

Appendix
LAX Master Plan Supplement to the Draft EIS/EIR

**S-H. Updated Biological Assessment
Technical Report**

June 2003

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

Prepared by:

Sapphos Environmental, Inc.

Table of Contents

1.	Introduction	1
1.1	Purpose and Need of the Updated Biological Assessment	1
1.2	Location	1
1.3	Scope of Updated Biological Assessment	2
1.4	Species Considered	2
1.5	Findings and Conclusions	2
2.	Alternatives	7
2.1	Background to the Master Plan Process	7
2.2	Surrounding Land Uses and Constraints	8
2.3	Master Plan Objectives	8
2.4	Master Plan Alternatives	8
2.4.1	Existing Conditions	8
2.4.2	No Action/No Project Alternative (2005, 2015)	9
2.4.3	Alternatives A, B, and C	9
2.4.4	Alternative D - Enhanced Safety and Security Plan	10
3.	Study Methods and Results	11
3.1	Plant Communities	11
3.2	Directed Surveys for Listed Plants	11
3.3	Directed Wildlife Surveys	12
4.	Existing Conditions	19
4.1	Plant Communities	20
4.2	Federally- and State-Listed Threatened and Endangered Plant Species	21
4.3	Federally- and State-Listed Threatened and Endangered Wildlife Species	22
4.4	Sensitive Plant Species	23
4.5	Sensitive Wildlife Species	23
5.	Effects	24
5.1	Flora	24
5.2	Fauna	24
6.	Conclusions And Recommendations	28
6.1	Flora	28
6.2	Fauna	28
7.	References	35

List of Tables

Table S1	Mitigation Land Evaluation Procedure for the Mitigation Site	33
----------	--	----

List of Figures

Figure S1	Regional Location Map	3
Figure S2	Project Location	5
Figure S3	Plant Communities	13
Figure S4	Ephemeral Aquatic Habitat at Los Angeles International Airport Northern Survey Area	15
Figure S5	Ephemeral Aquatic Habitat at Los Angeles International Airport Southern Survey Area	17
Figure S6	Vernal Pool Restoration Opportunities Considered	31

This Page Intentionally Left Blank

1. INTRODUCTION

The U.S. Department of Transportation, Federal Aviation Administration (FAA), and the city of Los Angeles prepared a joint Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) regarding proposed further development of Los Angeles International Airport (LAX). As required by the National Environmental Policy Act of 1969 (NEPA), the FAA evaluated three Master Plan development alternatives (Alternatives A, B, and C) that met the purpose and need for the proposed improvements and the No Action/No Project Alternative. The Master Plan project components within the development alternatives and the No Action/No Project Alternative were evaluated and described in detail in the Draft EIS/EIR. The Draft EIS/EIR was released for public review January 2001.

Following the publication of the Draft EIS/EIR, public comment received during the review period for the document called for a regional approach alternative, whereby growth at LAX would be planned to encourage other regional airports to accommodate future air travel demands. Also occurring within that period were the terrorist attacks of September 11, 2001, which, among other things, elevated the issue of airport security. In response to these events, the newly elected mayor of Los Angeles directed the Los Angeles Board of Airport Commissioners to develop a new LAX Master Plan alternative that, consistent with public comment calling for a regional approach alternative, would be designed to accommodate passenger and cargo activity levels at LAX that would approximate those of the No Action/No Project Alternative, have fewer environmental impacts than the No Action/No Project Alternative, and in light of the tragic events of September 11, would be designed specifically with an emphasis on airport security.

As a result of consultation with Los Angeles World Airports (LAWA) and the FAA, Alternative D, the Enhanced Safety and Security Plan, was developed as a fifth alternative within the existing Master Plan process. Alternative D retains the existing four-runway configuration at LAX. Major project elements include airfield modifications; development of new terminals with the removal of public parking structures in the Central Terminal Area (CTA); restriction of private vehicle access to the CTA; Ground Transportation Center; Consolidated Rental Car Facility; Intermodal Transportation Center; and an Automated People Mover system. Alternative D is described in detail and evaluated in Chapter 3, *Alternatives*, of the Supplement to the Draft EIS/EIR, to be released for public comment in June 2003.

This document serves to update the Biological Assessment previously provided as Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, to include the analysis of Alternative D effects on any federally-listed or candidate-threatened or endangered species. Similar to the Draft EIS/EIR, the Supplement to the Draft EIS/EIR is being prepared to satisfy the requirements of NEPA and the California Environmental Quality Act (CEQA) in accordance with procedures described in 40 CFR Parts 1500-1508,¹ FAA Order 5050.4A,² *Airport Environmental Handbook*, and CEQA statutes.³

1.1 Purpose and Need of the Updated Biological Assessment

To account for the evaluation of a new alternative, Alternative D, included in the Draft LAX Master Plan Addendum, and ongoing consultation with the U.S. Fish and Wildlife Service (USFWS), the FAA has prepared this Updated Biological Assessment in partial fulfillment of its responsibilities under Section 7(a)(2) of the Federal Endangered Species Act (16 USC 1536[c]); this document is intended to be used by the FAA to complete consultation with the USFWS.

1.2 Location

LAX is located in the southwestern portion of the County of Los Angeles, adjacent to the Santa Monica Bay and 14 miles southwest of downtown Los Angeles (**Figure S1**, Regional Location Map). Reference point coordinates for the airport are 33° 56' north latitude by 118° 24' west longitude. The LAX airfield is located entirely in the city of Los Angeles, Los Angeles County, California, as depicted on U.S.G.S. Venice Quadrangle, within the boundaries of Township 2 South and Township 3 South and Range 14

¹ Title 40, Code of Federal Regulations (CFR), Part 1500-1508.

² United States Department of Transportation, Federal Aviation Administration, *Airport Environmental Handbook*, October 8, 1985.

³ Public Resources Code, Division 13, Sections 21000-21177.

West and Range 15 West of the San Bernardino Principal Meridian. The airfield lies within the Sausal Redondo Land Grant Boundary (**Figure S2**, Project Location), and is bordered to the north by Westchester Parkway, to the east by Aviation Boulevard, to the south by Interstate 105, and to the west by Dockweiler State Beach. LAX encompasses approximately 3,350 acres with an average elevation of 125.5 feet above mean sea level (msl), and constitutes a large industrial district.

1.3 Scope of Updated Biological Assessment

The scope of the Updated Biological Assessment is to evaluate the potential environmental effects of LAX Master Plan development projects associated with Alternative D on federally-listed threatened and endangered species that are or may be present in the vicinity of the Airport, and the designated critical habitat for those species. In addition to the evaluation of Alternative D, the Updated Biological Assessment includes the following:

- ◆ Consideration of changes to Year 2000 existing conditions using the same methodology applied to the 1996 environmental baseline scenario analyzed in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR,
- ◆ Surveys of the American peregrine falcon conducted in late 2002 and early 2003.
- ◆ Surveys of the endangered El Segundo blue butterfly conducted annually by LAWA. The results of these surveys through 2002 are reported in Section 4.11, *Endangered and Threatened Species of Flora and Fauna*, of the Supplement to the Draft EIS/EIR.
- ◆ Revised analysis of the potential environmental effects from the installation of navigational aids and associated service roads within occupied habitat of the El Segundo blue butterfly.
- ◆ Additional analysis of the indirect effects of air quality, light emissions, and noise on the American peregrine falcon. Analysis of the indirect effects of jet exhaust emissions, fugitive dust, and light and glare was reported for the El Segundo blue butterfly in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, and is also included herein. The potential effects of noise were not evaluated as the El Segundo blue butterfly has no auditory organ and therefore no sense of hearing. Details regarding the methodology used in the analysis of indirect effects of air quality, light emissions, and noise are provided in Section 4.10, *Biotic Communities*, of the Supplement to the Draft EIS/EIR.

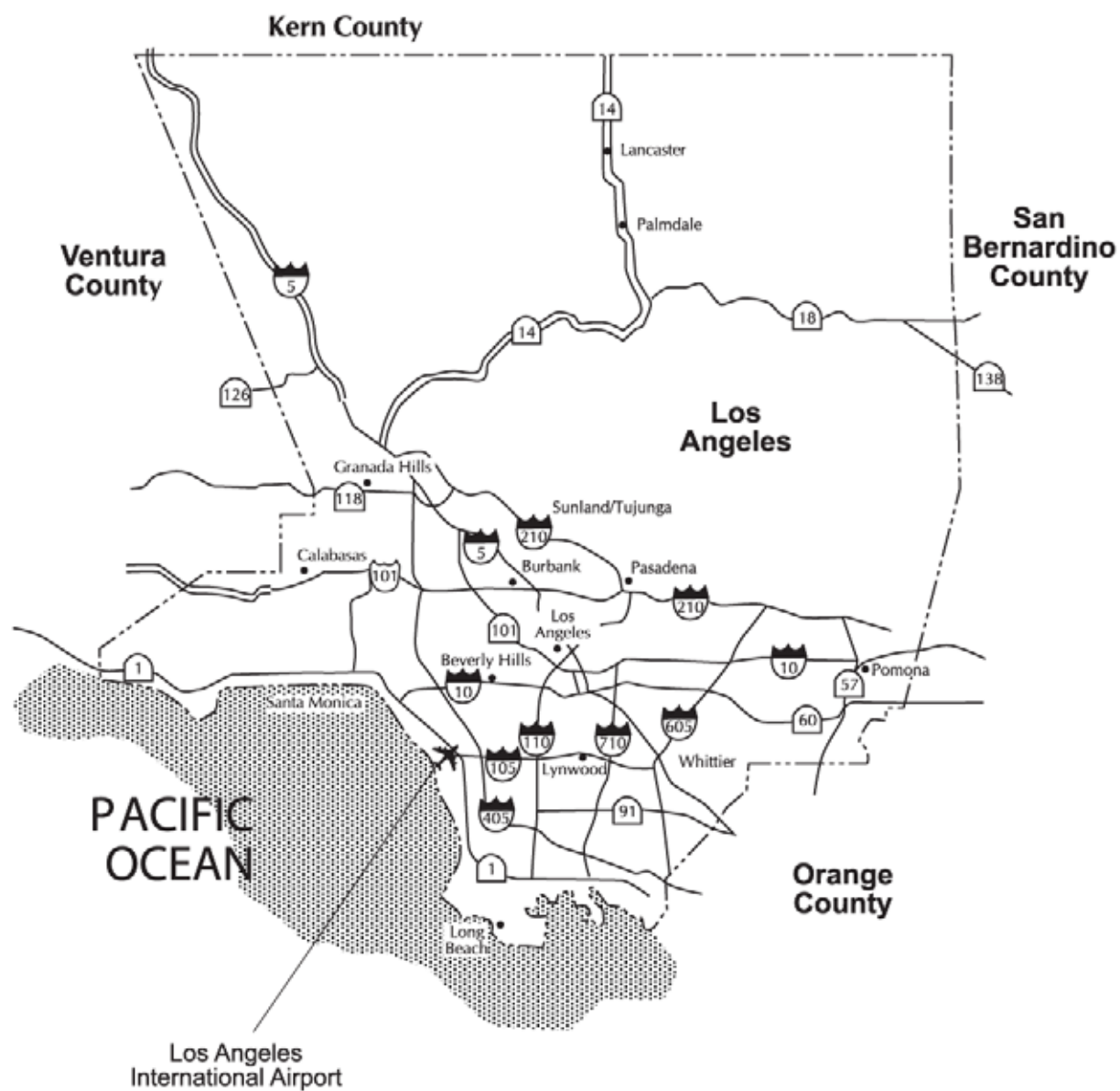
Effects on other federally- or state-designated sensitive species are similarly evaluated in Section 4.10, *Biotic Communities*, of the Supplement to the Draft EIS/EIR for Alternative D to determine if implementation of the Master Plan project would catalyze the need for federal listing of a species.

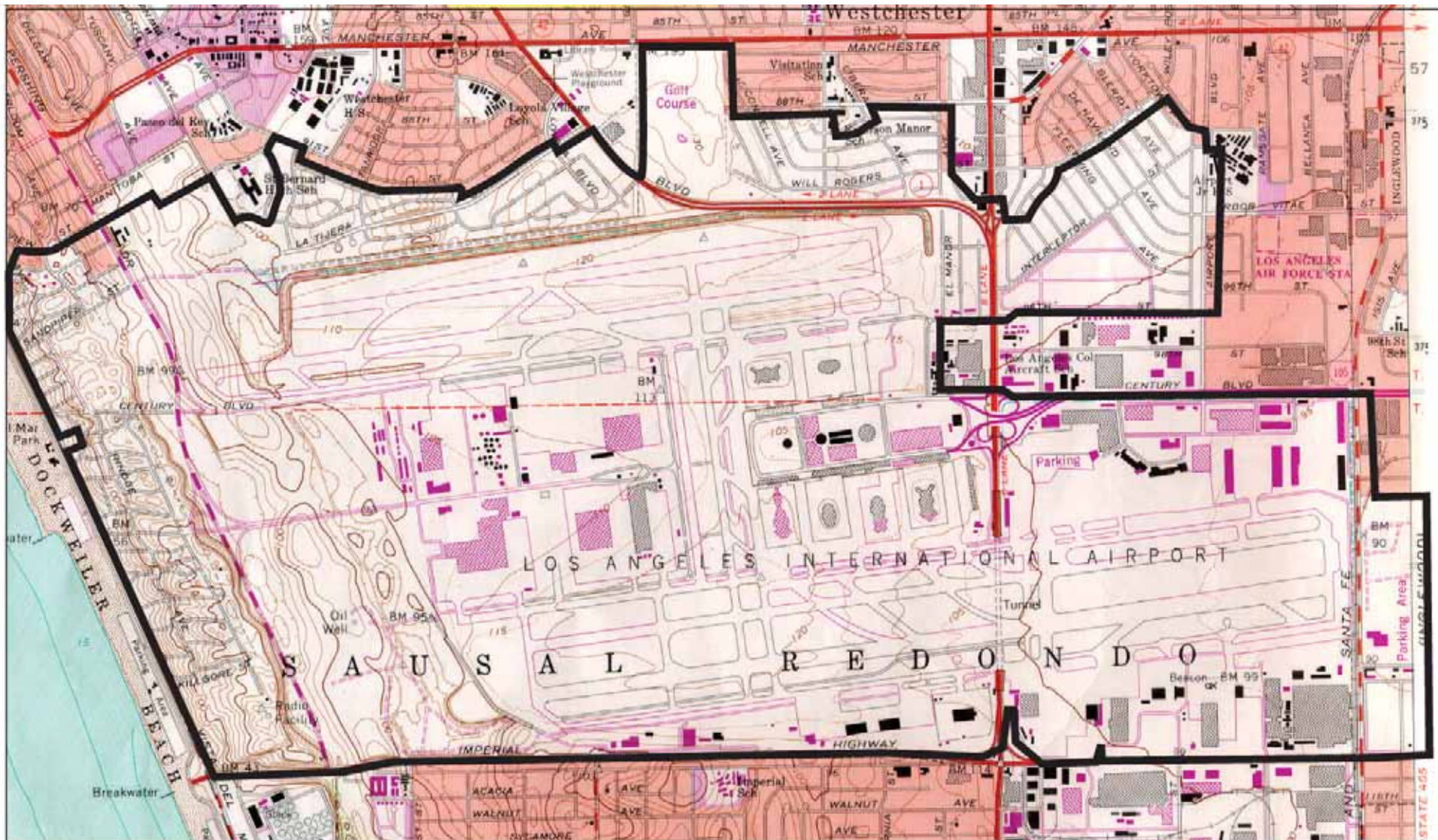
1.4 Species Considered

As described in Appendix J1, *Biological Assessment Technical Report* of the Draft EIS/EIR, the USFWS recommended the consideration of two listed plant species, two listed aquatic invertebrate species, one listed butterfly, three bird species, and one listed mammal species. Review of the California Natural Diversity Database (CNDDB) resulted in the identification of six additional federally-listed threatened or endangered plant species and one state-listed threatened plant species that warranted consideration. Finally, the site falls within the range of two additional listed bird species; therefore, they were also evaluated.

1.5 Findings and Conclusions

As a result of the literature review, directed surveys, and coordination with the USFWS and the California Department of Fish and Game (CDFG), it has been determined that Alternative D may affect one federally- and state-listed endangered invertebrate species, Riverside fairy shrimp (*Streptocephalus woottoni*); one federally-listed endangered insect species, El Segundo blue butterfly (*Euphilotes battoides allyni*); and one state-listed endangered bird species, American peregrine falcon (*Falco peregrinus anatum*). Under Alternative D, construction avoidance measures have been developed to avoid potential effects to the El Segundo blue butterfly and its habitat, and conservation measures have





LEGEND

Current Airport Property Boundary

Not to Scale

Source: U.S.G.S., 7.5 minute Venice Quadrangle

**Los Angeles International Airport
Master Plan Updated Biological Assessment**

Project Location

**Figure
S2**

been developed to reduce potential effects and insure no net loss of occupied habitat. It is not feasible to avoid effects to the embedded cysts of the Riverside fairy shrimp. Conservation measures have been recommended to ensure that Alternative D will not likely jeopardize the continued existence of Riverside fairy shrimp or cause adverse modification of designated critical habitat.⁴ Under Alternative D, no effects to the American peregrine falcon would occur.

Alternative D affects one sensitive plant species, Lewis' evening primrose (*Camissonia lewisii*). Alternative D affects three sensitive wildlife species: western spadefoot toad (*Scaphiopus hammondi*), loggerhead shrike (*Lanius ludovicianus*), and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). Recommended mitigation measures are addressed in Section 4.10, *Biotic Communities*, of the Supplement to the Draft EIS/EIR.

