

**ALTAMONT LANDFILL AND RESOURCE RECOVERY FACILITY
BIOLOGICAL ASSESSMENT**

**ALTAMONT LANDFILL AND RESOURCE RECOVERY FACILITY
BIOLOGICAL ASSESSMENT**

January 17, 1995

Prepared for:

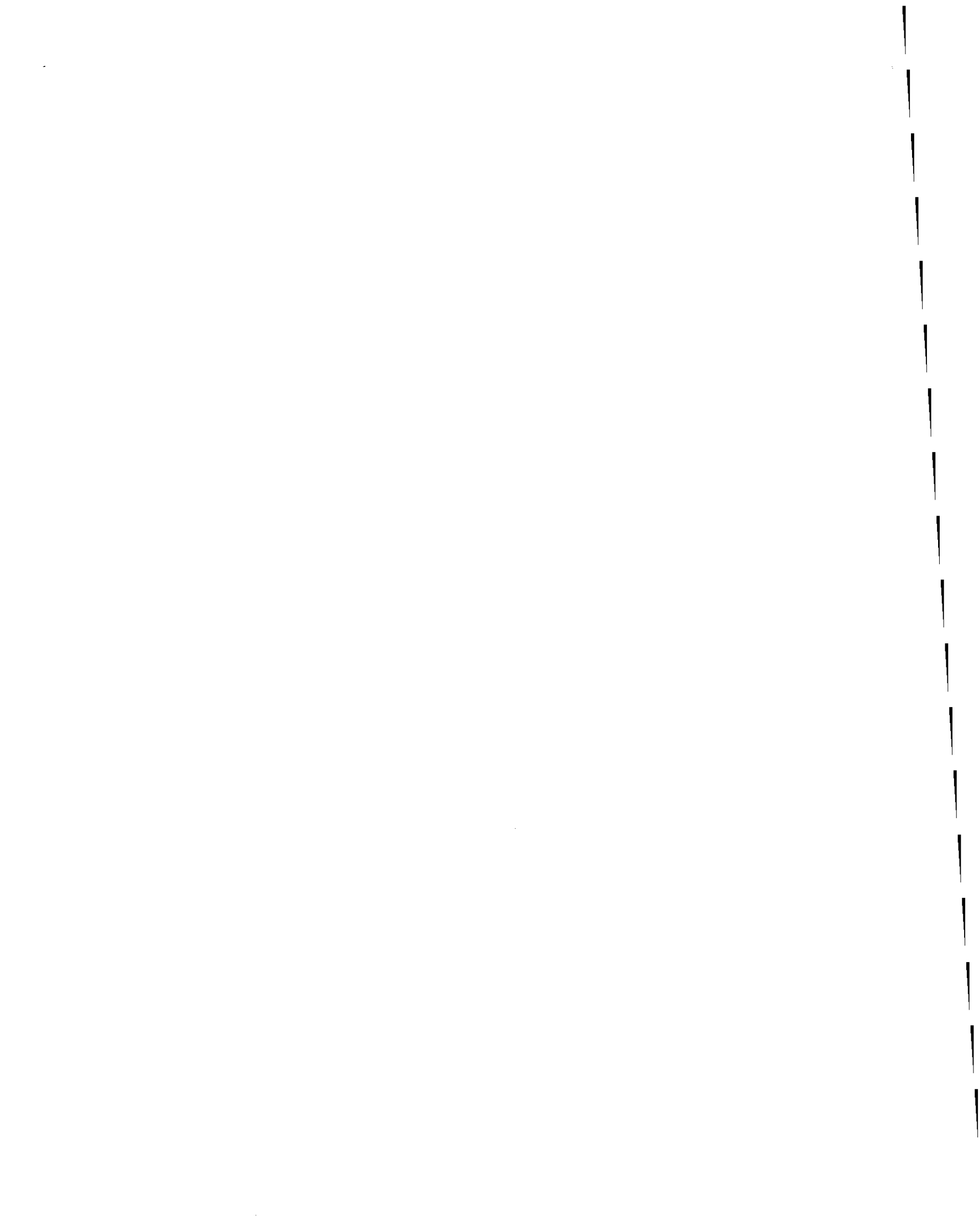
*Waste Management of Alameda County
Altamont Landfill
10840 Altamont Pass Road
Livermore, CA 94550*

Prepared by:

*LSA Associates, Inc.
157 Park Place
Pt. Richmond, California 94801
(510) 236-6810
LSA Project #WMI108*

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
BACKGROUND	1
PROJECT LOCATION	1
PROJECT DESCRIPTION	4
METHODS	7
PRE-FIELD INVESTIGATIONS	7
FIELD SURVEYS	7
ENVIRONMENTAL SETTING	16
TOPOGRAPHY AND SOILS	16
LAND USE	16
VEGETATION	17
WILDLIFE VALUES	19
SPECIAL STATUS PLANT SPECIES	20
SPECIAL STATUS WILDLIFE SPECIES	20
PROJECT IMPACTS	28
SPECIAL STATUS PLANTS	28
SPECIAL STATUS WILDLIFE	28
CUMULATIVE IMPACTS	32
MITIGATION - PHASE 1	33
SAN JOAQUIN KIT FOX	33
SAN JOAQUIN POCKET MOUSE	40
PACIFIC WESTERN BIG-EARED BAT AND GREATER WESTERN MASTIFF BAT	40
FERRUGINOUS HAWK	41
WESTERN BURROWING OWL	41
CALIFORNIA TIGER SALAMANDER	41
CALIFORNIA RED-LEGGED FROG	45
MITIGATION - PHASE 2 THROUGH PHASE 4	47
SAN JOAQUIN KIT FOX	47
SAN JOAQUIN POCKET MOUSE	48
FERRUGINOUS HAWK	48
WESTERN BURROWING OWL	49
CALIFORNIA TIGER SALAMANDER	49
CALIFORNIA RED-LEGGED FROG	49
REFERENCES	50
LITERATURE CITED	50



INTRODUCTION

BACKGROUND

This biological assessment of Waste Management of Alameda County's Altamont Landfill and Resource Recovery Facility (ALRRF) has been prepared by LSA Associates, Inc. (LSA) to satisfy the requirements of Section 7 of the federal Endangered Species Act of 1973. Due to the projects' potential impact to waters of the United States and adjacent wetlands, a Section 404 permit under the federal Clean Water Act is required, thus triggering the need for a Section 7 consultation under the Endangered Species Act. A wetlands mitigation plan has been developed (LSA 1995) and an Environmental Impact Report (EIR) is being prepared by the County of Alameda Planning Department. Consultation will occur concurrently with the California Department of Fish and Game (CDFG) because the San Joaquin kit fox (*Vulpes macrotis mutica*) is also a State-listed species. Two federally endangered plant species, large flowered fiddleneck (*Amstinkia grandiflora*) and palmate-bracted bird's-beak (*Cordylanthus palmatus*); five federally threatened or endangered wildlife species, San Joaquin kit fox, bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), longhorn fairy shrimp (*Branchinecta longiantenna*), and vernal pool fairy shrimp (*B. lynchi*); and four species proposed for listing federally as threatened or endangered, the Contra Costa goldfields (*Lasthenia conjugens*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), California red-legged frog (*Rana aurora draytonii*), and Callippe silverspot butterfly (*Speyeria callippe callippe*), could potentially be affected by the project. Other special status species could be affected by the proposed project. The Altamont Sanitary Landfill is an existing, permitted facility that receives refuse from Alameda County and the surrounding area.

PROJECT LOCATION

The project site is located northeast of Livermore, in Alameda County, approximately 1.5 miles north of Interstate 580 off Altamont Pass Road (Figure 1). The ALRRF property covers approximately 3.5 square miles. The project site consists of Sections 15, 16, 17, and the northern portion of Section 21 in Township 2 East, Range 3 South (Figure 2). The existing landfill (Fill Area 1) is located in portions of Sections 16 and 21. The proposed Altamont Expansion Area is located in portions of Sections 15 and 16 (excluding Fill Area 1). A proposed mitigation area is located within the majority of Section 17.

Primary access is along Altamont Pass Road, which skirts the property on the south. Dyer Road borders the property to the west, while northern and eastern sides of the property border on open rangeland (Figure 2).

Central portions of the site (Fill Area 1) support an ongoing landfill operation. Landfilling and construction of facilities began in 1978. Fill Area 1 now covers

approximately 230 acres. Outside of Fill Area 1, the ALRRF property consists primarily of undeveloped annual grasslands and is used as rangeland for cattle. Wind-powered generators are located along most of the ridgelines on the property.

PROJECT DESCRIPTION

Waste Management of Alameda County is proposing to expand and upgrade its Altamont facility. The new facility would be the Altamont Landfill and Resource Recovery Facility (ALRRF). The project would involve an increase in the overall size of the facility, as well as a reclassification from Class III to a Class II landfill. The landfill will be designed and constructed to meet the requirements of a Class II sanitary landfill, including a leachate collection and treatment system and a landfill gas collection system. The ALRRF will receive primarily municipal refuse and construction and demolition materials, but it would also receive sludge and ashes. The facility will not receive hazardous wastes for disposal.

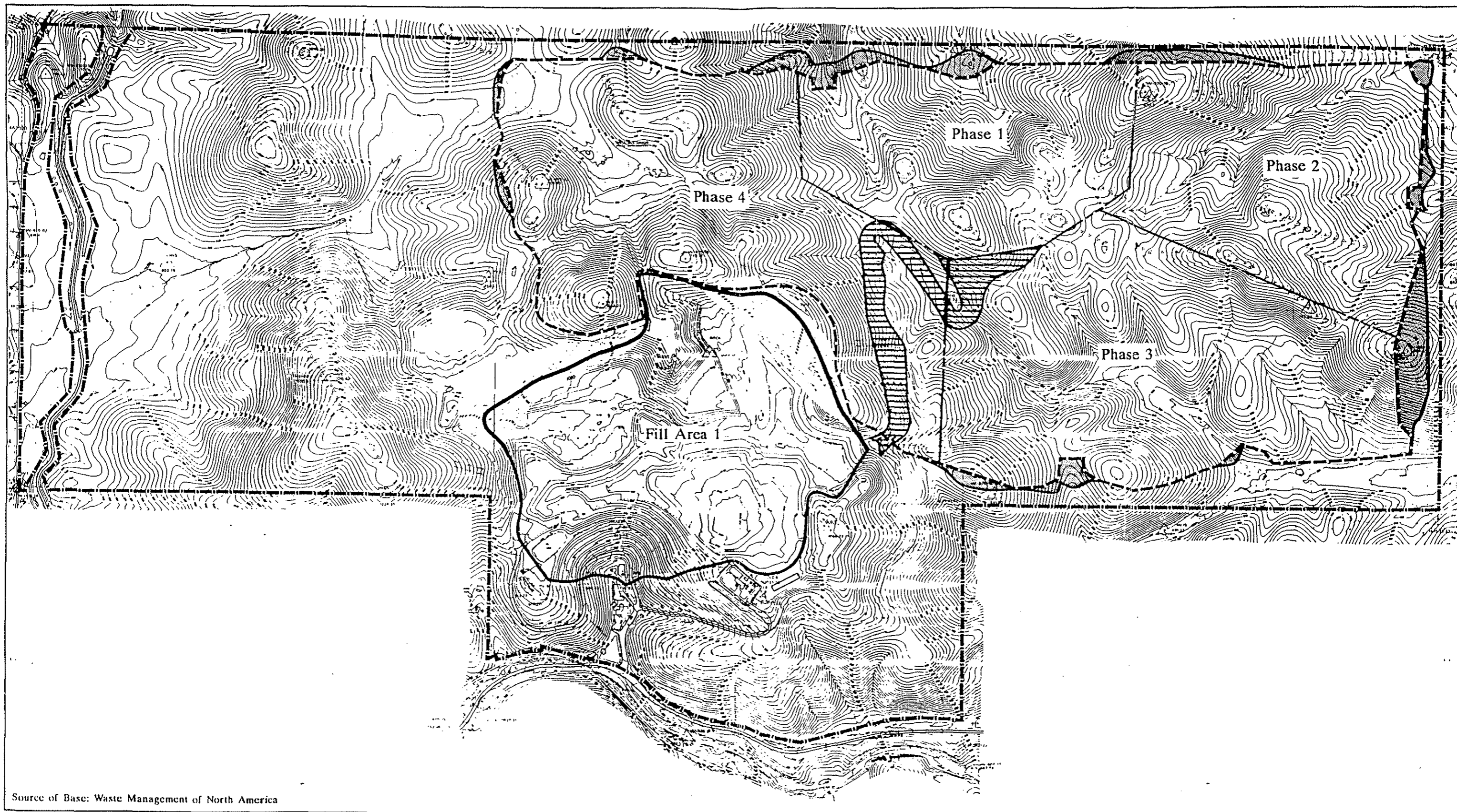
Under current and anticipated volumes of waste disposal, Fill Area 1 will close in 8 to 12 years. Based on maximum waste disposal calculations, the proposed Class II landfill expansion will have an estimated life of 45 years. This expansion would occur in four phases beginning with Phase 1 following the completion of Fill Area 1. The actual duration of each phase and the life of the overall expansion project will depend on the actual volume of waste received at the facility, as well as the specific type of daily cover and compaction rates. The proposed landfill expansion footprint (Altamont Expansion Area) with the phase locations and boundaries is shown on Figure 3.

Construction will include the development of landfill cells and access roads. Construction activity will involve excavation, transportation of excavated material, filling of excavated material, and compaction. Principal equipment used will be scrapers, excavators, dump trucks, headers, compactors, and water trucks. Operations activities will involve all the elements of construction and include transport and deposition of non-hazardous waste and certain designated wastes such as sewage sludge.

All waste will be brought by transfer vehicles or other large vehicles. Waste will be deposited on-site at the working face and compacted. Active landfill areas will be enclosed by a perimeter security fence.


The ALRRF operates 24 hours a day with refuse being delivered, compacted and covered on a virtually continuous basis. The working face is typically being compacted by four large bulldozers and two large compactors at any one time. Up to four large scrapers can be placing soil cover. In addition, there are dozens of employees working at and around the active area.

The high level of activity combined with the rapid compaction of refuse has



Source of Base: Waste Management of North America





11-05-93(WM1108)



LSA

Scale in Feet

0 ————— 1025

-  Approximate Property Boundary
-  Approximate Area of Existing Landfill
-  Approximate Limits of Proposed Landfill
-  Phasing Boundary



-  Cut or Fill Slopes
-  Access Road

Figure 3

Fill Area 1 Boundary and Proposed Expansion

served as a very effective deterrent to wildlife scavenging from the working face. A bird control policy will be developed and implemented if a bird problem should occur. A licensed pest control specialist will be consulted if a vector problem arises within the ALRRF. Ground squirrels in the active area will be controlled by poisoning.

Once each landfill phase has reached capacity, it will be closed in compliance with applicable state and federal regulations. The objectives of the closure plan are to minimize surface water infiltration and associated leachate production, as well as reduce the potential for odors and gas emissions. In addition, final grades will be established to control drainage from the closed landfill areas.

Under the current closure plan, landfill faces will have slopes of 3:1 with approximately 20-foot wide benches every 50 vertical feet. After control elevations are reached, final cover will be applied. Final cover will consist of a 6-foot thick layer over the entire disposal area. Two feet of cover foundation material, 24 inches of soil liner material, a geotextile layer, and 24 inches of topsoil will comprise the final layer. The soil stockpile, currently located in Section 17, will be entirely consumed during the process of covering Fill Area 1.

Drainage ditches will be constructed on the surface of the completed Fill Area 1. The landfill will be vegetated in grasses to protect the final cover layer from erosion due to runoff. All leachate will be collected and treated within the ALRRF.

METHODS

PRE-FIELD INVESTIGATIONS

Leitner and Leitner (1992), Arnold (1991), and the Botanical Research Group (1991) conducted surveys for special status species on the Altamont Expansion Area and 40 acres in the northeastern portion of Section 17 of the USGS Altamont quadrangle during 1990 and 1991. Prior to field surveys, they consulted with CDFG and U.S. Fish and Wildlife Service (Service) concerning listed and candidate species in the region. They also reviewed recently completed field surveys in the surrounding region. They examined information from the California Natural Diversity Data Base (CNDDDB 1991) to determine locations and habitat of special status species in the project vicinity. The CNDDDB area search included nine quadrangles, centered around the Altamont Expansion Area, plus a five mile "envelope" around it. Records of the California Native Plant Society (CNPS) (Smith and Berg 1988), and other floristic studies in the project vicinity were also reviewed. All these sources were used to compile a list of special status plant (Table A) and wildlife species (Table B) with potential to occur on Altamont Expansion Area.

LSA consulted with the Service concerning listed and candidate species that may occur on the Altamont Expansion Area. LSA also searched an updated version of the CNDDDB (1992) for additional records that may not have been present when Leitner and Leitner (1992) examined the data base.

FIELD SURVEYS

Leitner and Leitner (1992), Arnold (1991), and the Botanical Research Group (1991) conducted field surveys that covered all of Sections 15 and 16, except for the portion of Section 16 already disturbed by the present landfill operation, and an additional 40 acres in the northeast quarter of Section 17 (Figure 2). LSA conducted field surveys at specific locations throughout the Altamont Expansion Area and all of Section 17.

