & material.

Severe Ground Motion: Chemical tanks are situated within an ample secondary containment area.

Major Power Failure: Facility will not operate during power loss.

Flood: N/A

b. Is this facility located on a 100 year flood plain? ☐ **Yes** ☒ **No**

c. Ground Motion -- Identify facility areas and list mechanical or other systems that require immediate inspection or isolation because of their vulnerability to earthquake related ground motion.

Visually inspect chemical tanks and associated equipment.

6. Clean-Up (Remove the Hazard) -- How do you handle the complete process of cleaning up, and disposing of related materials at your facility? Note: Notify the Hazardous Materials Unit when clean-up is complete.

Employees will follow CCWA's ERP guidelines to a spill event. Small spills will be contained by CCWA staff. Larger spills, depending on the chemical, may require outside vendor assistance. Materials will be sent to the proper sites for disposal.

G. Location -- Your business is required to keep a copy of the Business Plan and related MSDS sheets on-site. Describe where this information is located.

In control room on bookshelf. Both items are clearly identified.

Santa Barbara County Fire Department

Certified Unified Program Agency

EMPLOYEE TRAINING PROGRAM

I.D. #

DATE: 12/09

A. Describe the safety procedure training for all employees in the event of a release or threatened release of hazardous materials. This training shall include, but not be limited to, the following: new employee training, annual training, periodic refresher courses, and familiarization with Emergency Plans and Procedures of this Business Plan / Contingency Plan.

1. Summarize specific job descriptions for all positions that work with or come in contact with hazardous materials / hazardous waste and indicate how these specific positions are trained for their job responsibilities or hazards of exposure (describe training program). Designate whether employee is working with hazardous material (HM), hazardous waste (HW), or both (B).

The Santa Ynez Pumping Plant and Dechlorination facility is operated and owned by the Central Coast Water Authority (CCWA). This facility is fully automated and staff is only present for short durations to perform routine maintenance, daily Inspections or for training exercises, or for utilizing equipment for fabrication purposes. All processes are monitored through a SCADS system with a monitoring site at the Buellton office and at CCWA's Water Treatment Facility (manned 24/7). CCWA staff operating this facility will be knowledgeable in all equipment functions, emergency isolation and shut-down procedures, evacuation procedures and the general layout of the facility. Training will be provided/administered by CCWA's Regulatory Specialist. This site is a non-generating hazardous waste site.

2. Summarize training specific to **emergency response personnel** who deals with either hazardous material or hazardous waste release or threatened release.

Employees receive the following training specifically related to this site: Forklift operation training, Hazard Communications, HAZWOPER-First Responder, MSDS, ERP, Spill containment and clean-up training. All employees are certified in CPR and Basic First-Aid.

3. Indicate frequency and duration of training for each type of employee noted above (a table may be used).

Forklift Training – Initial 3 hours, 1 hour refresher class every 3 years.

Hazard Communication – 1 hour annually.

HAZWOPER – First Responder – 2 to 4 hours initially, at least 1 hour annually.

MSDS – 1 hour initially plus each new MSDS or update.

ERP – 1 hour annually plus hands on training (time varies depending upon the drill)

Spill containment and clean-up – 1 hour training initially, included in the Pesticide annual training.

CPR & Basic First-Aid – 4 to 5 hours initially, 4 to 5 hours every other year.

4. Indicate how your business facilitates employee access to training materials. (e.g. bulletin board, employee newsletter, staff meetings, etc.)

Safety training materials are provided on-line (classes) or in classroom settings on a monthly basis. MSDS's are available at CCWA facilities. Bulletin boards are available at the SYPP and Buellton office with current safety information. Safety posters Are posted throughout CCWA facilities.

B. List the personnel in charge of training and indicate qualifications of personnel conducting the training.

Ron Cline – Regulatory Specialist (Safety Officer/Administrator & Environmental compliance) (OSHA Certified 511 for General Industry Standards)

C. Indicate where records are kept. Records must document training including training duration and completion dates, names and positions of employees receiving training, and the name(s) of instructors / trainer.

Training records, injury/accident reports, and discrepancy reports can be found in the Regulatory Specialist office in Buellton.

The SYPP Business plan can be located at the SYPP in the main control room on the bookshelf along with the MSDS book.

FORM S – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY

BUSINESS OWNER/OPERATOR IDENTIFICATION

I. IDENTIFICATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3 *Polonio Pass Water Treatment Plant*	BUSINESS PHONE 102 *(805) 463-2122*
BUSINESS SITE ADDRESS 103 *5250 Antelope Road*	
CITY 104 *Shandon* — *CA*	ZIP CODE 105 *93461*
COUNTY 108 *San Luis Obispo*	
BUSINESS OPERATOR NAME 109 *Central Coast Water Authority*	BUSINESS OPERATOR PHONE 110 *(805) 688-2292*

II. BUSINESS OWNER

OWNER NAME 111 *Central Coast Water Authority*		OWNER PHONE 112 *(805) 688-2292*
OWNER MAILING ADDRESS 113 *255 Industrial Way*		
CITY 114 *Buellton*	STATE 115 *CA*	ZIP CODE 116 *93427*

III. ENVIRONMENTAL CONTACT

CONTACT NAME 117 *Ron Cline*		CONTACT PHONE 118 *(805) 688-2292 EXT 234*
CONTACT MAILING ADDRESS 119 *255 Industrial Way*		
CITY 120 *Buellton*	STATE 121 *CA*	ZIP CODE 122 *93427*

IV. EMERGENCY CONTACTS

-PRIMARY-	-SECONDARY-
NAME 123 *Darin Dargatz*	NAME 128 *Larry Seifert*
TITLE 124 *Regulatory Specialist*	TITLE 129 *Maintenance Superintendent*
BUSINESS PHONE 125 *(805) 463-2122*	BUSINESS PHONE 130 *(805) 463-2122 EXT 311*
24-HOUR PHONE 126 *(805) 463-2122 EXT 314*	24-HOUR PHONE 131 *(805) 463-2122*
PAGER # / CELL PHONE # 127 *Cell # (805) 712-1413*	PAGER # / CELL PHONE # 132 *Pager # (805) 283-6674 Cell # (805) 712-4410*

ADDITIONAL LOCALLY COLLECTED INFORMATION: 133

Certification: Based on my inquiry of those individuals responsible for obtaining the information, I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the information is true, accurate, and complete.

SIGNATURE OF OWNER/OPERATOR OR DESIGNATED REPRESENTATIVE	DATE 134 *1/21/09*	NAME OF DOCUMENT PREPARER 135 *Ron Cline*
NAME OF SIGNER (print) 136 *Ron Cline*	TITLE OF SIGNER 137 *Regulatory Specialist*	

FORM E

SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED

PROGRAM AGENCY (CUPA)

EMERGENCY RESPONSE PLAN

~~Or Hazardous Waste Contingency Plan~~

(see instruction page vii)

Date: 1/05/09

SECTION I-A: BUSINESS IDENTIFICATION DATA

Central Coast Water Authority		
BUSINESS NAME		
5250 Antelope Road	Shandon	93461
SITE ADDRESS	CITY	ZIP CODE
Polonio Pass Water Treatment Plant		(805) 463-2122
FACILITY UNIT		TELEPHONE NUMBER
255 Industrial Way	Buellton	93427
BUSINESS MAILING ADDRESS	CITY	ZIP CODE

If your business has a license or permit from any of the following agencies, please indicate the document number.

1. Hazardous Materials Underground Storage #	3. Air Pollution Control District # 956-1 (For Stand-by Diesel Generator)
2. Hazardous Waste Generator # EPA ID # CAL000178617	4. Responding Fire Dept & Permit # California Department of Forestry

Please provide the following information as it pertains to your business and its location. You are not required to notify these companies in the event of an emergency. This information is provided for your reference and to assist emergency response personnel in responding to a hazardous materials emergency at your facility. List the name and phone number of the utility company.

