

LAX MASTER PLAN

MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

2014 ANNUAL PROGRESS REPORT



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***Los Angeles
World Airports***

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Prepared by

Los Angeles World Airports

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*Tom Bradley International Terminal and the
LAX Federal Aviation Administration (FAA) Control Tower behind it*

Disclaimer: LAWA obtained data from a variety of sources to generate this report. The reporting team did not have access to each individual primary document and thus was not able to verify all data sets fully against the source documents. Due to these limitations, it is possible that certain numbers may not be accurate.

LAX Master Plan MMRP 2014 Annual Progress Report

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Appendices:

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December 2004 – Reference LAWA Website
<http://www.lawa.org/ourLAX/AnnualReports.aspx?id=8067> for a copy of
the document
- B. MMRP (CFTP, BWP, and WAMA-specific measures)
- C. LAX El Segundo Blue Butterfly 2014 Report dated January 2015
- D. Southern Tarplant Restoration Project Fourth Annual Monitoring Report
dated October 2014

1.0 Introduction/Background

On December 7, 2004, the Los Angeles City Council certified the LAX Master Plan Final Environmental Impact Report (FEIR) and related entitlements for the future development of LAX, and adopted the LAX Master Plan Mitigation Monitoring and Report Program (MMRP).

Pursuant to Section 15097 of the California State CEQA Guidelines, the lead agency, Los Angeles World Airports (LAWA), is responsible for reporting, monitoring, and ensuring implementation of all applicable mitigation measures in accordance with the adopted MMRP. This document is the tenth annual progress report for the LAX Master Plan MMRP. This report provides a status update on applicable mitigation activities, policies, and programs that have been and are being implemented by LAWA to ensure compliance with mitigation measures identified in the LAX Master Plan FEIR.

The MMRP (reference **Appendix A**) documents all mitigation measures set forth in the LAX Master Plan FEIR as well as mitigation measures required in conjunction with environmental (i.e., CEQA) review of individual projects proposed under the Master Plan.

As a result, project-specific mitigation measures are included for the South Airfield Improvement Project (SAIP), Crossfield Taxiway Project (CFTP), Bradley West Project (BWP), and West Aircraft Maintenance Area (WAMA). Los Angeles City Council approved the SAIP and certified its FEIR on January 11, 2006, the CFTP and its FEIR on February 9, 2009, the BWP and its FEIR on October 14, 2009, and the WAMA and its FEIR on April 1, 2014. The Los Angeles City Council adopted MMRPs for the SAIP, CFTP, BWP, and WAMA to mitigate or avoid potentially significant effects on the environment during construction of these projects.

Mitigation measures are implemented, monitored, and reported on in accordance with four main categories: (1) Program plans; (2) Construction-related mitigation measures; (3) Design mitigation requirements; and (4) “Stand-alone” mitigation plans, as explained below:

- (1) Program plans are documents that address program-wide mitigation measures specified in the LAX Master Plan MMRP and provide a framework to clearly identify the mitigation measure, define the process of implementation, and establish monitoring and reporting requirements. Some of the program plans are required to update existing operating procedures within appropriate LAWA Divisions and some program plans may be required to develop new procedures and guidelines. Examples of updating existing operations include the maintenance of applicable elements of the existing Aircraft Noise Abatement Program (ANAP) or implementing a Revised Aircraft Noise Mitigation Program (ANMP). New program plans were developed to address specific mitigation measures from the MMRP, such as the Mitigation Plan for Air Quality (MPAQ) to address air quality impacts.
- (2) To mitigate or avoid potential significant impacts on the environment during construction, construction-related mitigation measures were implemented by requiring the Construction Contractors to comply with specific environmental requirements. Key areas of mitigation include reduction of traffic impacts by requiring construction deliveries not to coincide with peak traffic periods; and

- construction equipment replacements and/or retrofit for noise control and reduction of air pollution.
- (3) Some mitigation measures, such as measures to maximize use of reclaimed water, were incorporated into the design of the CFTP and BWP and will be incorporated into other LAX Master Plan projects during the design process.
 - (4) "Stand-alone" mitigation plans are specifically developed to address impacts that are not specifically linked to any one project within the LAX Master Plan.

Mitigation measures applicable to the LAX Master Plan, the BWP, and WAMA are in the process of being implemented. Mitigation measures applicable to the SAIP and CFTP (with the exception of ongoing measure MM-BC (CFTP)-1), Conservation of Floral Resources: Southern Tarplant, were implemented and the projects are now complete. The SAIP was completed in June 2008 and the CFTP was completed in May 2010.

Appendix B provides a comprehensive delineation of current project-specific mitigation measures adopted to date for Master Plan projects. **Appendix A and B** provide the most current and comprehensive delineation of Master Plan commitments and mitigation measures included within the overall MMRP.

As discussed in prior annual MMRP progress reports, implementation or completion of some LAX Master Plan mitigation measures may be affected by ongoing evaluation of alternatives to certain LAX Master Plan projects. For example, while LAWA has conducted additional separate and independent planning efforts for parts of the airport under the Specific Plan Amendment Study (SPAS), given the programmatic level evaluation of SPAS and the need for additional refinement and environmental review, no changes associated with the SPAS study have been submitted to FAA for evaluation as they are not ready for such review. FAA continues to consider the project approved in the FAA's 2005 Record of Decision (ROD) and depicted in the LAX Airport Layout Plan (ALP) to be the current plan of record. Mitigation measures contained in the SPAS report are not, therefore, included here.

The primary purpose of this report is to document and report on the status of the current and recently completed mitigation measures set forth in the LAX Master Plan MMRP. This report covers the period January 1, 2014 through December 31, 2014.

2.0 Noise

2.0.A N-1 Maintenance of Applicable Elements of Existing Aircraft Noise Abatement Program (ANAP)

The LAX Master Plan MMRP states:

“Maintenance of Applicable Elements of Existing Aircraft Noise Abatement Program. All components of the current airport noise abatement program that pertain to aircraft noise will be maintained.”

The existing Aircraft Noise Abatement Program (ANAP) at LAX currently is maintained by LAWA's Noise Management Section (NMS). The existing ANAP at LAX sets forth LAWA's noise abatement procedures for aircraft traffic, flight, and runway use. All aircraft operations at LAX must comply with FAA regulations and procedures for noise abatement and noise emission standards and with all rules, policies, procedures, resolutions, and ordinances established by the State of California, City of Los Angeles, LAWA, and LAWA's Board of Airport Commissioners relative to noise abatement. LAWA's NMS will continue to maintain the ANAP throughout implementation of the LAX Master Plan projects. Actions indicating compliance include submission of the Quarterly Report per the 2011 Variance to the County of Los Angeles. Included in each quarterly report is a short summary of actions indicating compliance with each condition of the variance, including “continue, in full force and effect, the implementation and enforcement of the.... noise abatement policies to the extent of its authority.”

Status→ Existing Policy:

LAWA has complied with this commitment by continually maintaining the existing Aircraft Noise Abatement Program (ANAP) at LAX, as well as submitting the summary report with each Quarterly Report to the County of Los Angeles, per the Variance requirement.

2.0.B MM-N-4 Update the Aircraft Noise Abatement Program Elements as applicable to adapt to the future Airfield configuration

The LAX Master Plan MMRP states:

“Update the Aircraft Noise Abatement Program Elements as applicable to adapt to the future Airfield configuration. When existing runways are relocated or reconstructed as part of the Master Plan, the aircraft noise abatement actions associated with those runways shall be modified and re-established as appropriate to assure continuation of the intent of the existing program.”

Status→ No action required at this time:

No changes to the ANAP were required during the 2014 reporting period as a result of any of the ongoing Master Plan projects.

2.0.C MM-N-5 Conduct Part 161 Study to Make Over-Ocean Procedures Mandatory

The LAX Master Plan MMRP states:

“Conduct Part 161 Study to Make Over-Ocean Procedures Mandatory. A 14 CFR Part 161 Study shall be initiated to seek federal approval of a locally-imposed Noise and Access Restriction on departures to the east during Over-Ocean Operations, or when Westerly Operations remain in effect during the Over-Ocean Operations time period.”

The Part 161 Study is a technical and legal study regarding implementation of a Noise and Access Restriction. The proposed restriction included departures between the hours of midnight and 6:30 a.m. over the communities to the east of LAX, when LAX is operating in either over-ocean operations or remains in westerly operations, and excluding times when LAX operates in easterly operations (49 U.S.C. Section 47521 et seq.). The Part 161 Study must meet the relevant requirements of the Airport Noise and Capacity Act of 1990 (ANCA) and the Part 161 regulations (14 C.F.R. Part 161).

Status→ Completed:

The Part 161 Study process encompasses three general elements including: (1) data collection and analysis to justify the LAX Proposed Restriction; (2) evaluation and explanation of the legal, environmental, and economic impacts of the proposed restriction; and (3) preparation and submittal to the FAA of the required reports and application materials. LAWA began the Part 161 Study in June 2005.

The LAX Part 161 Study was completed in September 2012. The Part 161 draft application was released on November 1, 2012 for public review, and the public comment review ended December 17, 2012. The study indicates that the LAX Proposed Restriction complies with the six statutory conditions of the Airport Noise and Capacity Act of 1990 and the Part 161 regulations. The baseline and projected fleet mix forecasts were revised to reflect the new 2013 implementation and 2018 forecast years, and received FAA approval. LAWA conducted the Public Outreach Program. A public workshop was held on November 13, 2012, and the LAX Noise Roundtable and the LAX Area Advisory Committee were briefed during their November meetings.

The application was submitted to the FAA on January 29, 2013. FAA notified LAWA by letters March 1 and March 15, 2013 that the application was incomplete, and provided some specifics related to the additional information needed to complete the application. LAWA responded in a letter to the FAA on March 28, 2013 informing the FAA that LAWA will revise and resubmit the application. LAWA completed the Application Supplement and submitted it to the FAA for review on July 2, 2013. On August 2, 2013 the FAA informed LAWA by letter that the Application Supplement was still incomplete, and provided far more specificity related to what a complete application would include. LAWA responded in a letter to the FAA on August 20, 2013 informing them that LAWA will revise and resubmit the application.

On May 9, 2014, LAWA submitted a fully revised application to the FAA. On May 22, 2014, LAWA submitted an erratum to the May 9, 2014 submission. On June 10, 2014, FAA submitted a letter to LAWA indicating that LAWA's application was determined to be administratively complete. This FAA completeness determination was not an approval or disapproval of the proposed restriction. The FAA also indicated that they would publish notice of the proposed restriction in the Federal Register as required, and that

following review of the application, public comments; they would issue a formal decision approving or disapproving the proposed restriction by November 8, 2014.

On November 8, 2014, the FAA issued its decision on LAWA's application. The FAA determined that LAWA's application for the proposed restriction met three of the six required statutory conditions. The regulations require that the proposed restriction meet all six statutory conditions, therefore, the FAA disapproved the application. The six statutory conditions and the FAA decision related to each, are:

Condition:	The proposed restriction is reasonable, non-arbitrary and non-discriminatory
FAA Response:	Not satisfied
Condition:	The proposed restriction does not create an undue burden on interstate or foreign commerce
FAA Response:	Not satisfied
Condition:	The proposed restriction maintains safe and efficient use of the navigable airspace
FAA Response:	Satisfied
Condition:	The proposed restriction does not conflict with any existing federal statute or regulation
FAA Response:	Not satisfied
Condition:	The applicant has provided adequate opportunity for public comment on the proposed restriction
FAA Response:	Satisfied
Condition:	The proposed restriction does not create an undue burden on the national aviation system
FAA Response:	Satisfied

With the formal rejection of this application by FAA, the Part 161 Study process is complete. All materials related to this application and study, and all formal communications with LAWA and FAA may be found at

<http://www.lawa.org/LAXPart161.aspx?id=7203>

2.0.D. MM-N-7 Construction Noise Control Plan

The LAX Master Plan MMRP states:

“Construction Noise Control Plan. *A Construction Noise Control Plan will be prepared to provide feasible measures to reduce significant noise impacts throughout the construction period for all projects near noise sensitive uses. For example, noise control devices shall be used and maintained, such as equipment mufflers, enclosures, and barriers. Natural and artificial barriers such as ground elevation changes and existing buildings may be used to shield construction noise.”*

BWP Status→ Completed**WAMA Status→ Ongoing:**

No construction occurred within 600 feet of any noise-sensitive uses during the 2014 reporting period. Therefore, a construction noise control plan was not required in the 2014 reporting period.

2.0.E. MM-N-8 Construction Staging

The LAX Master Plan MMRP states:

“Construction Staging. *Construction operations shall be staged as far from noise-sensitive uses as feasible.”*

BWP Status→ Completed**WAMA Status→ Ongoing:**

Staging for the WAMA project (including both the WAMA and Qantas hangar components) is located in an existing LAX construction-staging area near the southwest corner of the airport, south of World Way West and east of Pershing Drive. This area is located away from noise-sensitive uses and has been used for construction staging for many years.

2.0.F. MM-N-9 Equipment Replacement

The LAX Master Plan MMRP states:

“Equipment Replacement. *Noisy equipment shall be replaced with quieter equipment (for example, rubber tired equipment rather than track equipment) when technically and economically feasible.”*

BWP Status→ Completed**WAMA Status → Ongoing:**

Some construction equipment, such as dump trucks and front loaders, is rubber-tired. Other equipment, such as dozers and excavators, is required to be tracked equipment due to site requirements and to ensure safety. Construction equipment is well-maintained, which reduces noise.

2.0.G. MM-N-10 Construction Scheduling

The LAX Master Plan MMRP states:

“Construction Scheduling. *The timing and/or sequence of the noisiest on-site construction activities shall avoid sensitive times of the day, as feasible (9 p.m. to 7 a.m. Monday-Friday; 8 p.m. to 6 a.m. Saturday; anytime on Sunday or Holidays).”*

BWP Status→ Completed**WAMA Status→ Ongoing:**

Construction activity did not occur during restricted hours during the 2014 reporting period.

2.0.H. MM-N-11 Automated People Mover (APM) Noise Assessment and Control

The LAX Master Plan MMRP states in part:

“Automated People Mover (APM) Noise Assessment and Control Plan. In conjunction with detailed design and engineering of the proposed APM systems, a noise control plan shall be prepared specifying noise attenuation measures to reduce APM noise levels at the two significantly impacted hotels to acceptable level (i.e. less than 67 dBA [A-weighted decibels] Community Noise Equivalency Level [CNEL] for the Courtyard by Marriott and the Four Points Sheraton).”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because LAWA had not entered into the engineering or design phases of the APM Project. LAWA initiated the environmental and preliminary planning analysis for the Landside Access Modernization Program (LAMP), and project description was prepared for the Notice Of Preparation (NOP), which was anticipated to be released in 2015.

3.0 Land Use**3.0.A LU-1 Incorporation of City of Los Angeles Ordinance No. 159,526 (Q) Zoning Conditions for LAX Northside into the LAX Northside/Westchester Southside Project**

The LAX Master Plan MMRP states in part:

“Incorporation of City of Los Angeles Ordinance No. 159,526 (Q) Zoning Conditions for LAX Northside into the LAX Northside/Westchester Southside Project. To the maximum extent feasible, all [Q] Conditions (Qualifications of Approval) from City of Los Angeles Ordinance No. 159,526 that address the Northside project area will be incorporated by LAWA into a new LAX Zone/LAX Specific Plan for the LAX Northside/Westchester Southside project.”

Status→ Completed:

The LAX Specific Plan, adopted by the City Council in December, 2004, established the LAX Northside as a distinct land use designation and added the LAX-N Zone to the Los Angeles Municipal Code. The LAX Northside Plan section was updated and Environmental Impact Report (EIR) and LAX Specific Plan Update released in May 2014, the Final EIR was released December 2014, and was scheduled for approval by the City Planning Commission, Los Angeles County Airport Land Use Commission, and the Los Angeles City Council Planning and Land Use Committee, and City Council in 2015.

3.0.B LU-2 Establishment of a Landscape Maintenance Program for Parcels Acquired due to Airport Expansion

The LAX Master Plan MMRP states:

“Establishment of a Landscape Maintenance Program for Parcels Acquired due to Airport Expansion. Land acquired and cleared for airport development will be fenced, landscaped, and maintained regularly until the properties are actually developed for airport purposes.”

Status→ Plan Established, Implementation Ongoing:

The LAX Street Frontage and Landscape Development Plan (LDP) was completed in March 2005 and addresses landscaping requirements for parcels acquired under the LAX Master Plan. This measure was not applicable during the 2014 reporting period as LAWA did not acquire any Alternative D parcels in 2014.

3.0.C LU-4 Neighborhood Compatibility Program

The LAX Master Plan MMRP states in part:

“Neighborhood Compatibility Program. Ongoing coordination and planning will be undertaken by LAWA to ensure that the airport is as compatible as possible with surrounding properties and neighborhoods.”

Status→ In Progress:

LAWA, through its Stakeholder Liaison Office, consults with the neighboring communities on all Master Plan projects. Other projects subject to the LAX Plan Compliance Review (LAX Specific Plan Section 7) also must have community input before approval. Conditions of development along the northern and southern boundaries of the airport property include, but are not limited to, setbacks, buffer zones and landscaping.

3.0.D LU-5 Comply with City of Los Angeles Transportation Element Bicycle Plan

The LAX Master Plan MMRP states in part:

“Comply with City of Los Angeles Transportation Element Bicycle Plan. LAWA will comply with bicycle policies and plans in the vicinity of LAX, most notably those outlined in the City of Los Angeles Transportation Element Bicycle Plan and the General Plan Framework, including Pershing Drive, Sepulveda Boulevard, and Aviation Boulevard.”

Status→ Ongoing:

The City of Los Angeles approved the latest Bicycle Master Plan (independent of LAWA) in March 2011. The Plan includes streets that are expected to have bike routes and bike lanes in the future. LAWA used the information in the Los Angeles Bicycle Master Plan when considering off-airport mitigations for the Specific Plan Amendment Study. LAWA is in compliance with the Plan.

3.0.E MM-LU-1 Implement Revised Aircraft Noise Mitigation Program

The LAX Master Plan MMRP states:

“Implement Revised Aircraft Noise Mitigation Program. LAWA shall expand and revise the existing Aircraft Noise Mitigation Program (ANMP) in coordination with affected neighboring jurisdictions, the State, and the FAA. The expanded Program shall mitigate land uses that would be rendered incompatible by noise impacts associated with implementation of the LAX Master Plan, unless such uses are subject to an existing aviation easement and have been provided with noise mitigation funds. LAWA shall accelerate the ANMP's timetable for achieving full compatibility of all land uses within the existing noise impact area pursuant to the requirements of the California Airport Noise Standards (California Code of Regulations, Title 21, Subchapter 6) and current Noise Variance. With the exception of a possible new interior noise level standard for schools to be established through the study required by Mitigation Measure MM-LU-3, Conduct Study of the Relationship Between Aircraft Noise Levels and the Ability of Children to Learn, the relevant performance standard to achieve compatibility for land uses that are incompatible due to aircraft noise (i.e., residences, schools, hospitals and churches) is adequate acoustic performance (sound insulation) to ensure an interior noise level of 45 CNEL or less. As an alternative to sound insulation, incompatible property may also achieve compatibility if the incompatible use is converted to a noise-compatible use.

LAWA shall revise the ANMP to incorporate new, or expand existing measures, including, but not necessarily limited to, the following:

- Continued implementation of successful programs to convert existing incompatible land uses to compatible land uses through sound insulation of structures and the acquisition and conversion of incompatible land use to compatible land use.
- Ongoing monitoring and provision of annual updates in support of the requirements of the current LAX Noise Variance pursuant to the California Airport Noise Standards, with the updates made available (upon request) to affected local jurisdictions, the Airport Land Use Commission of Los Angeles County, and other interested parties.
- Continue the current pre- and post-insulation noise monitoring to ensure achievement of interior noise levels at or below 45 CNEL.
- Accelerated rate of land use mitigation to eliminate noise impact areas in the most timely and efficient manner possible through:
 - Increased annual funding by LAWA for land use mitigation;
 - Reevaluating aviation easements requirements with sound insulation mitigation;
 - Provision by LAWA of additional technical assistance, where needed, to local jurisdictions to support more rapid and efficient implementation of their land use mitigation programs;

- *Reduction or elimination, to the extent feasible, of structural and building code compliance constraints to mitigation of sub-standard housing.*
- *Revised criteria and procedures for selection and prioritization of properties to be sound insulated or acquired in consideration of the following:*
 - *Insulation or acquisition of properties within the highest CNEL measurement zone;*
 - *Acceleration of the fulfillment of existing commitments to owners wishing to participate within the current ANMP boundaries prior to proceeding with newly eligible properties;*
 - *Insulation or acquisition of incompatible properties with high concentrations of residents or other noise-sensitive occupants such as those housed in schools or hospitals.*
- *Amend the ANMP to include libraries as noise-sensitive uses eligible for aircraft noise mitigation.*
- *Upon completion of the acquisition and/or soundproofing commitment under the current Program, expand the boundaries of the ANMP as necessary over time. LAWA will continue preparing quarterly reports that monitor any expansion of the 65 CNEL noise contours beyond the current ANMP boundaries. Based upon these quarterly reports, LAWA will evaluate and adjust the ANMP boundaries, periodically as appropriate, so that as the 65 CNEL noise contours expand, residential and noise sensitive uses newly impacted by 65 CNEL noise levels would be included within the Program.”*

The Aircraft Noise Mitigation Program (ANMP) describes the ongoing efforts by LAWA to convert existing incompatible land uses surrounding LAX to compatible land uses through the implementation of two noise mitigation strategies: (1) sound insulation of structures; and (2) acquisition of property followed by the conversion of its incompatible land use to compatible land use (land recycling).

LAWA implements the ANMP in an effort to reduce adverse impacts of airport noise and achieve airport standards as set forth in Chapter 6 of Title 21 of the California Code of Regulations. ANMP reports are also specifically required by the State of California as a formal condition of approval of the three-year variances granted by the State to LAWA airports that have not achieved land use compatibility. Based on current data and funding commitments, the ANMP documents the progress made toward achieving land use compatibility and projects the ultimate date when full compatibility will be reached.

Status→ In Progress:

As described above, LAWA has an existing program in place with periodic updates to the State of California and the County of Los Angeles. In addition, specific updates are as follows:

- LAWA continues to implement two programs to convert existing incompatible land uses to compatible land uses through sound insulation of structures (LAWA's LAX Soundproofing program) and the acquisition and conversion of

incompatible land use to compatible land use (LAWA's Residential Acquisition program). The LAX Soundproofing program completed the final phase of the program in 2014.

- Annual updates in support of the requirements of the current LAX Noise Variance pursuant to the California Airport Noise Standards are submitted with the Quarterly Report for the second quarter each year, with the updates provided to all affected jurisdictions, and made available upon request to other interested parties.
- Pre- and post-insulation noise monitoring audits are regularly conducted to ensure achievement of interior noise levels at or below 45 CNEL.
- Land use mitigation programs are being implemented as quickly as possible given that participation in the programs is voluntary.
- LAWA makes available land use mitigation funds as soon as the jurisdiction has met all program requirements and upon approval of the Board of Airport Commissioners (BOAC).
- Avigation easements are no longer required for sound insulation, except for limited circumstances. Avigation easements are still required for land acquisition using LAWA funds.
- Under very limited circumstances, as required by California Airport Noise Standards where acoustical treatments alone are insufficient to convert residential land uses to compatible uses with airport operations, noise easements are required for residential sound insulation mitigation.
- LAWA makes available the resources for timely technical assistance, where needed, to local jurisdictions to support more rapid and efficient implementation of their land use mitigation programs.
- Selection of and prioritization of properties to be sound insulated or acquired are in consideration of the following:
 - a. Insulation or acquisition of properties within the highest CNEL measurement zone.
 - b. Acceleration of the fulfillment of existing commitments to owners wishing to participate within the current ANMP boundaries prior to proceeding with newly eligible properties.

3.0.F MM-LU-2 Incorporate Residential Dwelling Units Exposed to Single Event Awakenings Threshold into Aircraft Noise Mitigation Program

The LAX Master Plan MMRP states:

“Incorporate Residential Dwelling Units Exposed to Single Event Awakenings Threshold into Aircraft Noise Mitigation Program. In addition to any restrictive measures that may be implemented resulting from completion of Mitigation Measure MM-N-5, Conduct Part 161 Study to Make Over-Ocean Departure Procedures Mandatory, the boundaries of the ANMP will be expanded to include residential uses newly exposed to single event exterior nighttime noise levels of 94 dBA SEL, based on the Master Plan alternative that is ultimately approved and periodic reevaluation and adjustments by LAWA. Uses that are newly exposed would be identified based on annual average conditions as derived from the most current monitored data.”

Status→ In Progress:

All of the newly impacted areas, by definition, would be outside of the 65 CNEL area as defined by the ANMP. Therefore, they will be prioritized after the completion of the current residential program. As part of the standard Variance requirements, annual ANMP progress reports and periodic ANMP report updates will continue to be submitted to the County of Los Angeles.

3.0.G MM-LU-3 Conduct Study of the Relationship Between Aircraft Noise Levels and the Ability of Children to Learn

The LAX Master Plan MMRP states:

“Conduct Study of the Relationship Between Aircraft Noise Levels and the Ability of Children to Learn. Current studies of aircraft noise and the ability of children to learn have not resulted in the development of a statistically reliable predictive model of the relative effect of changes in aircraft noise levels on learning. Therefore a comprehensive study shall be initiated by LAWA to determine what, if any, measurable relationship may be present between learning and the disruptions caused by aircraft noise at various levels. An element of the evaluation shall be the setting of an acceptable replacement threshold of significance for classroom disruption by both specific and sustained aircraft noise events.”

Status→ In Progress:

The Transportation Research Board’s (TRB’s) Airport Cooperative Research Program (ACRP) completed the study entitled “Evaluating the Impact of Aviation Noise on Learning.” A panel created by the TRB, including one LAWA staff member, defined the scope and objectives of the study, selected the contractor to perform the work, evaluated the work, and reviewed and commented on the draft and final reports.

The objectives of the ACRP study were to determine when aircraft noise impacts student learning and what noise metric(s) best defines impact on learning. The contractor was hired by ACRP in 2010 to perform the study, and the study was finalized by ACRP and TRB staff. The study included a recommendation for follow-on research, including specific case studies.

A follow-on research project has been funded by ACRP in the amount of \$600,000, and is entitled Assessing Aircraft Noise Conditions Affecting Student Achievement – Case Studies (Case Studies research). The objectives of the Case Studies research are to (1) develop and implement a rigorous case study methodology to identify and measure those factors at the individual classroom, student, and teacher level that influence the impact of aircraft noise on student achievement, especially as it relates to reading comprehension; (2) identify appropriate metrics that define the level and characteristics of aircraft noise that impact student achievement; and (3) develop practical guidance for use by decision makers on how to reduce the impact of aircraft noise on student achievement.

Similar to the first study, the panel for the Case Studies research includes one LAWA staff member, and has already defined the scope of work and objectives of the study as stated above. In February of 2014, the panel selected the contractor to perform the study, and the project commenced in May of 2014. During 2014, the panel reviewed the proposed research plan, and approved the research plan including the selection of schools to be included in the research. The data collection, data analysis, and draft report preparation will take place in 2015, and the final report is scheduled for completion in early 2016.

Upon completion of these studies, LAWA will assess the conclusions of the studies against the goal of setting an acceptable threshold of significance for classroom disruption by both specific and sustained aircraft noise events. If the goals are met, then further study will not be necessary. If the goals are not met, or only partially met, then LAWA will assess the need for additional study, as required.

3.0.H MM-LU-4 Provide Additional Sound Insulation for Schools Shown by MM-LU-3 to be Significantly Impacted by Aircraft Noise

The LAX Master Plan MMRP states:

“Provide Additional Sound Insulation for Schools Shown by MM-LU-3 to be Significantly Impacted by Aircraft Noise. Prior to completion of the study required by Mitigation Measure MM-LU-3, Conduct Study of the Relationship Between Aircraft Noise Levels and the Ability of Children to Learn, and within six months of the commissioning of any relocated runways associated with implementation of the LAX Master Plan, LAWA shall conduct interior noise measurements at schools that could be newly exposed to noise levels that exceed the interim LAX interior noise thresholds for classroom disruption of 55 dB Lmax, 65 dB Lmax, or 35 Leq(h), as presented in Section 4.1 Noise, of the Final EIS/EIR. All school classroom buildings (except those within schools subject to an aviation easement) that are found through the noise measurements to exceed the interim interior noise thresholds, as compared to the 1996 baseline conditions presented in the Final EIS/EIR, would become eligible for soundproofing under the ANMP.

Upon completion of the study required by Mitigation Measure MM-LU-3 and acceptance of its results by peer review of industry experts, any schools found to exceed a newly established threshold of significance for classroom disruption based on comparison with 1996 baseline conditions due to implementation of the LAX Master Plan, shall be eligible for participation in the ANMP administered by LAWA, unless they are subject to an

existing aviation easement. A determination of which schools become eligible will be made following application of the new threshold based on measured data.”

Status→ No action required at this time:

LAWA will implement this measure's requirements contingent on the results from the study required by MM-LU-3. It should be noted that there is ongoing work related to settlement agreements that were reached between LAWA and both the Inglewood Unified and Lennox School Districts. LAWA actively is assisting each school district in its efforts to mitigate the impacts to schools, per those agreements.

On July 9, 2008 LAWA submitted a letter to the FAA asking that a determination be made related to which schools are impacted. On August 24, 2009 the FAA responded to LAWA by letter with information that this determination will be made as part of the Passenger Facility Charge (PFC) application process. LAWA is proceeding with the PFC application pending information from each school district sufficient for the FAA to make such a determination.

On October 2, 2008, Congress enacted Public Law 110-337, which made noise mitigation for certain schools located within the LAX noise impact area in both the Lennox School District (LSD) and the Inglewood Unified School District (IUSD) eligible for PFC funding regardless of an easement.

Lennox School District

On January 10, 2011, the BOAC authorized LAWA to submit the PFC application to the FAA for authorization to collect and use PFC funds to sound insulate impacted schools in the Lennox School District (the District), with the application submitted to FAA on February 2, 2011.

On May 2, 2011 the FAA issued the Final Agency Decision (FAD) finding the schools in LSD to be “significantly impacted and adversely affected by aircraft noise,” and authorized the expenditure of up to \$34,089,058 in PFC funds to insulate the schools listed in the Settlement Agreement between LAWA and LSD.

On September 19, 2011 BOAC approved the Letter of Agreement between LAWA and LSD, and authorized the release of \$10 million to LSD for the first year of the sound insulation program. The funds were delivered to LSD on December 12, 2011.

In September 2012, sound attenuation work was completed for the Animo Leadership High School, the District's charter school under the management of Green Dot.

In September 2013, the District sent LAWA a written request to remove Lennox Fine and Performing Arts Academy from the list of approved new schools to be mitigated. The school will not be built by the District.

In April 2014, the sound attenuation portion of Jefferson ORG was completed (ORG stands for Overcrowding Relief Grant). New construction is continuing at this location on the site north of Jefferson Elementary and is expected to be completed in 2015.



Jefferson Elementary School, October 2014
Construction of new section of the school

On June 2, 2014, LAWA authorized \$10 million for the Second Work Plan and released \$4,079,000 as the first installment. This Second Work Plan focuses on existing Jefferson Elementary and Buford Elementary Schools. Sound attenuation plans for both of these schools were submitted to the Division of State Architect (DSA), and the District is awaiting their approval.

In September 2014, Lennox Middle School's construction was deemed 99 percent complete with just a few punch list items remaining.

In October 2014, construction of Felton Elementary School was completed.



Felton Elementary School, September 2014
New double-paned windows and solid doors

Inglewood Unified School District (IUSD)

LAWA worked with the IUSD and the FAA to complete the PFC application process requesting authorization to use PFC funding for sound insulation of impacted schools for the IUSD. The PFC application was submitted to the FAA on August 19, 2013 for \$64 million dollars which would attenuate seven schools plus the Child Development Center at Woodward Elementary.

In October, 2014, the FAA issued the Final Agency Decision (FAD) for the Inglewood Unified School District, finding the schools to be “significantly impacted”. The FAA approved \$44,378,659 to fund sound attenuation projects in the IUSD with PFC funds. The Los Angeles International Airport will collect PFC funds to pay for the sound attenuation of five campuses and the Child Development Center at Woodworth. Two schools, Inglewood High School and Hudnall Elementary, are located outside the 65 dB of the FAA-approved noise contour and were not approved for PFC funding by FAA. The schools/campuses approved for sound attenuation are as follows:

- Morningside High School
- Oak Street Elementary School
- Payne Elementary School
- Woodworth Elementary School
- Monroe Middle School
- Child Development Center at Woodworth Elementary

In 2014, LAWA worked with IUSD to develop their First Work Plan which will outline which schools are scheduled for design and construction phases first. Once the Work Plan is received and approved, LAWA will request authority from the BOAC to release the first \$10 million allocation.

3.0.I MM-LU-5 Upgrade and Expand Noise Monitoring Program

The LAX Master Plan MMRP states:

“Upgrade and Expand Noise Monitoring Program. LAWA shall upgrade and expand its existing noise monitoring program in surrounding communities through new system procurement, noise monitor location, and equipment installation. Permanent or portable monitors shall be located in surrounding communities to record noise data 24 hours per day, seven days per week for correlation with FAA radar data to cross-reference noise episodes with flight patterns. The upgraded system will support LAWA and other jurisdictional ANMP’s when considering adjustments to airport noise mitigation boundaries.”

Status→ Completed:

On February 4, 2010, CalTrans approved LAWA’s Noise Monitoring Plan for LAX, Ontario, and Van Nuys airports that included the upgraded and expanded Aircraft and Noise Monitoring and Management System (ANMMS). The system is fully functional at this time.

As part of the new system design, LAWA replaced all of the actual noise monitoring equipment located throughout the communities impacted by LAX operations. LAWA installed many new permanent noise monitors to better represent the actual noise levels in different areas, including areas well outside of the current 65 dB CNEL Noise Impact Area. A total of 39 noise monitors have been installed at LAX and all are operational. These monitors all are permanent sites, and will be collecting data continuously. Data from each site is downloaded nightly into the Airport Noise and Operations Monitoring System (ANOMS), and processed with the flight data to determine the noise levels

associated with airport operations. The data then is used to calculate the annual noise levels represented in the State-required Quarterly Reports.

4.0 Surface Transportation (On-Airport)

4.0.A ST-2 Non-Peak CTA Deliveries

The LAX Master Plan MMRP states:

“Non-Peak CTA Deliveries. *Deliveries to the CTA terminal reconstruction projects will be limited to non-peak traffic hours whenever possible.”*

Status→ Ongoing:

LAWA established the Coordination and Logistic Management (CALM) team. Working in cooperation with LAWA staff including Terminal Operations, Airport Police, Capital Programming and Planning Group, and the Commercial Development Group, the CALM team monitors construction traffic, coordinates lane and roadway closures and analyzes traffic conditions to determine the need for additional traffic controls, lane restriping and traffic signal modifications. An approval process for proposed construction work has been established in which contractors submit request forms describing the work, when the work is proposed to take place, duration, coordination efforts with other projects, etc. If pedestrian or vehicular traffic will be impacted, the submittal form will include proposed traffic control plans. These requests are reviewed by staff from the CALM team and various LAWA divisions, and any concerns are addressed prior to approval. The CALM team also develops an informational campaign for construction activities, including wayfinding signage for pedestrians to locate ground transportation facilities and parking during construction, information for commercial shuttle drivers regarding lane closures and detours, and traffic alerts on LAWA's website for the public and airport employees. Weekly meetings occur to discuss minimizing the construction impacts of current and future projects.

Deliveries that required lane closures in the Central Terminal Area (CTA) were reviewed by LAWA staff and the CALM team. Restrictions were imposed, whenever possible, to limit these deliveries during certain times of the day or certain days of the week depending on anticipated traffic impacts.

4.0.B ST-7 Adequate GTC, ITC, and APM Design

The LAX Master Plan MMRP states:

Adequate GTC, ITC, and APM Design. *LAWA will ensure that the surface transportation system and curbfront for the GTC and ITC, commercial vehicle staging areas, and APM systems will be designed to adequately accommodate all forecast vehicular activity through 2015.*

Status→ Ongoing:

On September 2013, the Los Angeles Board of Airport Commissioners awarded a project management and planning services contract to MAPLAX, a joint venture, in the

amount of \$2,850,000 for the first year, and subsequently on September 18, 2014, awarded a Professional Services contract to provide environmental consulting from Ricondo and Associates, in the amount of \$3,251,400 for a Landside Access Modernization Program that could include a new Automated People Mover that would connect the airline terminals with a Consolidated Rental Car Facility, multiple locations for passenger pick-up and drop-off, and Metro's planned Crenshaw Line station at 96th Street/Aviation Boulevard. The plan is designed to relieve congestion in the CTA as well as on local streets surrounding the airport.

4.0.C ST-8 Limited Short-Term Lane Closures

The LAX Master Plan MMRP states:

“Limited Short-Term Lane Closures. *When construction of any new ramps at the Century Boulevard/Sepulveda Boulevard interchange or construction for the GTC, ITC, or APM elevated structures require short-term lane closures, the lane closures will be for as brief a period as practical, with a goal that closures would principally be scheduled for non-peak periods.”*

Status→ No action required at this time:

No new ramps at the Century Boulevard/Sepulveda Boulevard interchange were constructed in 2014, and the Ground Transportation Center (GTC), Intermodal Transportation Center (ITC), and the APM were not under construction in 2014.

4.0.D MM-ST-1 Require CTA Construction Vehicles to Use Designated Lanes

The LAX Master Plan MMRP states:

“Require CTA Construction Vehicles to Use Designated Lanes. *Whenever feasible, construction vehicles shall be restricted to designated roadways or lanes of traffic on CTA roadways adjacent to the existing close-in parking, thus limiting the mix of construction vehicles and airport traffic.”*

Status→ Ongoing:

LAWA established the CALM team. Working in cooperation with LAWA staff including Terminal Operations, Airport Police, Capital Programming, Planning and Engineering Group, and Commercial Development Group, the CALM team monitors construction traffic, coordinates lane and roadway closures and analyzes traffic conditions to determine the need for additional traffic controls, lane restriping and traffic signal modifications. An approval process for proposed construction work has been established in which contractors submit request forms describing the work, when the work is proposed to take place, duration, coordination efforts with other projects, etc. If pedestrian or vehicular traffic will be impacted, the submittal form will include proposed traffic control plans. These requests are reviewed by staff from the CALM team and various LAWA divisions, and any concerns are addressed prior to approval. The CALM team also develops an informational campaign for construction activities, including wayfinding signage for pedestrians to locate ground transportation facilities and parking during construction, information for commercial shuttle drivers regarding lane closures

and detours, and traffic alerts on LAWA's website for the public and airport employees. Weekly meetings occur to discuss minimizing the construction impacts of current and future projects.

Deliveries that required lane closures in the CTA were reviewed by LAWA staff and the CALM team. Restrictions were imposed, whenever possible, to limit these deliveries during certain times of the day or certain days of the week depending on anticipated traffic impacts.

4.0.E MM-ST-2 Modify CTA Signage

The LAX Master Plan MMRP states:

“Modify CTA Signage. *During construction, additional signage will be installed, as required, to separate construction traffic from non-construction traffic to the extent feasible.”*

Status→ Ongoing:

LAWA's CALM team works in cooperation with LAWA staff including Terminal Operations, Airport Police, Capital Programming, Planning and Engineering Group, and Commercial Development Group, to monitor construction traffic, coordinate lane and roadway closures and analyze traffic conditions to determine the need for additional traffic controls, lane restriping and traffic signal modifications. An approval process for proposed construction work has been established in which contractors submit request forms describing the work, when the work is proposed to take place, duration, coordination efforts with other projects, etc. If pedestrian or vehicular traffic will be impacted, the submittal form will include proposed traffic control plans. These requests are reviewed by staff from the CALM team and various LAWA divisions, and any concerns are addressed prior to approval. The CALM team also develops an informational campaign for construction activities, including wayfinding signage for pedestrians to locate ground transportation facilities and parking during construction, information for commercial shuttle drivers regarding lane closures and detours, and traffic alerts on LAWA's website for the public and airport employees. Weekly meetings occur to discuss minimizing the construction impacts of current and future projects.

In 2014, LAWA staff and the CALM team reviewed and approved worksite traffic control plans for construction projects within the CTA. These worksite traffic control plans include the need for additional and modified signage.

4.0.F MM-ST-3 Develop Designated Shuttle Stops for Labor Buses and ITC-CTA Buses

The LAX Master Plan MMRP states:

“Develop Designated Shuttle Stops for Labor Buses and ITC-CTA Buses. *Develop shuttle stops for labor buses (i.e. buses carrying construction workers) and the ITC-CTA shuttle buses at the CTA arrivals level. All ITC-CTA shuttle buses will be routed to these*

lower level (arrivals) curb areas. These buses will not circulate through the upper level (departures) curbside.

Status→ No action required at this time:

There were no LAX Master Plan projects that required labor or shuttle buses for construction workers in the CTA in 2014.

4.0.G MM-ST (BWP)-2 Improve the Intersection of Center Way and World Way South

The Bradley West Project MMRP states in part:

“Improve the Intersection of Center Way and World Way South. Widen World Way South approach on the east side of the roadway to provide an additional right turn lane. The resulting configuration would be a single left turn lane, one through-left turn lane, two through lanes, and two right turn lanes.”

Status→ In Progress:

In 2014, this project was awarded for construction. The project was scheduled to begin construction in the first quarter of 2015.

4.0.H MM-ST (BWP)-3 Widen World Way Across from TBIT

The Bradley West Project MMRP states:

“Widen World Way Across from TBIT. Widen the arrivals-level outer roadway across from TBIT by changing the left-most lane that currently terminates at Center Way to a through/left lane and extending this lane to World Way South.”

Status→ Completed:

This improvement was completed in June 2013 as part of the Central Utility Plant upgrade.

4.0.I MM-ST (BWP)-12 Distribution of Contractor Employee Parking between the Northwest Construction Staging/Parking Area and the East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area

The Bradley West Project MMRP states in part:

“Distribution of Contractor Employee Parking between the Northwest Construction Staging/Parking Area and the East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area. General parking for Bradley West Project contractor employees within the Northwest Construction Staging/Parking Area and within the East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area shall be distributed such that neither the northwest area (i.e., Northwest Construction Staging/Parking Area) or the east/southeast area (i.e., East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area) is assigned parking for more than 601 vehicles.”

BWP Status→ Completed

5.0 Surface Transportation (Off-Airport)

5.0.A ST-9 Construction Deliveries

The LAX Master Plan MMRP states:

“Construction Deliveries. *Construction deliveries requiring lane closures shall receive prior approval from the Construction Coordination Office. Notification of deliveries shall be made with sufficient time to allow for any modifications to approved traffic detour plans.”*

BWP Status→ Ongoing:

No lane closures were required for construction deliveries in the 2014 reporting period.

WAMA Status→ Ongoing:

Prior to the initiation of construction in 2014, the contractor developed a Construction Traffic Management Plan and a Logistics Plan, both of which were reviewed by LAWA. The plans specify a number of traffic-related provisions, including procedures related to construction deliveries. The plans were in effect during the 2014 reporting period, however, no lane closures were required for construction deliveries in 2014.

5.0.B ST-12 Designated Truck Delivery Hours

The LAX Master Plan MMRP states:

“Designated Truck Delivery Hours. *Truck deliveries shall be encouraged to use night-time hours and shall avoid the peak periods of 7:00 a.m. to 9:00 a.m. and 4:30 p.m. to 6:30 p.m.”*

BWP Status→ Ongoing:

LAWA monitors truck deliveries and such deliveries are strictly enforced by LAWA inspectors and mitigation monitors. On occasion, waivers are granted for deliveries during peak periods when required for engineering/construction reasons, such as for large-scale concrete pours that must be completed on a continuous basis over the course of many hours. No truck waivers were granted during the 2014 reporting period.

WAMA Status → Ongoing:

Prior to the initiation of construction, the contractor developed a Construction Traffic Management Plan and a Logistics Plan, both of which were reviewed by LAWA. The plans specify a number of traffic-related provisions, including provisions relating to construction delivery hours. In accordance with the MMRP and these plans, LAWA monitors truck deliveries, and such deliveries are strictly enforced by LAWA inspectors and mitigation monitors. On occasion, waivers may be granted for deliveries during peak periods when required for engineering/construction reasons, such as for large-scale concrete pours that must be completed on a continuous basis over the course of many hours. The vast majority of truck delivery hour waivers for LAX construction projects were based on this type situation.

5.0.C ST-14 Construction Employee Shift Hours

The LAX Master Plan MMRP states:

“Construction Employee Shift Hours. *Shift hours that do not coincide with the heaviest commuter traffic periods (7:00 a.m. to 9:00 a.m., 4:30 p.m. to 6:30 p.m.) will be established. Work periods will be extended to include weekends and multiple work shifts, to the extent possible and necessary.”*

BWP Status→ Completed

WAMA Status→ Ongoing:

Prior to the initiation of construction, the contractor developed a Construction Traffic Management Plan and a Logistics Plan, both of which were reviewed by LAWA. The plans specify a number of traffic-related provisions, including provisions related to construction employee shift hours. The standard shift for the WAMA project (including both the LAWA WAMA construction component and the Qantas hangar component) conforms to the restrictions contained in this measure. In order to meet engineering and scheduling requirements, graders associated with the LAWA WAMA construction effort worked an extended shift that ends during the pm peak hour commute period. As soon as this element is completed, this extended shift will be eliminated.

5.0.D ST-16 Designated Haul Routes

The LAX Master Plan MMRP states:

“Designated Haul Routes. *Every effort will be made to ensure that haul routes are located away from sensitive noise receptors.”*

BWP Status→ Completed

WAMA Status→ Ongoing:

Prior to the initiation of construction, the contractor developed a Construction Traffic Management Plan and a Logistics Plan, both of which were reviewed by LAWA. The plans specify a number of traffic-related provisions, including haul routes. In accordance with these plans and with the MMRP, no haul routes in noise-sensitive areas were used during the 2014 reporting period.