Plant Surveys

Leitner and Leitner (1992) conducted surveys for special status plants on February 13, July 25, August 29, and September 28, 1990, and September 15, 1991. Botanical Research Group (1991) conducted special status plant surveys on March 22 and 28, and May 10, 1991.

These surveys were conducted to ascertain the presence or absence of the two endangered plant species (large flowered fiddleneck and palmate-bracted bird's beak), the plant species proposed for listing federally as endangered (Contra Costa goldfields), and the following candidate plant species: heartscale (*Atriplex cordulata*), San Joaquin spearscale (*Atriplex joaquiniana*), hispid bird's-beak (*Cordylanthus mollis* ssp. *bispidus*),

Table A - Special Status Plant Species

SPECIES	STATUS*
<i>Amsinckia grandiflora</i> Large Flowered Fiddleneck	FE/SE/1B
<i>Atriplex cordulata</i> Heartscale	C2/--/1B
<i>Atriplex joaquiniana</i> San Joaquin Spearscale	C2/--/1B
<i>Cordylanthus mollis</i> ssp. <i>bispidus</i> Hispid Bird's-beak	C2/--/1B
<i>Cordylanthus palmatus</i> Palmate-bracted Bird's-beak	FE/SE/1B
<i>Delphinium recurvatum</i> Recurved Larkspur	C2/--/1B
<i>Eschscholzia rhombipetala</i> Diamond-petaled Poppy	C2/--/1A
<i>Fritillaria liltacea</i> Fragrant Fritillary	C2/--/1B
<i>Helianthella castanea</i> Diablo Helianthella	C2/--/1B
<i>Hesperolinon breweri</i> Brewer's Dwarf Flax	C2/--/1B
<i>Lasthenia conjugens</i> Contra Costa Goldfields	FPE/--/1B
<i>Lilaeopsis masonii</i> Mason's Lilaeopsis	C2/SR/1B
<i>Trifolium amoenum</i> Showy Indian Clover	C2/--/1B
<i>Tropidocarpum capparideum</i> Caper-fruited Tropidocarpum	C2/--/1A

*Status: FE = federally listed as endangered; FPE = federally proposed as endangered; C2 = federal category 2 candidate for listing; SE = state listed as endangered; SR = state listed as rare; List 1A = species determined by the California Native Plant Society to be potentially extinct; List 1B = species determined by the California Native Plant Society to be rare and endangered.

Table B - Special Status Wildlife Species

COMMON NAME	SCIENTIFIC NAME	STATUS*
San Joaquin Kit Fox	<i>Vulpes macrotis mutica</i>	FE/ST
Riparian Brush Rabbit	<i>Sylvilagus bachmani riparius</i>	C1/SE
San Francisco Dusky-footed Woodrat	<i>Neotoma fuscipes annectens</i>	C2/CSC
San Joaquin Pocket Mouse	<i>Perognathus inornatus</i>	C2/--
Pacific Western Big-eared Bat	<i>Plecotus townsendii townsendii</i>	C2/CSC
Greater Western Mastiff Bat	<i>Eumops perotis californicus</i>	C2/CSC
Bald Eagle	<i>Haliaeetus leucocephalus</i>	FE/SE
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	FE/SE
Ferruginous Hawk	<i>Buteo regalis</i>	C2/CSC
Western Burrowing Owl	<i>Speotyto cunicularia hypugea</i>	C2/CSC
Tricolored Blackbird	<i>Agelaius tricolor</i>	C2/CSC
Alameda Whipsnake	<i>Masticophis lateralis euryxanthus</i>	FPE/ST
Western Pond Turtle	<i>Clemmys marmorata</i>	C2/CSC
California Tiger Salamander	<i>Ambystoma californiense</i>	C1/CSC
California Red-legged Frog	<i>Rana aurora draytonii</i>	FPE/CSC
Western Spadefoot Toad	<i>Scaphiopus hammondi</i>	C2/CSC
Foothill Yellow-legged Frog	<i>Rana boylei</i>	C2/CSC
Callippe Silverspot Butterfly	<i>Speyeria callippe callippe</i>	FPE/--
Molestan Blister Beetle	<i>Lytta molesta</i>	C2/--
Curve-footed Hygrotus Diving Beetle	<i>Hygrotus curvipes</i>	C2/--
Ricksecker's Water Scavenger Beetle	<i>Hydrochara rickseckeri</i>	C2/--
Longhorn Fairy Shrimp	<i>Branchinecta longiantenna</i>	FE/--
Vernal Pool Fairy Shrimp	<i>Branchinecta lynchi</i>	FT/--

*Status: FE = Federally listed as endangered; FPE = Proposed for listing as an endangered species by the U.S. Fish and Wildlife Service; C1 = Federal category 1 candidate for listing as threatened or endangered (sufficient biological information available to support a proposal to list taxa as endangered or threatened); C2 = Federal category 2 candidate for listing (existing information indicates taxa that may warrant listing, but substantial biological information necessary to support a proposed rule is lacking); SE = Listed by the State of California as Endangered; ST = Listed by the State of California as Threatened; CSC = California State Species of Special Concern.

recurved larkspur (*Delphinium recurvatum*), diamond-petaled poppy (*Eschscholzia rhombipetala*), fragrant fritillary (*Fritillaria liliacea*), Diablo helianthella (*Helianthella castanea*), Brewer's dwarf flax (*Hesperolimon breweri*), Mason's lilaeopsis (*Lilaeopsis masonii*), showy Indian clover (*Trifolium amoenum*), and caper-fruited tropidocarpum (*Tropidocarpum capparideum*).

Surveys entailed covering the entire Altamont Expansion Area and 40 acres in the north-east corner of Section 17 on-foot while searching for special status plant species. Special attention was given to unusual habitats that may support special status plant species. These areas included moist places, rock outcroppings, or areas of unusual soils.

Plants were identified to species when possible, or to the level necessary to determine whether or not they were special status species.

Wildlife Surveys

Field surveys for special status wildlife species were conducted by Leitner and Leitner (1992) and Arnold (1991) at the optimum time of year to ascertain presence or absence within the Altamont Expansion Area. Agency guidelines for specific surveys were followed where available.

LSA conducted additional surveys for San Joaquin kit fox and California tiger salamander for site-specific facilities necessary for current landfill operations in 1992, and for California red-legged frog in 1994. The surveys conducted by LSA were located in selected areas within the boundaries of the Altamont Expansion Area, including the mitigation area in the western portion of Section 17 discussed below.

Surveys were conducted for six special status mammals, the endangered San Joaquin kit fox; and five candidate mammal species: riparian brush rabbit (*Sylvilagus bachmani riparius*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), San Joaquin pocket mouse (*Perognathus inornatus*), Pacific western big-eared bat (*Plecotus townsendii townsendii*), and greater western (=California) mastiff bat (*Eumops perotis californicus*).

Surveys were conducted for five avian species, the endangered bald eagle and American peregrine falcon; and three candidate bird species: ferruginous hawk (*Buteo regalis*), western burrowing owl (*Speotyto cunicularia hypugea*), and tricolored blackbird (*Agelaius tricolor*).

Surveys were conducted for the presence of one special status amphibian species proposed for listing federally as endangered, the California red-legged frog, and three candidate amphibians, California tiger salamander (*Ambystoma californiense*), western spadefoot toad (*Scaphiopus hammondi*), and foothill yellow-legged frog (*Rana boylei*).

Surveys were conducted for two reptile species, one proposed for listing federally as endangered, the Alameda whipsnake (*Masticophis lateralis euryxanthus*), and one candidate reptile, western pond turtle (*Clemmys marmorata*).

Surveys were conducted for one invertebrate species proposed for listing federally as endangered, the callippe silverspot butterfly (*Speyeria callippe callippe*), and for three candidate invertebrates, molestan blister beetle (*Lytta molesta*), curve-footed hygrotus diving beetle (*Hygrotus curvipes*), and Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*).

Surveys were also conducted for two fairy shrimp species listed as threatened or endangered by the Service, the vernal pool fairy shrimp and longhorn fairy shrimp. Surveys were also conducted for California linderiella (*Lindneriella occidentalis*), which was recently proposed for listing as endangered. However, the Service has subsequently determined that the listing was not warranted.

San Joaquin Kit Fox

Survey methodology for the San Joaquin kit fox entailed use of guidelines developed by Region 4 of the CDFG (CDFG 1990). Surveys were conducted prior to the release of the more intensive survey protocol established by the Service for kit foxes in the northern portion of their range (U.S. Fish and Wildlife Service 1993). Because kit foxes were sighted using the Region 4 guidelines, additional surveys were not necessary. Twelve scent stations were established throughout the Altamont Expansion Area (Figure 4) and operated for a total of six nights during the period from June 22 through July 8, 1991. Spotlighting surveys were conducted for a total of six nights during the period from July 2 - 18, 1991. The spotlighting route covered all accessible roads within Section 17 and the Altamont Expansion Area plus those off the ALRRF boundary, but within 1 mile of the boundary (Figure 5). Leitner and Leitner (1992) conducted den surveys during the period from June 8 through September 15, 1991. LSA conducted surveys for potential dens on specific sites that were going to be disturbed by current ALRRF operations on July 23, November 16 and 18, and December 16, 1992.

San Joaquin Pocket Mouse

No specific surveys were conducted for San Joaquin pocket mouse as they are known to occur throughout grassland habitats in the region and they are known to occur on the site (Leitner and Leitner 1992).



- X Observation of San Joaquin Kit Fox while Spotlighting
- Scent Station without Tracks of San Joaquin Kit Fox
- Scent Station with Tracks of San Joaquin Kit Fox
- Potential Den, San Joaquin Kit Fox (Leitner and Leitner 1992)
- Potential Den, San Joaquin Kit Fox (LSA)


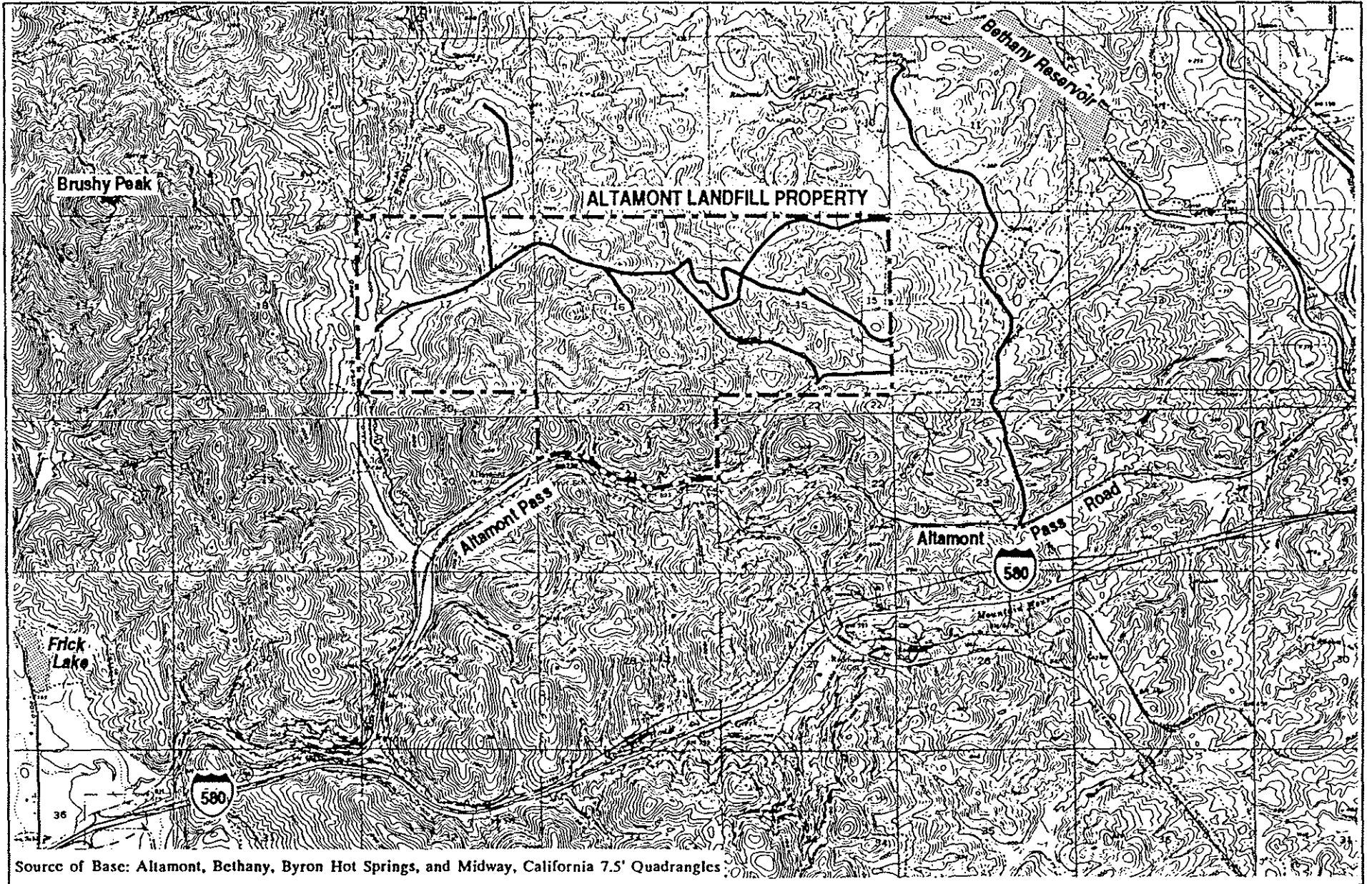

LSA
 Scale in Feet
 0 ——— 1025

Figure 4

0761





10-04-93(WMI108)



LSA

Scale in feet



Figure 5

Spot Light Survey Route

Riparian Brush Rabbit and San Francisco Dusky-footed Woodrat

No specific surveys were conducted for riparian brush rabbit or San Francisco dusky-footed woodrat because suitable habitat is not present on the Altamont Expansion Area.

Pacific Western Big-eared Bat and Greater Western Mastiff Bat

No specific surveys were conducted for Pacific western big-eared bats or greater western mastiff bats.

Raptors

Leitner and Leitner (1992) conducted surveys on January 27 and February 24, 1991, to determine the winter utilization of the Altamont Expansion Area by raptors, especially bald eagle, American peregrine falcon, and ferruginous hawk. Two observers walked a route which covered the Altamont Expansion Area from 10:30 through 16:30.

The entire project area was surveyed for burrowing owls and their burrows while conducting den surveys for San Joaquin kit fox (Leitner and Leitner 1992).

Passerines

Surveys for special status passerine birds, specifically, tricolored blackbird, were conducted while conducting surveys for San Joaquin kit fox dens.

Amphibians and Reptiles

Leitner and Leitner (1992) conducted surveys for special status reptiles and amphibians on April 1 and May 23, 1991, in the four stock ponds that held water. Each was surveyed for California tiger salamander and red-legged frog by seining for larvae and visually surveying for adults. While Leitner and Leitner (1992) did not specifically examine the ponds for western spadefoot toads, spadefoot toads would have been found while surveying for California tiger salamanders and California red-legged frogs. LSA surveyed three additional ponds in the proposed mitigation area in Section 17 for special status amphibians on June 10, 1992. In mid-March, 1993, reconnaissance surveys were conducted at one additional pond and a rut that contained water. All of these pond surveys conducted by LSA were located in the proposed mitigation area in the western portion of Section 17. On April 28, 1994, LSA conducted additional surveys for California tiger salamander and California red-legged frog in all ponds on the project site that held water.

No specific surveys for the foothill yellow-legged frog or Alameda whipsnake were conducted because suitable habitat appears to be absent from the Altamont Expansion Area.

No surveys were conducted specifically for western pond turtle, although suitable habitat is present.

Callippe Silverspot Butterfly

In March and April, 1991, several patches of violets (*Viola pedunculata*) were mapped. The violet is a larval food plant of the callippe silverspot butterfly. During the adult flight season in May, 1991, Arnold (1991) walked transects throughout the areas where violets occurred and on nearby hilly ridges.

Molestan Blister Beetle

The survey for the molestan blister beetle included walking transects throughout areas of the Altamont Expansion Area where California poppy (*Eschscholzia californica*), lupine (*Lupinus* sp.), and other flowers known to be visited by blister beetles were found (Arnold 1991). These areas were also searched for nest sites of bees belonging to the genus *Anthophora*. Blister beetles presumably parasitize bees of this genus (Arnold 1991). Surveys were conducted in spring 1991.

Aquatic Beetles and Fairy Shrimp

Eight aquatic habitats were identified and surveyed for one or more of the following species: longhorn fairy shrimp, vernal pool fairy shrimp, curve-footed hygrotus diving beetle, and Ricksecker's water scavenger beetle (Arnold 1991). Surface, subsurface and bottom samples were collected at each waterbody in February, March, April, and May, 1991. Each sample was inspected for the special status beetles and fairy shrimps.

Reconnaissance Surveys

LSA conducted surveys to designate areas for mitigation on February 3, 1993 and May 16, 1994.

ENVIRONMENTAL SETTING

TOPOGRAPHY AND SOILS

Topography within the ALRRF consists of a series of mostly steeply sloping hills. Rock outcrops are present on several of the hillsides. The Soil Conservation Service (SCS) mapped Altamont Clay and Pescadero Clay loam as occurring on the ALRRF. The following descriptions of these soils are adapted from the *Soil Survey of Alameda Area, California* (SCS 1966).