2. ALTERNATIVES

Description of Proposed Action and Alternatives

Alternatives A, B, and C are described in detail in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR. This section describes Alternative D - Enhanced Safety and Security Plan of the Supplement to the Draft EIS/EIR.

The Supplement to the Draft EIS/EIR has been prepared by the FAA and the city of Los Angeles. The role of the FAA in the master planning process is to ensure the safe and efficient use of navigable airspace through approval of the revised Airport Layout Plan, and to act on any applications for Airport Improvement Program grants and/or the use of Passenger Facility Changes for eligible projects. The city of Los Angeles is solely responsible for implementing any future improvements at LAX.

Description of Alternative D - Enhanced Safety and Security Plan

Alternative D is designed to serve approximately 78.9 million annual passengers and 3.1 million tons of air cargo activity, which is similar to the activity level identified by the Southern California Association of Governments in their 2001 Regional Transportation Plan. This level of aviation activity is also equivalent to the No Action/No Project activity level. The facilities proposed for Alternative D would reduce airport congestion and delay by accommodating less of the projected regional aviation demand at LAX and encourage the growth of aviation activity at airports other than LAX. Alternative D is designed to protect airport users and critical airport infrastructure in response to the increased risk of terrorism aimed at aviation and commercial assets. Airport improvements under Alternative D would increase passenger convenience, improve roadway access to curbside and parking areas, and improve the airfield layout to fit the future aircraft fleet. These improvements are also intended to enhance the safety and security of passengers, employees, and aircraft at LAX over the No Action/No Project Alternative.

2.1 Background to the Master Plan Process

The LAX Master Plan process initiated in 1995 addressed the long-term issues of airport capacity, ground access, and environmental impacts. The results were published in the Draft LAX Master Plan and Draft EIS/EIR in January 2001. In response to public comments on the Draft EIS/EIR and heightened security since September 11, the Los Angeles Board of Airport Commissioners developed a new LAX Master Plan alternative, Alternative D - Enhanced Safety and Security Plan, designed to limit growth at LAX and emphasize airport security.

To facilitate comparison of all the alternatives, the Draft LAX Master Plan Addendum describes Alternative D in a manner similar in detail to the descriptions of the LAX Master Plan Alternatives A, B, C and the No Action/No Project Alternative in the Draft Master Plan. The Supplement to the Draft EIS/EIR provides for Alternative D the same level of information and analysis that was provided for the other alternatives in the Draft EIS/EIR.

⁴ In May 2001, the USFWS issued a final rule designating critical habitat for the Riverside fairy shrimp, a portion of which was located within the Los Angeles/El Segundo Dunes. In October 2002, the United States District Court for the District of Columbia vacated the final rule. As a result, the El Segundo Dunes do not currently contain designated critical habitat for the Riverside fairy shrimp.

2.2 Surrounding Land Uses and Constraints

The communities surrounding LAX comprise a diverse mix of land uses, including commercial/industrial, public land, and residential use. Within the LAX Master Plan study area and immediately to the west of the LAX airfield lies the 307-acre Los Angeles/El Segundo Dunes area. The southern two-thirds of the Los Angeles/El Segundo Dunes, approximately 200 acres, comprise the El Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area), a habitat for the federally-listed endangered El Segundo blue butterfly (*Euphilotes battoides allyni*) and its host foodplant, coast buckwheat (*Eriogonum parvifolium*). The remaining 100 acres are north of the Habitat Restoration Area, and consist of degraded habitat, invasive species, roads, and remnants of houses.

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, the feasible range of on-site development alternatives is severely constrained by existing land uses in surrounding areas; effects on biological resources under any of the development alternatives considered would be limited primarily to the West/Coast area.

2.3 Master Plan Objectives

The project components within Alternatives A, B, and C necessary to meet Master Plan objectives were previously evaluated and described in detail in the Draft LAX Master Plan and Draft EIS/EIR. LAWA had previously selected Alternative C as its Preferred Alternative to meet the purposes and objectives of the Master Plan. However, based on public comment, the events of September 11, 2001, and the direction of the mayor of Los Angeles, Alternative D was developed as the regional airport alternative specifically designed as a safety and security plan, and is now the LAWA Preferred Alternative. Alternative D would provide the best Master Plan alternative to enhance safety and security at LAX, encourage the development and use of regional airports to serve local demand, maintain LAX as the International Gateway to Southern California, and mitigate the impacts of LAX's continued operation.

The project components evaluated within Alternative D include: airfield modifications; development of new terminals with the removal of public parking structures in the CTA; restriction of private vehicle access to the CTA; Ground Transportation Center; Consolidated Rental Car Facility; Intermodal Transportation Center; and an Automated People Mover system.

Alternative D is evaluated in the Supplement to the Draft EIS/EIR to be released for public comment in June 2003. All alternatives have been analyzed in accordance with NEPA and CEQA.

2.4 Master Plan Alternatives

This section briefly describes Master Plan elements as they relate to Alternatives A, B, C and the No Action/No Project Alternative previously described in detail in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, and Alternative D described in Chapter 3, *Alternatives*, of the Supplement to the Draft EIS/EIR.

Evaluation of the four improvement alternatives (A, B, C and D) is based in part on an assessment of LAX's existing airside and landside facilities and the facility requirements needed to accommodate projected demand for commercial passenger and cargo operations by the year 2015.

2.4.1 Existing Conditions

Environmental Baseline Scenario (1996)

Existing conditions are described first by a baseline that describes current conditions both on-airport and off-airport. The North Airfield Complex has two runways. The South Airfield Complex also has two runways. There are eight passenger terminals in the CTA of LAX that service domestic and international passengers. There are three cargo facilities at LAX: the Century Cargo Complex, the Imperial Cargo Complex, and the South Cargo Complex. The transportation and circulation system is represented by 1996 existing facilities.

Properties scheduled for acquisition under the ongoing Aircraft Noise Mitigation Program (ANMP) (Belford and Manchester Square Areas) currently contain residential uses; undeveloped properties owned by the airport and entitled for development are reported as vacant. These areas include LAX Northside and 28.5

acres of property known as “Continental City” located at the northeast corner of Aviation Boulevard and Imperial Highway.

Year 2000/Existing Conditions

The Supplement to the Draft EIS/EIR utilizes the complete dataset from Year 2000 to reflect current airport activity and existing physical facilities at the airport. The years 2001 and 2002 were inappropriate to use for comparison to the Draft EIS/EIR’s baseline year because the terrorist attacks of September 11, 2001 had a profound impact on aviation activity. The Year 2000 is evaluated as the basis for consideration and comparison of how “current” conditions have evolved from the baseline conditions analyzed in the Draft EIS/EIR.

Changes to airport facilities include: acquisition of Manchester Square and Belford Area under the ANMP; modification to taxiways on the south airfield; several reconstruction and renovation projects within existing terminal buildings, without creating additional passenger handling capacity; realignment of Avion Drive; increase in short-term parking spaces in the CTA; two new ancillary facilities; a First Flight Child Development Center; and changes to cargo facilities.

CEQA Adjusted Baseline Conditions (2005, 2015)

The adjusted baseline describes historical airport activity for 1996, while taking into account projected levels of additional off-airport background land use development and other growth activity anticipated for plan years 2005 and 2015. The adjusted baseline is used principally as a means of providing useful cumulative impact analysis for future years. The adjusted baseline scenario for these future years assumed land acquisition (Belford and Manchester Square Areas) occurred as part of the previously approved ANMP, and that they will be vacant. Previously acquired, now-vacant properties, including LAX Northside and Continental City, are assumed to continue to remain vacant through 2005 and 2015.

2.4.2 No Action/No Project Alternative (2005, 2015)

No Action/No Project Alternative (2005, 2015)

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, this scenario is based on the activity levels projected to be experienced at LAX during 2005 and 2015 utilizing modest facility improvements previously approved by LAWA that are presently underway, but does not include the substantial improvements proposed by the various Master Plan alternatives. Besides anticipated continued growth in airport activity, this alternative also assumes that certain existing airport properties that are now vacant will be built out in accord with prior approvals, including previously obtained final map approvals (LAX Northside) and development agreements (Continental City).

2.4.3 Alternatives A, B, and C

Alternative A

Alternative A would add a new runway, Runway 24R, on the North Airfield north of current Runway 6L/24R. In the South Airfield, Runway 7L/25R would be reconstructed and widened on the existing runway centerline. Runway 7R/25L would be reconstructed and extended on a centerline south of the existing runway centerline to allow construction of a center taxiway between Runways 7R/25L and 7L/25R. The terminal facilities would be expanded to the west with a new western entrance and landside terminal facilities. The pier concourses on the CTA’s north terminals and the Tom Bradley International Terminal (TBIT) would be reconfigured. The new West Terminal Area (WTA) would be located on the west side of the airport (east of Pershing Drive). A people-mover would provide access to the new west short-term parking garage and the WTA and concourses. A new ring road would enhance vehicular access to the terminals and other airport facilities from surrounding freeways. Cargo facilities would be expanded. The Metropolitan Transit Authority (MTA) Green Line rail system would be extended to provide services to the new WTA.

To accommodate new facilities as planned in Alternative A, approximately 273 acres of land must be acquired. The LAX Northside property, as described in the No Action/No Project Alternative, would be replaced by a substantially smaller Westchester Southside development.

Alternative B

Alternative B would add a new runway (Runway 25L) on the south side in the existing cargo area. To complete this alternative, the current south runways (Runways 7R/25L and 7L/25R) would be relocated to the north. In the North Airfield, existing Runway 6R/24L would be extended to the east, while the west end of this runway would be relocated to the east. In addition, existing Runway 6L/24R's centerline would be shifted to the north to allow room for a new taxiway between 6L/24R and 6R/24L. Terminal improvements in this alternative are similar to those in Alternative A, except Alternative B would demolish existing cargo facilities and new cargo facilities would be provided.

To accommodate new facilities as planned in Alternative B, approximately 345 acres of land must be acquired. In Alternative B, property that is owned by LAX but is not required for airport facilities would be developed for non-aviation uses. The LAX Northside properties would be replaced by the Westchester Southside development.

Alternative C

Alternative C improves the existing four runways by increasing their length and lateral separation to airfield operations. On the North Airfield, Runway 6L/24R would be reconstructed to the north of existing Runway 6L/24R's centerline and would be extended. Runway 6R/24L would be extended along its existing centerline. On the South Airfield, Runway 7R/25L would be relocated to the south of the existing Runway 7R/25L centerline to allow construction of a center taxiway between Runways 7R/25L and 7L/25R. Terminal improvements in this alternative are similar to those in Alternatives A and B, except Alternative C retains the majority of existing cargo facilities and new cargo facilities would be constructed.

2.4.4 Alternative D - Enhanced Safety and Security Plan

Alternative D - Enhanced Safety and Security Plan

The airfield modifications in Alternative D would improve gate accessibility for large aircraft at LAX, reduce delays, and reduce the potential for runway incursions, thereby enhancing the safety of passengers and aircraft at LAX. Runway 6L/24R on the north airfield would maintain its current location; however, it would be extended approximately 1,495 feet to the west for a total length of approximately 10,495 feet. Runway 6R/24L would be reconstructed approximately 338 feet south of the existing runway centerline to allow for the construction of a new parallel taxiway between the runways. Runway 6R/24L would be extended approximately 135 feet west and approximately 1,280 feet to the east. The total runway length would be approximately 11,700 feet long and 200 feet wide. A new parallel center taxiway would be constructed between Runways 6L/24R and 6R/24L to reduce the potential for runway incursions and enhance the safety of operations at LAX. The new taxiway would be a 10,420-foot by 100-foot full-length Modified Group VI parallel taxiway located 520 feet north of relocated Runway 6R/24L and 520 feet south of Runway 6L/24R.

Runway 7L/25R on the south airfield would not be modified in Alternative D. Runway 7R/25L would be moved approximately 50 feet south of the existing Runway 7R/25L centerline to allow for the construction of a new parallel taxiway between the south airfield runways. The relocated runway would be 11,090 feet long and 200 feet wide. A new 11,090-foot by 100-foot full-length Group V parallel taxiway would be constructed between Runways 7L/25R and 7R/25L. The new taxiway would be located 400 feet north of Runway 7R/25L and 400 feet south of Runway 7L/25R.

Other major project elements include development of new and reconfigured passenger terminal space and aircraft gates, the elimination of public parking structures in the CTA; a new Ground Transportation Center to be the primary airport access center for private and most commercial vehicles; a new employee parking garage on the west side of the airport; Consolidated Rental Car Facility; Intermodal Transportation Center to serve as the connection between the airport, the Green Line, and regional bus service; and an Automated People Mover system.

Important security features include the elimination of private vehicles from the CTA roadways and elimination of the public parking facility within the CTA. Passengers and employees working in the CTA would access the CTA via the Automated People Mover. Limiting vehicle access to these areas would enhance security at each of the facilities in the CTA. One hundred percent baggage screening capabilities would be a fundamental component of the new terminals, in addition to all other federal security recommendations and mandates enhancing the safety and security of the existing new facilities.

The presence of law enforcement and emergency response teams would also be enhanced with Alternative D. The project would include two new Aircraft Rescue and Fire Fighting facilities, and a new police headquarters to increase response capabilities to airport facilities.

3. STUDY METHODS AND RESULTS

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, directed surveys were conducted for 18 federally- and state-listed species, as well as other designated sensitive species determined to have the potential to exist within the LAX Master Plan boundaries. Prior to conducting the directed surveys, the existing plant communities within the LAX Master Plan project area were mapped and the delineation of ponded areas that were possibly subject to the jurisdiction of the U.S. Army Corps of Engineers (USACOE) was completed. All surveys were conducted in accordance with applicable state and federal protocols, and the USFWS and the CDFG were notified prior to the commencement of the directed surveys for listed species.

3.1 Plant Communities

General plant surveys within the LAX Master Plan boundaries were conducted in 1996 by Sapphos Environmental, Inc. During field surveys, the following observations were made and recorded:

- ◆ Dominant and characteristic floral components comprising the plant communities and associated wildlife resources present within the LAX Master Plan boundaries
- ◆ The presence or absence of sensitive species and the potential of the site to support such species
- ◆ The presence or absence of wetlands habitat
- ◆ The presence or absence of other sensitive habitat
- ◆ The proximity to wildlife dispersal or migration corridors

Boundaries of plant communities were marked on an aerial photograph of the LAX Master Plan study area and a plant communities map was generated for the Master Plan boundaries, **Figure S3**, Plant Communities. Plant communities are described in accordance with the definitions provided in *Preliminary Descriptions of the Terrestrial Natural Communities of California*⁵ and in *A Manual of California Vegetation*.⁶ The plant communities identified include: Southern Foredune (CNDDDB Element Code 21230), Southern Dune Scrub (CNDDDB Element Code 21330), Valley Needlegrass Grassland (CNDDDB Element Code 42110), Disturbed Dune Scrub/Foredune, Disturbed/Bare Ground, Non-Native Grassland/Ruderal, Landscaped, and Developed.

3.2 Directed Surveys for Listed Plants

Directed surveys for listed plant species were undertaken by Sapphos Environmental, Inc. in 1996, 1997, 1998, and 2000. Surveys for listed plant species were undertaken during the seasons most appropriate for detection of each individual species and during confirmed flowering periods for each listed species.

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, the LAX Master Plan boundaries were surveyed on foot and individuals of each listed species encountered were recorded including San Diego button-celery (*Eryngium aristulatum* var. *parishii*), beach spectacle-pod (*Dithyrea maritima*), Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*), Branton's milkvetch (*Astragalus brauntonii*), coastal dune milkvetch (*Astragalus tener* var. *titi*), Mexican flannelbush (*Fremontodendron mexicanum*), and California orcutt grass (*Orcuttia californica*), all surveyed for during the spring; Ventura marsh milkvetch (*Astragalus pycnostachyus* var. *lanosissimus*), and salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*) surveyed for during the summer).

Sapphos Environmental, Inc. also conducted directed surveys for vernal pool-associated plant species in 20 areas within LAX Master Plan boundaries determined to have potential to support vernal pool species (**Figure S4**, Ephemeral Aquatic Habitat at Los Angeles International Airport Northern Survey Area and

⁵ R. F. Holland, R.F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*, California Department of Fish and Game, Sacramento, California, 1986.

⁶ Sawyer, J. O. and T. Keeler-Wolf, *A Manual of California Vegetation*, California Native Plant Society, Sacramento, California, 1995.

Figure S5, Ephemeral Aquatic Habitat at Los Angeles International Airport Southern Survey Area). Surveys were conducted in 1997, 1998, and 2000.

No federally- or state-listed plant species were determined to be present within the LAX Master Plan boundaries as a result of directed surveys conducted in support of the Draft EIS/EIR (January 2001).

3.3 Directed Wildlife Surveys

Directed surveys were undertaken for all federally- and state-listed wildlife species with the potential to exist within the LAX Master Plan boundaries. Nine federally- and state-listed endangered wildlife species were identified as potentially present: Riverside fairy shrimp (*Streptocephalus wootoni*), San Diego fairy shrimp (*Branchinecta sandiegonensis*), El Segundo blue butterfly (*Euphilotes battoides allyni*), California brown pelican (*Pelecanus occidentalis californicus*), American peregrine falcon (*Falco peregrinus anatum*), California least tern (*Sterna antillarum brownii*), southwestern willow flycatcher (*Empidonax eximius traillii*), least Bell's vireo (*Vireo belli pusillus*), and Pacific pocket mouse (*Perognathus longimembris pacificus*).