5.0.E ST-17 Maintenance of Haul Routes

The LAX Master Plan MMRP states:

“Maintenance of Haul Routes. *Haul routes on off-airport roadways will be maintained periodically and will comply with City of Los Angeles or other appropriate jurisdictional requirements for maintenance. Minor striping, lane configurations, and signal phasing modifications will be provided as needed.”*

BWP Status→ Ongoing:

No maintenance of off-airport roadways was required by construction contractors was required during the 2014 reporting period.

WAMA Status→ Ongoing:

No maintenance of off-airport roadways by construction contractors was required during the 2014 reporting period.

5.0.F ST-18 Construction Traffic Management Plan

The LAX Master Plan MMRP states:

“Construction Traffic Management Plan. *A complete construction traffic plan will be developed to designate detour and/or haul routes, variable message and other sign locations, communication methods with airport passengers, construction deliveries, construction employee shift hours, construction employee parking locations and other relevant factors.”*

BWP Status→ Ongoing:

LAWA inspectors and construction monitors conducted ongoing monitoring of construction-related traffic during the 2014 reporting period, including haul routes, delivery hours, posting of variable signs, construction employee shift hours, construction employee parking locations, and other considerations. Construction employees parked in a designated area east of the north airfield and were shuttled to the construction site. Construction employee hours were reported weekly.

WAMA Status→ Ongoing:

Construction activities began in mid-fourth quarter of the 2014 reporting period. Prior to the initiation of construction, the contractor developed a Construction Traffic Management Plan, which was reviewed by LAWA. Construction traffic was monitored by LAWA inspectors and construction monitors, including haul routes, delivery hours, construction employee shift hours, construction employee parking locations, and other considerations. Construction employees parked in a designated area within the construction site, accessed via Pershing Drive. Construction employee hours were reported weekly.

5.0.G ST-19 Closure Restrictions of Existing Roadways

The LAX Master Plan MMRP states:

“Closure Restrictions of Existing Roadways. *Other than short time periods during nighttime construction, existing roadways will remain open until they are no longer needed for regular traffic or construction traffic, unless a temporary detour route is available to serve the same function. This will recognize that there are three functions taking place concurrently: (1) airport traffic, (2) construction haul routes, and (3) construction of new facilities.”*

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there were no LAX Master Plan projects under construction with the potential to require road closures.

5.0.H ST-20 Stockpile Locations

The LAX Master Plan MMRP states:

“Stockpile Locations. *Stockpile locations will be confined to the eastern area of the airport vicinity, to the extent practical and feasible. After the eastern facilities are under construction in Alternative D, stockpile locations will be selected that are as close to I-405 and I-105 as possible, and can be accessed by construction vehicles with minimal disruption to adjacent streets. Multiple stockpile locations may be provided, as required.”*

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because eastern area airport facilities were not under construction.

5.0.I ST-21 Construction Employee Parking Locations

The LAX Master Plan MMRP states:

“Construction Employee Parking Locations. *During construction of the eastern airport facilities, employee parking locations will be selected that are as close to I-405 and I-105 as possible and can be accessed by employee vehicles with minimal disruption to adjacent streets. Shuttle buses will transport employees to construction sites. In addition, remote parking locations (of not less than 1 mile away from project construction activities) will be established for construction employees with shuttle service to the airport. An emergency return system will be established for employees that must leave unexpectedly.”*

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because eastern area airport facilities were not under construction.

5.0.J ST-22 Designated Truck Routes

The LAX Master Plan MMRP states in part:

“Designated Truck Routes. *For dirt and aggregate and all other materials and equipment, truck deliveries will be on designated routes only (freeways and non-residential streets). Every effort will be made for routes to avoid residential frontages....”*

BWP Status→ Completed

WAMA Status→ Ongoing:

Designated truck routes are specified in the construction contract for the LAWA construction component. In addition, the Qantas lease requires compliance with the WAMA Project Design Features, Commitments, and Mitigation Monitoring and Reporting Program (MMRP), including this provision (i.e., ST-22). The designated truck routes for both project components avoid residential frontages. LAWA inspectors and monitors checked to see that trucks used the designated routes.

5.0.K ST-23 Expanded LAX Gateway Improvements/Greening of Impacted Communities

The LAX Master Plan MMRP states in part:

“Expanded LAX Gateway Improvements/Greening of Impacted Communities. Gateway LAX improvements will be enabled through transportation improvements along Century Boulevard to the east as they are proposed to extend into low-income and minority communities in the City of Inglewood. LAWA anticipates making financial contribution, on a fair-share basis up to a maximum of ten million dollars, to various off-airport surface transportation related components.”

Status→ In Progress:

The funding and implementation of the Master Plan commitments, as well as the MMRP mitigation measures, are subject to LAWA’s ability to use airport revenue to the extent permissible under federal law and policies, or to develop other state or federal funding sources. In 2006, LAWA requested a determination on the use of funds for this measure. As LAWA had not received a final determination on whether airport revenues may be used, LAWA submitted a new request on December 3, 2013 that FAA make a determination to provide funding for MMRP Commitment ST-23, Expanded Gateway Improvements/Greening of Impacted Communities. LAWA had not received FAA’s formal response during the 2014 reporting period.

5.0.L ST-24 Fair Share Contribution to Congestion Management Plan (CMP) Improvements

The LAX Master Plan MMRP states in part:

“Fair Share Contribution to Congestion Management Plan (CMP) Improvements. At the time of substantial completion of the LAX Master Plan, LAWA will contribute funding on a fair-share basis to future transportation improvements identified through the Congestion Management Plan (CMP) analysis completed for Alternative D.”

Status→ No action required at this time:

As the LAX Master Plan was not substantially complete in 2014, no action was required.

5.0.M MM-ST-6 Add New Traffic Lanes

The LAX Master Plan MMRP states in part:

“Add New Traffic Lanes. Traffic lanes shall be added to select intersections to the satisfaction of LADOT or other appropriate jurisdiction, sufficient to increase the capacity of the intersection without unnecessarily reducing sidewalk widths, removing on-street parking, or encroaching onto other land uses.”

Status→ No action required at this time:

Per the LAX Master Plan traffic mitigation program, no action was required in 2014.

5.0.N MM-ST-7 Restripe Existing Facilities

The LAX Master Plan MMRP states in part:

“Restripe Existing Facilities. Existing traffic lanes shall be restriped to the satisfaction of LADOT or other appropriate jurisdiction, so that additional lane capacity will be provided without adding any new pavement to the intersection or road segment.”

Status→ No action required at this time:

Per the LAX Master Plan traffic mitigation program, no action was required in 2014.

5.0.O MM-ST-8 Add ATSAC, ATCS or Equivalent

The LAX Master Plan MMRP states in part:

“Add ATSAC, ATCS or Equivalent. Automated Traffic Surveillance and Control (ATSAC) or Adaptive Traffic Control System (ATCS) capability or equivalent shall be added to select intersections to the satisfaction of LADOT or other appropriate jurisdiction. The improved capability will result in a more effective traffic signal network.”

Status→ No action required at this time:

Per the LAX Master Plan traffic mitigation program, no action was required in 2014.

5.0.P MM-ST-10 Modify Signal Phasing

The LAX Master Plan MMRP states in part:

“Modify Signal Phasing. The traffic signal phasing of select intersections shall be modified to the satisfaction of LADOT or other appropriate jurisdiction, to allow more efficient use of the intersections, particularly those that will experience a notable change in traffic characteristics as a result of the project.”

Status→ No action required at this time:

Per the LAX Master Plan traffic mitigation program, no action was required in 2014.

5.0.Q MM-ST-12 Provide New Ramps Connecting I-105 to LAX Between Aviation Boulevard and La Cienega Boulevard

The LAX Master Plan MMRP states:

“Provide New Ramps Connecting I-105 to LAX Between Aviation Boulevard and La Cienega Boulevard. These ramps shall be provided to allow for direct access and egress to/from the ITC and GTC via I-105, between Aviation Boulevard and La Cienega Boulevard. A feasibility study is underway to determine the best design for these ramps.”

Status→ No action required at this time:

No action was required in 2014 as the Intermodal Transportation Center (ITC) and the Ground Transportation Center (GTC) were not under design. As part of the planning for the new Ground Transportation Program at LAX, LAWA is reevaluating and developing roadway connections to the local highway system.

5.0.R MM-ST-13 Create a New Interchange at I-405 and Lennox Boulevard

The LAX Master Plan MMRP states:

“Create a New Interchange at I-405 and Lennox Boulevard. This interchange shall provide grade-separated ramps from I-405 directly into airport property, and vice-versa. It shall be located approximately mid-way between Century Boulevard and Imperial Highway. A feasibility study is underway to determine the best design for the interchange. Should this proposed interchange not be constructed, suitable and alternate traffic mitigation measures shall be designed and implemented to the satisfaction of LADOT and the Bureau of Engineering.”

Status→ No action required at this time.

Per the LAX Master Plan traffic mitigation program, no action was required in 2014.

5.0.S MM-ST-14 Ground Transportation/Construction Coordination Office Outreach Program

The LAX Master Plan MMRP states:

“Ground Transportation/Construction Coordination Office Outreach Program. The construction coordination office proposed in Master Plan Commitment C-1, Establishment of a Ground Transportation/Construction Coordination Office, shall establish appropriate mechanisms to involve and coordinate with other major airport-area development projects to the extent feasible, to ensure that the cumulative impacts of construction in the airport area are coordinated and minimized.”

Status→ Ongoing:

In 2014, LAWA's CALM team worked in cooperation with LAWA staff including Terminal Operations, Airport Police, Capital Programming, Planning and Engineering Group, and Commercial Development Group, to monitor construction traffic, coordinate lane and roadway closures and analyze the need for additional traffic controls.

5.0.T MM-ST-15 Provide Fair-Share Contributions to Transit Improvements

The LAX Master Plan MMRP states in part:

“Provide Fair-Share Contributions to Transit Improvements. Provide fair-share contributions to benefit transit to and from LAX to the satisfaction of LADOT and/or other appropriate jurisdiction or agency.”

Status→ No action required at this time.

No action was required in 2014.

5.0.U MM-ST-16 Provide Fair-Share Contribution to LA County's project to extend the Marina Expressway

The LAX Master Plan MMRP states in part:

“Provide Fair-Share Contribution to LA County's project to extend the Marina Expressway. Provide fair-share contribution to Los Angeles County's project to extend the Marina Expressway (Route 90) to Admiralty Way or complete alternative off-site improvements at the following intersections: By 2015: Lincoln Boulevard & Washington Boulevard, Bali Way & Lincoln Boulevard, Fiji Way & Lincoln Boulevard, Lincoln Boulevard & Marina Expressway, Lincoln Boulevard & Maxella Avenue, Lincoln Boulevard & Mindanao Way...”

Status→ No action required at this time:

Per Los Angeles County, the Marina Expressway extension project is not currently programmed or funded. Per the LAX Master Plan traffic mitigation program, no action was required in 2014 for the alternative off-site improvements.

5.0.V MM-ST (BWP)-1 Trip Reduction Measures

The Bradley West Project MMRP states:

“Trip Reduction Measures. LAWA will implement the following trip reduction measures:

(a) Continue to promote and expand the FlyAway services in accordance with LAX Master Plan Mitigation Measure MM-AQ-3. It is anticipated that the continued expansion of the FlyAway service will promote a shift in mode-share away from the private vehicle mode which would reduce traffic volume using the CTA roadway system.

(b) Continue to promote the consolidation of shuttle services (e.g., hotel/motel, off-airport parking, rental cars) or programs to reduce trips associated with these modes.”

Status→ Ongoing:

On July 15, 2014, LAWA began FlyAway service between LAX and the City of Santa Monica (in front of the Santa Monica Civic Auditorium), and on September 3, 2014, LAWA began FlyAway service between LAX and Hollywood (at the intersection of Argyle

Avenue and Hollywood Boulevard). Marketing included FlyAway wayfinding signage on city streets in Santa Monica and Hollywood, and advertising on transit buses and in tourist publications.

5.0.W MM-ST (BWP)-4 Modify the Intersection of Airport Boulevard and Manchester Avenue (Intersection #9)

The Bradley West Project MMRP states in part:

“Modify the Intersection of Airport Boulevard and Manchester Avenue (Intersection #9). The eastbound approach to the Airport Boulevard and Manchester Avenue intersection shall be restriped to provide one left-turn lane, two through lanes, and a through/right lane... Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 19.7 million annual passengers.”

Status→ Completed:

In 2014, this intersection improvement was completed as part of another project unrelated to the airport.

5.0.X MM-ST (BWP)-5 Modify the Intersection of Arbor Vitae Street and Aviation Boulevard (Intersection #10)

The Bradley West Project MMRP states in part:

“Modify the Intersection of Arbor Vitae Street and Aviation Boulevard (Intersection #10). The eastbound approach to the Arbor Vitae Street and Aviation Boulevard intersection shall be widened to provide one left-turn lane, two through lanes, and a right-turn lane....Los Angeles and City of Inglewood. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 20.7 million annual passengers.”

Status→ No action required at this time:

In 2014, there were 19.1 million international annual passengers at LAX. This measure will be triggered when the number of international passengers at LAX reaches 20.7 million annual passengers.

5.0.Y MM-ST (BWP)-6 Modify the Intersection of Imperial Highway and Sepulveda Boulevard (Intersection #71)

The Bradley West Project MMRP states in part:

“Modify the Intersection of Imperial Highway and Sepulveda Boulevard (Intersection #71). The northbound approach to the Imperial Highway and Sepulveda Boulevard intersection shall be restriped to provide one left-turn lane, three through lanes, and two right-turn lanes. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 19.7 million annual passengers.”

Status→ No action required at this time:

In 2014, there were 19.1 million international annual passengers at LAX. This measure will be triggered when the number of international passengers at LAX reaches 19.7 million annual passengers. LAWA staff is currently seeking approval from Caltrans to implement this improvement.

5.0.Z MM-ST (BWP)-7 Modify the Intersection of La Cienega Boulevard and I-405 Ramps N/O Century Boulevard (Intersection #96)

The Bradley West Project MMRP states in part:

“Modify the Intersection of La Cienega Boulevard and I-405 Ramps N/O Century Boulevard (Intersection #96). The southbound approach to the La Cienega Boulevard and I-405 Ramps N/O Century Boulevard intersection shall be widened to provide two left-turn lanes and two through lanes....

Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 20.7 million annual passengers.”

Status→ No action required at this time:

In 2014, there were 19.1 million international annual passengers at LAX. This measure will be triggered when the number of international passengers at LAX reaches 20.7 million annual passengers.

5.0.AA MM-ST (BWP)-8 Modify the Intersection of La Tijera Boulevard and Sepulveda Boulevard (Intersection #101)

The Bradley West Project MMRP states in part:

“Modify the Intersection of La Tijera Boulevard and Sepulveda Boulevard (Intersection #101). The westbound approach to the La Tijera Boulevard and Sepulveda Boulevard intersection shall be restriped and the traffic signal modified to provide two left-turn lanes, one through lane, and a through/right lane. ... Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 18.7 million annual passengers.”

Status→ No action required at this time:

In 2014, there were more than 18.7 million annual international passengers. However, when discussing the implementation of this mitigation with the Los Angeles Department of Transportation, LAWA discovered that LADOT is pursuing a separate project to install bike lanes on La Tijera Boulevard east of Sepulveda Boulevard, and if both the bike lane project and MM-ST (BWP)-8 were installed, it would result in the loss of approximately 18 parking spaces on La Tijera Boulevard between Sepulveda Boulevard and Sepulveda Eastway. A traffic analysis conducted in 2014 revealed that this intersection is operating at Level of Service B during the AM and PM peak hours, which is significantly better than the Level of Service D which was projected to occur during these peak hours when LAX reached 18.7 million annual international passengers. The mitigation, and the resulting parking loss if both the mitigation and LADOT's bike lane project were installed, was discussed at a Westchester Neighborhood Council meeting on August 5, 2014 and at a

meeting with the Westchester Business Improvement Association on August 21, 2014. LAWA has received requests to postpone implementation of this traffic mitigation, to monitor the level of service at this intersection and report back to LADOT for a determination as to when the traffic mitigation should be implemented.

5.0.BB MM-ST (BWP)-9 Modify the Intersection of Sepulveda Boulevard and 76th/77th Street (Intersection #136)

The Bradley West Project MMRP states in part:

“Modify the Intersection of Sepulveda Boulevard and 76th/77th Street (Intersection #136). The eastbound approach to the Sepulveda Boulevard and 76th/77th Street intersection shall be restriped to provide two left-turn lanes, a through/left-turn lane, and one right-turn lane.... Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 19.7 million annual passengers.”

Status→ No action required at this time:

In 2013, there were 19.1 million international annual passengers at LAX. This measure will be triggered when the number of international passengers at LAX reaches 19.7 million annual passengers. LAWA staff is currently seeking approval from LADOT to implement this improvement.

5.0.CC MM-ST (BWP)-10 Modify the Intersection of Imperial Highway and Main Street (Intersection #68)

The Bradley West Project MMRP states:

“Modify the Intersection of Imperial Highway and Main Street (Intersection #68). Modify the median island on the east leg of the intersection to provide a second left turn lane. The resulting westbound configuration would be comprised of a dual left-turn lane and two through lanes.”

Status→ Completed:

This project was completed on February 14, 2012.

5.0.DD MM-ST (BWP)-11 Modify the Intersection of Imperial Highway and Pershing Drive (Intersection #69)

The Bradley West Project MMRP states:

“Modify the Intersection of Imperial Highway and Pershing Drive (Intersection #69). Widen the north side of the westbound approach of Imperial Highway to provide a second right-turn lane. The resulting westbound lane configuration would be comprised of one left turn lane, two through lanes, and two right turn lanes.”

Status→ Completed:

This project was completed on February 14, 2012.

6.0 Relocation of Residences and Businesses

6.0.A RBR-1 Residential and Business Relocation Program

The LAX Master Plan MMRP states in part:

“Residential and Business Relocation Program. To address the acquisition of properties and relocation of businesses and residents associated with the proposed Master Plan, LAWA will prepare a Residential and Business Relocation Plan (Relocation Plan) in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, state and local regulations, and FAA Advisory Circular 150/5100-17, prior to the commencement of acquisition.”

Status→ Completed:

LAWA completed an LAX Master Plan Program, Alternative D Draft Relocation Plan on April 2004 in accordance to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and Title 49 Code of Federal Regulations Part 24 to address proposed acquisition and relocation of properties under Alternative D of the LAX Master Plan. However, no LAX Master Plan improvements requiring acquisition and relocation in the Alternative D Proposed Property Acquisition Areas occurred in 2014.

6.0.B MM-RBR-1 Phasing for Business Relocations

The LAX Master Plan MMRP states in part:

“Phasing for Business Relocations. To maximize opportunities for airport/airport-dependent businesses and other businesses being acquired to relocate in proximity to their current sites, LAWA shall, to the maximum degree feasible, schedule acquisition phasing and/or development phasing to accommodate interested parties on airport property in a manner that would avoid delays to the overall construction and development schedule.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period, as no LAX Master Plan improvements requiring acquisition and relocation in the Alternative D Proposed Property Acquisition Areas occurred in 2014.

6.0.C MM-RBR-2 Relocation Opportunities through Aircraft Noise Mitigation Program

The LAX Master Plan MMRP states in part:

“Relocation Opportunities through Aircraft Noise Mitigation Program. As a special project under the Aircraft Noise Mitigation Program (ANMP) for LAX, LAWA shall coordinate with the City of Inglewood and the County of Los Angeles to identify residential land uses that are subject to high levels of aircraft noise where land acquisition and conversion to compatible land uses is contemplated under applicable plans or is otherwise deemed appropriate.”

Status→ Ongoing:

LAWA supports the efforts of Inglewood and Los Angeles County in using land acquisition to achieve land use compatibility. However, because LAWA does not run their mitigation programs, it is up to those jurisdictions to identify properties for acquisition and make requests for funding to LAWA via the Grant Implementation Plan (GIP) process. During 2014, neither Inglewood nor the County submitted an acquisition GIP. Los Angeles County has never identified any properties for acquisition, and has no plans to submit an acquisition GIP.

7.0 Environmental Justice

7.0.A EJ-1 Aviation Curriculum

The LAX Master Plan MMRP states:

“Aviation Curriculum. *LAWA will work with local school districts to offer aviation-related curriculum at elementary schools, middle schools, high schools and colleges in affected communities near the Los Angeles International Airport. Potential pilot schools could include: Beulah Payne Elementary School, Lennox Middle School, Hillcrest Continuation School, Inglewood High School, Morningside High School, and Los Angeles Southwest College.”*

Status→ Ongoing:

In 2014, LAWA continued to coordinate with the local school districts in developing aviation-related curriculum. In July, LAWA offered a one-week Aviation Career Education Academy for middle school students and another for high school students. Students were recruited from Orville Wright Middle School, Westchester High School, and from all area high schools. LAWA also offered an on-site Flight Simulation training for students at Orville Middle School in Westchester. LAWA held a Santa Fly-In event in December 2014 for kindergarten students from neighboring schools. At this event, students were given safety talks and introduced to airport-related jobs.

7.0.B EJ-2 Aviation Academy

The LAX Master Plan MMRP states:

“Aviation Academy. *LAWA will work with local school districts to provide comprehensive educational and trade training for aviation-related careers, targeting students in the affected communities to provide them with increased career opportunities.”*

Status→ Ongoing:

The Aviation Career Education (ACE) Academy is a free, week-long motivational program to provide students with a basic understanding of career opportunities within the aviation industry, as well as a general knowledge about LAX. This program is open to seventh-and eighth-grade students (between the ages of 12 and 14) and high school students (between the ages of 15 and 18) in communities surrounding LAX, including El Segundo, Hawthorne, Inglewood, Lennox, and Westchester/Playa del Rey. Program

participants attend site visits and presentations by organizations such as the Federal Aviation Administration, NASA Jet Propulsion Laboratory, Transportation Security Administration, Airlines, Encore Flight Academy, Los Angeles Airport Police, LAX Airport Operations, and others. Approximately 45 local students participated in the program during the summer of 2014.

The Gateways Internship Program was launched by LAWA as a collaborative initiative of the Inglewood Unified School District, South Bay Private Industry Council, and Los Angeles World Airports. The program was developed as one of several approaches to address the current and projected demand for qualified employees to fill positions at LAWA. This program provides paid and non-paid internships to local youth currently attending high school or college and has been expanded to include Los Angeles Unified School District, Centinela Valley High School District, and El Segundo Unified School District. The program consists of a high school and a college internship component. The goal of the program is to expose local high school and college students to career opportunities in the aviation industry. This is accomplished by providing on-the-job practical experience in the aviation field through education, training and mentoring programs and activities. In 2014, 75 students participated in the internship program. AIRCademics, "Passport to Art Program" is comprised of a 30-week curriculum offered by LAWA. This school-to-career enrichment program focuses on teaching the subjects of science, math, reasoning, and aviation through the completion of art projects. Participants, who are of middle school age, also learn about the history of flight while attending lectures and field trips. The final class project is the creation of a comic book about LAX. The program was placed on hold due to the retirement of the Program Manager. LAWA anticipates reinstating the Program in 2015 with new staff.

Job Shadow Day is an opportunity for students to learn about the aviation industry and its career possibilities while experiencing the workplace. LAWA hosts a group of students and introduces them to the airport and the career possibilities in aviation. Each student shadows an airport employee throughout the day to witness the individual's daily work activities. In 2014, LAWA coordinated with the Orville Wright Middle School (Westchester), Albert Monroe Middle School (Inglewood), Westchester High School, and Saint Bernard High School (Westchester) to host Job Shadow Day for approximately 140 students

The "Flight Path Flyer" flight simulation program offers basic flying skills and operating techniques on flight simulators for six-Saturday sessions at the Flight Path Museum at LAX. This community-educational based program is free and offered three times per year aimed at novice students, ranging from middle school to senior citizens. This year, each class had a one-to-one ratio of student-per-simulator, offering a more structured and personal class. In 2014, 40 students in the local communities participated in the flight simulation program with 25 students from Loyola Marymount University's Reserve Officers' Training Corps (ROTC).

LAX Airfield Construction Tours are an opportunity for students, airport neighbors and local community groups to learn about the various improvements being made at LAX. Students also have the opportunity to learn about careers and jobs in aviation. In 2014, LAX Community Relations hosted more than 40 scout troops, school groups, chambers and rotary groups on tours to learn about the architecture of the Bradley West Project and other new and ongoing construction projects at LAX. Students were mentored by



Student participating in Flight Simulation Program hosted at the LAX Flight Path Museum

LAWA professionals about careers, construction techniques and physical attributes of the various construction projects at LAX.

Passport to Success – launched by the Families In Schools (FIS) organization - is an innovative family engagement initiative to reduce summer learning loss by encouraging students and families to participate in summer learning activities. LAWA participated in the Passport to Success Program by hosting students at the Flight Path Learning Museum at LAX to promote aviation related careers and the rich history of LAX and aviation in Southern California. Students from kindergarten through high school grades participate in the program and 76 students from various LAUSD schools visited the Flight Path Center during the summer in 2014.

LAWA is continually coordinating with local school districts to provide education and trade training programs for aviation-related careers. Positive feedback was received from participants surveyed in these LAX education outreach programs.

7.0.C EJ-3 Job Outreach Center

The LAX Master Plan MMRP states in part:

“Construction and Other LAX-Related Job Outreach - LAWA will create or utilize an existing resource center to assist historically underrepresented and at-risk local residents to find construction and other substantive jobs with LAWA and surrounding airport-related businesses through training and comprehensive outreach.”

Status→ Ongoing:

Gateways Internship Program

The Gateways Internship Program provides college and high school students with exposure to career opportunities in the aviation industry and other airport-related jobs.

The Gateways Program gives students on-the-job practical experience in various airport jobs through education, training, and mentoring activities to better prepare them to enter the workforce.

The Gateways Internship Program has partnered with various colleges such as UCLA, USC, Cal State University of Long Beach, Cal State University of Los Angeles, Loyola Marymount, West Los Angeles College, Cal State Fullerton, Cal State University, Northridge, Cal State University Dominguez Hills, Chapman-Brandman University, Cerritos College, Santa Monica College, East Los Angeles Community College, Trade Technical College, Southwest College, and Cerro Coso College.

LAWA also partners with Brotherhood Crusade, Watts Labor Community Action Committee (WLCAC), and Los Angeles Job Corps to place students into its internship program. Since its inception, the Gateways Program has placed more than 1170 students in a wide range of internship positions including: Accounting, Administration, Airfield Operations, Airports Development, City Attorney Office, Commercial Development Group, Community Relations, Human Resources, Information Management and Technology Group (IMTG), Engineering, Facilities Management, Environmental Management, Landside, Noise Management, Public Relations, and FAA-related.

LAWA's Gateways Program is comprised of four internship programs:

- *Gateways College Student Professional Worker Program*
- *Gateways College Volunteer Internship Program*
- *Gateways International Student Professional Worker Program*
- *Gateways High School Volunteer Internship Program*

LAWA's Business Jobs Resource Center (BJRC) was able to place over 75 students through its four programs within various internships in LAWA Divisions in 2014. This increase in internship positions was accomplished primarily through funding partners included community and faith based organizations and colleges.

The BJRC conducted extensive outreach to students by attending Career Day and job fairs at colleges, posting internship job descriptions to the college career sites, and connecting with various college career centers and advisors. BJRC also disseminated internship information at 27 community job fairs. Additionally, the BJRC has continued its relationship with Cerritos College to place IT students with LAWA through its approved prerequisite course work to the program. The BJRC also continues its partnership with City of Los Angeles Public Works High School Internship Program, the Brotherhood Crusade and will be a worksite

In addition to students from local and out-of-state schools, the BJRC also attracts international students who wish to volunteer at LAX. BJRC hosted international students from China, Germany, Korea, Japan and France.

Job Training Program

Although the FAA has not approved a job training program (JTP) for LAWA, and therefore no LAWA funds may be used for job training, LAWA leverages its relationships with various agencies funded to provide job training.

By leveraging relationships with over 16 JTP partners, LAWA, through its BJRC, initiated its JTP in January 2007. LAWA was successfully able to work with agencies funded through other means to provide job training opportunities to residents in the Project Impact Area (PIA), defined as the communities of South Los Angeles, El Segundo, Hawthorne, Inglewood and Lennox. Currently, LAWA is working with agencies that provide an array of training, including computer skills, customer service, time management, bilingual skills, leadership skills, and other classes.

Many local residents have completed training in customer service, retail sales, auto mechanics and other disciplines through the LAWA partnerships. The Mayor's Office has initiated discussions with area Work Source Centers, the Los Angeles Community College District and surrounding LAWA businesses to conduct Hospitality Training for local residents. Plans are underway to create training modules that will result in career paths for residents within the hospitality industry. Upon the completion of training, these candidates will be well-positioned to compete for job opportunities at the hotels or with various Airport employers.

JTP Referrals:	2014: 69	Program-to-Date:	838
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Completed Training:	2014: 44	Program-to-Date:	488
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Contact information for the Business Jobs Resource Center (BJRC) is posted at <http://www.lawa.org/bjrc/About.aspx?id=1968>.

First Source Hiring Program

The First Source Hiring Program (FSHP) is designed to provide residents from the communities immediately surrounding the airport and those most impacted by airport operations access to airport jobs. Those communities are a part of the PIA.

The FSHP is now automated with an Applicant Tracking System (ATS) to quickly assist those LAWA employers in need of prescreened and qualified individuals for employment consideration. Over 20,000 people have registered and posted their resumes on LAWA's ATS.

The BJRC works closely with area Work Source and One-Stop Centers, community and faith-based organizations that serve the airport area and beyond, to register potential candidates on the ATS for positions with LAWA employers. FSHP is training the job developers at these organizations to prescreen and qualify their clients to be eligible for opportunities at LAWA as they arise. Their clients are able to post their resumes and apply for positions and those applications are reviewed by hiring managers in the terminals.

As new concessions and new contracts are being awarded, BJRC will work to enroll contractors to promote their job opportunities and coordinate Targeted Recruitment Events to bring prescreened candidates for interview consideration.

During 2014, LAWA coordinated three targeted recruitment events for the following companies:

- Delaware North Companies Targeted Recruitment Fair- March 18, 2014
- CMS Hospitality Targeted Recruitment Fair- April 14-18, 2014
- HMS Host Targeted Recruitment Fair- April 22, 2014

BJRC also participates in community job fairs to promote the FSHP and provide employment assistance to job seekers. In 2014, BJRC attended 42 job fairs.

2014 Information

FSHP Referrals:	2014: 2150	Program-to-Date: 13,772
FSHP Hires:	2014: 180	Program-to-Date: 1,317
FSHP Hires Living in PIA:	2014: 176	

For more information on the First Source Hiring Program, please visit the program website at <http://www.lawa.org/bjrc/Employment.aspx?id=2058>.

7.0.D EJ-4 Community Mitigation Monitoring

The LAX Master Plan MMRP states:

“Community Mitigation Monitoring. LAWA will include community participation in monitoring the implementation of the final Mitigation Measures and Master Plan Commitments in order to ensure agency compliance and accountability. The community participation will include a diverse group of residents, stakeholders, environmental specialists and community leaders that will convene on a regular basis.”

Status→ In Progress:

The LAX Master Plan Stakeholders Liaison Office (LAX MP SLO) was created as a component of the LAX Plan and the LAX Specific Plan by the Los Angeles City Council to ensure public participation in the implementation of the LAX Master Plan. The LAX MP SLO provides stakeholders with direct access to applicable information on the LAX Master Plan. In addition, the SLO continues to provide the communities with notifications that solicit public comments, e.g., Notice of Preparation, Draft Environmental Impact Reports (DEIR's), Draft Environmental Assessments, Executive Director's Report, and LAX Plan Compliance Notifications.

In 2014, the SLO notified stakeholders of the following master plan projects:

- West Aircraft Maintenance Area
 - Notice of Availability of a Final EIR and Certification Hearing
- Midfield Satellite Concourse
 - Notice of Availability of a Draft EIR and Public Workshop
 - LAX Plan Compliance Notification and Request to Comment
 - Notice of Availability of a Final EIR and Certification Hearing

- LAX Plan Compliance approval hearings at BOAC, Trade, Commerce and Tourism (TCT) Committee, and City Council

8.0 Air Quality

8.0.A AQ-1 Air Quality Source Apportionment Study

The LAX Master Plan MMRP states in part:

"Air Quality Source Apportionment Study. LAWA will conduct an air quality source apportionment study to evaluate the contribution of on-airport aircraft emissions to off-airport air pollutant concentrations."

Status→ Completed:

The LAX Air Quality and Source Apportionment Study (AQSAS) was completed in 2013, and presented to LAWA's Board of Airport Commissioners on June 18, 2013.

The Final Report was posted on the project website, and hard copies of the report were available for public review at the District Office of Councilmember Bill Rosendahl and his successor, Mike Bonin, located at 7166 W Manchester Avenue, Los Angeles, 90045 and at the following public libraries:

- Westchester-Loyola Village Branch Library, 7114 West Manchester Avenue, Los Angeles, CA 90045
- Inglewood Library, 101 West Manchester Boulevard, Inglewood, CA 90301
- El Segundo Library, 111 West Mariposa Avenue, El Segundo, CA 90245



LAX AQSAS Community East monitoring station measuring air pollutants



LAX AQSAS Public Symposium

A Public Symposium was held on Saturday, September 28, 2013 at The Proud Bird Restaurant in Los Angeles to discuss the LAX Air Quality and Source Apportionment Study (AQSAS). Key technical team members presented the study's findings, followed by an hour-long, facilitated question and answer period. Informational materials regarding the study were also provided. The study and informational materials can be found on the web page titled, Final Report and Materials, at <http://www.lawa.org/AirQualityStudy.aspx?id=7716>.
(<http://www.lawa.org/airQualityStudy.aspx>)

Several options were offered for submitting written input on the Study, including at the public symposium, or online at <http://www.lawa.org/airqualitystudy>, or by e-mail to

airqualitystudy@lawa.org; or by mail to: Los Angeles World Airports, Environmental Services Division, Attention: LAX AQSAS, 7301 World Way West, 3rd Floor, Los Angeles, CA 90045-5803. The original public input period was from June 16, 2013 to October 11, 2013, but was later extended to November 7, 2013 at the request of The Neighborhood Council of Westchester/Playa. The report with public feedback appended was posted on the project website in March, 2014.

In 2014, LAWA's LAX Air Quality and Source Apportionment Study was selected as the Airports Council International-North America (ACI-NA) runner-up for the Environmental Achievement Award in the Innovative/Special Projects category. The AQSAS was the first apportionment study of its kind at a major airport.

The completion of this study fulfills the LAX MMRP Commitment AQ-1 to conduct an air quality source apportionment study.

8.0.B AQ-2 School Air Filters

The LAX Master Plan MMRP states:

"School Air Filters. LAWA will provide funding for air filtration system at qualifying public schools with air conditioning systems in place. The qualifying schools will be determined based upon review of the conclusions and recommendations of the Air Quality Source Apportionment Study to be conducted in Master Plan Commitment AQ-1."

Status→ In Progress:

The funding and implementation of the Master Plan commitments, as well as the MMRP mitigation measures, are subject to LAWA's ability to use airport revenue to the extent permissible under federal law and policies, or to develop other state or federal funding sources. On December 3, 2013, LAWA requested that the FAA make a determination on whether airport revenues may be used to provide funding for MMRP Commitment AQ-2, School Air Filters. LAWA had not received FAA's formal response during the 2014 reporting period.

8.0.C AQ-3 Mobile Health Research Lab

The LAX Master Plan MMRP states:

"Mobile Health Research Lab. LAWA will explore the ability to fund/co-fund, to the extent feasible and permissible by federal and local regulations, or seek funding sources to support the goal of a Mobile Health Research Lab. The goal of the Mobile Health Research Lab will be to research and study, not diagnose or treat, upper respiratory and hearing impacts that may be directly related to the operation of LAX."

Status→ In Progress:

The funding and implementation of the Master Plan commitments, as well as the MMRP mitigation measures, are subject to LAWA's ability to use airport revenue to the extent permissible under federal law and policies, or to develop other state or federal funding sources. On December 3, 2013, LAWA requested that the FAA make a determination

on whether airport revenues may be used to provide funding for MMRP Commitment AQ-3, Mobile Health Research Lab. LAWA had not received FAA's formal response during the 2014 reporting period.

8.0.D MM-AQ-1 LAX Master Plan – Mitigation Plan for Air Quality (Framework)

The LAX Master Plan MMRP states in part:

"LAX Master Plan - Mitigation Plan for Air Quality - LAWA shall expand and revise the existing air quality mitigation programs at LAX through the development of an LAX Master Plan – Mitigation Plan for Air Quality (LAX MP-MPAQ)."

Status→ Plan Established, Implementation Ongoing:

In 2005, LAWA completed a Mitigation Plan for Air Quality that established the overall framework for the implementation of specific measures for mitigating air quality impacts associated with the LAX Master Plan. The MM-AQ-1 Plan was adopted by the Board of Airport Commissioners in December 2005, in conjunction with approval of the SAIP (i.e., prior to implementation of the first project under the LAX Master Plan).

8.0.E MM-AQ-2 Construction-Related Mitigation Measures

The LAX Master Plan MMRP states in part:

"Construction-Related Mitigation Measures - The required components of the construction-related air quality mitigation measures are itemized below [starting on page 4-725 of the FEIR]. These components include numerous specific actions to reduce emissions from on-road and non-road mobile sources and stationary engines. All of these measures must be in place prior to commencement of the first Master Plan construction project and must remain in place through build out of the Master Plan. An implementation plan will be developed which provides available details as to how each of the elements of this construction-related mitigation measures will be implemented and monitored."

Status→ Plan Established, Implementation Ongoing:

LAWA completed a Construction-Related Mitigation Plan that set forth specific implementation requirements for the measures referenced in the LAX Master Plan Final EIR. The MM-AQ-2 Plan was adopted by the Board of Airport Commissioners in December 2005, in conjunction with approval of the SAIP (i.e., prior to implementation of the first project under the LAX Master Plan) and required measures have been integrated into the individual project construction specifications as appropriate, including those for BWP and WAMA. The execution of this implementation plan (i.e., the MM-AQ-2 Plan) occurs in conjunction with construction of each Master Plan project.

BWP Status→ Ongoing:

Several components of the BWP were underway in 2014, including interior improvements to the Bradley West core; Taxiway T Phase 1 (completed in August 2014); and continued work on the TBIT Renovation, including, specifically, renovation of the east aprons. The interior improvements did not involve work that required

compliance with MM-AQ-2. Construction work on the TBIT Renovation and Taxiway T Phase I was monitored by mitigation monitors on an ongoing basis.

For the TBIT Renovation and the Taxiway T Phase I, the contractors implemented measures to minimize fugitive dust in compliance with mitigation requirements and with SCAQMD Rule 403, including regular watering of construction areas, watering or covering of soil stockpiles, street sweeping of roadways and exits, use of track out plates and wheel washing, and covers for trash and haul trucks. On-road mobile source emissions were also implemented, including scheduling regular shift times to avoid off-peak periods (when travel speeds are lower), and use of an on-site rock crushing facility for concrete removed from the aprons. Mobile source controls followed the requirements of MM-AQ-2. Construction vehicles were parked in areas away from sensitive receptors and employees were shuttled from a construction employee parking lot to the work site by bus, which served to reduce employee vehicle emissions. Vehicle operators were instructed that no vehicle idling is permitting in excess of 5 minutes during periods of non-active vehicle use; no written violations pertaining to excessive equipment idling occurred. In addition, mitigation monitors reviewed maintenance plans for construction equipment. Only ultra-low sulfur diesel (ULSD) fuel was used in construction equipment, as this is the only fuel commercially available. No shortage of ULSD was experienced within Southern California during the 2014 reporting period and no substitution of ULSD occurred on the BWP project. Prior to mobilization, construction contractors were required to submit documentation for each piece of diesel equipment to be utilized or planned for possible utilization on the project relative to compatibility with Best Available Emissions Control Devices. Mitigation monitors developed and implemented a monitoring process to track each piece of equipment and document compliance.

For the Taxiway T Phase I component of the BWP project, 89 pieces of equipment were documented by LAWA's monitor during the 2014 reporting period, including independent verification of equipment compatibility with a CARB or USEPA-verified diesel emission control system (VDECS), and documentation of equipment that received an exemption from LAWA. Of this value, 49 pieces of diesel equipment met the USEPA 2010, Tier 4, or Tier 4-Interim emission standards; this equipment was configured with VDECS and represented the lowest-emitting on- and off-road equipment commercially available. This value included 33 pieces of off-road diesel equipment certified as Tier 4 or Tier 4-Interim, and approximately 16 vehicles that met the requirements for on-road vehicles equipped with VDECS. In addition, 7 pieces of off-road equipment were retrofitted with a CARB Level 3 VDECS. Nine (9) pieces of off-road diesel equipment were granted a "20-day" exemption.

For the East Aprons component of the BWP project, a total of 343 pieces of equipment have been evaluated. For on-road vehicles, a total of 80 trucks were evaluated. Of these, 28 met or exceeded the USEPA 2007 standards and were equipped with a factory installed VDECS; 5 additional vehicles underwent a VDECS retrofit. It was determined that 34 on-road vehicles did not have a compatible CARB-verified or USEPA certified VDECS available at the time construction commenced. Finally, 13 on-road trucks were found to have a compatible VDECS available; these vehicles were either awaiting VDECS installation prior to accessing the airfield construction site or were removed from consideration by the construction contractor. Relative to off-road diesel equipment, a total of 263 pieces of construction equipment were evaluated by LAWA monitors. Of these, 160 were certified by the USEPA as compliant with Tier 4 or Tier 4-Interim Emissions Standards; this equipment is configured with a factory-installed diesel

emission control system. Thirty-seven (37) pieces of off-road equipment underwent a VDECS retrofit and 10 pieces of equipment were determined to not have a VDECS available at the time construction commenced. In addition, 22 pieces of equipment were granted a driver safety "line of sight" exemption in accordance with Cal/OSHA requirements. A total of 30 vehicles were identified as having one or more compatible VDECS commercially available; these vehicles were either awaiting VDECS installation or were removed from project consideration. Finally, the monitor was unable to identify any documentation relative to 4 pieces of equipment; this equipment may no longer be proposed for airfield use.



New Tier 4 Equipment Operating at TBIT Renovation – East Apron

WAMA Status→ Ongoing:

WAMA's compliance with this measure is accomplished through implementation of LAX-AQ-2. See measure 8.0.I LAX-AQ-2 – Construction-Related Measures, below.

8.0.F MM-AQ-3 Transportation-Related Mitigation Measures

The LAX Master Plan MMRP states in part:

"Transportation-Related Mitigation Measure - The primary feature of the transportation-related air quality mitigation measure is the development and construction of at least eight (8) additional sites with Flyaway service similar to the service provided by the Van Nuys Flyaway currently operated by LAWA. The intent of these FlyAway sites is to reduce the quantity of traffic going to and from LAX by providing regional locations where LAX employees and passengers can pick up an LAX-dedicated, clean-fueled bus that will transport them from a FlyAway closer to their home or office into LAX and back."

Status→ In Progress:

In 2014, LAWA operated six FlyAway routes between LAX and remote boarding locations at Van Nuys, Union Station, Westwood/UCLA, Santa Monica, Hollywood, and La Brea/Expo. The La Brea/Expo Line FlyAway location in Mid-City closed in September 2014 due to poor ridership.

The full 2014 FlyAway network service realized an average daily ridership of 4,320 passengers, reduced vehicle emissions by 38,758 pounds each day, and removed 3,377 vehicles trips per day, travelling a combined total of 68,371 miles per day on roads accessing and egressing LAX Airport.

Promotion of the FlyAway routes in 2014 included: 1) A 13-month LA County Metro Bus advertising campaign on 40 route targeted buses that continues through April 2015, 2) Five subway platform backlight diorama adverts for 13 months, 3) Spot advertising in various tourist publications, 4) Transit mapping for the FlyAway on Google maps, 5) Continued distribution of FlyAway brochures to Metro, Metrolink, Amtrak, UCLA and other interested parties, 6) LAWA promotion at various travel, aviation and community events, and, 7) Complete information about the FlyAway on a re-designed website at www.lawa.org, which is directly accessible from www.LAXFlyAway.org.

Two new FlyAway locations were planned for 2015: 1) Victory/Woodley Blvd Orange Line Busway, connecting Orange Line passengers from and between Chatsworth and North Hollywood to FlyAway service in Van Nuys., and 2) A location to be determined south of LAX in Los Angeles County.