Altamont clay is the primary soil on the ALRRF. This soil is 40 to 60 inches deep, has very slow permeability, is well drained, and has high shrink-swell potential. It is classified as a fine, montmorillonitic, thermic, Typic Chromoxerert. Altamont soils form in small drainageways over shale or soft sandstone. Altamont clay is classified as non-hydric by the SCS.

Pescadero clay loam occurs in some of the larger valley bottoms. This soil is deep, has slow permeability, and is poorly drained. It is classified as a fine, montmorillonitic, thermic, Aquic Natrixeralf. This soil forms in inland valleys in alluvium from sedimentary rock. Pescadero clay loam is classified as hydric by the SCS.

LAND USE

The ALRRF is located in a rural area. A few residences are located to the east along Dyer Road and the Mountain House School is four miles west of the ALRRF.

The ALRRF is zoned for agriculture and has been designated an agricultural preserve under terms of California's Williamson Act. The ALRRF and the surrounding area are designated in the Alameda County General Plan as Agricultural/Open Space/Solid Waste Facility.

The grassland within the ALRRF has been greatly modified by dry land farming on all but the steepest and rockiest slopes (Leitner and Leitner 1992). Current and historical land use also includes grazing by cattle. More recently, the Altamont Pass region has been developed into a wind resource area and the ALRRF supports wind turbines.

One unoccupied ranch house and several outbuildings are located in the northwest corner of Section 16 (Figure 2). The ranch area supports primarily weedy vegetation. Several trees, blue gum (*Eucalyptus globulus*) and elm (*Ulmus cf. procerus*), grow at the ranch house site.

VEGETATION

Grassland

Non-native annual grassland, dominated by soft chess (*Bromus mollis*) and slender oats (*Avena barbata*), is the predominant vegetation type of the ALRRF. This vegetation occurs throughout the ALRRF and adjacent areas. Some native herbaceous species that are also present include blue dicks (*Dichelostemma capitatum*), California poppy, purple owl's clover (*Castilleja exserta*), and miniature lupine (*Lupinus bicolor*).

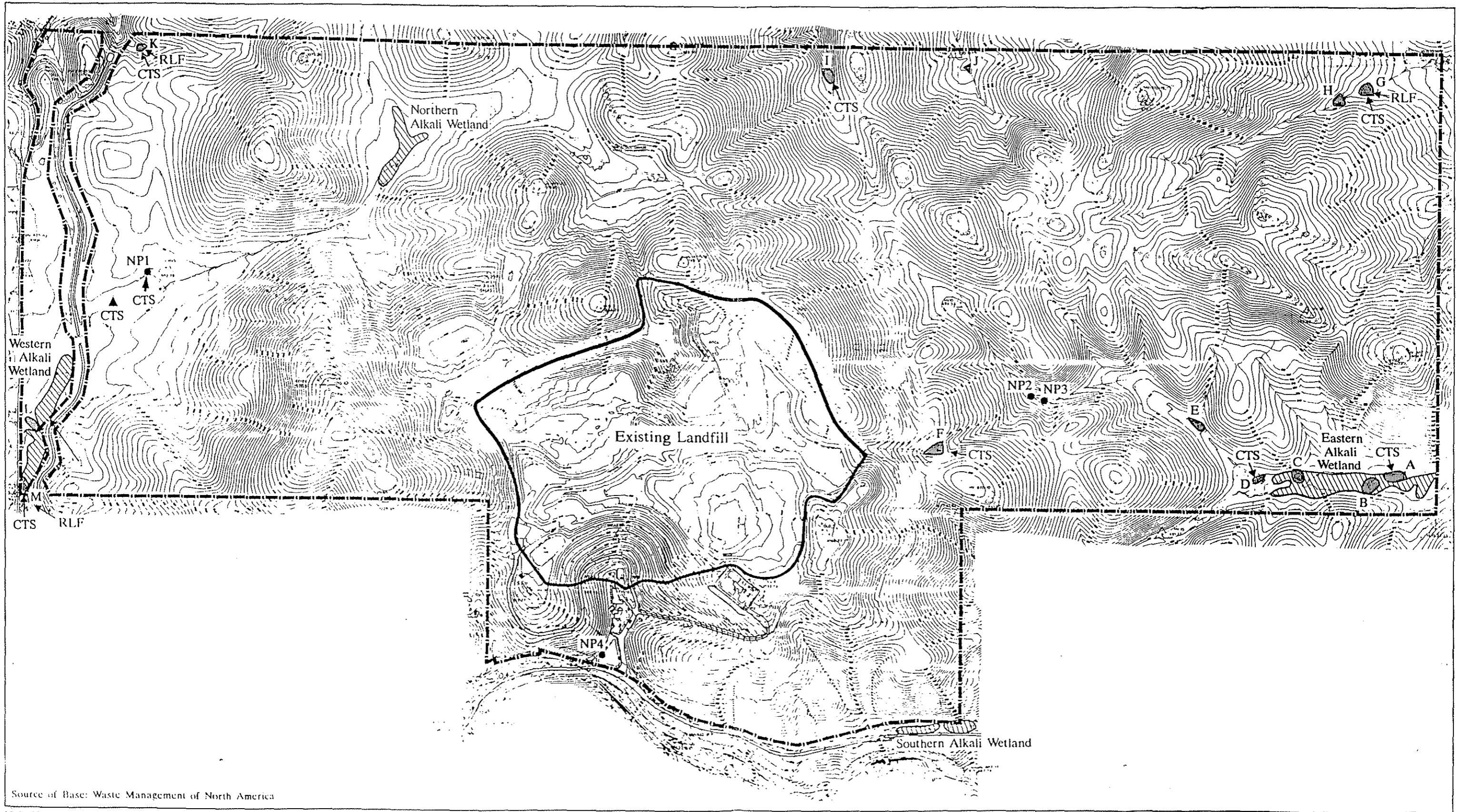
Rock outcroppings in the grassland support a more diverse assemblage of plant species. Several plant species were found only in association with the rock outcroppings. These included woodland star (*Lithophragma heterophylla*), vari-leaf nemophila (*Nemophila heterophylla*), miner's lettuce (*Claytonia perfoliata*), and blue elderberry (*Sambucus mexicana*).

Alkali Wetland

Alkali wetlands are located in four areas of the ALRRF (Figure 6). These wetlands vary in their species composition depending on the amount of inundation. The dryer portions of the wetlands are dominated by Mediterranean barley (*Hordeum geniculatum*) and in the case of the northern alkali wetland, common blennosperma (*Blennosperma nanum*), blow-wives (*Achyrochaena mollis*), woolly marbles (*Psilocarphus oregonus*), and tidy-tips (*Layia platyglossa*). Pickleweed (*Salticornia virginica*), alkali heath (*Frankenia grandiflora*), alkali weed (*Cressa truxelensis*), saltgrass (*Distichlis spicata*), rush (*Juncus mexicana*), peppergrass (*Lepidium oxycarpum*), and fat hen (*Atriplex patula*), characterize the vegetation of alkali wetlands. The moist portions of the eastern alkali wetland supported monkeyflower (*Mimulus guttatus*), curly dock (*Rumex crispus*), hedge nettle (*Stachys* sp.), and water-cress (*Rorippa nasturtium-aquaticum*). The hydrology of these alkali wetlands has been altered by roads and stock ponds acting as barriers to flow.

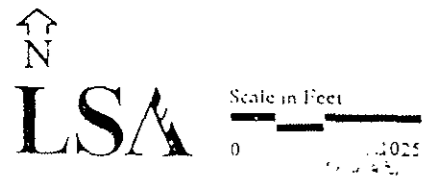
Ponds

Thirteen stock ponds and four natural ponds occur within the ALRRF (Figure 6). On LSA's site visit on 3 February, 1993, recent heavy rains had filled all ponds to high levels. During the late spring 1991 fieldwork, only four of these ponds contained water (Leitner and Leitner 1992). Vegetation at all but two of the stock ponds was similar to surrounding grassland vegetation. One of these ponds supported a sparse growth of spikerush (*Eleocharis* sp.) while the other pond supported cattails (*Typha* sp.).



Source of Base: Waste Management of North America

10-04-93(WMI108)



- Alkali Wetlands
- NP Natural Ponds
- Rut in Road
- Stock Pond
- CTS California Tiger Salamander
- RLF Rut in Road

0767

Figure 6

Location of California Tiger Salamander Observations,
Stock Ponds, Natural Ponds, and Alkali Wetlands

WILDLIFE VALUES

Wildlife inhabiting the Altamont Expansion Area is typical of grassland habitat in the Inner Coast Range. Appendix B lists species observed on the Altamont Expansion Area. The number of wildlife species present is relatively low because the Altamont Expansion Area is dominated by a single vegetation type (non-native grassland). Only a few trees are present on the Altamont Expansion Area to provide nesting habitat. The rock outcrops are small and provide little potential for nesting or denning. For a grassland however, the Altamont Expansion Area is fairly diverse, and supports a number of special status species that frequent grassland areas.

Amphibians expected to be present on the Altamont Expansion Area and Section 17 include California tiger salamander, California red-legged frog, Pacific treefrog (*Pseudacris regilla*), and western toad (*Bufo boreas*). Ponds on the Altamont Expansion Area provide breeding habitat for amphibians. The ponds on-site can be seasonal or permanent, depending on the amount of rainfall and aquifer recharge. During drought years, amphibians which require permanent or semi-permanent water would not be expected to occur on the Altamont Expansion Area, because ponds would become dry. Amphibian species observed on the Altamont Expansion Area and Section 17 were Pacific treefrog, California red-legged frog, and California tiger salamander.

Reptiles observed or expected within the Altamont Expansion Area include the western fence lizard (*Sceloporus occidentalis*), Gilbert skink (*Eumeces gilberti*), gopher snake (*Pituophis melanaoleucus*), racer (*Coluber constrictor*), and western rattlesnake (*Crotalus viridis*).

Several ground nesting bird species typical of grasslands were observed on the Altamont Expansion Area. These include western meadowlarks (*Sturnella neglecta*), Savannah sparrows (*Passerculus sandwichensis*), and California horned larks (*Eremophilus alpestris*). Mixed flocks of Brewer's blackbirds (*Euphagus cyanocephalus*), and red-winged blackbirds (*Agelaius phoeniceus*) foraged in grasslands on the Altamont Expansion Area. Rock wrens (*Salpinctes obsoletus*) were observed on the larger rock outcrops. House finches (*Carpodacus mexicanus*), European starlings (*Sturnus vulgaris*), and western kingbirds (*Tyrannus verticalis*), were observed near the ranch buildings and associated trees.

Resident, migrant and overwintering raptors were observed in the Altamont Expansion Area during January and February, 1991. Observations included golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk, northern harrier (*Circus cyaneus*), and burrowing owl.

A variety of mammalian species were observed on the Altamont Expansion Area and Section 17 including San Joaquin kit fox, red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), California ground squirrels (*Spermophilus beecheyi*), pocket gopher

(*Thomomys bottae*), California vole (*Microtus californicus*), San Joaquin pocket mouse, and California pocket mouse (*Perognathus californicus*).

SPECIAL STATUS PLANT SPECIES

Fourteen special status plant species are known to occur in the general vicinity of the Altamont Expansion Area. Two of these, the large flowered fiddleneck and palmate-bracted bird's-beak, are federally listed as endangered; one, Contra Costa goldfields, is proposed as endangered. The other special status plant species are federal candidates for listing as threatened or endangered. None of the special status plant species were observed on the Altamont Expansion Area, and it is unlikely that they occur on-site. Appendix C contains special status species accounts including the status and distribution of each plant species.

SPECIAL STATUS WILDLIFE SPECIES

Twenty-three special status wildlife species are known to occur in the general vicinity of the Altamont Expansion Area. San Joaquin kit fox, bald eagle, American peregrine falcon, and longhorn fairy shrimp are listed federally as endangered species, vernal pool fairy shrimp are listed as threatened, and Alameda whipsnake, California red-legged frog, and callippe silverspot butterfly are proposed as endangered. The other wildlife species are federal category 1 or 2 candidates for listing as threatened or endangered. Seven of these wildlife species were confirmed to occur on or immediately adjacent to the Altamont Expansion Area: San Joaquin kit fox, San Joaquin pocket mouse, bald eagle, ferruginous hawk, western burrowing owl, California tiger salamander, and California red-legged frog. Appendix D contains species accounts of the special status species that are not known to occur on the Altamont Expansion Area.

San Joaquin Kit Fox

Information on kit fox biology is abstracted from reviews by O'Farrell (1983) and Orloff (1990), unless otherwise noted.

Status

The San Joaquin kit fox is a California listed threatened species and a federally listed endangered species.

Distribution

The San Joaquin kit fox ranges from Contra Costa County throughout the length of the San Joaquin Valley into Kern County with additional populations in the Carrizo Plains and San Benito County. The Altamont Expansion Area is located within the northern extreme of species' range.

Habitat

The San Joaquin kit fox occurs in the San Joaquin Valley and surrounding foothill areas supporting sparscale scrub, alkali sink, and non-native grassland communities. Blue oak woodland may provide marginal habitat. San Joaquin kit fox generally inhabit areas where slopes are less than 40 percent.

Kit foxes are primarily nocturnal and prey upon black-tailed hare (*Lepus californicus*), desert cottontails (*Sylvilagus auduboni*), kangaroo rats (*Dipodomys* spp.), and, especially in the northern part of their range, California ground squirrels. Kit foxes are also opportunistic and will prey on birds, reptiles, and arthropods and will scavenge for carrion, particularly road kills.

Adult kit foxes are solitary during late summer and fall, but by October females begin to excavate and enlarge natal dens. Mating occurs during winter. One litter of pups is born each year in late February to March. Litters generally range in size from 3 to 5 pups. In the northern part of their range, pups appear to be born during the middle of March. The pups emerge from the den at about one month old, and both parents help raise the young. Pups generally disperse by September.

In the northern portion of their range, kit foxes enlarge and den in abandoned mammal burrows, especially those of the California ground squirrel (Orloff *et al.* 1986). Dens have one to several entrances. Dens used for escape or daily shelter are more common and generally smaller than natal dens. Active dens may show signs of habitation, such as recent digging, tracks, fresh scat, fleas, or prey remains. Nevertheless, dens currently used by kit foxes may show no sign of recent activity. For this reason, any burrow in suitable habitat with the appropriate size and shape is considered to be a potential den. Moreover, potential dens may serve as shelter from predators, even if not used for other activities.

Family groups and individuals will use many dens throughout the year, and families may change natal dens once or twice per month. Individual foxes may use up to two dozen dens, and any particular den is therefore likely to be vacant. Natal dens are used in successive years by the same mated pair or family group, and den sites may be used by successive generations of foxes.

Results

San Joaquin kit fox were found to occur on the project site (Leitner and Leitner 1992). Kit fox tracks were noted at two scent stations on June 30 and July 14. Two night-time observations of kit foxes were made, both in the same area in which the tracks at scent stations were noted. All tracks and sightings were within and adjacent to the western portion of the Altamont Expansion Area (NE quarter of Section 17 and NW quarter of Section 16). Figure 4 locates the positions of scent stations, observations of kit fox tracks, and direct observations of kit foxes.

No known kit fox dens were located, but 100 potential dens were mapped by Leitner and Leitner (1992) and eight by LSA (Figure 4). The potential dens were distributed throughout the Altamont Expansion Area.

San Joaquin Pocket Mouse

Status

The San Joaquin pocket mouse is a federal category 2 candidate for listing as threatened or endangered and currently has no state status.

Distribution

The San Joaquin pocket mouse occurs in the inner coast ranges and the San Joaquin Valley.

Habitat

The San Joaquin pocket mouse prefers sandy of fine-textured soils in areas of grasslands and oak woodlands.

Results

Whereas specific surveys for San Joaquin pocket mouse were not conducted, BioSystems Analysis, Inc. (1988) reported finding one dead specimen on the site, and it is presumed the species occupies all suitable habitat on the site.

Bald Eagle

Status

The bald eagle is a state and federally listed endangered species.

Distribution

The breeding range of bald eagles in California is primarily limited to mountainous habitats near reservoirs, lakes, and rivers in the northern quarter of the state (Zeiner *et al.* 1990). They winter at lakes, reservoirs, rivers, and some rangelands and coastal wetlands in central and northern portions of the state and some localities in southern California. Occurrences in the project area have been recorded during fall and winter at Bethany Reservoir, in the Kellogg Creek watershed, and Morgan Territory Regional Preserve (CDFG 1983). Twenty-two bald eagles have also recently been reported in the Altamont wind resource area (which includes the Altamont Expansion Area) during winter and spring (BioSystems Analysis, Inc. 1991).

Habitat

In California, bald eagles nest primarily in coniferous forests and are always associated with a large waterbody such as a lake or reservoir (Malette and Gould 1976).

Results

No bald eagles were observed during the raptor surveys (Leitner and Leitner 1992) although this species is a migrant in the vicinity of the Altamont Expansion Area (BioSystems Analysis, Inc. 1991). Suitable habitat is absent from the Altamont Expansion Area because of the absence of trees for roosting and bodies of water suitable for fishing.

Ferruginous Hawk

Status

The ferruginous hawk is a federal category 2 candidate and a California Species of Special Concern.