Two federally-listed endangered and one state-listed endangered wildlife species were determined to be present within the LAX Master Plan boundaries as a result of directed surveys conducted in support of the Draft EIS/EIR (January 2001). These species include the Riverside fairy shrimp, El Segundo blue butterfly, and American peregrine falcon.

Listed Species

Crustaceans

Riverside Fairy Shrimp

Directed dry and wet season surveys for federally-endangered Riverside fairy shrimp were conducted by permitted subconsultants of Sapphos Environmental, Inc., in accordance with survey protocols established by the USFWS.⁷ Dry season sampling was performed in September and November 1997. Dry season soil samples were collected from at least ten localities and sent to Jones and Stokes Associates, Inc. for identification of fairy shrimp cysts. Wet season surveys were conducted following significant rainfall in December 1997 and January, March and April 1998. Sampling of adult fairy shrimp was accomplished with sweep nets, and sampling periods were timed to coincide with observed hatching of fairy shrimp at other sites throughout Southern California.

As a result of 1997 dry season surveys, Riverside fairy shrimp cysts were determined to be present in nine ephemerally wetted areas on the LAX airfield. Subsequent rearing of fairy shrimp cysts confirmed the identity as Riverside fairy shrimp.⁸

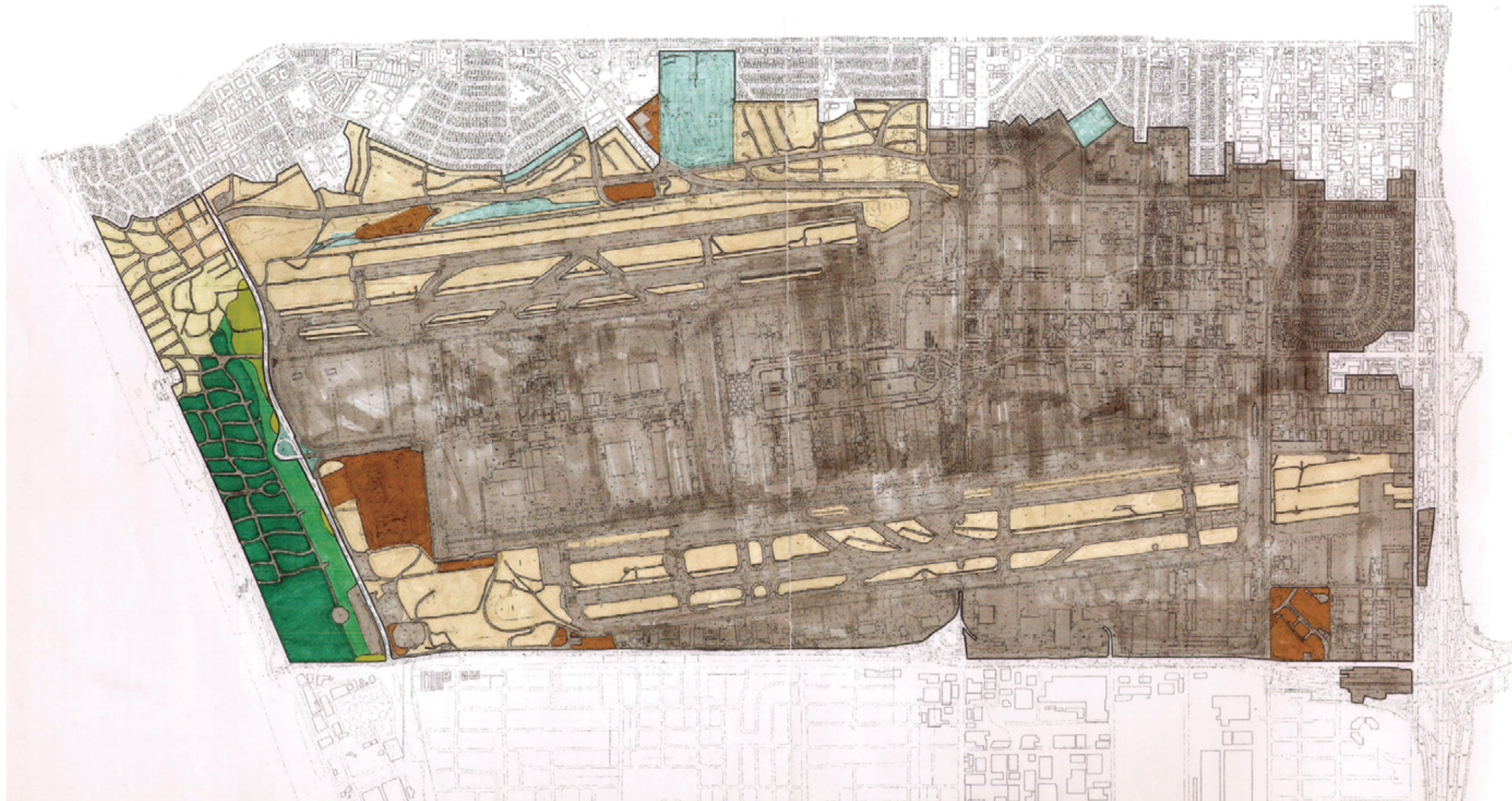
Arthropods

El Segundo Blue Butterfly









Sapphos Environmental, Inc. has employed two methodologies to survey for the federally-endangered El Segundo blue butterfly (ESB): the transect count method and the block count census method. The transect count method was employed in 1995 through 2002. Transects are walked at one-week intervals at the height of the flight season, usually from mid-June to mid-August, thus ensuring that the majority of butterflies have emerged from the pupal stage. The block count census method was employed during the height of the flight season in 1996 through 2002 on all subsites of the Habitat Restoration Area. Each subsite was completely surveyed, and all male and female butterflies were counted and their locations mapped.

⁷ RECON (Patterson and Ayers), Fairy Shrimp Survey at Los Angeles International Airport, Prepared for Sapphos Environmental, Inc., July 1, 1998.

⁸ Rogers, Christopher, Jones & Stokes Associates, Inc., Personal Communications, June 1, 1999.



LEGEND

 Southern Foredune	 Disturbed Dune Scrub/Foredune	 Non-Native Grassland/Ruderal	 Landscaped
 Southern Dune Scrub	 Valley Needlegrass Grassland	 Disturbed/Bare Ground	 Developed



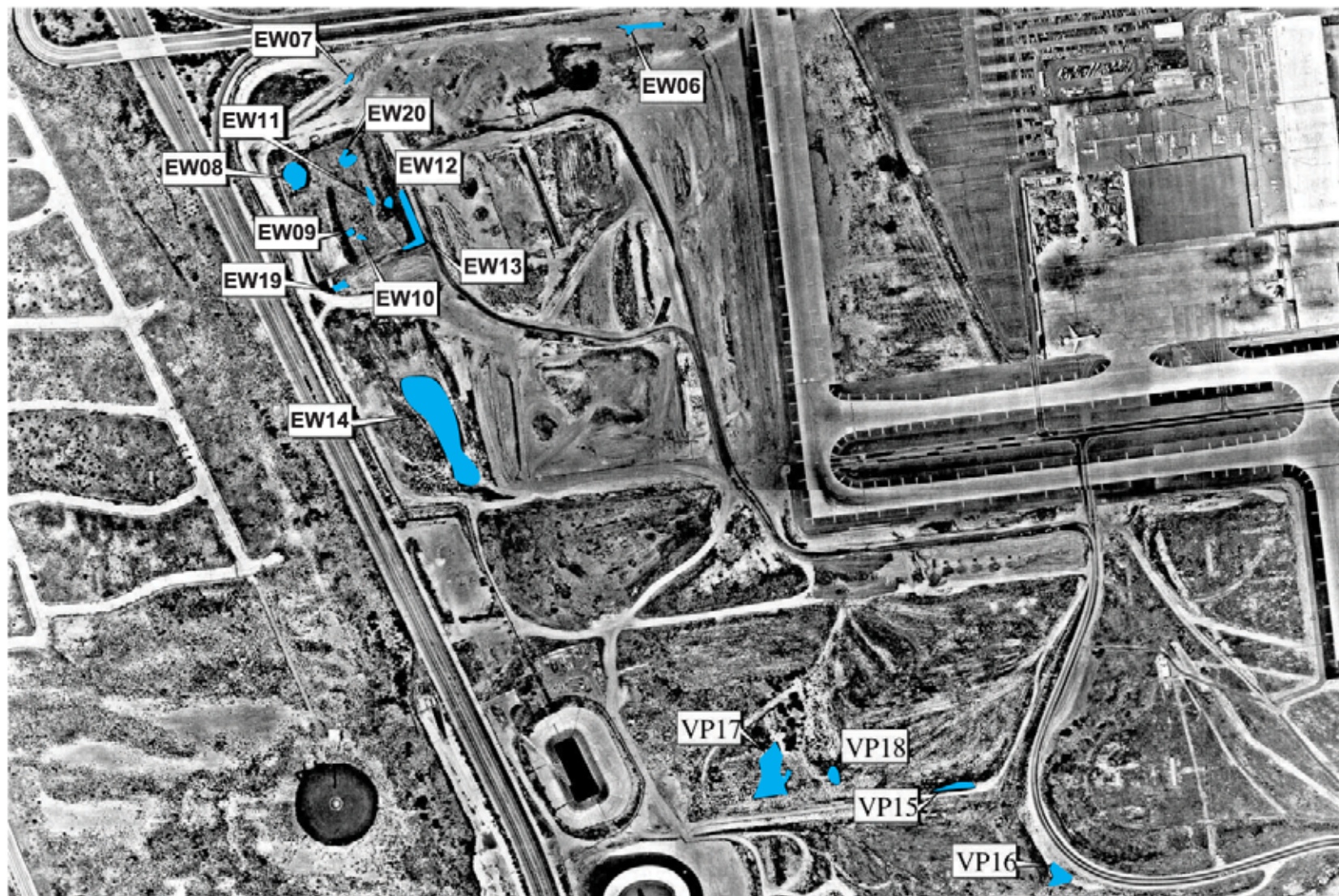


Not to Scale

**Los Angeles International Airport
Master Plan Updated Biological Assessment**

**Ephemeral Aquatic Habitats at Los Angeles
International Airport Northern Survey Area**

**Figure
S4**



Methodologies are described in detail in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIS. The results of yearly ESB surveys from 1995 to 2000 are available in Technical Report 7, *Biological Memorandum for the Record on Floral and Faunal Survey*, of the Draft EIS/EIR. The result of yearly ESB surveys from 2001 and 2002 are referenced in Section 4.11, *Endangered and Threatened Species of Flora and Fauna*, of the Supplement to the Draft EIS/EIR.

Birds

American Peregrine Falcon

The American peregrine falcon was removed from the list of federally-endangered species on August 25, 1999,⁹ however, it does remain a California state-listed endangered species. Directed surveys for the state-endangered American peregrine falcon were undertaken in 1998 as part of the 1998 spring bird surveys, in 2000, and in winter 2002/2003. Surveys were performed on the Los Angeles/EI Segundo Dunes and the LAX airfield by scanning all potential perching sites with binoculars and listening for call notes.

No American peregrine falcons were found over the Los Angeles/EI Segundo Dunes or over the LAX airfield during surveys undertaken in 1998.¹⁰ Results of surveys undertaken in 2000 revealed the presence of foraging roost sites in the tall buildings adjacent to LAX, but no nesting habitat.¹¹ The American peregrine falcon was not observed to be present during surveys undertaken in winter 2002/2003.¹²

4. EXISTING CONDITIONS

Historic land uses of the area are described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR. Today, LAX encompasses approximately 3,650 acres along the western margin of the Los Angeles Basin where the coastal plain approaches the Pacific Ocean. LAX constitutes a large industrial district presently made up of the following facilities and uses:

- ◆ Four runways
- ◆ 3.9 million square feet of domestic and international terminal space, including 148 narrow body equivalent gates
- ◆ 197 acres of cargo area, including 1.9 million square feet of building space
- ◆ 384 acres of ancillary space
- ◆ 33,926 parking spaces
- ◆ 1,076 acres of open space, not including 307 acres of Los Angeles/EI Segundo Dunes

The Los Angeles/EI Segundo Dunes occupy 307 acres immediately west of LAX, and constitute one the last remaining vestiges of the once-extensive California coastal sand dunes. The Los Angeles/EI Segundo Dunes, managed by LAWA, support the largest of four remaining occupied habitats for the EI Segundo blue butterfly. Within the 307-acre site, the city has designated a 200-acre EI Segundo Blue Butterfly Habitat Restoration Area (Habitat Restoration Area) for the long-term conservation of the EI Segundo blue butterfly. There are currently 150.2 acres of occupied habitat by the EI Segundo blue butterfly within the Los Angeles/EI Segundo Dunes. LAWA initiated active habitat management measures for the EI Segundo blue butterfly in 1987, and continues those work efforts as part of its annual operations and maintenance activities.¹³ Numbers of EI Segundo blue butterfly have been closely monitored since the city initiated active management of the Habitat Restoration Area, and have increased since 1995.

⁹ 50 CFR Part 17

¹⁰ Sapphos Environmental, Inc., Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo and Loggerhead Shrike at LAX/EI Segundo Dunes," August 18, 1998.

¹¹ Sapphos Environmental, Inc., Memorandum for the Record 1049-002.M30, Subject: "Results of 2002/2003 Directed Surveys for American Peregrine Falcon at LAX/EI Segundo Dunes," February 13, 2003.

¹² Sapphos Environmental, Inc., Memorandum for the Record 1049-002.M30, Subject: "Results of 2002/2003 Directed Surveys for American Peregrine Falcon at LAX/EI Segundo Dunes," February 13, 2003.

¹³ Environmental Science Associates, Long-term Habitat Management Plan, 1994.

4.1 Plant Communities

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, native plant communities that once occupied the Los Angeles basin included Coastal Strand, Coastal Salt Marsh, Freshwater Marsh, Coastal Sage Scrub, Chaparral, Valley Needlegrass Grassland, and Southern Oak Woodland.¹⁴

Today, the most predominant plant community within the Master Plan study area is the Developed community, followed by Non-native Grassland (CNDDDB Element Code 42220)/Ruderal, Disturbed/Bare Ground, Southern Foredune (CNDDDB Element Code 21230), Landscaped, Disturbed Dune Scrub, Southern Dune Scrub (CNDDDB Element Code 21330), and Valley Needlegrass Grassland (CNDDDB Element Code 42110). The acreage associated with each of these plant communities was determined by planimetry of the communities present within the study area for each of the four build alternatives and the No Action/No Project Alternative. Plant communities in the study area are shown in **Figure S3**, and are described below.

Southern Foredune (CNDDDB Element Code 21230)

The Southern Foredune plant community is a state-designated sensitive habitat.¹⁵ Southern Foredune plant communities are typically dominated by perennial species with a high proportion of suffrutescent plants up to 30 cm tall.¹⁶ Within the study area, this community occupies 135.6 acres within the Habitat Restoration Area west of Pershing Drive. The host plant and primary food source for the El Segundo blue butterfly, coast buckwheat (*Eriogonum parvifolium*), is found in this biotic community.

Southern Dune Scrub (CNDDDB Element Code 21330)

The Southern Dune Scrub plant community is a state-designated sensitive habitat occupying 24.4 acres within the Habitat Restoration Area along the steep slope of the backdune.¹⁷ Southern Dune Scrub vegetation is a dense coastal scrub community of scattered shrubs, subshrubs, and herbs, generally less than one meter tall, often developing considerable cover, and often somewhat succulent.¹⁸ The host plant and primary food source for the El Segundo blue butterfly, coast buckwheat is found in this biotic community.

Valley Needlegrass Grassland (CNDDDB Element Code 42110)

The Valley Needlegrass Grassland plant community is a state-designated sensitive habitat.¹⁹ The plant community typically associated with this grassland is now almost completely absent due to extensive grading and paving and the invasion of exotic annual grasses. At the present time, the Valley Needlegrass Grassland community occupies 17.1 acres within the Habitat Restoration Area.

Disturbed Dune Scrub/Foredune

This community is made up of approximately 74.6 acres, and is located north of the Habitat Restoration Area, east of Vista del Mar Boulevard, south of Waterview Street, west of Pershing, and is bisected by Sandpiper Street. This biotic community is dominated by invasive species that drive out native vegetation.

Non-Native Grassland (CNDDDB Element Code 42220)/Ruderal

This community consists of open space between and surrounding the runways and taxiways on the airfield, and is subjected to regular operations maintenance. This community is also found on a small

¹⁴ Munz, Philip A., *A Flora of Southern California*, University of California Press, Berkeley, 1974.

¹⁵ Jennings, M. R. and M. P. Hayes, *Amphibian and Reptile Species of Special Concern in California*, California Department of Fish and Game, 1994.

¹⁶ Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program*, California Department of Fish and Game, 1986.

¹⁷ Jennings, M. R. and M. P. Hayes, *Amphibian and Reptile Species of Special Concern in California*, California Department of Fish and Game, 1994.

¹⁸ Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program*, California Department of Fish and Game, 1986.

¹⁹ Jennings, M. R. and M. P. Hayes, *Amphibian and Reptile Species of Special Concern in California*, California Department of Fish and Game, 1994

portion of the Los Angeles/El Segundo Dunes. It is composed of a total of 721.8 acres. Non-Native Grassland is characterized by a dense to sparse cover of annual grasses up to one meter in height.

Landscaped

Areas within the LAX Master Plan boundaries that support landscaped vegetation include a golf course, a small park, and most roadway medians. The landscaped plant community is composed of approximately 79.2 acres. Landscape treatments are variable, and include lawn and ornamental tree plantings; also present are ornamental shrubs, groundcover, and annual plantings.