Table 1: Summary of CY 2014 FlyAway Network Service Locations & Level of Service

Route Name	Weeks Operating	Bus Trips Run	Bus Type	2014 Passengers	2014 Average Passengers /Bus	Operating Dates
Van Nuys	52	43,311	Diesel	957,602	22.11	Since 1975; facility upgraded: 12/2005
Union Station	52	33,366	Diesel	531,702	15.94	Since 03/15/2006
Westwood	52	12,791	Propane	62,704	4.90	Since 06/14/2007
Santa Monica	26	5,934	Propane	7,407	1.25	Since 07/15/2014
Hollywood	17	4,190	Diesel	16,682	3.98	Since 09/03/2014
La Brea/Expo	35	4,405	Propane	848	0.19	07/01/2013 to 09/02/2014
Irvine	n/a	n/a	CNG	n/a	n/a	11/16/2009 to 08/31/2012

TABLE 2: LAX FlyAway Network Emissions Reduction Summary: CY 2007 thru 2014 (Emissions reported

include NOX, CO, ROG, PM10 and CO2)

ROUTE DATA		2007	2008	2009	2010	2011	2012	2013	2014
Van Nuys	Ridership	946,018	987,705	880,024	807,485	835,346	887,260	890,740	957,602
	Vehicle Trips Saved	790,203	839,491	747,969	686,315	709,995	754,119	741,013	796,636
	Reduction in Miles Traveled	16.6 million	17.6 million	15.7 million	14.4 million	14.9 million	15.8 million	15.6 million	16,729,354 miles
	Emissions reduced	5,484 tons	7,400.6 tons	6,455.5 tons	5,595.2 tons	6,033.5 tons	6,296.8 tons	4,808.3 tons	5,264.0 tons
	Auto operating cost savings	\$9,325,979	\$11.0 million	\$9.8 million	\$6.8 million	\$8.4 million	\$9.4 million	\$9.5 million	\$9,853,589
Union Station	Ridership	329,323	433,216	409,491	413,975	434,096	455,919	508,019	531,702
	Vehicle Trips Saved	275,082	368,208	348,043	351,854	368,956	387,504	352,277	368,699
	Reduction in Miles Traveled	5.4 million	7.3 million	6.9 million	6.9 million	7.3 million	7.7 million	6.9 million	7,300,241 miles
	Emissions reduced	801 tons	2,549.8 tons	2,322.2 tons	2,328.9 tons	2,496.3 tons	2,674.3 tons	1,751.8 tons	1,804.4 tons
	Auto operating cost savings	\$3,060,998	\$4.5 million	\$4.3 million	\$3.3 million	\$4.1 million	\$4.6 million	\$4.2 million	\$4,299,842
Westwood	Ridership	49,137	125,288	115,048	107,136	97,337	84,179	78,030	62,704
	Vehicle Trips Saved	41,044	106,487	97,784	91,059	82,731	71,547	60,460	48,585
	Reduction in Miles Traveled	316,038	1.3 million	1.2 million	1.1 million	1.0 million	0.9 million	0.7 million	583,020 miles
	Emissions reduced	- 633.0 tons	67.7 tons	211.9 tons	204 tons	187.4 tons	158.2 tons	174.6 tons	118.3 tons
	Auto operating cost savings	\$177,613	\$796,000	\$731,000	\$618,000	\$562,000	\$511,000	\$441,000	\$343,399
Santa Monica	Ridership								7,407
	Vehicle Trips Saved								5,762
	Reduction in Miles Traveled								46,101 miles
	Emissions reduced								-19.4 tons
	Auto operating cost savings								\$27,154
Hollywood	Ridership								16,682
	Vehicle Trips Saved								12,144
	Reduction in Miles Traveled								291,466 miles
	Emissions reduced								- 67.5 tons
	Auto operating cost savings								\$171,674
La Brea Expo	Ridership							1,210	848
	Vehicle Trips Saved							932	654
	Reduction in Miles Traveled							7,000 miles	5,227 miles
	Emissions reduced							- 19.4 tons	- 26.5 tons
	Auto operating cost savings							\$4,534	\$3,079

ROUTE DATA		2007	2008	2009	2010	2011	2012	2013	2014
Irvine	Ridership			1,500	13,604	16,504	11,897		
	Vehicle Trips Saved			1,275	11,563	14,027	10,112		
	Reduction in Miles Traveled			60 Th. miles	580 Th. miles	701 Th. miles	505 Th. miles		
	Emissions reduced			N/A	- 81 tons	- 20.3 tons	5.5 tons		
	Auto operating cost savings			\$40,000	\$327,000	\$397,000	\$301,000		
Network Summary	Ridership	1,324,478	1,546,209	1,406,063	1,342,200	1,383,283	1,439,255	1,477,999	1,576,945
	Vehicle Trips Saved	11,063,329	1,314,186	1,195,295	1,140,791	1,175,709	1,223,282	1,154,682	1,232,480
	Reduction in Miles Traveled	22.3 M. miles	26.2 M. miles	23.8 M. miles	23.0 M. miles	23.9 M. miles	24.9 M. miles	23.2 M. miles	24,955,409 miles
	Emissions reduced	5,652 tons	10,018 tons	8,990 tons	7,966 tons	8,697 tons	9,134.8 tons	6,715.3 tons	7,073.3 tons
	Auto operating cost savings	\$12.6 million	\$16.3 million	\$14.9 million	\$13.0 million	\$13.5 million	\$14.8 million	\$14.1 million	\$14.7 million

Locations open for partial year are shown in italics.



Santa Monica FlyAway Opening Ceremony

Hollywood FlyAway Opening Ceremony

"Transportation-Related Mitigation Measure – Other feasible mitigation elements may be developed to ensure that the emission reductions for this transportation-related measure are achieved. These may include, for example"... Clean Vehicle Fleets measures such as:

- Promoting commercial vehicles/trucks/vans using terminal areas (LAX and regional intermodal) to install SULEZ/ZEV engines to reduce vehicle air emissions.



100% of LAWA's LAX Shuttles are fueled by
Compressed Natural Gas (CNG)

Status→ In Progress:

LAWA's fleet is the largest Alternative Fuel Vehicle (AFV) airport fleet in the nation and includes over 600 AFVs. In 2014, over 60 percent of LAWA's fleet vehicles and equipment at LAX were AFV's. Additionally, 100 percent of the LAX courtesy shuttle fleet was powered by natural gas. LAWA has a state-of-the-art, high-technology LNG/LCNG fueling station at LAX.



LAWA's AFV program has been recognized as
one of the most successful airport AFV programs in the nation
and a world-class model for airports and other agencies

8.0.G MM-AQ-4 Operations-Related Mitigation Measures

The LAX Master Plan MMRP states in part:

"Operations-Related Mitigation Measure: The primary component of the operations-related air quality mitigation measure consists of one airside item, the conversion of ground support equipment (GSE) to extremely low emission technology (such as electric power, fuel cells, or other future technological developments)."

Status→ In Progress:

LAWA updated the 2007 LAX GSE inventory by completing a comprehensive e-GSE feasibility study in 2013. Based on the updated feasibility study, LAWA reviewed and analyzed strategies and options to achieve GSE emission reductions. These options are being reviewed and analyzed in consultation with airlines. LAWA's GSE strategies are aligned with the California Air Resources Board's current approach to achieving GSE emission reductions.

This measure was not applicable to WAMA during the 2014 reporting period because the WAMA project was not operational.



Current LAX GSE inventory includes emission-saving electric forklift



Current LAX GSE inventory includes emission-saving SmarteCart electric baggage cart retriever

8.0.H LAX-AQ-1 – General Air Quality Control Measures (WAMA)

The WAMA MMRP states in part:

"This measure describes a variety of specific actions to reduce air quality impacts associated with projects at LAX, and applies to all projects. Specific measures are identified below:"

- 1a *"Watering (per SCAQMD Rule 403 and CalEEMod default) – twice daily"*
- 1b *"Ultra-low sulfur diesel (ULSD) fuel will be used in construction equipment."*
- 1c *"Post a publicly visible sign with the telephone number and person to contact regarding dust complaints; this person shall respond and take corrective action within 24 hours. "*
- 1d *"Prior to final occupancy, the applicant demonstrates that all ground surfaces are covered or treated sufficiently to minimize fugitive dust emissions."*
- 1e *"All roadways, driveways, sidewalks, etc., being installed as part of the project should be completed as soon as possible; in addition, building pads should be laid as soon as possible after grading."*

- 1f *“Prohibit idling or queuing of diesel-fueled vehicles and equipment in excess of five minutes. This requirement will be included in specifications for any LAX projects requiring on-site construction.”*
- 1g *“Require that all construction equipment working on-site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.”*

WAMA Status→ Ongoing:

The status of these measures during the reporting period is as follows:

- 1a. Both the LAWA and Qantas components of the WAMA project employ very effective dust control programs. Watering for dust control occurs essentially full time during construction activities.
- 1b. ULSD is the only fuel commercially available and is used in all construction equipment. No shortage of ULSD was experienced within Southern California during the 2014 reporting period, and no substitution of ULSD occurred on the WAMA project.
- 1c. Completed. A sign was posted on Pershing Drive (see photo). No phone calls were received during the reporting period.



Dust Complaint Sign on Pershing Drive

- 1d. Not applicable during the 2014 reporting period.
- 1e. Not applicable during the 2014 reporting period.
- 1f. This requirement is included in the construction specifications for the LAWA WAMA project and is required as a condition of the Qantas lease. LAWA monitors and inspectors monitored for compliance with this requirement.
- 1g. This requirement is included in the construction specifications for the WAMA project and is required as a condition of the Qantas lease. LAWA inspectors and monitors monitor for compliance with this requirement. When new diesel equipment was proposed to be used, construction firm was required to submit, in writing, the scheduled maintenance procedures for the equipment. All such maintenance plans were reviewed by LAWA monitors.

8.0.I LAX-AQ-2 – LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures (WAMA)

The WAMA MMRP states:

“This measure describes numerous specific actions to reduce fugitive dust emissions and exhaust emissions from on-road and off-road mobile and stationary sources used in construction. Some components of LAX-AQ-2 are not readily quantifiable, but would be implemented as part of LAX Master Plan projects. These control strategies are expected to reduce construction-related emissions.” The mitigation elements presented in LAX-AQ-2 were derived from LAX Master Plan Mitigation Measure MM-AQ-2.

“Specific measures applicable to the Project are below.”

- 2a *“All diesel-fueled equipment used for construction will be outfitted with the best available emission control devices, where technologically feasible, primarily to reduce emissions of diesel particulate matter (PM), including fine PM (PM_{2.5}), and secondarily, to reduce emissions of NO_x. This requirement shall apply to diesel-fueled off-road equipment (such as construction machinery), diesel-fueled on-road vehicles (such as trucks), and stationary diesel-fueled engines (such as electric generators). (It is unlikely that this measure will apply to equipment with Tier 4 engines.) The emission control devices utilized in construction equipment shall be verified or certified by California Air Resources Board or US Environmental Protection Agency for use in on-road or off-road vehicles or engines. For multi-year construction projects, a reassessment shall be conducted annually to determine what constitutes a best available emissions control device.”*
- 2b *“Watering (Watering (per SCAQMD Rule 403 and CalEEMod default) – three times daily.”*
- 2c *“Pave all construction access roads at least 100 feet onto the site from the main road.”*
- 2d *“To the extent feasible, have construction employees’ work/commute during off-peak hours.”*
- 2e *“Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips.”*
- 2f *“Utilize on-site rock crushing facility, when feasible, during construction to reuse rock/concrete and minimize off-site truck haul trips.”*
- 2g *“Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using “clean burning diesel” fuel and exhaust emission controls.”*
- 2h *“Suspend use of all construction equipment during a second- stage smog alert in the immediate vicinity of LAX.”*
- 2i *“Utilize construction equipment having the minimum practical engine size (i.e., lowest appropriate horsepower rating for intended job).”*
- 2j *“Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.”*
- 2k *“The contractor or builder shall designate a person or persons to ensure the implementation of all components of the construction-related measure through direct inspections, record reviews, and investigations of complaints.”*

- 2l *“LAWA will locate rock-crushing operations and construction material stockpiles for all LAX-related construction in areas away from LAX-adjacent residents, to the extent possible, to reduce impacts from emissions of fugitive dust.”*
- 2m *“LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.”*
- 2n *“On-road trucks used on LAX construction projects with a gross vehicle weight rating of at least 19,500 pounds shall, at a minimum, comply with USEPA 2007 on-road emissions standards for PM10 and NOX.”*

WAMA Status→ Ongoing:

The status of these measures during the reporting period is as follows:

- 2a Prior to mobilization, construction contractors were required to submit documentation for each piece of diesel equipment to be utilized or planned for possible utilization on the project relative to compatibility with Best Available Emissions Control Devices. LAWA monitors developed and implemented a monitoring process to track each piece of equipment and document compliance. For the WAMA project, a total of 156 pieces of equipment were evaluated by LAWA's monitor during 4th Quarter 2014. Of this value, 124 pieces were approved by LAWA for airfield use. A total of 42 on-road vehicles were evaluated. Of these, 17 met or exceeded the USEPA 2007 standards and were equipped with a factory installed verified diesel emission control system (VDECS), and 25 on-road vehicles, primarily dirt-hauling trucks, were granted an exemption in accordance LAWA policies. With respect to off-road equipment, a total of 82 pieces of construction equipment were reviewed by LAWA's monitor. Of these, 63 were certified by the USEPA as compliant with Tier 4 or Tier 4-Interim Emissions Standards; this equipment is configured with a factory-installed diesel emission control system. The other 19 pieces of equipment were granted a driver safety "line of sight" exemption in accordance with Cal/OSHA requirements and LAWA policies. Finally, a total of 32 vehicles or equipment were not approved for airfield use by LAWA due to their failure to meet requirements. Off-road diesel equipment operating on the WAMA project whose engines were determined to be compatible with a Level 3 VDECS, but not retrofitted with the best available emissions control technology, were documented to ensure that the equipment had been granted an exemption in accordance with LAWA policies. The LAWA monitor also independently assessed and documented diesel equipment for which no CARB-verified or USEPA-certified diesel emission control system was available. This equipment was granted an exemption by LAWA on the basis of unavailability.



Model Year 2014 Rubber-Tire Loader Operating at LAWA WAMA Site

- 2b Both the LAWA and Qantas components of the WAMA project employ very effective dust control programs. Watering for dust control occurs essentially full time during construction activities.
- 2c Complete. The entrance to the construction area is paved with asphalt.
- 2d For the LAWA WAMA project, standard construction shift hours did not coincide with the heaviest commuter traffic periods during the 2014 reporting period. However, due to construction requirements, some specialty workers worked longer shifts that ended during the evening peak period. For the Qantas project, construction employee shift hours did not coincide with the heaviest commuter traffic periods during the reporting period.
- 2e Lunch trucks visited the construction site or nearby construction staging/office area on a regular basis (i.e., daily Monday through Friday).
- 2f An on-site rock crushing facility was used to crush stockpiles located on the project site. The crushed material was used as fill on the WAMA and Qantas portions of the project site as well as other LAWA airside projects.
- 2g Complete. For the LAWA WAMA project, construction equipment was powered from grid power during the 2014 reporting period. On occasion, some construction equipment was powered by clean-burning generators for work that was of short duration and not located in proximity to grid power sources. LAWA WAMA construction offices were powered by temporary generators in 2014. Grid power is planned to be established in early 2015. For the Qantas project, construction equipment and offices used clean-burning generators during the 2014 reporting period. Grid power is planned to be established in 2015.
- 2h Not applicable during the 2014 reporting period.
- 2i This requirement is included in the construction specifications for the LAWA WAMA project and is required as a condition of the Qantas lease.
- 2j This requirement is included in the construction specifications for the LAWA WAMA project and is required as a condition of the Qantas lease.
- 2k Complete. Project staff, including both LAWA personnel and construction contractor personnel, are responsible for implementing construction-related mitigation measures. Compliance with these measures is discussed at weekly project meetings and at pre-activity meetings prior to starting new construction activities. A number of people are responsible for ensuring implementation of all

- components of the construction-related measure, including LAWA inspectors and mitigation monitors. Monitoring includes direct inspections, reviews of monthly reports, and investigation of complaints.
- 2l Complete. The rock-crushing operation and related stockpiles were located in the central portion of the LAWA WAMA project site, away from adjacent residents.
 - 2m Sweepers are fueled by alternative fuels (compressed natural gas). In addition, many staff and some construction contractor vehicles are alternative-fueled vehicles. There is available and sufficient infrastructure to provide fuel to these alternatively-fueled vehicles.
 - 2n All construction equipment is subject to review and approval by LAWA monitors prior to being allowed to operate at the airport. All on-road trucks with a gross vehicle weight rating of at least 19,500 pounds comply with USEPA 2010 on-road emissions standards for PM10 and NOx.

8.0.J LAX-AQ-4 – Operations-Related Control Measures (WAMA)

The WAMA MMRP states in part:

“4a. This measure requires the conversion of LAX GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies).”

Status→ No action required at this time:

This component was not applicable during the 2014 reporting period because the WAMA project was not operational. In 2014, LAWA worked on developing a GSE emission requirement and draft policy that is aligned with the California Air Resources Board's (CARB) approach. The requirement and policy were anticipated to be completed, approved and adopted by the Board of Airport Commissioners in 2015. This policy will apply to WAMA, once the project is operational. The Qantas hangar is being designed to incorporate electric charging stations for GSE.

Other measures required by LAX-AQ-4 include the following:

- 4d. *LAWA will require the use of electric lawn mowers and leaf blowers, as these unites become available for commercial use, for landscape maintenance*
- 4e. *LAWA will require the conversion of sweepers to alternative fuels or electric power for ongoing airfield and roadway maintenance. HEPA filters will be installed on airport sweepers where technologically and financially feasible without posing a safety hazard to airport operations.*
- 4f. *LAWA will ensure that there is available and sufficient alternative-fuel infrastructure.*

Status→ No action required at this time:

Components 4d, 4e, and 4f were not applicable during the 2014 reporting period because the WAMA project was not operational.

8.0.K MM-AQ (WAMA)-1

The WAMA MMRP states:

“On-road trucks used on LAX construction projects with a gross vehicle weight rating of at least 19,500 pounds shall, at a minimum, comply with USEPA 2010 on-road emissions standards for PM₁₀ and NO_x. Contractor requirements to utilize such on-road haul trucks or the next cleanest vehicle available will be subject to the provisions of LAWA Air Quality Control Measure 2”x” (part of LAX Master Plan Commitment LAX-AQ-2, LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures). All off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, USEPA Tier 3 off-road emission standards. In addition, all off-road diesel-powered construction equipment greater than 50 hp with engines meeting USEPA Tier 3 off-road emission standards shall be retrofitted with a CARB-verified Level 3 Diesel Emissions Control Strategies (DECS). Any emissions control device used by the Contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. In the event the Contractor is using off-road diesel-powered construction equipment with engines meeting USEPA Tier 4 off-road emission standards and is already supplied with a factory-equipped diesel particulate filter, no retrofitting with DECS is required. Contractor requirements to utilize Tier 3 equipment or next cleanest equipment available will be subject to the provisions of LAWA Air Quality Control Measure 2”x” (part of LAX Master Plan Commitment LAX-AQ-2, LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures). LAWA will encourage construction contractors to apply for SCAQMD “SOON” funds to accelerate clean-up of off-road diesel engine emissions.”

WAMA Status→ Ongoing:

During the 2014 reporting period, construction contractors working on the WAMA project (including both LAWA's component of the project and the Qantas hangar component) were required to submit documentation for each piece of diesel equipment to be utilized on the project. Mitigation monitors developed and implemented a monitoring process to track each piece of equipment and document compliance with the provisions of MM-AQ (WAMA)-1. On-road trucks were reviewed to determine their compliance with USEPA 2010 on-road emissions standards for PM₁₀ and NO_x. In addition, off-road diesel-powered construction equipment greater than 50 hp was monitored for compliance with USEPA Tier 3 off-road emissions standards, retrofit standards, and emissions reductions achieved.

Of the construction equipment that was reviewed by monitors, 63 pieces of equipment were certified as compliant with USEPA Tier 4 or Tier 4-Interim emission standards and 19 pieces of equipment were granted a driver safety “line of sight” exemption in accordance with Cal/OSHA requirements. A total of 32 vehicles or pieces of equipment were not approved for airfield use due to their failure to meet requirements. All equipment that was determined to be compatible with a Level 3 VDECS, but that was not retrofitted with the best available emission control technology, was documented to show that the equipment had been granted an exemption in accordance with LAWA policies and procedures (i.e., the equipment was the next cleanest vehicle available and/or the equipment was used onsite for a period less than 20 calendar days per calendar year). The monitor verified that the Level 3 devices that were utilized on the

WAMA project during the 2014 reporting period did not result in an increase of any pollutant above the level that is standard for that equipment's engine.

9.0 Hydrology and Water Quality

9.0.A HWQ-1 Conceptual Drainage Plan

The LAX Master Plan MMRP states in part:

“Conceptual Drainage Plan. *Once a Master Plan alternative is selected, and in conjunction with its design, LAWA will develop a conceptual drainage plan of the area within the boundaries of the Master Plan alternative (in accordance with FAA guidelines and to the satisfaction of the City of Los Angeles Department of Public Works, Bureau of Engineering). The purpose of the drainage plan will be to assess area-wide drainage flows as related to the Master Plan project area, and at a level of detail sufficient to identify the overall improvements necessary to provide adequate drainage capacity to prevent flooding.”*

Status→ Completed:

LAWA completed a Conceptual Drainage Plan which was adopted in conjunction with the SAIP.

9.0.B MM-HWQ-1 Update Regional Drainage Facilities

The LAX Master Plan MMRP states:

“Update Regional Drainage Facilities. *Regional drainage facilities should be upgraded, as necessary, in order to accommodate current and projected future flows within the watershed of each stormwater outfall resulting from cumulative development. This could include upgrading the existing outfalls, or building new ones. The responsibility for implementing this mitigation measure lies with the Los Angeles County Department of Public Works and/or the City of Los Angeles Department of Public Works, Bureau of Engineering. A portion of the increased costs for the upgraded flood control and drainage facilities would be paid by LAX tenants and users in accordance with the possessory interest tax laws and other legal assessments, consistent with federal airport revenue diversion laws and regulations and in compliance with state, county and city laws. The new or upgraded facilities should be designed in accordance with the drainage design standards of each agency.”*

Status→ Ongoing:

Although not responsible for implementing this mitigation measure, LAWA evaluates the post-construction drainage conditions for ongoing and future projects to determine if regional drainage facilities should be upgraded.

10.0 Historical/Architectural and Archaeological/Cultural Resources

10.0.A HR-1 Preservation of Historic Resources

The LAX Master Plan MMRP states:

“Preservation of Historic Resources. *In implementing the LAX Plan and conducting ongoing activities associated with operation of the airport, LAWA will support the preservation of identified significant historic/architectural resources through careful review of design and development adjacent to those resources and by undertaking any modifications to those resources in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties. Additionally, where sound insulation is proposed for identified significant historic/architectural resources under the Aircraft Noise Mitigation Program, LAWA will ensure that methods are developed with the approval of a qualified architectural historian or historic architect, who meets the Secretary of the Interior's Professional Qualifications Standards, in compliance with the Secretary of the Interior's Standards for Rehabilitation.”*

Status→ No action required at this time:

Any project at LAWA involving a designated historic resource is required to be reviewed by the Office of Historic Resources of the City of Los Angeles before any changes to the resource are approved. The historic preservation architect within this division of the Department of City Planning is charged with this responsibility. No action was required during the 2014 reporting period as there were no LAX Master Plan projects in 2014 that triggered this measure.

10.0.B MM-HA-1 Historic American Buildings Survey (HABS) Document

The LAX Master Plan MMRP states in part:

“Historic American Buildings Survey (HABS) Document. *For historic properties eligible at the federal, state or local levels that are proposed for demolition or partial demolition (i.e., the International Airport Industrial District), a Historic American Buildings Survey (HABS) document shall be prepared by LAWA in accordance with the Secretary of the Interior's Guidelines for Architectural and Engineering Documentation Standards. The level of documentation (I, II, III) shall be determined by the National Park Service (NPS).”*

Status→ No action required at this time:

No action was required during the 2014 reporting period as no historic buildings were proposed for demolition or partial demolition in 2014.

10.0.C MM-HA-2 Historic Educational Materials

The LAX Master Plan MMRP states in part:

Historic Educational Materials. *For the significant historic resources proposed for demolition or partial demolition, educational materials suitable for the general public,*

secondary school use, and/or aviation historians and enthusiasts shall be designed with the assistance of a qualified historic preservation professional and implemented by LAWA.

Status→ No action required at this time:

No action was required during the 2014 reporting period as no significant historic resources were proposed for demolition or partial demolition in 2014.

10.0.D MM-HA-4 Discovery

The LAX Master Plan MMRP states in part:

***“Discovery.** The FAA shall prepare an archaeological treatment plan (ATP), in consultation with SHPO, that ensures the long-term protection and proper treatment of those unexpected archaeological discoveries of federal, state, and/or local significance found within the APE of the selected alternative.”*

Status→ Completed:

Subsequent to the adoption of this measure, LAWA prepared an Archaeological Treatment Plan (ATP) in June 2005. In addition to fulfilling the requirements of MM-HA-4, the ATP incorporates the requirements of LAX Master Plan Mitigation Measures MM-HA-4 through MM-HA-10 and provides details regarding compliance with these measures. Master Plan projects comply with the ATP and thus comply with Mitigation Measure MM-HA-4.

10.0.E MM-HA-5 Monitoring

The LAX Master Plan MMRP states in part:

***“Monitoring.** Any grading and excavation activities within LAX proper or the acquisition areas that have not been identified as containing redeposited fill material or having been previously disturbed shall be monitored by a qualified archaeologist.”*

Status→ Ongoing:

Monitoring of grading and excavation activities is required on all Master Plan projects with the potential for encountering archaeological resources. Each project at LAX undergoes environmental analysis and clearances before grading and excavation activities are performed, and this environmental clearance identifies the potential need for a project archeologist. LAWA and project archeologists adhere to the guidelines provided in the Archeological Treatment Plan (ATP), in compliance with Section 106 of the National Historic Preservation Act (NHPA), the California Environmental Quality Act (CEQA), and the environmental guidelines of local agencies regarding the treatment of unexpected archeological discoveries of federal, state, and/or local significance that may be encountered during construction activities.

10.0.F MM-HA-6 Excavation and Recovery

The LAX Master Plan MMRP states:

“Excavation and Recovery. Any excavation and recovery of identified resources (features) shall be performed using standard archaeological techniques and the requirements stipulated in the ATP. Any excavations, testing, and/or recovery of resources shall be conducted by a qualified archaeologist selected by LAWA.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no archaeological resources were encountered during Master Plan construction activities.

10.0.G MM-HA-7 Administration

The LAX Master Plan MMRP states:

“Administration. Where known resources are present, all grading and construction plans shall be clearly imprinted with all of the archaeological/cultural mitigation measures. All site workers shall be informed in writing by the on-site archaeologist of the restrictions regarding disturbance and removal as well as procedures to follow should a resource deposit be detected.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no archaeological resources were encountered during Master Plan construction activities.

10.0.H MM-HA-8 Archaeological/Cultural Monitor Report

The LAX Master Plan MMRP states in part:

“Archaeological/Cultural Monitor Report. Upon completion of grading and excavation activities in the vicinity of known archaeological resources, the Archaeological/Cultural monitor shall prepare a written report. The report shall include the results of the fieldwork and all appropriate laboratory and analytical studies that were performed in conjunction with the excavation.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no grading and excavation activities in the vicinity of known archaeological resources were completed within the period.

10.0.I MM-HA-9 Artifact Curation

The LAX Master Plan MMRP states:

“Artifact Curation. All artifacts, notes, photographs, and other project-related materials recovered during the monitoring program shall be curated at a facility meeting federal and state standards.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no archaeological resources were encountered during Master Plan construction activities.

10.0.J MM-HA-10 Archaeological Notification

The LAX Master Plan MMRP states:

“Archaeological Notification. If human remains are found, all grading and excavation activities in the vicinity shall cease immediately and the appropriate LAWA authority shall be notified: compliance with those procedures outlined in Section 7050.5(b) and (c) of the State Health and Safety Code, Section 5097.94(k) and (i) and Section 5097.98(a) and (b) of the Public Resources Code shall be required. In addition, those steps outlined in Section 15064.5(e) of the CEQA Guidelines shall be implemented.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no human remains were encountered during Master Plan construction activities.

10.0.K MM-HA (BWP)-1 Conformance with LAX Master Plan Archaeological Treatment Plan

The Bradley West Project MMRP states in part:

“Conformance with LAX Master Plan Archaeological Treatment Plan. Prior to initiation of grading and construction activities, LAWA will retain an on-site Cultural Resource Monitor (CRM), as defined in the LAX Master Plan MMRP ATP, who will determine if the proposed project area is subject to archaeological monitoring.”

BWP Status→ Completed:

LAWA retained an on-site Cultural Resource Monitor for the Bradley West Project. Archaeological resource monitoring was conducted during the excavation phase, which was completed in June 2011.

10.0.L ARCHAEO-1

The WAMA MMRP states in part:

“Prior to initiation and construction activities, LAWA will retain an on-site Cultural Resources Monitor (CRM), as defined in the LAX Master Plan Mitigation Monitoring and Reporting Program (MMRP) Archaeological Treatment Plan (ATP), who will determine if the project site is subject to archaeological monitoring. If the CRM determines that the Project site is subject to archaeological monitoring, a qualified archaeologist... shall be retained by LAWA to inspect excavation and grading activities that occur within native material.”

WAMA Status→ Ongoing:

Prior to the initiation of construction of the WAMA project (including both the LAWA project component and the Qantas hangar component), LAWA retained an on-site Cultural Resource Monitor (CRM). During the reporting period, the CRM monitored excavation and grading activities that occurred within native materials. No archaeological resources were encountered during construction during the 2014 reporting period.

11.0 Paleontological Resources

11.0.A MM-PA-1 Paleontological Qualification and Treatment Plan

The LAX Master Plan MMRP states:

*“**Paleontological Qualification and Treatment Plan.** A qualified paleontologist shall be retained by LAWA to develop an acceptable monitoring and fossil remains treatment plan (that is, a Paleontological Management Treatment Plan - PMTP) for construction-related activities that could disturb potential unique paleontological resources within the project area. This plan shall be implemented and enforced by the project proponent during the initial phase and full phase of construction development. The monitoring and treatment plan shall be subject to approval by the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County to comply with paleontological requirements, as appropriate.”*

Status→ Completed:

The Paleontological Management Treatment Plan (PMTP) was prepared and revised in December 2005. In addition to fulfilling the requirements of MM-PA-1, the PMTP incorporates the requirements of LAX Master Plan Mitigation Measures MM-PA-2 through MM-PA-7 and provides details regarding compliance with these measures. Master Plan projects comply with the PMTP and thus comply with Mitigation Measure MM-PA-1.

10.0.P MM-PA (BWP)-1 Conformance with LAX Master Plan Paleontological Management Treatment Plan

The Bradley West Project MMRP states in part:

“Conformance with LAX Master Plan Paleontological Management Treatment Plan. Prior to the initiation of grading and construction activities, LAWA will retain a professional paleontologist, as defined in the Final LAX Master Plan MMRP PMTP, who will determine if the project site exhibits a high or low potential for subsurface resources.”

BWP Status→ Completed:

LAWA retained an on-site Paleontological Resource Monitor for the Bradley West Project. Paleontological resource monitoring was conducted during the excavation phase, which was completed in June 2011.

11.0.B MM-PA-2 Paleontological Authorization

The LAX Master Plan MMRP states:

“Paleontological Authorization. The paleontologist shall be authorized by LAWA to halt, temporarily divert, or redirect grading in the area of an exposed fossil to facilitate evaluation and, if necessary, salvage. No known or discovered fossils shall be destroyed without the written consent of the project paleontologist.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no exposed fossils were encountered during Master Plan construction activities.

11.0.C MM-PA-3 Paleontological Monitoring Specifications

The LAX Master Plan MMRP states:

“Paleontological Monitoring Specifications. Specifications for paleontological monitoring shall be included in construction contracts for all LAX projects involving excavation activities deeper than six feet.”

BWP Status→ Completed:

Excavation conducted in 2014 was not subject to paleontological monitoring.

11.0.D MM-PA-4 Paleontological Resources Collection

The LAX Master Plan MMRP states:

“Paleontological Resources Collection. Because some fossils are small, it will be necessary to collect sediment samples of promising horizons discovered during grading or excavation monitoring for processing through fine mesh screens. Once the samples have been screened, they shall be examined microscopically for small fossils.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no fossils were encountered during Master Plan construction activities.

11.0.E MM-PA-5 Fossil Preparation

The LAX Master Plan MMRP states:

“Fossil Preparation. *Fossils shall be prepared to the point of identification and catalogued before they are donated to their final repository.”*

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no fossils were encountered during Master Plan construction activities.

11.0.F MM-PA-6 Fossil Donation

The LAX Master Plan MMRP states:

“Fossil Donation. *All fossils collected shall be donated to a public, nonprofit institution with a research interest in the materials, such as the Los Angeles County Museum of Natural History.”*

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no fossils were encountered during Master Plan construction activities.

11.0.G MM-PA-7 Paleontological Reporting

The LAX Master Plan MMRP states:

“Paleontological Reporting. *A report detailing the results of these efforts, listing the fossils collected, and naming the repository shall be submitted to the lead agency at the completion of the project.”*

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period because no fossils were encountered during Master Plan construction activities.

11.0.I MM-PA (BWP)-2 Construction Personnel Briefing

The Bradley West Project MMRPs states:

“Construction Personnel Briefing. *In accordance with the PMTP, construction personnel will be briefed by the consulting paleontologist in the identification of fossils or*

fossiliferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur.”

BWP Status→ Completed

11.0.J PALEO-1 (WAMA)

The WAMA MMRP states in part:

“Conformance with LAX Master Plan Paleontological Management Treatment Plan: (PMTP): Prior to the initiation of grading and construction activities, LAWA will retain a professional paleontologist, as defined in the Final LAX Master Plan MMRP PMTP, who will determine if the Project site exhibits a high or low potential for subsurface resources.”

WAMA Status→ Ongoing:

Prior to the initiation of construction of the WAMA project (including both the LAWA project component and the Qantas hangar component), LAWA retained an on-site Paleontological Resource Monitor. During the 2014 reporting period, the monitor monitored excavation and grading activities that occurred within native materials. No paleontological resources were encountered during construction during the 2014 reporting period.

11.0.K PALEO-2 (WAMA)

The WAMA MMRP states:

“Construction Personnel Briefing: In accordance with the PMTP, construction personnel will be briefed by the consulting paleontologist in the identification of fossils or fossiliferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur.”

WAMA Status→ Completed:

LAWA’s consulting paleontologist conducted construction personnel briefings for the WAMA LAWA project component personnel and the Qantas hangar component personnel on October 24, 2014 and November 18, 2014, respectively.

12.0 Biotic Communities

12.0.A MM-BC (SA)-1 Replacement of Habitat Units Associated with the SAIP (Disturbed/Bar Ground and Non-Native Grassland/Ruderal Areas)

The LAX Master Plan MMRP states in part:

***“Replacement of Habitat Units Associated with the South Airfield Improvement Project.** LAWA or its designee shall undertake mitigation for the loss of 17.2 habitat units resulting from implementation of the SAIP. These habitat units shall be replaced at*

a 1:1 ratio within the FAA-owned habitat preserve at the former Marine Corps Air Station El Toro (El Toro site), or other appropriate site.”

Status→ Completed:

Of the 17.2 habitat units required to be mitigated, 16.8 habitat units were replaced through the Palos Verdes Peninsula Land Conservancy (PVPLC). The PVPLC mitigation project is complete. The remaining 0.4 habitat units were replaced as part of the LAX Coastal Dunes Improvement Project, Phase I, which was completed in 2014. See additional discussion in Section 12.0.E, MM-BC-8, Replacement of Habitat Units. This mitigation measure is complete.

12.0 B MM-BC-1 Conservation of State-Designated Sensitive Habitat Within and Adjacent to the El Segundo Blue Butterfly Habitat Restoration Area

The LAX Master Plan MMRP states in part:

“Conservation of State-Designated Sensitive Habitat Within and Adjacent to the El Segundo Blue Butterfly Habitat Restoration Area. LAWA or its designee shall take all necessary steps to ensure that state-designated sensitive habitats within and adjacent to the Habitat Restoration Area are conserved and protected during construction, operation, and maintenance.”

Status→ In Progress:

LAWA is continuing to maintain and manage the El Segundo Blue Butterfly (ESBB) Habitat Restoration Area.

LAWA’s ESBB conservation program has three components:

- Restoration of the native sand dunes habitat
- Monitoring the progress of the program
- Public awareness

Restoration

Because human activity negatively impacts the ESBB and its food plant (coast buckwheat), the area is protected and activities are controlled to meet the restoration goals. A major threat to both the ESBB and buckwheat are the invasive plant species that dominate the habitat. In the past, LAWA has performed maintenance within the habitat area to conduct vegetative management, weeding, and trash removal.

LAWA’s endangered species recovery permit expired. Although LAWA submitted an application for a new permit to the U.S. Fish and Wildlife Service, permit renewal did not occur in 2014. However, the terms of the new recovery permit were negotiated. When granted, the new permit will allow for volunteer restoration activities in the El Segundo Blue Butterfly Habitat Restoration Area when a monitoring biologist is present and measures are taken to prevent take of an endangered species. Additional training and regulatory signage are included in the draft permit as measures to prevent accidental take of endangered species.

Due to the permit status, weeding only occurred in Block 23 under the Biological Opinion incidental take permit and in areas outside of the El Segundo Blue Butterfly Habitat Restoration Area in 2014. For invasive shrub removals outside of the El Segundo Blue

Butterfly Habitat Restoration Area that occurred during nesting/breeding season, a LAWA biologist provided clearance surveys prior to shrub removals. Shrub removal was limited in dunes areas south of Sandpiper Street due to the presence of the coastal California gnatcatcher.

As noted above, LAWA continued to maintain Block 23, where coast buckwheat was planted in 2011. The plants are now flowering, and El Segundo Blue Butterfly have been observed in Block 23 over the past few years compared to no observations in previous years. Additional plants for supplemental planting are being raised in the nursery. In order to ensure that LAWA activities in the Dunes do not adversely affect the ESBB or its habitat, LAWA conducted training events for staff who conduct work in the Dunes. As part of this effort, the LAWA Film Office and Airport Police received follow up training regarding the need to stay on roads to prevent impacts to ESBB. Technicians performing other projects in the Dunes, such as camera replacements, received take avoidance training. Access paths and avoidance areas were marked for technicians, and their work efforts were monitored by a LAWA biologist. In addition, LAWA Airport Police were requested to discontinue K-9 training in the Dunes at the advice of the Coastal Commission permit officer.

Monitoring

Annual monitoring of the ESBB and the coast buckwheat host plant was completed in 2014. It was a hot, drought year in a series of drought years. Consequently, the flight season began early and was the shortest observed in 20 years. There was a 44 percent decline in El Segundo Blue Butterfly numbers from the previous year, and the population estimate was the lowest observed in 17 years. See Appendix C for the LAX El Segundo Blue Butterfly 2014 Report dated January 2015.

Public Awareness

LAWA continued to update the Dunes webpage and host volunteer events in the northern Dunes area, which is being restored as part of the LAX Coastal Dunes Improvement Project, a project being completed to satisfy the LAX Master Plan Stipulated Settlement Agreement and MM-BC-8. In addition, annual employee tours and one stakeholder tour were provided in 2014.

12.0.C MM-BC-2 Conservation of Floral Resources: Lewis' Evening Primrose

The LAX Master Plan MMRP states in part:

“Conservation of Floral Resources: Lewis' Evening Primrose. LAWA or its designee shall prepare and implement a plan to compensate for the loss of individuals of the sensitive Lewis' evening primrose, currently located at the westerly end of the north runway and within the Habitat Restoration Area. LAWA or its designee shall collect seed from those plants to be removed, and properly clean and store the collected seed until used. If possible, seeds shall be collected in multiple years to ensure an adequate seed supply for planting. A mitigation site of suitable habitat equal to the area of impact shall be delineated within areas of the Los Angeles/El Segundo Dunes as described in MM-BC-13.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period, as there were no LAX Master Plan projects that would affect Lewis' evening primrose.

12.0.D MM-BC-3 Conservation of Floral Resources: Mature Tree Replacement

The LAX Master Plan MMRP states in part:

“Conservation of Floral Resources: Mature Tree Replacement. LAWA or its designee shall prepare and implement a plan to compensate at a ratio of 2:1 for the loss of approximately 300 mature trees, which would occur as a result of implementation of the LAX Northside project.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there were no current LAX Master Plan projects that resulted in the removal of mature trees.

12.0.E MM-BC-8 Replacement of Habitat Units

The LAX Master Plan MMRP states in part:

“Replacement of Habitat Units. LAWA or its designee shall undertake mitigation for the loss of habitat units resulting from implementation of Alternative D. Implementation of Alternative D would result in the loss of 45.43 habitat units. These habitat units shall be replaced at a 1:1 ratio within the Los Angeles/El Segundo Dunes.”

Status→ In Progress:

This measure was partially fulfilled by MM-BC (SA)-1. Please see Section 12.0.A, Replacement of Habitat Units Associated with the SAIP. The SAIP project identified an impact to 17.17 habitat units (rounded to 17.2 habitat units in the project-specific mitigation measure); 16.8 habitat units were restored in an offsite location in 2007. Construction staging activities for SAIP, CFTP, and BWP affected additional acreage, requiring a total of 21.43 habitat units to be provided as mitigation.

As noted above, 16.80 habitat units were restored in an offsite location. Replacement of the remaining 4.63 habitat units associated with the SAIP, BWP and CFTP projects commenced in 2013 with implementation of the LAX Coastal Dunes Improvement Project within the 48-acre LAX/El Segundo Dunes area north of Sandpiper Street. Phase I of the Coastal Dunes Improvement Project was completed by February 2014, and approximately 6 acres of hardscape (roads, sidewalks and retaining walls and gravel beds) were removed and replaced with native seed (hand-seeded, locally collected seeds, crimped into the soil with sterile rice straw). Iceplant, arundo, and other undesired non-native plants were also removed from portions of the site (approximately 2 acres), and native plants are recovering in many of the weed removal areas. Areas with sensitive plants were protected and left undisturbed. Acacia is being slowly removed on a weekly basis and given to the Los Angeles Zoo as fodder. In addition, volunteers have been helping with weed removal throughout the 48-acre site 1 to 3 times per month.

Within the road removal areas, coastal prairie seeds were hand-broadcasted on the road removal area east of Trask/Earldom and have become established, and coastal dune scrub and foredune seeds were broadcasted west of Trask/Earldom in the road and hardscape removal areas, where they have partly become established. In some areas, where needed to prevent or minimize erosion, temporary riprap beds and an infiltration basin made of riprap were installed in addition to fiber rolls and straw being crimped into the soil. Road removal areas were backfilled with local native sand. Part of Rindge was retained and converted to a permeable road surface with less color contrast with the surrounding habitat (Rindge will be maintained as a north-south access road running through the Dunes). Driveways on Vista Del Mar were removed, and curb and gutter were restored in their place. A driveway along the Waterview Trail was removed and restored to native landscaping, and a connective trail section was installed to join the existing pedestrian trail sections.

As the native vegetation becomes more established in the road removal and weed removal areas, and weeding continues throughout the 48-acre area during Phase II of the project, it is anticipated that the number of habitat units ultimately accomplished by the Coastal Dunes Improvement Project will complete the replacement of the remaining 4.63 habitat units associated with the SAIP, BWP, and CFTP, projects, as well as contribute additional habitat replacement units to fulfill, and even exceed, the total 45.43 units required by the LAX Master Plan. By 2021, it is anticipated that a total of 48 acres will have been improved to a habitat value (HV) of 0.80 HV per acre, yielding approximately 35 habitat replacement units (0.8 HV is the maximum feasible target habitat value for restoration and enhancement of biotic communities).



Before Road Removal



After Road Removal

12.0.F MM-BC-9 Conservation of Faunal Resources

The LAX Master Plan MMRP states in part:

“Conservation of Faunal Resources. LAWA or its designee shall develop and implement a relocation and monitoring plan to compensate for the loss of 1.34 habitat units of occupied western spadefoot toad habitat and for the loss of western spadefoot toad individuals currently in the southwestern portion of the AOA; 2.38 habitat units of occupied San Diego black-tailed jackrabbit habitat and for the loss of individuals of this species within the AOA; and 10.83 habitat units utilized by loggerhead shrike within the western airfield. LAWA shall minimize incidental take of active nests of loggerhead shrike through pre-construction surveys and construction avoidance measures. LAWA

shall conduct pre-construction surveys for silvery legless lizard, San Diego horned lizard and burrowing owls and relocate individuals, if required.”

Status→ Completed for the Bradley West Project

Status→ No action required at this time:

No action was required during the reporting period, as there were no LAX Master Plan projects that resulted in impacts to species addressed in this measure.

12.0.G MM-BC-13 Replacement of State-Designated Sensitive Habitats

The LAX Master Plan MMRP states in part:

“Replacement of State-Designated Sensitive Habitats. LAWA or its designee shall undertake mitigation for the loss of State-designated sensitive habitat within the Los Angeles/El Segundo Dunes, including the Habitat Restoration Area.”

Status→ No action required at this time:

No action was required during the 2014 reporting period, as there were no LAX Master Plan projects that resulted in the loss of State-designated sensitive habitat within the Dunes Area.

12.0.H MM-BC (CFTP)-1 Conservation of Floral Resources: Southern Tarplant

The Crossfield Taxiway Project MMRP states in part:

“Conservation of Floral Resources: Southern Tarplant. LAWA or its designee shall prepare a special status plant mitigation program. The loss of the southern tarplant individuals shall be mitigated through seed collection and seeding into a suitable mitigation site within undeveloped property owned by LAWA, determined based on habitat, soil type, moisture levels, and other relevant conditions.”

Status→ In Progress:

The southern tarplant mitigation program for the Crossfield Taxiway Project was combined with the mitigation program for the Bradley West Project. Remedial mitigation commenced in fall of 2010 for MM-BC (CFTP)-1 and MM-BC (BWP)-1 at a mitigation site in the southwest corner of the airport near the water retention basins along Pershing Drive.

Monitoring completed after Year 1 showed that the mitigation project had far exceeded the requirement of approximately 200 plants flowering and setting seed for the first year, with a count of about 10,000 individual flowering plants. Year 2 was a drought year in which very few southern tarplant grew and flowered. The quantitative survey for Year 3 showed 310 individual flowering southern tarplant, exceeding the success criteria of 264 plants, while Year 4 had a decline to only 138 plants as expected by the severe drought weather. Quarterly monitoring and annual reporting will continue as required. See Appendix D for the Southern Tarplant Fourth Annual Monitoring Report.

12.0.I MM-BC (BWP)-1 Conservation of Floral Resources: Southern Tarplant

The Bradley West Project MMRP states in part:

“Conservation of Floral Resources: Southern Tarplant. LAWA or its designee shall prepare a special status plant mitigation program for the southern tarplant. The loss of the southern tarplant individuals shall be mitigated through seed collection and seeding into a suitable mitigation site within undeveloped property owned by LAWA or at a suitable off-site location, determined based on habitat, soil type, moisture levels, and other relevant conditions. One suitable off-site location is the Three Sisters Reserve located on the Palos Verdes Peninsula.”