Distribution

In California, the ferruginous hawk winters in the arid plains and open rangeland along the western edge of the Central Valley, in open valleys in the inner Coast Ranges, and in the deserts of southern California. The species is not known to breed in California.

Habitat

This species primarily feeds on small- and medium-sized mammals. California ground squirrels are presumably a primary food of this species.

Results

During the two-day raptor survey conducted January 27 and February 24, 1991 a total of 17 observations of ferruginous hawk were recorded (Leitner and Leitner 1992). They found the ferruginous hawk to be one of the most commonly observed raptors, second only to the red-tailed hawk.

Western Burrowing Owl

Status

The western burrowing owl is a federal category 2 candidate for listing as threatened or endangered and is a California Species of Special Concern.

Distribution

Burrowing owls occur in open dry grassland areas throughout the state.

Habitat

Burrowing owls occupy burrows in the open grassland habitats of arid areas. The species is frequently associated with other burrowing animals such as the California ground squirrel.

Results

Burrowing owls were commonly seen over much of the study area during surveys conducted for raptors and for San Joaquin kit fox (Leitner and Leitner 1992).

California Tiger Salamander

Status

The California tiger salamander is a federal Category 1 candidate and a California Species of Special Concern. A petition to consider this species for listing was filed with the USFWS on February 20, 1992 by Dr. H. Bradley Shaffer of UC Davis. The USFWS issued a 90-day finding on November 19, 1992 that found the requested action may be warranted and have begun a

formal status review of the species. On April 18, 1994 the USFWS announced a finding that the petition was warranted, but precluded by listing actions on higher priority species and was assigned a listing priority of 8.

Distribution

The California tiger salamander occurs in central California from the central Sacramento Valley to the central San Joaquin Valley and surrounding foothills of both the Coast Range and the Sierra Nevada (Stebbins 1985). The species has also been recorded from the San Francisco Bay region, the Monterey Bay region, and valleys and foothills in San Luis Obispo and Santa Barbara Counties. The actual occurrence of the species within this range is restricted to locations where breeding ponds are surrounded by suitable upland habitat.

In the vicinity of the Altamont Expansion Area, California tiger salamander has been reported about 5 miles northwest within the Los Vaqueros Project site (Jones and Stokes Associates, Inc. 1992), 3 miles southwest along Laughlin Road and in Frick Lake (LSA unpublished data) and less than 1 mile west between Dyer Road and Brushy Peak (CNDDDB unpublished data).

Habitat

Adult California tiger salamanders inhabit grassland, savanna, or deciduous oak woodland habitats that include natural ponds, vernal pools, intermittent streams or stock ponds. Adult California tiger salamanders are only active during the rainy season and spending the majority of their life below ground in the burrows of California ground squirrels or other rodents. They may remain dormant in a state of aestivation while in the rodent burrows. The adults emerge from this dormancy period after the first fall rains, to mate and lay their eggs in vernal pools, stock ponds, pools in drainages, and other ephemeral water bodies devoid of fish or other predators such as bullfrogs (*Rana catesbeiana*).

The major threat to California tiger salamander is the loss of breeding pools and ponds and associated upland habitat and the introduction of aquatic predators to otherwise suitable breeding sites.

Results

During 1991, all four ponds, within the Altamont Expansion Area, that held water into April (Ponds A, D, G, and I) supported California tiger salamanders (Leitner and Leitner 1992). On April 1, 1991, four adult California tiger salamanders were captured at Pond G, presumably breeding. During seining on May 23, 1991, tiger salamander larvae were captured in all four ponds. Approximately 200 California tiger salamander larvae were counted in Pond

A, more than 150 were counted at Pond D, 17 were counted at Pond G, and 5 were counted at Pond I.

LSA observed approximately 10 California tiger salamander larvae in Pond K and more than 30 larvae in Pond M. Larvae were also observed in the Natural Pond 1 and in a rut along a road that was retaining water just west of Natural Pond 1 (Figure 6).

On the April 24, 1994 site visit, LSA observed tiger salamanders in pond F and I. Tiger salamanders were not observed in previous surveys of pond F.

All four ponds surveyed by Leitner and Leitner (1992) appear to provide suitable breeding habitat during both wet and dry years. All other stock ponds likely provide breeding habitat at least during wet years. Natural Pond 1 likely provides suitable habitat for breeding during years with above average rainfall, while the rut likely only provides suitable habitat for breeding during years with exceptional rainfall. The status of breeding at the other three natural ponds is unknown, but breeding may occur during years with high rainfall.

California Red-legged Frog

Status

The California red-legged frog is federally proposed for listing as endangered, and a California Species of Special Concern. On February 2, 1994, the USFWS formally proposed this species for listing as endangered under the federal Endangered Species Act.

Distribution

The California red-legged frog occurs in permanent and semi-permanent water bodies in the Coast Ranges of California, from Humboldt County to northern Baja California, and eastward into the central Sierra Nevada and the Central Valley (Hayes and Jennings 1988).

Recent records of the California red-legged frog in the vicinity of the project site include locations 5 - 10 miles to the west of the site, in the Kellogg Creek watershed (Jones and Stokes Associates, Inc. 1992) and in the south Livermore area 10 miles southeast of the project site (LSA unpublished data).

Habitat

The California red-legged frog is found in marshes, streams, ponds, and other permanent and semi-permanent water sources. Breeding ponds usually have a fringe of emergent vegetation such as cattails. Red-legged frogs occur most frequently in semi-permanent waters that lack predators such as fish and

bullfrogs (Hayes and Jennings 1988). California red-legged frogs may disperse after rains and appear in damp woods and meadows far from water.

The primary threats to the California red-legged frog are the loss and fragmentation of habitat and the presence of introduced fish and bullfrogs, which prey on the juvenile red-legged frogs, larvae, and eggs (Hayes and Jennings 1988).

Results

Red-legged frogs were found on the project site on the April 24, 1994 site visit in three ponds. Adult and larvae red-legged frogs were found in ponds K and M (Figure 6). Red-legged frog larvae were found in pond G (Figure 6). Red-legged frogs were not found in other ponds on-site on the April 24, 1994 site visit because they were either dry or too alkaline. During extremely wet years, other ponds on the project site could potentially hold water sufficiently long for red-legged frogs to breed.

PROJECT IMPACTS

The landfill expansion project is separated into four phases. Phase 1 covers a land area of 151 acres in size. Of this 151-acre area, approximately 3.5 acres consists of roads and pads for windmills. The previously undisturbed area therefore consists of 147.5 acres. The access road to the Phase 1 portion of the Altamont Expansion Area would affect an area no greater than 25.5 acres. Therefore, the total area of previously undisturbed land to be directly affected by Phase 1 of the Altamont Expansion Area would be 173 acres. Project impacts and corresponding mitigation measures for Phase 1 will be addressed in detail in this report.

Impact assessment of subsequent phases of the proposed landfill expansion will be addressed when more precise information on rate and duration of fill can be developed. Consumer demand, recycling, and amount of packaging related to landfill use and cannot be predicted for more than a few years. Subsequent impact assessment and planning will occur closer to the time that each additional phase of the ALRRF would be needed. Complete utilization of the areas in Phases 1-4 would result in landfill covering 850 acres.

SPECIAL STATUS PLANTS

None of the special status plant species, including two federally listed, one federally proposed, and 11 candidate species, were observed within the Altamont Expansion Area. It is unlikely that any special status plant species would be affected by the proposed project.

SPECIAL STATUS WILDLIFE

The proposed project could result in direct or indirect impacts to six of the special status wildlife species which were observed within the Altamont Expansion Area, one of which is federally listed (San Joaquin kit fox), one is proposed for listing as endangered (California red-legged frog), and four are federal candidates for listing (San Joaquin pocket mouse, ferruginous hawk, western burrowing owl, and California tiger salamander).

While bald eagles do winter in the general vicinity of the Altamont Expansion Area, the project would not likely have any significant impacts on the species because of the absence of suitable foraging habitat. Pacific western big-eared bat and greater western mastiff bat do not currently occur within the Altamont Expansion Area. However, habitat for these species occurs in an abandoned ranch house located in Phase 4 of the Altamont Expansion Area. If either of these two bat species colonize the abandoned building prior to expansion into the Phase 4 area, they could experience impacts.

San Joaquin Kit Fox

Direct Impacts to San Joaquin Kit Fox Habitat

The proposed project would result in the loss of 173 acres of denning and foraging habitat of the San Joaquin kit fox from Phase 1 activities. This area may be partially restored as kit fox habitat after closure as described in the *Landfill Restoration Research* section.

Mortality and Injury to San Joaquin Kit Fox

Mortality or injury to kit foxes could occur during both construction and landfill operation activities from: (1) accidental entrapment in burrows; (2) entrapment of kit foxes in pipes and culverts; (3) encounters with heavy equipment; (4) speeding vehicles hitting kit foxes on established roads; (5) encounters with vehicles that drive off established roads; (6) personnel using firearms that may harm kit foxes; (7) the introduction of pets, especially dogs, that could harm kit foxes; and (8) edible trash left by personnel that would attract kit foxes. Kit foxes could also be killed or injured by the use of rodenticides on kit fox prey species during operation of the ALRRF.

Accidental Entrapment

San Joaquin kit fox enter into dens to escape from danger. If dens are located in an area where grading or excavation is occurring, then the potential exists for foxes to be buried within a den by earthmoving activities.

Similarly, San Joaquin kit fox potentially will enter pipes and culverts to escape from predators and to avoid being observed by humans. Dropping the pipes on the ground, placing the pipes in trenches prior to filling the trench and other use of pipes and culverts that are occupied could result in the foxes' injury or death.

Collisions With Passenger Vehicles or Heavy Equipment

One known cause of mortality of San Joaquin kit fox is collisions with passenger vehicles. Driving too fast or driving off established roads can result in kit fox mortality. Such mortality could result from direct collisions or collapsing dens containing kit foxes. Kit foxes trapped in a collapsed den are likely to suffocate. Heavy construction equipment, while operating in suitable habitat, may accidentally hit kit foxes. San Joaquin kit fox are active at night and vehicles driven at night, especially in areas inhabited by kit foxes, pose an increased risk to kit foxes.

Fire Arms

People are prone to use fire arms in rural and isolated areas such as the ALRRF. San Joaquin kit fox may be killed or harmed by target practice by workers who have access to areas within the ALRRF boundary.

Introduction of Dogs

Domestic dogs are often predators of livestock and naturally occurring wildlife. Because of their larger size, domestic dogs can kill or harm San Joaquin kit fox.

Edible Trash

Edible trash can attract San Joaquin kit fox. Nevertheless, operation of the ALRRF on a continuous basis around the clock would discourage scavenging and reduce the likelihood of injury to kit foxes.

Use of Rodenticides

Rodents are one favored prey species for San Joaquin kit fox and the California ground squirrel is the favored prey species in the northern portion of their range. Consumption of prey that recently ingested a rodenticide could result in harm or death of kit foxes. Kit foxes may also experience harm or mortality from scavenging carcasses that still contain poison.

Heavy use of rodenticides results in the reduction of rodent populations. This is likely to result in the reduction in the abundance of kit foxes due to absence of prey.

San Joaquin Pocket Mouse

The proposed project would result in the loss of 173 acres of burrowing and foraging habitat of the San Joaquin pocket mouse from Phase 1 activities. This area may be partially restored as suitable habitat after closure as described in the *Landfill Restoration Research* section.

Impacts to San Joaquin pocket mouse could occur during both construction and landfill operation activities from entrapment in burrows, speeding vehicles hitting mice on or off established roads. San Joaquin pocket mouse could also be killed or injured by the use of rodenticides targeted for ground squirrels.

Ferruginous Hawk

Ground squirrels comprise a substantial portion of the diet of the ferruginous hawk. The proposed Phase 1 expansion would result in the permanent loss of 173 acres of foraging habitat because ground squirrels would be excluded from the finished landfill.

Western Burrowing Owl

The proposed project would result in the loss of 173 acres of burrow and foraging habitat of the western burrowing owl from Phase 1 activities. This area may be partially restored as suitable habitat after closure as described in the *Landfill Restoration Research* section.

Impacts to burrowing owl could occur during both construction and landfill operation activities from entrapment in burrows, speeding vehicles hitting owls on or off established roads. Burrowing owls could also be killed or injured by the use of rodenticides targeted for California ground squirrels.

California Tiger Salamander and California Red-legged Frog

The project proposes to fill six stock ponds and two natural ponds. California tiger salamanders and California red-legged frogs were found in three of the ponds to be filled, stock ponds F, G, and I. Tiger salamanders were found in ponds F, G, and I, and red-legged frogs were found in pond G. Assuming that grasslands within a 1/4 mile radius of salamander breeding habitat provide potential salamander upland habitat (Shaffer, pers. comm.), approximately 85 acres of salamander habitat adjacent to ponds A and D, both known salamander breeding ponds, will be excavated for Phase 3 of the ALRRF.

The filling of the three existing tiger salamander breeding ponds and one red-legged frog breeding pond will occur over the life of the project. Mitigation for the loss of tiger salamander and red-legged frog breeding habitat will occur at the beginning of the project.

CUMULATIVE IMPACTS

Cumulative impacts are considered the combined effects of the Phase 1 expansion project and all other nonfederal projects on surrounding lands that are reasonably certain to occur, and the contribution of the project to this impact. Impacts that could combine with the effects of the Phase 1 landfill expansion are from planned developments within eastern Alameda County and western San Joaquin County.

Most of the land surrounding the Altamont Expansion Area provides suitable habitat for the six special status wildlife species that will be impacted by the project. The land immediately surrounding the Altamont Expansion Area is currently zoned as an agricultural district established to "promote the implementation of General Plan land use proposals for agricultural and other non-urban uses, to conserve and protect existing agricultural uses, and to provide space for and encourage such use in places where more intensive development is not desirable or necessary for the general welfare" (Alameda County 1976). The existing land use on most of the surrounding area (grazing and wind energy) are not likely to impact the special status species.

The Contra Costa Water District's proposed Los Vaqueros Project, located approximately 10 miles northwest of the Altamont Expansion Area would result in the loss of approximately 2,546 acres of grassland habitat, but would also permanently protect approximately 9,620 acres in the Kellogg Creek watershed (Jones and Stokes Associates, Inc. 1992). Other proposed projects that are likely to affect special status species in the general vicinity of the ALRRF include expansion of the cities of Livermore and Byron, the Unimin Mine and the Byron Airport. A new development project that is proposed in the area includes a residential development by the Cowell Foundation approximately 10 miles northwest of the proposed ALRRF.

Due the amount of suitable habitat for the special status species that will be permanently lost, relative to the amount of remaining habitat, the cumulative impacts should be minimal.

MITIGATION - PHASE 1

Mitigation for the impacts to the Phase 1 area is discussed in detail below. Mitigation for subsequent phases is discussed in a latter section of the Biological Assessment.

SAN JOAQUIN KIT FOX

One San Joaquin kit fox was observed within the ALRRF boundaries and one was observed just beyond the boundary. Tracks of San Joaquin kit fox were observed on the northwestern portion of the Altamont Expansion Area and the northeastern portion of Section 17. The entire Altamont Expansion Area consists almost entirely of grassland and is suitable habitat for the San Joaquin kit fox. Implementation of the following measures are designed to bring the proposed project into compliance with the Service's standardized recommendations for protection of the San Joaquin kit fox (USFWS 1989).

Qualified Biologist

Some of the mitigation measures in this section call for the services of a "qualified biologist." This person will have completed at least 4 years of university training in wildlife biology or a related science and have demonstrated field experience in the identification and life history of the San Joaquin kit fox.

Implementation

Failure to implement the mitigation plan as prescribed could result in the initiating agency reopening the consultation. In addition, Waste Management of Alameda County will execute a conservation easement in substantially the form as shown in Appendix E within 90 days of issuance of the Biological Opinion.

Habitat Compensation

San Joaquin kit fox habitat subject to disturbance because of project related activities will be subject to compensation that offsets the area lost through permanent protection of an appropriate area of intact habitat. The amount of habitat permanently protected consists of 3 acres of area protected for every 1 acre of area permanently disturbed. Additional area consisting of 222 acres in Section 17, 16 and 21 is being reserved for partial mitigation for impacts associated with Phase 2.

On-site Mitigation Lands

Description

Mitigation habitat for the San Joaquin kit fox is located adjacent to the Altamont Expansion Area. The mitigation habitat encompasses approximately 519 acres located in Section 17 (Figure 7). The size of the mitigation area was calculated as follows: 519 mitigation acres = 3 x 173 acres of impact. The loss of kit fox habitat will be mitigated at a 3:1 ratio during Phase 1. The mitigation area is contiguous to off-site grasslands. The mitigation area is also outside of the active area and facilities area. Designation of additional kit fox mitigation habitat will be required before use of the Phase 2 area can begin.

Regional Context

As described above, the 519 acres of on-site mitigation lands will be managed for kit foxes (Figure 7). The mitigation plan is designed to preserve and enhance potential fox habitat on-site, which is linked with the species' range to the north and south. Virtually all of the area included in Figure 2 is grassland habitat. The only woody vegetation present on this figure occurs at Brushy Peak and its amount is too small to map. These grasslands comprise kit fox habitat. Thus, the on-site mitigation lands are connected with similar off-site potential kit fox habitat.