Disturbed/Bare Ground

Areas of Disturbed/Bare Ground consist of large open spaces within the Master Plan boundaries where regular soil disturbance does not allow vegetation to become established. There are approximately 103.1 acres of Disturbed/Bare Ground community. Areas determined as disturbed have been continuously scraped and are bare due to vehicle use.

Developed

Developed areas within the LAX Master Plan boundaries occupy 2,644.9 acres and include the Airport Operations Area (AOA), terminals, parking and support facilities. The hardscape associated with this community, largely paved and built areas, make it unsuitable to support vegetation.

4.2 Federally- and State-Listed Threatened and Endangered Plant Species

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, general and directed surveys were undertaken for all federally- or state-listed or other sensitive plant species that had the potential to exist within the LAX Master Plan boundaries:

San Diego button-celery (*Eryngium aristulatum* var. *parishii*): a vernal pool associated species. San Diego button-celery was not observed in the study area as a result of dry season surveys in fall 1997, or during directed surveys on July 16, 1998 and in May 2000.

Beach spectacle-pod (*Dithyrea maritima*): typically found in coastal dunes and scrub.²⁰ This species was not observed during directed surveys in spring 1996, 1997, 1998, or 2000, and is not expected to occur in the Master Plan study area.²¹

California orcutt grass (*Orcuttia californica*): a vernal pool associated species. California orcutt grass was not observed in the study area as a result of dry season surveys in fall 1997 or during directed surveys on July 16, 1998 and June 2000.

Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *marcescens*): typically known to grow on shaded, rocky outcrops among chaparral and coastal sage scrub habitats.²² It has not been observed in the study area as a result of directed surveys undertaken in June 2000, and is not expected to occur due to lack of suitable habitat.

Braunton's milkvetch (*Astragalus brauntonii*): typically found in disturbed chaparral or gravelly, clay soils overlying granite or limestone.^{23, 24} This species has not been observed in the study area, and is not expected to occur due to lack of suitable habitat.

Coastal dunes milkvetch (*Astragalus tener* var. *titi*): found in moist, sandy depressions near the coast, typically coastal bluffs or dunes.²⁵ Coastal dunes milkvetch was not observed in the Master Plan study area during surveys conducted in spring 1996, 1997, 1998, and 2000, and is not expected to occur.²⁶

²⁰ Hickman, James C. ed., *The Jepson Manual: Higher Plants of California*, University of California Press, Berkeley, 1993

²¹ Sapphos Environmental, Inc., Technical Memorandum, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management November 8, 1996.

²² Skinner, M. W. and B. M. Pavlik, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, California Native Plant Society, Sacramento, 1994.

²³ Hickman, James C. ed., *The Jepson Manual: Higher Plants of California*, University of California Press, Berkeley, 1993.

²⁴ California Department of Fish and Game, *California Natural Diversity Database - Rarefind 2*, Sacramento, California, 1999.

Ventura marsh milkvetch (*Astragalus pycnostachyus* var. *lanosissimus*): characteristic habitat of this species is described as coastal marshes and seeps.²⁷ This species has not been observed in the study area, and is not expected to occur.

Salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*): known to occur in coastal dunes and salt marshes.²⁸ The species is not expected to occur in the study area due to unsuitable habitat and based on qualitative and directed surveys.²⁹

Mexican flannelbush (*Fremontodendron mexicana*): typically found in canyons in chaparral habitat on gabbroic or serpentine soils.³⁰ This species has not been observed in the study area, and is not expected to occur due to lack of suitable habitat.

4.3 Federally- and State-Listed Threatened and Endangered Wildlife Species

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, directed surveys were undertaken for all federally- or state-listed wildlife species that had the potential to occur within the LAX Master Plan boundaries:

Riverside fairy shrimp (*Streptocephalus woottoni*): Embedded cysts of the Riverside fairy shrimp were found in soil samples taken from nine locations (totaling 1.3 acres) within the AOA located in the western portion of the LAX Master Plan area. The Riverside fairy shrimp was not observed in the adult phase of its life cycle. The extent of alteration of the 1.3 acres of ephemerally wetted area coupled with the wildlife hazards management activities required by the FAA reduce the likelihood of the Riverside fairy shrimp completing the adult phase of its life cycle at these locations.

The *Recovery Plan for Vernal Pools of Southern California (VP Recovery Plan)* does not designate critical habitat for the Riverside fairy shrimp.³¹ However, as a result of an agreement between the USFWS and the Center for Biological Diversity,³² the USFWS proposed designation of critical habitat for the Riverside fairy shrimp on September 21, 2000.³³ A recent decision, however, by the U.S. District Court for the District of Columbia granted the request of the USFWS to vacate and remand the fairy shrimp critical habitat designation. The 10th District Court rejected the baseline approach utilized by the USFWS to designate critical habitat noting that it rendered the USFWS economic analysis essentially without meaning. The Court concluded that the USFWS was to conduct a full analysis of all of the economic impacts of a critical habitat designation regardless of whether those impacts are attributable co-extensively to other causes. The Court has ordered that the USFWS publish new final regulations with respect to the designation of critical habitat for the Riverside fairy shrimp (as well as arroyo southwestern toad) by no later than July 30, 2004.³⁴

²⁵ Hickman, James C. ed., *The Jepson Manual: Higher Plants of California*, University of California Press, Berkeley, 1993

²⁶ Sapphos Environmental, Inc., Technical Memorandum, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team, November 8, 1996.

²⁷ California Department of Fish and Game, *California Natural Diversity Database - Rarefind 2*, Sacramento, California, 1999.

²⁸ Skinner, M. W. and B. M. Pavlik, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, California Native Plant Society, Sacramento, 1994.

²⁹ Sapphos Environmental, Inc., Technical Memorandum, Subject: "Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR," Prepared for the City of Los Angeles, Department of Airports, Program Management Team, November 8, 1996.

³⁰ Skinner, M. W. and B. M. Pavlik, *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*, California Native Plant Society, Sacramento, 1994.

³¹ United States Fish and Wildlife Service, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon, 1998.

³² United States District Court for the Northern District of California, San Francisco Division. *Stipulated Settlement Agreement: Center for Biological Diversity vs. Bruce Babbitt, Secretary of the Department of the Interior*. Civil No. C99-3202 SC, dated February 15, 2000.

³³ Federal Register, Department of the Interior, U.S. Fish and Wildlife Service, *50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Riverside Fairy Shrimp*, September 21, 2000.

³⁴ United States District Court for the District of Columbia. *Building Insrustry Legal Defense Foundation vs. Norton*, D.C. No. 01-2311, dated October 2002.

San Diego fairy shrimp (*Branchinecta sandiegoensis*): found mainly in vernal pools within San Diego County. No cysts or adults of San Diego fairy shrimp were recovered or observed during the 1997/1998 dry or wet season surveys for listed fairy shrimp at LAX.³⁵

El Segundo blue butterfly (*Euphilotes battoides allyni*): known from only two other small localities, a 1.5-acre site at the oil refinery located south of the airport, and a half-acre site at Malaga Cove. The Dunes population represents over 90% of the known population of this species.

California brown pelican (*Pelecanus occidentalis californicus*): a bird of the open ocean and near-shore coastal waters and coastal estuaries. No California brown pelican have been observed within the project area during directed surveys (Sapphos Environmental, Inc., 1998, 2000).³⁶

American peregrine falcon (*Falco peregrinus anatum*): inhabits tall cliffs, ridges, and rocky promontories.³⁷ It is a rare visitor to LAX, and was not observed during directed surveys undertaken in 1995, 1996 and 1998.^{38, 39, 40} The results of 2000 directed surveys revealed that the American peregrine falcon utilizes tall buildings as foraging roost sites within and adjacent to LAX, but does not nest in the project area. Directed surveys undertaken in winter 2002/2003 did not result in the identification of American peregrine falcon within the Master Plan study area.

California least tern (*Sterna antillarum browni*): breeds statewide along the coast in flat open areas, especially on sandy beaches. No least terns have been observed within the project area.⁴¹

Southwestern willow flycatcher (*Empidonax extimus trillii*): breeds in riparian areas throughout the southwest. This species is not present in the project area due to lack of suitable habitat.⁴²

Least Bell's vireo (*Vireo belli pusillus*): breeds in riparian areas. It is not present within the project area due to lack of suitable habitat.⁴³

Pacific pocket mouse (*Perognathus longimembris pacificus*): known from only three localities in coastal Southern California. It has not been observed within the project area.

Only three of the nine listed species were found to be present within the Master Plan study area during directed surveys: Riverside fairy shrimp, El Segundo blue butterfly and American peregrine falcon.

4.4 Sensitive Plant Species

Sensitive plant species that are not federally- or state-designated as rare, threatened, or endangered are not addressed in this Updated Biological Assessment. They are addressed in Section 4.10, *Biotic Communities*, of the Draft EIS/EIR and Supplement to the Draft EIS/EIR.

4.5 Sensitive Wildlife Species

Sensitive wildlife species that are not federally- or state-designated as rare, threatened, or endangered, are not addressed in this Updated Biological Assessment. They are addressed in Section 4.10 *Biotic Communities*, of the Draft EIS/EIR and Supplement to the Draft EIS/EIR.

³⁵ RECON (Patterson and Ayers), Fairy Shrimp Surveys at Los Angeles International Airport, Prepared for Sapphos Environmental, Inc., July 1, 1998.

³⁶ Sapphos Environmental, Inc., Memorandum for the Record 1067-007.M01, Subject: "Winter Bird Count at El Segundo Dunes", January 29, 1998.

³⁷ Johnsgard, P. A., *Hawks, Eagles, and Falcons of North America*, Smithsonian Institution, Washington D.C., 1990.

³⁸ Sapphos Environmental, Inc., Memorandum for the Record 1043-002.M07, Subject: "Results of 1995 Spring Surveys for Birds at the Los Angeles International Airport El Segundo Dunes," March 7, 1996.

³⁹ Sapphos Environmental, Inc., Memorandum for the Record 1067-001.M19, Subject: "1996 Breeding Birds of Prey Survey at the Los Angeles International Airport (LAX) in March of 1996," April 3, 1996.

⁴⁰ Sapphos Environmental, Inc., Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/El Segundo Dunes," September 8, 1998.

⁴¹ Sapphos Environmental, Inc., Memorandum for the Record 1067-007.M01, Subject: "Winter Bird Count at El Segundo Dunes", January 29, 1998

⁴² Sapphos Environmental, Inc., Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/El Segundo Dunes," September 8, 1998.

⁴³ Sapphos Environmental, Inc., Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/El Segundo Dunes," September 8, 1998.

5. Effects

Three listed species were determined to be present within the Master Plan study area as a result of directed surveys: Riverside fairy shrimp (*Streptocephalus woottoni*), El Segundo blue butterfly (*Euphilotes battoides allyni*) and American peregrine falcon (*Falco peregrinus anatum*). Embedded cysts of the Riverside fairy shrimp were found in dry soil samples taken from approximately 1.3 acres of the AOA. The El Segundo blue butterfly was determined to be present within the El Segundo Blue Butterfly Habitat Restoration Area of the Los Angeles/El Segundo Dunes and absent within existing undeveloped areas of the AOA. In 2000, the American peregrine falcon was observed flying over and foraging within and adjacent to LAX, but was not observed nesting within the Master Plan study area.

Effects on other sensitive plant and wildlife species are addressed in Section 4.10, *Biotic Communities*, of the Supplement to the Draft EIS/EIR, and do not indicate any need to pursue designation as threatened or endangered.

Potential adverse effects to endangered species could result from:

- ◆ Conversion of open areas/degraded habitat to developed uses within the airfield
- ◆ Changes in ambient levels of light and glare, jet exhaust emissions, and noise within the airfield and the southeastern portion of the Los Angeles/El Segundo Dunes
- ◆ Construction activities adjacent to the Los Angeles/El Segundo Dunes
- ◆ Construction of navigational aids in the Los Angeles/El Segundo Dunes

5.1 Flora

No Action/No Project Alternative

Implementation of the No Action/No Project Alternative will not affect any federally- or state-listed plant species because no federally- or state-listed plant species occur within the LAX Master Plan boundaries.

Alternatives A, B, and C

Implementation of build Alternatives A, B or C would not affect any federally- or state-listed plant species because no federally- or state-listed plant species occur within the LAX Master Plan boundaries.

Alternative D

Implementation of build Alternative D would not affect any federally- or state-listed plant species because no federally- or state-listed plant species occur within the LAX Master Plan boundaries.

5.2 Fauna

Riverside Fairy Shrimp

No Action/No Project Alternative

Under the No Action/No Project Alternative, 1.3 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp would remain within the AOA. The 1.3 acres would be subject to continued operations and maintenance activities in compliance with Title 14, CFR Part 139. As described in detail in the Draft EIS/EIR, Title 14, CFR, Part 139 mandates that the AOA be maintained in a condition to minimize or eliminate public safety hazards that would result from wildlife utilization of the AOA. Such routine maintenance activities may include mowing or discing of vegetation to reduce its attractiveness to wildlife and elimination of standing water. Long-term operations and maintenance activities within the western AOA, which includes the 1.3 acres of habitat containing the embedded cysts, would continue to result in the loss of habitat values for the Riverside fairy shrimp.

Alternatives A, B, and C

Under Alternatives A, B and C, 1.3 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp would be affected as a result of construction staging, airfield improvements and/or airfield operations and maintenance activities (i.e., removal of standing water and discing or mowing to

manage vegetation). Recommendations to reduce the effects to the Riverside fairy shrimp are discussed in Section 6.0, *Conclusions and Recommendations*.

Alternative D

As with Alternatives A, B and C, implementation of Alternative D would affect the 1.3 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp. Effects would result from direct (e.g., wetlands are filled) or indirect (e.g., wetland hydrology is altered) habitat modification associated with construction staging activities and development of the new west employee parking garage. Should avoidance measures be implemented such that the 1.3 acres of degraded wetland habitat would not be affected by construction and development, all 1.3 acres would continue to be subject to long-term operations and maintenance activities as described in the No Action/No Project Alternative. These activities would result in the loss of habitat values for the Riverside fairy shrimp. However, with implementation of the Master Plan mitigation measures, soils containing cysts of Riverside fairy shrimp shall be moved to a suitable alternate location in coordination with the USFWS, thus providing an opportunity for the species' recovery. Recommendations to reduce the effects to the Riverside fairy shrimp are discussed in Section 6.0, *Conclusions and Recommendations*.

EI Segundo blue butterfly

No Action/No Project Alternative

The No Action/No Project Alternative would not result in alteration to or degradation of occupied or potentially suitable habitat of the EI Segundo blue butterfly. The 150.2 acres of habitat occupied by the EI Segundo blue butterfly would remain unaltered under this alternative. Analysis of the potential effects of jet exhaust emissions has determined that, under this alternative, there would be no effect on the EI Segundo blue butterfly or its host plant.⁴⁴ Construction activities under the No Action/No Project Alternative would be minor and are not anticipated to result in deposition of fugitive dust within occupied habitat of the EI Segundo blue butterfly. Analysis of the potential effects of light emissions and glare has concluded that the level of light and glare at the Habitat Restoration Area would remain at existing levels, and there would be no effect on the EI Segundo blue butterfly.

Alternative A/Alternative B

As described in Section 4.11, *Endangered and Threatened Species of Flora and Fauna*, of the Supplement to the Draft EIS/EIR, Alternative A would result in the conversion of 8,514 square feet (0.20 acre)⁴⁵ of occupied habitat of the EI Segundo blue butterfly within the Habitat Restoration Area from installation of navigational aids and associated service roads for Runway 6R/24L. Likewise, Alternative B would result in the conversion of 2,316 square feet (0.05 acre)⁴⁶ of occupied habitat of the EI Segundo blue butterfly within the Habitat Restoration Area from installation of navigational aids and associated service roads for Runway 6R/24L. The conversion of occupied habitat under Alternatives A and B are considered to be significant impacts based on the CEQA significance thresholds presented in the Supplement to the Draft EIS/EIR. Potential adverse effects to the EI Segundo blue butterfly are also described in Section 5.0 of this Updated Biological Assessment Technical Report. The FAA has determined that the conversion of occupied habitat resulting from installation of navigational aids and associated service roads would trigger the need for a Section 7 consultation with the USFWS to determine whether the impacts would jeopardize the continued existence of the species. As described in greater detail below, relative to Alternative D, the FAA has determined that this conversion would not result in an adverse impact to the federally listed EI Segundo blue butterfly because the recommended mitigation measure, calling for creation of new replacement habitat, would be fully implemented prior to the conversion occurring (i.e., replacement habitat would be planted three years prior to the installation of new navigational aids and, with new habitat being fully established prior to the conversion of existing habitat, there would be no net loss of habitat).

⁴⁴ As noted in Section 4.10, *Biotic Communities*, of the Draft EIS/EIR, elevated levels of vanadium were found in buckwheat within the Habitat Restoration Area. However, there is no evidence that the EI Segundo blue butterfly is adversely affected by vanadium. Monitoring results indicate that current levels of vanadium are not adversely affecting the EI Segundo blue butterfly population at the Habitat Restoration Area since trends show a significant increase in the population since 1996.

⁴⁵ Modified since publication of the Draft EIS/EIR to account for buffer area and essential access roads.

⁴⁶ Modified since publication of the Draft EIS/EIR to account for buffer area and essential access roads.