Electric Service	Pacific Gas & Electric	Telephone #	877-743-0040
Gas Service	Delta Liquid Energy	Telephone #	(805) 239-0616
Sanitation	San Miguel Garbage	Telephone #	(805) 467-9283
Water District	N/A	Telephone #	N/A

SECTION I-B: OWNER CERTIFICATION OF DATA (Certify either 1 or 2)

1. This is a ☐ **NEW Plan** ☒ **UPDATED Existing Plan.** I have personally examined the information it contains and am familiar with the operation of the plan. (If you check either of the above two options, continue to complete the remained of the Emergency Response / Contingency Plan).
2. ☐ This plan **requires no change** and is on file with San Luis Obispo County Hazardous Materials Unified Program Agency and does not need any change. (If you check this section, please proceed directly to Form T, the Training Program.)

I certify under penalty of law that the above information is true and accurate.

William Brennan (Executive Director)		1/16/09
PRINT NAME OF OWNER OR OPERATOR	SIGNATURE	DATE
Ron Cline (Regulatory Specialist)		1/16/09
DOCUMENTS PREPARED BY	SIGNATURE	DATE

SECTION II: EMERGENCY RESPONSE PLANS AND PROCEDURES

Note: Complete all sections of this Emergency Response Procedure below. Use of terms such as "N/A" (Not Applicable) will not be accepted.

A. FIRE, SPILL OR RELEASE: The fire code requires immediate notification through dialing 911, by whoever first sights the incident. In the event of release or spill of hazardous materials, you must also notify:

1. **San Luis Obispo County Hazardous Materials Unified Program Agency during business hours @ 805-781-5544. After busin hours dial 911.**

2. **The State Office of Emergency Services - (800) 852-7550 or (916) 262-1621.**

List the individuals responsible for verifying that these calls have been made and also indicate their position in your company.

FOR VERIFYING THE DIALING OF 911:

NAME	POSITION
Darin Dargatz	Water Treatment Plant Supervisor

Individual responsible for calling San Luis Obispo County Hazardous Materials Unified Program Agency and the State Office of Emergency Services: (Normally the Emergency Coordinator of your business.)

NAME	POSITION
Darin Dargatz	Water Treatment Plant Supervisor

B. List the local emergency medical facilities that will be used by your business in the event of an accident or injury caused by a release or threatened release of hazardous materials.

NAME	ADDRESS	CITY	PHONE
Twin Cities Community Hospital	110 Las Tablas Road	Templeton	(805) 434-3500
MedWorks	350 Posada, #102	Templeton	(805) 434-3699

C. List the Emergency Coordinator(s) at your facility.

	NAME	TITLE	BUSINESS PHONE	24 HR PHONE	CELL#
Primary:	Darin Dargatz	WTP Supervisor	(805) 463-2122 x 313	(805) 463-2122 x 314	(805)712-1413
Secondary:	Larry Seifert	Maintenance Superintendant	(805) 688-2122 x311	(805) 463-2122 x 314	(805) 712-4410

D. Does your business have an on-site emergency response team? ☐Yes ☒No Describe procedures your business will follow in the event of a release or threatened release of hazardous materials.

See Attachment #1

E. If you have **acutely hazardous materials above threshold planning quantities**, list (by name and address) adjacent neighboring businesses and residences, schools, hospitals, etc. **Include sensitive facilities (schools, hospitals and rest homes) within 1,000 feet (straight-line distance from your property line).** List telephone numbers for all businesses; for apartment buildings, list manager's phoı Do not list telephone numbers for private residences.

The Polonio Pass Water Treatment Plant site is surrounded by rangelands with no neighboring businesses, residences, schools, hospitals, etc. The nearest public area that has the possibility of being influenced by an accidental release would be highway 46. The Department of the California Highway Patrol would be notified of the kind and amount of release along with current weather conditions. It would be up to the CHP if Highway 46 would need to be closed. This is by prior agreement with the CHP and in accordance with CCWA's RMP.

F. Briefly describe your standard operating procedures **in the event of a release or threatened release of hazardous materials.** Emergency response procedures must comply with all federal, state and local regulations. Existing emergency response procedures may b referenced and attached to this document.

1. **Prevention** -- Describe the accident potentials associated with the hazardous materials present at your facility. What actions would your business take to reduce accident potentials? Include description of safety, storage and containment procedures.

Mistakenly putting the wrong chemical into the wrong storage tank: Operator on duty is responsible for taken a sample from the delivery truck, looking at the color & checking the specific gravity. The fill valves to all the bulk chemical tanks are locked and the valves would not be released until the Operator on duty has confirmed the chemical and releases the appropriate valve. Chlorine ton cylinders are stored inside and designed to be cleaned by an atmospheric scrubber in case of accidental release.

2. **Equipment** -- List the emergency response equipment at your facility (e.g. fire extinguishing systems, spill control equipment, decontamination equipment).

Item	Use	Location	Maintenance Procedure
Fire Extinguishers	Extinguish small fires	Throughout WTP facility	Monthly inspection, annual service by outside contractor (Scott O'Brien Fire & Safety Co.) + annual training on proper use of extinguishers.
Eyewash & Shower Stations	Flush contam-inated body parts	Throughout WTP facility	Monthly inspection & operation.
Cl2 Scrubber	Neutralize Cl2 atmosphere	East side of Chlorine storage building	Annual inspection & rebuild. Caustic health checked quarterly. Run montl (no chlorine).
Cl2 Sensors/Alarms	Sense Cl2 atmosphere	Cl2 Storage & feed rooms	Sensors calibrated monthly. Sensors run an automatic self check daily.
SCBA's	Supplied air	Bottom of stairwell	Monthly inspections, annual fit testing, and tanks checked every 3 years.
Cl2 Vacuum System	Provide vacuum	Entire chlorine system	Yearly re-build.

3. **Evacuation** -- Describe how you will immediately evacuate your facility. What communications or alarms are used? How will you operate these during power failure?

Audible alarms will sound along with an announcement over the Plant public address system to evacuate. All personnel at the WTP will evacuate to the flagpole for a roll call and brief on the situation plus assignment of duties. The Operator may maintain communication with staff at the evacuation point via radio if busy handling other issues. WTP has a backup generator that will fully power the facility when normal power is unavailable.

4. **Shutdown** -- Describe the shutdown for each site or facility.

See Attachment # 2 (Emergency Shutdown Procedure of the WTP, Emergency shutdown Procedure of the Chlorine feed Equipment, and Emergency Shutdown Procedure of the Ammonia Feed System)

5a. **Response** -- Describe what is done to lessen or mitigate the harm or damage to person(s), property, or the environment, and prevent the event from getting worse or spreading. What is your immediate response to:

Fire: Fire extinguishers are located throughout the WTP that could be used to extinguish small fires. A fire sprinkler & alarm system are also installed throughout the facility. CDF inspects the WTP annually & CCWA staff informs the Shandon Station of any hazardous work.

Explosion: Same response as for earthquake.

Spill: All bulk chemical tanks are situated in large secondary containment areas and highly hazardous chemicals like the ammonia have quick acting isolation valves. The Cl2 areas are situated in enclosed buildings where the atmosphere can be cleaned by a Cl2 scrubber.

Earthquake: Personnel evacuate to flagpole. Operator on duty monitors for a rise in flow from WTP. Operator on duty also inspects bulk chemical areas, checking the status of containment areas and checking for damage/leaks.

Major Power Failure: Entire Plant can be powered by an on-site back-up generator.