The grasslands contiguous to the mitigation area are currently used for grazing, which is compatible with kit fox habitat. Those adjacent lands in private ownership are currently protected as habitat because they are zoned for agriculture or open space.

Mitigation Site Enhancement

The mitigation area will be enhanced as kit fox habitat by increasing the natural establishment of ground squirrels. Ground squirrels are the primary prey species of kit foxes in the northern portion of their range and ground squirrel burrows provide the starts for kit fox dens and refuges from predators. Ground squirrels will be managed by a tailored grazing regime and by prohibiting the use of rodenticides in the mitigation area. Ground squirrel habitat will be further enhanced on the mitigation areas by drilling holes in the ground that would accommodate ground squirrels. Holes will be drilled in areas that currently maintain few, if any, ground squirrels. Ground squirrels often build dens adjacent to boulders or rocks. To further increase the population of ground squirrels within the mitigation area, boulders will be placed in selected areas.

Replacement of Dens

Any dens that are known to have been used by kit foxes that must be destroyed due to ALRRF operations will be replaced. Artificial dens will be constructed and installed within the on-site mitigation area at locations that are relatively flat, but which currently lack suitable dens.

Replacement of dens will compensate for the loss of important shelter used by kit foxes for protection, reproduction, and escape from predators. Replacement dens are particularly important in areas where den availability appears to be limiting. Den design and placement should be determined on a site-specific basis in consultation with the Service, CDFG, and kit fox experts.

Procedures to Reduce Mortality and Injury of San Joaquin Kit Fox

The procedures that are discussed below are based on the Service's Standardized Recommendations for Protection of the San Joaquin Kit Fox (USFWS 1989). The procedures discussed below consist of surveys for presence of San Joaquin kit fox, and all practical measures to prevent harm or other impacts to kit foxes.

Preconstruction Surveys

The following procedures will be implemented in order to avoid take of the San Joaquin kit fox.

Preconstruction Survey Fieldwork

LSA will initiate surveys of the project areas for San Joaquin kit fox no earlier than 60 days prior to construction of any of the projects. Areas surveyed will be the footprints of proposed construction areas and a 150-foot wide area surrounding the edge of the footprint. Surveys will be conducted by qualified wildlife biologists. Surveys will be carried out by examining areas along transects for potential dens of San Joaquin kit fox. Survey methodology will follow techniques acceptable to the Service (USFWS 1989). Burrows will be considered potential dens if they are 4 - 12-inches diameter, and maintain this diameter to at least 4 feet deep. Known dens will be identified by the presence of the remains of prey, scat, hair, prints, and/or recent excavation.

Protective Exclusion Zones

Protective exclusion zones will be established around any potential and known dens of San Joaquin kit fox located outside the footprint but within 150 feet of the construction area. These zones will be circular and 100 feet in diameter for known dens (150 feet if found to be occupied) and 25 feet in diameter for

potential dens. The only activity permitted within these exclusion zones will be vehicles traveling on existing roads or foot traffic.

The boundaries of the protective exclusion zones located around any known dens will be marked by 4 - 5 foot tall metal or wooden stakes connected by rope. Three or more signs will be posted in strategic areas equidistant along the perimeter of the zone. Each sign will identify the fenced zone as an environmentally sensitive area and state that no disturbance is permitted without prior authorization from appropriate project personnel or the Service. The fencing and signs will remain until all construction related activity ceases.

The boundaries of the protective exclusion zones located around potential kit fox dens will be marked with 4 - 5 foot tall stakes and flagging. A single sign, as described above will accompany the stakes.

Kit Fox Dens

Within the construction footprint, disturbance to potential and known dens of the San Joaquin kit fox will be avoided to the extent possible. No known kit fox dens will be destroyed without prior notification of the Service in writing. If any known dens cannot be avoided, they will be destroyed while foxes are confirmed to be absent, and prior to initiating construction activity in the area. Destruction of known or suspected natal or pupping dens will not occur without prior consultation with the Service.

Monitoring. Prior to the destruction or covering of any known or potential San Joaquin kit fox den within the construction footprint, the den will be monitored for at least three consecutive days to determine its current status. Activity at the subject den will be monitored first by placing tracking medium at its entrance(s). If no kit fox activity is observed during a consecutive 3-day period, dens will be destroyed or covered immediately, to preclude subsequent use. If prints are observed, construction activity will be postponed for five days, the track evaluation will be repeated, and LSA will establish a camera station for three consecutive nights at the entrance of any potentially active burrow. Burrows will be determined non-active if the tracking medium and camera confirm kit fox absence for three consecutive nights. Active dens will not be disturbed. Potential and non-active known dens within the construction footprint will be destroyed only if they can not be avoided and temporarily blocked if they can be avoided.

If kit fox activity is observed at a den during this period, the den will 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 activities. Den plugging and similar techniques to discourage use will not be employed.

Excavation Procedures. Destruction of potential or known kit fox dens will be accomplished by careful excavation with hand tools until it is certain that no kit foxes are inside. The den will be fully excavated and then 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 a den, the excavation activity will cease immediately and monitoring of the den as described above will be resumed. The Service will be contacted for advice immediately.

Personnel. All San Joaquin kit fox den excavations and pre-excavation monitoring will be conducted by a qualified biologist or under the direct supervision of a qualified biologist. The qualified biologist will be present within the Altamont Expansion Area during monitoring activities and excavations.

Reporting Survey Results

Results of the preconstruction surveys will be submitted to the Service within 2 weeks of their completion. This report will describe methods and results, and discuss the significance of the results. If no kit fox activity is identified, the report will be submitted in letter form and address only essential information (e.g., number of potential kit fox dens located in the preconstruction survey area, map of locations of potential dens, etc.). If kit fox activity is noted, a more extensive report, including proposed mitigation measures, will be submitted.

Construction and Operations

Construction Activity Areas

Areas subject to permanent and temporary construction disturbances and other types of project-related disturbance have been minimized. Project designs limit or cluster permanent project features to the least area possible while still permitting project goals to be achieved. Roads and pipelines will be located in areas of least impact.

Vehicle Operation

All project related vehicle traffic will be restricted to established roads, construction areas, storage areas, and staging and parking areas.

Off-road traffic outside of designated project areas will be prohibited. Project related vehicles will observe a 20 mph speed limit in all project areas, except on county roads, and state and federal highways.

Trenches

To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of the project, all excavated, steep-walled holes or trenches more than 2 feet deep outside of the perimeter fence will be covered at the close of each working day with plywood or similar materials, or provided with one or more ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures described under the section titled *Accidental Harm to Kit Fox* will be followed.

Pipes and Culverts

All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater will be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved. Any pipes placed in trenches, but not connected on both ends, will be capped at the end of each day.

Trash

All food related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers only and regularly removed.

Pets

No pets will be permitted at the ALRRF.

Feeding Wildlife

Feeding wildlife will be not be permitted.

Firearms

No firearms will be permitted on the ALRRF property.

Rodenticides and Herbicides

No use of rodenticides and herbicides in project areas within 1 mile of known San Joaquin kit fox occurrences will occur. All uses of such compounds will 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. If chemical rodent control must be conducted at the ALRRF, zinc phosphide will be used because of its proven low risk to kit foxes. Compound 1080, strychnine, chlorophacinone, diphacinone, and fumigants such as methyl bromide will be banned entirely from the ALRRF property.

Employee Education Program

An employee education program will be conducted. The program will consist of a brief consultation in which a person knowledgeable in kit fox biology and legislative protection explains endangered species concerns to all officers and supervisors in charge of the ALRRF. Officers and supervisors will subsequently relate these concerns to their staff. The program will include a description of the San Joaquin kit fox and its habitat needs, and will address the species and its protection under the Endangered Species Act, along with measures being taken to reduce impacts to the species during project construction and operation.

A brief educational pamphlet conveying this information will be prepared for distribution to all contractors, their employees, and agency personnel involved in the project construction and implementation. Prior to beginning work on the project, all independent construction company field supervisors and their staff will be required to read this pamphlet and sign a written statement indicating that they understand the information presented and will comply with measures designed for protection of the kit fox. A copy of this pamphlet will be made available to each construction worker.

Employees of the ALRRF will also be required to review this pamphlet. This measure does not apply to waste haulers or other temporary visitors.

Accidental Harm to Kit Fox

Any contractor or employee who inadvertently kills or injures a San Joaquin kit fox or who finds a dead, injured, or entrapped San Joaquin kit fox will report the incident immediately to his or her immediate supervisor. Any kit fox or other endangered species found dead or injured must be reported immediately to the CDFG at (916) 445-1383 to determine procedures for care and analysis.

If a kit fox should accidentally enter the ALRRF and/or become entrapped, ALRRF personnel will maintain surveillance of the animal to the extent feasible,

while avoiding harassment. The Service will be notified as soon as possible and in any case within 24 hours, in order for the Service to take appropriate action. Telephone notification (916-978-4866) will be followed by written notification within three working days (USFWS, Endangered Species Office, 2800 Cottage Way, Room E-1803, Sacramento, CA 95825).

Notification and Reporting

Bill Gilmour will be the representative from Waste Management of Alameda County designated to keep the Service, Sacramento Field Office, and CDFG apprised of the status of ongoing efforts to protect the San Joaquin kit fox during the construction of these facilities.

Project-related information to be submitted will be directed to:

U.S. Fish and Wildlife Service
Sacramento Endangered Species Office
2800 Cottage Way, Room E-1823
Sacramento, CA 95825
Telephone: 916/978-4866

California Department of Fish and Game
Environmental Services Supervisor
1701 Nimbus Road
Rancho Cordova, CA 95670

Post-construction Compliance Report

At the completion of each project (stockpiles, water pipeline, storm drain basin), a qualified biologist will inspect the work and submit a letter report to the Service on compliance. A post-construction compliance report will be submitted within 45 calendar days of completion of each project.

SAN JOAQUIN POCKET MOUSE

Land preservation and habitat acquisition measures that mitigate impacts to San Joaquin kit fox will also mitigate impacts to San Joaquin pocket mouse because of their similar habitat requirements.

PACIFIC WESTERN BIG-EARED BAT AND GREATER WESTERN MASTIFF BAT

Surveys of the abandoned ranch house will be conducted for Pacific western big-eared bat and greater western mastiff bat prior to expansion into Phase 4. If one or both of these species of bats are present in the abandoned ranch house, then suitable roosting habitat will be created on a finished portion of

the ALRRF. These bats will be moved to their new habitat prior to expanding into the Phase 4 area. The surveys will be conducted with enough lead time (1½ years) to allow for the construction of new habitat and transfer of bats.

FERRUGINOUS HAWK

Land preservation and habitat acquisition measures that mitigate impacts to San Joaquin kit fox will also mitigate impacts to ferruginous hawk because of their similar habitat requirements.

WESTERN BURROWING OWL

Within construction footprints, disturbance to occupied burrowing owl burrows will be avoided to the extent possible. Preconstruction surveys will be conducted for the presence of burrowing owl simultaneously with surveys conducted for San Joaquin kit fox. If owls are found within the construction footprint during the breeding season (February 1 - August 31), the occupied burrow must be avoided and a 50-foot diameter exclusion zone will be constructed surrounding the burrow. After the chicks have fledged, the burrow may be fitted with exclusion devices (one-way doors) until the birds leave, and then excavated. Outside of the breeding season, occupied burrowing owl burrows found within the construction footprint will be immediately fitted with exclusion devices until the birds leave, and then excavated. Exclusion zones will be constructed around all occupied burrows located within the surveyed buffer area (160-foot wide area surrounding the construction footprint).

Land preservation and habitat acquisition measures that mitigate impacts to San Joaquin kit fox will also mitigate impacts to western burrowing owl because of their similar habitat requirements.

CALIFORNIA TIGER SALAMANDER

Mitigation Concept

The western portion of the ALRRF property (a portion of section 17) used as mitigation for the kit foxes will also be used as the mitigation area for the California tiger salamander (Figure 7). Three existing stock ponds that will be filled currently support populations of California tiger salamander and California red-legged frog populations. These are stock ponds F, G, and I. Stock pond I will be filled during Phase 1; stock pond G will be filled during Phase 2; and, pond F will be filled during Phase 3. Mitigation for the loss of these ponds and other jurisdictional waters will involve the creation of ponds in the designated mitigation area in the western portion of the site, at a 1.5:1 ratio (new to filled). Further information on the wetland mitigation plan is

presented in LSA (1994). All ponds established in mitigation area will be surrounded with suitable upland habitat.

Three existing ponds present in the on-site mitigation area (Ponds K and M and natural pond 1) currently support breeding California tiger salamanders and California red-legged frogs. This indicates that the proposed on-site mitigation area provides suitable breeding habitat for tiger salamanders and red-legged frogs, and upland habitat tiger salamanders.

Salamander Habitat Areas

Breeding habitat for California tiger salamanders in the on-site mitigation area will consist of three existing stock ponds, one natural pond, and three newly created ponding areas totalling approximately 1.04 acres (Figure 7). The newly created ponds represent a component of the wetland mitigation plan developed to compensate for impacts to 1.67 acres of jurisdictional waters of the United States (LSA 1994). The mitigation plan involves the creation of a total of 2.5 acres of seasonally inundated wetlands at four locations, which includes a total of 1.04 acres of ponding areas within the boundaries of the replacement wetlands.

Existing Breeding Habitat

The existing ponds K, L, and M will be maintained as tiger salamander and red-legged frog breeding sites by protecting the ponds and preserving the adjacent upland habitat. These existing ponds are within the proposed mitigation area. Both ponds K and M supported breeding populations of tiger salamanders in 1992 and red-legged frogs in 1994. In addition, natural pond 1 contained larvae of California tiger salamanders in 1992.

Proposed Breeding Habitat

Two ponds having water surface areas of 0.35 and 0.17 acres will be constructed in the mitigation area to compensate for the loss of ponds I and J within the Phase 1 expansion area. Two additional ponds having surface ponding areas of 0.35 and 0.17 acres will be constructed to mitigate impacts to two additional existing ponds that will be removed by subsequent phases of the proposed expansion. Each pond will be surrounded by seasonal wetlands.

These mitigation ponds will be constructed prior to the first winter after the approval of the mitigation plan. Heavy equipment will be used to shape the pond basin and form a berm at the downstream end of the ponding region. The ponds will range from 3 - 5 feet deep, 50 - 75 feet wide and 75 - 150 feet long. Pond edges will be gently sloped to allow for growth of wetland vegetation. Wetland vegetation surrounding each pond will cover an area

approximately one-quarter to one-half an acre in size. For those ponds located in larger watersheds, a water control structure will be constructed to safely convey any overflow downstream, as well as maintain suitable breeding habitat.

Salamander Introductions

Site Preparation

Invertebrates from existing stock ponds on the property will be introduced to the newly created ponds. Aquatic invertebrates and eggs of Pacific tree frog will be captured and transferred to newly created ponds. The invertebrates will be captured using dip nets and the tree frog eggs will be gathered by hand.

The introduction of the invertebrates will be accomplished by either of two methods. If possible, between 100 and 200 square feet of pond bottom 1 inch in depth from existing ponds will be removed and added to the bottom of newly established ponds. This will occur immediately after the ponds have been constructed. This pond-bottom soil will likely contain the eggs of numerous invertebrates as well as seeds of aquatic plant species.

Alternately, during the first winter/spring (February, March, April) following pond construction, tadpoles and aquatic invertebrates will be transferred from existing ponds on within the ALRRF property boundaries.

Introduction Techniques

Prior to the introduction of tiger salamander larvae, each of the newly constructed ponds will be inspected for the presence of tiger salamander eggs and sampled by dip net and seine in mid-February and mid-March to determine if adult salamanders in the area naturally colonized and bred in the pond. Tiger salamander larvae from existing ponds will be introduced into any newly created ponds which do not have larvae present as early in the breeding season as possible. If tiger salamanders do occur in any of the newly created ponds, the population will be supplemented with additional larvae from existing ponds using the methods below.

The introduction of California tiger salamander larvae to newly created ponds will be done when the larvae are small in order for them to become acclimated to their new environment. Larvae will be collected by seine net or reared from eggs collected from existing ponds planned to be filled. An introduction of 50 - 100 larvae will occur in each of the first 2 years after pond construction to establish a new breeding population.

CALIFORNIA RED-LEGGED FROG

Mitigation Concept

Mitigation for the California red-legged frog will be similar to mitigation measures discussed for California tiger salamander, above. One pond will be created in the on-site mitigation area to provide breeding habitat for red-legged frogs.

Red-legged Frog Habitat Areas

Breeding habitat for the California red-legged frog in the on-site mitigation area will consist of the creation of one pond in the designated mitigation area (Figure 7).

Existing Breeding Habitat

Existing red-legged frog breeding habitat present in the mitigation area, ponds K and M, will be maintained as breeding habitat for the red-legged frog through permanent protection of the ponds. Red-legged frog breeding habitat present in the proposed landfill area is one stock pond, (pond G), located in the Phase 2 area.

Proposed Breeding Habitat

One pond will be created in the mitigation area to provide breeding habitat for red-legged frogs (Figure 7).

Pond construction will follow methods discussed above for California tiger salamander. The pond will have a shelf around the perimeter that will range from 2 to 3 feet deep, and a deeper central portion, that will range from 10 to 12 feet deep. The pond will be 50 - 75 feet wide, and 75 -150 feet long. Wetland vegetation will cover an area approximately one-third to one-half the shoreline. Willows (*Salix* sp.) will be planted along the pond edge to provide shade. The shallow shelf will be dominated by emergent species such as cattails.