Analysis of the potential effects of jet exhaust emissions determined that there would be no effects on the El Segundo blue butterfly.^{47, 48} Analysis of the net change in navigational lighting within the Habitat Restoration Area shows that there would be a minimal increase in lighting within occupied habitat. Additional lighting associated with the proposed West Terminal/Concourses and parking facilities would increase ambient light levels by an estimated maximum of 0.34 foot candles to 0.60 foot candles on the Habitat Restoration Area, as described in Section 4.18, *Light Emissions*, of the Draft EIS/EIR. However, the El Segundo blue butterfly is a diurnal species, does not exhibit flight-to-light behavior, and remains perched around the coastal buckwheat foodplant during the night. Therefore, additional lighting under Alternatives A and B would not be expected to affect the El Segundo blue butterfly. Construction activities, including staging and stockpiling of materials proximal to the Habitat Restoration Area, have the potential to result in deposition of fugitive dust within occupied habitat of the El Segundo blue butterfly, specifically during implementation of the ring road, parking facilities, West Terminal Area, and People Mover components of the proposed alternatives. Construction activities proximal to the Habitat Restoration Area have the potential to affect habitat occupied by the El Segundo blue butterfly.

Recommendations are discussed in Section 6.0, *Conclusions and Recommendations*, to avoid or reduce the potential effects to the El Segundo blue butterfly and ensure no net loss of occupied habitat results under this Alternative.

Alternative C

Under Alternative C, no changes to navigational aids within occupied habitat of the El Segundo blue butterfly would occur. Construction avoidance measures (as discussed in Section 6.0, *Conclusions and Recommendations*) shall be implemented to ensure construction activities do not have the potential to affect habitat occupied by the El Segundo blue butterfly and its host plant. As indicated under Alternative A/Alternative B, there would be no effect of jet exhaust emissions on the El Segundo blue butterfly or its host plant. Analysis of the effects of the proposed additional lighting has likewise determined that under Alternative C, increased light and glare would not affect the El Segundo blue butterfly.

Alternative D

Alternative D would result in the conversion of 10,597 square feet (0.24 acre) of occupied habitat of the El Segundo blue butterfly in the Habitat Restoration Area from installation of replacement navigational aids and associated service roads for Runway 6R/24L. This conversion is considered to be a significant impact based on the CEQA significance thresholds presented in the Supplement to the Draft EIS/EIR. The FAA has determined that this conversion may affect this federally listed species and would require formal Section 7 consultation with USFWS to determine whether the impact would jeopardize the continued existence of the species.

For Alternative D, FAA and LAWA would implement Mitigation Measure ET-4, as described in Section 6.2 below, that would result in a zero net loss of habitat for the butterfly. Mitigation Measure ET-4 provides that coast buckwheat be planted in a minimum of three (3) years prior to the impact of the installation of the replacement navigational aids. This would be accomplished to allow for establishment of the plants and to ensure that the plants are mature enough to bloom. Further, creation of new replacement habitat prior to the impact would result in no temporal loss of habitat. The plantings of coast buckwheat would be located within the southwest corner of subsite 23 of the Habitat Restoration Area, as depicted in Figure 4.11-7, Mitigation Site for El Segundo Blue Butterfly Relocation, of the 2001 Draft EIS/EIR. Subsite 23 is located just south of the southern most east-west paved roadway in the Habitat Restoration Area.

Since the mitigation measure would be implemented and in effect prior to the installation of the replacement navigational aid along with any salvaged plants and El Segundo blue butterfly larvae, FAA has determined that the conversion would not result in an adverse impact to the federally listed El Segundo Blue Butterfly. The conclusion of the formal Section 7 consultation with the USFWS is a Biological Opinion. FAA and LAWA will incorporate the Service's Biological Opinion into the Final EIS/EIR.

⁴⁷ Venkatesan, M.I. and K.A. Boyle, *Analyses of Hydrocarbons and Trace Metals in Environmental Samples in support of Los Angeles International Airport 2015 Master Plan Expansion Project EIS/EIR*, June 28, 1999.

⁴⁸ Vanadium was the only element associated with jet aircraft exhaust found at elevated levels within the Habitat Restoration Area. There is no evidence that the El Segundo blue butterfly is adversely affected by vanadium, and monitoring results indicate that current levels of vanadium are not adversely affecting the El Segundo blue butterfly population at the Habitat Restoration Area since counts for 2000 showed a significant increase in the population when compared to 1999.

Analysis of the potential effects of jet exhaust emissions for Alternative D is similar to that of the other build alternatives and has determined that there would be no effect on the El Segundo blue butterfly. The anticipated increase in light levels under Alternative D are similar to those for the other build alternatives and would not affect the El Segundo blue butterfly.

Recommendations are discussed in Section 6.0, *Conclusions and Recommendations*, to avoid or reduce the potential effects to the El Segundo blue butterfly and ensure no net loss of occupied habitat results under this alternative.

American Peregrine Falcon

No Action/No Project Alternative

The No Action/No Project Alternative would not affect the continued existence of the American peregrine falcon due to the absence of breeding sites within the LAX Master Plan boundaries.

Alternative A/Alternative B

Alternatives A and B would not affect the continued existence of the American peregrine falcon because this species does not breed within the proposed developed facilities, construction staging, or associated support activities areas. Alternatives A and B would require installation of navigational aids within the Habitat Restoration Area, however, the American peregrine falcon has not been observed within the Habitat Restoration Area. In addition, the American peregrine falcon rarely hunts from a perch and will usually swoop from flight onto flying prey.⁴⁹ Thus, installation of navigational aids within the Habitat Restoration Area would not affect the continued existence of this species. The increase in nighttime light would not affect the American peregrine falcon's roosting and foraging behaviors because it hunts in the daytime. Analysis of air quality has determined that there would be no effect on the American peregrine falcon, primarily because these birds have successfully adapted to living in highly urbanized environments. The American peregrine falcon has been recorded nesting in cities and towns since the Middle Ages, and in the 20th century, reintroduced peregrines have adapted to tall buildings in urbanized areas of North America and Europe.⁵⁰ Although peregrine falcons have adapted to living in urban environments,⁵¹ the supporting scientific research and documentation of the effects of air pollutants on peregrine falcons is lacking. In fact, there is very little research on the effects of air pollutants on raptors and birds in general.⁵² As a consequence, the direct effects of gaseous pollutants on these animals living in the wild is unknown.⁵³ Air emissions of carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and particulate matter (PM₁₀) would increase under Alternatives A and B, however, there is no evidence that such increases would result in adverse effects to the American peregrine falcon. Analysis of potential noise effects on the American peregrine falcon have determined that these birds would not be adversely affected by the noise from nearby jet aircraft.⁵⁴ Alternatives A and B would not result in any other effects to the American peregrine falcon due to the absence of breeding sites within, or adjacent to, LAX.

Alternative C

Alternative C would not affect the continued existence of the American peregrine falcon because this species does not breed within the proposed developed facilities, construction staging, or associated support activities areas. In addition, Alternative C would not would require installation of navigational aids within the Habitat Restoration Area. Changes in nighttime lighting, air quality, or noise from nearby jet aircraft under Alternative C are similar to those for Alternatives A and B and would not affect the American peregrine falcon.

⁴⁹ California Department of Fish and Game, California Statewide Wildlife Habitat Relationships System, California Wildlife, Volume II, Birds, State of California Resource Agency, 1990.

⁵⁰ Cade, T.J.; M. Martell, P. Redig, G. Septon and H. Tordoff, "Peregrine Falcons in Urban North America," Raptors in Human Landscapes, Edited by D. Bird, D. Varland and J. Negro. Academic Press Inc., San Diego, California, 1996.

⁵¹ Cade, T.J.; M. Martell, P. Redig, G. Septon and H. Tordoff, "Peregrine Falcons in Urban North America," Raptors in Human Landscapes, Edited by D. Bird, D. Varland and J. Negro. Academic Press Inc., San Diego, California, 1996.

⁵² Warner, Amy, Wildlife Biologist, Sapphos Environmental, Inc., Peter Bloom, Peter Bloom Consulting Services, Personal Communication, 15 April 2003.

⁵³ Maniero, T.G. The Effects of Air Pollutants on Wildlife and Implications in Class I Areas, National Park Service Air Resources Division. Contact: PO Box 25287 Denver, CO 80225.

⁵⁴ Supplement to the Draft EIS/EIR, Section 4.11, *Endangered and Threatened Species of Flora and Fauna* (subsection 4.11.3).

Alternative D

Alternative D would not affect the continued existence of the American peregrine falcon because this species does not breed within the proposed developed facilities, construction staging, or associated support activities areas. Alternative D would require installation of navigational aids within the Habitat Restoration Area, however, the American peregrine falcon has not been observed within the Habitat Restoration Area. Thus, installation of navigational aids within the Habitat Restoration Area would not affect the continued existence of this species. Changes in nighttime lighting, air quality, or noise from nearby jet aircraft under Alternative D would be similar to those for the other build alternatives and would not affect the American peregrine falcon.

6. CONCLUSIONS AND RECOMMENDATIONS

This section of the Updated Biological Assessment describes those measures to be undertaken by the FAA or its designee to ensure that implementation of the LAX Master Plan Addendum would not affect the survival and recovery in the wild of any federally- or state-listed endangered or threatened species determined to be present within the LAX Master Plan project area. Recommendations developed for the conservation of these species include conservation strategies associated with construction, operation, and maintenance of the Master Plan elements under Alternative D. Also included herein are those conservation strategies under Alternatives A, B, and C that have been revised since publication of the Draft EIS/EIR. Specific consideration has been given to the Riverside fairy shrimp, which would be adversely effected under Alternatives A, B, C, and D. In addition, installation of navigational aids and associated service roads required under Alternatives A, B, and D would result in the conversion of occupied habitat for the El Segundo blue butterfly within the Habitat Restoration Area. No effect to the American peregrine falcon would occur under any build alternative or the No Action/Project Alternative, therefore, the species is not further considered. As described below, the potential effects of proposed Alternatives A, B, C, and D on the Riverside fairy shrimp and El Segundo blue butterfly would be avoided or reduced through implementation of the recommended mitigation measures. Implementation of these recommendations would fulfill the responsibilities of the FAA pursuant to the Fish and Wildlife Coordination Act and the federal Endangered Species Act.

6.1 Flora

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, directed surveys have determined that there are no federally- or state-listed rare, threatened, or endangered plant species present within the LAX Master Plan boundaries. However, the 307-acre Los Angeles/El Segundo Dunes provides opportunities for improvement, restoration and/or creation of suitable habitat for the establishment of sensitive plant communities.

No Action/No Project Alternative, Alternatives A, B, and C

No federally- or state-listed plant species were determined to be present within the LAX Master Plan boundaries; therefore, no recommendations for mitigating project effects on flora are provided.

Alternative D

No federally- or state-listed plant species were determined to be present within the LAX Master Plan boundaries; therefore, no recommendations for mitigating project effects on flora are provided.

6.2 Fauna

The potential effects to the Riverside fairy shrimp were identified under each of the four build alternatives (Alternatives A, B, C and D) in association with construction staging activities, airfield improvements, and/or airfield operations and maintenance activities. These effects result from the modification of 1.3 acres of soil containing embedded cysts of the Riverside fairy shrimp. Restoration of suitable habitat for the Riverside fairy shrimp must be compatible with FAA Wildlife Hazard Management guidelines for ensuring aviation safety, pursuant to 14 CFR Part 139.⁵⁵

⁵⁵ United States Department of Transportation, Federal Aviation Administration, Title 14, Code of Federal Regulations (CFR), Part 139, Section 139.337: Wildlife Hazard Management.

The potential effects to the El Segundo blue butterfly were identified under Alternatives A, B, and D in association with the installation of navigational aids and service roads.

Riverside Fairy Shrimp

No Action/No Project Alternative

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, degraded wetland habitat containing Riverside fairy shrimp cysts would be retained, but could not be improved due to FAA Wildlife Hazards Management guidelines. It is anticipated that the USFWS would require that ongoing routine operations and maintenance activities in areas containing cysts be undertaken by hand and without the use of machinery that may be detrimental to cysts. However, even with these measures intended to avoid taking the cysts, the Riverside fairy shrimp would unlikely be able to complete the adult phase of its life cycle.

Alternatives A, B, C and D

Implementation of Alternatives A, B, C or D would result in the modification of 1.3 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp located within the AOA. On-site conservation of Riverside fairy shrimp within the AOA would be incompatible with FAA guidelines pursuant to 14 CFR, Section 139.337. Hazard management activities performed under these guidelines with respect to vegetation management include mowing, discing, and grading activities to ensure safety, which is in direct conflict with habitat improvements for the Riverside fairy shrimp.

The following mitigation measure has been modified since publication of the Draft EIS/EIR to reflect the results of ongoing consultation among LAWA, FAA, and USFWS regarding the mitigation ratio and potential sites for the relocation of soils containing cysts of the Riverside fairy shrimp.

♦ MM-ET-1. Riverside Fairy Shrimp Habitat Restoration (Alternatives A, B, C, and D)

LAWA or its designee shall undertake mitigation for impacts to 1.3 acres of degraded wetland habitat containing embedded cysts of Riverside fairy shrimp. Habitat occupied by embedded cysts of Riverside fairy shrimp shall be replaced at no less than two suitable alternate locations at a ratio of not more than 3:1. The FAA shall oversee the development of a Riverside Fairy Shrimp Wetland Habitat Restoration Program for the embedded cysts to ensure that the selected development alternative would be consistent with the recommendations provided in the *Recovery Plan for Vernal Pools of Southern California*.⁵⁶ LAWA or its designee, in conjunction with the USFWS, shall identify the suitable locations for the creation of high-quality habitat to which soils containing embedded cysts can be relocated.

Ongoing Section 7 consultation among LAWA, FAA, and USFWS is necessary to identify suitable mitigation sites pursuant to Section 7 of the Endangered Species Act. As a result, extensive research has been conducted to identify sites that historically or currently support vernal pools or vernal pool-associated species in southern California. Information was gathered from the *Recovery Plan for Vernal Pools of Southern California*, the California Natural Diversity Database (CNDDB), and coordination with recognized experts in the field. This information was augmented through a review of geologic maps of the coastal portions of Los Angeles and topographic quadrangles for locations known to have historically supported vernal pools. A total of 35 potential relocation sites were identified for further site characterization.

Each of the 35 sites was visited and inspected by teams of biologists and environmental analysts. Analysis of site topography, historic or extant vernal pools, historic or extant vernal pool species, drainage features, climate, and parent material (from regional geologic maps) was conducted. Hazardous materials databases were consulted for information on known potential sources of contamination for those sites. In-field soil texture analysis was conducted, followed by laboratory analysis of collected soil samples. Land use at the site and surrounding the site was characterized, plant communities were characterized, and the presence or absence of suitable hydrology was determined.

⁵⁶ United States Fish and Wildlife Service, *Vernal Pools of Southern California Recovery Plan*, U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon, 1998.

Prioritization of the potential sites for the relocation of soils containing cysts of the Riverside fairy shrimp was based solely on the presence of physical and biological characteristics provided in the *Recovery Plan for Vernal Pools of Southern California* and did not reflect planning constraints indicated by current land uses. LAWA and FAA, in consultation with the USFWS, have recommended the relocation of cysts to alternate locations within the Los Angeles County portion of the Los Angeles-Orange Management Area for vernal pools. Potential sites within the Los Angeles County portion of the Los Angeles-Orange Management Area are depicted in **Figure S6**, Vernal Pool Restoration Opportunities Considered. Should use of these sites within Los Angeles County be determined infeasible, LAWA shall evaluate the feasibility of vernal pools or vernal pool complexes located in the Orange County portion of the Los Angeles Basin-Orange Management Area and the Ventura County portion of the Transverse Management Area.

Once suitable mitigation sites are identified and secured, vernal pool creation shall be undertaken by LAWA or its designee, in consultation with the USFWS. Methods of vernal pool creation may vary depending on the physical and biological characteristics of the selected sites. LAWA or its designee, in conjunction with the USFWS and a qualified wildlife biologist, shall develop a program to monitor the progress of vernal pool creation. LAWA or its designee shall undertake the relocation of soils containing embedded cysts of Riverside fairy shrimp from the western portion of the airfield to the vernal pool mitigation sites. Soil salvage shall be undertaken from all sites containing embedded cysts of the Riverside fairy shrimp. The top 6 to 12 inches of soil containing the cysts shall be transplanted during the dry season to minimize damage to the cysts during transport. The soil shall then be deposited and spread out in small basins or pool-like areas of similar size without active mechanical compaction to minimize potential damage to the cysts. Any potential indirect environmental effects resulting from vernal pool construction activities shall be compliant with best management practices and terms and conditions stipulated by the permitting agencies.

LAWA or its designee, in conjunction with the USFWS and a qualified wildlife biologist, shall also develop a program to monitor created habitat for the presence of Riverside fairy shrimp annually for a period of not more than five years.

Implementation of Mitigation Measure MM-ET-1 would provide for replacement of 1.3 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp, with estimated habitat value of 0.15, with 3.9 acres with estimated habitat value of 0.75 (see **Table S1**, Mitigation Land Evaluation Procedure for the Mitigation Site). By relocating embedded cysts to habitat restoration sites that are managed for the existence of the species, the opportunity for embedded cysts to complete the adult phase of their life cycle would be enhanced.