Status→ In Progress:

The southern tarplant mitigation program for the Bradley West Project was combined with the mitigation program for the Crossfield Taxiway Project. See the Crossfield Taxiway project-specific discussion of Mitigation Measure MM-BC (CFTP)-1, Conservation of Floral Resources: Southern Tarplant, in Section 12.0.H, above. As indicated in that discussion, remedial mitigation commenced in fall of 2010 for MM-BC (CFTP)-1 and MM-BC (BWP)-1 at a mitigation site in the southwest corner of the airport near the water retention basins along Pershing Drive.

Monitoring completed after Year 1 showed that the mitigation project had far exceeded the requirement of approximately 200 plants flowering and setting seed for the first year with a count of about 10,000 individual flowering plants. Year 2 was a drought year in which very few southern tarplant grew and flowered. The quantitative survey for Year 3 showed 310 individual flowering southern tarplant exceeding the success criteria of 264 plants, while Year 4 had a decline to only 138 plants as expected by the severe drought weather. Quarterly monitoring and annual reporting will continue as required. See Appendix D for the Southern Tarplant Fourth Annual Monitoring Report.

12.0.J MM-BC (BWP)-2 Conservation of Floral Resources: Lewis' Evening Primrose

The Bradley West Project MMRP states in part:

“Conservation of Floral Resources: Lewis' Evening Primrose. Prior to any work activities (i.e., vegetation clearing, invasive species removal and/or spraying, and sediment removal) on the project site, including construction staging areas, pre-construction focused surveys shall be conducted during the period of March through May by a qualified biologist to determine the presence or absence of Lewis' evening primrose.”

Status→ Completed:

Prior to the implementation of construction staging, laydown, and parking areas associated with the Bradley West Project, LAWA conducted focused plant surveys in November 2008 for the Lewis' evening-primrose (*Camissonia lewisii*) and California spineflower (*Mucronea californica*). Neither species was observed during the focused surveys. No additional mitigation is required.

12.0.K MM-BC (BWP)-3 Conservation of Floral Resources: California Spineflower

The Bradley West Project MMRP states in part:

“Conservation of Floral Resources: California Spineflower. Prior to any work activities (i.e., vegetation clearing, invasive species removal and/or spraying, and sediment removal) on the project site, including construction staging areas, pre-construction focused surveys shall be conducted during the period of March through July by a qualified biologist to determine the presence or absence of California spineflower.”

Status→Completed:

See status of MM-BC (BWP)-2 above.

12.0.L MM-BC (BWP)-4 Conservation of Faunal Resources: Burrowing Owl

The Bradley West Project MMRP states in part:

“Conservation of Faunal Resources: Burrowing Owl. Prior to any work activities (i.e., vegetation clearing, invasive species removal and/or spraying, and sediment removal) within the Southeast Construction Staging/Parking Area (also known as the Continental City site), a survey for burrows by a qualified biologist will be conducted by walking through the suitable habitat within the site in accordance with CDFG-accepted protocols.”

Status→ Completed:

Prior to the implementation of construction staging, laydown, and parking areas associated with the Bradley West Project, LAWA conducted focused surveys in June 2009 for the western burrowing owl (*Athene cunicularia hypugea*). The burrowing owl was not observed during the spring surveys. However, based on previous reports of burrowing owl within the western portion of LAX, it was recommended that monthly surveys be conducted between September and January, during development of the West Construction Staging Area. These surveys were undertaken by the LAX USDA wildlife biologist under contract to LAWA. No burrowing owls were observed during these monthly surveys. No additional mitigation is required.

12.0.M MM-BC (BWP)-5 Conservation of Faunal Resources: Loggerhead Shrike

The Bradley West Project MMRP states in part:

“Conservation of Faunal Resources: Loggerhead Shrike. If construction is scheduled to occur during the nesting season for the loggerhead shrike (March 15 to August 15), vegetation that will be impacted by the proposed project shall be removed outside the nesting season if feasible.”

Status→ Completed:

Vegetation that was required to be removed in order to develop construction staging and parking areas associated with the Bradley West Project was removed in 2010 prior to the nesting season for the loggerhead shrike.

12.0.N MM-BC (BWP)-6 Conservation of Faunal Resources: San Diego Black-Tailed Jackrabbit

The Bradley West Project MMRP states in part:

“Conservation of Faunal Resources: San Diego Black-Tailed Jackrabbit. Prior to the commencement of clearing operations or other activities involving significant soil disturbance at locations identified in Table 4.7-2 with suitable habitat, a survey shall be conducted to locate black-tailed jackrabbits within 100 feet of the outer extent of projected soil disturbance activities.”

Status→ Completed:

Prior to clearing operations associated with development of construction staging and parking areas for the Bradley West Project, surveys for the presence of black-tailed jackrabbits were conducted by the LAX USDA wildlife biologist from September 2009 through February 2010 under contract to LAWA. No black-tailed jackrabbits were observed. No additional mitigation is required.

12.0.O MM-BC (BWP)-7 Conservation of Floral Resources: Mature Tree Replacement

The Bradley West Project MMRP states in part:

“Conservation of Floral Resources: Mature Tree Replacement. LAWA or its designee shall compensate at a ratio of 2:1 for the loss of mature trees, which would occur as a result of implementation of Northwest Construction Staging/Parking Area.”

Status→ Completed:

In conjunction with the implementation of the Bradley West Project's Northwest Construction Staging Area, LAWA entered into letters of agreement with TreePeople, a non-profit environmental organization, and funds were provided to plant 66 native mature trees at Westchester Park and 64 trees at Morningside High School and the adjacent, student-run Empowerment Community Garden. The mature tree plantings were initiated in 2010 and were completed by June 2012. As of June 2012, 67 trees had been planted at Westchester Park as part of the TreePeople project, 66 of which are associated with Mitigation Measure MM-BC (BWP)-7. In addition, TreePeople led six tree care events in Westchester Park in 2012.

The Morningside High School/Empowerment Community Garden project was expanded to encompass a large-scale greening plan in the City of Inglewood, in conjunction with the non-profit Social Justice Learning Institute. In addition to the 41 trees that had been planted in 2011, TreePeople and community volunteers planted 32 trees at Vincent Park in Inglewood. As of June 2012, 73 trees had been planted as part of the TreePeople project in Inglewood, 64 of which are associated with Mitigation Measure MM-BC (BWP)-7. The trees were planted at the Empowerment Community Garden, Warren Lane Elementary School (a feeder school to Morningside High School), Queen Park and Vincent Park. The Orchard that was planted at the Empowerment Community Garden is growing and the trees are already bearing fruit. In addition, three Tree Care follow-up events were held in 2012.

12.0.P MM-BC (BWP)-8 Conservation of Faunal Resources: Nesting Birds/Raptors

The Bradley West Project MMRP states in part:

“Conservation of Faunal Resources: Nesting Birds/Raptors. *To comply with the Migratory Bird Treaty Act, for those areas of the project site that are not actively maintained and have a potential for nesting birds/raptors, if construction is scheduled to occur during the nesting season for birds/raptors (generally February 1 to June 30 for raptors and March 15 to August 15 for nesting birds), vegetation that will be impacted by the proposed project shall be removed outside the nesting season if feasible.”*

Status→ Completed:

Prior to the removal of trees associated with implementation of the North Construction Staging Area for the Bradley West Project, LAWA conducted surveys for nesting raptors in April 2010. No birds exhibiting breeding behavior or active nests were observed during the survey. Moreover, according to the LAX USDA wildlife biologist, the West Construction Staging Area does not contain suitable habitat for raptors to nest and no nesting raptors have been observed in this area in the past 8 years. As a result, surveys for nesting raptors were not conducted for this construction staging area prior to the removal of vegetation. No additional mitigation is required.

13.0 Endangered and Threatened Species

13.0.A MM-ET-1 Riverside Fairy Shrimp Habitat Restoration

The LAX Master Plan MMRP states in part:

“Riverside Fairy Shrimp Habitat Restoration. *LAWA or its designee shall undertake mitigation for direct impacts to 0.04 acre (1,853 square feet) of degraded wetland habitat containing embedded cysts of Riverside fairy shrimp and potential indirect impacts to 1.26 acres of degraded wetland habitat containing embedded cysts of the Riverside fairy shrimp.”*

Status→ In Progress:

Efforts to create a vernal pool habitat for Riverside Fairy Shrimp at Madrona Marsh were not successful. At the suggestion of the U.S. Fish and Wildlife Service, LAWA began to explore acquisition of an existing vernal pool as an alternate conservation option. Letters to nine landowners were mailed out. One willing seller responded, but LAWA could not reach an agreement on acquiring the property. Efforts are ongoing to find another site.

13.0.B MM-ET-3 El Segundo Blue Butterfly Conservation: Dust Control

The LAX Master Plan MMRP states:

“El Segundo Blue Butterfly Conservation: Dust Control. *To reduce the transport of fugitive dust particles related to construction activities, soil stabilization, watering or other dust control measures, as feasible and appropriate, shall be implemented with a goal to reduce fugitive dust emissions by 90 to 95 percent during construction activities within 2,000 feet of the El Segundo Blue Butterfly Habitat Restoration Area. 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.”

Status→ In Progress:

The West Aircraft Maintenance Area (WAMA) project was the only Master Plan project with ongoing grading and excavation activities in proximity to the El Segundo Blue Butterfly Habitat Restoration Area in 2014. Both the LAWA and Qantas components of the WAMA project employed very effective dust control measures. Watering for dust control occurred essentially full-time during grading and excavation activities during the 2014 reporting period. The entrance to the construction area is paved with asphalt to reduce dust generation. No grading or stockpiling occurred within 100 feet of occupied habitat of the El Segundo Blue Butterfly.

13.0.C MM-ET-4 El Segundo Blue Butterfly Conservation: Habitat Restoration

The LAX Master Plan MMRP states in part:

“El Segundo Blue Butterfly Conservation: Habitat Restoration. 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.

...As possible, depending on the location and condition of individual plants, FAA and LAWA shall salvage existing coast buckwheat plants and any larvae on the plant or pupae in the soil below the plant that would be removed to accommodate the replacement navigational aids to further conserve this species. These plants shall be salvaged immediately prior to the installation of the replacement navigational aids outside of the butterfly flight season. These salvaged plants shall be transported in a suitable container and replanted after the onset of winter rains in subsite 23...”

Status→ No action required at this time:

No action was required during the 2014 reporting period for these components of the measure.

“In conformance with the Biological Opinion, activities associated with navigational aids development shall be limited to the existing roads and proposed impact areas as depicted in the Final EIS/EIR. 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. The plantings of coast buckwheat shall be located within the southwest corner of subsite 23 of the Habitat Restoration Area, as depicted in Figure F5-5, and shall encompass 1.25 acres in conformance with the Biological Opinion. Coast buckwheat plants will be planted at an initial density of 200 plants per acre to ensure the long-term planting density target (130 plants per acre). Coast buckwheat plants will be placed in clusters or groupings based on microtopographic features present within subsite 23 to better support the El Segundo Blue Butterfly, which is known to prefer large clusters of plants for nectaring and shelter.”

Status→ In Progress:

LAWA continued to maintain Block 23, where 325 coast buckwheat plants were planted in 2011 in clusters of 3 to 5 plants. In 2013, a survey showed a 35 percent survival rate, and 116 plants. This does not meet the requirement for 1.25 acres of coast buckwheat at a long-term density of 130 plants per acre. As a result, additional plants for supplemental planting are being raised in the nursery for planting in fall of 2015. The surviving plants from the initial planting are now flowering, and El Segundo Blue Butterfly have been observed in Block 23 over the past few years compared to no observations in previous years.

“...LAWA shall coordinate with the USFWS to create educational materials on the El Segundo blue butterfly for integration into LAWAs public outreach program.”

Status→ Completed13.0.D MM-ET (BWP)-1 Mitigation for Riverside Fairy Shrimp

The Bradley West Project MMRP states in part:

“Mitigation for Riverside Fairy Shrimp. *If Riverside fairy shrimp are found to be located on-site, LAWAs shall coordinate with FAA and USFWS to initiate consultation under the federal Endangered Species Act and prepare a Mitigation Plan in consultation with the USFWS.”*

Status→ Completed:

Prior to the implementation of the Southeast Construction Staging/Parking Area associated with the Bradley West Project, two wet season surveys and one focused dry season survey for Riverside fairy shrimp (*Streptocephalus woottoni*) were conducted in 2009 and 2010 in accordance with USFWS protocol guidelines. No federally-listed Riverside fairy shrimp were observed within the survey area.

14.0 Energy Supply14.0.A E-1 Energy Conservation and Efficiency Program

The LAX Master Plan MMRP states in part:

“Energy Conservation and Efficiency Program. *LAWAs will seek to continually improve the energy efficiency of building design and layouts during the implementation of the LAX Master Plan. Title 24, Part 6, Article 2 of the California Administrative Code establishes maximum energy consumption levels for heating and cooling of new buildings to assure that energy conservation is incorporated into the design of new buildings.”*

BWP Status→ Completed

14.0.B E-2 Coordination with Utility Providers

The LAX Master Plan MMRP states:

“Coordination with Utility Providers. LAWA will implement Master Plan activities in coordination with local utility providers. Utility providers will provide input on the layout of utilities at LAX to assure that LAX and the surrounding region receive both safe and uninterrupted service. When service by existing utility lines could be affected by airport design features, LAWA will work with the utility to identify alternative means of providing equivalent or superior post-construction utility service.”

BWP Status→ Completed

14.0.C PU-1 Develop a Utility Relocation Program

The LAX Master Plan MMRP states in part:

“Develop a Utility Relocation Program. LAWA will develop and implement a utilities relocation program to minimize interference with existing utilities associated with LAX Master Plan facility construction.”

BWP Status→ Completed

15.0 Light Emissions

15.0.A LI-2 Use of Non-Glare Generating Building Materials

The LAX Master Plan MMRP states:

“Use of Non-Glare Generating Building Materials. Prior to approval of final plans, LAWA will ensure that proposed LAX facilities will be constructed to maximize use of non-reflective materials and minimize use of undifferentiated expanses of glass.”

BWP Status→ Completed

15.0.B LI-3 Lighting Controls

The LAX Master Plan MMRP states in part:

“Lighting Controls. Prior to final approval of plans for new lighting, LAWA will conduct reviews of lighting type and placement to ensure that lighting will not interfere with aeronautical lights or otherwise impair Airport Traffic Control Tower or pilot operations.”

BWP Status→ Completed

16.0 Solid Waste

16.0.A SW-1 Implement an Enhanced Recycling Program

The LAX Master Plan MMRP states in part:

“Implement an Enhanced Recycling Program. *“LAWA will enhance their existing recycling program, based on successful programs at other airports and similar facilities.”*

Status→ Plan Completed, Ongoing Implementation:

LAWA completed an enhanced recycling plan in 2011 for LAX. The total recycling and source reduction achieved by LAWLA’s Maintenance Services Division’s Recycling and Source Reduction Program for calendar year 2014 was 25,459 tons, which equated to 66.99 percent diverted.



LAX recycles corrugated boxes



Recycling bins throughout LAX terminals

Some notable achievements for the Recycling and Source Reduction Program include the following:

• Construction and demolition debris/ Processed miscellaneous base	13,282 tons
• Mixed paper and cardboard	8,206 tons
• Wood/pallets	1,153 tons
• Plastics	859 tons
• Source Reduction	631 tons
• Metals	454 tons
• Green materials	349 tons
• Tires	86 tons
• Food Donations	28 tons
• Glass	11 tons
• Other	<u>400 tons</u>
Sub-Total	25,459 tons
• Master Plan construction concrete recycling	<u>155,383 tons</u>
Total 2014 Recycling	<u>180,842 tons</u>

Features of the enhanced recycling program will include:

“..development of a recycling program at LAX Northside/Westchester Southside..”

Status→ No action required at this time:

This provision was not applicable during the 2014 reporting period because the LAX Northside project had not been approved nor constructed.

“...lease provisions requiring that tenants meet specified division goals...”

“...and preference for recycled materials during procurement, where practical and appropriate.”

Status→ Ongoing:

The LAX Procurement Services Division (PSD) promotes resource efficiency with contract language that includes recycling requirements and through direct purchase of products with sustainable attributes and certifications.

16.0.B SW-2 Requirements for the Use of Recycled Materials During Construction

The LAX Master Plan MMRP states:

“Requirements for the Use of Recycled Materials During Construction. LAWA will require, where feasible, that contractors use a specified minimum percentage of recycled materials during construction of LAX Master Plan improvements. The percentage of recycled materials required will be specified in the construction bid documents. Recycled materials may include, but are not limited to, asphalt, drywall, steel, aluminum, ceramic tile, cellulose insulation, and composite engineered wood products. The use of recycled materials in LAX Master Plan construction will help to reduce the project's reliance upon virgin materials and support the recycled materials market, decreasing the quantity of solid waste requiring disposal.”

BWP Status→ Completed**16.0.C SW-3 Requirements for the Recycling of Construction and Demolition Waste**

The LAX Master Plan MMRP states:

“Requirements for the Recycling of Construction and Demolition Waste. LAWA will require that contractors recycle a specified minimum percentage of waste materials generated during demolition and construction. The percentage of waste materials required to be recycled will be specified in the construction bid documents. Waste materials to be recycled may include, but are not limited to, asphalt, concrete, drywall, steel, aluminum, ceramic tile, and architectural details.”

BWP Status→ Completed

16.0.D MM-SW-1 Provide Landfill Capacity

The LAX Master Plan MMRP states:

“Provide Landfill Capacity. Additional landfill capacity in the Los Angeles region should be provided through the siting of new landfills, the expansion of existing landfills, or the extension of permits for existing facilities. As an alternative, or to augment regional landfill capacity, landfill capacity outside the region could be accessed by developing the necessary rail haul infrastructure. The responsibility for implementing this mitigation measure lies with state, county, and local solid waste planning authorities. The costs for implementing this mitigation measure will be passed on to LAX and other solid waste generators through increased solid waste disposal costs.”

Status→ No action required:

LAWA has no jurisdiction regarding this mitigation measure which must be implemented by state, county, and local solid waste planning authorities.

17.0 Construction Impacts

17.0.A C-1 Establishment of a Ground Transportation/Construction Coordination Office

The LAX Master Plan MMRP states in part:

“Establishment of a Ground Transportation/Construction Coordination Office. Establish this office for the life of the construction projects to coordinate deliveries, monitor traffic conditions, advise motorists and those making deliveries about detours and congested areas, and monitor and enforce delivery times and routes.”

BWP Status→ Completed

WAMA Status→ Ongoing:

LAWA established the Coordination and Logistic Management (CALM) team to, among other responsibilities, coordinate logistics relating to LAX Master Plan construction projects, including construction-related traffic. In addition, LAWA monitors are responsible for monitoring construction activities, including construction-related traffic and deliveries. In 2014, the CALM team and LAWA monitors worked with the WAMA project staff and contractors, including staff of the LAWA WAMA component and staff of the Qantas component, to coordinate deliveries, monitor traffic conditions, and monitor and enforce delivery times and routes during the reporting period. There were no detours required for the WAMA project during the reporting 2014 period.

17.0.B C-2 Construction Personnel Airport Orientation

The LAX Master Plan MMRP states:

“Construction Personnel Airport Orientation. All construction personnel will be required to attend an airport project-specific orientation (pre-construction meeting) that includes where to park, where staging areas are located, construction policies, etc.”

BWP Status→ Completed**WAMA Status→ Ongoing:**

In 2014, pre-construction meetings were held for the WAMA project to make contractors aware of parking areas, construction staging areas, and construction policies. In addition, weekly status meetings are held to discuss issues relating to construction.

18.0 Design, Art, and Architecture Applications/Aesthetics**18.0.A DA-1 Provide and Maintain Airport Buffer Areas**

The LAX Master Plan MMRP states:

***“Provide and Maintain Airport Buffer Areas.** Along the northerly and southerly boundary areas of the airport, LAWA will provide and maintain landscaped buffer areas that will include setbacks, landscaping, screening or other appropriate view-sensitive improvements with the goals of avoiding land use conflicts, shielding lighting, enhancing privacy and better screening views of airport facilities from adjacent residential uses. Use of existing facilities in buffer areas may continue as required until LAWA can develop alternative facilities.”*

Status→ No action required at this time:

In 2014, LAWA continued to provide and maintain all buffer areas surrounding the airport. The Street Frontage and Landscape Development Plan provides integrated and coordinated landscape design guidelines for new development along the perimeter areas of LAX consistent with the LAX Master Plan. Emphasis is placed on buffer areas between the airport and surrounding land uses to the north and south of the airport while incorporating all the necessary airport security guidelines and maximizing neighborhood compatibility. Additionally, the LAX Northside sub-area of the LAX Specific Plan is currently undergoing an update which also includes an update to the 1989 Northside Design Plan and Development Guidelines. These guidelines will also include additional landscape guidelines and buffer areas to the northern boundary of LAX.

18.0.B DA-2 Update and Integrate Design Plans and Guidelines

The LAX Master Plan MMRP states in part:

***“Update and Integrate Design Plans and Guidelines.** The following plans and guidelines will be individually updated or integrated into a comprehensive set of design-related guidelines and plans; LAX Street Frontage and Landscape Development Plan (June 1994), LAX Air Cargo Facilities Development Guidelines (April 1998; updated August 2002), and LAX Northside Design Plan and Development Guidelines (1989), including conditions addressing heights, setbacks and landscaping.”*

Status→ In Progress:

The Street Frontage and Landscape Plan was updated in March 2005. The LAX Air Cargo Facilities Development Guidelines were updated in August 2002. These plans include requirements to be incorporated into Master Plan projects.

With the California Green Building Code and the LA Green Building Ordinance now in effect, LAWA's program is: "All building projects with an Los Angeles Department of Building and Safety (LADBS) permit-valuation over \$200,000 shall achieve LAGBC Tier-1 conformance, to be certified by LADBS during Final Plan-Check (on the issued building permit) and validated by the LADBS inspector during Final Inspection (on the Certificate of Occupancy)." These guidelines were incorporated into LAWA's Design and Construction Handbook and the program went into effect on November 7, 2012.

An update of the LAX Northside Plan and Development Guidelines continued throughout 2014. The updated plan is scheduled to be completed in 2015.

18.0.C DA-3 Undergrounding of Utility Lines

The LAX Master Plan MMRP states:

"Undergrounding of Utility Lines. *In conjunction with the extension of the Century Freeway and other roadway/right-of-way improvement projects, LAWA will pursue opportunities to place existing overhead utility lines underground wherever feasible and appropriate."*

Status→ No action required at this time:

There were no roadway projects during the 2014 reporting period that triggered this requirement.

18.0.D MM-DA-1 Construction Fencing

The LAX Master Plan MMRP states:

"Construction Fencing. *Construction fencing and pedestrian canopies shall be installed by LAWA to the degree feasible to ensure maximum screening of areas under construction along major public approach and perimeter roadways, including Sepulveda Boulevard, Century Boulevard, Westchester Parkway, Pershing Drive, and Imperial Highway west of Sepulveda Boulevard. Along Century Boulevard, Sepulveda Boulevard, and in other areas where the quality of public views are a high priority, provisions shall be made by LAWA for treatment of the fencing to reduce temporary visual impacts."*

BWP Status→ Completed

19.0 Hazardous Materials

19.0.A HM-1 Ensure Continued Implementation of Existing Remediation Efforts

The LAX Master Plan MMRP states in part:

"Ensure Continued Implementation of Existing Remediation Efforts. *Prior to initiating construction of a Master Plan component, LAWA will conduct a pre-construction evaluation to determine if the proposed construction will interfere with existing soil or groundwater remediation efforts."*

WAMA Status→ Ongoing:

Soil investigations were conducted prior to commencement of grading for the WAMA project. In addition, WAMA contractors comply with LAWA policies regarding the handling of impacted soils encountered during construction. No groundwater remediation wells are located on the WAMA project site, including both the LAWA WAMA site and the Qantas site. There are several groundwater monitoring wells near the eastern border of the LAWA WAMA site that are associated with a groundwater remediation effort located to the east. These groundwater monitoring wells were flagged prior to the initiation of WAMA grading activities to ensure that the wells would not be damaged during construction.

19.0.B HM-2 Handling of Contaminated Materials Encountered During Construction

The LAX Master Plan MMRP states in part:

***“Handling of Contaminated Materials Encountered During Construction.** Prior to the initiation of construction, LAWA will develop a program to coordinate all efforts associated with the handling of contaminated materials encountered during construction. The intent of this program will be to ensure that all contaminated soils and/or groundwater encountered during construction are handled in accordance with all applicable regulations.”*

Status→ Completed:

A Hazardous Materials Management Plan was developed and revised in December 2005, and all LAWA contractors are required to comply with its provisions as they apply to the different projects.

19.0.C MM-HAZ (WAMA)-1

The WAMA MMRP states:

Prior to construction at the Project site, additional research shall be undertaken to determine if abandoned/plugged wells at the Project site were abandoned per the current regulations. If necessary, these wells shall be properly abandoned per current regulations. Since the Division of Oil, Gas, and Geothermal Resources (DOGGR) maps are not guaranteed to be accurate, a magnetometer survey shall be completed to determine the exact location of these abandoned/plugged oil wells. If the magnetometer survey successfully determines the location of these oil wells, a subsurface investigation in coordination with the DOGGR and City of Los Angeles Fire Department, as applicable, will be performed to determine if the abandoned wells pose a risk during the grading and construction activities.

Specific DOGGR regulations and requirements for the inspection, testing, plugging, and abandonment of oil wells are contained within Chapter 4, Development, Regulation, and Conservation of Oil and Gas Resources, Article 3 of the State of California Code of Regulations. These regulations require a specific set of actions be taken, dependent on the found state of the abandoned oil wells (e.g. for open holes, a cement plug must extend from the total depth of the well or from at least 100 feet below the bottom of each oil or gas zone to at least 100 feet above the top of each oil or gas zone, for cased

holes, all perforations are to be plugged with cement, with the plug extending at least 100 feet above the top of a landed liner, the uppermost perforations, the casing cementing point, the water shut-off holes, or the oil or gas zone, whichever is highest). Chapter V, Article 7, (Fire Code) (57.90.01-45) of the Los Angeles City Municipal Code further regulates the location, drilling safeguards, and abandonment of oil wells in the City. In the event oil wells are found that have not been properly abandoned, the procedures and agency oversight prescribed in these regulations would serve as performance standards to ensure that significant impacts associated with the potential migration of fluids and groundwater contamination would be avoided during construction of the proposed Project. Construction will comply with all applicable requirements of DOGGR and the City of Los Angeles Fire Department for the investigation and/or re-abandonment of the well(s).

WAMA Status→ Ongoing:

A magnetometer test was conducted to identify the location of abandoned oil wells within the LAWA WAMA construction site. In addition, one abandoned oil well was encountered within the LAWA WAMA construction area towards the end of the 2014 reporting period (see photo). The site was flagged to prevent damage to the well. Follow up regarding the abandoned oil well will occur in the next (i.e., 2015) reporting period.



Abandoned Oil Well at LAWA WAMA construction site

20.0 Water Use

20.0.A W-1 Maximize Use of Reclaimed Water

The LAX Master Plan MMRP states:

“Maximize Use of Reclaimed Water. *To the extent feasible, LAWA will maximize the use of reclaimed water in Master Plan-related facilities and landscaping. The intent of this commitment is to maximize the use of reclaimed water as an offset for potable water use and to minimize the potential for increased water use resulting from implementation of the LAX Master Plan. This commitment will also facilitate achievement of the City of Los Angeles' goal of increased beneficial use of its reclaimed water resources. This commitment will be implemented by various means, such as installation and use of reclaimed water distribution piping for landscape irrigation.”*

BWP Status→ Completed

20.0.B W-2 Enhance Existing Water Conservation Program

The LAX Master Plan MMRP states:

“Enhance Existing Water Conservation Program. *“LAWA will enhance the existing Street Frontage and Landscape Plan for LAX to ensure the ongoing use of water conservation practices at LAX facilities. The intent of this program, to minimize the potential for increased water use due to implementation of the LAX Master Plan program, is also in accordance with regional efforts to ensure adequate water supplies for the future. Features of the enhanced conservation program will include identification of current water conservation practices and an assessment of their effectiveness; identification of alternate future conservation practices; continuation of the practice of retrofitting and installing new low-flow toilets and other water-efficient fixtures in all LAX buildings, as remodeling takes place or new construction occurs; use of Best Management Practices for maintenance; use of water efficient vegetation for landscaping, where possible; and continuation of the use of fixed automatic irrigation for landscaping.”*

Status→ Completed:

The Street Frontage and Landscape Plan was updated in March, 2005 and it includes policies pertaining to the use of reclaimed water in Master Plan-related landscaping and new policies enhancing the ongoing use of water conservation practices at LAX.

Some landscaped areas at LAX are irrigated by reclaimed water. The number of landscaped areas served is limited to those areas accessible to the reclaimed water supply pipeline. Approximately 129 million gallons or 173 acre-feet of water is conserved each year through the use of reclaimed water. Additionally, much of the irrigation system at LAX is monitored and controlled through a centralized computer irrigation control center. This system further conserves valuable water resources.

All buildings and passenger terminals at LAX feature low-flow devices on all toilets and sinks, with telephone numbers prominently posted in all restrooms so that people can notify maintenance staff if they encounter leaky faucets or other water problems.

LAWA's Design and Construction Handbook specifications for new and replacement water closets and urinals specify that the maximum water closet flush is to be limited to 1.28 gallons per flush and the maximum urinal flush is to be limited to 0.125 gallons per flush. In addition, water used in on-airport car wash facilities is recycled.

21.0 Wastewater

21.0.A MM-WW-1 Provide Additional Wastewater Treatment Capacity to Accommodate Cumulative Flows

The LAX Master Plan MMRP states:

“Provide Additional Wastewater Treatment Capacity to Accommodate Cumulative Flows. Additional wastewater capacity within the City of Los Angeles should be provided by the expansion/upgrade of the City's wastewater treatment systems via a combination of improvements to address the projected wastewater [capacity] shortfall resulting from cumulative development. Such improvements could include increasing capacity at the Hyperion Treatment Plant (HTP), building new reclamation capacity upstream of HTP, conservation of potable water, and infiltration/inflow reduction. Implementation of this mitigation measure is the responsibility of the City of Los Angeles Department of Public Works, Bureau of Sanitation. Specific improvements will be identified in the City's IPWP and Wastewater Facilities Plan component of the City's Integrated Resources Plan. The cost for implementing this mitigation measure would be passed on to LAX and other wastewater generators through increased wastewater fees.”

Status→ No action required:

LAWA has no jurisdiction regarding this mitigation measure which will be implemented by the City of Los Angeles Department of Public Works, Bureau of Sanitation.

22.0 Fire Protection

22.0.A FP-1 LAFD Design Recommendations

The LAX Master Plan MMRP states in part:

“LAFD Design Recommendations. During the design phase prior to initiating construction of a Master Plan component, LAWA will work with LAFD to prepare plans that contain the appropriate design features applicable to that component, such as those recommended by LAFD.”

BWP Status→ Completed

22.0.B PS-1 Fire and Police Facility Relocation Plan

The LAX Master Plan MMRP states:

“Fire and Police Facility Relocation Plan. Prior to any demolition, construction, or circulation changes that would affect LAFD Fire Stations 51, 80, and 95, or on-airport

police facilities, a Relocation Plan will be developed by LAWA through a cooperative process involving LAFD, LAWAPD, the LAPD LAX Detail, and other airport staff. The performance standards for the plan will ensure maintenance of required response times, response distances, fire flows, and a transition to new facilities such that fire and law enforcement services at LAX will not be significantly degraded. The plan will also address future facility needs, including details regarding space requirement, siting, and design.”

BWP Status→ Completed

22.0.C PS-2 Fire and Police Facility Space and Siting Requirements

The LAX Master Plan MMRP states:

“Fire and Police Facility Space and Siting Requirements. *During the early design phase for implementation of the Master Plan elements affecting on-airport fire and police facilities, LAWA and/or its contractors will consult with LAFD, LAWAPD, LAPD, and other agencies as appropriate, to evaluate and refine as necessary, program requirements for fire and police facilities. This coordination will ensure that final plans adequately support future facility needs, including space requirements, siting and design.”*

BWP Status→ Completed

23.0 Law Enforcement

23.0.A LE-1 Routine Evaluation of Manpower and Equipment Needs

The LAX Master Plan MMRP states:

“Routine Evaluation of Manpower and Equipment Needs. *LAWA will ensure that LAWAPD and LAPD LAX Detail continue to routinely evaluate and provide additional officers, supporting administrative staff, and equipment, to keep pace with forecasted increases in activity and development at LAX in order to maintain a high level of law enforcement services. This will be achieved through LAWA notification to LAWAPD and LAPD regarding pending development and construction and through LAWA review of status reports on law enforcement services at LAX.”*

Status→ Ongoing:

LAWAPD monitors law enforcement needs on an ongoing basis to adjust, as needed, law enforcement assignments and services at LAX in light of changes in conditions/circumstances including, but not limited to, passenger activity level increases. The ongoing monitoring and adjustments include officers, administrative staff, and equipment. Operational meetings are conducted regularly and steps are taken to adjust resources as needed. During 2014, which saw a six percent increase in passenger activity levels at LAX, staffing levels and assignments were monitored and adjusted as needed to maintain an acceptable level of law enforcement services at LAX.

In addition, the CALM team is responsible for coordinating with LAWAPD to ensure adequate law enforcement services associated with LAX Master Plan construction projects. In 2014, additional staffing was required for several Airport Operations Area (AOA) access posts used by construction vehicles.

23.0.B LE-2 Plan Review

The LAX Master Plan MMRP states:

“Plan Review. *During the design phase of terminal and cargo facilities and other major airport development, the LAPD, LAWAPD, and other law enforcement agencies will be consulted to review plans so that, where possible, environmental contributors to criminal activity, such as poorly-lit areas, and unsafe design, are reduced.”*

BWP Status→ Completed

24.0 Project Design Features – West Aircraft Maintenance Area (WAMA)

24.0.A WAMA-PDF-1 Quarterly Reporting

The WAMA MMRP states in part:

“The tenants of the WAMA site will be required to provide to LAWA a quarterly report indicating the number, time of day, duration, and specific aircraft type of all aircraft engine high-power and low-power ground run-ups conducted during the reporting period.....”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

“In conjunction with application of a ground run-up reporting program, LAWA will develop a tiered penalty program applicable to violations of the LAX nighttime curfew for aircraft engine high-power ground run-ups.....”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

24.0.B WAMA-PDF-2 APU Usage While Aircraft is Parked

The WAMA MMRP states:

“Aircraft parked at the WAMA site shall not utilize on-board auxiliary power units (APUs) for aircraft electrical power or interior cooling at parking spaces where ground power and preconditioned air are available, with the exceptions being: (1) if an APU is being

serviced or checked relative to those functions; or (2) for some limited time if APU is required to tug/tow aircraft to/from WAMA site (i.e., for proper operation of essential on-board electronics while being moved). In addition to the proposed RON kits with ground power and preconditioned air for aircraft parking positions along the perimeter of the site (i.e., at hangar areas along World Way West and RON/RAD positions along Pershing Drive), the final WAMA site design will include additional aircraft ground power connect ports at the two interior RON/RAD positions within the site.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

24.0.C WAMA-PDF-3 Aircraft Taxiing

The WAMA MMRP states:

“All aircraft traveling to or from WAMA during nighttime hours (11:00 p.m. to 6:00 a.m.) must be tugged/towed and are not allowed to taxi under own power, unless otherwise directed by LAWA Airport Operations in situation-specific circumstances where taxiing is required to maintain airfield safety and efficiency.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

24.0.D WAMA-PDF-4 Aircraft Engine Ground Run-Ups

The WAMA MMRP states:

“Aircraft engine high-power ground run-ups of any duration and low-power run-ups of five minutes or more can only occur at the onsite blast fence; and, all run-ups (high-power and low-power of any duration) are prohibited anywhere on the WAMA site between 11:00 p.m. and 6:00 a.m.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

24.0.E WAMA-PDF-5 Use of the WAMA Site

The WAMA MMRP states:

“Aircraft parking spaces at WAMA site cannot be used for passenger boarding or deplaning (i.e., cannot be used as remote gates), except during or as a result of emergency circumstances.”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

24.0.F WAMA-PDF-6 Automated Run-Up Monitoring System

The WAMA MMRP states:

“An aircraft engine ground run-up monitoring system, including a sound level meter and video camera, will be provided at the run-up area. LAWA will make all reasonable efforts to make data from the monitoring system accessible to the public via an internet link provided on LAWA’s website (i.e., lawa.org).”

Status→ No action required at this time:

This measure was not applicable during the 2014 reporting period as there was no aircraft activity for that area because the project was not operational.

APPENDIX A

LAX MASTER PLAN MMRP AS ADOPTED DECEMBER 2004

REFERENCE

LAWA Website:

http://www.lawa.org/uploadedFiles/OurLAX/Past_Projects_and_Studies/Past_Publications/mmrp.pdf

for a copy of the document

APPENDIX B

LAX MASTER PLAN PROJECT-SPECIFIC MEASURES

(SAIP-SPECIFIC MEASURES, CFTP-SPECIFIC MEASURES, BWP-SPECIFIC, AND WAMA-SPECIFIC MEASURES)

**SOUTH AIRFIELD IMPROVEMENT PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES¹**

Master Plan Commitments/ Mitigation Measures		Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<i>Biotic Communities</i>					
MM-BC (SA)-1 Monitoring Agency: LAWA	Replacement of Habitat Units Associated with the South Airfield Improvement Project. LAWA or its designee shall undertake mitigation for the loss of 17.2 habitat units resulting from implementation of the SAIP. These habitat units shall be replaced at a 1:1 ratio within the FAA owned habitat preserve at the former Marine Corps Air Station El Toro (El Toro site), or other appropriate site.	Impacts on Disturbed/Bare Ground and Non-Native Grassland/Ruderal areas	Preparation of Replacement Plan prior to or concurrent with commissioning of relocated Runway 7R-25L	As per Replacement Plan for Habitat Units	Preparation of Replacement Plan for Habitat Units; Periodic Monitoring Report
MM-BC (SA)-2 Monitoring Agency: LAWA	Conservation of Faunal Resources Associated with the South Airfield Improvement Project. Directed surveys for the San Diego black-tailed jackrabbit and the loggerhead shrike shall be undertaken by a qualified wildlife biologist at least 14 days before construction activities. LAWA or its designee shall relocate any observed San Diego black-tailed jackrabbit individuals currently inhabiting the SAIP project areas. Relocation efforts shall be coordinated with CDFG.	Impacts on San Diego black-tailed jackrabbit habitat and loggerhead shrike habitat	Initiated and completed prior to or concurrent with commissioning of relocated Runway 7R-25L	As per Replacement Plan for Habitat Units	Preparation of Replacement Plan for Habitat Units; Periodic Monitoring Report

¹ The South Airfield Improvement Project is subject to many of the LAX Master Plan Commitments and Mitigation Measures adopted in conjunction with the LAX Master Plan Final EIR. See User Guide located at front of the MMRP.

**CROSSFIELD TAXIWAY PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES¹**

CFTP-Specific Mitigation Measures		Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Historical/Architectural and Archaeological/Cultural Resources					
MM-HA (CFTP)-1 Monitoring Agency: LAWA	Conformance with LAX Master Plan Archaeological Treatment Plan: Prior to initiation of grading and construction activities, LAWA will retain an on-site Cultural Resource Monitor (CRM), as defined in the LAX Master Plan MMRP ATP, who will determine if the proposed project area is subject to archaeological monitoring. As defined in the ATP, areas are not subject to archaeological monitoring if they contain redeposited fill or have previously been disturbed. The CRM will compare the known depth of redeposited fill or disturbance to the depth of planned grading activities, based on a review of construction plans. If the CRM determines that the proposed project site is subject to archaeological monitoring, a qualified archaeologist (an archaeologist who satisfies the Secretary of the Interior's Professional Qualifications Standards [36 CFR 61]) shall be retained by LAWA to inspect excavation and grading activities that occur within native material. The extent and frequency of inspection shall be defined based on consultation with the archaeologist. Following initial inspection of excavation materials, the archaeologist may adjust inspection protocols as work proceeds.	Potential to unexpectedly encounter and impact subsurface archaeological resources, including Native American remains, during grading and excavation associated with construction of the CFTP	Prior to initiation of grading and/or excavation activities associated with the construction of the CFTP	As per the Cultural Resource Monitor determining proposed project area being subject to archaeological monitoring, the extent and frequency of inspection shall be defined based on consultation with the archeologist	Conformance with LAX Master Plan Archaeological Treatment Plan

¹ The Crossfield Taxiway Project is subject to many of the LAX Master Plan Commitments and Mitigation Measures adoption in conjunction with the LAX Master Plan Final EIR. See User Guide at front of MMRP.

**CROSSFIELD TAXIWAY PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES¹**

CFTP-Specific Mitigation Measures		Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Paleontological Resources					
MM-PA (CFTP)-1 Monitoring Agency: LAWA	Conformance with LAX Master Plan Paleontological Management Treatment Plan: Prior to the initiation of grading and construction activities, LAWA will retain a professional paleontologist, as defined in the Final LAX Master Plan MMRP PMTP, who will determine if the project site exhibits a high or low potential for subsurface resources. If the project site is determined to exhibit a high potential for subsurface resources, paleontological monitoring will be conducted in accordance with the procedures stipulated in the PMTP. If the project site is determined to exhibit a low potential for subsurface deposits, excavation need not be monitored as per the PMTP. In the event that paleontological resources are discovered, the procedures outlined in the PMTP for the identification of resources will be followed.	Potential to unexpectedly encounter and impact subsurface paleontological resources during grading and excavation associated with construction of the CFTP	Prior to initiation of grading and/or excavation activities associated with the construction of the CFTP	As per the professional paleontologist determining proposed project area being subject to paleontological monitoring, the extent and frequency of inspection shall be defined based on procedures outlined in the PMTP	Conformance with LAX Master Plan Paleontological Management Treatment Plan
MM-PA (CFTP)-2 Monitoring Agency: LAWA	Construction Personnel Briefing: In accordance with the PMTP, construction personnel will be briefed by the consulting paleontologist in the identification of fossils or fossiliferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur.	Potential to unexpectedly encounter and impact subsurface paleontological resources during grading and excavation associated with construction of the CFTP	Prior to initiation of grading and/or excavation activities associated with the construction of the CFTP	Once	Completion of briefing of construction personnel on identification of fossils or fossiliferous deposits and notification procedures in accordance with the PMTP

**CROSSFIELD TAXIWAY PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES¹**

CFTP-Specific Mitigation Measures		Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Biotic Communities					
MM-BC (CFTP)-1 Monitoring Agency: LAWA	<p>Conservation of Floral Resources: Southern Tarplant. LAWA or its designee shall prepare a special status plant mitigation program. The loss of the southern tarplant individuals shall be mitigated through seed collection and seeding into a suitable mitigation site within undeveloped property owned by LAWA, determined based on habitat, soil type, moisture levels, and other relevant conditions.</p> <p>A qualified Seed Collector shall monitor the tarplant phenology to determine the appropriate timing for seed collection. Tarplant seed shall be collected from all tarplants within the impact area, which shall be delineated in the field with lath and flagging by a Qualified Biologist. The Biologist shall ensure that seed shall only be collected from plants that will be impacted by the CFTP. Upon completion of seed collection, the seed collector shall clean the seeds to prepare for the seeding effort.</p> <p>A mitigation plan shall be developed at a level of detail necessary for successful program implementation by a Landscape Contractor. The detailed program shall contain the following items:</p> <ul style="list-style-type: none"> ◆ <i>Responsibilities and qualifications of the personnel to implement and supervise the plan.</i> The plan shall specify the responsibilities and qualifications of the personnel who will supervise and implement the mitigation plan, including LAWA, Technical Specialists, and Maintenance Personnel. 	Impacts on the loss of the southern tarplant individuals	Preparation of a special status plant mitigation program prior to relocation/ construction of the existing American Airlines employee parking lot	As per special status plant mitigation program for southern tarplant resources; Regular site visits (i.e. monthly, quarterly) for no more than 5 years or until germination, flowering and seed set of at least 29 individuals (100 percent of the original population size)	Preparation of special status plant mitigation program; Periodic Monitoring Report

**CROSSFIELD TAXIWAY PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES¹**

CFTP-Specific Mitigation Measures	Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<ul style="list-style-type: none"> ◆ <i>Site selection.</i> The site for the mitigation shall be determined in coordination with LAWA, and shall be located in a suitable area within the boundaries of LAX. The appropriate site shall consist of approximately 0.14 acre and shall have suitable hydrology, soils, and other factors necessary for the establishment of the southern tarplant. Such suitable sites exist within the boundaries of LAX, including but not limited to areas within LAX Northside and in the southwestern portion of the airport, west of the south airfield complex. ◆ <i>Site preparation and planting implementation.</i> The plan shall include specifications for seed collection and storage and guidelines for on-site preparation. The guidelines shall contain specifications for (1) existing native species protection; (2) trash and weed removal; (3) soil treatments (e.g., imprinting and decompacting); (4) temporary irrigation installation as needed; (5) erosion control measures (e.g., rice or willow wattles); and (6) seed application. ◆ <i>Schedule.</i> A schedule shall be developed, which includes planting, to occur in late fall and early winter (between October and January 30). ◆ <i>Maintenance plan/guidelines.</i> A three to five year maintenance plan shall include (1) weed control; (2) herbivory control; (3) trash removal; (4) irrigation system maintenance; (5) maintenance training; and (6) replacement seeding, if necessary. Ten percent of the original seed collected shall be stored in the event it is needed for replacement seeding. 				