Red-legged Frog Introductions

Red-legged frogs will not be introduced into the mitigation pond in the first year. If red-legged frog eggs or larvae are not found in the mitigation pond after the first breeding season, frogs will be taken from existing on-site populations or from the local vicinity and introduced into the mitigation pond. If the California red-legged frog becomes formally listed as threatened or endangered prior to the establishment of red-legged frog populations in the

mitigation pond, introductions would require approval and permitting from the USFWS.

MITIGATION - PHASE 2 THROUGH PHASE 4

Phase 2 through Phase 4 will result in the conversion of approximately 600 to 700 acres of grassland to landfill. Because the precise phasing plan has not yet been completed, the mitigation measures presented here are as definitive as possible, given the uncertainties of timing and logistics of future phases.

SAN JOAQUIN KIT FOX

Mitigation for impacts to Phase 2 through Phase 4 would be very similar to Phase 1 mitigation. The procedures to reduce San Joaquin kit fox injury and mortality will be the same as those discussed for Phase 1. The measures discussed below would provide for lost habitat by off-site purchase of San Joaquin kit fox habitat through an institutionalized financing mechanism at the ALRRF. In addition, some replacement habitat may be provided by Fill Area 1, based on results of research described below.

Habitat Acquisition

Habitat that surrounds the ALRRF is currently used for grazing and generating electricity from windmills (wind farming). These types of uses are compatible with the habitat requirements of the San Joaquin kit fox. The ALRRF will fund the protection of habitat of the San Joaquin kit fox. One possible funding mechanism would be for the ALRRF to establish a "tipping fee" whose magnitude would depend on the current cost of using the ALRRF and costs for using neighboring landfills. Protection will entail either the purchase of a conservation easement or the outright purchase of the title of parcels in the vicinity of the ALRRF.

Lands purchased will be those in the vicinity of the ALRRF and will serve to protect the ability of kit foxes to disperse and freely move in a north-south direction. These lands are currently zoned for agriculture and are used for grazing or wind-farming. Mitigation lands will be maintained as habitat for the kit fox by grazing. Rodent eradication programs will not occur on these off-site mitigation lands.

Landfill Restoration Research

Research will be conducted to investigate the potential for Fill Area 1 (and subsequent fill areas) to provide kit fox habitat after closure. Research will focus on techniques of accommodating burrowing animals in areas with shallow soil. Rodents, other than California ground squirrels, will be allowed to occur on the completed portions of the ALRRF (burrowing activities of the California ground squirrel may penetrate the landfill cap.) A program will be implemented to capture, using live catch traps, any ground squirrels that colonize the surface of the completed Fill Area 1. The danger with using the

closed fill areas as kit fox replacement habitat is that penetration of the landfill cap by ground squirrels could allow moisture to enter the landfill. Penetrating the cap would also release large amounts of methane. Because ground squirrels will be excluded from the closed fill areas, it is currently unclear as to what degree of replacement habitat can be provided when potential prey are excluded. If suitable habitat could reasonably be provided by Fill Area 1 after closure, then off-site purchase requirements possibly could be reduced. Kit fox use of the ALRRF, including colonization of the Fill Area 1, will be examined by establishing scent stations, conducting den surveys, and conducting spotlighting surveys. This research will indicate the amount of Fill Area 1 that is used by kit foxes. This research will also be standardized in order to compare the usage of undeveloped areas within the ALRRF boundaries to that of Section 17, the mitigation area, and the restored potential of Fill Area 1.

Artificial Dens

Artificial dens will be created on selected areas of the completed Fill Area 1 portion of the ALRRF. These artificial dens will be located on an area of topsoil 6 - 8 feet deep and approximately 100 - 200 feet on a side. Because soil is not likely to be available in the quantities necessary to cover the entire landfill cap to a depth of 6 - 8 feet, only areas 10,000 - 40,000 square feet will be covered with a deep layer of topsoil. Each area will be termed an artificial den complex.

Artificial dens will be constructed by excavating a hole 8 - 10 inches in diameter, 6 feet long, and slanting at approximately a 15° angle. Approximately 10 to 20 such dens will be excavated in each area (100 to 200 feet on a side [10,000 - 40,000 square feet]). Ten to fifteen artificial den complexes will be placed on the completed Fill Area 1.

SAN JOAQUIN POCKET MOUSE

Habitat acquisition for San Joaquin kit fox will also mitigate any impacts to San Joaquin pocket mouse because of their similar habitat requirements.

FERRUGINOUS HAWK

Land preservation and habitat acquisition measures that mitigate impacts to San Joaquin kit fox will also mitigate impacts to ferruginous hawk because of their similar habitat requirements.

WESTERN BURROWING OWL

Mitigation for impacts to Phase 2 through Phase 4 would be very similar to Phase 1 mitigation. The procedures to reduce burrowing owl injury and mortality will be the same as those discussed for Phase 1.

Land preservation and habitat acquisition measures that mitigate impacts to San Joaquin kit fox will also mitigate impacts to western burrowing owl because of their similar habitat requirements.

CALIFORNIA TIGER SALAMANDER

Preservation of off-site land for San Joaquin kit fox will also mitigate impacts to California tiger salamanders because land-use compatible to maintaining habitat for kit foxes would also maintain habitat for salamanders. In addition to acquisition of habitat area, at least three additional ponds will be created for breeding habitat for California tiger salamanders. Site preparation and introduction techniques will be the same as those previously discussed in the Phase 1 mitigation section.

CALIFORNIA RED-LEGGED FROG

Mitigation for the red-legged frog would be similar to measures discussed above for tiger salamanders. One mitigation pond will be created to provide breeding habitat for red-legged frogs. Site preparation would be as discussed previously in the Phase I mitigation section.

REFERENCES

LITERATURE CITED

- Alameda County Zoning Ordinance, January 1976.
- Arnold, R. A. 1991. Altamont Landfill: Surveys for Sensitive Invertebrates. Prepared for Leitner Biological Consulting, Oakland, CA.
- BioSystems Analysis, Inc. 1991. Wind turbine effects on avian activity, habitat use, and mortality. Draft report 1989 - 1991. Prepared for Alameda County Planning Department, Hayward, CA.
- BioSystems Analysis, Inc. 1988. Reconnaissance survey of rare or endangered plants and animals, U.S. Windpower proposed development, Oakland Scavenger's property, Alameda County, California. Prepared for U.S. Windpower, Livermore, CA. 17 pages.
- Botanical Research Group. 1991. Altamont Pass landfill rare plant survey. Prepared for Leitner, B., Oakland, CA.
- California Department of Fish and Game (CDFG). 1983. Los Vaqueros Project - Fish and Wildlife Impacts. A Status Report. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 264 pp.
- California Department of Fish and Game (CDFG). 1990. Region 4 survey methodologies for San Joaquin kit fox, blunt nosed leopard lizard, San Joaquin antelope squirrel, Tipton kangaroo rat, giant kangaroo rat. California Department of Fish and Game, Region 4, Fresno, CA.
- California Natural Diversity Data Base (CNDDB). 1992. Special status species occurrence report for the Antioch South, Brentwood, Woodward Island, Tassajara, Byron Hot Springs, Clifton Court Forebay, Livermore, Altamont, and Midway USGS 7.5 min. quadrangles. California Department of Fish and Game, Natural Heritage Division, Sacramento, CA.
- Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylei*): implications for management. Pages 144-158 in: Proceedings of the Symposium: Management of Amphibians, Reptiles, and Small Mammals in North America, July 19-21, 1988. U.S.D.A. Forest Service, Rocky Mtn. For. and Range Exp. Stn., Fort Collins, CO. Gen Tech. Rep. RM-166.
- Jones and Stokes Associates, Inc. 1992. Biological assessment for federal threatened, endangered, and candidate species for the Los Vaqueros

- project. Prepared for U.S. Bureau of Reclamation, Sacramento, CA, and Contra Costa Water District, Concord, CA.
- Leitner, M. and P. Leitner. 1992. Altamont sanitary landfill expansion biological resource study. Prepared for Oakland Scavenger Company, Oakland, CA.
- LSA Associates, Inc. (LSA). 1994. Conceptual wetlands mitigation plan Altamont Landfill and Resource Recovery Facility, Alameda County, California. Prepared for Waste Management of Alameda County.
- Mallette, R. D. and G. I. Gould, Jr. 1976. Raptors of California. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 85 pp.
- O'Farrell, T. P. 1983. San Joaquin kit fox recovery plan. U.S. Fish and Wildlife Service, Portland, OR. 83 pp.
- Orloff, S. G. 1990. Survey techniques for the San Joaquin kit fox (*Vulpes macrotis mutica*). Endangered Wildlife Technical Workshop, The Wildlife Society, San Joaquin Valley Chapter, Clovis, CA.
- Orloff, S., F. Hall, and L. Spiegel. 1986. Distribution and habitat requirements of the San Joaquin kit fox in the northern extreme of their range. Trans. West. Sec. Wildl. Soc. 22:60-70.
- Smith, J. P. Jr. and K. Berg. 1988. Inventory of rare and endangered vascular plants of California. Special Publication No. 1, 4th ed., California Native Plant Society, Sacramento, CA. 168 pp.
- Soil Conservation Service (SCS). 1966. Soil Survey of Alameda Area, California. U.S. Department of Agriculture.
- Stebbins, R. C. 1985. A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, MA. 336 pp.
- U.S. Fish and Wildlife Service (USFWS). 1989. Standardized recommendations for protection of the San Joaquin Kit Fox. April, 1989.
- U.S. Fish and Wildlife Service (USFWS). 1993. San Joaquin kit fox survey protocol for the northern kit fox range. Prepared by the Sacramento Field Office April 30, 1993.
- Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White. 1990. California's Wildlife, Vol. II: Birds. California Department of Fish and Game, The Resources Agency, Sacramento, CA. 731 pp.

APPENDIX A

**PLANT SPECIES OBSERVED WITHIN THE ALTAMONT
EXPANSION AREA**

APPENDIX A

PLANT SPECIES OBSERVED WITHIN THE ALTAMONT
EXPANSION AREA

AMARANTH FAMILY

Tumbleweed

AMARYLLIS FAMILY

Pom-pon onion

Harvest brodiaea

Brodiaea

Blue dicks

CARROT FAMILY

Purple sanicle

MILKWEED FAMILY

Narrow-leaved milkweed

SUNFLOWER (ASTER) FAMILY

Yarrow

Blow-wives

Mayweed

Mugwort

Common blennosperma

Star thistle

Bull thistle

Brass buttons

Great Valley gumplant

Common spike weed

Telegraph weed

Tarweed

Cat's-ear

Prickly lettuce

Goldfields

Tidy-tips

Pineapple weed

Woolly marbles

Common butterweed

Milk thistle

Cocklebur

AMARANTHACEAE

Amaranthus albus

AMARYLLIDACEAE

*Allium serratum**Brodiaea coronaria**Brodiaea peduncularis**Brodiaea pulchella*

APIACEAE

Saniceula bipinnata

ASCLEPIADACEAE

Asclepias fascicularis

ASTERACEAE

*Achillea millefolia**Achyrochaena mollis**Anthemis cotula**Artemisia dracunculus**Blennosperma nanum**Centaurea solstitialis**Cirsium vulgare**Cotula australis**Grindelia camporum**Hemizonia pungens**Heterotheca grandiflora**Holocarpha virgata**Hypochoeris glabra**Lactuca serriola**Lasthenia californica**Layia platyglossa**Matricaria catricarioides**Psilocarpus oregona**Senecio vulgaris**Stybum marianum**Xanthium strumarium*

BORAGE FAMILY

Fiddleneck
Heliotrope
Popcorn flower

MUSTARD FAMILY

Athysanus
Winter cress

GERANIUM FAMILY

Cut-leaved geranium
Carolina geranium
Soft geranium

WATERLEAF FAMILY

Vari-leaf nemophila
Phacelia

IRIS FAMILY

Iris

RUSH FAMILY

Rush

MINT FAMILY

Clasping henbit
Horehound
Hedge nettle

LILY FAMILY

Soap plant
Stinkbells

MALLOW FAMILY

Cheesewood
Alkali meadow

MYRTLE FAMILY

Blue gum eucalyptus

POPPY FAMILY

California poppy
Cream cups

GRASS FAMILY

Slender oats
Wild oats
Brome
Ripgut brome

BORAGINACEAE

Amsinckia intermedia
Heliotropium curassavicum
Platobotrys spp.

BRASSICACEAE

Athysanus pusillus
Barbarea verna

GERANIACEAE

Geranium dissectum
Geranium carolinianum
Geranium molle

HYDROPHYLLACEAE

Nemophila heterophylla
Phacelia sp.

IRIDACEAE

Iris sp.

JUNCACEAE

Juncus mexicanus

LAMIACEAE

Lamium amplexicaule
Marrubium vulgare
Stachys sp.

LILIACEAE

Chlorogalum pomeridianum
Fritillaria agrestis

MALVACEAE

Malva nicaeensis
Sida bederacea

MYRTACEAE

Eucalyptus globulus

PAPAVERACEAE

Eschscholzia californica
Platystemon californicus

POACEAE

Avena barbata
Avena fatua
Bromus catharticus
Bromus diandrus

Soft chess	<i>Bromus mollis</i>
Red brome	<i>Bromus rubens</i>
Brome	<i>Bromus stamineus</i>
Saltgrass	<i>Distichlis spicata</i>
Wildrye	<i>Elymus triticoides</i>
Fescue	<i>Festuca dertonensis</i>
Mediterranean barley	<i>Hordeum geniculatum</i>
Foxtail barley	<i>Hordeum leporinum</i>
Italian ryegrass	<i>Lolium multiflorum</i>
Lemmon's timothy	<i>Pbalaris lemmonii</i>
Annual bluegrass	<i>Poa annua</i>
Rabbitsfoot grass	<i>Polypogon monspeliensis</i>
NETTLE FAMILY	URTICACEAE
Stinging nettle	<i>Urtica urens</i>
VERBENA FAMILY	VERBENACEAE
Verbena	<i>Verbena officinalis</i>
VIOLET FAMILY	VIOLACEAE
Violet	<i>Viola pedunculata</i>

APPENDIX B

**WILDLIFE SPECIES OBSERVED WITHIN THE ALTAMONT
EXPANSION AREA**

APPENDIX B

WILDLIFE SPECIES OBSERVED WITHIN THE ALTAMONT
EXPANSION AREA

AMPHIBIANS

California tiger salamander

Ambystoma californiense

Pacific treefrog

Pseudacris regilla

California Red-legged Frog

Rana aurora draytonii

REPTILES

Western fence lizard

Sceloporus occidentalis

Gopher snake

Pituophis melanoleucus

Western rattlesnake

Crotalus viridis

BIRDS

Mallard

Anas platyrhynchos

Turkey vulture

Cathartes aura

Northern harrier

Circus cyaneus

Red-tailed hawk

Buteo jamaicensis

Ferruginous hawk

Buteo regalis

Rough-legged hawk

Buteo lagopus

Golden eagle

Aquila chrysaetos

American kestrel

Falco sparverius

Prairie falcon

Falco mexicanus

Killdeer

Charadrius vociferus

Long-billed curlew

Numenius americanus

Herring gull

Larus argentatus

California gull

Larus californicus

Rock dove

Columba livia

Mourning dove

Zenaida macroura

Western burrowing owl

Speotyto cunicularia hypugea

Say's phoebe

Sayornis saya

Horned lark

Eremophila alpestris

Cliff swallow

Hirundo pyrrhonota

Barn swallow

Hirundo rustica

American crow

Corvus brachyrhynchos

Common raven

Corvus corax

Rock wren

Salpinctes obsoletus

Western bluebird

Sialia mexicana

Mountain bluebird

Sialia currucoides

American pipit
Loggerhead shrike
European starling
Savannah sparrow
Red-winged blackbird
Western meadowlark
Brewer's blackbird
Brown-headed cowbird
Northern oriole
House finch
House sparrow

MAMMALS

Desert cottontail
Black-tailed jackrabbit
California ground squirrel
Pocket gopher
California vole
San Joaquin pocket mouse
California pocket mouse
Deer mouse
Coyote
Red fox
San Joaquin kit fox
Raccoon
Badger
Striped skunk

Anthus rubescens
Lanius ludovicianus
Sturnus vulgaris
Passerculus sandwichensis
Agelaius phoeniceus
Sturnella neglecta
Euphagus cyanocephalus
Molothrus ater
Icterus galbula
Carpodacus mexicanus
Passer domesticus

Sylvilagus audubonii
Lepus californicus
Spermophilus beecheyi
Thomomys bottae
Microtus californicus
Perognathus inornatus
Perognathus californicus
Peromyscus maniculatus
Canus latrans
Vulpes vulpes
Vulpes macrotis mutica
Procyon lotor
Taxidea taxus
Mephitis mephitis

APPENDIX C

**SPECIES ACCOUNTS OF SPECIAL STATUS PLANTS NOT
FOUND WITHIN THE ALTAMONT EXPANSION AREA**

Distribution

Heartscale occurs in seasonally wet, dense, alkaline soils in the Sacramento and San Joaquin Valleys. It has been found in the Springtown Wetlands Reserve, west of the project site.