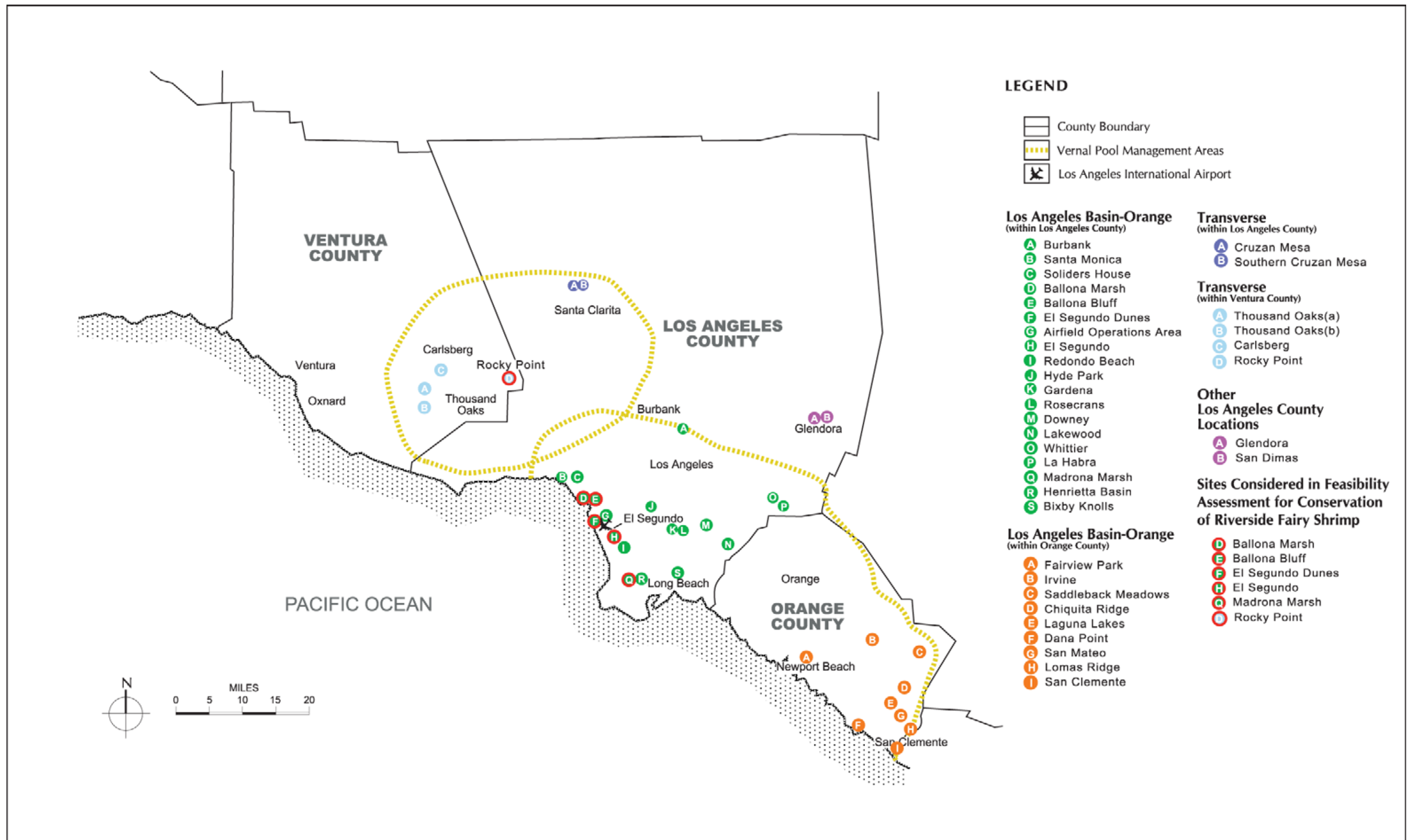


Table S1

Mitigation Land Evaluation Procedure for the Mitigation Site

	Habitat Reference Sites	Riverside Fairy Shrimp Wetland Habitat Mitigation Site
Topography/Hydrology	0.20	0.20
Mound-Depression Microrelief	0.05	0.05
Native Soils w/Slope <10%	0.05	0.05
Areas w/Period of Inundation ≥30 days	0.05	0.05
Summer Desiccation	0.05	0.05
Flora	0.20	0.20
>10% Vegetative Cover	0.05	0.05
Native Grasses >10%	0.05	0.05
Vernal Pool Associated Species	0.05	0.05
Listed Vernal Pool Associated Species	0.05	0.05
Fauna	0.20	0.15
Dominated by Native Fauna (reproducing)	0.05	0.05
Grassland-Associated Species (reproducing)	0.05	0.05
Sensitive Vernal Pool-Associated Species (reproducing)	0.05	0.05
Listed Vernal Pool-Associated Species (reproducing)	0.05	0.00
Ecosystem Functional Integrity	0.40	0.20
Contiguous w/Wetland and State-designated Sensitive Terrestrial Habitat	0.10	0.00
Under Regulatory Conservation	0.10	0.10
Variety of Pollinator/Dispersal Mechanisms Present (Wind, Wildlife)	0.10	0.10
Contiguous Native Habitat >40 acres	0.10	0.00
Total Habitat Value (HV)	1.00	0.75

Source: Sapphos Environmental, Inc. 2003

EI Segundo Blue Butterfly

No Action/No Project Alternative

As described in Appendix J1, *Biological Assessment Technical Report*, of the Draft EIS/EIR, facility improvements (including those currently under way and those scheduled for construction in support of continued growth in airport activity in the absence of the Master Plan) will be undertaken. Ongoing management and monitoring efforts are anticipated to continue within the Habitat Restoration Area. It is recommended, then, that ongoing management and monitoring efforts continue to focus on a regular and aggressive weed abatement program, annual qualitative and quantitative vegetation monitoring, and annual monitoring of the EI Segundo blue butterfly.

Alternative A and B

The following mitigation measure has been modified since publication of the Draft EIS/EIR with respect to the acreage of impact, as indicated in the Supplement to the Draft EIS/EIR.

♦ MM-ET-2. EI Segundo Blue Butterfly Conservation: Habitat Restoration (Alternatives A and B)

LAWA or its designee shall take all necessary steps to avoid the flight season of the EI Segundo blue butterfly (June 14 - September 30) when undertaking installation of navigational aids proposed under Master Plan Alternative A and B within habitat occupied by the EI Segundo blue butterfly. Installation of navigational aids within the Habitat Restoration Area should be required to take place between October 1 and May 31. The number of coast buckwheat plants impacted shall be mitigated at a ratio of 1:1, or as otherwise determined through Section 7 consultation with the USFWS. Coast buckwheat shall be planted a minimum of three years prior to the impact, not only to allow for establishment of the plants, but also to ensure that the plants are mature enough to bloom.⁵⁷ The plantings of coast

⁵⁷ The time period of three years was determined from coast buckwheat restoration efforts previously undertaken by LAWA within the Habitat Restoration Area of the Los Angeles/EI Segundo Dunes.

buckwheat shall be located within the southwest corner of subsite 23 of the Habitat Restoration Area, as depicted in Figure 4.11-7, Mitigation Site for El Segundo Blue Butterfly Relocation, of the Draft EIS/EIR. Mitigation plantings for Alternative A shall encompass 8,514 square feet (0.20 acre). Mitigation plantings for Alternative B shall encompass 2,316 square feet (0.05 acre). This area shall be the designated mitigation site for planting coast buckwheat and the site to which El Segundo blue butterfly pupae shall be relocated. Prior to navigational aid installation, a permitted and qualified biologist shall salvage El Segundo blue butterfly larvae in coordination with the USFWS to minimize impacts to the butterfly. Based on LAWA's restoration experience within the Habitat Restoration Area, occupation of restored habitat can occur within two to three years of restoration efforts. Therefore, there would be no net loss in acres or value of occupied habitat.

Alternatives A, B, C, and D

The following mitigation measure is materially the same as that identified in Section 4.11, *Endangered and Threatened Species of Flora and Fauna*, of the Draft EIS/EIR.

♦ MM-ET-3. El Segundo Blue Butterfly Conservation: Dust Control (Alternatives A, B, C, and D)

To reduce the transport of fugitive dust particles related to construction activities, soil stabilization and/or watering to reduce fugitive dust emissions during construction shall be implemented to reduce particulate matter emissions by 90 to 95 percent (Table S4.6-20, Recommended Mitigation Measures, in Section 4.6, *Air Quality* (subsection 4.6.8) of the Supplement to the Draft EIS/EIR). In addition, to the extent feasible, no grading or stockpiling for construction activities should take place within 100 feet of occupied habitat of the El Segundo blue butterfly.

Alternative D

♦ MM-ET-4. El Segundo Blue Butterfly Conservation: Habitat Restoration (Alternative D)

LAWA or its designee shall take all necessary steps to avoid the flight season of the El Segundo blue butterfly (June 14 - September 30) when undertaking installation of navigational aids and associated service roads proposed under Master Plan Alternative D within habitat occupied by the El Segundo blue butterfly. Installation of navigational aids within the Habitat Restoration Area should be required to take place between October 1st and May 31st. The number of coast buckwheat plants impacted shall be mitigated at a ratio of 1:1, or as otherwise determined through Section 7 consultation with the USFWS. Coast buckwheat shall be planted a minimum of three years prior to the impact, not only to allow for establishment of the plants, but also to ensure that the plants are mature enough to bloom.⁵⁸ The plantings of coast buckwheat shall be located within the southwest corner of subsite 23 of the Habitat Restoration Area and shall encompass 10,597 square feet (0.24 acre). As possible, depending on the location and condition of individual plants, FAA and LAWA would salvage existing coast buckwheat plants and any larvae on the plant or in the soil below the plant that would be removed to accommodate the replacement navoids to further conserve this species. These plants would be salvaged immediately prior to the installation of the replacement navoids outside of the butterfly flight season. These salvaged plants would be replanted in subsite 23 near what would be the previously established mitigation measure actions. This area shall be the designated mitigation site for planting coast buckwheat and the site to which El Segundo blue butterfly pupae shall be relocated. Prior to navigational aid installation, a permitted and qualified biologist shall salvage El Segundo blue butterfly larvae in coordination with the USFWS in order to minimize impacts to the butterfly. Based on LAWA's restoration experience within the Habitat Restoration Area, occupation of restored habitat can occur within two to three years of restoration efforts. Therefore, there would be no net loss in acres or value of occupied habitat.

⁵⁸ The time period of three years was determined from coast buckwheat restoration efforts previously undertaken by LAWA within the Habitat Restoration Area of the Los Angeles/El Segundo Dunes.

7. REFERENCES

- Abrams, Leroy. 1981. *Illustrated Flora of the Pacific States, Vol. I*. Palo Alto: Stanford University Press.
- Applegate, R. D. 1977. Possible ecological role of food caches of loggerhead shrikes. *Auk* 94:391-392.
- Arnold, R. A. 1983. Ecological studies of six endangered butterflies (*Lepidoptera: Lycaenidae*); island biogeography, patch dynamics, and the design of habitat preserves. *University of California Publications in Entomology* 99:1-161.
- Arnold, R. A. 1995. Monitoring of the Endangered El Segundo Blue Butterfly at the Chevron Refinery in El Segundo, California between July 1994 and June 1995. Annual Report for Chevron, U.S.A., Inc.
- Arnold, R. A. 1997. "Preliminary Report of El Segundo Blue Monitoring Activities at the Los Angeles International Airport in July and August 1997." Prepared for Sapphos Environmental 133 Martin Alley, Pasadena, CA 91105 and U.S. Fish and Wildlife Service, Carlsbad Field Office, 2730 Loker Ave. West, Carlsbad, CA 92008.
- Arnold, R. A. 1997. *Personal Communication*. July 15.
- Atwood, L. J. and Dennis E. Minsky. 1983. Least tern ecology at three major California breeding colonies. *Western Birds* 14(2):57-71.
- Bailey, V. 1939. The solitary lives of two little pocket mice. *Journal of Mammalogy* 20: 325-328.
- Barbour, M. G. and A. F. Johnson. 1988. "Beach and Dune," in M. G. Barbour and J. Major (eds.). *Terrestrial Vegetation of California*. California Native Plant Society.
- Barbour, M. G and J. Major, eds. 1990. *Terrestrial Vegetation of California*, New Expanded Edition. California Native Plant Society, Special Publication Number 9.
- Barnaby, R. C. 1964. Atlas of North American astragalus, Part II. *Memoirs of the New York Botanical Garden* 13: 810-812.
- Bent, A. C. 1938. Life histories of North American birds of prey (pt 2). *U.S. National Museum Bulletin* 170:1-440.
- Bent, A. C. 1950. Life histories of North American wagtails, shrikes, vireos, and their allies. *U.S. National Museum Bulletin* 197:1-411.
- Berger, A. J. Population density of alder flycatchers and common goldfinches in *Crataegus* habitats of southwestern Michigan. *Wilson Bulletin* 69: 317-322.
- Best, T. L. 1996. *Lepus californicus*. Mammalian Species No. 530. American Society of Mammalogists.
- Blair, A. P. 1947. Field observations on spadefoot toads. *Copeia* 1947:67.
- Blair, A. P. 1949. Differentiation of mating call in spadefoots, genus *Scaphiopus*. *Texas Journal of Science* 7:183-188.
- Bohall-Wood, P. 1987. Abundance, habitat use, and perch use of loggerhead shrikes in North-Central Florida. *Wilson Bulletin* 99:82-86.
- Bond, R. M. 1942. Food of the burrowing owl in western Nevada. *Condor* 44: 183.
- Bowers, M. A. 1986. Geographic comparison of microhabitats used by three heteromyids in response to rarefaction. *Journal of Mammalogy* 67(1): 46-52.
- Bragg, A. N. 1944. The spadefoot toads in Oklahoma with a summary of our knowledge of the group. *American Naturalist* 78:517-533.
- Bragg, A. N. 1945. The spadefoot toads in Oklahoma with a summary of our knowledge of the group. II. *American Naturalist*, 79:52-77.
- Bronson, F. H. and O. W. Tiemeier. 1958. Reproduction and age distribution of black-tailed jackrabbits in Kansas. *Journal of Wildlife Management* 22:409-414.
- Bronson, F. H. and O. W. Tiemeier. 1959. The relationship of precipitation and black-tailed jackrabbit populations in Kansas. *Ecology* 40:194-198.

- Brown, B. T. 1993. Bell's vireo. *The Birds of North America* 35: 1-14.
- Brown, J. W., M. A. Wier, and D. Belk. 1993. New records of fairy shrimp (Crustacea: Anostraca) from Baja California, Mexico, *The Southwestern Naturalist* 38 (4): 389-390.
- Bryant, H. C. 1911. The horned lizards of California and Nevada of the genera *Phrynosoma* and *Anota*. *University of California Publications in Zoology* 9: 1-84.
- Brylski, P. R. Erickson and D. Laabs. 1994. "Pacific pocket mouse." *Life on the Edge*. Edited by Carl G. Thelander. Santa Cruz: BioSystem Books.
- Butts, K. O. 1976. Burrowing owls wintering in the Oklahoma panhandle. *Auk* 93:510-516.
- Caffrey, C. 1998. *California Least Tern Breeding Survey*. California Department of Fish and Game. Sacramento, CA.
- California Department of Fish and Game. 1991. Southern California Coastal Sage Scrub Scientific Review Panel's Survey Guidelines.
- California Department of Fish and Game. 1995. Staff Report on Burrowing Owl Survey Protocol and Mitigation Guideline.
- California Department of Fish and Game. 1997a. Letter to Mr. Jack Graham at City of Los Angeles Department of Airports on August 13, 1997.
- California Department of Fish and Game. 1997b, 1999. *Rarefind2: California Department of Fish and Game Natural Diversity Database*. 1416 9th Street, 12th Floor, Sacramento, CA 95814.
- Cartwright, O. L. 1955. Scarab beetles of the genus *Psammodytes* in the Western Hemisphere. *Proceedings of the United States National Museum* 104(3344): 448-449.
- Chew, R. M. and A. E. Chew. 1970. Energy relationships of the mammals of a desert shrub (*Larrea tridentata*) community. *Ecological Monograph* 40:1-21.
- Chew, R. M. and B. B. Butterworth. 1964. Ecology of rodents in Indian Cove (Mojave Desert), Joshua Tree National Monument, California. *Journal of Mammalogy* 45:203-225.
- City of Los Angeles, Department of Airports. 1980. *Final Environmental Impact Report, West End Development Project-LAX East of Pershing Drive*. Prepared by Bureau of Environmental Planning.
- City of Los Angeles, Department of Airports. 1984. *Griley Freight Lines Parking Lot*, Document No. ND-037-84-A. Prepared by Bureau of Environmental Management, 1 World Way, Los Angeles, CA. 90045
- City of Los Angeles, Department of Airports. 1990. *Species Diversity and Habitat Evaluation Across the El Segundo Sand Dunes at LAX*." Prepared by R. Mattoni, H. T. Agresearch, Inc. Prepared for the Los Angeles Environmental Affairs Department, City of Los Angeles, the Board of Airport Commissioners.
- City of Los Angeles. 1998. Department of Planning, Environmental Review Section. *West Bluffs Project, Subsequent Draft Environmental Impact Report*, May.
- City of Los Angeles. May 18, 1992. Ordinance No. 167940. Establishing the Los Angeles Airport/El Segundo Dunes Specific Plan Area.
- Clark, W. R. and G. S. Innis. 1982. Forage interactions and black-tailed jackrabbit population dynamics: a simulation model. *Journal of Wildlife Management* 46:1018-1035.
- Clarke, H. 1989. *An Introduction to Southern California Birds*. Missoula: Mantec Production Company.
- Costa, W. R., K. A. Nagy and V. H. Shoemaker. 1976. Observations of the behavior of jackrabbits (*Lepus californicus*) in the Mojave Desert. *Journal of Mammalogy* 57:399-402.
- Coulombe, H. N. 1971. Behavior and population ecology of the burrowing owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor* 73:162-176.
- Craig, R. B. 1978. An analysis of the predatory behavior of the loggerhead shrike. *Auk* 95:221-234.
- Cunningham, J. D. 1966. Additional observations on the body temperature of reptiles. *Herpetologica* 22: 184-189.