**CROSSFIELD TAXIWAY PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES¹**

CFTP-Specific Mitigation Measures	Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>♦ <i>Monitoring plan.</i> The monitoring plan shall include the following success criteria:</p> <ul style="list-style-type: none"> - Germination, flowering and seed set of at least 17 individuals (60 percent of the original population size) in year one; - Germination, flowering and seed set of at least 23 individuals (80 percent of the original population size) by year three; - Germination, flowering and seed set of at least 29 individuals (100 percent of the original population size) by year five. <p>If these success criteria are not met, or are unlikely to be met within the required time periods, remedial measures will be required.</p> <p>This plan may include qualitative and quantitative monitoring. Qualitative monitoring includes site visits at regular intervals (i.e., monthly, quarterly, etc.) to determine the overall general performance of the site and maintenance needs. Quantitative monitoring is conducted on an annual basis and includes data collection specific to the performance standards established in the monitoring plan.</p> <p><i>Long-term preservation.</i> Long-term preservation of the site shall also be outlined in the conceptual mitigation plan to ensure that future development does not impact the mitigation site.</p>				

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Surface Transportation					
MM-ST (BWP)-1 Monitoring Agency: LAWA	Trip Reduction Measures. LAWA will implement the following trip reduction measures: (a) Continue to promote and expand the FlyAway services in accordance with LAX Master Plan Mitigation Measure MM-AQ-3. It is anticipated that the continued expansion of the FlyAway service will promote a shift in mode-share away from the private vehicle mode which would reduce traffic volume using the CTA roadway system. (b) Continue to promote the consolidation of shuttle services (e.g., hotel/motel, off-airport parking, rental cars) or programs to reduce trips associated with these modes.	Traffic congestion and delays along on-airport roadways during airport operations	Ongoing programs	Annually	Status updates/confirmation in annual MMRP progress report
MM-ST (BWP)-2 Monitoring Agency: LAWA	Improve the Intersection of Center Way and World Way South. Widen World Way South approach on the east side of the roadway to provide an additional right turn lane. The resulting configuration would be a single left turn lane, one through-left turn lane, two through lanes, and two right turn lanes. During the Future (2013) Without Project overall airport peak hour the intersection of Center Way and World Way South operates at a V/C of 0.978 which is LOS E. With an intersection operating at a LOS E condition, the volume to capacity ratio can be increased by 0.01 without generating an impact. This	Traffic congestion and delays at the intersection of Center Way and World Way South during airport operations	When traffic levels reach the conditions specified in the measure	(1) Prior to implementation of intersection improvements, this measure will be monitored annually to determine whether CTA average daily traffic volumes in the peak month (August) have	Confirmation that the subject intersection improvement has been completed

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>equates to an increase in the intersection's V/C ratio from 0.978 to 0.988, or approximately 1.1 percent (i.e., 0.988/0.978) in the critical movement traffic volume without triggering an impact. LAWA will monitor traffic conditions at this intersection to determine when an estimated impact has been "triggered" in accordance with the LOS thresholds described above. Specifically, LAWA will monitor future CTA average daily traffic volumes in August to determine when CTA average daily traffic volumes have increased by more than 1.1 percent relative to the Future (2013) Without Project average daily traffic volumes. In addition, LAWA will record turning movement volumes at this intersection annually during the airport's peak month (August). When the August average daily CTA volumes have increased by 1.1 percent as compared to the Future (2013) Without Project estimated volume, LAWA will complete a V/C analysis using the same intersection methodology described in the Bradley West Draft EIR (Section 4.1.3.7) to determine if an impact has occurred. The mitigation measure would be constructed once both (a) the CTA average daily traffic volumes are 1.1 percent greater than the Future (2013) Without Project and (b) the V/C for the intersection meets or exceeds 0.988. The intersection analysis would be subject to approval by LADOT regarding timing of the mitigation measure.</p>			<p>increased by more than 1.1 percent relative to the Future (2013) Without Project average daily traffic volumes, based on annual passenger activity reports. (2) Following implementation of intersection improvements, the monitoring frequency will be reduced to once, upon completion of subject intersection improvement</p>	

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-ST (BWP)-3 Monitoring Agency: LAWA	Widen World Way Across from TBIT. Widen the arrivals-level outer roadway across from TBIT by changing the left-most lane that currently terminates at Center Way to a through/left lane and extending this lane to World Way South.	Traffic congestion and delays along on-airport roadways during airport operations	The subject widening shall occur in conjunction with the project-related construction at TBIT, which is anticipated to be completed in 2013	Once, upon completion of subject roadway widening	Confirmation that the subject roadway widening has been completed
MM-ST (BWP)-4 Monitoring Agency: LAWA	Modify the Intersection of Airport Boulevard and Manchester Avenue (Intersection #9). The eastbound approach to the Airport Boulevard and Manchester Avenue intersection shall be restriped to provide one left-turn lane, two through lanes, and a through/right lane. Three parking spaces on the south side of Manchester Avenue west of Belford Avenue and two parking spaces on the south side of Manchester Avenue east of Belford Avenue shall be restricted during the PM peak period. Alternatively, the westbound approach to the Airport Boulevard and Manchester Avenue intersection shall be restriped and the traffic signal modified to provide two left-turn lanes, two through lanes, and a right-turn lane. This mitigation measure will be implemented to the standards and satisfaction of the City of Los Angeles. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 19.7 million annual passengers.	Traffic congestion and delays at the intersection of Airport Boulevard and Manchester Avenue during airport operations	If/when international passenger activity levels at TBIT increase to 19.7 million annual passengers	(1) Prior to implementation of the intersection improvements, this measure will be monitored annually to determine whether TBIT passenger activity levels have reached 19.7 MAP, based on annual passenger activity reports. (2) Following implementation of the intersection improvement, the monitoring frequency will be reduced to	Confirmation that the subject intersection improvement has been completed

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
				occurring just once, upon completion of the intersection improvement	
MM-ST (BWP)-5 Monitoring Agency: LAWA	Modify the Intersection of Arbor Vitae Street and Aviation Boulevard (Intersection #10). The eastbound approach to the Arbor Vitae Street and Aviation Boulevard intersection shall be widened to provide one left-turn lane, two through lanes, and a right-turn lane. This mitigation measure will be implemented to the standards and satisfaction of the City of Los Angeles and City of Inglewood. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 20.7 million annual passengers.	Traffic congestion and delays at the intersection of Arbor Vitae Street and Aviation Boulevard during airport operations	If/when international passenger activity levels at TBIT increase to 20.7 million annual passengers	(1) Prior to implementation of the intersection improvement, this measure will be monitored annually to determine whether TBIT passenger activity levels have reached 20.7 MAP, based on annual passenger activity reports. (2) Following implementation of the intersection improvement, the monitoring frequency will be reduced to occurring just once, upon completion of the intersection	Confirmation that the subject intersection improvement has been completed

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
				improvement	
MM-ST (BWP)-6 Monitoring Agency: LAWA	Modify the Intersection of Imperial Highway and Sepulveda Boulevard (Intersection #71). The northbound approach to the Imperial Highway and Sepulveda Boulevard intersection shall be restriped to provide one left-turn lane, three through lanes, and two right-turn lanes. While restriping this intersection as described above would mitigate this impact, an alternative would be to widen the east side of Sepulveda Boulevard south of Imperial Highway to provide one left-turn lane, three through lanes, and two right-turn lanes on the northbound approach. However, provided the right-of-way is available, the provision of additional travel lane area would require disruption of traffic flows, generation of construction-related air pollutant emissions and noise impacts, and therefore the restriping is recommended rather than the widening. This mitigation measure will be implemented to the standards and satisfaction of the City of Los Angeles, City of El Segundo, and Caltrans. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 19.7 million annual passengers.	Traffic congestion and delays at the intersection of Imperial Highway and Sepulveda Boulevard during airport operations	If/when international passenger activity levels at TBIT increase to 19.7 million annual passengers	(1) Prior to implementation of the intersection improvement, this measure will be monitored annually to determine whether TBIT passenger activity levels have reached 19.7 MAP, based on annual passenger activity reports. (2) Following implementation of the intersection improvement, the monitoring frequency will be reduced to occurring just once, upon completion of the intersection improvement	Confirmation that the subject intersection improvement has been completed

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-ST (BWP)-7 Monitoring Agency: LAWA	Modify the Intersection of La Cienega Boulevard and I-405 Ramps N/O Century Boulevard (Intersection #96). The southbound approach to the La Cienega Boulevard and I-405 Ramps N/O Century Boulevard intersection shall be widened to provide two left-turn lanes and two through lanes. This mitigation measure will be implemented to the standards and satisfaction of the City of Los Angeles, City of Inglewood, and Caltrans. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 20.7 million annual passengers.	Traffic congestion and delays at the intersection of La Cienega Boulevard and I-405 Ramps N/O Century Boulevard during airport operations	If/when international passenger activity levels at TBIT increase to 20.7 million annual passengers	(1) Prior to implementation of the intersection improvement, this measure will be monitored annually to determine whether TBIT passenger activity levels have reached 20.7 MAP, based on annual passenger activity reports. (2) Following implementation of the intersection improvement, the monitoring frequency will be reduced to occurring just once, upon completion of the intersection improvement	Confirmation that the subject intersection improvement has been completed
MM-ST (BWP)-8 Monitoring Agency:	Modify the Intersection of La Tijera Boulevard and Sepulveda Boulevard (Intersection #101). The westbound approach to the La Tijera Boulevard and Sepulveda Boulevard intersection shall be restriped	Traffic congestion and delays at the intersection of La Tijera Boulevard and	If/when international passenger activity levels at TBIT	(1) Prior to implementation of the intersection improvement, this	Confirmation that the subject intersection improvement has been completed

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Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
LAWA	and the traffic signal modified to provide two left-turn lanes, one through lane, and a through/right lane. This mitigation measure will be implemented to the standards and satisfaction of the City of Los Angeles. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 18.7 million annual passengers.	Sepulveda Boulevard during airport operations	increase to 18.7 million annual passengers	measure will be monitored annually to determine whether TBIT passenger activity levels have reached 18.7 MAP, based on annual passenger activity reports. (2) Following implementation of the intersection improvement, the monitoring frequency will be reduced to occurring just once, upon completion of the intersection improvement	

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-ST (BWP)-9 Monitoring Agency: LAWA	Modify the Intersection of Sepulveda Boulevard and 76th/77th Street (Intersection #136). The eastbound approach to the Sepulveda Boulevard and 76th/77th Street intersection shall be restriped to provide two left-turn lanes, a through/left-turn lane, and one right-turn lane. This mitigation measure will be implemented to the standards and satisfaction of the City of Los Angeles. Implementation of this measure shall occur if/when international passenger activity levels at TBIT increase to 19.7 million annual passengers.	Traffic congestion and delays at the intersection of Sepulveda Boulevard and 76th/77th Street during airport operations	If/when international passenger activity levels at TBIT increase to 19.7 million annual passengers	(1) Prior to implementation of the intersection improvement, this measure will be monitored annually to determine whether TBIT passenger activity levels have reached 19.7 MAP, based on annual passenger activity reports. (2) Following implementation of the intersection improvement, the monitoring frequency will be reduced to occurring just once, upon completion of the intersection improvement	Confirmation that the subject intersection improvement has been completed
MM-ST (BWP)-10 Monitoring Agency:	Modify the Intersection of Imperial Highway and Main Street (Intersection #68). Modify the median island on the east leg of the intersection to provide a second left turn lane. The resulting westbound	Traffic congestion and delays at the intersection of Imperial Highway and Main	The preparation of intersection improvement plans, pursuit of	Once, upon completion of the subject intersection	Confirmation that the subject intersection improvement has been completed

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
LAWA	configuration would be comprised of a dual left-turn lane and two through lanes.	Street due to peak construction traffic	necessary approvals, and scheduling for receipt of contractor estimates/bids shall commence immediately upon approval of the Bradley West Project	improvement	
MM-ST (BWP)-11 Monitoring Agency: LAWA	Modify the Intersection of Imperial Highway and Pershing Drive (Inter-section #69). Widen the north side of the westbound approach of Imperial Highway to provide a second right-turn lane. The resulting westbound lane configuration would be comprised of one left turn lane, two through lanes, and two right turn lanes.	Traffic congestion and delays at the intersection of Imperial Highway and Pershing Drive due to peak construction traffic	The preparation of intersection improvement plans, pursuit of necessary approvals, and scheduling for receipt of contractor estimates/bids shall commence immediately upon approval of the Bradley West Project	Once, upon completion of the subject intersection improvement	Confirmation that the subject intersection improvement has been completed
MM-ST (BWP)-12 Monitoring Agency:	Distribution of Contractor Employee Parking between the Northwest Construction Staging/Parking Area and the East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area. General parking for Bradley	Traffic congestion and delays at off-airport intersections during project construction	Prior to start of construction of the Bradley West Project	Once, prior to finalization of construction bid documents for activities that	Confirmation that construction bid documents for activities involving the subject parking areas

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
LAWA	West Project contractor employees within the Northwest Construction Staging/Parking Area and within the East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area shall be distributed such that neither the northwest area (i.e., Northwest Construction Staging/Parking Area) or the east/southeast area (i.e., East Contractor Employee Parking Area or Southeast Construction Staging/Parking Area) is assigned parking for more than 601 vehicles. Should the need for contractor employees' daily general parking exceed 601 vehicles in either of these areas (northwest area or east/southeast area), the additional increment of daily parking demand shall be assigned to the other area.			would use the subject contractor employee parking areas	include the parking limitations specified in the measure

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Historical/Architectural and Archaeological/Cultural Resources					
MM-HA (BWP)-1 Monitoring Agency: LAWA	<p>Conformance with LAX Master Plan Archaeological Treatment Plan. Prior to initiation of grading and construction activities, LAWA will retain an on-site Cultural Resource Monitor (CRM), as defined in the LAX Master Plan MMRP ATP, who will determine if the proposed project area is subject to archaeological monitoring. As defined in the ATP, areas are not subject to archaeological monitoring if they contain redeposited fill or have previously been disturbed. The CRM will compare the known depth of redeposited fill or disturbance to the depth of planned grading activities, based on a review of construction plans. If the CRM determines that the proposed project site is subject to archaeological monitoring, a qualified archaeologist (an archaeologist who satisfies the Secretary of the Interior's Professional Qualifications Standards [36 CFR 61]) shall be retained by LAWA to inspect excavation and grading activities that occur within native material. The extent and frequency of inspection shall be defined based on consultation with the archaeologist. Following initial inspection of excavation materials, the archaeologist may adjust inspection protocols as work proceeds.</p>	Potential to unexpectedly encounter and impact subsurface archaeological resources, including Native American remains, during grading and excavation associated with construction of the Bradley West Project	Prior to initiation of grading and/or excavation activities associated with the construction of the Bradley West Project	The extent and frequency of inspection shall be defined based on consultation with the qualified archaeologist if the Cultural Resource Monitor determines that the project area is subject to archaeological monitoring	Conformance with LAX Master Plan Archaeological Treatment Plan

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Paleontological Resources					
MM-PA (BWP)-1 Monitoring Agency: LAWA	Conformance with LAX Master Plan Paleontological Management Treatment Plan. Prior to the initiation of grading and construction activities, LAWA will retain a professional paleontologist, as defined in the Final LAX Master Plan MMRP PMTP, who will determine if the project site exhibits a high or low potential for subsurface resources. If the project site is determined to exhibit a high potential for subsurface resources, paleontological monitoring will be conducted in accordance with the procedures stipulated in the PMTP. If the project site is determined to exhibit a low potential for subsurface deposits, excavation need not be monitored as per the PMTP. In the event that paleontological resources are discovered, the procedures outlined in the PMTP for the identification of resources will be followed.	Potential to unexpectedly encounter and impact subsurface paleontological resources during grading and excavation associated with construction of the Bradley West Project	Prior to initiation of grading and/or excavation activities associated with the construction of the Bradley West Project	The extent and frequency of inspection shall be defined based on procedures outlined in the PMTP if the professional paleontologist determines that the project area is subject to paleontological monitoring	Conformance with LAX Master Plan Paleontological Management Treatment Plan
MM-PA (BWP)-2 Monitoring Agency: LAWA	Construction Personnel Briefing. In accordance with the PMTP, construction personnel will be briefed by the consulting paleontologist in the identification of fossils or fossiliferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur.	Potential to unexpectedly encounter and impact subsurface paleontological resources during grading and excavation associated with construction of the Bradley West Project	Prior to initiation of grading and/or excavation activities associated with the construction of the Bradley West Project	Once, prior to the initiation of grading and/or excavation activities	Completion of briefing of construction personnel on identification of fossils or fossiliferous deposits and notification procedures in accordance with the PMTP

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Biotic Communities					
MM-BC (BWP)-1 Monitoring Agency: LAWA	<p>Conservation of Floral Resources: Southern Tarplant. LAWA or its designee shall prepare a special status plant mitigation program for the southern tarplant. The loss of the southern tarplant individuals shall be mitigated through seed collection and seeding into a suitable mitigation site within undeveloped property owned by LAWA or at a suitable off-site location, determined based on habitat, soil type, moisture levels, and other relevant conditions. One suitable off-site location is the Three Sisters Reserve located on the Palos Verdes Peninsula.</p> <p>A qualified Seed Collector shall monitor the tarplant phenology to determine the appropriate timing for seed collection. Tarplant seed shall be collected from all tarplants within the impact area, which shall be delineated in the field with lath and flagging by a qualified biologist. The biologist shall ensure that seed shall only be collected from plants that will be impacted by the Bradley West Project. Upon completion of seed collection, the seed collector shall clean the seeds to prepare for the seeding effort.</p> <p>A mitigation plan shall be developed at a level of detail necessary for successful program implementation by a landscape contractor. The detailed program shall contain the following items:</p> <ul style="list-style-type: none"> ◆ <i>Responsibilities and qualifications of the personnel to implement and supervise the plan.</i> The plan shall specify the responsibilities and 	Loss of southern tarplant individuals	Preparation of a special status plant mitigation program upon project approval and prior to initiation of construction of the Bradley West Project	As per special status plant mitigation program for southern tarplant ; Regular site visits (i.e., monthly, quarterly) for no more than 5 years or until germination, flowering and seed set of at least 300 individuals (100 percent of the original population size)	Preparation of special status plant mitigation program; periodic monitoring report, at least annually

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Bradley West Project-Specific Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>qualifications of the personnel who will supervise and implement the mitigation plan, including LAWA, Technical Specialists, and Maintenance Personnel.</p> <ul style="list-style-type: none"> ◆ <i>Site selection.</i> The site for the mitigation shall be determined in coordination with LAWA, and shall be located in a suitable area within the boundaries of LAX or at a suitable off-site location. The appropriate site shall consist of approximately 0.76 acre and shall have suitable hydrology, soils, and other factors necessary for the establishment of the southern tarplant. Such suitable sites exist within the boundaries of LAX, including but not limited to areas within LAX Northside and in the southwestern portion of the airport, west of the south airfield complex. If a site at LAX is selected, site selection will occur in consultation with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports" and LAWA's "LAX Wildlife Hazard Mitigation Plan" to avoid increasing wildlife hazards to aircraft. ◆ <i>Site preparation and planting implementation.</i> The plan shall include specifications for seed collection and storage and guidelines for on-site preparation. The guidelines shall contain specifications for (1) existing native species protection; (2) trash and weed removal; (3) soil treatments (e.g., imprinting and decompacting); (4) temporary irrigation installation as needed; (5) erosion control measures (e.g., rice or willow 				

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Bradley West Project-Specific Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>wattles); and (6) seed application.</p> <ul style="list-style-type: none"> ◆ <i>Schedule.</i> A schedule shall be developed, which includes planting, to occur in late fall and early winter (between October and January 30). ◆ <i>Maintenance plan/guidelines.</i> A three to five year maintenance plan shall include (1) weed control; (2) herbivory control; (3) trash removal; (4) irrigation system maintenance; (5) maintenance training; and (6) replacement seeding, if necessary. Ten percent of the original seed collected shall be stored in the event it is needed for replacement seeding. ◆ <i>Monitoring plan.</i> The monitoring plan shall include the following success criteria: <ul style="list-style-type: none"> – Germination, flowering and seed set of 60 percent of the original population size in year one; – Germination, flowering and seed set of 80 percent of the original population size by year three; – Germination, flowering and seed set of 100 percent of the original population size by year five. <p>If these success criteria are not met, or are unlikely to be met within the required time periods, remedial measures will be required. Such measures could include reseeding, transplanting container plants or selection of an alternative site if required.</p> <p>This plan may include qualitative and quantitative monitoring. Qualitative monitoring includes site visits at regular intervals (i.e., monthly, quarterly,</p>				

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	<p>etc.) to determine the overall general performance of the site and maintenance needs. Quantitative monitoring is conducted on an annual basis and includes data collection specific to the performance standards established in the monitoring plan.</p> <ul style="list-style-type: none"> ♦ <i>Long-term preservation.</i> Long-term preservation of the site shall also be outlined in the conceptual mitigation plan to ensure that future development does not impact the mitigation site. 				
MM-BC (BWP)-2 Monitoring Agency: LAWA	<p>Conservation of Floral Resources: Lewis' Evening Primrose. Prior to any work activities (i.e., vegetation clearing, invasive species removal and/or spraying, and sediment removal) on the project site, including construction staging areas, pre-construction focused surveys shall be conducted during the period of March through May by a qualified biologist to determine the presence or absence of Lewis' evening primrose. Known populations of this species shall be monitored to determine the best time to conduct the surveys. The surveys shall follow guidelines developed by the CNPS and the CDFG. If this species is not observed, no further mitigation shall be required. If this plant species is observed on-site, a qualified botanist and LAWA shall evaluate the number of individuals, their location and the type of impact that would occur to determine if the anticipated impact would result in a substantial adverse effect or substantial net reduction in the population, given the species' rarity and abundance. If impacts are deemed not significant, no additional measures are warranted.</p>	Potential loss of Lewis' evening primrose individuals that would result in a substantial adverse effect or substantial net reduction in population	Prior to any work activities, pre-construction focused surveys during the period of March through May to determine the presence or absence of Lewis' evening primrose. If it is determined that a substantial net reduction in population would occur, preparation of a special status plant mitigation program prior to initiation of construction of the Bradley West	If required, as per special status plant mitigation program for Lewis' evening primrose; regular site visits (e.g., quarterly, annually) for no more than 5 years or until germination, flowering and seed set of at least an equal number of plants impacted	If required, preparation of special status plant mitigation program; periodic monitoring report, at least annually

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Bradley West Project-Specific Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>If it is determined that a substantial net reduction in population would occur, LAWA or its designee shall prepare and implement a plan to compensate for the loss of individuals of the sensitive Lewis' evening primrose. LAWA or its designee shall collect seed from those plants to be removed, and properly clean and store the collected seed until used. A mitigation site of suitable habitat equal to the area of impact shall be delineated within the boundaries of LAX or at a suitable off-site location. If a site at LAX is selected, site selection will occur in consultation with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports" and LAWA's "LAX Wildlife Hazard Mitigation Plan" to avoid increasing wildlife hazards to aircraft. Collected seed shall be broadcast (distributed) after the first wetting rain. LAWA or its designee shall implement a monitoring plan to monitor the establishment of individuals of Lewis' evening primrose for a period of not more than five years. Performance criteria shall include the establishment of an equal number of plants as that impacted in the first year following the distribution of seed within the mitigation site. Performance criteria shall also include confirmation of recruitment for two years following the first year flowering is observed and establishment of individuals throughout the mitigation area within three years following the first year flowering is observed.</p>		Project		

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-BC (BWP)-3 Monitoring Agency: LAWA	<p>Conservation of Floral Resources: California Spineflower. Prior to any work activities (i.e., vegetation clearing, invasive species removal and/or spraying, and sediment removal) on the project site, including construction staging areas, pre-construction focused surveys shall be conducted during the period of March through July by a qualified biologist to determine the presence or absence of California spineflower. Known populations of this species shall be monitored to determine the best time to conduct the surveys. The surveys shall follow guidelines developed by the CNPS and the CDFG. If this species is not observed, no further mitigation shall be required. If this plant species is observed on-site, a qualified botanist and LAWA shall evaluate the number of individuals, their location and the type of impact that would occur to determine if the anticipated impact would result in a substantial adverse effect or substantial net reduction in the population, given the species' rarity and abundance. If impacts are deemed not significant, no additional measures are warranted.</p> <p>If impacts to California spineflower are found to be adverse, LAWA or its designee shall prepare and implement a plan to compensate for the loss of individuals of the sensitive California spineflower. LAWA or its designee shall collect seed from those plants to be removed, and properly clean and store the collected seed until used. A mitigation site of suitable habitat equal to the area of impact shall be delineated within the boundaries of LAX or at a suitable off-site location. If a site at LAX is selected,</p>	<p>Potential loss of California spineflower individuals that would result in a substantial adverse effect or substantial net reduction in population</p>	<p>Prior to any work activities, pre-construction focused surveys during the period of March through July to determine the presence or absence of California spineflower. If it is determined that a substantial net reduction in population would occur, preparation of a special status plant mitigation program prior to initiation of construction of the Bradley West Project</p>	<p>If required, as per special status plant mitigation program for California Spineflower; regular site visits (e.g., quarterly, annually) for no more than 5 years or until germination, flowering and seed set of at least an equal number of plants impacted</p>	<p>If required, preparation of special status plant mitigation program; periodic monitoring report, at least annually</p>

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	<p>site selection will occur in consultation with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports" and LAWA's "LAX Wildlife Hazard Mitigation Plan" to avoid increasing wildlife hazards to aircraft. Collected seed shall be broadcast (distributed) after the first wetting rain. LAWA or its designee shall implement a monitoring plan to monitor the establishment of individuals of California spineflower for a period of not more than five years. Performance criteria shall include the establishment of an equal number of plants as that impacted in the first year following the distribution of seed within the mitigation site. Performance criteria shall also include confirmation of recruitment for two years following the first year flowering is observed and establishment of individuals throughout the mitigation area within three years following the first year flowering is observed.</p>				
MM-BC (BWP)-4	<p>Conservation of Faunal Resources: Burrowing Owl. Prior to any work activities (i.e., vegetation clearing, invasive species removal and/or spraying, and sediment removal) within the Southeast Construction Staging/Parking Area (also known as the Continental City site), a survey for burrows by a qualified biologist will be conducted by walking through the suitable habitat within the site in accordance with CDFG-accepted protocols. If the site contains burrows that could be used by burrowing owls, four surveys will be conducted during the burrowing owl breeding season (April 15 through July</p>	Potential loss of burrowing owl individuals	Prior to any work activities within the Southeast Construction Staging/Parking Area, a survey for burrows that could be used by burrowing owls and, if burrows are present, four additional surveys	If required, monthly removal of burrows between September and January every year during construction period. If nesting owls are identified during the four surveys,	If required, preparation of Habitat Restoration Plan including periodic monitoring report, at least annually. Removal of burrows annually, if present, until entire staging area is in use; reports submitted periodically, at least annually, during construction or

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<p>15). If an active burrow is observed during the nesting season, disturbance of the owls would constitute a significant impact and the burrow will be protected until nesting activity has ended to ensure compliance with Section 3503.5 of the California Fish and Game Code. Nesting activity for burrowing owl normally occurs from February 1 through August 31. To protect any active burrow, the following restrictions are required between February 1 and August 31 (or until burrows are no longer active as determined by a qualified biologist): (1) clearing limits will be established a minimum of 300 feet in any direction from any occupied nest and (2) access and surveying will be restricted within 200 feet of any occupied nest. Any encroachment into the 300/200 foot buffer area around the known nest will only be allowed if it is determined by a qualified biologist that the proposed activity will not disturb the nest occupants. These avoidance measures will be coordinated with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports" and LAWA's "LAX Wildlife Hazard Management Plan."</p> <p>If nesting individuals are observed, LAWA or its designee will develop and implement a habitat replacement plan to compensate for the loss of habitat associated with use of the site for construction staging and parking. The objective of the habitat replacement plan will be to replace the habitat value to be lost with equal or greater habitat value. The habitat replacement will occur at an off-site location to avoid</p>		<p>between April 15 and July 15 followed by monthly removal of any burrows onsite between September and January until such time as the entire staging area is in active use</p>	<p>protection of active burrows between February 1 and August 31</p>	<p>until entire staging area is in use</p>

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	<p>potential conflicts with aircraft activities at LAX. Off-site locations for habitat replacement may include Madrona Marsh Nature Center in Torrance, Three Sisters Reserve located on the Palos Verdes Peninsula, or another location deemed appropriate.</p> <p>Whether or not any nesting burrowing owls are identified on-site, after the end of the nesting period (August 31), LAWA or its designee will remove all burrows from the site on a monthly basis between September and January. Removal may include physically collapsing the burrows or installing one-way doors in burrow entrances. Such maintenance will continue annually until such time as the entire staging area is in active use.</p>				
MM-BC (BWP)-5	<p>Conservation of Faunal Resources: Loggerhead Shrike. If construction is scheduled to occur during the nesting season for the loggerhead shrike (March 15 to August 15), vegetation that will be impacted by the proposed project shall be removed outside the nesting season if feasible. If this is not feasible, a qualified biologist shall inspect the shrubs/trees at least 14 days prior to construction activities to ensure that no nesting shrike are present. If a nest is present, construction avoidance measures shall include flagging of all active nests and a 300-foot wide buffer area around the active nests. These construction avoidance measures will be coordinated with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports"</p>	Potential loss of nesting loggerhead shrike individuals	If construction is scheduled to occur between March 15 and April 15, removal of vegetation outside the nesting season, if feasible. If not feasible, pre-construction surveys 14 days prior to construction	If nests are present, a Biological Monitor shall be present between March 15 and August 15	Removal of vegetation between August 16 and March 14 prior to initiation of construction followed by a report of activities. Alternatively, if required, pre-construction surveys 14 days prior to construction occurring between March 15 and April 15. If required, establishment of construction avoidance measures and onsite monitoring between

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	and LAWA's "LAX Wildlife Hazard Mitigation Plan" to avoid increasing wildlife hazards to aircraft. In addition, a Biological Monitor shall be present to ensure the buffer area is not infringed upon and vegetation clearing within the designated 300-foot buffer only takes place from August 16 to March 14.				March 15 and August 15 and written report documenting construction avoidance measures undertaken; reports submitted periodically, at least annually, during construction or until vegetation has been removed
MM-BC (BWP)-6 Monitoring Agency: LAWA	Conservation of Faunal Resources: San Diego Black-Tailed Jackrabbit. Prior to the commencement of clearing operations or other activities involving significant soil disturbance at locations identified in Table 4.7-2 with suitable habitat, a survey shall be conducted to locate black-tailed jackrabbits within 100 feet of the outer extent of projected soil disturbance activities. The locations of any observed jackrabbits shall be clearly marked and identified on the construction plans. If this species is present, a monitoring biologist shall be on-site during any clearing to flush the jackrabbit from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. The monitoring biologist shall have authority to halt construction activities until individual jackrabbits can be removed from the construction impact areas to assure that the jackrabbit shall not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis.	Potential loss of San Diego black-tailed jackrabbit individuals	Prior to commencement of clearing operations or other activities involving significant soil disturbance within the Northwest Construction Staging/Parking Area, West Construction Staging Area, or Southeast Construction Staging/Parking Area	If species is present, a monitoring biologist shall be onsite prior to and during any brush-clearing and earth-moving activities	If required, onsite monitoring during brush-clearing and earth-moving activities and written documentation of field activities submitted periodically, at least annually, during construction or until all clearing and soil disturbance at identified locations is complete

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Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-BC (BWP)-7 Monitoring Agency: LAWA	Conservation of Floral Resources: Mature Tree Replacement. LAWA or its designee shall compensate at a ratio of 2:1 for the loss of mature trees, which would occur as a result of implementation of Northwest Construction Staging/Parking Area. The species of newly planted replacement trees shall be local native tree species to the extent feasible. Each mitigation tree shall be at least a 15-gallon or larger specimen. The replacement will be implemented within the boundaries of LAX or at a suitable off-site location. If mitigation occurs within LAX boundaries, the replacement site and tree species will be determined in consultation with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports" and LAWA's "LAX Wildlife Hazard Mitigation Plan" to avoid increasing wildlife hazards to aircraft.	Potential loss of mature trees	Prior to removal of mature trees within the Northwest Construction Staging/Parking Area	If mitigation occurs within LAX boundaries, periodic site visits to ensure trees are established, at least annually	Replacement of trees, if required and monitoring report one year following planting
MM-BC (BWP)-8 Monitoring Agency: LAWA	Conservation of Faunal Resources: Nesting Birds/Raptors. To comply with the Migratory Bird Treaty Act, for those areas of the project site that are not actively maintained and have a potential for nesting birds/raptors, if construction is scheduled to occur during the nesting season for birds/raptors (generally February 1 to June 30 for raptors and March 15 to August 15 for nesting birds), vegetation that will be impacted by the proposed project shall be removed outside the nesting season if feasible. If this is not feasible, then a qualified biologist shall inspect the shrubs/trees prior to project activities to ensure that no nesting birds/raptors are present. If the	Potential loss of nesting birds/raptors subject to the Migratory Bird Treaty Act	If construction occurs between February 1 and August 15, removal of vegetation outside the nesting season, if feasible. If not feasible, pre-construction surveys	If active nests are present and may be impacted, a Biological Monitor shall be present during those periods when construction activities will occur near active nest areas	If required, establishment of buffer zones and construction avoidance measures between February 1 and August 15 and written report documenting construction avoidance measures undertaken; reports submitted periodically,

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	biologist finds an active nest within the construction area and determines that the nest may be impacted, the biologist will delineate an appropriate buffer zone; the size of the buffer zone will depend on the species and the type of construction activity, and will be determined in consultation with CDFG. Only construction activities (if any) that have been approved by a Biological Monitor will take place within the buffer zone until the nest is vacated. The biologist shall serve as a construction monitor during those periods when construction activities shall occur near active nest areas to ensure that no inadvertent impacts on these nests shall occur. These construction avoidance measures will be coordinated with LAWA's USDA Wildlife Hazard Biologist and will be consistent with FAA Advisory Circular No. 150/5200-33 "Hazardous Wildlife Attractants on or Near Airports" and LAWA's "LAX Wildlife Hazard Mitigation Plan" to avoid increasing wildlife hazards to aircraft.				at least annually, during construction or until vegetation is removed
Endangered and Threatened Species of Flora and Fauna					
MM-ET (BWP)-1 Monitoring Agency: LAWA	Mitigation for Riverside Fairy Shrimp. If Riverside fairy shrimp are found to be located on-site, LAWA shall coordinate with FAA and USFWS to initiate consultation under the federal Endangered Species Act and prepare a Mitigation Plan in consultation with the USFWS. The plan shall provide mitigation for direct impacts to affected habitat through salvage and relocation of soil containing Riverside fairy shrimp. The receiver site of the soil and cysts shall be equal or	Potential loss of Riverside fairy shrimp individuals at Southeast Construction Staging/Parking Area	If required, preparation of Mitigation Plan for Riverside fairy shrimp prior to clearing or other construction activities within the Southeast	If required, monthly during the first year following relocation of cyst-bearing soils, quarterly in years 2-4, biannually in years 5, 7 and 9,	If required, preparation of Mitigation Plan for Riverside Fairy Shrimp; annual monitoring reports due to USFWS on September 1 of each specified monitoring year

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	<p>greater in biological value, as determined by the USFWS.</p> <p>Specific requirements of the Mitigation Plan shall be subject to the Section 7 consultation with USFWS, but generally will require that soils containing embedded cysts of the Riverside fairy shrimp be salvaged and translocated to created Riverside fairy shrimp habitat at a suitable site. One potential site is the Madrona Marsh Nature Center in Torrance, 20 miles south of LAX. Responsibility for habitat creation and maintenance of the created habitat may be transferred to a LAWA designee at any time with USFWS approval.</p> <p>Soils containing embedded cysts of the Riverside fairy shrimp shall not be translocated to the created habitat until the habitat is established and has met certain success criteria specified during Section 7 consultation. Success criteria for the created habitat will likely include holding water for a minimum of 60 days, having less than 10 percent absolute cover exotic herbaceous species within the created habitat, having less than 20 percent absolute cover of exotic herbaceous species within 300 feet of the area from limits of the created habitat, removal of all non-herbaceous plant species within the created habitat and 300 feet from the created habitat annually, and providing suitable water quality for Riverside fairy shrimp. Duration of inundation, exotic species removal, and water quality analyses may be undertaken within the first year after habitat creation. The performance criteria for percent absolute cover of</p>		Construction Staging/Parking Area; Implementation per Mitigation Plan	annually in year 10	

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>exotic herbaceous species within 300 feet of the area from limits of the created habitat may be redesignated by mutual agreement of FAA, LAWA, and USFWS.</p> <p>Upon meeting success criteria and approval from the USFWS, soils containing embedded cysts of the Riverside fairy shrimp may be brought to the created habitat. LAWA shall make every effort to collect all cyst-bearing soils from the entire surface area of the occupied habitat, however it is expected that some small number of undetected individual cysts will remain in the soil. Soil containing the cysts shall be salvaged and translocated during the dry season to minimize damage to the cysts during transport. The soil shall be collected using a hand trowel, removed in chunks, and kept out of direct sunlight to ensure viability. Soil shall be stored in properly labeled boxes or bags with adequate ventilation. The soils 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 impacts resulting from habitat construction activities shall be compliant with best management practices and terms and conditions stipulated by the permitting agencies.</p> <p>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 as described in the Mitigation Plan. LAWA shall be responsible for implementing a monitoring and reporting program to demonstrate successful achievement of the performance standards</p>				

**Mitigation Monitoring and Reporting Program
Bradley West Project-Specific Mitigation Measures**

Bradley West Project-Specific Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>to be determined in consultation with USFWS for off-site relocation over a 10-year period:</p> <ul style="list-style-type: none"> ◆ Monthly during the first year, following relocation of soils containing embedded cysts of the Riverside fairy shrimp ◆ Quarterly in the second, third, and fourth years, following relocation of soils containing embedded cysts of the Riverside fairy shrimp ◆ Biannually in the fifth, seventh, and ninth years, following relocation of soils containing embedded cysts of the Riverside fairy shrimp ◆ Annually in the tenth year, following relocation of soils containing embedded cysts of the Riverside fairy shrimp <p>LAWA shall provide the USFWS with annual monitoring reports as specified in the Mitigation Plan. The monitoring report, due on September 1 of each specified monitoring year, shall provide information regarding the implementation of habitat creation, restoration, and maintenance activities. The yearly report shall also discuss the effectiveness of the project as it pertains to the existing condition of the created habitat and Riverside fairy shrimp population. To measure the effectiveness of the created habitat, the FAA and LAWA shall work with the USFWS to develop long-term goals and objectives as part of their habitat creation plan.</p>				

Project-Specific Project Design Features

PDF		Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
WAMA-PDF-1 Monitoring Agency: LAWA	<p>Quarterly Reporting: The tenants of the WAMA site will be required to provide to LAWA a quarterly report indicating the number, time of day, duration, and specific aircraft type of all aircraft engine high-power and low-power ground run-ups conducted during the reporting period. This reporting requirement shall also extend to any airline using the WAMA site for ground run-ups as shall be monitored by LAWA Airfield Operations. The completeness and accuracy of the report shall be attested to by a company official of the tenant.</p> <p>In conjunction with application of a ground run-up reporting program, LAWA will develop a tiered penalty program applicable to violations of the LAX nighttime curfew for aircraft engine high-power ground run-ups. The penalty structure will be modeled after policies seen at other similarly situated airports (e.g., Seattle Tacoma International Airport). An example of the penalty structure includes: a Letter of Admonishment for first offense within a one year period and fines for second, third and additional offences within a one year period. It is anticipated that LAWA's development of a financial penalty program, to the extent allowed by law, will be tiered, whereby the amount of financial penalty is progressively higher for each recurring violation, with a substantial increase in penalty amounts for repeat violations that occur within a short amount of time.</p>	First implemented prior to occupancy of the proposed Project	Quarterly	LAWA will require tenants of the WAMA site to abide by the requirement; status updates in annual LAX MMRP progress report.
WAMA-PDF-2 Monitoring Agency: LAWA	<p>APU Usage While Aircraft is Parked: Aircraft parked at the WAMA site shall not utilize on-board auxiliary power units (APUs) for aircraft electrical power or interior cooling at parking spaces where ground power and preconditioned air are available, with the exceptions being: (1) if an APU is being serviced or checked relative to those functions; or (2) for some limited time if APU is required to tug/tow aircraft to/from WAMA site (i.e., for proper operation of essential on-board electronics while being moved). In addition to the proposed RON kits with ground power and preconditioned air for aircraft parking positions along the perimeter of the site (i.e., at hangar areas along World Way West and RON/RAD positions along Pershing Drive), the final WAMA site design will include additional aircraft ground power connect ports at the two interior RON/RAD positions within the site.</p>	First implemented prior to occupancy of the proposed Project	Ongoing	LAWA will require tenants of the WAMA site to abide by the requirement; status updates in annual LAX MMRP progress report.
WAMA-PDF-3 Monitoring	<p>Aircraft Taxiing: All aircraft traveling to or from WAMA during nighttime hours (11:00 p.m. to 6:00 a.m.) must be tugged/towed and are not allowed to taxi</p>	First implemented prior to occupancy	Ongoing	LAWA will require tenants of the WAMA site to

Project Design Features, Commitments & Mitigation Monitoring and Reporting Program

Project-Specific Project Design Features

PDF		Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Agency: LAWA	under own power, unless otherwise directed by LAWA Airport Operations in situation-specific circumstances where taxiing is required to maintain airfield safety and efficiency.	of the proposed Project		abide by the requirement; status updates in annual LAX MMRP progress report.
WAMA-PDF-4 Monitoring Agency: LAWA	Aircraft Engine Ground Run-Ups: Aircraft engine high-power ground run-ups of any duration and low-power run-ups of five minutes or more can only occur at the onsite blast fence; and, all run-ups (high-power and low-power of any duration) are prohibited anywhere on the WAMA site between 11:00 p.m. and 6:00 a.m.	First implemented prior to occupancy of the proposed Project	Ongoing	LAWA will require tenants of the WAMA site to abide by the requirement; status updates in annual LAX MMRP progress report.
WAMA-PDF-5 Monitoring Agency: LAWA	Use of the WAMA Site: Aircraft parking spaces at WAMA site cannot be used for passenger boarding or deplaning (i.e., cannot be used as remote gates), except during or as a result of emergency circumstances.	First implemented prior to occupancy of the proposed Project	Ongoing	LAWA will require tenants of the WAMA site to abide by the requirement; status updates in annual LAX MMRP progress report.
WAMA-PDF-6 Monitoring Agency: LAWA	Automated Run-Up Monitoring System: An aircraft engine ground run-up monitoring system, including a sound level meter and video camera, will be provided at the run-up area. LAWA will make all reasonable efforts to make data from the monitoring system accessible to the public via an internet link provided on LAWA's website (i.e., lawa.org).	Final Design Plans; Prior to occupancy of the proposed Project	Plan Check; Ongoing	Completion of an aircraft engine ground run-up monitoring system; status updates in annual LAX MMRP progress report.
WAMA-PDF-7 Monitoring Agency: LAWA	Resurfacing a Portion of Imperial Highway: LAWA will work with City of Los Angeles Bureau of Street Services (LABSS) to contribute its reasonable allocable share subject to FAA approval toward resurfacing of Imperial within the City of Los Angeles's jurisdiction; if the LABSS undertakes this resurfacing project, LAWA will also work with LABSS and the Council District 11 office to schedule resurfacing work. LAWA commits to meetings with Caltrans (alongside the City of El Segundo) to discuss improvements to areas under Caltrans control but cannot make any guarantees as to Caltrans' actions.	Planning process associated with resurfacing of Imperial within the City of Los Angeles' jurisdiction	Ongoing	Status updates in annual LAX MMRP progress report.

Project-Specific Mitigation Measures

	MM	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Air Quality					
MM-AQ (WAMA)-1 Monitoring Agency: LAWA	On-road trucks used on LAX construction projects with a gross vehicle weight rating of at least 19,500 pounds shall, at a minimum, comply with USEPA 2010 on-road emissions standards for PM10 and NOX. Contractor requirements to utilize such on-road haul trucks or the next cleanest vehicle available will be subject to the provisions of LAWA Air Quality Control Measure 2"x" (part of LAX Master Plan Commitment LAX-AQ-2, LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures). All off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, USEPA Tier 3 off-road emission standards. In addition, all off-road diesel-powered construction equipment greater than 50 hp with engines meeting USEPA Tier 3 off-road emission standards shall be retrofitted with a CARB-verified Level 3 Diesel Emissions Control Strategies (DECS). Any emissions control device used by the Contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. In the event the Contractor is using off-road diesel-powered construction equipment with engines meeting USEPA Tier 4 off-road emission standards and is already supplied with a factory-equipped diesel particulate filter, no retrofitting with DECS is required. Contractor requirements to utilize Tier 3 equipment or next cleanest equipment available will be subject to the provisions of LAWA Air Quality Control Measure 2"x" (part of LAX Master Plan Commitment LAX-AQ-2, LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures). LAWA will encourage construction contractors to apply for SCAQMD "SOON" funds to accelerate clean-up of off-road diesel engine emissions.	Air pollutant emissions associated with the construction (On- and Off-Road Mobile sources) of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project	Once, upon completion of implementation plan, and as specified in the implementation plan	Inclusion of measure in construction contracts. Completion of implementation plan for construction-related measures within the MRP; status updates in annual LAX MMRP progress report.