Flood: N/A

b. **Is this facility located on a 100-year flood plain?** ☐Yes ☒No

c. **Earthquake** - Identify facility areas and list mechanical or other systems that require immediate inspection or isolation because of their vulnerability to earthquake related ground motion.

Fuel Tanks – Diesel, Unleaded Gas & Propane, all bulk chemical storage areas – ammonia, caustic soda, chlorine, alum, ammonium hydroxide, Polymer, & sulfuric acid . All chemical related process piping. Treated and untreated water storage areas and associated piping.

6. **Clean-Up** (Remove the Hazard) -- How do you handle the complete process of cleaning up, and disposing of related materials at your facility? Note: Notify the Hazardous Materials Unified Program Agency when clean up is complete.

CCWA staff is responsible for minimizing the size of release and for the containment of the release. A licensed contractor will be called to clean-up and dispose of properly all residue contributed to the release.

G. **Location** -- Your business is required to keep a copy of the Business Plan and related MSDS sheets on-site. Describe where this information is located.

On bookshelf across from secretaries desk. First office to your left as you come through the main doors.

ATTACHMENT # 1
CENTRAL COAST WATER AUTHORITY

Emergency Response Procedures for Release of Hazardous Materials

1. The employee first aware of the release is responsible for notifying the Operator on duty.

2. The Operator on duty is responsible for quickly evaluating the situation and determining whether the chemical release can be SAFELY isolated, and for notifying the Water Treatment Plant Supervisor. In case of a chlorine leak, shut down the treatment process. The plant shall not be restarted until the chlorine leak is isolated and repaired and the scrubber is reloaded with fresh chemical.

3. If someone has been injured, or the chemical release has escaped secondary containment and is at risk of moving offsite, or in the case of chlorine, the chlorine building, call 9-1-1 for emergency assistance immediately.

4. If the release is greater than the Reportable Quantity (RQ), as defined by 49 CFR 171.101 or greater than 55 gallons for those materials that do not have an established RQ threshold and has escaped secondary containment and is moving offsite, the WTP Supervisor is responsible for calling the County of San Luis Obispo County Environmental Health Services (805-781-5500) and the California State Warning Center (OES) (800-852-7550).

   The WTP Supervisor will also be responsible for conducting the initial calculations necessary for determining if the release has exceeded the established RQ threshold. If the release of Cl2 is more than 10 lbs. and has escaped secondary containment (i.e. chlorine storage building, chlorine feed room), the WTP Supervisor must call the United States Coast Guard (310-732-7380).

Attachment # 2

Central Coast Water Authority
Polonio Pass Water Treatment Plant

Emergency Shutdown Procedure of the Water Treatment Plant

SCADA Overview

The Supervisory Control, Alarm, and Data Acquisition (SCADA) System provides a centralized and uniform means of monitoring plant operation and facilitates process interaction by the plant operators. The prime function of the SCADA system is monitoring and control of the plant equipment and process units. In addition to providing automatic logic, set point control, and remote manual operator control, the system acquires and stores up-to-date and reliable data reflecting the plant operation. Checking for and alerting the plant operator of alarms, input variables that exceed predetermined limits and shutting down the plant is another feature of the SCADA system. SCADA provides a shutdown screen that will allow the plant operator to quickly shutdown the process in the event of an emergency.

Procedure

1. Go to the main map page on SCADA
2. In the lower right hand corner of the map page there is a icon **"SHUTDOWN"**
3. Click **"SHUTDOWN"** to open the shutdown page
4. In the upper middle of the shutdown page there is a **"SHUTDOWN"** icon with a heading above "Manual Plant Shutdown"
5. Click **"SHUTDOWN"**
6. A message window will pop up stating ***"Manual shutdown? Are you sure about this?***
7. Click **OK**
8. This will immediately shutdown the plant process.
9. <u>The chlorine feed is the only system that will not shut down by this procedure, it must be closed manually.</u>
10. Initiate a chlorine feed system shutdown
11. FOLLOW THE APPLICABLE SAFETY PRECAUTIONS AND WEAR THE APPROPRIATE PPE TO AVOID ANY POSSIBLE CONTACT WITH CHLORINE.
12. Go directly to the chlorine storage located in the North section of the blower building.
13. On the East and West walls of the Blower Building, located between the entry doors to the storage and chlorinator rooms there is a "Red E-Stop" emergency shutdown system button for the valve closure system.
14. "Push" the button to shutdown the chlorine feed system. This will remotely close the valves located on the in-service and the standby set of one-ton containers allowing the system to evacuate itself into process.
15. Notify emergency services if needed. Call 911
16. Notify Plant Supervisor.
17. Verify all systems are off-line

Attachment # 2

Central Coast Water Authority
Polonio Pass Water Treatment Plant

Emergency Shutdown Procedure of the Chlorine Feed Equipment

Chlorination System Overview

The chlorination system is of the remote vacuum design with the chlorine taken as a gas from one-ton containers. Two automatic switchover vacuum regulators located in the container storage room convert the chlorine container pressure to a vacuum. When the operating set of chlorine containers become exhausted, the vacuum regulators automatically switch to the standby set of containers. The chlorine gas under vacuum is metered by chlorinators to injectors located at the application points. The chlorine injectors dissolve the chlorine gas into a solution with the injector operating water and create the vacuum necessary for gas transport and operation of the vacuum regulators in the container storage room.

Valve Closure System Overview

The MaxProTM Valve Closure System provides first line protection against leaks at the most vulnerable point in the supply system, the valve opening in the pressurized container. The system mounts to a standard one-ton container to close the valve automatically.

Procedure

1. Verify area is safe to enter.
2. FOLLOW THE APPLICABLE SAFETY PRECAUTIONS AND WEAR THE APPROPRIATE PPE TO AVOID ANY POSSIBLE CONTACT WITH CHLORINE.
3. Notify emergency services if needed, Call 911
4. Notify Plant Supervisor
5. Go directly to the chlorine storage located in the North section of the blower building.
6. On the East and West walls of the Blower Building, located between the entry doors to the storage and chlorinator rooms there is a "Red E-Stop" emergency shutdown system button for the valve closure system.
7. "Push" the button to shutdown the chlorine feed system. This will remotely close the valves located on the in-service and the standby set of one-ton containers allowing the system to evacuate itself into process.
8. Plant process must be shutdown at this point due to lack of disinfection, see (WTP Emergency Shutdown Procedure)
9. Verify system is secure.

Attachment # 2

Central Coast Water Authority
Polonio Pass Water Treatment Plant

Emergency Shutdown Procedure of the Ammonia Feed System

System Overview

Three metering pumps, 5-FD-16, 5-FD-17 and 5-FD-18, feed aqua ammonia from storage tank 6-T-3 to the chemical injection points at the initial flash mix facility, intermediate flash mix facility, and the chlorine contact basin inlet. The Aqua Ammonia storage tank 6-T-3 is located in the bulk chemical storage. It has a maximum capacity of 6,383 gallons. The tank overflow pipe is capped to prevent emission of ammonia vapors and in lieu of a gravity vent, the aqua ammonia storage tank has a combination vacuum/pressure relief valve assembly. The pressure relief vent discharges through a pipe submerged in a water seal tank located adjacent to the aqua ammonia tank. The tank outlet is supplied with a 3"valve and actuator that can be controlled locally or remotely from north outside wall of the bulk chemical containment structure.