Results

No heartscale was found on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992).

San Joaquin Spearscale

Status

The San Joaquin spearscale (*Atriplex joaquiniana*) is a federal category 2 candidate species and is on CNPS's list 1B. It has no state status.

Distribution

San Joaquin spearscale is presently known only from Alameda, Contra Costa, Colusa, and Merced Counties. It occurs on highly alkaline soils in habitats such as alkali meadow and alkali scrub. San Joaquin spearscale blooms from June through September. This species occurs northwest and west of the project site in the Kellogg Creek watershed (Jones and Stokes Associates, Inc. 1992), and it also occurs to the west of the project site in the Livermore Valley.

Results

No San Joaquin spearscale plants were located on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992). Although this species has been reported from similar habitat in the project area (Jones and Stokes Associates, Inc. 1992).

Hispid Bird's-beak

Status

Hispid bird's-beak (*Cordylanthus mollis* ssp. *bispidus*) is a federal category 2 candidate and is a CNPS List 1B species. It has no state status.

Distribution

Hispid bird's-beak is restricted to alkali meadow habitat at the northwest end of the San Joaquin Valley. A population is known to occur west of the project site on the west side of Vasco Road in the Springtown Alkali Sink Wetlands preserve.

Habitat

Hispid bird's-beak occurs on highly alkaline soils in habitats such as alkali meadow or alkali scrub. The species flowers in June and July.

Results

No hispid bird's-beak was located on the project site during surveys conducted during 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992).

Palmate-bracted Bird's-beak

Status

Palmate-bracted bird's-beak (*Cordylanthus palmatus*) is federally and state listed as endangered and is a CNPS List 1B species.

Distribution

Palmate-bracted bird's-beak is restricted to the west side of the Central Valley and formerly occurred from Colusa to Fresno Counties. Extant populations are known from only two locations, the closest of which is on the west side of Vasco Road in the Springtown Alkali Sink Wetlands preserve.

Habitat

Palmate-bracted bird's-beak occurs on highly alkaline soils in habitats such as alkali meadow or alkali scrub. The species flowers in June and July.

Results

No palmate-bracted bird's-beak plants were located on the project site during the surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992). One small alkali meadow (approximately 10 acres)

occurs on the project site, but it was heavily degraded by hydrologic alterations such as stock ponds, and intensive use by cattle. Furthermore, the alkali in the wetland on-site is not as concentrated as it is at bird's-beak habitat at Springtown, and it is doubtful that palmate-bracted bird's-beak would occur here.

Recurved Larkspur

Status

Recurved larkspur (*Delphinium recurvatum*) is a federal category 2 candidate and is a CNPS List 1B species. This species is not listed by the State of California.

Distribution

Recurved larkspur has been recorded at widely scattered localities in the Central Valley, ranging from Colusa County to Kern County. Its habitat is alkaline soils along drainages, in swales, and in grassland. The populations nearest to the project area are to the north, near the City of Byron.

Results

No recurved larkspur was located on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992).

Diamond-petaled Poppy

Status

Diamond-petaled poppy (*Eschscholzia rhombipetala*) is a federal category 2 candidate and is a CNPS List 1A species. The species has no state status.

Distribution

Diamond-petaled poppy previously occurred uncommonly throughout central California. Its range included Alameda, Contra Costa, Colusa, San Joaquin, San Luis Obispo, and Stanislaus Counties. The localities nearest to the project site are to the northeast in the hills south of Byron and to the south in Corral Hollow near Tesla.

Habitat

Diamond-petaled poppy is found in thin rocky soils on grassy slopes and blooms during the early spring.

Results

No diamond-petaled poppy was located on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992).

Fragrant Fritillary

Status

Fragrant fritillary (*Fritillaria liliacea*) is a federal category 2 candidate species and a CNPS list 1B species. It has no state status.

Distribution

Fragrant fritillary is found in the Coast Range and the western edge of the Central Valley from Sonoma to San Benito County.

Habitat

Fragrant fritillary grows in grassland areas in clay or serpentine soils.

Results

No fragrant fritillary was located during surveys of the project site conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992). It is unlikely that fragrant fritillary would occur on the project site because it was not observed during site surveys.

Diablo Helianthella

Status

Diablo helianthella (*Helianthella castanea*) is a federal category 2 candidate species and a CNPS list 1B species. It has no state status.

Distribution

Diablo helianthella is known from Alameda, Contra Costa, San Francisco, and San Mateo Counties. This species occurs west of the project site in several areas of chaparral in the Kellogg Creek watershed (Jones and Stokes Associates, Inc. 1992).

Habitat

Diablo helianthella grows on dry grassy hillsides, often in association with the ecotone of chaparral and oak woodland or grassland.

Results

No Diablo helianthella was located on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992) and it is unlikely that this species would occur on the project site.

Brewer's Dwarf Flax

Status

Brewer's dwarf flax (*Hesperolimon breweri*) is a federal category 2 candidate species and a CNPS list 1B species. It has no state status.

Distribution

Brewer's dwarf flax is known from the Vaca Mountains in Napa and Solano counties and the northern Mt. Diablo Range in Alameda and Contra Costa Counties. Several populations of this species were located in the hills of the Kellogg Creek watershed west of the project site (Jones and Stokes Associates, Inc. 1989).

Habitat

Brewer's dwarf flax occurs on grassy slopes in oak woodland. It is usually associated with the ecotone of oak woodland and grassland or chaparral.

Results

No Brewer's dwarf flax was located on the project site during the surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992), and it is doubtful that it occurs on-site.

Contra Costa Goldfields

Status

Contra Costa goldfields (*Lasthenia conjugens*) is a federally proposed as endangered and is a CNPS List 1B species. The species has no state status.

Distribution

Contra Costa goldfields grows in vernal pools, vernal swales, and other wet grassy areas and is known from Santa Barbara County and Alameda County to Mendocino and Solano Counties. Presently it is known to occur only in Napa and Solano Counties. The location recorded nearest to the project site is northeast, near Byron.

Results

No Contra Costa goldfields were located on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992).

Mason's Lilaepsis

Status

Mason's lilaepsis (*Lilaepsis masonii*) is listed federally as a Category 2 candidate and by the State as rare. It is a CNPS List 1B species.

Distribution

Mason's lilaepsis occurs in freshwater and brackish marshes and riparian habitats, in tidal zones, muddy or silty soil formed by river deposition or river bank erosion, from sea level to 25 feet in elevation (CNDDDB 1992). The nearest known occurrence is the waterfront of the riverside city park (Antioch Marina) in the City of Antioch, approximately three quarters of a mile west of the project site.

Results

No habitat suitable for Mason's lilaepsis exists on the project site. No Mason's lilaepsis was observed on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992). Mason's lilaepsis, therefore, does not occur on the project site.

Showy Indian Clover

Status

Showy Indian clover (*Trifolium amoenum*) is a federal category 2 candidate and is a CNPS List 1B species. Showy indian clover is not listed by the State of California.

Distribution

Showy Indian clover has been found in moist swales of grassland habitats from Alameda County to Sonoma and Solano Counties. It flowers from April through June and was last observed in 1969. The closest recorded location to the project area is to the east, in the vicinity of Midway.

Results

No showy Indian clover was located on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991, Leitner and Leitner 1992).

Caper-fruited Trepidocarpum

Status

Caper-fruited trepidocarpum (*Trepidocarpum capparideum*) is a federal category 2 candidate and is a CNPS List 1A species. It has no state status.

Distribution

Caper-fruited trepidocarpum has been found in grassland habitat with slightly alkaline soils. The species blooms in March and April. No extant populations are known and the plant was last observed in 1957. All historic localities are in Alameda, Contra Costa, and western San Joaquin Counties.

APPENDIX C

SPECIES ACCOUNTS OF SPECIAL STATUS PLANTS NOT FOUND WITHIN THE ALTAMONT EXPANSION AREA

Large-flowered Fiddleneck

Status

Large-flowered fiddleneck (*Amsinckia grandiflora*) is both a federal and state endangered species. It is also a CNPS List 1B species.

Distribution

Large-flowered fiddleneck blooms from April through May on open grassy slopes in western central California. Although it formerly grew at several locations in Alameda and Contra Costa Counties, it is presently known only from two sites, one of which was experimentally established. The natural occurrence is located southwest of the project area, north of Corral Hollow, on Lawrence Livermore Laboratory property (Site 300) and experimentally established northwest in Black Diamond Mines Regional Park.

Habitat

Large-flowered fiddleneck is found on steep grassy slopes and openings in oak woodland on light soils. Other foothill plant communities which may support large-flowered fiddleneck include perennial grasslands and chaparral (Jones and Stokes Associates, Inc. 1992).

Results

No large flowered fiddleneck was found on the project site during surveys conducted in 1990 and 1991 (Botanical Research Group 1991).

Heartscale

Status

Heartscale (*Atriplex cordulata*) is a federal category 2 candidate species and is on CNPS's list 1B. It has no state status.

Results

Surveys conducted in 1990 and 1991 did not locate any caper-fruited tropidocarpum on the project site (Botanical Research Group 1991, Leitner and Leitner 1992).

LITERATURE CITED

- Botanical Research Group. 1991. Altamont Pass landfill rare plant survey. Prepared for Leitner, B., Oakland, CA.
- California Natural Diversity Data Base (CNDDB). 1992. Special status species occurrence report for the Antioch South, Brentwood, Woodward Island, Tassajara, Byron Hot Springs, Clifton Court Forebay, Livermore, Altamont, and Midway USGS 7.5 min. quadrangles. California Department of Fish and Game, Natural Heritage Division, Sacramento, CA.
- Jones and Stokes, Inc. 1989. Results of biological resource inventories and habitat evaluations in the Kellogg Creek watershed. (JSA 87-031.) Prepared for James M. Montgomery, Consulting Engineers, Inc., Walnut Creek, CA.
- Jones and Stokes Associates, Inc. 1992. Biological assessment for federal threatened, endangered, and candidate species for the Los Vaqueros project. Prepared for U.S. Bureau of Reclamation, Sacramento, CA, and Contra Costa Water District, Concord, CA.
- Leitner, M. and P. Leitner. 1992. Altamont sanitary landfill expansion biological resource study. Prepared for Oakland Scavenger Company, Oakland, CA.

APPENDIX D

**SPECIES ACCOUNTS OF SPECIAL STATUS WILDLIFE NOT
FOUND WITHIN THE ALTAMONT EXPANSION AREA**

APPENDIX D

SPECIES ACCOUNTS OF SPECIAL STATUS WILDLIFE NOT FOUND WITHIN THE ALTAMONT EXPANSION AREA

Riparian Brush Rabbit

Status

The riparian brush rabbit (*Sylvilagus bachmani riparius*) is a federal category 1 candidate for listing as threatened or endangered and listed as endangered by the state.

Distribution

The riparian brush rabbit is currently known only from the lower Stanislaus River in Caswell State Park. They may occur in small numbers between Caswell State Park and the confluence of the Stanislaus and San Joaquin Rivers. Formerly, the species range may have extended along the San Joaquin River from Stanislaus County to the Delta Region (Williams 1986).

Habitat

Riparian brush rabbits occur in dense thickets of wild rose (*Rosa* sp.), willows (*Salix* sp.), and blackberries (*Rubus* sp.) along rivers and streams (Williams 1986). The riparian brush rabbit occurs year-around in vegetation dominated by riparian trees and shrubs along the San Joaquin River. They feed on herbaceous plants at the immediate edge of shrubs (Williams 1986).

Results

Riparian brush rabbits were not observed on the landfill expansion area. Riparian habitat required by this species for shelter and food is not present on-site. The riparian brush rabbit would not occur in the expansion area.

San Francisco Dusky-footed Woodrat

Status

The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is a federal category 2 candidate for listing as threatened or endangered and a California Species of Special Concern.

Distribution

The San Francisco dusky-footed woodrat occurs from San Francisco and Contra Costa Counties south to the Monterey County line (Hall and Kelson 1959).

Habitat

Dusky-footed woodrats occur in woodland and brushland habitats including riparian woodland. The San Francisco woodrat occurs in hardwood forests and brushlands. They construct large cone-shaped stick houses on the ground or in the low branches of trees. These houses can be as large as 12 feet in diameter and six feet high. The species feeds on leaves, fruits, berries, and nuts (Hall and Kelson 1959, Jameson and Peeters 1988).

Results

Dusky-footed woodrats were not observed nor were any woodrat stick houses found on the landfill extension area. The woodrat would not be expected to occur on-site because of the absence of woodlands and shrub habitat.

Pacific Western Big-eared Bat

Status

The Pacific western big-eared bat (*Plecotus townsendii townsendii*) is a federal category 2 candidate for listing as threatened or endangered and is a California Species of Special Concern.

Distribution

The Pacific western big-eared bat occurs in the humid coastal regions of northern and central California and the pale western big-eared bat (*P. t. pallescens*), which is a California Species of Special Concern and not listed federally, occurs throughout the remainder of the state, in drier portions of the State.

Habitat

Western big-eared bats live in a variety of communities including coastal conifer and broad-leaf forests, oak woodlands, arid grasslands and deserts, and high elevation forests and meadows. It is most common in mesic sites within these communities (Williams 1986). Western Big-eared bats feed on insects and capture them in-flight. They roost in colonies and form feeding, maternity, and hibernation roosting colonies. They roost in limestone caves, lava tubes, mine tunnels, buildings, and other human-made structures (Williams 1986). These roosting sites are used only when free of human

disturbance. A single visit by humans can cause the bats to abandon a roost (Williams 1986).

Results

Western big-eared bats were not observed on the project site. Roosting colonies would not be expected to occur on-site because habitat for this species is not present on-site. The old farm house present on-site is not likely suitable for the bats because of disturbances to the building.

Greater Western Mastiff Bat

Status

The greater western mastiff bat (*Eumops perotis californicus*) is a federal category 2 candidate for listing as threatened or endangered and a California Species of Special Concern.

Distribution

Mastiff bats occur from central California, southward to Mexico, from Butte County southward in the lowlands throughout the southern California coastal basins and the western portions of the southeastern desert region (Williams 1986).

Habitat

Mastiff bats appear to favor rugged, rocky areas where crevices are available for day-roosts. The day-roosts are usually located in large cracks in exfoliated slabs of granite or sandstone. The crevices must open downward, be at least 5-cm wide and 30-cm deep, and must be at least 2 meters above the ground (Williams 1986). Mastiff bats may roost in buildings which have shelter conditions similar to those described above (Williams 1986). Mastiff bats feed on insects which they capture in-flight. Mastiff bats are large and have difficulty taking flight, having to drop at least two to three meters for launching. Because of this, the roost in downward facing crevices which are high on cliff faces or buildings so they can take flight (Williams 1986).

Results

Mastiff bats were not observed on the landfill expansion area and are not expected to occur on-site because of the absence of suitable habitat which could be used for roosting and shelter.

American Peregrine Falcon

Status

The American peregrine falcon (*Falco peregrinus anatum*) is listed by the federal and California State governments as an endangered species.

Distribution

The American peregrine falcon occurs throughout most of the state during migration and in winter, except in the deserts. The breeding range presently includes the Channel Islands, coast of Central California, inland north coastal mountains, Klamath and Cascade ranges, and the Sierra Nevada (CDFG 1989). The project site is within the general breeding range, but there is no suitable breeding habitat on the site.

Habitat

Peregrine falcons typically nest on ledges of large cliff faces, but will nest on city buildings and bridges structures. Nesting and wintering habitats are varied, including wetlands, woodlands, cities, agricultural areas and coastal habitats (CDFG 1989). Peregrine falcons forage over open country and feed almost exclusively on birds which they usually capture in flight. Nest sites are on ledges or in pot holes in cliffs or rock outcroppings, usually near water. Nesting usually begins in March and hatchlings usually fledge by mid-June.

The species has declined due to pesticide use prior to the 1970's and to loss of foraging and nesting habitat or disturbance to nesting sites. The pesticide DDT accumulates in adult birds and causes eggshells to become thin. This often results in the death of embryos or eggs being broken by the weight of adults incubating the eggs.

Results

Peregrine falcons were not observed on the project site. Because of its inland location, use of the site by peregrine falcons is expected to be incidental, if at all.

Tricolored Blackbird

Status

The tricolored blackbird (*Agelatus tricolor*) is a California Species of Special Concern and a federal category 2 candidate species.

Distribution

The tricolored blackbird occurs mainly in California with a few colonies in Oregon and Baja California. The majority of tricolored blackbird colonies occur in the Sacramento and San Joaquin Valleys and adjacent foothills. Fewer numbers of tricolored blackbirds occur along the coast, in the southwestern deserts, and in the great basin in northeastern California (Beedy *et al.* 1991).

Habitat

Tricolored blackbirds nest in marshy areas usually vegetated with cattails and bulrushes (*Scirpus* sp.). Birds also nest on edges of reservoirs with emergent vegetation, in riparian areas with thickets of willows and blackberry, or areas dominated by nettles (*Urtica* sp.), thistle (*Cirsium* sp.), or mustard (*Brassica* sp.) (Bent 1958). Tricolored blackbirds forage in fields, marshes, and livestock pens. They may forage as far as 4 miles from the nesting colony (Orians 1961).

Results

No tricolored blackbirds were observed during the site surveys (Leitner and Leitner 1992). The project site is within the general breeding range of the species. However, no suitable breeding habitat is present on the project site. The grassland provides suitable feeding habitat for tricolored blackbirds during the non-breeding season.