Project Design Features, Commitments & Mitigation Monitoring and Reporting Program

Project-Specific Mitigation Measures

	MM	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Hazards and Hazardous Materials					
MM-HAZ (WAMA)-1 Monitoring Agency: LAWA	<p>Prior to construction at the Project site, additional research shall be undertaken to determine if abandoned/plugged wells at the Project site were abandoned per the current regulations. If necessary, these wells shall be properly abandoned per current regulations. Since the Division of Oil, Gas, and Geothermal Resources (DOGGR) maps are not guaranteed to be accurate, a magnetometer survey shall be completed to determine the exact location of these abandoned/plugged oil wells. If the magnetometer survey successfully determines the location of these oil wells, a subsurface investigation in coordination with the DOGGR and City of Los Angeles Fire Department, as applicable, will be performed to determine if the abandoned wells pose a risk during the grading and construction activities.</p> <p>Specific DOGGR regulations and requirements for the inspection, testing, plugging, and abandonment of oil wells are contained within Chapter 4, Development, Regulation, and Conservation of Oil and Gas Resources, Article 3 of the State of California Code of Regulations. These regulations require a specific set of actions be taken, dependent on the found state of the abandoned oil wells (e.g. for open holes, a cement plug must extend from the total depth of the well or from at least 100 feet below the bottom of each oil or gas zone to at least 100 feet above the top of each oil or gas zone, for cased holes, all perforations are to be plugged with cement, with the plug extending at least 100 feet above the top of a landed liner, the uppermost perforations, the casing cementing point, the water shut-off holes, or the oil or gas zone, whichever is highest). Chapter V, Article 7, (Fire Code) (57.90.01-45) of the Los Angeles City Municipal</p>	<p>Potential hazards associated with abandoned/plugged oil wells on the Project site.</p>	<p>Prior to construction</p>	<p>Once prior to construction</p>	<p>Completion of a magnetometer survey to determine the exact location of abandoned/plugged oil wells. Completion of implementation plan for construction-related measures within the MRP; status updates in annual LAX MMRP progress report.</p>

Project-Specific Mitigation Measures

	MM	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	Code further regulates the location, drilling safeguards, and abandonment of oil wells in the City. In the event oil wells are found that have not been properly abandoned, the procedures and agency oversight prescribed in these regulations would serve as performance standards to ensure that significant impacts associated with the potential migration of fluids and groundwater contamination would be avoided during construction of the proposed Project. Construction will comply with all applicable requirements of DOGGR and the City of Los Angeles Fire Department for the investigation and/or re-abandonment of the well(s).				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
Air Quality					
MM-AQ-1	LAX-AQ-1 – General Air Quality Control Measures				
Monitoring Agency: LAWA	This measure describes a variety of specific actions to reduce air quality impacts associated with projects at LAX, and applies to all projects. Specific measures are identified below:				
1a	Watering (per SCAQMD Rule 403 and CalEEMod default) – twice daily.	Air pollutant emissions associated with the construction (Fugitive Dust) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Project Design Features, Commitments & Mitigation Monitoring and Reporting Program

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
1b	Ultra-low sulfur diesel (ULSD) fuel will be used in construction equipment.	Air pollutant emissions associated with the construction (On- and Off-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
1c	Post a publicly visible sign with the telephone number and person to contact regarding dust complaints; this person shall respond and take corrective action within 24 hours.	Air pollutant emissions associated with the construction (Fugitive Dust) of the proposed Project	During construction of the proposed Project	Prior to commencing construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
1d	Prior to final occupancy, the applicant demonstrates that all ground surfaces are covered or treated sufficiently to minimize fugitive dust emissions.	Air pollutant emissions associated with the construction (Fugitive Dust) of the proposed Project	Prior to final occupancy	Once prior to occupancy	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
1e	All roadways, driveways, sidewalks, etc., being installed as part of the project should be completed as soon as possible; in addition, building pads should be laid as soon as possible after grading.	Air pollutant emissions associated with the construction (Fugitive Dust) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
1f	Prohibit idling or queuing of diesel-fueled vehicles and equipment in excess of five minutes. This requirement will be included in specifications for any LAX projects requiring on-site construction.	Air pollutant emissions associated with the construction (On- and Off-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
1g	Require that all construction equipment working on-site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.	Air pollutant emissions associated with the construction (Mobile and Stationary sources) of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project and during construction of the proposed Project	Prior to commencing construction and periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
LAX-AQ-2 Monitoring Agency: LAWA	LAX-AQ-2 – LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures This measure describes numerous specific actions to reduce fugitive dust emissions and exhaust emissions from on-road and off-road mobile and stationary sources used in construction. Some components of LAX-AQ-2 are not readily quantifiable, but would be implemented as part of LAX Master Plan projects. These control strategies are expected to reduce construction-related emissions. Specific measures applicable to the Project are below:				
2a	All diesel-fueled equipment used for construction will be outfitted with the best available emission control devices, where technologically feasible, primarily to reduce emissions of diesel particulate matter (PM), including fine PM (PM _{2.5}), and secondarily, to reduce emissions of NO _x . This requirement shall apply to diesel-fueled off-road equipment (such as construction machinery), diesel-fueled on-road vehicles (such as trucks), and stationary diesel-fueled engines (such as electric generators). (It is unlikely that this measure will apply to equipment with Tier 4 engines.) The emission control devices utilized in construction equipment shall be verified or certified by California Air Resources Board or US Environmental Protection Agency for use in on- road or off-road vehicles or engines. For multi-year construction projects, a reassessment shall be conducted annually to determine what constitutes a best available emissions control device.	Air pollutant emissions associated with the construction (Off-Road and On-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Project Design Features, Commitments & Mitigation Monitoring and Reporting Program

Applicable LAX Master Plan Commitments and Mitigation Measures

	Master Plan Commitments/ Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
2b	Watering (per SCAQMD Rule 403 and CalEEMod default) – three times daily.	Air pollutant emissions associated with the construction (Fugitive Dust) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2c	Pave all construction access roads at least 100 feet onto the site from the main road.	Air pollutant emissions associated with the construction (Fugitive Dust) of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project	Prior to commencing construction/grading	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2d	To the extent feasible, have construction employees' work/commute during off-peak hours.	Air pollutant emissions associated with the construction (On-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2e	Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips.	Air pollutant emissions associated with the construction (On-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2f	Utilize on-site rock crushing facility, when feasible, during construction to reuse rock/concrete and minimize off-site truck haul trips.	Air pollutant emissions associated with the construction (on-road mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2g	Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using "clean burning diesel" fuel and exhaust emission controls.	Air pollutant emissions associated with the construction (stationary point source controls) of the proposed Project	Prior to commencement of construction	Once prior to construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
2h	Suspend use of all construction equipment during a second-stage smog alert in the immediate vicinity of LAX.	Air pollutant emissions associated with the construction (mobile and stationary sources) of the proposed Project	During construction/grading of the proposed Project	During any second stage smog alerts occurring during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2i	Utilize construction equipment having the minimum practical engine size (i.e., lowest appropriate horsepower rating for intended job).	Air pollutant emissions associated with the construction (mobile and stationary sources) of the proposed Project	During construction/grading of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2j	Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.	Air pollutant emissions associated with the construction (mobile and stationary sources) of the proposed Project	Prior and during construction/grading of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2k	The contractor or builder shall designate a person or persons to ensure the implementation of all components of the construction-related measure through direct inspections, record reviews, and investigations of complaints.	Air pollutant emissions associated with the construction of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project	Once prior to issuance of grading or demolition permit of the proposed Project	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2l	LAWA will locate rock-crushing operations and construction material stockpiles for all LAX-related construction in areas away from LAX-adjacent residents, to the extent possible, to reduce impacts from emissions of fugitive dust.	Air pollutant emissions associated with the construction (fugitive dust) of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project	Once prior to issuance of grading or demolition permit of the proposed Project	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
2m	LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.	Air pollutant emissions associated with the construction (mobile sources) of the proposed Project	Prior and during construction/grading of the proposed Project	Once prior to construction and periodically during construction	Inclusion in specifications for the WAMA project; status updates in annual LAX MMRP progress report.
2n	On-road trucks used on LAX construction projects with a gross vehicle weight rating of at least 19,500 pounds shall, at a minimum, comply with USEPA 2007 on-road emissions standards for PM ₁₀ and NO _x .	Air pollutant emissions associated with the construction (on-road mobile sources) of the proposed Project	Prior and during construction/grading of the proposed Project	Once prior to construction and periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
LAX-AQ-4 Monitoring Agency: LAWA	LAX-AQ-4 – Operations-Related Control Measures The principal feature of this measure is the conversion of LAX GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). It should be noted that no estimate of the air quality benefit (i.e., emission reductions) of other secondary measures is made in this analysis. Specific operations-related control measures applicable to the Project are identified below:				
4a	LAX GSE will be converted to low- and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). Both LAWA- and tenant-owned equipment will be included in this conversion program, which will be implemented in phases. LAWA will assign a GSE coordinator whose responsibility it will be to ensure the successful conversion of GSE in a timely manner. This coordinator will have adequate authority to negotiate on behalf of the City and have sufficient technical support to evaluate technical issues that arise during the implementation of this measure.	Operations-related air pollutant emissions.	Work with assigned GSE coordinator regarding implementation conversion	Ongoing	Inclusion of measure in construction contracts; Status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
4d	LAWA will require the use of electric lawn mowers and leaf blowers, as these units become available for commercial use, for landscape maintenance associated with the proposed project.	General air pollutant emissions.	Prior to completion of proposed Project	Once prior to completion of the proposed Project	Inclusion of measure in landscaping maintenance contracts; status updates in annual LAX MMRP progress report.
4e	LAWA will require the conversion of sweepers to alternative fuels or electric power for ongoing airfield and roadway maintenance. In the 2006 GSE inventory, two of ten sweepers were electric powered and one was either CNG or LPG fueled. HEPA filters will be installed on airport sweepers where the use of HEPA filters is technologically and financially feasible and does not pose a safety hazard to airport operations.	General air pollutant emissions.	Work with assigned GSE coordinator regarding implementation	Ongoing	Status updates in annual LAX MMRP progress report.
4f	LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.	Air pollutant emissions related to operational vehicles.	Work with assigned GSE coordinator regarding implementation	Ongoing	Status updates in annual LAX MMRP progress report.
Greenhouse Gas Emissions					
MM-AQ-1	LAX-AQ-1 – General Air Quality Control Measures				
Monitoring Agency: LAWA	This measure describes a variety of specific actions to reduce air quality impacts associated with projects at LAX, and applies to all projects. Specific measures are identified below:				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
1f	Prohibit idling or queuing of diesel-fueled vehicles and equipment in excess of five minutes. This requirement will be included in specifications for any LAX projects requiring on-site construction.	Air pollutant emissions associated with the construction (On- and Off-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
1g	Require that all construction equipment working on-site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.	Air pollutant emissions associated with the construction (Mobile and Stationary sources) of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project and during construction of the proposed Project	Prior to commencing construction and during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
LAX-AQ-2 Monitoring Agency: LAWA	LAX-AQ-2 – LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures This measure describes numerous specific actions to reduce fugitive dust emissions and exhaust emissions from on-road and off-road mobile and stationary sources used in construction. Some components of LAX-AQ-2 are not readily quantifiable, but would be implemented as part of LAX Master Plan projects. These control strategies are expected to reduce construction-related emissions. Specific measures applicable to the Project are below:				
2d	To the extent feasible, have construction employees' work/commute during off-peak hours.	Air pollutant emissions associated with the construction (On-Road Mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2e	Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips.	Air pollutant emissions associated with the construction (On-Road Mobile sources) of the proposed Project	During construction/grading of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
2f	Utilize on-site rock crushing facility, when feasible, during construction to reuse rock/concrete and minimize off-site truck haul trips.	Air pollutant emissions associated with the construction (on-road mobile sources) of the proposed Project	During construction of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2g	Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using "clean burning diesel" fuel and exhaust emission controls.	Air pollutant emissions associated with the construction (stationary point source controls) of the proposed Project	Prior to commencement of construction	Once prior to construction.	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2i	Utilize construction equipment having the minimum practical engine size (i.e., lowest appropriate horsepower rating for intended job).	Air pollutant emissions associated with the construction (mobile and stationary sources) of the proposed Project	During construction/grading of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2j	Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.	Air pollutant emissions associated with the construction (mobile and stationary sources) of the proposed Project	Prior and during construction/grading of the proposed Project	Periodically during construction	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.
2k	The contractor or builder shall designate a person or persons to ensure the implementation of all components of the construction-related measure through direct inspections, record reviews, and investigations of complaints.	Air pollutant emissions associated with the construction of the proposed Project	Prior to issuance of grading or demolition permit of the proposed Project	Once prior issuance of grading or demolition permit of the proposed Project	Inclusion of measure in construction contracts; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
2m	LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.	Air pollutant emissions associated with the construction (mobile sources) of the proposed Project	Prior and during construction/grading of the proposed Project	Once prior to construction and periodically during construction	Inclusion in specifications for the WAMA project; status updates in annual LAX MMRP progress report.
LAX-AQ-4 Monitoring Agency: LAWA	LAX-AQ-4 – Operations-Related Control Measures The principal feature of this measure is the conversion of LAX GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). It should be noted that no estimate of the air quality benefit (i.e., emission reductions) of other secondary measures is made in this analysis. Specific operations-related control measures applicable to the Project are identified below:				
4a	LAX GSE will be converted to low- and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). Both LAWA- and tenant-owned equipment will be included in this conversion program, which will be implemented in phases. LAWA will assign a GSE coordinator whose responsibility it will be to ensure the successful conversion of GSE in a timely manner. This coordinator will have adequate authority to negotiate on behalf of the City and have sufficient technical support to evaluate technical issues that arise during the implementation of this measure.	Operations-related air pollutant emissions.	Work with assigned GSE coordinator regarding implementation	Ongoing	Inclusion of measure in construction contracts; Status updates in annual LAX MMRP progress report.
4d	LAWA will require the use of electric lawn mowers and leaf blowers, as these units become available for commercial use, for landscape maintenance associated with the proposed project.	General air pollutant emissions	Prior to completion of proposed Project	Once prior to completion of the proposed Project	Inclusion of measure in landscaping maintenance contracts; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
4e	LAWA will require the conversion of sweepers to alternative fuels or electric power for ongoing airfield and roadway maintenance. In the 2006 GSE inventory, two of ten sweepers were electric powered and one was either CNG or LPG fueled. HEPA filters will be installed on airport sweepers where the use of HEPA filters is technologically and financially feasible and does not pose a safety hazard to airport operations.	General air pollutant emissions	Work with assigned GSE coordinator regarding implementation	Ongoing	Status updates in annual LAX MMRP progress report.
4f	LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.	Air pollutant emissions related to operational vehicles	Work with assigned GSE coordinator regarding implementation	Ongoing	Status updates in annual LAX MMRP progress report.
Hazards and Hazardous Materials					
HM-1 Monitoring Agency: LAWA	Ensure Continued Implementation of Existing Remediation Efforts. Prior to initiating construction of a Master Plan component, LAWA will conduct a pre-construction evaluation to determine if the proposed construction will interfere with existing soil or groundwater remediation efforts. For sites currently on LAX property, LAWA will work with tenants to ensure that, to the extent possible, remediation is complete prior to the construction. If remediation must be interrupted to allow for Master Plan-related construction, LAWA will notify and obtain approval from the regulatory agency with jurisdiction, as required, and will evaluate whether new or increased monitoring will be necessary. If it is determined that contamination has migrated during construction,	Potential for construction activities to interfere with existing soil or groundwater remediation efforts	Prior to initiation of construction	Once prior to construction	Status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>temporary measures will be taken to stop the migration. As soon as practicable following completion of construction in the area, remediation will be reinstated, if required by the Regional Water Quality Control Board (RWQCB) or another agency with jurisdiction. In such cases, LAWA will coordinate the design of the Master Plan component and the re-design of the remediation systems to ensure that they are compatible and to ensure that the proposed remediation system is comparable to the system currently in place. If it is determined during the pre-construction evaluation that construction will preclude reinstatement of the remediation effort, LAWA will obtain approval to initiate construction from the agency with jurisdiction.</p> <p>For properties to be acquired as part of the LAX Master Plan, LAWA will evaluate the status of all existing soil and groundwater remediation efforts. As part of this evaluation, LAWA will assess the projected time required to complete the remediation activities and will coordinate with the land owner and the agency with jurisdiction to ensure that remediation is completed prior to scheduled demolition and construction activities, if possible. In cases where remediation cannot be completed prior to demolition and construction activities, LAWA will undertake the same steps required above, namely, an evaluation of the need to conduct monitoring; implementation of temporary measures to stop migration, if required; and reinstatement of remediation following completion of construction, if required.</p>				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
HM-2. Monitoring Agency: LAWA	<p>Handling of Contaminated Materials Encountered During Construction. Prior to the initiation of construction, LAWA will develop a program to coordinate all efforts associated with the handling of contaminated materials encountered during construction. The intent of this program will be to ensure that all contaminated soils and/or groundwater encountered during construction are handled in accordance with all applicable regulations. As part of this program, LAWA will identify the nature and extent of contamination in all areas where excavation, grading, and pile-driving activities are to be performed. LAWA will notify the appropriate regulatory agency when contamination has been identified. If warranted by the extent of the contamination, as determined by the regulatory agency with jurisdiction, LAWA will conduct remediation prior to initiation of construction. Otherwise, LAWA will incorporate provisions for the identification, segregation, handling and disposal of contaminated materials within the construction bid documents. In addition, LAWA will include a provision in all construction bid documents requiring all construction contractors to prepare site-specific Health and Safety Plans prior to the initiation of grading or excavation. Each Health and Safety Plan would include, at a minimum, identification/description of the following: site description and features; site map; site history; waste types encountered; waste characteristics; hazards of concern; disposal methods and practices; hazardous material summary; hazard evaluation; required protective equipment; decontamination procedures; emergency contacts; hospital map and contingency plan.</p> <p>In the event that any threshold of significance listed in the Hazardous Materials section of the EIS/EIR for the LAX Master Plan is exceeded due to the discovery of soil or groundwater contaminated by hazardous</p>	Potential for encountering hazardous materials/waste during construction activities	Prior to initiation of construction	Once prior to construction	Compliance with the provisions contained in the <i>Procedure for the Management of Contaminated Materials Encountered During Construction</i> , including the preparation of a detailed Health and Safety Plan; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	<p>materials or if previously unknown contaminants are discovered during construction or a spill occurs during construction, LAWA will notify the lead agency(ies) with jurisdiction and take immediate and effective measures to ensure the health and safety of the public and workers and to protect the environment, including, as necessary and appropriate, stopping work in the affected area until the appropriate agency has been notified.</p> <p><i>Note: Subsequent to the approval of the LAX Master Plan, LAWA adopted the Procedure for the Management of Contaminated Materials Encountered During Construction for application to all LAX Master Plan projects. The Procedure, provides further guidance for implementing LAX Master Plan Commitment HM-2, especially for projects involving excavation and grading of soils.</i></p>				
Hydrology and Water Quality					
<p>HWQ-1.</p> <p>Monitoring Agency:</p> <p>LAWA</p>	<p>Conceptual Drainage Plan. Once a Master Plan alternative is selected, and in conjunction with its design, LAWA will develop a Conceptual Drainage Plan (CDP) of the area within the boundaries of the Master Plan (in accordance with FAA guidelines and to the satisfaction of the City of Los Angeles Department of Public Works [LADPW], Bureau of Engineering). The purpose of the drainage plan will be to assess area-wide drainage flows as related to the Master Plan area, and at a level of detail sufficient to identify the overall improvements necessary to provide adequate drainage capacity to prevent flooding. The CDP will provide the basis and specifications from which detailed drainage improvement plans will be designed in conjunction with site engineering specific to each Master Plan.</p>	<p>Significant changes in surface hydrology or adverse impacts to surface water quality due to new development associated with the Master Plan</p>	<p>Prior to issuance of a grading/building permit for a project involving substantial surface alterations or substantial changes to existing operations</p>	<p>Once upon completion of conceptual drainage plan</p>	<p>Completion of conceptual drainage plan.</p>

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>BMPs will be incorporated to minimize the effect of airport operations on surface water quality and to prevent a net increase in pollutant loads to surface water resulting from the selected Master Plan alternative.</p> <p>To evaluate drainage capacity, LAWA will use either the Peak Rate Method specified in Part G - Storm Drain Design of the City of Los Angeles' Bureau of Engineering Manual or the Los Angeles County Modified Rational Method, both of which are acceptable to the LADPW and the City of Los Angeles Bureau of Engineering. In areas within the boundary of the selected alternative where the surface water runoff rates are found to exceed the capacity of the storm water conveyance infrastructure with the potential to cause flooding, LAWA will take measures to either reduce peak flow rates or increase the structure's capacity. These drainage facilities will be designed to ensure that they adequately convey storm water runoff and prevent flooding by adhering to the procedures set forth by the Peak Rate Method/Los Angeles County Modified Rational Method. Methods to reduce the peak flow could include:</p> <ul style="list-style-type: none"> o Decreasing impervious area by removing unnecessary pavement or utilizing porous concrete or modular pavement o Building storm water detention structures o Diverting runoff to pervious areas (reducing directly-connected impervious areas) o Diverting runoff to outfalls with additional capacity o Redirecting storm water flows to increase the time of concentration o Measures to increase drainage capacity could 				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>include:</p> <ul style="list-style-type: none"> - Increasing the capacity of storm water conveyance structures - Increasing the number of storm water conveyance structures and/or outfalls <p>To evaluate the effect of the selected Master Plan alternative on surface water quality, LAWA will prepare a specific Standard SUSMP for the selected alternative, as required by the LARWQCB. The SUSMP addresses water quality and drainage issues by specifying source control, structural, and treatment control BMPs with the objective of reducing the discharge of pollutants from the storm water conveyance system to the maximum extent practicable. Once BMPs are identified, an updated pollutant load estimate will be calculated that takes into account reductions from treatment control BMPs.</p> <p>These BMPs will be applied to both existing and future sources with the goal of achieving no net increase in loadings of pollutants of concern to receiving water bodies. LAWA will therefore address water quality issues, including erosion and sedimentation, and comply with the SUSMP requirements, by incorporation of the BMPs specified in the SUSMP, including:</p> <ul style="list-style-type: none"> o Vegetated swales and strips o Oil/Water separators, clarifiers and Media filtration o Detention basins, and catch basin inserts and screens 				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<ul style="list-style-type: none"> o Continuous flow deflective systems o Bioretention and infiltration o Manufactured treatment units and hydrodynamic devices <p>Other structural BMPs may also be selected from the literature and the many federal, state and local guidance documents available. Performance of structural BMPs varies considerably based on their design. USEPA has published estimated ranges of pollutant removal efficiencies for structural BMPs based on substantial document review.</p> <p>In addition to the structural BMP types that will be used, non-structural/source control BMPs will continue to be a part of the LAX program to reduce pollutant loadings. Existing practices and potentially new ones will be extended to acquisition areas and to the areas where airport operations will increase in frequency or duration.</p> <p>These source control BMPs will be incorporated into the SWPPP and will consequently be required of LAWA and all airport tenants at all locations where industrial activities occur that have the potential to impact water quality.</p> <p>The overall result of LAX Master Plan Commitment HWQ-1 will be drainage infrastructure that provides adequate drainage capacity to prevent flooding and control peak flow discharges, that incorporates BMPs to minimize the effect of airport operations on surface water quality, and that prevents a net increase of pollutant loads to receiving waters.</p>				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-HWQ-1. Monitoring Agency: LAWA	Update Regional Drainage Facilities. Regional drainage facilities should be upgraded, as necessary, in order to accommodate current and projected future flows within the watershed of each storm water outfall resulting from cumulative development. This could include upgrading the existing outfalls, or building new ones. The responsibility for implementing this mitigation measure lies with the LACDPW and/or LADPW, Bureau of Engineering. A portion of the increased costs for the upgraded flood control and drainage facilities would be paid by LAX tenants and users in accordance with the possessory interest tax laws and other legal assessments, consistent with federal airport revenue diversion laws and regulations and in compliance with state, county and city laws. New facilities should be designed in accordance with the drainage design standards of each agency.	Impacts to storm drain infrastructure	Ongoing	Ongoing	Status updates in annual LAX MMRP progress report. Once the necessary improvements to the offsite facilities have been approved, the need for monitoring ceases.
Noise					
MM-N-7 Monitoring Agency: LAWA	Construction Noise Control Plan. A Construction Noise Control Plan will be prepared to provide feasible measures to reduce significant noise impacts throughout the construction period for all projects near noise sensitive uses. For example, noise control devices shall be used and maintained, such as equipment mufflers, enclosures, and barriers. Natural and artificial barriers such as ground elevation changes and existing buildings may be used to shield construction noise.	Significant noise impacts at noise-sensitive receivers during construction	Prior to the earliest of either the issuance of a grading permit, issuance of a demolition permit, or construction commencement of the Project with noise sensitive uses within 600 feet of Project site	Once, upon completion of Noise Control Plan and as specified in the Noise Control Plan	Inclusion of requirement of a Noise Control Plan in subcontract agreement and subsequent approval of the Noise Control Plan by LAWA; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-N-8 Monitoring Agency: LAWA	Construction Staging. Construction operations shall be staged as far from noise-sensitive uses as feasible.	Significant noise impacts at noise-sensitive receivers during construction	Prior to the earliest of either the issuance of a grading permit, issuance of a demolition permit, or construction commencement of the Project with noise sensitive uses within 600 feet of Project site	Once, upon approval of construction staging area by LAWA	Approval of construction staging area by LAWA; status updates in annual LAX MMRP progress report.
MM-N-9 Monitoring Agency: LAWA	Equipment Replacement. Noisy equipment shall be replaced with quieter equipment (for example, rubber tired equipment rather than track equipment) when technically and economically feasible.	Significant noise impacts at noise-sensitive receivers during construction.	Prior to the earliest of either the issuance of a grading permit, issuance of a demolition permit, or construction commencement of the Project with noise sensitive uses within 600 feet of the Project site	Once, upon completion of Noise Control Plan and as specified in the Noise Control Plan	Inclusion of requirement of a Noise Control Plan in subcontract agreement and subsequent approval of the Noise Control Plan by LAWA; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
MM-N-10 Monitoring Agency: LAWA	Construction Scheduling. The timing and/or sequence of the noisiest on-site construction activities shall avoid sensitive times of the day, as feasible (9 p.m. to 7 a.m. Monday - Friday; 8 p.m. to 6 a.m. Saturday; anytime on Sunday or Holidays).	Significant noise impacts at noise-sensitive receivers during construction.	Prior to the earliest of either the issuance of a grading permit, issuance of a demolition permit, or construction commencement of the Project with noise sensitive uses within 600 feet of the Project site	Once, upon completion of Noise Control Plan and as specified in the Noise Control Plan	Inclusion of requirement of a Noise Control Plan in subcontract agreement and subsequent approval of the Noise Control Plan by LAWA; status updates in annual LAX MMRP progress report.
N-1 Monitoring Agency: LAWA	Maintenance of Applicable Elements of Existing Aircraft Noise Abatement Program. All components of the current airport noise abatement program that pertain to aircraft noise will be maintained.	Expose noise-sensitive areas to 65 CNEL or greater with at least a 1.5 CNEL increase	Already being implemented. Will continue noise abatement program throughout implementation and use	Ongoing	Submission of Annual Report per Variance Conditions to County of Los Angeles; status updates in annual LAX MMRP progress report.
ST-16 Monitoring Agency: LAWA	Surface Transportation, Designated Haul Routes. Every effort will be made to ensure that haul routes are located away from sensitive noise receptors.	Traffic noise	At issuance of approved haul route	Once, at approval of haul route	Approval of haul route by LAWA Ground Transportation/Construction Coordination Office; status updates in annual LAX MMRP progress report

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
ST-22 Monitoring Agency: LAWA	Surface Transportation, Designated Truck Routes. For dirt and aggregate and all other materials and equipment, truck deliveries will be on designated routes only (freeways and non-residential streets). Every effort will be made for routes to avoid residential frontages. The designated routes on City of Los Angeles streets are subject to approval by LADOT's Bureau of Traffic Management and may include, but will not necessarily be limited to: Pershing Drive (Westchester Parkway to Imperial Highway); Florence Avenue (Aviation Boulevard to I-405); Manchester Boulevard (Aviation Boulevard to I-405); Aviation Boulevard (Manchester Avenue to Imperial Highway); Westchester Parkway/Arbor Vitae Street (Pershing Drive to I-405); La Cienega Boulevard (north of Imperial Highway); Airport Boulevard (Arbor Vitae Street to Century Boulevard); Sepulveda Boulevard (Westchester Parkway to Imperial Highway); I-405; and I-105.	Traffic congestion and delay as they relate to construction activities	At issuance of haul route approval	Once, upon approval of each haul route	Approval of haul route by LAWA Ground Transportation/Construction Coordination Office; status updates in annual LAX MMRP progress report
Land Use					
LU-4 Monitoring Agency: LAWA	Neighborhood Compatibility Program. Ongoing coordination and planning will be undertaken by LAWA to ensure that the airport is as compatible as possible with surrounding properties and neighborhoods. Measures to enforce this policy will include: <ul style="list-style-type: none">Along the northerly and southerly boundary areas of the airport, LAWA will provide and maintain landscaped buffer areas that will include setbacks, landscaping, screening or other appropriate view sensitive uses with the goal of avoiding land use conflicts, shielding lighting, enhancing privacy and better screening views of airport facilities from adjacent residential uses. Use of existing facilities in buffer areas may continue as required until LAWA can	Conflict with any applicable land use plan, policy, or regulation (including, but not limited to, the general plan, specific plans, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect	Ongoing	Ongoing	Compliance with the provisions of the LAX Zone/LAX Specific Plan and LAX Plan; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	<p>develop alternative facilities.</p> <ul style="list-style-type: none"> Locate airport uses and activities with the potential to adversely affect nearby residential land uses through noise, light spill-over, odor, vibration and other consequences of airport operations and development as far from adjacent residential neighborhoods as feasible. Provide community outreach efforts to property owners and occupants when new development on airport property is in proximity to and could potentially affect nearby residential uses. 				
Construction Surface Transportation					
<p>C-1.</p> <p>Monitoring Agency:</p> <p>LAWA</p>	<p>Establishment of a Ground Transportation/Construction Coordination Office.</p> <p>Establish this office for the life of the construction projects to coordinate deliveries, monitor traffic conditions, advise motorists and those making deliveries about detours and congested areas, and monitor and enforce delivery times and routes. LAWA would periodically analyze traffic conditions on designated routes during construction to see whether there is a need to improve conditions through signage and other means.</p> <p>This office may undertake a variety of duties, including but not limited to:</p> <ul style="list-style-type: none"> Inform motorists about detours and congestion by use of static signs, changeable message signs, media announcements, airport website, etc.; Work with airport police and the Los Angeles Police Department to enforce delivery times and routes; 	Traffic congestion and delays as they relate to construction activities	Prior to issuance of any permits. Complete set of duties for this office will be established prior to issuance of any permit for the project that may significantly impact surface streets	Ongoing coordination by the LAWA Ground Transportation/Construction Coordination Office in conjunction with LAWA Construction and Logistics Management (CALM) team	LAWA Ground Transportation/Construction Coordination Office prior to approval; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	<ul style="list-style-type: none"> Establish staging areas; Coordinate with police and fire personnel regarding maintenance of emergency access and response times; Coordinate roadway projects of Caltrans, City of Los Angeles, and other jurisdictions with those of the Airport construction projects; Monitor and coordinate deliveries; Establish detour routes; Work with residential and commercial neighbors to address their concerns regarding construction activity; and Analyze traffic conditions to determine the need for additional traffic controls, lane restriping, signal modifications, etc. <p><i>Note: Subsequent to the approval of the LAX Master Plan, LAWA established a "Ground Transportation/Construction Coordination Office" in the form of the CALM team. The CALM team coordinates and monitors construction traffic, coordinates with agencies as necessary, and reviews traffic control plans to address any concerns prior to approval. The CALM team, discussed in detail in Section 4.7.3.8, above, provides implementation of the LAX Master Plan Commitment C-1.</i></p>				
C-2. Monitoring Agency: LAWA	Construction Personnel Airport Orientation. All construction personnel will be required to attend an airport project-specific orientation (pre-construction meeting) that includes where to park, where staging areas are located, construction policies, etc.	Traffic congestion and delays as they relate to construction activities	Prior to commencement of construction	As required by arrival of new personnel	Contractor certification; signatures of orientation attendees; status updates in annual LAX MMRP progress report.

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Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
ST-9. Monitoring Agency: LAWA	Construction Deliveries. Construction deliveries requiring lane closures shall receive prior approval from the Construction Coordination Office. Notification of deliveries shall be made with sufficient time to allow for any modifications to approved traffic detour plans.	Traffic congestion and delay as they relate to construction activities	During construction	Ongoing during construction	Status updates in annual LAX MMRP progress report.
ST-12 Monitoring Agency: LAWA	Designated Truck Delivery Hours. Truck deliveries shall be encouraged to use night-time hours and shall avoid the peak periods of 7:00 AM to 9:00 AM and 4:30 PM to 6:30 PM.	Traffic congestion and delay as they relate to construction activities	LAWA approval of delivery schedule as part of the Construction Traffic Management Plan	Ongoing during construction	Status updates in annual LAX MMRP progress report.
ST-14 Monitoring Agency: LAWA	Construction Employee Shift Hours. Shift hours that do not coincide with the heaviest commuter traffic periods (7:00 AM to 9:00 AM, 4:30 PM to 6:30 PM) would be established. Work periods will be extended to include weekends and multiple work shifts, to the extent possible and necessary.	Traffic congestion and delay as they relate to construction activities	Prior to construction activities	Once, during review of Construction Traffic Management Plan	LAWA approval of employee work schedule as part of the Construction Traffic Management Plan; status updates in annual LAX MMRP progress report.
ST-16 Monitoring Agency: LAWA	See discussion of ST-16 under Noise.				
ST-17 Monitoring Agency: LAWA	Maintenance of Haul Routes. Haul routes on off-airport roadways will be maintained periodically and will comply with City of Los Angeles or other appropriate jurisdictional requirements for maintenance. Minor striping, lane configurations, and signal phasing modifications would be provided as needed.	Roadway safety	Ongoing during construction	Ongoing during construction	Field inspection report; maintenance logs; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
ST-18 Monitoring Agency: LAWA	Construction Traffic Management Plan. A complete construction traffic plan will be developed to designate detour and/or haul routes, variable message and other sign locations, communication methods with airport passengers, construction deliveries, construction employee shift hours, construction employee parking locations and other relevant factors.	Traffic congestion, delay and safety related to construction activities	Prior to commencement of construction	Ongoing during construction,	LAWA approval of Construction Traffic Management Plan by LAWA Ground Transportation/Construction Coordination Office in conjunction with LAWA CALM Team; status updates in annual LAX MMRP progress report.
ST-22 Monitoring Agency: LAWA	See discussion of ST-22 under Noise.				
Miscellaneous Applicable Mitigation Measures					
ARCHAEO-1 Monitoring Agency: LAWA	Prior to initiation and construction activities, LAWA will retain an on-site Cultural Resources Monitor (CRM), as defined in the LAX Master Plan Mitigation Monitoring and Reporting Program (MMRP) Archaeological Treatment Plan (ATP), who will determine if the project site is subject to archaeological monitoring. As defined in the ATP, areas are not subject to archaeological monitoring if they contain redeposited fill or have previously been disturbed. LAWA shall retain an archaeologist to monitor excavation activities in native or virgin soils in accordance with the detailed monitoring procedures and other procedures outlined in the ATP regarding treatment for archaeological resources that are accidentally encountered during construction. In accordance with the methods and guidelines provided in the ATP, the CRM will compare the known depth of	Potential to unexpectedly encounter and impact subsurface archaeological resources, including Native American remains, during grading and excavation	Prior to issuance of grading or demolition permit of the proposed Project, with continued monitoring efforts in accordance with the ATP	Once, upon retention of archaeologist and ongoing during excavation and grading activities, as identified in ATP	Retention of archaeologist and filing of periodic monitoring reports with LAWA, as stipulated in the ATP; status updates in annual LAX MMRP progress report.

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures	Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
<p>redeposited fill or disturbance to the depth of planned grading activities, based on a review of construction plans. If the CRM determines that the Project site is subject to archaeological monitoring, a qualified archaeologist (an archaeologist who satisfies the Secretary of the Interior's Professional Qualifications Standards [36 CFR 61]) shall be retained by LAWA to inspect excavation and grading activities that occur within native material. The extent and frequency of inspection shall be defined based on consultation with the archaeologist. Following initial inspection of excavation materials, the archaeologist may adjust inspection protocols as work proceeds. Identification, evaluation, and recovery of cultural resources shall be conducted in accordance with the methods, guidelines, and measures established in the ATP. If Native American cultural resources are encountered, LAWA shall comply with guidance established in the ATP for retaining a Native American monitor. If human remains are found, LAWA shall comply with the State Health and Safety Code regarding the appropriate treatment of those remains as outlined in the ATP. Reporting shall be completed in conformance with the requirements established in the ATP to document the archaeological monitoring effort and guidance as to the proper curation and archiving of artifacts in accordance with industry and federal standards.</p>				

Applicable LAX Master Plan Commitments and Mitigation Measures

Master Plan Commitments/ Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
PALEO-1 Monitoring Agency: LAWA	Conformance with LAX Master Plan Paleontological Management Treatment Plan: (PMTP): Prior to the initiation of grading and construction activities, LAWA will retain a professional paleontologist, as defined in the Final LAX Master Plan MMRP PMTP, who will determine if the Project site exhibits a high or low potential for subsurface resources. If the Project site is determined to exhibit a high potential for subsurface resources, paleontological monitoring will be conducted in accordance with the procedures stipulated in the PMTP. If the Project site is determined to exhibit a low potential for subsurface deposits, excavation need not be monitored as per the PMTP. In the event that paleontological resources are discovered, the procedures outlined in the PMTP for the identification of resources will be followed to ensure that unique paleontological resources are studied and treated in accordance with applicable regulations and procedures such that significant impacts are avoided.	Potential loss or destruction of important paleontological resources	Prior to issuance of grading or demolition permits for the proposed project, with continued monitoring efforts in accordance with the PMTP	Once, upon retention of paleontologist and ongoing during excavation and grading activities, as identified in PMTP	Retention of paleontologist and filing of periodic monitoring reports with LAWA, as stipulated in the PMTP; status updates in annual LAX MMRP progress report.
PALEO 2 Monitoring Agency: LAWA	Construction Personnel Briefing: In accordance with the PMTP, construction personnel will be briefed by the consulting paleontologist in the identification of fossils or fossiliferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur.	Potential loss or destruction of important paleontological resources	Prior to commencement of grading or excavation for the proposed Project, with continued monitoring efforts in accordance with the PMTP	Once for each worker involved with excavation and grading activities	Sign-in sheets for workers attending the construction briefing; status updates in annual LAX MMRP progress report.

APPENDIX C

REPORT LOS ANGELES INTERNATIONAL AIRPORT EL SEGUNDO BUTTERFLY 2014 DATED JANUARY 2015

**REPORT
LOS ANGELES INTERNATIONAL AIRPORT
EL SEGUNDO BLUE BUTTERFLY
2014**



**Entomological Consulting Services, Ltd.
Richard A. Arnold, Ph.D.**

REPORT OF EL SEGUNDO BLUE BUTTERFLY

MONITORING ACTIVITIES IN 2014 AT THE

LOS ANGELES INTERNATIONAL AIRPORT

Conducted under USFWS Permit
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Final Report:

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SECTION 1 INTRODUCTION

This report describes the findings of monitoring surveys for the federally-listed, endangered El Segundo Blue (ESBB) butterfly (*Euphilotes battoides allyni*) and its foodplant, Coast Buckwheat (*Eriogonum parvifolium*) that occurred in May through August 2014, at the Los Angeles International Airport (LAX). All activities described in this report were conducted under the auspices of a recovery permit issued by the U.S. Fish & Wildlife Service to Richard Arnold, Ph.D., President of Entomological Consulting Services, Ltd.

During the ESBB's adult flight season in 2014, the following butterfly and habitat monitoring activities were performed at LAX:

- a) Surveys began in May to check on the flowering status of the ESBB's food plant, Coast Buckwheat and estimate the start of the butterfly's flight season;
- b) 12 counts of ESBB adults were conducted along the historical transect route;
- c) a single block count of ESBB adults throughout the entire dune preserve area was conducted at the peak of the butterfly's 2014 flight season;
- d) a seasonal population estimate was calculated for the entire 2014 flight season of the ESBB and throughout the entire 202.8-acre LAX preserve;
- e) the buckwheat food plant of the butterfly was mapped and flowerhead numbers tallied for the entire historical transect route (1.5 miles) and 126 randomly placed transects (10.1 miles) in the blocks; and
- f) selected target areas were mapped as exemplars of where invasive plant control is needed.

The remainder of this report describes the LAX study site, plus the 2014 ESBB monitoring activities and findings. The 2014 monitoring results are compared to findings from previous years to discern year-to-year trends in the ESBB population numbers plus buckwheat plant and flowerhead numbers at LAX, as well as to identify habitat management actions.

SECTION 2

LAX STUDY SITE

2.1 Site Description.

The LAX dunes comprise a 307.1-acre site located west of the runways and terminals at the Los Angeles International Airport. These dunes are generally bounded by Waterview St. on the north, Imperial Highway on the south, Pershing Blvd. on the east and Vista Del Mar on the west. The southern approximately 202.8 acres of the LAX dunes comprises the preserve, which was designated the El Segundo Blue Butterfly Habitat Restoration Area (hereafter, Habitat Restoration Area, study area, or preserve) in 1987. Approximately 104.3 acres of undeveloped, but degraded dunes lie immediately north of the Habitat Restoration Area. The Habitat Restoration Area, where the annual monitoring studies of the ESBB and its habitat were focused, is depicted in Figure 1 on the Venice 7.5' quadrangle U.S. Geological Survey topographic map (Range 15 West, Township 3, South).

Weather conditions at LAX are characterized by a Mediterranean climate as is typical of coastal areas in Southern California. The summer temperatures are warmest between June and October, with daily high temperatures typically between 75 and 85° F. Winter, spring, and fall temperatures are generally mild, with a daytime high in the 70's F and nightly low in the 50's F. The rainy season is measured between July 1 and June 30 and the annual, average rainfall totals 12 inches.

Predominant dune landforms that remain today at LAX include foredunes, backdunes, and deflation plain. Strand and bluff landforms were formerly located where Dockweiler Beach State Park is now located, immediately west of LAX dunes (Figure 1). There are approximately 210.2 acres of foredunes, 24.4 acres of backdune, and 34 acres of deflation plain. In addition to the dune communities, there are also 23 acres of non-dune soil type and about 15.5 acres of developed or heavily disturbed areas. Approximately 38.6 acres of roads overlay on these habitats, which remain from the former residential community that was razed during 1966-1972, and buildings and other structures that are used for current airport operations. The historical transect route (Figure 2), which is walked repeatedly throughout the ESBB's flight season to document the timing and abundance of the butterfly, includes portions of the foredunes and backdunes, as well as the edge of the deflation plain.

Figure 3 illustrates the various subsites, based upon former residential blocks and located within the Habitat Restoration Area, that were used for the ESBB's annual block count. The blocks vary in size as delineated by the existing streets in the central and northern portions, or by natural landmarks in the southern and eastern portions of the Habitat Restoration Area. These pre-existing polygons or "blocks" were used as the sampling areas for the ESBB block count. Blocks to the north and northwest of the Habitat Restoration Area are also checked annually during the block count, but the ESBB and its food plant have not been observed outside of the preserve portion of the LAX dunes for many years. In addition, buckwheat monitoring was performed along 126 transects that were randomly located throughout the blocks, as illustrated in Figure 4.

2.2 Plant Communities.

Because of the former residential neighborhood, movement of sand to uplift the current VOR site (VHF Omnidirectional Range navigational system for the airplanes), former sand mining activities, and the construction of roads around the periphery of the dunes, most of the dunes have been disturbed to some degree. The disturbance is reflected in the mixture of native plant communities and various weeds and exotics that now grow at the dunes. During the past couple of decades, habitat restoration activities have resulted in the removal of various non-native plant species, (see earlier monitoring reports prepared by Dr. Rudi Mattoni) in portions of the dunes and some plantings of native species, primarily Coast Buckwheat, to improve habitat quality. However, the weeds continue to colonize and continue to dominate in portions of the dunes.

Native plant communities at the LAX dunes include southern foredune, southern dune scrub, and valley needlegrass grassland; however, all have been degraded by past land use activities and colonization by invasive plants. The southern foredune community is found on the foredunes, the southern dune scrub on the backdunes, and the valley needlegrass grassland (or prairie) on the deflation plain. Coast Buckwheat, also sometimes referred to as Seacliff or Dune buckwheat, is the sole larval and primary adult food plant of the ESBB and grows primarily in the foredune and backdune portions of the preserve, although a few individuals can be found in a few scattered, small remnants of the valley needlegrass grassland.

The southern foredune plant community is dominated by perennials with a high proportion of shrubs and sub-shrubs. Characteristic species of the southern foredune plant community include: Coast Buckwheat (*Eriogonum parvifolium*), Bush Lupine (*Lupinus chamissonis*), Coast Goldenbush (*Ericameria ericoides*), Beach Evening Primrose (*Camissonia chieranthifolia*), Dune Wallflower (*Erysimum suffrutescens*), Beach Sand Verbena (*Abronia umbellata*), and Beach Bur (*Ambrosia chamissonis*). The southern dune scrub plant community consists of a coastal scrub community of shrubs and sub-shrubs characterized by most of the aforementioned taxa. One of the main differences between these two communities is the degree of plant cover, as the southern foredune is generally characterized by sparser vegetative cover than the dense vegetative growth characteristic of southern dune scrub plant communities. At the LAX dunes, the distinction between these two plant communities is also blurred due to the infusion of various non-native weeds and grasses that have colonized the formerly more open portions of the dunes.

The valley needlegrass grassland community is now almost completely absent at the LAX dunes due to grading for the construction of Pershing Boulevard, and subsequent invasion of exotics and annual grasses that now dominate in portions of the dunes where the valley needlegrass grassland formerly occurred. A few, very small patches of the needlegrass still grow on the slopes adjacent to Pershing Boulevard and at some widely scattered locations elsewhere in the dunes. Under more natural conditions, this prairie would be dominated by bunchgrasses, primarily, Purple Needle Grass (*Nassella cernua*), a mixture of herbaceous flowers and shrubs, including California Encelia (*Encelia californica*), Lewis' Evening Primrose (*Camissonia lewisii*), Deerweed (*Lotus scoparius*),

and Bush Lupine. Today the dominant grasses are introduced species, including Ripgut Brome (*Bromus diandrus*), Bermuda Grass (*Cynodon dactylon*), and Veldt Grass (*Ehrharta* sp.).