Procedure

1. FOLLOW THE APPLICABLE SAFETY PRECAUTIONS AND WEAR THE APPROPRIATE PPE TO AVOID ANY POSSIBLE CONTACT WITH THE AQUA AMMONIA SOLUTION AND AMMONIA FUMES.
2. Notify emergency services if needed. Call 911
3. Notify Plant Supervisor.
4. Go to the North side of the bulk chemical containment structure.
5. A control box is located on the wall just left of the base side stair structure.
6. The box has a **"RED"** closed light and a **"GREEN"** open light to indicate the ammonia tank valve position.
7. An **"OPEN" "STOP" "CLOSED"** switch is located on the box.
8. Turn the switch to the **"CLOSED"** position.
9. When the "green" open light goes off and the "red" closed light is on, the valve has closed.
10. The valve will close in approximately 30 seconds.
11. Place the switch back to the **"STOP"** position.
12. Shutdown the plant. <u>The treatment process must have ammonia under normal conditions.</u>
13. Verify system is secure.

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

■ ADD ☐ DELETE ☐ REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Maintenance Shop – Welding Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *E-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Acetylene

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Acetylene

EHS* ☐ Yes ■ No 208

CAS# 209
74-86-2

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212: ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☐ b. LIQUID ■ c. GAS

LARGEST CONTAINER 215: *103 cu/ft*

FED HAZARD CATEGORIES (Check all that apply) 216: ■ a. FIRE ☐ b. REACTIVE ■ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *103 cu/ft*

MAXIMUM DAILY AMOUNT 218: *103 cu/ft*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ☐ a. GALLONS ■ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO
☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ■ l. CYLINDER
☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON
☐ r. OTHER ☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *100* 226	*Acetylene* 227	☐ Yes ■ No 228	*74-86-2* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Bulk Chemical Storage Area

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *D-5&6*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Aluminum Sulfate Solution 48%

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Liquid Alum

EHS* ☐ Yes ■ No 208

CAS# 209
10043-01-3

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 1-0-1

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *26,800 Gal.*

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ■ e. CHRONIC HEALTH

VERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
,000 Gal.	*53,600 Gal.*	*None*	*N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
■ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *48* 226	*Aluminum Sulfate* 227	☐ Yes ■ No 228	*10043-01-3* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)

CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201

Sludge Lagoons

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *F-1*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Aluminum Hydroxide

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Alum Sludge

EHS* ☐ Yes ■ No 208

CAS# 209
21645-51-2

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
N/A

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ☐ b. MIXTURE ■ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ■ a. SOLID ☐ b. LIQUID ☐ c. GAS

LARGEST CONTAINER *17,000 Tons* 215

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ■ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *2.6 (Dry) Tons*

MAXIMUM DAILY AMOUNT 218: *5.4 (Dry) Tons*

ANNUAL WASTE AMOUNT 219: *450 (Dry) Tons*

STATE WASTE CODE 220: *411*

UNITS* (Check one item only) 221: ☐ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ■ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO
☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER
☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON
■ r. OTHER ☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *80* 226	*Aluminum Hydroxide* 227	☐ Yes ■ No 228	*21645-51-2* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

SLUDGE PRODUCED BY WATER TREATMENT OPERATIONS INCLUDES ALUMINUM HYDROXIDE, POLMERS, COLLOIDS, AND MICROBES. WILL BE STORED ON SITE IN LAGOONS, DRIED AND DISPOSED ON SITE.

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Bulk Storage Chemical Area

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
■ YES ☐ NO

FACILITY ID # (Agency use only) 1

MAP# 203 *1*

GRID# 204 *D-6*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Ammonium Hydroxide 19%

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Aqueous Ammonia

EHS* ☐ Yes ■ No 208

CAS# 209
1336-21-6

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 3-1-0

HAZARDOUS MATERIAL TYPE (Check one item only) 211 ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212 ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214 ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215 *6,700 Gal.*

FED HAZARD CATEGORIES (Check all that apply) 216 ☐ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ■ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217 *000 Gal.*

MAXIMUM DAILY AMOUNT 218 *6,700 Gal.*

ANNUAL WASTE AMOUNT 219 *None*

STATE WASTE CODE 220 *N/A*

UNITS* (Check one item only) 221 ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
*If EHS, amount must be in pounds.

DAYS ON SITE: 222 *365*

STORAGE CONTAINER 223
■ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224 ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225 ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 226 *19*	227 *Ammonium Hydroxide*	228 ☐ Yes ■ No	229 *1336-21-6*
2 230	231	232 ☐ Yes ☐ No	233
3 234	235	236 ☐ Yes ☐ No	237
4 238	239	240 ☐ Yes ☐ No	241
5 242	243	244 ☐ Yes ☐ No	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ☐REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant

CHEMICAL LOCATION 201
Shop Welding Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ● NO

FACILITY ID # (Agency use only) 1

MAP# 203 *1*

GRID# 204 *E-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Argon - 40

TRADE SECRET ☐ Yes ● No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Argon

EHS* ☐ Yes ● No 208

CAS# 209
7440-37-1

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211 ☐ a. PURE ● b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ● No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214 ☐ a. SOLID ☐ b. LIQUID ● c. GAS

LARGEST CONTAINER *248 cu/ft* 215

FED HAZARD CATEGORIES (Check all that apply) 216 ☐ a. FIRE ☐ b. REACTIVE ● c. PRESSURE RELEASE ● d. ACUTE HEALTH ● e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217 *248 cu/ft*

MAXIMUM DAILY AMOUNT 218 *248 cu/ft*

ANNUAL WASTE AMOUNT 219 *None*

STATE WASTE CODE 220 *N/A*

UNITS* (Check one item only) 221 ☐ a. GALLONS ● b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222 *365*

STORAGE CONTAINER 223
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO
☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ● l. CYLINDER
☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON
☐ r. OTHER ☐ q. RAIL CAR

STORAGE PRESSURE 224 ● a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225 ● a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *100* 226	*Argon - 40* 227	☐ Yes ● No 228	*7440-37-1* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ ADD ☐ DELETE ■ REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Shop Welding Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *E-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
75 % Argon, 25% Carbon Dioxide

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
C-25 Shielding Gas

EHS* ☐ Yes ■ No 208

CAS# 209

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☐ b. LIQUID ■ c. GAS

LARGEST CONTAINER 215: *211 cu/ft*

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☐ b. REACTIVE ■ c. PRESSURE RELEASE ■ d. ACUTE HEALTH ■ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *211 cu/ft*

MAXIMUM DAILY AMOUNT 218: *211 cu/ft*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ☐ a. GALLONS ■ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO
☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ■ l. CYLINDER
☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON
☐ r. OTHER ☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *75* (226)	*Argon-40* (227)	☐ Yes ■ No (228)	*7440-37-1* (229)
2 *25* (230)	*Carbon Dioxide* (231)	☐ Yes ■ No (232)	*124-38-9* (233)
3 (234)	(235)	☐ Yes ☐ No (236)	(237)
4 (238)	(239)	☐ Yes ☐ No (240)	(241)
5 (242)	(243)	☐ Yes ☐ No (244)	(245)

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Chemical Feed Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *E-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Cationic Polymer – CAT FLOC TL

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Cationic Polymer

EHS* ☐ Yes ■ No 208

CAS# 209
This product is not considered to be hazardous

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 0-0-0

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *3800 Gallons*

FED HAZARD CATEGORIES (Check all that apply) 216: ■ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *1,500 Gal.*

MAXIMUM DAILY AMOUNT 218: *3,800 Gal.*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
■ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
■ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ☐ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☐ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *N/A* 226	*N/A* 227	☐ Yes ■ No 228	*N/A* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
THERMAL DECOMPOSITION OR COMBUSTION MAY PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, AMMONIA, OXIDES OF NITROGEN AND/OR HYDROGEN CHLORIDE.