Western Spadefoot Toad

Status

The western spadefoot toad (*Scaphiopus hammondi*) is a federal category 2 candidate species and a California Species of Special Concern.

Distribution

The western spadefoot toad breeds in ephemeral pools, stockponds and drainage in grasslands and alkali plains habitats. The species has been found from the central Sacramento Valley through the San Joaquin Valley and west to Santa Barbara County. No records of this species exist from the Livermore Valley. The closest known occurrence of this species is in the Corral Hollow drainage in western San Joaquin and eastern Alameda Counties (CNDDDB 1992).

Habitat

Adult western spadefoot toads are terrestrial and presumably spend the majority of their life below ground in rodent burrows, natural crevices, or buried in dried mud. During the rainy season (between November and

March), western spadefoot toads emerge from their burrows in response to rainfall and migrate to an ephemeral pond to breed. After breeding, the adults return to their burrows in response to rainfall or bury themselves in the soft damp mud and remain there until the next rainy season.

Western spadefoot toad larvae grow rapidly in order to metamorphose before the breeding pool dries out. The larvae are opportunistic feeders and have been known to become cannibalistic when food supplies run short. The larvae frequently metamorphose just as the water in the breeding pool dries out.

Results

No western spadefoot toads were found during the amphibian surveys conducted in April and May of 1991 (Leitner and Leitner 1992). Although no formal surveys were conducted for western spadefoot toad, methods used to survey for other amphibian species would have captured spadefoot toads if they were present on the project site.

Foothill Yellow-legged Frog

Status

The foothill yellow-legged frog (*Rana boylei*) is a federal category 2 candidate and a California Species of Special Concern.

Distribution

The foothill yellow-legged frog occurs along permanent streams and creeks in the Coast Ranges from Oregon to the San Gabriel River in Los Angeles County and along the foothills of the Sierra Nevada (Stebbins 1985).

In the project vicinity, the only recent records are from Del Puerto Canyon, 25 miles south of the project site (LSA unpublished data) and Las Trampas Creek, approximately 20 miles to the west.

Habitat

Foothill yellow-legged frogs are found in association with flowing perennial waterways such as streams, creeks, and smaller rivers, in grassland, oak woodland, or forest habitats. They may occur in intermittent drainage. They are usually found on stream banks, especially near riffles, where suitable basking sites exist. When disturbed, the adults hide beneath the rocks or other debris on stream bottom.

The primary threats to the foothill yellow-legged frog are the loss of habitat, the degradation of stream channels, and the presence of introduced fish species which prey on the frog larvae and eggs (Hayes and Jennings 1988).

Results

No habitat suitable for foothill yellow-legged frog exists on the project site. No foothill yellow-legged frog were found during the amphibian surveys conducted in April and May of 1991 (Leitner and Leitner 1992)

Western Pond Turtle

Status

The western pond turtle (*Clemmys marmorata*) is a federal category 2 candidate species and California species of special concern.

Distribution

A southwestern subspecies of the western pond turtle occurs in the drainage of the coastal hills and valleys west of the Central Valley, from San Francisco south to northwestern Baja California and a northwestern subspecies from the San Francisco Bay north through the northern Coast Range (Stebbins 1985). Western pond turtles occur in several permanent pools in and along Kellogg Creek 5 - 10 miles northwest of the project site (Jones and Stokes Associates, Inc. 1992). Pond turtles have also been observed in Altamont Creek 4 miles west of the project site (LSA 1992).

Habitat

Pond turtles utilize permanent or nearly permanent waterbodies in a variety of habitat types. They can be found in ponds, marshes, rivers, streams, and irrigation ditches within grasslands, woodlands, and open forests. Basking sites such as logs, rocks, mats of floating vegetation, or open mud banks are necessary for thermoregulation. Upland areas, frequently in grassland are used for egg laying.

Breeding occurs in the spring, after hibernation, and eggs may be laid from April through August (Stebbins 1985). Hatchlings may remain in the nest during winter and emerge in the spring (Jennings *et al.* 1992). Adults may also overwinter in upland sites (Jennings *et al.* 1992).

The primary threats to the western pond turtle are loss and degradation of riparian and wetland habitat, habitat fragmentation, loss of upland nesting sites, and introduction of predators.

Results

No western pond turtles were observed in any of the ponds on the project site during surveys in 1990 and 1991 (Leitner and Leitner 1992). No surveys were conducted to determine the status of the species on the project site. Potential

habitat may exist in several of the more permanent ponds on the project site.

Alameda Whipsnake

Status

The Alameda whipsnake (*Masticophis lateralis euryxanthus*) is federally proposed as endangered and a state listed threatened species.

Distribution

The Alameda whipsnake is found primarily in Alameda and Contra Costa counties (Stebbins 1985). The Alameda whipsnake occurs 10 miles both west and north of the project site near Vasco Road (CNDDDB 1992, McGinnis 1990).

Habitat

The Alameda whipsnake occurs primarily in chaparral, coastal sage, and other scrub habitats, but also utilizes surrounding grasslands and open woodlands when adjacent to a scrub community (Swaim and McGinnis 1992). Whipsnakes are most frequently associated with open-canopy scrub, on southerly facing slopes (Swaim and McGinnis 1992).

Alameda whipsnakes are most active during spring, when mating occurs and when their primary prey, lizards, are most active (Swaim and McGinnis 1992). During spring male whipsnakes make extensive movements in search of females (Swaim and McGinnis 1992). Mating occurs from late March through June (Swaim 1994). Eggs are laid May through July (Stebbins 1985) and hatch August through October. Hatchling whipsnakes are active from August through late November when hatchling lizards are abundant (Swaim and McGinnis 1992).

Results

No suitable habitat, consisting of coastal scrub or chaparral, for the Alameda whipsnake is present on the project. Due to the absence of habitat, it is unlikely that Alameda whipsnake occurs on the project site.

Callippe Silverspot Butterfly

Status

The callippe silverspot butterfly (*Speyeria callippe callippe*) is federally proposed as endangered and has no state status.

Distribution

The callippe silverspot butterfly is found only in the San Francisco Bay region. Historically it was found throughout the region, but is now known only from Joaquin Miller and Redwood Regional Parks in Alameda County, San Bruno Mountain in San Mateo County, and the hills of Southern Solano County (Arnold 1991).

Habitat

The callippe silverspot butterfly is found in grasslands where its larval foodplant, the violet occurs.

Results

Several areas of suitable habitat containing were located on the project site. Surveys of these areas and nearby ridges failed to locate any adult callippe silverspot butterflies. No callippe silverspot butterflies were located on the project site during surveys conducted in May, 1991 (Arnold 1991). (Leitner and Leitner 1992) While unlikely, the presence of Callippe silverspot butterfly on the project site cannot be ruled out. Surveys for the species did not span the entire flight season of the butterfly. Arnold (1991) also expressed doubt regarding the adequacy of the results of the survey.

Molesten Blister Beetle

Status

The Molesten blister beetle (*Lytta molesta*) is a federal category 2 candidate species and has no state status.

Distribution

The Molestan blister beetle is known from approximately 30 sites, primarily in the San Joaquin Valley (Arnold 1991). In the project vicinity this species has been collected from Brentwood in Contra Costa County.

Habitat

All species of *Lytta* are thought to be parasitic on ground-nesting bees of the genus *Anthrophora* (Arnold 1991). Adult beetles congregate and feed on the petals and pollen of plants which grow in valley grasslands and vernal pools, such as, native members of Fabaceae, Convolvulaceae, Asteraceae, Papaveraceae, and Rosaceae (Arnold 1991). Bees of the genus *Anthrophora* visit these same plant species and are hosts for the developing larvae of blister beetles (Arnold 1991).

Results

Intensive searches of poppies and lupines that were widely distributed throughout the grassland at the project site failed to reveal any Molestan blister beetles (Arnold 1991). Efforts to locate beetles by locating bee nests were also unsuccessful as no bee nests were found on the project site. Although the presence of the blister beetle is unlikely, it cannot be ruled out because the extent of the surveys over the project site were not specified.

Curve-footed Hygrotus Diving Beetle

Status

The curve-footed hygrotus diving beetle (*Hygrotus curvipes*) is a category 2 candidate species with the federal government and is not listed by the State of California.

Distribution

The curve-footed hygrotus diving beetle is known only from ponds and ephemeral drainage in eastern Contra Costa County. The species occurs in vernal pools, streams, and made-made water-filled structures at the Byron Airport site, 10 miles north of the project site (Stromberg 1991) and in the Kellogg Creek watershed 5 - 10 miles northwest of the project site (Jones and Stokes Associates, Inc. 1992).

Habitat

Curve-footed hygrotus diving beetles occur in small drying mineralized pools, small ponds, and pools in intermittent creeks. Occasionally the beetle has been found in stock ponds when near one of the above habitat associations. Salt or salt-tolerant vegetation, such as salt grass, is associated with pools at many sites known to be occupied by the beetle.

Results

No curve-footed hygrotus diving beetles were found in any of the aquatic habitats during the 1991 surveys.

Ricksecker's Water Scavenger Beetle

Status

Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*) is a category 2 candidate species with the federal government and is not listed by the State of California.

Distribution

Ricksecker's water scavenger beetle is only known from thirteen specimens. Its range is generally considered to be the throughout the Bay Area. No specific data on exact locations is readily available, collections have been made from fresh water seeps, springs, farm ponds, and slow moving streams in the San Mateo, Santa Rosa, Alameda, and south Livermore areas (Arnold 1991).

Results

No specimens of the Ricksecker's water scavenger beetle were found in any of the aquatic habitats on the project site.

Fairy Shrimp

Longhorn Fairy Shrimp

Status

The longhorn fairy shrimp (*Branchinecta longiantenna*) is listed as an endangered species by the federal government. The species is not listed by the State of California.

Distribution

Longhorn fairy shrimp occur in vernal pools and in pools in rock outcrops. It is known from only three locations, including ephemeral pools in the Kellogg Creek Watershed 5 - 10 miles northwest of the project site and an unspecified location in the Altamont Pass area (Eng *et al.* 1990). The species is also recorded near Soda Lake in San Luis Obispo County.

Vernal Pool Fairy Shrimp

Status

The vernal pool fairy shrimp (*Branchinecta lynchi*) is listed as a threatened species by the federal government. The species is not listed by the State of California.

Distribution

Vernal pool fairy shrimp occurs in freshwater vernal pools throughout the Central Valley and foothills of California as well as the Los Angeles Basin.

Vernal pool fairy shrimp have been found in vernal pools, alkali wetlands, and an ephemeral drainage on the Byron Airport site 10 miles to the north of the project site (Stromberg 1991), in rock outcrop pools in the Los Vaqueros

project (Jones and Stokes Associates, Inc. 1991) 5 - 10 miles northwest of the project site, and vernal pools 4 miles west of the site along Vasco Road (LSA 1993).

Results of Fairy Shrimp Surveys

Neither of the fairy shrimp species were found in any of the aquatic habitats on the project site during surveys conducted in 1991 though these fairy shrimp species were reported found on unspecified nearby sites following the March rains of 1991 (Arnold 1991). Because fairy shrimp eggs can survive several years during dry conditions as encysted eggs, these species may be present in water bodies on the project site that were dry during 1991. The presence of these fairy shrimp species on the project site cannot be ruled out.

LITERATURE CITED

- Arnold, R. A. 1991. Altamont Landfill: Surveys for Sensitive Invertebrates. Prepared for Leitner Biological Consulting, Oakland, CA.
- Beedy, E. C., S. D. Sanders, and D. Bloom. 1991. Breeding Status, Distribution, and Habitat Associations of the Tricolored Blackbird (*Agelaius tricolor*) 1950-1989. Prepared for U.S. Fish and Wildlife Service, Sacramento, CA. 42 pp.
- Bent, A. C. 1958. Life Histories of North American Blackbirds, Orioles, Tanagers and Allies. Smithsonian Institution, U. S. National Museum, Bulletin 211. 549 pp.
- California Department of Fish and Game (CDFG). March 1989. 1988 Annual Report on the Status of California's State Listed Threatened and endangered Plants and Animals. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 129 pp.
- California Natural Diversity Data Base (CNDDB). 1992. Special status species occurrence report for the Antioch South, Brentwood, Woodward Island, Tassajara, Byron Hot Springs, Clifton Court Forebay, Livermore, Altamont, and Midway USGS 7.5 min. quadrangles. California Department of Fish and Game, Natural Heritage Division, Sacramento, CA.
- Eng, L. L., D. Belk, and C. H. Eriksen. 1990. California *Anostraca*: distribution, habitat, and status. *J. Crust. Biol.* 10:247-277.
- Hall, E. R. and K. R. Kelson. 1959. The Mammals of North America. Two volumes. The Ronald Press Co., New York. 1083 pp.

- Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylei*): implications for management. Pages 144-158 in: Proceedings of the Symposium: Management of Amphibians, Reptiles, and Small Mammals in North America, July 19-21, 1988. U.S.D.A. Forest Service, Rocky Mtn. For. and Range Exp. Stn., Fort Collins, CO. Gen Tech. Rep. RM-166.
- Jameson, E. W. and H. J. Peeters. 1988. California Mammals. California Natural History Guides: 52. University of California Press, Berkeley, CA. 403 pp.
- Jennings, M. R., M. P. Hays, and D. C. Holland. 1992. A petition to list the U. S. Fish and Wildlife Service to Place the California Red-legged Frog (*Rana aurora draytonii*) and the Western Pond Turtle (*Clemmys marmorata*) on the List of Endangered and Threatened Wildlife and Plants. Letter to the U. S. Fish and Wildlife Service.
- Jones and Stokes Associates, Inc. 1991. Los Vaqueros draft recreation plan (JSA 90-239). Prepared for James M. Montgomery, Consulting Engineers, Inc., Walnut Creek, CA.
- Jones and Stokes Associates, Inc. 1992. Biological assessment for federal threatened, endangered, and candidate species for the Los Vaqueros project. Prepared for U.S. Bureau of Reclamation, Sacramento, CA, and Contra Costa Water District, Concord, CA.
- Leitner, M. and P. Leitner. 1992. Altamont sanitary landfill expansion biological resource study. Prepared for Oakland Scavenger Company, Oakland, CA.
- LSA Associates, Inc. (LSA). 1992. Preliminary Draft Biological Assessment, Maralisa Planned Development. Prepared for the City of Livermore, CA.
- LSA Associates, Inc. (LSA). 1993. Results of Surveys to Determine the Status of Fairy Shrimp, Maralisa Planned Development. Prepared for the City of Livermore, CA.
- McGinnis, S. M. 1990. Survey for the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on the north-facing slope of the Kellogg Creek watershed west of Vasco Road, Contra Costa County, California. Prepared for Jones and Stokes Associates, Inc., Sacramento, CA.
- Orians, G. H. 1961. The ecology of blackbird (*Aeglaeus*) social systems. Ecol. Monogr. 31:285-312.
- Stebbins, R. C. 1985. A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, MA. 336 pp.

- Stromberg, L. P. 1991. Biological assessment Byron Airport expansion project Contra Costa County California. Prepared for the Federal Aviation Administration, Burlingame, CA, and Airports Division, Contra Costa County Public Works Department, Buchanan Field, Concord, CA.
- Swaim, K. E. 1994. Aspects of the ecology of the Alameda whipsnake (*Masticophis lateralis euryxanthus*). Master's Thesis. California State University, Hayward.
- Swaim, K. E. and S. M. McGinnis. 1992. Habitat Associations of the Alameda Whipsnake. Trans. West. Sec. Wildl. Soc. 28:107-111.
- Williams, D. F. 1986. Mammalian Species of Special Concern in California. The Resources Agency, California Department of Fish and Game, Sacramento, CA. 112 pp.

APPENDIX E

SAMPLE CONSERVATION EASEMENT

RECORDED AT THE REQUEST OF
AND WHEN RECORDED SEND TO:

GRANT OF CONSERVATION EASEMENT

PURSUANT TO SECTIONS 815 ET SEQ. OF THE CALIFORNIA CIVIL CODE, WASTE MANAGEMENT OF ALAMEDA COUNTY, a California corporation (hereinafter referred to as "Grantor") hereby grants to _____
_____ a _____
(hereinafter called "Grantee") a conservation easement (hereinafter called the "Easement") over that certain parcel of land described in Exhibit A hereto (hereinafter called the "Servient Tenement").

The Easement is granted for purposes of preserving the Servient Tenement in predominantly its agricultural and open space condition. For the purposes of this Easement, "agricultural" includes "grazing."

The Servient Tenement shall be deemed as being preserved predominantly for agriculture and open space so long as no use made thereof by the Grantor, its successors or assigns impairs the suitability of the land shown on Exhibit B as the Kit Fox Mitigation Area as habitat for the San Joaquin kit fox (*Vulpes macrotis matrica*).

Grantor, its successors and assigns shall be entitled to use the Servient

Tenement for any purpose which is not inconsistent with its preservation predominantly in its agricultural condition including grazing and to grant, subject to this Easement, further rights, estates and interests therein.

IN WITNESS WHEREOF, Grantor has executed this Grant on this _____ day of _____ 1991.

WASTE MANAGEMENT OF ALAMEDA COUNTY,
a California corporation

By: _____

Title: _____