2.3 Coast Buckwheat

Eriogonum parvifolium serves as both the larval and primary adult food plant of the ESBB. It is a perennial shrub (also sometimes referred to as a subshrub) that grows in sand dunes, coastal scrub, coastal strand, and on coastal bluffs between San Diego and Monterey counties. In the northern part of its geographic range it is also commonly known as Seacliff Buckwheat. When full grown, it is characterized by loosely branched, decumbent stems that may get as tall as about three feet, or in windblown areas may be prostrate. The stems terminate in one or more white flowerheads, about the size of a small cotton ball, which contain numerous individual flowers.

Arnold (unpublished data) has followed the growth and survivorship of individual Coast Buckwheat plants at the nearby Chevron Refinery in El Segundo since 1977. Individual buckwheat plants commonly live 25-30 years and exhibit five growth stages: seedling, juvenile, mature, senescent, and dead. Seedlings spend most of their energy developing a deep root system, so few if any flowerheads are produced during the first couple years of life. Juvenile plants are small statured, but the number of flowerheads and branches increase rapidly with each year's growth. The seedling and juvenile stages are apparent during the first 4-7 years of life, with plants in sheltered portions of the dunes growing faster than those in windy locations. The buckwheat's mature stage typically refers to the "middle-aged" years of the plant's lifespan and is characterized by hundreds and often thousands of flowerheads. This is the life stage of greatest value to the ESBB since both its larval and adult life stages feed on the flowers. In its later years, flowerhead numbers decline on an aging or senescent buckwheat plant as it directs most of its energy into just surviving. Dead plants do not have any flowerheads.

2.4 El Segundo Blue Butterfly

The El Segundo Blue was recognized as an endangered species by the US Fish & Wildlife Service in 1976. It is a small butterfly, whose wingspan is about one inch. Uppersides of the males' wings are blue, while those of females are brownish-gray (see report cover). Background color of the undersides of the wings in both sexes is light gray, with numerous black, irregularly-shaped markings and a row of orange markings near the outer margin of the hind wings.

At the time of its recognition as endangered, the butterfly was only known from the Chevron refinery in El Segundo and at LAX. Both of these sites are remnant populations that occur on the formerly more extensive El Segundo Sand Dunes, which ranged from Playa del Rey south to the Malaga Cove area at the northern end of the Palos Verdes Peninsula. Subsequent surveys have found the butterfly at a few coastal bluff locations on the Palos Verdes Peninsula, a sand dune remnant at the Ballona Wetlands, and most recently in Santa Barbara County in both coast sage scrub and sand dune habitats. Recent sand dune habitat restoration efforts in Redondo Beach and at Dockweiler State Beach have also successfully attracted ESBBs that colonized these newly restored habitat locations.

At all locations the ESBB larvae feed on the flowerheads of *Eriogonum parvifolium*. The flowers of this plant also serve as the primary nectar source for adults. This dual dependence of both larvae and adults on the flowers of its buckwheat host is somewhat unusual among butterflies. Most butterflies feed as larvae on one or a few closely related plants, and then as adults on several flowers that are generally not related to the larval food plant.

The adult flight season generally occurs between about mid-June through late August, although there is annual variation in the starting and ending times of the flight season, as well as, its duration. On average, individual adults generally live less than a week under field conditions. During this time, they mate and females lay eggs in the flowerheads of the buckwheat. About one week later, the caterpillar (or larva) emerges and begins feeding on the buckwheat. As it grows in size, it molts four times during about a one month period. When the larva is full grown it crawls down and burrows in the sand or leaf litter beneath the buckwheat and pupates. The pupal stage lasts until the next summer, when the next generation of the adult butterfly emerges.

SECTION 3 METHODS

3.1 Historical Transect Survey

Dr. Rudi Mattoni established a transect route that has been used for monitoring the El Segundo Blue butterfly at the airport since 1984. Mattoni (1990, Figure 11), in his summary report on the ESBB at LAX, illustrated his transect as a nearly continuous route that is very similar to the route followed since 1996 at LAX. Mattoni et al. (2001, Figure 1) illustrated his route as five, discrete transects, which did not survey all habitat along the transect route, including some areas supporting significant stands of buckwheat (e.g., Block 9) situated between the boundaries of these transects. The route used for the historical transect surveys conducted since 1996 follows the nearly continuous route originally established in 1984 and is illustrated in Figure 2.

During the 2014 ESBB flight season, the historical transect route was surveyed on 12 days between May 29th and July 28th. Additional specific survey dates included June 6, 13, 20 and 29, July 1, 3, 6, 14, 21, and 27. Richard Arnold conducted all transect counts during 2014.

The historical transect route (Figure 2) meanders approximately 1.3 miles through a portion of the foredunes that lie immediately west of the VOR facility, and along the top and toe of the backdunes in the southern and eastern portions of the Habitat Restoration Area. The backdune portion of the transect begins east of the VOR and meanders north, generally parallel to Pershing Blvd. to the entrance road (Century Blvd.) of the Habitat Restoration Area. The historical transect route traverses sectors of the Habitat Restoration Area where the ESBB's food plant, *Eriogonum parvifolium*, was abundant and thriving in prior years, areas where the food plant is currently abundant, some hillside areas where natural regeneration has occurred, areas where non-natives have been removed, areas where non-natives still need to be removed, and portions of the dune preserve where restoration activities have occurred in prior years.

Beginning in 1996, the beginning, ending, and intermediate points along the historical transect route were marked by stakes (Interval Posts in Figure 2) in the field with unique alphanumeric identifiers. During 2002, the stakes were remarked, due to loss of the older identification tags, with pre-numbered, aluminum tags to facilitate the identity of interval boundaries. The distance between two consecutive stakes along the transect route is referred to as an interval. There are 35 intervals in the entire transect route (Figure 2), which vary in length from about 65 to 837 feet (Table 1). The intervals vary in length because the beginning and ending points of each interval are located where there are changes in the vegetation, changes in topographic relief, and man-made features, all of which are used to identify the transect route in the field (Figure 2). Table 1 provides the length of every interval of the historical transect route and the total transect length, which equals 7,114 feet. A Trimble XR Pro global positioning system (GPS), with real-time submeter precision, was used to obtain positional information using Universal Trans Mercator (UTM) geographic coordinates (a world-wide coordinate system based on the metric system of measurement and similar to latitude and longitude) for every stake along the entire route of the historical transect during 2002. These

coordinates were differentially corrected via post-processing to improve the accuracy of the positional readings. Data collected with the GPS were transferred to a geographic information system, ArcGIS from software developer ESRI, to measure interval lengths.

As an observer walks the historical transect from beginning to end (i.e., intervals #1 to #35), the numbers of adult ESBBs that are observed along the route within 10 feet on either side of the transect centerline are counted. Tallies are recorded as males or females when diagnostic characteristics are clearly observed, and as undetermined sex when sexual characteristics cannot be observed. No ESBBs are captured or otherwise handled. The locations of observed adults are noted by obtaining positional coordinates using a Trimble GPS unit.

A Kestrel 2000 Pocket Thermo Wind Meter was used to measure air temperature and wind speed during all butterfly counts. Cloud cover was also noted during the counts. All transect counts occurred when weather conditions were suitable for ESBB activity, usually greater than 68° F and winds less than 5 mph, and as evidenced by ESBB adults and other butterflies being active at the times of the transect counts.

3.2 Block Count Survey

When the historical transect was initiated in 1984, the distribution of *Eriogonum parvifolium* at LAX was restricted primarily to the backdunes along the transect route and in the foredunes west of the VOR facility. However, due to restoration efforts in the early 1990's, *E. parvifolium* now grows in portions of the foredunes where the residential neighborhood once existed. Since the historical transect route did not include most portions of the Habitat Restoration Area where buckwheat propagation activities were undertaken, an alternative survey method was necessary to monitor the ESBB in these areas. Starting in 1996, and annually thereafter, block count surveys have been utilized in addition to the historical transect survey to monitor the ESBB population throughout the entire 200-acre Habitat Restoration Area.

ESBB counts were conducted in 86 blocks, which collectively comprise the entire 202.8 acres of Habitat Restoration Area at the LAX dunes. The blocks are numbers 1-60, although some blocks are divided into an east and west or north and south blocks, which results in the 86 total blocks. Only the blocks within the Habitat Restoration Area, where Coast Buckwheat grows, are illustrated in Figure 3. These include blocks #1 through #45, and #49 through #52. The remaining blocks lie north of the Habitat Restoration Area and include blocks #46 through #48, and #53 through #60.

During the block count, all blocks are visited once during the flight season within a period of a few days. The visit is timed to coincide with the approximate peak of the ESBB's flight season. In 2014, these counts were performed between June 30th and July 2nd by Richard Arnold. Using the information gathered from the counts along the historical transect route, the timing of the approximate peak of the ESBB flight season can be estimated while the flight season is in progress by examining the trend in the numbers of butterflies observed on the transect counts and the sex ratio of males to females.

Each block is uniquely identified and is delineated by either the streets or, as in the southern and eastern portions of the LAX dunes, by natural or topographic features with the boundaries marked by stakes (Figure 3). During the block count, the observer systematically surveys all portions of a particular block and visits every buckwheat plant only once, while looking for ESBB adults. As adults are observed, their numbers were tallied and their locations were mapped using a handheld, WAAS-enabled GPS manufactured by Trimble (GeoExplorer 6000). Tallies were recorded as males or females when diagnostic characteristics could be observed. Tallies were recorded as undetermined sex when sexual characteristics could not be readily observed, or in a few cases, when butterflies were so abundant at a single plant that individuals could not be tracked to reliably sex all individuals. No ESBBs are captured or otherwise handled. When possible, behaviors were also noted. All 86 blocks were surveyed in four days using one observer on each survey day.

The data dictionary of the GPS was programmed to store all butterfly observations for every block as well as the associated behaviors. The GPS was used to obtain a positional fix for the location of every observation, which may include more than one butterfly. Data files were downloaded from the GPS unit to a laptop computer at the end of each survey day. During post-processing, the coordinates were differentially corrected to improve the positional accuracy. After completion of the field survey portion of the block counts, the coordinates and other butterfly data were transferred to a data base to facilitate the analysis of the block count data, and to link the data file to a geographic information system to prepare maps of the findings for this report.

Under ideal circumstances, all 86 blocks in the preserve would be simultaneously inventoried and the counts of observed ESBB adults would represent a census (i.e., a complete count of all individuals) of the butterfly population at that time. This approach would minimize the chance of counting the same individual more than once during the census, which could result in inflated census counts. Using this approach, the ESBB population could be considered demographically and geographically closed, because the sampling period is short enough that no births, deaths, immigration, or emigration occurs.

Since 86 qualified and permitted surveyors were not available to conduct the counts of the 86 blocks simultaneously, the counts were performed over a 4-day period in 2014 (3 days for the ESBB occupied blocks in the Habitat Restoration Area and a fourth day for the unoccupied blocks outside of the Habitat Restoration Area). Because the butterflies were not marked, it is possible that some individuals were counted more than once during the census effort as the butterflies dispersed from one location to another within the dunes. Similarly, because the count occurred over a 4-day period, some unknown quantity of births and deaths occurred during this period, thus the ESBB population is considered open during the block count. Also, it is possible that some unknown number of butterflies dispersed from the LAX dunes during the census period and were not detected.

Despite these limitations, the block count is a very valuable method of estimating the overall ESBB population as well as assessing the butterfly's distribution and relative abundance throughout the entire Habitat Restoration Area. The results of the block count

surveys from different years are compared to evaluate the stability of the ESBB population, document its fluctuations and detect any trends, and to provide insight for maintenance, monitoring, and restoration recommendations that will benefit the ESBB and LAX dunes.

3.3 Seasonal Population Estimate for the El Segundo Blue Butterfly.

After the 1998 monitoring report was submitted, Dr. Andrew Huang, formerly of LAX but now retired, developed a mathematical methodology to calculate a seasonal population estimate for the ESBB within the detection area of the historical transect route.

This value, in conjunction with the tallies of the block count and information from prior capture-recapture studies¹ of the ESBB (Arnold 1983 and 1986), were then used to extrapolate a seasonal population estimate for the entire LAX dune preserve. These methods are briefly summarized in the remainder of this section, but are explained in greater detail in Dr. Huang's memo (1998). Although Dr. Huang's methodology has not been published, it has been informally reviewed by insect population biologists at Yale University and the University of California, Davis, and a statistical ecologist at Stanford University (Arnold, personal communication).

Monitoring observations and the transect counts establish the starting and ending dates of the ESBB's flight season, plus the magnitude and shape of the seasonal population curve. When the transect counts are plotted against the flight day, the seasonal population curve of ESBB adult numbers closely tracks a normal bell shape or Gaussian curve, which can be described mathematically.

On any particular day of the ESBB's flight season, the butterfly population consists of individuals that emerged earlier that same day, as well as individuals that emerged on prior days and survived to the present day. Similarly, the butterflies observed on the day of each transect count are comprised of individuals that just emerged and survivors from previous days. Estimated residence rates for the ESBB at the Chevron refinery in El Segundo and at LAX were derived from prior capture-recapture studies of the ESBB (Arnold 1983 and 1986). These capture-recapture studies also revealed that the maximum residence for ESBB adults in the field is six days, even though the maximum observed adult life span under lab conditions is about 14 days (Mattoni 1992). The shorter lifespan in the field is due to mortality from predation and inclement weather conditions (i.e., foggy days or cool temperatures that can prevent cold-blooded ESBB adults from warming up sufficiently and limit their activity).

Thus, mathematically the transect survey count for the butterflies, $P(x)$, on any particular survey date within the ESBB's flight season can be expressed as:

¹ Capture-recapture (also sometimes referred to as "capture-mark-recapture" or "mark-release-recapture") is a technique for estimating the population density and other population parameters, such a birth and death rates, and dispersal for mobile animals. A sample of the population is captured, marked, and released and marked individuals are subsequently recaptured. Various statistical models have been devised to estimate population numbers and other population parameters for each sampling period.

$$P(x) = P_1(x) + P_2(x) + P_3(x) + P_4(x) + P_5(x) + P_6(x) \quad (1)$$

where x is the flight day of the survey. $P_1(x)$, $P_2(x)$, $P_3(x)$, $P_4(x)$, $P_5(x)$, and $P_6(x)$, are the butterflies that just emerged, and those who survived from two, three, four, five and six days ago, respectively. $P_1(x) > P_2(x) > P_3(x) > P_4(x) > P_5(x) > P_6(x)$, as fewer and fewer butterflies are left in each successive day, as demonstrated by the capture-recapture studies (Arnold 1983 and 1986).

The rate of mortality for a population can be expressed mathematically by the following equation from Pianka (1988):

$$dN/dt = -a N \quad (2)$$

This commonly accepted model assumes that the rate of decrease in a population is proportional to the number of individuals within that population. Using equation (2) and the fact that the ESBB lives only 4 to 6 days under field conditions, the remaining butterflies for each successive day after the first day of emergence can be described mathematically as:

$$N = N_0 \exp(-a(t-1)) \quad 2 \leq t \leq 6 \quad (3)$$

$$= 0 \quad 6 < t$$

where t is in days and N_0 is the number of butterflies emerging on day one.

Assuming that at the end of day four, only 5% of the original butterflies that emerged 4 days earlier still remained, then the value of "a" in the above equation can be shown to be 0.998. Substituting this value and evaluating equation (3) for day 2, 3, 4, 5 and 6, we have mathematically

$$P(x) = 1.00 P_1(x) + 0.37 P_1(x) + 0.14 P_1(x) + 0.05 P_1(x) + 0.02 P_1(x) + 0.01 P_1(x) \quad (4a)$$

or

$$P(x) = 1.59 P_1(x) \quad (4b)$$

Equation 4b suggests that on any day of the transect survey, the actual number of emerging butterflies is the total number counted divided by 1.59, as suggested by Huang's mathematical derivation, or 1.66 as indicated by field results. Either number can be used since they are close in value. In this report, both values are used to provide a range of seasonal population estimates for the ESBB at LAX. A capture-recapture study at the Chevron preserve for the ESBB indicates that this factor may be as low as 1.21 (Arnold 1986).

For the entire flight season, the total ESBB population size is the number of newly emerged butterflies on each day added over the total days of the flight season. This summation is equivalent to integrating $P_1(x)$, the population distribution function, over the total number of flight days. Mathematically, it is described by:

$$\text{Total seasonal count} = \int P_1(x) dx \quad (5)$$

Equation (5) can be assessed from the field count data by using equation (4b), in which we have

$$\text{Total seasonal count} = \int P_1(x) dx = \int P(x) dx / 1.59 \quad (6)$$

To calculate a seasonal population estimate for the entire dunes, the first step is to determine the number of butterflies for the entire flight season for the transect acreage alone. This is mathematically equivalent to evaluating the right side of equation (6). The integral $\int P(x) dx$ is simply the area under the Gaussian curve that illustrates the ESBB seasonal population numbers based on the transect counts. Huang (1998) described two methods to solve this integral; using a trapezoidal numerical approximation method and a best-fitted Gaussian curve integration method. Both methods yield similar solutions. In this report, the 2014 ESBB transect survey data, in conjunction with the trapezoidal numerical approximation method, were used to estimate the total seasonal population number of ESBB for the transect route in 2014.

After establishing the total seasonal ESBB population number for the historical transect, this number is scaled up proportionately to estimate the seasonal population number for the entire 202.8 acre, Habitat Restoration Area. Since the block count data were obtained during or close to the peak flight period of the ESBB, the scaling factor is simply the ratio of the block count to the transect peak value. Thus, the ESBB seasonal count for the entire LAX dunes is obtained by multiplying the total seasonal population number of the transect survey by this scaling factor.

3.4 Buckwheat Monitoring.

Monitoring of the ESBB at LAX during the past several years has revealed that population numbers of the ESBB fluctuate dramatically from year-to-year. A variety of factors affect population numbers of the butterfly, including seasonal weather conditions, levels of parasitism, disease, and predation, plus abundance of its sole larval and primary adult food plant, Coast Buckwheat, as well as the numbers of buckwheat flowerheads

Arnold (1985) demonstrated the positive correlation that exists between buckwheat plant and flowerhead numbers with ESBB numbers based on his studies performed at the nearby Chevron refinery in El Segundo. Arnold and Goins (1987) further elaborated upon this relationship. Since information on the numbers of buckwheat plants and flowerheads can provide insight as to why ESBB numbers increase

or decrease annually, monitoring of the buckwheat was initiated in 2002 and has been performed annually since. At LAX the 2014 inventories of buckwheat plant numbers, age classes, and flowerhead numbers were obtained for:

- a) the entire length of the historical transect route; and
- b) 126 transects laid in other portions of the Habitat Restoration Area (i.e., outside of the historical transect route).

Lengths of the 35 intervals of the historical transect route are presented in Table 1, while the lengths of the 126 transects are presented in Table 2. Buckwheats were inventoried along the entire 1.3-mile length of the historical transect. The 126 other transects collectively measure 10.1 miles in total length. Results of the 2014 buckwheat monitoring efforts are compared to those of prior years for the historical transect and the block transects to identify any trends.

For both buckwheat monitoring activities, a Trimble Ranger GPS with real-time submeter precision was used to map the locations of buckwheat plants. A laser rangefinder, the bluetooth TruPulse model of Laser Technology, Inc., was used with the GPS to obtain the positional coordinates for every buckwheat so the operator did not have to stand next to each plant with the GPS antenna, which could have damaged the buckwheat or life stages of the ESBB. The positional information for all buckwheats was differentially corrected during post-processing to improve the accuracy of all positional fixes.

All buckwheats growing within the 20-foot wide corridor of the historical transect route were mapped using the GPS and laser rangefinder. In addition, the age class (seedling, juvenile, mature, or senescent) and number of flowerheads for every buckwheat plant was also recorded and later transferred to a data base to perform various summary statistics and to link the information to the GIS to summarize the findings in a series of maps.

3.5 Relationships Between Rainfall, Buckwheat Flowerheads and ESBB Numbers.

The relationships between annual rainfall, the annual number of buckwheat flowerheads, and annual numbers of ESBB adults observed during the block counts was examined using linear regression analysis. Regression analysis is a statistical method used for testing hypotheses about the relationships between two variables, which can also be used for prediction or estimation purposes. The results of regression analyses are equations that show the mathematical relationship between the dependent variables (in this case the annual number of flowerheads and ESBB adults) and the independent or explanatory variable (in this case rainfall and number of flowerheads). Thus the linear regression equations are used to estimate the numbers of flowerheads and butterflies one could “expect” to observe this year. For comparative purposes, two different sets of regression equations are utilized, one using data from 2002 through 2013 and the second using data from 2002 through 2014.

SECTION 4

RESULTS AND DISCUSSION

4.1 Timing and Length of the ESBB's Flight Season.

The first adults of ESBB at LAX in 2014 were observed on May 29th. This date is 6 days earlier than the first ESBB observation of 2013 (Arnold 2013). Two, very worn ESBB females were observed during a historical transect count that was performed on July 27th, and based on their physical condition are presumed to have died on that date. Thus, the butterfly's flight season was at about 60 days during 2014 or approximately 8.5 weeks in duration. In prior years, the ESBB flight season has ranged from 64-76 days in length (Arnold 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005a, 2007a, 2007b, 2009, 2010, 2011, 2012a, 2012b, 2013, plus Arnold and Rios 2000). Thus the timing and duration of the ESBB's 2014 flight season was the shortest that has been observed during the past 20 years. The third consecutive year of severe drought conditions probably contributed to the shorter flight season, as the duration of buckwheat flowering was also shorter during 2014.

4.2 Historical Transect Survey.

A total of 562 adult ESBBs were observed on the 12 survey dates in 2014, including 383 males and 179 females. The seasonal total applies to only the detection area of the transect route, which measures approximately 20 ft. x 7,114 ft. or 3.3 acres, rather than to the entire dune preserve. Table 3 summarizes the total numbers (males + females) of ESBB adults observed by survey date. The transect counts suggest that the seasonal population peak occurred on July 1st, when 98 butterflies were observed. Observed ESBB numbers per interval of the historical transect throughout the 2014 flight season ranged from 0 in seven intervals to 84 within interval #33 (Table 3).

Table 4 summarizes the annual ESBB counts for the historical transect at LAX for the years 1984 through 2014. The historical transect counts have been performed annually since 1984, except for 1985 when no counts were undertaken. As depicted in Table 4, the 2011 seasonal tally of 4,690 ESBB adults was the highest seasonal total observed. The 2014 ESBB seasonal total is only 12% of the 2011 seasonal total and the seasonal total declined approximately 58% in 2014 compared to the 2013 seasonal total. Furthermore, the 2014 seasonal EBS total of 562 was well below the average seasonal total of 1,746 adults.

The precipitous decline in ESBB numbers is undoubtedly related to the decline in buckwheat and flowerhead numbers that have occurred in recent years. The continued drought conditions are likely responsible for much of the observed buckwheat mortality and reduced flowerhead numbers, but many of the buckwheat plants along the historical transect and becoming senescent as they age. These factors are discussed further in Section 4.6 and other portions of this report.

4.3 Block Count Survey.

In 2014, a total of 1,488 adult ESBBs were observed during the block count, including 986 males and 502 females (Table 5). Each block, as illustrated on the attached map of the LAX dunes (Figure 3), was visited only once during the period June 30

through July 2nd. Table 5 summarizes the numbers of ESBBs that were observed in every block during 2014.

Figure 5 is a map that illustrates the location of every ESBB adult noted during the 2014 block count. Behaviors of adult ESBBs observed during the block counts are also summarized in Table 5 for each block where butterflies were seen. The vast majority of individuals (80.5%) were observed flying, while smaller percentages of individuals exhibited perching (4.3%), basking (3.6%), courtship (3.5%), mating (2.1%), foraging (i.e., nectaring, 5.6%), or oviposition (0.4%) behaviors. These percentages are comparable to the observed frequencies of these behaviors in prior monitoring years.

Within the approximately 200-acre Habitat Restoration Area, tallies of the numbers of ESBB adults observed during the 2014 block count ranged from zero individuals in 8 blocks to 170 individuals in block #38N. Outside of the Habitat Restoration Area (blocks #46 - #48 and #53 - #60), no ESBBs were observed. One additional buckwheat grows outside of the Habitat Restoration Area near the park located on Vista Del Mar Avenue.

Annual block count data presented in Table 6 indicates that during the 19-year period, 1996-2014, ESBB adults were generally found in the same blocks in all years and most blocks exhibited similar trends in population numbers during this period. Results of the block counts indicate that ESBB population numbers declined about 44% in 2014 compared to 2013 (Table 7).

4.4 Seasonal Population Estimate for the ESBB.

Using the trapezoidal numerical integration method, the 2014 seasonal population estimate for the ESBB throughout the entire Habitat Restoration Area at LAX was 26,302 to 27,460 individuals (Table 8). These seasonal estimates indicate that ESBB population numbers decreased about 40% in 2014 compared to the seasonal population estimates for 2013 (Arnold 2013).

4.5 Year-to-Year ESBB Population Trends.

All three population estimation techniques, the historical transect counts (58%), the block count (44%), and the seasonal population estimate (40%), indicate that the ESBB numbers declined substantially in 2014 compared to 2013. Table 8 summarizes the seasonal population estimates for the ESBB for the years 1998 through 2014. During this 17-year period, estimated seasonal population numbers have fluctuated from a low of 26,302 in 2014 to 142,727 in 2006, a factor of 5.4 times. The 2014 ESBB estimates are the lowest observed during this 17-year period.

Declines and increases of this magnitude are not unusual among insects, especially those that have only a single generation per year, such as the ESBB. Indeed, several moths that are routinely monitored because they are forest pests, can exhibit a 10-fold increase in population numbers within a few generations (i.e., an outbreak) or may decline just as rapidly (Varley, Gradwell, and Hassell 1974). Factors such as seasonal weather conditions, increased parasitism and predation, a higher incidence of disease, or a decline in food plant numbers (or flowerhead numbers in the case of the ESBB), may

individually or collectively affect population numbers.

One factor that influences annual ESBB population numbers is rainfall, which in turn influences flower production of the Coast Buckwheat. Table 9 presents annual rainfall totals, measured between July 1 and June 30, for the years 1996 through 2014. During this period the average annual rainfall was 12.01 inches, with a low of 2.63 inches in 2007 and a high of 31.28 inches in 1998. During this same period, annual ESBB numbers, as measured during the block counts, ranged from 1,488 to 5,675 individuals. The graph associated with Table 9 illustrates the very strong positive correlation between ESBB numbers and annual rainfall during this 19-year period.

During this monitoring program, dramatic fluctuations in ESBB population numbers have been witnessed even between consecutive generations of the butterfly. For example, ESBB numbers nearly doubled between 1996 and 1998, between 2002 and 2003, and between 2004 and 2005. In contrast, substantial declines have also been observed. For example, there was an approximate 50% decline between 1998 and 1999, between 2001 and 2002, between 2003 and 2004, a 68% decline between 2006 and 2007, as well as a 74% decline between 2010 and 2014. These dramatic increases and decreases in annual numbers are likely within the “normal” range of population fluctuations for the ESBB. Even though population data on the butterfly have now been collected in a consistent manner for the past several years, statisticians would insist that another 10 years may be needed to evaluate the full range of normal variation on annual population numbers. Regardless, due to the unusual weather conditions that the Los Angeles area experienced in the past few years, the extremes in fluctuations of ESBB numbers may have already been observed, even within this relatively short period of time.

4.6 Buckwheat Monitoring and Trends.

Figure 6 illustrates the locations of Coast Buckwheat plants that grew within the historical transect route in 2014. It also summarizes the numbers of plants and flowerheads in each of the 35 intervals. Five intervals (an increase of one interval compared to 2013) supported no buckwheat plants, 15 intervals supported between 1 and 10 plants, 9 intervals supported between 11 and 20 plants, 4 intervals supported between 21 and 30 plants, 0 intervals supported between 31 and 40 plants or between 41 and 50 plants, 1 interval between 51 and 60 plants, and 1 interval had between 61 and 74 plants.

Table 10 provides a breakdown of the buckwheat age classes (seedling, juvenile, mature, and senescent) that were observed in every interval along the historical transect route in 2014. Survey results indicated that approximately 63% of the buckweats were mature plants, while 28% were senescent, 8% were juveniles, and less than 1% were seedlings.

A total of 459 Coast Buckwheat plants grew within the historical transect route during 2014, which represents a 5.4% decrease in plant numbers between 2013 and 2014 (Table 11). These plants produced an estimated total of 324,495 flowerheads in 2014, which represents a 40% decrease from the 2013 tally. The number of flowerheads in a particular transect interval ranged from 0 (5 intervals) to 153,753 (Figure 6). As in recent past years, five transect intervals, #30, #31, #33, #34, and #35 accounted for

approximately 86% of the buckwheat flowerheads observed along the entire historical transect route in 2014.

As detailed in Table 11, buckwheat plant numbers along the historical transect exhibited a net decline of 28% (692 to 501) between 2002 and 2008, but increased to 552 in 2011. Between 2011 and 2014 plant numbers declined to only 459, the lowest number throughout the period of 2002 through 2014.

Even though plant numbers declined, the average numbers of flowerheads of mature buckwheats doubled between 2002 and 2006, but declined 49% in 2007 (a drought year) to return to the 2002 level (Table 12). Because of the drought of 2007 (Table 9), total flowerhead biomass declined 80% between 2007 and 2006. Fortunately, rainfall during the winter of 2007- 2008 was nearer normal levels and the average flowerhead numbers doubled in 2008 compared to 2007 (Table 12). Between 2008 and 2009, rainfall was below average, but again near normal, and average flowerhead numbers more than doubled, increasing 61% (Table 12). Precipitation totals were normal during the 2009-2010 rainy season and flowerhead numbers remained high in 2010. Higher than normal precipitation during the 2010-2011 rainy season enabled flowerhead numbers to continue to increase in 2011. Precipitation during the 2011-2012 rainy season was only about 63% of normal, so not surprisingly, the average number of flowerhead numbers dropped slightly. With 2014 being the third consecutive year of drought (37% of average annual rainfall), the decline in average flowerhead numbers (707 in 2014) continued (Table 12).

Arnold (1985) described the strong positive correlation between buckwheat plant numbers, flowerhead numbers, and ESBB adults. Table 13 details this relationship for the historical transect during the period of 2002 through 2014.

Outside of the historical transect route, 126 transects were randomly placed throughout the blocks of the Habitat Restoration Area to collect data on the numbers of Coast Buckwheat plants and flowerheads, as well as their locations. Figure 7 illustrates the locations of these transects and the buckwheats growing along them. Of the 126 transects, buckwheat data was also collected from 56 of these same transects during 2002, while 70 new transects were added during 2003 (Table 2) and have been monitored annually since then. Table 14 lists the number of plants and average numbers of flowerheads observed along each transect during 2014.

Tables 15 and 16 summarize the numbers of buckwheat plants by age class and the average numbers of flowerheads by age class for all 126 transects for the 12-year period, 2003 through 2014. Although the overall numbers of buckwheats increased 7.8% in 2014 compared to 2013, mature buckwheats declined by 21% during the same period (Table 15). The proportion of seedlings and juveniles in the buckwheat population increased slightly between 2013 and 2014, while the proportion of senescent plants increased from 37% to 41% during this period. Thus, average number of flowerheads for all buckwheat plants, regardless of age class, declined about 35% between 2013 and 2014 (Table 16).

Table 17 summarizes the annual block counts of ESBB, buckwheat plants, and buckwheat flowerhead numbers for the period of 2003 through 2014 at the LAX dunes. It also graphically illustrates the correlations between ESBB and buckwheat plant (including all age classes) numbers, as well as the ESBB and flowerhead numbers. Although the increases and declines in ESBB numbers correlate well with changes in buckwheat plant numbers, an even stronger positive correlation exists between ESBB numbers and buckwheat flowerhead numbers.

Tables 18 and 19 summarize the same information for the 56 transects that were surveyed during the 13-year period, 2002 through 2014. Similar declines and proportions for plant numbers, flowerhead numbers, and increased senescence as observed for the buckwheats on all 126 transects occurred during the aforementioned 12-year period.

4.7 Relationships Between Rainfall, Buckwheat Flowerheads, and ESBB Numbers.

Table 20 and its associated graphs illustrate the strong positive correlation between ESBB adult numbers from the block counts and the buckwheat flowerhead numbers. Both flowerhead and ESBB numbers are positively correlated with annual (July 1 – June 30) rainfall totals. The flowerhead/rainfall and ESBB/flowerhead correlation coefficients are 0.46 and 0.52, respectively.

The regression equations that were estimated in 2013 (data from 2002 – 2013) were used to predict the estimated numbers of buckwheat flowerheads and ESBB to be tallied in 2014. A similar prediction was made using regression equations estimated in 2014 (data from 2002 – 2014). The regression equations are provided in a note to Table 21. This exercise is one way to look at the ability of statistical analysis to predict expected population numbers.

Predictions are presented in Table 21. The total rainfall for the 2014 growing season (July 1, 2013 – June 30, 2014) was 4.45 inches. The estimated number of flowerheads was 982 using the 2013 and 2014 equations, respectively. Remarkably, both equations slightly underestimated the actual number of flowerheads observed, 984, a difference of only 2 flowerheads (0.2%). Based on the number of flowerheads, 984, the estimated numbers of ESBB adults in 2014 are 3,552, which is about 2.4 times higher than the 1,488 ESBB adults actually observed during the block counts during 2014. I don't have a good explanation for the difference in the predictive power of the regression equations, but it is possible that the effects of the continued drought may be greater on the ESBB than the buckwheat. Alternatively, additional years of data on the ESBB and buckwheat flowerheads may be necessary to improve their correlation and the predictive power of their regression equation.

Table 22 and its associated graphs illustrate the observed trends in buckwheat plant and flowerhead numbers for both the historical transect route and the block transects during the period of 2003 through 2014. Buckwheat numbers along the historical transect have declined while numbers along the block transects have increased during this 12-year period. There has been a downward trend in buckwheat numbers on the historical transect route over the past 12 years. Even though the number of

flowerheads has varied considerably annually, there is a slight upward trend in flowerhead numbers during this same period, but the correlation coefficient for this equation only 0.15, indicating that the trend is not significant. As noted earlier, during 2014 both plant and flowerhead numbers were down.

While the regression equations demonstrate there is a strong positive relationship between the number of flowerheads and the ESBB adults observed, additional factors that are not included in the equations may also influence butterfly numbers. For example, it would be useful to know what percentage of ESBB pupae may not emerge the next year if they don't receive the proper environmental cues and how many years they can delay their emergence. Also, rainfall during certain periods of the year may be more important to the buckwheat and its flowerhead development. For example, during the summer of 2014, flower buds were frequently observed in many flowerheads that failed to actually flower. Also, the duration of the buckwheat flowering season was shorter than normal in 2014, which in turn contributed to a shorter flight season for the ESBB. Thus, while the existing data and analyses have established the importance of rainfall to flowerheads and flowerheads to support the ESBB, other factors likely play a role in these relationships but are not accounted for by the current regression equations.

Additionally, the existing data set is relatively small, spanning only 11 years for prediction of 2014 estimates. Statisticians generally want a minimum of 30 observations (in this case, 30 years of data) upon which to base any statistically significant conclusions for these types of analyses. As encouraging as the predicted estimates have been thus far, additional years of observations, data analyses, and inclusion of other factors should improve our understanding of these relationships.

SECTION 5

HABITAT MANAGEMENT ACTIVITIES AND RECOMMENDATIONS

5.1 Routine Habitat Management Activities.

The Construction and Maintenance Services Division of Los Angeles World Airports (LAWA) has a dedicated two-man crew that works at the LAX dunes to perform regular trash and debris removal, weeding, and other vegetation management activities. This crew works throughout the entire 307.1-acre dune area, not just the 202.8 Habitat Restoration Area where the ESBB occurs.

Although some habitat management activities occur throughout the Habitat Restoration Area, in recent years the emphasis of these activities has been in the peripheral portions of the Habitat Restoration Area as approved by USFWS in 2005 as part of the short-term weed removal plan (Arnold 2005b). In 2005, Richard Arnold trained the crew and their supervisors to recognize the butterfly's buckwheat food plant and how to distinguish it from other buckwheat taxa that currently grow at the LAX dunes, as well as about 15 other invasive weeds that were targeted for control in the aforementioned short-term weed management plan. In recent years, much of the crew's weed removal activities have focused on the southern border (i.e., adjacent to Imperial Highway) and the western border (i.e., adjacent to Vista Del Mar). In other portions of the Habitat Restoration Area, removal of acacias, sea lavender, *Eriogonum fasciculatum*, dead palm trees, and castor bean has been performed at various locations.

As noted in my 2012 and 2013 annual reports, I recommend that the crew refocus its weed removal efforts to the other blocks of the Habitat Restoration Area where the ESBB and its buckwheat food plant occur, as well as blocks where invasive plants dominate. Ice plant, acacia, three buckwheat taxa, and various weedy grasses, especially Veldt grass, are expanding and increasing in abundance throughout these areas and reducing habitat quality not only for the ESBB but also other dune endemic plants and animals.

It is my understanding that LAWA has applied to the US Fish & Wildlife Service for renewal of its ESBB permit to enable the crew to resume its weed control efforts at the LAX dunes preserve. To guide the crew's weed control efforts, Figures 8, 9, and 10 illustrate selected locations of three non-endemic buckwheats (*Eriogonum fasciculatum*, *E. grandiflorum*, and *E. cinereum*), acacia, pine, ice plant, Veldt grass, and non-native succulents grow within the Habitat Restoration Area at the LAX dunes that particularly need attention. Most of these same areas were also noted in my 2012 and 2013 annual reports (Arnold 2012a and 2013). I emphasize that the illustrated areas are not the only locations where these invasive plants are problematic at the LAX dunes; rather they are intended to serve as examples of what the crew could target in its annual work plan to control the invasive plants. Appendix A is a series of ground-level photographs for a subset of the aforementioned weed locations, which illustrate the targeted, invasive plants. Similarly, appendices attached to my 2012 and 2013 annual reports provide ground-level photographs for additional problem locations (see maps provided in my 2012 and 2013 reports). As in past years, the 2014 photographs of exemplar problem locations were taken with a GPS-enabled camera to obtain a positional fix for each photo

location. The photo location identification numbers, as illustrated in Figures 8, 9, and 10, are also the photo identifiers illustrated in Appendix A.

Appendix B provides copies of the work logs for the crew for the period of January through December 2014. The logs describe the types of habitat management activities that were performed and their locations within the dunes. As detailed in the logs, numerous truck loads of trash, which continually blow onto the dunes from the adjacent Dockweiler State Beach and vehicles that park along Vista Del Mar, are hauled out of the dunes regularly along with other debris and uprooted weeds (mostly Russian Thistle). Trash pickup consumes much of the 2-man crew's time, which preferably should be spent dealing with the weeds and other vegetation management issues. The City of Los Angeles recently banned plastic bags and covered trash cans have been installed along Vista Del Mar Ave. Hopefully these new measures will resolve the trash issue so the dune crew can devote its time to vegetation management rather than trash pickup and removal.

5.2 Need for Additional Buckwheat Outplanting at LAX.

Long term survival and maintenance of the ESBB butterfly population at the LAX dunes preserve is dependent on the replacement of the mature and aging buckwheat plants that characterize much of the habitat. As described earlier in this report and illustrated in the graphs for Table 22, the results of monitoring of the resident buckwheats throughout the entire Habitat Restoration Area during the past several years reveal that insufficient numbers of seedling and juvenile buckwheats are present to replace the mature and senescent individuals that comprise the vast majority of the population of the ESBB's larval and adult food plant. Although drought conditions in recent years have caused a substantial decline in the estimated annual numbers of the ESBB, the observed decline has been further exasperated by a decline in the numbers of buckwheat plants and their flowerheads.

Coast Buckwheats often require several years of survival and growth to produce adequate flowerhead numbers to benefit the ESBB. Thus, the propagation and outplanting of Coast Buckwheat should be continued at the LAX dunes, preferably on an annual basis. Ideally, other dune indigenous plants should also be propagated and outplanted along with the Coast Buckwheat to revegetate areas that are weeded at the LAX dunes to re-establish the habitat and improve habitat values for not only the ESBB but also other plants and animals endemic to this remnant of the El Segundo dunes system.

Throughout the LAX dunes a primary cause of the lack of buckwheat seedlings is the presence and abundance of various herbaceous weeds, annual grasses, and ornamental plants that continue to spread throughout the dunes and are locally abundant. Site management with an emphasis on invasive vegetation control is an important component in maintaining and improving the health of the LAX dunes preserve for the ESBB butterfly. Continued weeding should enable increased numbers of seedlings and juveniles of the Coast Buckwheat to establish naturally and eventually become mature plants to support future generations of the ESBB.

SECTION 6

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SECTION 7

TABLES

Table 1. Lengths of the 35 intervals along the historical ESB transect at LAX

Interval Number	Length (feet)
1	510
2	837
3	142
4	75
5	168
6	107
7	223
8	140
9	126
10	119
11	79
12	184
13	200
14	194
15	94
16	137
17	214
18	295
19	234
20	193
21	226
22	230
23	89
24	89
25	264
26	186
27	89
28	65
29	107
30	101
31	294
32	125
33	105
34	383
35	490
Total Length	7,114

Table 2. Lengths of the 126 transects for the block buckwheat monitoring.

Transect Number	Length (feet)	Transect Number	Length (feet)	Transect Number	Length (feet)
1	662	43*	287	85*	379
2	430	44*	255	86	958
3	540	45*	243	87	959
4	557	46	240	88	300
5*	787	47	269	89	256
6*	766	48	279	90	257
7	71	49	278	91	281
8	139	50	314	92	352
9*	168	51	259	93	361
10*	178	52	268	94	369
11*	201	53	248	95	333
12*	230	54	248	96*	379
13*	277	55	254	97*	379
14*	295	56	252	98*	420
15*	329	57	283	99*	442
16*	430	58	164	100*	285
17	191	59	254	101*	292
18	233	60	240	102*	307
19	276	61	238	103*	318
20	301	62	702	104	987
21*	295	63	924	105	1,171
22*	259	64	830	106*	309
23*	245	65	858	107*	304
24*	244	66*	175	108*	309
25*	562	67*	133	109*	292
26*	556	68*	176	110*	369
27*	535	69*	213	111*	244
28*	384	70	261	112*	239
29*	507	71	288	113*	270
30*	498	72	286	114*	1,432
31*	493	73	284	115*	1,432
32*	467	74	401	116	1,422
33	231	75	411	117	1,454
34	239	76	390	118	897
35	274	77	384	119	846
36	317	78*	170	120	1,015
37	318	79*	198	121	744
38	317	80*	191	122	603
39	860	81*	157	123	835
40	411	82*	398	124	674
41	461	83*	321	125	39
42*	320	84*	322	126	439
				Total Length	53,153

* indicates the 56 transects that have been monitored since 2002; the other transects have been monitored since 2003.

Table 3. Daily ESB Counts for the Historical Transect in 2014 (M = male, F = female).

Transect Interval Number	ESB Counts by Survey Date and Transect Number																								Seasonal			
	29-May		6-Jun		13-Jun		20-Jun		29-Jun		1-Jul		3-Jul		6-Jul		14-Jul		21-Jul		27-Jul		28-Jul		Total			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M+F	
1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	5	3	8	
2	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	3	4	
3	1	0	0	0	1	0	0	0	0	0	0	0	2	1	0	0	2	0	0	0	0	0	0	0	6	1	7	
4	0	0	1	0	0	0	2	1	1	1	0	0	2	1	1	0	2	3	0	0	0	0	0	0	9	6	15	
5	0	0	0	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	0	5	
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	
11	0	0	0	0	2	0	2	1	1	1	1	0	2	0	1	0	2	1	0	0	0	0	0	0	11	3	14	
12	0	0	1	0	1	0	3	1	0	0	2	1	0	1	2	1	0	1	0	0	0	0	0	0	9	5	14	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	2	2	4	
15	0	0	0	0	0	0	0	0	1	0	2	1	1	1	1	0	1	0	0	0	0	0	0	0	6	2	8	
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	1	1	3	1	2	1	4	2	2	1	3	0	2	1	0	1	0	0	0	0	17	8	25	
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	0	0	0	0	0	4	2	6	
21	0	0	0	0	0	0	0	0	1	0	1	1	1	1	2	1	2	1	0	1	0	0	0	0	7	5	12	
22	0	0	1	0	0	0	1	0	2	1	2	1	1	1	2	1	1	0	1	1	0	0	0	0	11	5	16	
23	0	0	0	0	1	0	1	0	1	1	1	0	2	1	0	0	1	2	1	0	0	0	0	0	8	4	12	
24	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	1	1	0	1	0	0	0	0	4	4	8	
25	0	0	0	0	0	0	0	0	2	1	1	0	1	0	2	0	1	0	0	1	0	0	0	0	7	2	9	
26	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	4	
27	0	0	0	0	0	0	3	2	1	0	1	0	1	1	0	0	1	0	1	0	0	0	0	0	8	3	11	
28	0	0	1	0	2	1	3	1	0	1	1	1	0	1	1	0	0	0	2	0	0	0	0	0	10	5	15	
29	0	0	1	0	2	0	1	1	2	1	1	1	1	0	0	1	0	0	1	1	0	0	0	0	9	5	14	
30	0	0	0	0	3	2	3	2	4	2	5	3	6	3	5	4	4	3	1	2	0	0	0	0	31	21	52	
31	0	0	0	0	1	1	4	0	3	0	5	2	7	3	4	2	4	2	1	1	0	0	0	0	29	11	40	
32	0	0	0	1	4	1	4	2	6	4	5	2	1	3	5	3	1	0	1	1	0	0	0	0	27	17	44	
33	0	0	2	0	8	1	9	2	12	4	12	4	9	5	4	2	4	2	1	2	0	1	0	0	61	23	84	
34	0	0	0	0	4	0	10	3	14	6	12	5	8	2	7	4	3	2	0	2	0	1	0	0	58	25	83	
35	0	0	0	0	3	1	4	1	3	1	6	3	9	2	5	3	2	2	0	1	0	0	0	0	32	14	46	
Daily Total	1	0	7	1	33	8	58	18	60	25	67	31	60	32	51	25	36	22	10	15	0	2	0	0	0	383	179	562
M+F	1		8		41		76		85		98		92		76		58		25		2		0					
Sex Ratio	1.00		0.88		0.80		0.76		0.71		0.68		0.65		0.67		0.62		0.40		0.00		#DIV/0!		#DIV/0!			