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Bulk Chemical Storage Area

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
■ YES ☐ NO

FACILITY ID # (Agency use only) 1

MAP# 203 *1*

GRID# 204 *D-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Sodium Hydroxide 25%

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Caustic Soda

EHS* ☐ Yes ■ No 208

CAS# 209
1310-73-2

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 3-0-1

HAZARDOUS MATERIAL TYPE (Check one item only) 211 ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212 ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214 ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215 *31,900 Gal.*

FED HAZARD CATEGORIES (Check all that apply) 216 ☐ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ■ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217 *[illegible],000 Gal.*

MAXIMUM DAILY AMOUNT 218 *64,800 Gal.*

ANNUAL WASTE AMOUNT 219 *None*

STATE WASTE CODE 220 *N/A*

UNITS* (Check one item only) 221 ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222 *365*

STORAGE CONTAINER 223
■ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224 ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225 ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 226 *25*	227 *Sodium Hydroxide*	228 ☐ Yes ■ No	229 *1310-73-2*
2 230	231	232 ☐ Yes ☐ No	233
3 234	235	236 ☐ Yes ☐ No	237
4 238	239	240 ☐ Yes ☐ No	241
5 242	243	244 ☐ Yes ☐ No	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Blower Building, Chlorine Storage Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
■ YES ☐ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *C-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Chlorine

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Chlorine

EHS* ☐ Yes ■ No 208

CAS# 209
7782-50-5

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 4-0-1

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ■ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212: ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☐ b. LIQUID ■ c. GAS

LARGEST CONTAINER 215: *2,00 lbs.*

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ■ b. REACTIVE ■ c. PRESSURE RELEASE ■ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *[illegible],000 lbs.*

MAXIMUM DAILY AMOUNT 218: *32,000 lbs.*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ☐ a. GALLONS ☐ b. CUBIC FEET ■ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
■ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
■ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ☐ a. AMBIENT ■ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *100* 226	*Chlorine* 227	☐ Yes ■ No 228	*7782-50-5* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Diesel Fuel Bulk Storage Tank

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *C-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Diesel Fuel

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Diesel Fuel

EHS* ☐ Yes ■ No 208

CAS# 209
68476-34-6

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 0-2-2

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ■ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *1,000 Gal.*

FED HAZARD CATEGORIES (Check all that apply) 216: ■ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

VERAGE DAILY AMOUNT 217: *500 Gal.*

MAXIMUM DAILY AMOUNT 218: *1,000 Gal.*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
■ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 226: *100*	227: *Diesel Fuel*	228: ☐ Yes ■ No	229: *68476-34-6*
2 230	231	232: ☐ Yes ☐ No	233
3 234	235	236: ☐ Yes ☐ No	237
4 238	239	240: ☐ Yes ☐ No	241
5 242	243	244: ☐ Yes ☐ No	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3

Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Emergency Generator Diesel Fuel Tank

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *C-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Diesel Fuel

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Diesel Fuel

EHS* ☐ Yes ■ No 208

CAS# 209
NFPA Code (Health-Fire-Reactivity) 0-2-0

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ■ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212: ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *75 Gal.*

FED HAZARD CATEGORIES (Check all that apply) 216: ■ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

VERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
0 Gal.	*75 Gal.*	*None*	*N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS

***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
■ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *100* 226	*Diesel Fuel* 227	☐ Yes ■ No 228	*68476-34-6* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ADD ☐DELETE ■REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Shop Welding Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *E-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Helium

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Helium

EHS* ☐ Yes ■ No 208

CAS# 209
7440-59-7

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211
■ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214
☐ a. SOLID ☐ b. LIQUID ■ c. GAS

LARGEST CONTAINER *240 cu/ft* 215

FED HAZARD CATEGORIES (Check all that apply) 216
☐ a. FIRE ☐ b. REACTIVE ■ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

VERAGE DAILY AMOUNT 217	MAXIMUM DAILY AMOUNT 218	ANNUAL WASTE AMOUNT 219	STATE WASTE CODE 220
0 cu/ft	*240 cu/ft*	*None*	*N/A*

UNITS* (Check one item only) 221
☐ a. GALLONS ■ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222
365

STORAGE CONTAINER 223
☐ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
■ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224
■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225
■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

	%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1	226: *100*	227: *Helium*	228: ☐ Yes ■ No	229: *7440-59-7*
2	230:	231:	232: ☐ Yes ☐ No	233:
3	234:	235:	236: ☐ Yes ☐ No	237:
4	238:	239:	240: ☐ Yes ☐ No	241:
5	242:	243:	244: ☐ Yes ☐ No	245:

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

☐ ADD ☐ DELETE ■ REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Laboratory

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *E-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Nitrogen

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Nitrogen

EHS* ☐ Yes ■ No 208

CAS# 209
7727-37-9

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ■ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212: ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☐ b. LIQUID ■ c. GAS

LARGEST CONTAINER 215: *304 cu/ft*

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☐ b. REACTIVE ■ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *819 cu/ft*

MAXIMUM DAILY AMOUNT 218: *819 cu/ft*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ☐ a. GALLONS ■ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO
☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ■ l. CYLINDER
☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON
☐ r. OTHER ☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 226: *99*	227: *Nitrogen*	228: ☐ Yes ■ No	229: *7727-39-9*
2 230	231	232: ☐ Yes ☐ No	233
3 234	235	236: ☐ Yes ☐ No	237
4 238	239	240: ☐ Yes ☐ No	241
5 242	243	244: ☐ Yes ☐ No	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

■ ADD ☐ DELETE ☐ REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Eastside of Clarifier

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *H-6*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Liquefied Petroleum Gas

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Propane (LPG)

EHS* ☐ Yes ■ No 208

CAS# 209
74-98-6

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 1-4-0

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *500 Gallons*

FED HAZARD CATEGORIES (Check all that apply) 216: ■ a. FIRE ☐ b. REACTIVE ■ c. PRESSURE RELEASE ■ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *625 Gal.*

MAXIMUM DAILY AMOUNT 218: *1250 Gal.*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
■ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ☐ a. AMBIENT ■ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☐ a. AMBIENT ☐ b. ABOVE AMBIENT ■ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *90* (226)	*Propane* (227)	☐ Yes ■ No (228)	*74-98-6* (229)
2 *5* (230)	*Propylene* (231)	☐ Yes ■ No (232)	*115-07-1* (233)
3 *2.5* (234)	*Butane* (235)	☐ Yes ■ No (236)	*106-97-8* (237)
4 (238)	(239)	☐ Yes ☐ No (240)	(241)
5 (242)	(243)	☐ Yes ☐ No (244)	(245)

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

■ ADD ☐ DELETE ☐ REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
Sulfuric Acid Bulk Storage Area

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
■ YES ☐ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *F-6*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Sulfuric Acid

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Sulfuric Acid

EHS* ☐ Yes ■ No 208

CAS# 209
7664-93-9

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 3-0-2

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ■ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ■ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *13,500 Gallons*

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ■ b. REACTIVE ☐ c. PRESSURE RELEASE ■ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

AVERAGE DAILY AMOUNT 217: *750 Gal.*

MAXIMUM DAILY AMOUNT 218: *13,500 Gal.*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
- ■ a. ABOVE GROUND TANK
- ☐ b. UNDERGROUND TANK
- ☐ c. TANK INSIDE BUILDING
- ☐ d. STEEL DRUM
- ☐ e. PLASTIC/NONMETALLIC DRUM
- ☐ f. CAN
- ☐ g. CARBOY
- ☐ h. SILO
- ☐ i. FIBER DRUM
- ☐ j. BAG
- ☐ k. BOX
- ☐ l. CYLINDER
- ☐ m. GLASS BOTTLE
- ☐ n. PLASTIC BOTTLE
- ☐ o. TOTE BIN
- ☐ p. TANK WAGON
- ☐ r. OTHER
- ☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *93-99* 226	*Sulfuric Acid* 227	☐ Yes ■ No 228	*7664-93-9* 229
2 230	231	☐ Yes ☐ No 232	233
3 234	235	☐ Yes ☐ No 236	237
4 238	239	☐ Yes ☐ No 240	241
5 242	243	☐ Yes ☐ No 244	245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