- Davies, Cathleen P., Marie A. Simovich and Stacie A. Hathaway. 1997. Population genetic structure of a California endemic branchiopod, *Branchinecta sandiegonensis*. *Hydrobiologia* 359: 149-158.
- Dice, L. R. 1945. Minimum intensities of illumination under which owls can find dead prey by sight. *American Naturalist* 79: 385-416.
- Ditmars, R. L. 1936. *The Reptiles of North America*. New York: Doubleday and Company.
- Dumas, P. C. 1964. Species-pair allopatry in the genera *Rana* and *Phrynosoma*. *Ecology* 45:178-181.
- Dyar, Dr. 1903. October 16, 1902. Proceedings of the Entomological Society of Washington 5: 137.
- Earhart, C. M. and N. K. Johnson. 1970. Size dimorphism and food habits of North American owls. *Condor* 72: 251-264.
- Eckert, A. W. 1974. *The Owls of North America*. New York: Doubleday and Company.
- Ehrlich, P. R., D. S. Dobkin and O. Wheye. 1988. *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*. New York: Simon and Schuster.
- Emmel, T. C. and J. F. Emmel. 1973. The Butterflies of Southern California. Natural History Museum of Los Angeles County. *Science Series* 26:70.
- Eng, Larry L., Denton Belk and Clyde H. Eriksen. 1990. Californian anostraca: distribution, habitat and status. *Journal of Crustacean Biology* 10(2): 247-277.
- Environmental Science Associates. 1994. "Long-Term Habitat Management Plan for Los Angeles Airport/El Segundo Dunes," Prepared by Sapphos Environmental, Inc.
- Errington, P. L. and L. J. Bennett. 1935. Food habits of burrowing owls in Northwestern Iowa. *Wilson Bulletin* 47:125-128.
- Ertter, Barbara. 1993. The puzzling potentillas. *Fremontia: A Journal of the California Native Plant Society* 21(1): 25-29.
- Fall, H. C. 1932. New North American scarabaeidae, with remarks on known species. *Journal of the New York Entomological Society* 40: 183-204.
- Farrand, J. 1988. *Western Birds an Audubon Handbook*. New York: McGraw-Hill Book Company.
- FH&A (Frank Hovore and Associates). 1996. "Report of 1996 Surveys for Sensitive Arthropods at El Segundo Dunes." Prepared for Sapphos Environmental, 133 Martin Alley, Pasadena, CA 91105.
- FH&A (Frank Hovore and Associates). 1998. "LAX Dune Transects- Arthropod Diversity and Sensitive Species Inventory; Preliminary Report of Sampling to Date." Prepared for Sapphos Environmental, 133 Martin Alley, Pasadena, CA 91105.
- Federal Register. Department of the Interior. U.S. Fish and Wildlife Service. 50 CFR Part 17. 1976. "Endangered and Threatened Wildlife and Plants; Determination That Six Species of Butterflies are Endangered Species."
- Federal Register. Department of the Interior. U.S. Fish and Wildlife Service. 1994. "Endangered and Threatened Wildlife and Plants; Proposed Rule to List the San Diego Fairy Shrimp as Endangered."
- Firschein, I. L. 1950. A new record of *Spea bomifrons* from Northern Mexico and remarks on the status of the *Hammondii* group of spadefoot anurans. *Herpetologica* 6:75-77.
- Fisher, R. 1998. *Personal Communication*. April 28.
- Fitch, H. S. 1970. Reproductive cycles in lizards and snakes. *University of Kansas Natural History Museum* No. 52: 1-247.
- Fraser, J. D., and D. R. Lukkonen. 1986. The loggerhead shrike. R.L. DiSilvestro, ed. Audubon Wildlife Report 1986. New York: National Audubon Society.
- Fugate, Michael. 1993. *Branchinecta sandiegonensis*, a new species of fairy shrimp (Crustacea: Anostraca) from Western North America. *Proceedings of the Biological Society of Washington* 106(2): 296-304.

S-H. Updated Biological Assessment Technical Report

- Gaines, D. 1977. "The status of selected riparian forest birds in California. A preliminary survey and review." California Department of Fish and Game, Sacramento, CA.
- Garrett, Kimball and J. Dunn. 1981. *Birds of Southern California, Status and Distribution*. Los Angeles: Los Angeles Audubon Society.
- Glover, F. A. 1953. Summer foods of the burrowing owl. *Condor* 55: 275.
- Gonzalez, Richard J., Jeff Drazen, Stacie Hathaway, Brent Bauer and Marie Simovich. 1996. Physiological correlates of water chemistry requirements in fairy shrimps (Anostraca) from Southern California. *Journal of Crustacean Biology* 16(2): 315-322.
- Gregg, W. O. 1948. Helioid snails of the desert regions of California. *Minutes of the Conchological Club of Southern California* 81: 1-7.
- Grinnell J. and A. H. Miller. 1944. The Distribution of the Birds of California. Pacific Coast Avifauna No. 27. Lee Vining: Artemesia Press.
- Grinnell, J. 1898. Birds of the pacific slope of Los Angeles County. *Pasadena Academy of Science* 11: 1-52.
- Grinnell, J. 1933. Review of the recent mammal fauna of California. *University of California Publications in Zoology* 40: 71-234.
- Hall, E. R. 1946. *Mammals of Nevada*. Berkeley: University of California Press.
- Hall, E. R. 1981. *The Mammals of North America*. New York: John Wiley & Sons.
- Hamilton, R. A. and D. R. Willick. 1996. *The Birds of Orange County California Status and Distribution*. Irvine: Sea and Sage Press.
- Hamilton, W. J. 1941. A note on the food of the western burrowing owl. *Condor* 43: 74.
- Hansen, K. L. 1958. Breeding patterns of the Eastern spadefoot toad. *Herpetologica* 14:57-67.
- Harrison, H. H. 1978. *A Field Guide to Western Bird's Nests*. Boston: Houghton Mifflin Company.
- Hardy, Alan and Fred G. Andrews. 1986. Studies in the coleoptera of Western sand dunes. 2. Notes on Four Scarabaeidae from the Algodones Dune System. *The Coleopterists Bulletin* 40(2): 127-139.
- Haskell, H. S. and H. G. Reynolds. 1947. Growth, developmental food requirements and breeding activity of the California jackrabbit. *Journal of Mammalogy* 28:129-136.
- Hathaway, S. A., D. P. Sheehan and M. A. Simovich. 1996. Vulnerability of branchiopod cysts to crushing. *Journal of Crustacean Biology* 16(3): 448-452.
- Hathaway, Stacie A. and Marie A. Simovich. 1996. Factors affecting the distribution and co-occurrence of two Southern Californian anostracans (Branchiopoda), *Branchinecta sandiegonensis* and *Streptocephalus woottoni*. *Journal of Crustacean Biology* 16(4): 669-677.
- Hawks, D. C. 1996. "El Segundo Dunes Insect Collection." A report prepared for Sapphos Environmental, Inc.
- Heath, J. E. 1965. Temperature regulation and diurnal activity in horned lizards. *University of California Publications in Zoology* 64: 97-136.
- Hickman, J. C. (ed.). 1993. *The Jepson Manual, Higher Plants of California*. Berkeley: University of California Press.
- Hitchcock, A. S. 1941. *Manual of the Grasses of the United States, Vols. One and Two*. New York: Dover Publications Inc.
- Hitchcock, A. S. 1971. *Manual of the Grasses of the United States*. Toronto: General Publishing Company.
- Hogue, C. 1993. *Insects of the Los Angeles Basin*. Los Angeles: Natural History Museum of Los Angeles County.

- Holland, R. F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game. Sacramento, CA.
- Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California Non-Game Heritage Program. California Department of Fish and Game. Sacramento, CA.
- Hotton, N. 1955. A survey of adaptive relationships of dentition to diet in the North American iguanidae. *American Midland Naturalist* 53: 88-114.
- Huey, L. M. 1964. The mammals of Baja California, Mexico. *Transcript of the San Diego Society of Natural History* 13:85-168.
- Jameson, E. W. and Hans J. Peeters. 1988. *California Mammals*. Berkeley: University of California Press.
- Jaques, D. L., C. S. Strong, T. W. Keeney. 1996. Brown Pelican Patterns and Responses to Disturbance at Mugu Lagoon and Other Non-breeding Sites in Southern California Bight. Tucson: U.S. Department of Interior.
- Jennings, M. R. and M. P. Hayes 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game.
- Jepson, W. L. 1970. *A Manual of the Flowering Plants of California*. Berkeley: University of California Press.
- Johnsgard, P. A. 1990. *Hawks, Eagles, and Falcons of North America*. Washington D.C.: Smithsonian Institution.
- Johnson, R. D. and J. E. Anderson. 1984. Diets of black-tailed jackrabbits in relation to population density and vegetation. *Journal of Range Management* 37:79-83.
- Kaufman, K. 1996. *Lives of North American Birds*. Boston: Houghton Mifflin Company.
- Keane, K. 1998. *Personal Communication*. June.
- Kellogg, R. 1932. Notes on the spadefoot in the Western plains (*Scaphiopus hammondi*). *Herpetologica* 1:36.
- Kenagy, G. J. 1973. Daily and seasonal patterns of activity and energetics in a heteromyid community. *Ecology* 54:1201-1219.
- King, J. R. 1955. Notes on the life history of Traill's flycatcher *Empidonax traillii extimus*. *Auk* 72: 148-173.
- Lafontaine, J. D. 1985. Biosystemics of the genus *Euxoa* (Lepidoptera: Noctuidae). XVIII. Comparative biology and experimental taxonomy of the sibling species *Euxoa ridingsiana* (GRT.) and *Euxoa maimes* (SM.) *The Canadian Entomologist* 117: 481-493.
- Landry, J-F. 1991. Systematics of nearctic scythrididae (Lepidoptera: Gelechioidea): Phylogeny and classification of supraspecific taxa, with a review of described species. *Memoirs of the Entomological Society of Canada* No. 160: 1-341.
- Lane, R. S. and J. R. Anderson. 1985. Biology of autogenous horseflies native to coastal California: *Brennania hera* (Diptera: Tabanidae). *Myia* 3: 433-461.
- Lechleitner, R. R. 1958. Certain aspects of the behavior of the black-tailed jackrabbit. *American Midland Naturalist* 60:145-155.
- Lechleitner, R. R. 1959. Sex ratio, age classes and reproduction of the black-tailed jackrabbit. *Journal of Mammalogy* 40:63-81.
- Lighton, J. R. B. and L. J. Fielden. 1996. Gas exchange in wind spiders (Arachnida, Solpugidae): Independent evolution of convergent control strategies in solpugids and insects. *Journal of Insect Physiology* 42(4): 347-357.
- Lincoln, Dale. 1992. "The Ecology, Preservation, and Use of Henrietta Basin Marsh, Torrance, California (A Layman's Study)," Prepared for: The Honorable Mayor, City Council, Planning Commission, and

Parks and Recreation Commission of the City of Torrance, and the Board of Education, Torrance Unified School District.

Longhurst, W. M. 1942. The summer food of burrowing owls in Costilla County, Colorado. *Condor* 44: 281-282.

Los Angeles World Airports. 1994. *Long-term Habitat Management Plan for Los Angeles Airport/El Segundo Dunes*. Prepared for City of Los Angeles, Environmental Affairs Department. Prepared by Environmental Science Associates in association with Sapphos Environmental, Inc. and Rudolf H. T. Mattoni, Ph.D.

Marti, C. D. 1974. Feeding ecology of four sympatric owls. *Condor* 76: 45-61.

Martin, D. J. 1973a. Selected aspects of burrowing owl ecology and behavior. *Condor* 75: 446-456.

Martin, D. J. 1973b. A spectrographic analysis of burrowing owl vocalizations. *Auk* 90: 564-578.

Mattoni, R. 1990. "Species diversity and habitat evaluation across the El Segundo Dunes at LAX." Final Report prepared for the Board of Airport Commissioners, One World Way West, Los Angeles, CA 90009.

Mattoni, R. 1992. The endangered El Segundo blue butterfly. *Journal of Research on Lepidoptera* 29: 277-304.

McAlister, W. H. 1959. The vocal structures and method of call production in the genus *Scaphiopus* holbrook. *Texas Journal of Science* 11:60-77.

Mearns, E. A. 1898. Descriptions of three new forms of pocket mice from the Mexican border of the United States. *Bulletin of the American Museum of Natural History* 10: 299-302.

Meserve, P. L. 1976. Food relationships of a rodent fauna in a California coastal sage scrub community. *Journal of Mammalogy* 57:300-319.

Middlekauf, W. W. and R. S. Lane. 1980. Adult and immature tabanidae (Diptera) of California. *Bulletin of the California Insect Survey* 22: 14-17.

Millar, J. S. 1977. Adaptive features of mammalian reproduction. *Evolution* 31:370-386.

Millar, J. S. 1981. Pre-partum reproductive characteristics of eutherian mammals. *Evolution* 35:1149-1163.

Miller, A. H. 1931. Systematic revision and natural history of the American shrikes (*Lanius*). *University of California Publication Zoology* 38: 11-242.

Miller L. 1948. An enemy of the horned lizard. *Copeia* 1948: 67.

Milne, L. J. and M. J. Milne. 1950. Notes on the behavior of horned toads. *American Midland Naturalist* 44:720-741.

Montanucci, R. R. 1968. Notes on the distribution and ecology of some lizards in the San Joaquin Valley, California. *Herpetologica* 24: 316-320.

Morey, S. 1998. *Personal Communication*. April 28.

Morrison, M. L. 1980. Seasonal aspects of the predatory behavior of the loggerhead shrikes. *Condor* 82:296-300.

Muma, M. H. 1966. Burrowing habits of North American solpugida (Arachnida). *Psyche* 73 (4):251- 260.

Muma, M. H. 1967. Basic behavior of North American solpugida. *The Florida Entomologist* 50(2):115-123.

Munger J. C. 1984. Optimal foraging? Patch use by horned lizards (Iguanidae: *Phrynosoma*). *American Naturalist* 123: 654-680.

Munger J. C. 1986. Rate of death due to predation from two species of horned lizard, *Phrynosoma cornutum* and *P. modestum*. *Copeia* 1986: 820-824.

Munroe, E. 1961. Synopsis of the North American odontiinae, with descriptions of new genera and species (*Lepidoptera: Pyralidae*). *The Canadian Entomologist, Supplement* 24: 39.

- Munz, Philip A. 1974. *A Flora of Southern California*. Berkeley: University of California Press.
- Nabhan, G. P. 1985. *Gathering the Desert*. Tucson: University of Arizona Press.
- Nowak, R. M. and J. L. Paradiso. 1983. *Walker's Mammals of the World*. Baltimore: Johns Hopkins University Press.
- Osgood, W. H. 1900. Revision of the pocket mice of the genus *Perognathus*. *North American Fauna* No. 18.
- Palmer, R. S. 1988. *Handbook of North American Birds, Volume 5*. New York: Yale University Press.
- Pearson, P. G. 1955. Population ecology of the spadefoot toad, *Scaphiopus h. holbrooki* (Harlan). *Ecological Monograph* 25:233-267.
- Pearson, P. G. 1957. Further notes on the population ecology of the spadefoot toad. *Ecology* 38:580-586.
- Philip, C. B. 1966. New North American tabanidae. XVIII. New species and addenda to a nearctic catalog. *Annals of the Entomological Society of America* 59 (3): 525-527.
- Phillips, A., J. Marshall, and G. Monson. 1983. *The Birds of Arizona*. Tucson: University of Arizona Press.
- Phillips, A.R. 1986. *The Known Birds of North America: Distributions and Variation, Migration, Changes, Hybrids, etc.* Denver.
- Pianka, E. R. and W.S. Parker. 1975. Ecology of horned lizards: A review with special reference to *Phrynosoma platyrhinos*. *Copeia* 1975: 141-162.
- Pierce, D. 1975. The sand dune weevils of the genus *Trigonoscutea* with a correlation of their anatomy to the geological history of our coastlines. Estate of Dr. William D. Pierce, Los Angeles County Museum of Natural History, Los Angeles.
- Pierce, W. D. and D. Pool. 1938. The fauna and flora of the El Segundo sand dunes, *Bulletin of the Southern California Academy of Sciences* 37: 93-97.
- Pierce, W. D. 1938-1939. Field Notes from Pierce Expedition to the Los Angeles/El Segundo Dunes, on file at Natural History Museum of Los Angeles County, Department of Entomology.
- Platnick, N. 1972. Notes on the epinensis group of the crab spider genus *Ebo* (Araneae: Thomisidae). *Psyche* 79(1-2):58-60.
- Powell, J. A. 1976. A remarkable new genus of brachypterous moth from coastal sand dunes in California (Lepidoptera: Gelechioidea, Scythrididae). *Annals of the Entomological Society of America* 69(2): 325.
- Powell, J. A. and C. Hogue. 1979. *California Insects*. Berkeley: University of California Press.
- Pratt, G. 1987. "Competition as a Controlling Factor of *Euphilotes battoides allyni* Larval Abundance." *Atala* 15: 1-9.
- Pratt, G. 1994. Evolution of *Euphilotes* (Lepidoptera: Lycaenidae) seasonal and host shifts. *Biological Journal of the Linnean Society* 51:387-416.
- Pratt, G. F. and G. Ballmer. 1993. Correlations of diapause intensity of *Euphilotes* species and *Philotiella speciosa* (Lepidoptera: Lycaenidae) with host bloom period and elevation. *Annals of the Entomological Society* 86: 265-272.
- Presch, W. 1969. Evolutionary osteology and relationships of the horned lizard genus *Phrynosoma* (family Iguanidae). *Copeia* 1969: 250-275.
- Public Resources Code, Division 13, Sections 21000-21177.
- Punzo, Fred. 1993. Diet and feeding behavior of the solpugid, *Eremobates palpisetulosus* (Solpugida: Eremobatidae). *Psyche* 100: 151-162.
- Ramirez, Martin G. and Julie L. Froehlig. 1997. Minimal genetic variation in a coastal dune arthropod: The trapdoor spider *Aptostichus simus* (Cyrtaucheniidae). *Conservation Biology* 11(1): 256-259.