FORM I – SAN LUIS OBISPO COUNTY CERTIFIED UNIFIED PROGRAM AGENCY (CUPA)
CHEMICAL INVENTORY

(one page per material per building or area)

■ ADD ☐ DELETE ☐ REVISE 200

I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
Polonio Pass Water Treatment Plant - Central Coast Water Authority

CHEMICAL LOCATION 201
West Side of Blower Room

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ■ NO

FACILITY ID # (Agency use only) 1

MAP# 203: *1*

GRID# 204: *C-5*

II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Petroleum Hydrocarbon

TRADE SECRET ☐ Yes ■ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Unleaded Gasoline

EHS* ☐ Yes ■ No 208

CAS# 209
8006-61-9

***If EHS is "Yes", all amounts below must be in lbs.**

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210
NFPA Code (Health-Fire-Reactivity) 1-3-0

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ■ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212: ☐ Yes ■ No

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ■ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: *500 Gallons*

FED HAZARD CATEGORIES (Check all that apply) 216: ■ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ■ e. CHRONIC HEALTH

VERAGE DAILY AMOUNT 217: *250 Gal.*

MAXIMUM DAILY AMOUNT 218: *500 Gal.*

ANNUAL WASTE AMOUNT 219: *None*

STATE WASTE CODE 220: *N/A*

UNITS* (Check one item only) 221: ■ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
***If EHS, amount must be in pounds.**

DAYS ON SITE: 222: *365*

STORAGE CONTAINER 223:
■ a. ABOVE GROUND TANK
☐ b. UNDERGROUND TANK
☐ c. TANK INSIDE BUILDING
☐ d. STEEL DRUM
☐ e. PLASTIC/NONMETALLIC DRUM
☐ f. CAN
☐ g. CARBOY
☐ h. SILO
☐ i. FIBER DRUM
☐ j. BAG
☐ k. BOX
☐ l. CYLINDER
☐ m. GLASS BOTTLE
☐ n. PLASTIC BOTTLE
☐ o. TOTE BIN
☐ p. TANK WAGON
☐ r. OTHER
☐ q. RAIL CAR

STORAGE PRESSURE 224: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ■ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

%WT	HAZARDOUS COMPONENT (For mixture or waste only)	EHS	CAS #
1 *15* 226	*Methyl Tert Butyl Ether* 227	☐ Yes ■ No 228	*1634-04-4* 229
2 *15* 230	*Toleune* 231	☐ Yes ■ No 232	*108-88-3* 233
3 *21* 234	*Xylene* 235	☐ Yes ■ No 236	*1330-20-7* 237
4 *5* 238	*Bezene* 239	☐ Yes ■ No 240	*71-43-2* 241
5 *5* 242	*1,2,4 – Trimethyl Benzene* 243	☐ Yes ■ No 244	*95-63-6* 245

If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

HCP APPENDIX H

Fire Prevention and Control Plan

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APPENDIX H
FIRE PREVENTION AND CONTROL PLAN

The following plan, or parts thereof as appropriate, shall be implemented by CCWA maintenance crews and contractors hired by CCWA for maintenance work.

1.0 DEFINITIONS AND ABBREVIATIONS

ECC	Emergency Communications (or Command) Center.
Fire Danger	Relative probability of how easily a wildfire will start and how it will behave based on daily measures of fuel conditions and weather.
Fire Hazard	Condition of vegetation and other flammable materials that affect the starting and spreading of wildfires.
Fire Prevention	Measures taken to prevent the starting of wildfires.
Fire Protection	Total program of planning, organizing, and implementing a system of fire prevention, dispatching, communication, and fire suppression for the purpose of mitigating damages by wildfires to life, property, and natural resources located in wildlands.
Fire Suppression	Measures taken to contain and control the spread of a wildfire once it has started.
Flammable Material	Any dead or living vegetation, leaves, twigs, branches, grass, shrubs, trees, duff, or other material that will ignite and burn.
H&SC	California Code of Regulations, Health and Safety Codes.
PRC	California Code of Regulations, Public Resources Codes.
SBCO	Santa Barbara County Fire Department
SLOC	San Luis Obispo County Fire Department (California Department of Forestry).
Wildlands	All more or less undeveloped lands covered by grass, shrubs, trees, or other flammable vegetation that will burn.
Wildfire	Any unwanted or illegal fire burning in grass, shrubs, trees, ground litter, or flammable material in the wildlands.

2.0 OBJECTIVES

The Fire Prevention and Control Plan shall be implemented in conformance with the terms of a valid fire permit. The objectives of this plan are to:

- Comply fully with requirements of all applicable state fire laws and county fire regulations.
- Prevent wildfires from being started by a contractor's operations or employees.
- Report all wildfires promptly to the appropriate ECC.
- Suppress the spread of wildfires from the construction or maintenance site.
- Fully coordinate the contractors fire prevention and suppression activities with those of the responsible agencies.
- Take special measures during critical fire weather to prevent and suppress wildfires.
- Conduct all fire protection activities in a safe manner.

3.0 COMPLIANCE WITH CALIFORNIA FIRE LAWS

To comply with California fire laws, CCWA and the contractor shall:

- Permit smoking only at designated places. (PRC 4255)
- Not start a fire without a burning permit. (PRC 4423)
- Control any fire the project starts. (PRC 4422; H&SC 13000)
- Be liable to the authority having jurisdiction for expenses of fighting any fire started by operations, negligence, or violation of law or regulation. (H&SC 13009)
- Have effective spark arresters on the exhaust of all equipment powered by gasoline, diesel, or other hydrocarbon fuel. The spark arrester must prevent escape from the exhaust of carbon or other flammable particles over 0.0232 inch in diameter. Motor trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are exempt from this provision if their exhaust system is equipped with a muffler. (PRC 4442)
- Have at least a 30-foot zone clear of flammable vegetation (except single specimens of trees, ornamental shrubbery, or similar plants used as groundcover that do not permit the spread of fire) around trailers, buildings, and other structures. SBCO or SLOC may require additional clearance up to 100 feet, depending on the fire hazard. In addition, tree branches must be cleared within 10 feet of any chimney or stove pipe; dead branches overhanging buildings must be removed; and roofs of buildings must be kept free of dead limbs, leaves, needles, etc. (PRC 4291)
- Place a screen (1/2-inch mesh or less) over the outlet of any chimney or stovepipe attached to any stove or other device that burns any solid or liquid fuel within any of the buildings at the work site. (PRC 4291)
- Use no motor, engine, welding equipment, cutting torch, grinding device, or equipment from which a spark, fire, or flame may originate without first (a) clearing away all flammable material for a distance of 10 feet and (b) having on hand a round-point shovel with an overall length of at least 46 inches and a water-filled backpack pump fully equipped

and ready to use. This does not apply to power saws and other portable tools powered by a gasoline-fueled internal combustion engine. (PRC 4427)

- Have at the work site a sealed box of firefighting tools to include at least 1 water-filled backpack pump, 2 axes (or Palaskis), 2 McLeods, and enough shovels so that each employee at the operation can be equipped to fight fire. At least 1 serviceable chainsaw (3.5 hp minimum with at least a 20-inch cutting bar) shall be immediately available within the operating area. Each vehicle and tractor used on the operation shall have 1 shovel. (PRC 4428)

- Use no portable gasoline-powered tool (chainsaw, etc.) within 25 feet of any flammable materials unless one round-point shovel with an overall length of at least 46 inches or a fire extinguisher having a rating of 2-BC or larger is also present. (PRC 4431)

- Set no backfire at the site unless it is done under the supervision of SBCO or SLOC, or it is done to save lives and property at the site. (PRC 4426)

- Provide contractor employees to help fight wildfires in the local area if requested by SBCO or SLOC. (PRC 4436)

4.0 FIRE PREVENTION

- Smoking shall be permitted only in areas cleared of vegetation for a distance of at least 5 feet or in enclosed vehicles. Cigarette butts shall be field stripped and properly disposed of.

- Open fires for any purpose shall not be permitted. All waste shall be hauled away from the site to county-approved disposal sites.

- All portable tools having internal combustion engines shall be equipped with spark arresters (see section 3.0 for specifications) that are cleaned periodically to remove accumulated carbon particles.

- No motor vehicles shall be parked or operated outside of cleared work areas except for the specific purpose of vegetation clearing.

- All welding shall be conducted in the pipeline trench or in vaults. Flammable material shall be cleared for a distance of at least 10 feet (up to 30 feet as required by SBCO or SLOC) prior to use of any motor, engine, welding equipment, cutting torch, or grinding device. Work will be conducted under a hot works permit.

5.0 READINESS

All contractor personnel shall attend an environmental training course provided by CCWA that includes basic fire awareness and requirements. Documentation of the environmental training course shall be maintained by CCWA and made available to SLCO or SBCO upon request.

6.0 ADDITIONAL FIREFIGHTING FACILITIES AND EQUIPMENT

As appropriate for the work being performed, CCWA crews and contractors shall have the following special facilities and equipment for preventing and suppressing wildfires:

- A minimum 500-gallon water truck/tank at the work site during welding and grinding operations occurring in the dry season (June through November). The truck shall have at least a 200-foot long, ¾-inch diameter hose.

- A minimum 1-lb fire extinguisher on all vehicles at the work site. Welding rigs shall have a minimum 20-lb (or 2 10-lb) fire extinguisher and a minimum of 5 gallons of water in a fire fighting apparatus.

- Contractor/CCWA foreman at the site shall be responsible as the firewatch for the activities under his supervision and shall have direct radio/cell phone contact to the Field Office Dispatcher.

7.0 ORGANIZATION

Prior to the arrival of fire agencies, all firefighting actions shall be initiated and directed by the contractor's construction foreman on site. Crew members shall strictly follow the instructions of the foreman.

The contractor shall retain a Field Office Dispatcher, who shall be able to contact 911 in the event of a wildfire, during all hours of construction.

8.0 REPORTING WILDFIRES

All fires off site shall be immediately reported to the appropriate ECC via 911. All pertinent information, in particular the location, will be given to the 911 fire dispatcher, and the line will not be terminated until fire dispatcher instructs to do so. Calls to 911 via cellular phones go to the CHP dispatch. If the fire is at or immediately adjacent to the work site, one person will report the fire immediately. The remaining members of the crew will begin to take suppression action.

When a telephone is unavailable in the immediate vicinity, the contractor shall report fires by radio to the Field Office Dispatcher who will immediately report the incident to the ECC via 911.

9.0 COORDINATION WITH SLOC AND SBCO

The contractor shall coordinate both its fire prevention and fire suppression activities with SLOC and SBCO. The contractor shall notify SBCO at least 72 hours in advance of any excavation within any flammable liquid, gas, or toxic gas pipeline corridors. SLOC and SBCO will make site-specific recommendations and discuss fire prevention and suppression measures with the contractor.

When SLOC or SBCO arrives at the scene of a fire, the contractor's employees and equipment assigned to help fight the fire will be under the direction of the Fire Department's Incident

Commander or his line representative. Typically, the incident Commander shall supervise the contractor's foreman, who will then direct the activities of the contractor's crew.

10.0 REQUIREMENTS ON VANDENBERG AIR FORCE BASE

In addition to the above requirements, contractors working on Vandenberg Air Force Base (VAFB) shall comply with the rules and regulations set forth in the Department of the Air Force, 30th Space Wing Regulation 92-1.

11.0 CERTIFICATION

The contractor shall read and sign the following contractor's certification statement and submit the original signature page along with the completed plan to CCWA prior to commencing the work.

CONTRACTOR'S CERTIFICATION

I certify under penalty of law that I have read, fully understand, and shall comply with all requirements and standards set by this document and all additional information submitted for this document. I am aware that failure to comply with these requirements and standards may result in a violation of State and/or County fire laws including the possibility of fine and imprisonment.

Signature	Date
Print Name	Title and Company

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HCP APPENDIX I

Construction Impacts

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Table I-1. Areas of Permanent Construction Impacts

Location	*Species*	*Impact*
Tank 1	San Joaquin kit fox	137.9 acres -- fenced facility, 60-ft inlet & outlet corridors, spoil pile
Tank 1 access road	San Joaquin kit fox, California red-legged frog	19.3 acres with 2 culverts in drainage OP-7A
Tank 1 to end Reach 1	San Joaquin kit fox	10-ft wide access in pipeline corridor = 3.4 acres
Reach 2	San Joaquin kit fox	10-ft wide access in pipeline corridor = 8.8 acres
Salinas River	Willow flycatcher, least Bell's vireo	1.95 acres of riparian woodland (replanted but long-term recovery assumed)
Drainage SLO-7.2	California red-legged frog	0.01 acre of stream habitat from access road
Kirshner Creek	California red-legged frog	0.61 acre from erosion during construction
Brizziolari Creek	California red-legged frog	0.65 acre – bedrock pools removed, temporary access road fill washed downstream
E. Fork Miossi Creek	California red-legged frog	0.01 acre – culvert placed in stream
Drainage SLO-19	California red-legged frog	0.01 acre – blowoff vault and access road culvert in stream
W. Corral de Piedra	California red-legged frog	0.21 acre – fractured bedrock with loss of water
E. Fork San Luis Obispo Creek	California red-legged frog	0.19 acre – dumping of spoil in tributary

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HCP APPENDIX J

Mitigation Bank Credits Receipts

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AGREEMENT FOR SALE OF CONSERVATION CREDITS
USFWS File # N/A
CDFW File # 2081-2012-035-05

This Agreement is entered into this 17th day of March, 2015, by and between Rancho Purisima, LLC, a California limited liability company (Bank) and Central Coast Water Authority (Project Applicant), jointly referred to as the "Parties," as follows:

RECITALS

A. The Bank Owner has developed the La Purisima Conservation Bank located in Santa Barbara County, California; and

B. The Bank was approved by the U.S. Fish and Wildlife Service ("Service") and California Department of Fish and Wildlife ("Department") on March 13, 2014, and is currently in good standing with these agencies; and

C. The Bank has received approval from the Service and the Department to offer California tiger salamander and Western spadefoot toad credits as compensation for the loss of breeding and upland habitat for California tiger salamander and Western spadefoot toad as specified in the *La Purisima Conservation Bank Enabling Instrument* ("Bank Agreement"); and

D. Project Applicant is seeking to implement the project described on Exhibit "A" attached hereto (Project), which would unavoidably and adversely impact California tiger salamander habitat, and seeks to compensate for the loss of California tiger salamander habitat by purchasing Conservation Credits from Bank; and

E. Project Applicant has been authorized by the Service, Service File No. N/A, and the Department, Department File No. 2081-2012-035-05, to purchase from the Bank One (1) California tiger salamander upland credit upon confirmation by the Bank Owner of credit availability/adequate balance of credits remaining for sale; and

F. Project Applicant desires to purchase from Bank and Bank desires to sell to Project Applicant One (1) California tiger salamander credit;

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. Bank hereby sells to Project Applicant and Project Applicant hereby purchases from Bank One (1) California tiger salamander credit for the purchase price of Thirty Five Thousand Dollars ($35,000.00). The Bank will then deliver to Project Applicant an executed Bill of Sale in the manner and form as attached hereto and marked Exhibit "B". The purchase price for said credits shall be paid by cashier's check or, at the option of Bank, wire transfer of funds according to written instructions by Bank to Project Applicant.