S-H. Updated Biological Assessment Technical Report

Raven, P. H., H. J. Thompson, and B. A. Prigge. 1986. *Flora of the Santa Monica Mountains, California*. Southern California Botanists Special Publication No. 2. Los Angeles, CA.

RECON (Patterson and Ayers).1998. *Fairy Shrimp Surveys at Los Angeles International Airport*. Prepared for Sapphos Environmental, Inc. July 1.

Remson J. V. 1978. *Bird Species of Special Concern in California*. California Department of Fish and Game, Sacramento, CA.

Rich, T. 1986. Habitat and nest-site selection by burrowing owls in the sagebrush steppe of Idaho. *Journal of Wildlife Management* 50: 548-554.

Rissing, S. W. 1981. Prey preferences in the desert horned lizard: Influence of prey foraging behavior and aggressive behavior. *Ecology* 62: 1031-1040.

Rogers, Christopher. 1999. Jones & Stokes Associates, Inc. *Personal Communications*. June 1.

Root, T. 1988. *Atlas of Wintering North American Birds*. Chicago: University of Chicago Press.

Roth, Barry and F. G. Hochberg. 1992. Two new species of *Helminthoglypta* (Gastropoda: Pulmonata) from Southern California, with comments on the subgenus *Charodotes* pilsbry. *The Veliger* 35(4): 338-346.

Sapphos Environmental, Inc. 1995. "Baseline Inventory for Small Mammals and Carnivores at the Los Angeles Airport El Segundo Dunes Restoration Project Site, Los Angeles County, CA." Prepared for Sapphos Environmental, Inc. by Mr. Steve Tabor.

Sapphos Environmental, Inc. 1995. Memorandum for the Record 1043-002.M04, dated March 7, 1995. Subject: 1995 Amphibian and Reptile Surveys at the Los Angeles International Airport El Segundo Dunes.

Sapphos Environmental, Inc. 1995. Memorandum for the Record 1043-001.M06, dated May 3, 1995. Subject: State of the Dunes and Recommendations for Management.

Sapphos Environmental, Inc. 1996. Memorandum for the Record 1043-002.M07, dated March 7, 1996. Subject: 1995 Bird Surveys at the Los Angeles International Airport El Segundo Dunes.

Sapphos Environmental, Inc. 1996a. Memorandum for the Record 1043-002.M08, dated March 4, 1996. Subject: 1995 Surveys for the El Segundo Blue Butterfly at the Los Angeles International Airport El Segundo Dunes.

Sapphos Environmental, Inc. 1996b. Memorandum for the Record 1043-002.M07, dated March 7, 1996. Subject: Results of 1995 Spring Surveys for Birds at the Los Angeles International Airport El Segundo Dunes.

Sapphos Environmental, Inc. 1996c. Memorandum for the Record 1067-001.M19, dated April 3, 1996. Subject: 1996 Breeding Birds of Prey Survey at the Los Angeles International Airport (LAX) in March of 1996.

Sapphos Environmental, Inc. 1996d. Memorandum for the Record 1067-001.M23, dated May 23, 1996. Subject: 1996 Herptofauna Surveys at the Los Angeles International Airport (LAX) in March and April of 1996 in Support of the LAX Master Plan Environmental Impact Report.

Sapphos Environmental, Inc. 1996e. Memorandum for the Record 1043-004.M01, dated October 25, 1996. Subject: 1996 ESB Numbers at LAX El Segundo Dunes.

Sapphos Environmental, Inc. 1996f. Technical Memorandum, dated November 8, 1996, Subject: Biotic Communities/Threatened and Endangered Species, Literature Review for the LAX Master Plan and EIR. Prepared for the City of Los Angeles, Department of Airports, Program Management Team, One World Way, Suite 400, Los Angeles, CA 90009-2216. Prepared by Sapphos Environmental, Inc., 133 Martin Alley, Pasadena, CA 91105.

Sapphos Environmental, Inc. 1997. Memorandum for the Record 1043-007.M02, dated November 18, 1997. Subject: Wildlife Survey of the Argo Ditch.

Sapphos Environmental, Inc. 1998. Memorandum for the Record 1067-007.M17 and 1043-008.M07, dated October 23, 1998. Subject: Results of Spring Surveys for Gastropods and Arthropods at Los Angeles International Airport 2015 Master Plan EIR/EIS.

Sapphos Environmental, Inc. 1998a. Memorandum for the Record 1067-005.M04, dated January 13, 1998. Subject: Final Report of Pacific Pocket Mouse Survey at LAX/EI Segundo Dunes in support of the LAX 2015 Master Plan Project, September 1 to 26, 1997.

Sapphos Environmental, Inc. 1998b. Memorandum for the Record 1067-007.M01, dated January 29, 1998. Subject: Winter Bird Count at EI Segundo Dunes.

Sapphos Environmental, Inc. 1998c. Results of Soil Characterization Study Jurisdictional Delineation for Vernal Pools in Support of Los Angeles International Airport Master Plan 2015 Expansion. City of Los Angeles, Los Angeles County, CA. Prepared for Landrum and Brown on February 6, 1998.

Sapphos Environmental, Inc. 1998d. Memorandum for the Record 1067-007.M08, dated March 19, 1998 (revised April 9, 1998). Subject: Results of Winter Directed Surveys for Burrowing Owl at LAX/EI Segundo Dunes in Support of the LAX 2015 Master Plan Project, February 5 to 25, 1998.

Sapphos Environmental, Inc. 1998e. Memorandum for the Record 1043-008.M02, dated June 5, 1998. Subject: Results of Spring Directed Surveys for Burrowing Owl at LAX/EI Segundo Dunes in Support of the LAX 2015 Master Plan Project, April 17 - May 27, 1998.

Sapphos Environmental, Inc. 1998f. Memorandum for the Record 1043-008.M04, dated June 17, 1998. Subject: Recommendation to Discontinue Remaining Sensitive Bird Surveys at LAX/EI Segundo Dunes in Support of the LAX 2015 Master Plan Project, June 24 - July 29, 1998.

Sapphos Environmental, Inc. 1998. Memorandum for the Record 1043-008.M06, Subject: "Results of Directed Surveys for American Peregrine Falcon, California Least Tern, Southwestern Willow Flycatcher, Least Bell's Vireo, and Loggerhead Shrike at LAX/EI Segundo Dunes," September 8.

Sapphos Environmental, Inc. 1999. "1998-1999 Vegetation Monitoring Report and Schedule for On-Going Maintenance Activities, EI Segundo Blue Butterfly Habitat Restoration Area at Los Angeles International Airport, Los Angeles, California."

Sauer, R. J. and N. Platnick. 1972. The crab spider genus *Ebo* (Araneida: Thomisidae) in the United States and Canada. *The Canadian Entomologist* 104: 35-60.

Sawyer, J. O and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento: California Native Plant Society.

Schick, R. X. 1965. The crab spiders of California (Araneida, Thomisidae). *Bulletin of the American Museum of Natural History* 129: 19-129.

Schmidt, P. J., W. C. Sherbrooke and J. O. Schmidt. 1989. The detoxification of ant (*Pogonomyrmex*) venom by a blood factor in horned lizards (*Phrynosoma*). *Copeia* 1989: 603-607.

Schoenherr, A. A. 1996. *The Herpetofauna of the San Gabriel Mountains Los Angeles County, California*. Special Publication of Southwestern Herpetologist's Society.

Scott, S. L. (ed.). 1987. *Field Guide to the Birds of North America*. Washington D.C.: National Geographic Society.

Semlitsch, R. D. and J. P. Caldwell. 1982. Effects of density on growth, metamorphosis, and survivorship in tadpoles of *Scaphiopus holbrooki*. *Ecology* 63:905-911.

Serena, M. 1982. "The Status and Distribution of the Willow Flycatcher (*Empidonax trailii*) in Selected Portions of the Sierra Nevada, 1982." California Department of Fish and Game, Sacramento. Wildlife Management Branch Administrative Report No. 82-5.

Shaw, C. E. 1952. Notes on the eggs and young of some United States and Mexican lizards. *Herpetologica* 8: 71-79.

Sherbrooke, W. C. 1991. Behavioral (predator-prey) interactions of captive grasshopper mice (*Onychomys torridus*) and horned Lizards (*Phrynosoma cornutum* and *P. modestum*). *American Midland Naturalist* 126: 187-195.

- Shields, O. 1975. "Studies on North American Philotes IV. Taxonomic and Biological Notes and New Subspecies." *Bulletin Allyn Museum* 28: 30.
- Shoemaker, V. H., K. A. Nagy and W. R. Costa. 1976. Energy utilization and temperature regulation by jackrabbits (*Lepus californicus*) in the Mojave Desert. *Physiological Zoology* 49:364-375.
- Simovich, Marie A. and Stacie A. Hathaway. 1997. Diversified bet-hedging as a reproductive strategy of some ephemeral pool anostracans (*Branchiopoda*). *Journal of Crustacean Biology* 17(1): 38-44.
- Skinner, M. W. and B. M. Pavlik. 1994. *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants*. California Native Plant Society, Sacramento, CA.
- Small, A. 1994. *California Birds: Their Status and Distribution*. Vista: Ibis Publishing Company.
- Smith H. M. 1934. Notes on some lizards of the genus *Phrynosoma* from Mexico. *Transcript of the Kansas Academy of Science* 37: 287-297.
- Smith, H. M. and E. H. Taylor. 1950. An annotated checklist and key to the reptiles of Mexico exclusive of the snakes. *United States National Museum* 199: 1-253.
- Smith, R. L. 1973. An aggressive display and related behavior in the loggerhead shrike. *Auk* 90:287-298.
- Sogge, M. K., R. M. Marshall, S. J. Sferra and T. J. Tibbotts. 1997. *A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol*. Natural Park Service Technical Report.
- Sprunt, A., 1955. *North American Birds of Prey*. New York: Harper and Brothers.
- Stebbins, R. C. 1985. A field guide to western reptiles and amphibians, 2nd Edition, revised. Boston: Houghton Mifflin.
- Stein, R. C. 1963. Isolating mechanisms between populations of Traill's flycatchers. *Proceedings of the America Philosophical Society* 107: 21-50.
- Steinhart, P. 1990. California's Wild Heritage: Threatened and Endangered Animals in the Golden State. California Department of Fish and Game, Sacramento.
- Stoddart, L. C. 1984. Site fidelity and grouping of neonatal jackrabbits, *Lepus californicus*. *Journal of Mammalogy* 65:136-137.
- Swihart, R. K. 1984. Body size, breeding season length, and life history tactics of lagomorphs. *Oikos* 43:282-290.
- Swihart, R. K. 1986. Home range - body mass allometry in rabbits and hares (*Leporidae*). *ACTA Theriologica* 31:139-148.
- Title 40, Code of Federal Regulations (CFR), Part 1500-1508.
- Tanner, V. M. 1940. A study of the genus *Scaphiopus*. *Great Basin Naturalist* 1:3-19.
- Templeton, B. C. 1938. A new species of pholisma. *Bulletin of the Southern California Academy of Sciences* 37:98-100.
- Thelander, Carl G. et al, eds. 1994. *Life on the Edge*. Santa Cruz: Biosystems Books.
- Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. *Condor* 73: 177-192.
- United States Department of Transportation. Federal Aviation Administration. *Airport Environmental Handbook*, October 8, 1985.
- United States Department of Transportation. Federal Aviation Administration. 2000. Letter to Mr. James Ritchie (LAWA). June 30.
- United States Department of Transportation. Federal Aviation Administration. Title 14, Code of Federal Regulations (CFR), Part 139, Section 139.337: Wildlife Hazard Management.
- United States Fish and Wildlife Service. 1994a. Endangered and threatened wildlife and plants: Emergency rule to list the pacific pocket mouse as endangered. *Federal Register* 59(23): 5306-5310.

- United States Fish and Wildlife Service. 1994b. Endangered and threatened wildlife and plants: Proposed rule to list the pacific pocket mouse as endangered. *Federal Register* 59(23):5311-5312.
- United States Fish and Wildlife Service. 1996. "Interim Survey Guidelines to Permittees for Recovery Permits under Section 10 (a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods." Carlsbad Field Office, Carlsbad, CA.
- United States Fish and Wildlife Service. 1997a. Letter dated July 31 to Mr. David B. Kessler, Federal Aviation Administration, U.S. Department of Transportation, P.O. Box 92007, World Way Postal Center, Los Angeles, CA 90009-2007. U.S. Fish and Wildlife Service, Carlsbad Field Office, 2730 Loker Avenue West, Carlsbad, CA 92008.
- United States Fish and Wildlife Service. 1997b. Letter dated August 29 to Mr. David B. Kessler, Federal Aviation Administration, U.S. Department of Transportation, P.O. Box 92007, World Way Postal Center, Los Angeles, CA 90009-2007. U.S. Fish and Wildlife Service, Carlsbad Field Office, 2730 Loker Avenue West, Carlsbad, CA 92008.
- United States Fish and Wildlife Service. 1997c. "El Segundo Blue Butterfly (*Euphilotes battoides allyni*) Draft Recovery Plan." Portland, OR.
- United States Fish and Wildlife Service. 1997d. "Vernal Pools of Southern California Draft Recovery Plan." U.S. Fish and Wildlife Service, Portland, OR.
- United States Fish and Wildlife Service. 1997e. "Draft Recovery Plan for the Pacific Pocket Mouse." Carlsbad Filed Office, Ecological Services, Carlsbad, CA.
- United States Fish and Wildlife Service. 1998a. "Draft Recovery Plan for the Least Bell's Vireo (*Vireo Bellii* Pusillus)." United States Fish and Wildlife Service, Portland, OR.
- United States Fish and Wildlife Service. 1998b. "Vernal Pools of Southern California Recovery Plan." United States Department of the Interior, Fish and Wildlife Service, Portland, OR.
- U. S. Fish and Wildlife Service. 1999. Letter to Hadar Plafkin. Subject: West Bluffs Project, City of Los Angeles-State Clearing House No. 97111005; Coastal Development Permit No. CDP-93-013, Project Coordinator, Department of City Planning, City of Los Angeles, from Jim A. Bartel, Assistant Field Supervisor, Carlsbad Field Office.
- Unitt, Phillip. 1984. *The Birds of San Diego County*. San Diego Society of Natural History, San Diego, CA.
- Unitt, Phillip, 1987. *Empidonax trailli extimus*: an endangered subspecies. *Western Birds* 18(3): 137-162.
- Van Denburgh, J. Herpetology of lower California. *Proceedings of the California Academy of Science* 5: 83-161.
- Van Dyke, Edwin C. 1951. New species of coleoptera from North America. *The Pan-Pacific Entomologist* XXVII(1): 27-36.
- Venkatesan and K. A. Boyle. 1999. "Analysis of Hydrocarbons and Trace Metals in the Environmental Samples in Support of Los Angeles International Airport 2015 Master Plan Expansion Project EIS/EIR." Prepared for Sapphos Environmental, Inc. June 28.
- Walkinshaw, L. H. 1966. Summer biology of Traill's Flycatcher. *Wilson Bulletin* 56: 193-205.
- Walton, B. J. 1998. California Peregrine Falcon Implementation Plan Pre-1988 Season Update.
- Wasserman, A. O. 1957. Factors affecting interbreeding in sympatric species of spadefoots (genus *Scaphiopus*). *Evolution* 11:320-338.
- Wasserman, A. O. 1958. Relationships of allopatric populations of spadefoots (genus *Scaphiopus*). *Evolution* 12:311-318.
- Wasserman, A. O. 1968. *Scaphiopus holbrooki*. Catalog of American Amphibians and Reptiles 70.1-70.4.
- Wasserman, A. O. 1970. *Scaphiopus couchii*. Catalog of American Amphibians and Reptiles 85.1-85.3.
- Watson, J. R. 1910. The impaling instinct in shrikes. *Auk* 27:459.

S-H. Updated Biological Assessment Technical Report

Weathers, W. W. 1983. *Birds of Southern California's Deep Canyon*. Berkeley: University of California Press.

Website:http://eco.bio.lmu.edu/www_nat_history/reptiles/

Website:<http://www.sysac.com/~varney/explorer/caresheets/legless.html>

Whitford, W. B. and W. G. Whitford. 1973. Combat in the horned lizard (*Phrynosoma coronatum*). *Herpetologica* 29: 191-193.

Williams, Daniel F. 1986. *Mammalian Species of Special Concern in California*. California Department of Fish and Game.

Williams, Daniel F., Hugh H. Genoways and Janet K. Braun. 1993. "Taxonomy." *Biology of the Heteromyidae*. Special Publication No. 10, The American Society of Mammalogists.

Zeiner, David C., William F. Laudenslayer, Jr., Kenneth E. Mayer and Marshall White (eds.). 1990 (November). Department of Fish and Game. Sacramento: California Statewide Wildlife Habitat Relationship Systems.