2. The sale and transfer herein is not intended as a sale or transfer to Project Applicant of a security, license, lease, easement, or possessory or non-possessory interest in real property, nor the granting of any interest of the foregoing.

3. Project Applicant shall have no obligation whatsoever by reason of the purchase of the Conservation Credits, to support, pay for, monitor, report on, sustain, continue in perpetuity, or otherwise

be obligated or liable for the success or continued expense or maintenance in perpetuity of the credits sold, or the Bank. Pursuant to the Bank Agreement and any amendments thereto, Bank shall monitor and make reports to the Service and Department on the status of any Conservation Credits sold to Project Applicant. Bank shall be fully and completely responsible for satisfying any and all conditions placed on the Bank or the Conservation Credits by the Service and Department.

4. The Conservation Credits sold and transferred to Project Applicant shall be non-transferable and non-assignable, and shall not be used as compensatory mitigation for any other Project or purpose, except as set forth herein.

5. Project Applicant must exercise his/her/its right to purchase the Conservation Credits within 30 days of the date of this Agreement. After the 30-day period, this Agreement will be considered null and void.

6. Upon purchase of the credits specified in paragraph D above, the Bank shall submit to the parties listed in the Notices section of the Bank Agreement / Bank Enabling Instrument, copies of the: a) Agreement for Sale of Conservation Credits; b) Bill of Sale; c) Payment Receipt; and d) an updated ledger. The updated inventory / ledger must detail: i) Project Applicant; ii) Project Name; iii) Status (sale complete/sale not complete); iv) Credit Sale Date; v) Service File Number; vi) U.S. Army Corps of Engineers File Number (if applicable); vii) Total Number of Credits Authorized to Sell; viii) Total Number of Credits Sold to Date (inclusive); and ix) Balance of all Credits Available. The inventory / ledger should include all sales data from bank opening/establishment to the present.

IN WITNESS WHEREOF, the parties have executed this Agreement the day and year first above written.

BANK:

RANCHO PURISIMA, LLC

By: _____ Date: March 17, 2015
Brian Sweeney, Manager

PROJECT APPLICANT:

By: _____ Date: 3/24/15

APPROVED

UNITED STATES FISH AND WILDLIFE SERVICE:

This Agreement fulfills a portion of the Project Applicant's proposed California tiger salamander habitat conservation measures, as described in the Service's Biological Opinion; Service File Number N/A _____ dated _____. The Service verifies that the La Purisima Conservation Bank is in good standing as of the date of this Agreement.

By: _____ Date: _____

Ventura Fish and Wildlife Office

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE:

This Agreement fulfills a portion of the Project Applicant's proposed California tiger salamander habitat conservation measures, as described in CDFW's File Number 2081-2012-035-05 dated _____. The CDFW verifies that the La Purisima Conservation Bank is in good standing as of the date of this Agreement.

By: _____ Date: 3/26/15

California Department of Fish & Wildlife, South Coast Region

Exhibit "A"

DESCRIPTION OF PROJECT
TO BE
MITIGATED

The Project for this 2081 permit is operation and maintenance (O&M) of State Water Project (SWP) facilities in Santa Barbara County, from the Santa Maria River to Lake Cachuma. These facilities include a buried pipeline with appurtenant facilities. Project construction was completed and operations began in 1997. A Habitat Conservation Plan (HCP) has been prepared in support of obtaining an Incidental Take Permit under section 10(a)(1)(B) of the federal Endangered Species Act (ESA) for operation and maintenance of these facilities.

Service File # N/A; Department File #2081-2012-035-05, Santa Barbara County, California

*****

Exhibit "B"

BILL OF SALE

Contract # 2015-01

Service File # 1-1- N/A

Department File # 2081-2012-035-05

In consideration of Thirty Five Thousand Dollars ($35,000.00), receipt of which is hereby acknowledged, Rancho Purisima, LLC does hereby bargain, sell and transfer to Central Coast Water Authority (Project Applicant), One (1) credit in the *La Purisima Conservation Bank* in Santa Barbara County, California, developed, and approved by the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife pursuant to the *La Purisima Conservation Bank Enabling Instrument* (the "Bank Agreement").

Rancho Purisima, LLC represents and warrants that it has good title to the credits, has good right to sell the same, and that they are free and clear of all claims, liens, or encumbrances other than those authorized by the Bank Agreement.

Rancho Purisima, LLC covenants and agrees with the buyer to warrant and defend the sale of the credits hereinbefore described against all and every person and persons whomsoever lawfully claiming or to claim the same.

DATED: 3/30/15

RANCHO PURISIMA, LLC

By: _____
Brian Sweeney, Manager

Exhibit "C"

La Purisma Conservation Bank

CALIFORNIA TIGER SALAMANDER CREDITS: PAYMENT RECEIPT

PARTICIPANT INFORMATION

Name: Central Coast Water Authority

Address: 255 Industrial Way, Buellton, CA 93427

Telephone: 805-688-2292, ext. 234

Contact: Ron Cline, Regulatory Specialist (rwc@ccwa.com)

PROJECT INFORMATION

Project Description: Central Coast Water Authority – Day-to-Day Operations for Facilities

Agency File Numbers:

Species/Habitat Affected: CA tiger salamander

Credits to be Purchased: 1

Payment Amount: $35,000.00

Project Location: Northern Santa Barbara County

County/Address:

PAYMENT INFORMATION

Payee: Rancho Purisima, LLC

Payer: Central Coast Water Authority

Amount: $35,000.00

Method of payment: Cash _____ Check No. 41765 Money Order No. _____

Received by: _____ Date: 3/30/15
(Signature)

Name: Brian Sweeney Title: Manager

RECEIVED
APR - 7 2010

COPY

BILL OF SALE

Palo Prieto Conservation Bank -- Lake Parcel

In consideration of their receipt of payment of Fifteen Thousand Dollars ($15,000), which is hereby acknowledged, JOHN WILLIAM GRANT, TRUSTEE OF THE GRANT FAMILY TRUST DATED OCTOBER 19, 1993, AND ROBERT A. GRANT, JR., TRUSTEE OF THE ROBERT A. GRANT JR. TRUST DATED NOVEMBER 5, 2004 (together "**Lake Parcel Owners**") do hereby bargain, sell and transfer to Central Coast Water Authority ("CCWA"), as approved by the U.S. Fish and Wildlife Service for use by CCWA to satisfy mitigation requirements in connection with its operation, repair, maintenance, and replacement of the State Water Pipeline from the Polonio Pass Water Treatment Plant to Lake Cachuma, in San Luis Obispo County and Santa Barbara County, California, 6.0 San Joaquin kit fox credits from the Lake Parcel of the Palo Prieto Conservation Bank ("PPCB"), located in San Luis Obispo County, California, as established pursuant to the Palo Prieto Conservation Bank Agreement, dated August 4, 2006, as amended on March 1, 2008 and October 20, 2009, by and among the PPCB Lake Parcel Owners, and John W. Grant, an unmarried man, and the California Department of Fish and Game and the U.S. Fish and Wildlife Service (Tracking No. 1802-2005-019-03).

PPCB LAKE PARCEL OWNERS

John W Grant TTE

John William Grant
Trustee of the Grant Family Trust
Dated October 18, 1993

Dated: 3/14/10

Robert A. Grant, Jr.
Trustee of the Robert A. Grant Jr. Trust
Dated November 5, 2004

Dated: 3-8-10

I HAVE THE ORIGINAL