Table 4. Summary of Annual ESB Historical Transect Counts at LAX for 1984-2014

Year	Number of Survey Dates	Span of Survey Dates (days)	Number of ESB Adults
1984	4	16	193
1985	Not surveyed		
1986	5	35	258
1987	9	56	473
1988	10	61	1,049
1989	11	54	1,390
1990	10	63	1,192
1991	12	90	906
1992	15	111	1,051
1993	10	58	925
1994	8	63	500
1995	10	69	1,239
1996	4	21	1,455
1997	4	21	126
1998	6	60	2,175
1999	11	64	1,741
2000	13	59	2,107
2001	10	64	2,652
2002	14	67	1,236
2003	14	72	2,688
2004	15	72	2,123
2005	14	70	2,653
2006	14	69	3,049
2007	12	60	777
2008	14	68	2,173
2009	13	70	2,859
2010	14	76	3,898
2011	14	76	4,690
2012	13	70	2,731
2013	13	64	1,319
2014	12	60	562

Table 5. 2014 El Segundo Blue Block Counts and Observed Behaviors (Census dates June 30 - July 2, 2014)

Block No.	No. of ESB Observed		No. of ESB Observed by Type of Behavior						
	Female	Male	Fly	Perch	Bask	Nectar	Court	Mate	Oviposit
1	19	28	29	4	5	4	2	2	1
2	4	13	14	-	-	1	2	-	-
3	2	1	3	-	-	-	-	-	-
4	4	12	11	-	-	1	2	2	-
5	2	1	3	-	-	-	-	-	-
6	7	10	9	2	2	2	-	2	-
7	10	14	19	-	2	1	2	-	-
8	9	21	21	1	-	3	2	2	1
9	16	27	35	3	1	2	2	-	-
10	5	6	11	-	-	-	-	-	-
11	-	5	5	-	-	-	-	-	-
12	-	1	1	-	-	-	-	-	-
13	3	14	13	1	1	-	2	-	-
14	7	12	13	2	-	2	2	-	-
15	7	18	22	-	2	1	-	-	-
16	14	18	18	5	3	4	2	-	-
17	-	1	1	-	-	-	-	-	-
18	4	10	14	-	-	-	-	-	-
19	1	-	1	-	-	-	-	-	-
20	4	12	9	2	4	1	-	-	-
21	-	1	1	-	-	-	-	-	-
22	-	1	1	-	-	-	-	-	-
23	3	-	3	-	-	-	-	-	-
24	1	2	3	-	-	-	-	-	-
25	3	3	4	1	1	-	-	-	-
26	2	5	5	1	-	1	-	-	-
27	5	10	10	1	1	1	2	-	-
28	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-
31	2	-	1	-	-	1	-	-	-
32	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-
35	13	22	16	5	4	6	2	2	-
36N	59	77	130	2	1	1	2	-	-
36S	25	50	75	-	-	-	-	-	-
37N	7	25	30	-	-	-	2	-	-
37S	47	104	120	10	10	7	4	-	-
38N	56	114	148	6	1	9	-	6	-
38S	21	36	46	-	-	-	4	6	1
39N	7	7	11	1	-	-	-	2	-
39S	12	16	24	-	-	-	-	4	-
40C	1	1	2	-	-	-	-	-	-
40N	5	40	37	4	-	4	-	-	-
40S	7	21	28	-	-	-	-	-	-
41N	8	23	27	1	-	1	2	-	-
41S	7	29	30	-	2	2	2	-	-
42N	14	25	33	1	1	2	2	-	-
42S	12	28	29	1	4	4	-	2	-
43N	17	21	23	3	1	8	2	-	1
43E	22	29	32	3	1	9	2	2	2
43W	2	2	4	-	-	-	-	-	-
44N	10	33	34	1	3	3	2	-	-
44S	12	24	27	1	2	2	4	-	-
45N	-	3	3	-	-	-	-	-	-
45S	4	10	8	2	2	-	2	-	-
46-60 Circle	-	-	-	-	-	-	-	-	-
TOTALS	502	986	1,197	64	54	83	52	32	6
F + M	1,488								
% Males	66.3%								

Table 6. Summary of Annual ESB Block Counts at LAX (1996 - 2014)

Block No.	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	19-Year Totals
1	107	51	96	64	3	110	77	365	119	260	256	124	132	105	186	158	115	72	47	2,447
2	34	25	170	72	80	123	27	166	69	134	134	38	52	74	67	58	51	41	17	1,432
3	0	0	14	1	0	9	119	9	15	9	10	7	5	2	6	1	1	1	3	212
4	22	1	1	16	1	6	66	95	30	59	43	15	61	36	107	92	56	28	16	751
5	26	3	10	18	10	13	18	68	9	46	25	6	12	21	27	23	14	5	3	357
6	8	1	13	9	125	16	19	51	14	37	28	13	25	22	55	48	30	16	17	547
7	23	1	8	4	24	47	40	111	40	70	88	39	64	49	101	98	52	23	24	906
8	103	9	147	46	47	127	42	179	47	139	161	45	58	86	71	61	29	27	30	1,454
9	221	48	539	286	310	258	198	512	94	493	456	74	230	200	304	293	157	85	43	4,801
10	54	18	134	60	28	66	86	120	55	175	135	34	84	59	131	103	85	34	11	1,472
11	14	1	0	1	7	3	21	61	13	106	79	24	37	10	73	60	31	11	5	557
12	85	55	66	57	33	53	35	5	4	0	3	2	5	15	12	9	2	1	1	443
13	152	35	113	92	65	107	96	168	38	340	139	33	59	103	169	135	116	61	17	2,038
14	5	3	19	9	15	14	26	133	30	68	121	49	71	139	117	112	117	59	19	1,126
15	55	0	108	27	38	81	75	234	39	128	222	50	110	186	103	96	104	65	25	1,746
16	6	0	36	15	13	35	47	59	12	23	73	52	83	117	94	90	51	43	32	881
17	3	0	1	0	1	5	0	1	0	0	1	1	1	1	2	2	2	1	1	23
18	47	28	120	75	65	90	48	106	15	188	83	39	80	59	137	137	88	45	14	1,464
19	10	10	16	27	37	30	24	2	0	0	1	1	1	1	0	0	1	4	1	166
20	50	75	169	245	175	346	87	133	85	118	190	16	64	70	122	86	73	36	16	2,156
21	11	5	37	6	7	3	0	0	1	2	3	0	0	0	0	1	2	3	1	82
22	1	0	4	0	1	2	7	5	2	14	9	15	16	14	9	5	11	4	1	120
23	1	0	0	0	1	0	1	0	0	2	4	4	5	4	3	3	8	5	3	44
24	18	0	20	6	23	34	0	34	6	7	6	3	9	6	4	3	6	4	3	192
25	0	0	4	28	53	48	33	62	19	39	53	17	42	39	16	14	23	17	6	513
26	6	0	4	19	25	22	0	5	10	5	14	5	18	20	17	9	17	10	7	213
27	0	1	0	2	0	18	6	27	14	57	49	22	56	50	26	26	27	26	15	422
28	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
29	2	0	0	9	6	7	0	0	0	0	0	1	0	0	0	0	0	0	0	25
30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
31	2	0	6	5	26	23	16	41	7	5	65	11	18	12	12	14	16	10	2	291
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
35	25	3	40	43	82	126	32	81	38	66	114	46	136	133	89	84	100	73	35	1,346

Table 6. Summary of Annual ESB Block Counts at LAX (1996 - 2014)

[illegible]

Table 6. Summary of Annual ESB Block Counts at LAX (1996 - 2014)

Block No.	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	19-Year Totals
55M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Circle	0	0	0	8	0	15	8	19	5	25	23	3	14	4	4	2	2	0	0	132
Total	2,093	726	4,069	2,135	2,960	4,733	2,750	5,803	2,645	5,560	7,642	2,440	4,447	4,843	5,675	5,347	4,061	2,656	1,488	72,073

Table 7. Year-to-year changes in number and percentage change in Block ESBs Census (1996 - 2014)

Measure	1996 to 1997	1997 to 1998	1998 to 1999	1999 to 2000	2000 to 2001	2001 to 2002	2002 to 2003	2003 to 2004	2004 to 2005	2005 to 2006	2006 to 2007	2007 to 2008	2008 to 2009	2009 to 2010	2010 to 2011	2011 to 2012	2012 to 2013	2013 to 2014
Number	(1,367)	3,343	(1,934)	825	1,773	(1,983)	3,053	(3,158)	2,915	2,082	(5,202)	2,007	396	832	(328)	(1,286)	(1,405)	(1,168)
Percent	-65%	460%	-48%	39%	60%	-42%	111%	-54%	110%	37%	-68%	82%	9%	17%	-6%	-24%	-35%	-44%

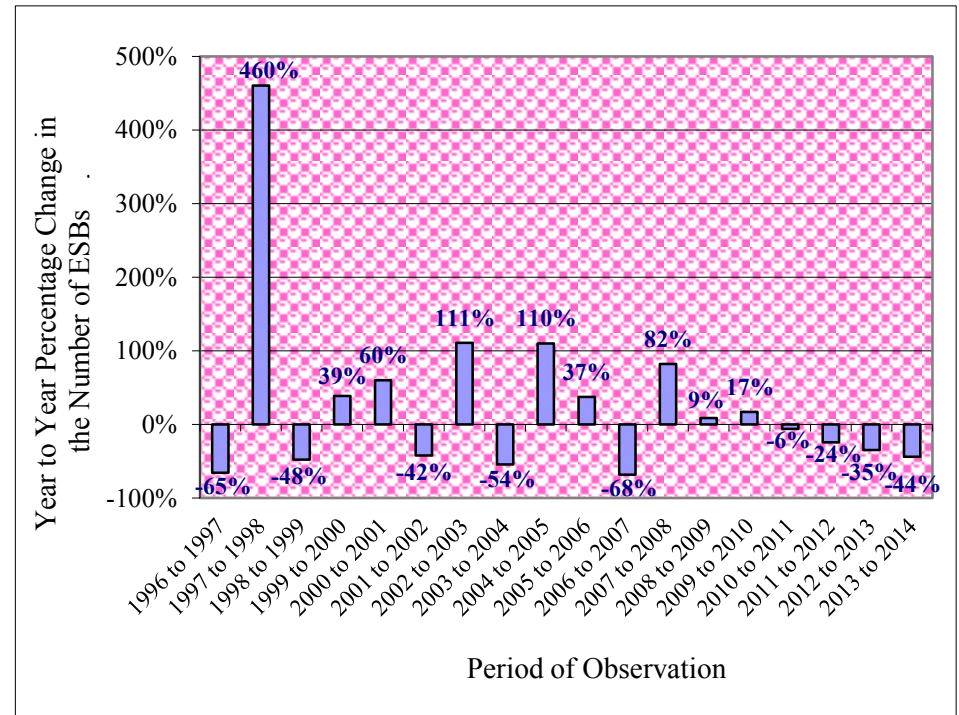
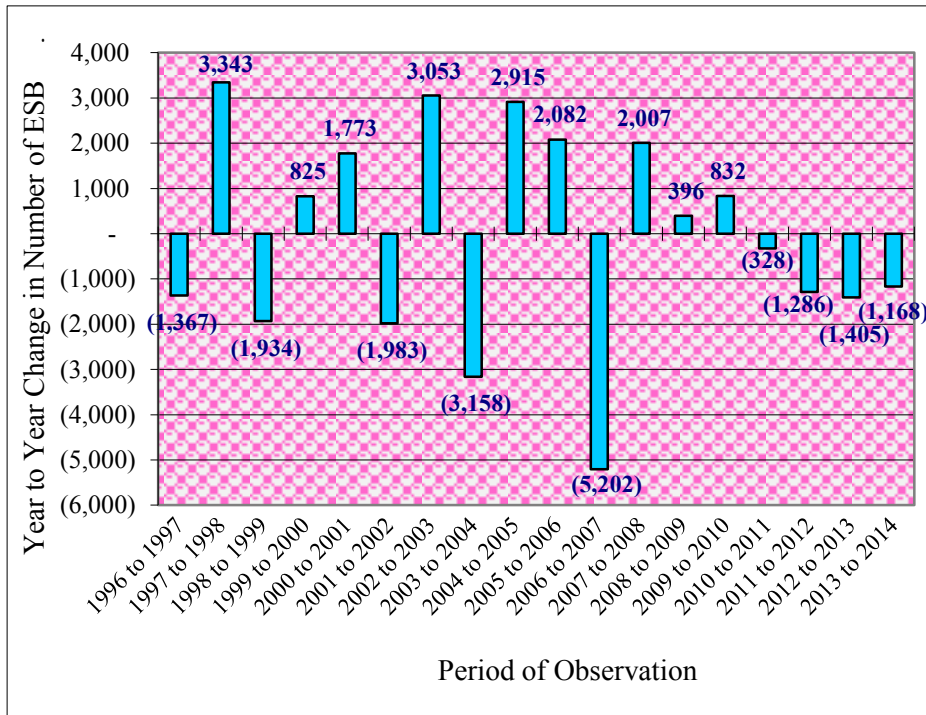


Table 8. Comparison of ESB Seasonal Population Estimates for 1998 - 2014

Year	Low Population Estimate	High Population Estimate
1998	83,000	87,000
1999	36,624	39,282
2000	66,650	69,584
2001	75,773	79,109
2002	51,725	54,002
2003	105,183	109,814
2004	49,617	51,801
2005	84,088	87,790
2006	136,708	142,727
2007	41,915	43,761
2008	64,576	67,419
2009	78,893	82,460
2010	111,562	116,474
2011	120,910	125,920
2012	83,943	87,639
2013	43,492	45,406
2014	26,302	27,460

Table 9. Annual ESB Numbers (from the Block Counts) and
Annual (July 1st through June 30th) Rainfall Totals

Survey Year	ESB Numbers	Rainfall
1996	2,093	10.29
1997	726 *	13.30
1998	4,069	31.28
1999	2,135	9.27
2000	2,960	10.11
2001	4,733	15.56
2002	2,750	4.16
2003	5,803	10.38
2004	2,645	8.63
2005	5,560	26.51
2006	7,642	10.89
2007	2,440	2.63
2008	4,447	10.24
2009	4,843	8.13
2010	5,675	12.43
2011	5,347	17.85
2012	4,061	7.61
2013	2,656	6.89
2014	1,488	4.45

Note * - only latter part of the 1997 season was surveyed

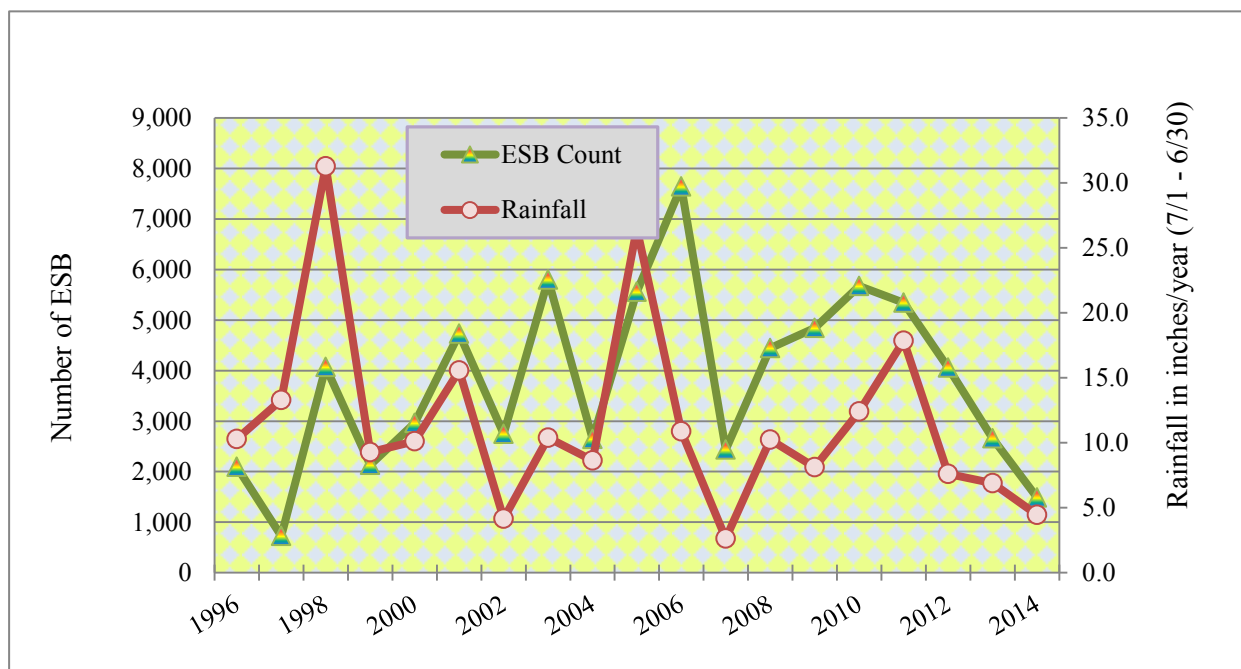


Table 10. 2014 Summary of Buckwheat Plants on the Historical Transect: Age Class and Flowerheads per Plant

Historical Interval Number	All Age Classes		Seedlings			Juveniles			Mature			Senescent		
	Total Plants	Average Flowerheads per Plant	Total Plants	Percent Seedlings	Average Flowerheads per Plant	Total Plants	Percent Juveniles	Average Flowerheads per Plant	Total Plants	Percent Mature	Average Flowerheads per Plant	Total Plants	Percent Senescent	Average Flowerheads per Plant
1	7	35	0	0.0%	0	1	14.3%	12	3	42.9%	67	3	42.9%	10
2	4	109	0	0.0%	0	0	0.0%	0	0	0.0%	0	4	100.0%	109
3	9	61	0	0.0%	0	0	0.0%	0	1	11.1%	350	8	88.9%	25
4	4	470	0	0.0%	0	0	0.0%	0	2	50.0%	875	2	50.0%	65
5	0	0	0	na	0	0	na	0	0	na	0	0	na	0
6	0	0	0	na	0	0	na	0	0	na	0	0	na	0
7	0	0	0	na	0	0	na	0	0	na	0	0	na	0
8	4	17	0	0.0%	0	1	25.0%	8	3	75.0%	20	0	0.0%	0
9	1	35	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	35
10	7	114	0	0.0%	0	0	0.0%	0	0	0.0%	0	7	100.0%	114
11	16	178	0	0.0%	0	6	37.5%	19	4	25.0%	566	6	37.5%	78
12	28	215	2	7.1%	1	11	39.3%	13	9	32.1%	637	6	21.4%	26
13	6	161	0	0.0%	0	0	0.0%	0	1	16.7%	800	5	83.3%	33
14	4	84	0	0.0%	0	0	0.0%	0	0	0.0%	0	4	100.0%	84
15	0	0	0	na	0	0	na	0	0	na	0	0	na	0
16	0	0	0	na	0	0	na	0	0	na	0	0	na	0
17	4	33	0	0.0%	0	3	75.0%	10	1	25.0%	100	0	0.0%	0
18	15	79	0	0.0%	0	0	0.0%	0	7	46.7%	124	8	53.3%	39
19	2	15	0	0.0%	0	0	0.0%	0	0	0.0%	0	2	100.0%	15
20	16	300	0	0.0%	0	1	6.3%	10	9	56.3%	362	6	37.5%	257
21	14	58	0	0.0%	0	3	21.4%	9	5	35.7%	109	6	42.9%	40
22	19	78	0	0.0%	0	7	36.8%	9	8	42.1%	158	4	21.1%	39
23	9	176	0	0.0%	0	0	0.0%	0	3	33.3%	420	6	66.7%	54
24	4	1,659	0	0.0%	0	0	0.0%	0	3	75.0%	2,190	1	25.0%	65
25	26	358	1	3.8%	1	1	3.8%	35	7	26.9%	624	17	65.4%	288
26	4	166	0	0.0%	0	0	0.0%	0	0	0.0%	0	4	100.0%	166
27	11	159	0	0.0%	0	1	9.1%	12	4	36.4%	169	6	54.5%	178
28	5	61	0	0.0%	0	2	40.0%	19	1	20.0%	100	2	40.0%	83
29	18	120	1	5.6%	2	1	5.6%	10	1	5.6%	20	15	83.3%	142
30	18	1,732	0	0.0%	0	0	0.0%	0	8	44.4%	3,334	10	55.6%	450
31	27	586	0	0.0%	0	0	0.0%	0	8	29.6%	1,151	19	70.4%	348
32	16	168	0	0.0%	0	2	12.5%	7	6	37.5%	308	8	50.0%	103
33	27	1,029	0	0.0%	0	1	3.7%	10	13	48.1%	1,907	13	48.1%	229
34	74	2,078	0	0.0%	0	2	2.7%	14	40	54.1%	3,481	32	43.2%	452
35	60	863	0	0.0%	0	2	3.3%	12	23	38.3%	1,821	35	58.3%	282
Total	459	707	4	0.9%	1	45	9.8%	13	170	37.0%	1,611	240	52.3%	223

Table 11. Number of buckwheat plants by age class on the Historical Transect.

Year	Total	Number of Plants by Age Class							
		Seedlings		Juveniles		Mature		Senescent	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
2002	692	12	2%	24	3%	518	75%	138	20%
2003	627	2	0%	13	2%	518	83%	94	15%
2004	612	4	1%	20	3%	444	73%	144	24%
2005	658	2	0%	38	6%	434	66%	184	28%
2006	643	2	0%	48	7%	407	63%	186	29%
2007	522	1	0%	25	5%	222	43%	274	52%
2008	501	2	0%	43	9%	251	50%	205	41%
2009	520	0	0%	20	4%	301	58%	199	38%
2010	538	2	0%	30	6%	408	76%	98	18%
2011	552	2	0%	18	3%	422	76%	110	20%
2012	544	7	1%	41	8%	374	69%	122	22%
2013	485	4	1%	38	8%	305	63%	138	28%
2014	459	4	1%	45	10%	170	37%	240	52%

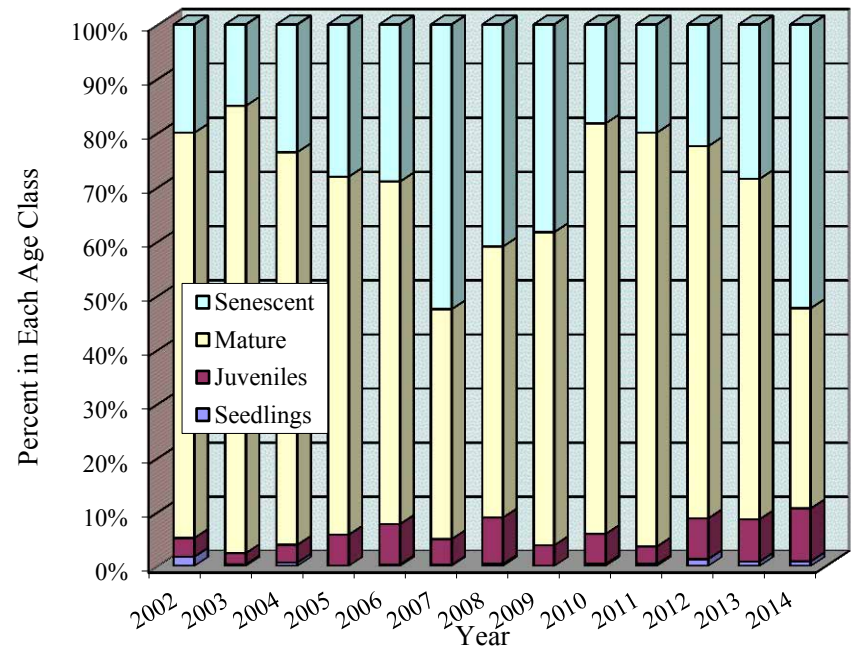
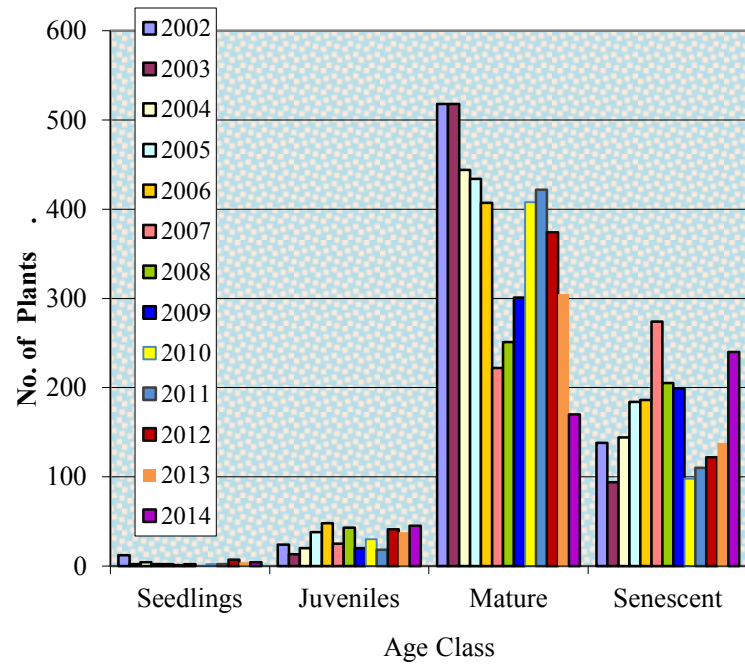


Table 12. Average number of flowerheads per plant by age class on the Historical Transect.

Year	Average All Plants	Average Flowerheads per Plant by Age Class			
		Seedlings	Juveniles	Mature	Senescent
2002	486	31	41	634	44
2003	638	20	40	763	43
2004	594	6	23	797	63
2005	771	3	29	1,114	122
2006	833	3	20	1,255	146
2007	318	2	9	642	91
2008	621	2	16	1,112	153
2009	1,001	-	23	1,613	194
2010	1,137	2	19	1,482	121
2011	1,667	2	19	2,147	188
2012	1,612	2	18	2,270	276
2013	1,108	3	17	1,666	238
2014	707	1	13	1,611	223

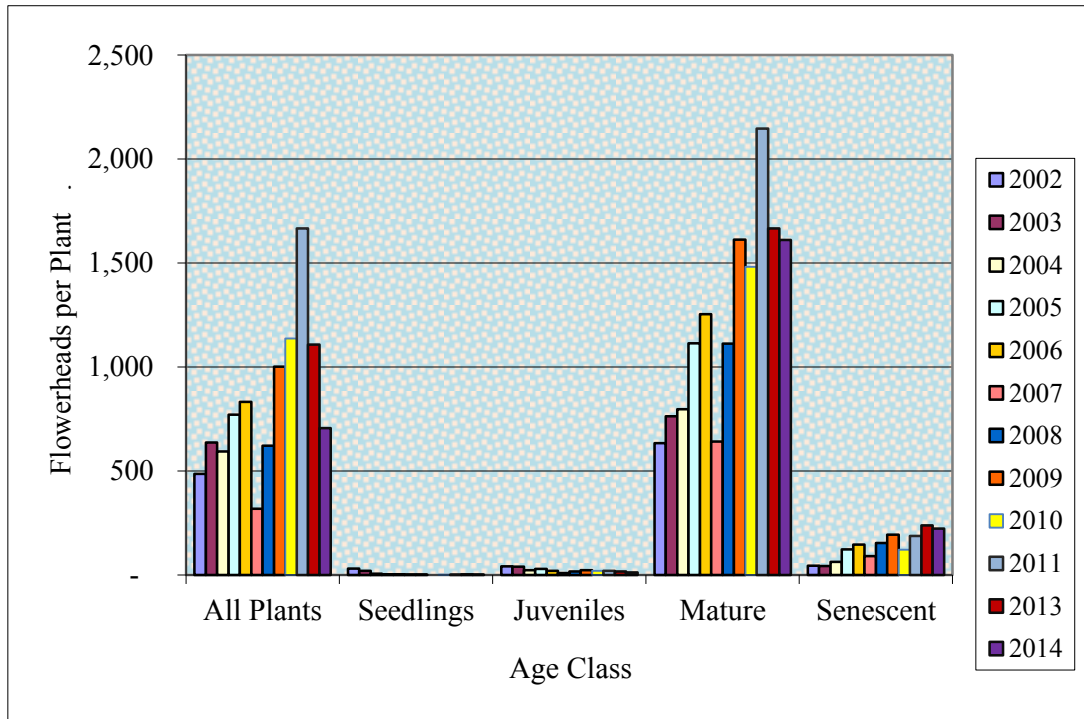


Table 13. Total number of buckwheat plants, flowerheads and ESB butterflies on the Historical Transect (2002 - 2014)

Year	Number of Plants	Number of Flowerheads	Number of ESB
2002	692	336,013	1,236
2003	627	399,783	2,688
2004	612	363,584	2,123
2005	658	506,660	2,653
2006	643	535,619	3,049
2007	522	165,996	777
2008	501	311,200	2,173
2009	520	524,599	2,859
2010	538	611,552	3,898
2011	552	920,184	4,690
2012	544	876,983	2,731
2013	485	537,186	1,319
2014	459	324,495	562

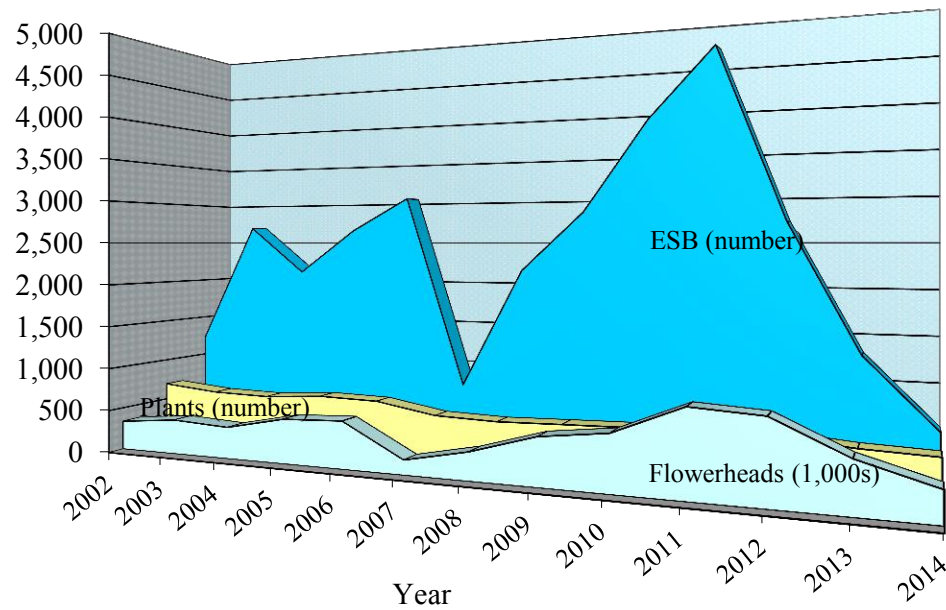


Table 14. 2014 Summary of Buckwheat Plants on Buckwheat Block Transects: Age Class and Flowerheads per Plant
El Segundo Blue Butterfly Preserve at LAX

Block Transect Number	All Age Classes		Seedlings			Juveniles			Mature			Senescent		
	Total Plants	Average Flowerheads per Plant	Total Plants	Percent Seedlings	Average Flowerheads per Plant	Total Plants	Percent Juveniles	Average Flowerheads per Plant	Total Plants	Percent Mature	Average Flowerheads per Plant	Total Plants	Percent Senescent	Average Flowerheads per Plant
1	26	1,084	0	0.0%	0	3	11.5%	15	11	42.3%	2,126	12	46.2%	395
2	2	1,400	0	0.0%	0	0	0.0%	0	2	100.0%	1,400	0	0.0%	0
3	17	200	0	0.0%	0	3	17.6%	7	10	58.8%	289	4	23.5%	123
4	28	73	5	17.9%	1	7	25.0%	12	5	17.9%	256	11	39.3%	61
5	90	114	5	5.6%	2	34	37.8%	10	24	26.7%	257	27	30.0%	137
6	41	108	0	0.0%	0	5	12.2%	7	10	24.4%	139	26	63.4%	115
7	0	0	0	na	0	0	na	0	0	na	0	0	na	0
8	2	38	0	0.0%	0	0	0.0%	0	0	0.0%	0	2	100.0%	38
9	3	475	0	0.0%	0	1	33.3%	10	1	33.3%	1,400	1	33.3%	15
10	3	42	0	0.0%	0	0	0.0%	0	0	0.0%	0	3	100.0%	42
11	1	500	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	500
12	0	0	0	na	0	0	na	0	0	na	0	0	na	0
13	17	654	4	23.5%	2	5	29.4%	9	3	17.6%	3,183	5	29.4%	304
14	5	109	0	0.0%	0	2	40.0%	9	1	20.0%	200	2	40.0%	165
15	4	344	0	0.0%	0	0	0.0%	0	2	50.0%	575	2	50.0%	113
16	0	0	0	na	0	0	na	0	0	na	0	0	na	0
17	43	476	5	11.6%	1	15	34.9%	10	12	27.9%	1,508	11	25.6%	203
18	11	103	1	9.1%	1	5	45.5%	16	2	18.2%	338	3	27.3%	125
19	21	75	4	19.0%	2	3	14.3%	9	4	19.0%	109	10	47.6%	111
20	33	281	3	9.1%	1	17	51.5%	12	6	18.2%	1,325	7	21.2%	156
21	10	114	0	0.0%	0	2	20.0%	15	4	40.0%	175	4	40.0%	101
22	28	170	7	25.0%	1	9	32.1%	10	7	25.0%	457	5	17.9%	294
23	46	79	4	8.7%	2	9	19.6%	15	6	13.0%	265	27	58.7%	71
24	12	263	0	0.0%	0	2	16.7%	15	5	41.7%	566	5	41.7%	60
25	1	250	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	250
26	3	508	0	0.0%	0	0	0.0%	0	1	33.3%	800	2	66.7%	363
27	3	130	0	0.0%	0	0	0.0%	0	1	33.3%	300	2	66.7%	45
28	10	172	0	0.0%	0	5	50.0%	14	2	20.0%	625	3	30.0%	133
29	57	316	3	5.3%	1	15	26.3%	12	16	28.1%	881	23	40.4%	162
30	44	297	5	11.4%	2	8	18.2%	16	26	59.1%	479	5	11.4%	92
31	88	290	23	26.1%	2	20	22.7%	14	19	21.6%	1,181	26	29.5%	105
32	109	72	31	28.4%	2	29	26.6%	18	26	23.9%	223	23	21.1%	63

Table 14. 2014 Summary of Buckwheat Plants on Buckwheat Block Transects: Age Class and Flowerheads per Plant
El Segundo Blue Butterfly Preserve at LAX - continued

Block Transect Number	All Age Classes		Seedlings			Juveniles			Mature			Senescent		
	Total Plants	Average Flowerheads per Plant	Total Plants	Percent Seedlings	Average Flowerheads per Plant	Total Plants	Percent Juveniles	Average Flowerheads per Plant	Total Plants	Percent Mature	Average Flowerheads per Plant	Total Plants	Percent Senescent	Average Flowerheads per Plant
33	44	87	6	13.6%	1	30	68.2%	11	6	13.6%	430	2	4.5%	450
34	26	86	8	30.8%	1	9	34.6%	14	4	15.4%	394	5	19.2%	106
35	10	1,255	0	0.0%	0	1	10.0%	25	6	60.0%	1,925	3	30.0%	325
36	27	231	4	14.8%	2	17	63.0%	9	3	11.1%	1,717	3	11.1%	313
37	13	455	4	30.8%	1	0	0.0%	0	3	23.1%	1,717	6	46.2%	126
38	14	64	2	14.3%	1	0	0.0%	0	1	7.1%	100	11	78.6%	72
39	33	230	0	0.0%	0	2	6.1%	10	9	27.3%	422	22	66.7%	172
40	41	121	5	12.2%	1	6	14.6%	11	4	9.8%	388	26	63.4%	128
41	57	213	7	12.3%	2	6	10.5%	12	18	31.6%	491	26	45.6%	123
42	32	195	0	0.0%	0	12	37.5%	11	7	21.9%	643	13	40.6%	125
43	10	547	0	0.0%	0	0	0.0%	0	2	20.0%	1,200	8	80.0%	384
44	13	54	0	0.0%	0	7	53.8%	12	1	7.7%	75	5	38.5%	108
45	45	290	1	2.2%	2	10	22.2%	12	14	31.1%	630	20	44.4%	205
46	6	41	0	0.0%	0	0	0.0%	0	2	33.3%	58	4	66.7%	33
47	22	244	1	4.5%	1	11	50.0%	13	7	31.8%	694	3	13.6%	120
48	56	204	1	1.8%	2	12	21.4%	14	16	28.6%	428	27	48.2%	162
49	28	233	2	7.1%	2	5	17.9%	18	6	21.4%	688	15	53.6%	154
50	29	113	2	6.9%	3	1	3.4%	9	9	31.0%	278	17	58.6%	45
51	16	84	1	6.3%	1	3	18.8%	13	7	43.8%	103	5	31.3%	117
52	31	113	5	16.1%	1	12	38.7%	11	4	12.9%	475	10	32.3%	147
53	38	267	2	5.3%	1	8	21.1%	9	7	18.4%	984	21	55.3%	152
54	9	728	0	0.0%	0	0	0.0%	0	4	44.4%	1,369	5	55.6%	216
55	15	1,284	0	0.0%	0	5	33.3%	14	6	40.0%	2,950	4	26.7%	371
56	6	1,104	0	0.0%	0	0	0.0%	0	4	66.7%	1,619	2	33.3%	75
57	12	391	0	0.0%	0	0	0.0%	0	3	25.0%	1,067	9	75.0%	166
58	27	229	3	11.1%	2	1	3.7%	6	6	22.2%	884	17	63.0%	51
59	4	1,228	0	0.0%	0	1	25.0%	12	2	50.0%	2,250	1	25.0%	400
60	25	367	0	0.0%	0	4	16.0%	9	10	40.0%	700	11	44.0%	194
61	22	755	0	0.0%	0	7	31.8%	13	14	63.6%	1,145	1	4.5%	500
62	38	122	0	0.0%	0	2	5.3%	11	8	21.1%	211	28	73.7%	104
63	11	122	0	0.0%	0	0	0.0%	0	2	18.2%	330	9	81.8%	76
64	73	165	5	6.8%	1	22	30.1%	15	19	26.0%	423	27	37.0%	137

Table 14. 2014 Summary of Buckwheat Plants on Buckwheat Block Transects: Age Class and Flowerheads per Plant
El Segundo Blue Butterfly Preserve at LAX - continued

Block Transect Number	All Age Classes		Seedlings			Juveniles			Mature			Senescent		
	Total Plants	Average Flowerheads per Plant	Total Plants	Percent Seedlings	Average Flowerheads per Plant	Total Plants	Percent Juveniles	Average Flowerheads per Plant	Total Plants	Percent Mature	Average Flowerheads per Plant	Total Plants	Percent Senescent	Average Flowerheads per Plant
65	53	316	2	3.8%	1	12	22.6%	11	15	28.3%	858	24	45.3%	156
66	14	708	0	0.0%	0	3	21.4%	12	5	35.7%	1,350	6	42.9%	521
67	6	20	0	0.0%	0	5	83.3%	8	0	0.0%	0	1	16.7%	80
68	9	1,273	0	0.0%	0	2	22.2%	16	4	44.4%	2,594	3	33.3%	350
69	15	649	0	0.0%	0	0	0.0%	0	9	60.0%	986	6	40.0%	144
70	19	47	0	0.0%	0	10	52.6%	16	1	5.3%	35	8	42.1%	87
71	8	351	0	0.0%	0	2	25.0%	26	3	37.5%	593	3	37.5%	325
72	0	0	0	na	0	0	na	0	0	na	0	0	na	0
73	9	1,359	0	0.0%	0	2	22.2%	39	4	44.4%	2,850	3	33.3%	250
74	5	314	0	0.0%	0	1	20.0%	6	1	20.0%	1,400	3	60.0%	55
75	9	240	0	0.0%	0	1	11.1%	32	5	55.6%	395	3	33.3%	52
76	13	428	2	15.4%	3	1	7.7%	9	3	23.1%	1,567	7	53.8%	121
77	6	229	0	0.0%	0	0	0.0%	0	2	33.3%	325	4	66.7%	181
78	2	2,325	0	0.0%	0	0	0.0%	0	1	50.0%	4,400	1	50.0%	250
79	0	0	0	na	0	0	na	0	0	na	0	0	na	0
80	0	0	0	na	0	0	na	0	0	na	0	0	na	0
81	0	0	0	na	0	0	na	0	0	na	0	0	na	0
82	24	395	0	0.0%	0	5	20.8%	10	4	16.7%	1,694	15	62.5%	177
83	4	156	0	0.0%	0	0	0.0%	0	2	50.0%	188	2	50.0%	125
84	1	300	0	0.0%	0	0	0.0%	0	1	100.0%	300	0	0.0%	0
85	16	762	0	0.0%	0	2	12.5%	8	8	50.0%	1,331	6	37.5%	254
86	150	179	11	7.3%	1	31	20.7%	15	43	28.7%	395	65	43.3%	145
87	83	224	15	18.1%	2	24	28.9%	18	33	39.8%	483	11	13.3%	201
88	24	488	0	0.0%	0	1	4.2%	22	12	50.0%	898	11	45.8%	82
89	23	709	0	0.0%	0	1	4.3%	13	12	52.2%	1,218	10	43.5%	169
90	15	947	0	0.0%	0	0	0.0%	0	9	60.0%	1,122	6	40.0%	683
91	9	865	0	0.0%	0	1	11.1%	9	5	55.6%	1,395	3	33.3%	267
92	40	730	3	7.5%	2	10	25.0%	14	19	47.5%	1,418	8	20.0%	266
93	27	676	0	0.0%	0	2	7.4%	20	13	48.1%	1,221	12	44.4%	196
94	7	959	0	0.0%	0	0	0.0%	0	3	42.9%	1,967	4	57.1%	203
95	8	371	0	0.0%	0	0	0.0%	0	1	12.5%	1,500	7	87.5%	210
96	24	546	0	0.0%	0	1	4.2%	22	10	41.7%	1,090	13	54.2%	167

Table 14. 2014 Summary of Buckwheat Plants on Buckwheat Block Transects: Age Class and Flowerheads per Plant
El Segundo Blue Butterfly Preserve at LAX - continued

Block Transect Number	All Age Classes		Seedlings			Juveniles			Mature			Senescent		
	Total Plants	Average Flowerheads per Plant	Total Plants	Percent Seedlings	Average Flowerheads per Plant	Total Plants	Percent Juveniles	Average Flowerheads per Plant	Total Plants	Percent Mature	Average Flowerheads per Plant	Total Plants	Percent Senescent	Average Flowerheads per Plant
97	26	502	0	0.0%	0	3	11.5%	25	15	57.7%	719	8	30.8%	273
98	32	408	0	0.0%	0	6	18.8%	18	18	56.3%	670	8	25.0%	111
99	25	484	5	20.0%	2	6	24.0%	17	10	40.0%	1,040	4	16.0%	400
100	45	628	0	0.0%	0	4	8.9%	23	24	53.3%	994	17	37.8%	254
101	26	363	0	0.0%	0	0	0.0%	0	7	26.9%	986	19	73.1%	134
102	20	687	0	0.0%	0	0	0.0%	0	10	50.0%	1,231	10	50.0%	143
103	15	1,061	2	13.3%	1	8	53.3%	14	4	26.7%	3,825	1	6.7%	500
104	64	242	3	4.7%	1	7	10.9%	10	19	29.7%	582	35	54.7%	124
105	40	114	0	0.0%	0	0	0.0%	0	8	20.0%	359	32	80.0%	53
106	6	510	0	0.0%	0	0	0.0%	0	2	33.3%	1,200	4	66.7%	165
107	14	441	0	0.0%	0	1	7.1%	19	7	50.0%	490	6	42.9%	454
108	3	118	0	0.0%	0	0	0.0%	0	1	33.3%	250	2	66.7%	53
109	8	148	0	0.0%	0	2	25.0%	19	2	25.0%	300	4	50.0%	136
110	52	204	5	9.6%	1	5	9.6%	8	19	36.5%	480	23	44.2%	63
111	41	120	0	0.0%	0	5	12.2%	13	11	26.8%	211	25	61.0%	102
112	15	91	0	0.0%	0	0	0.0%	0	9	60.0%	99	6	40.0%	80
113	5	144	0	0.0%	0	0	0.0%	0	3	60.0%	180	2	40.0%	90
114	12	184	0	0.0%	0	1	8.3%	16	4	33.3%	188	7	58.3%	206
115	51	303	0	0.0%	0	6	11.8%	12	21	41.2%	551	24	47.1%	159
116	32	155	0	0.0%	0	2	6.3%	15	10	31.3%	333	20	62.5%	81
117	34	453	0	0.0%	0	5	14.7%	17	17	50.0%	821	12	35.3%	114
118	13	102	0	0.0%	0	0	0.0%	0	6	46.2%	150	7	53.8%	61
119	4	123	0	0.0%	0	0	0.0%	0	4	100.0%	123	0	0.0%	0
120	3	14	0	0.0%	0	0	0.0%	0	1	33.3%	30	2	66.7%	6
121	1	20	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	20
122	0	0	0	na	0	0	na	0	0	na	0	0	na	0
123	1	8	0	0.0%	0	1	100.0%	8	0	0.0%	0	0	0.0%	0
124	12	2,779	0	0.0%	0	0	0.0%	0	12	100.0%	2,779	0	0.0%	0
125	2	1,775	0	0.0%	0	0	0.0%	0	2	100.0%	1,775	0	0.0%	0
126	2	210	0	0.0%	0	0	0.0%	0	0	0.0%	0	2	100.0%	210
Total	2,818	316	207	7.3%	2	572	20.3%	13	894	31.7%	801	1,145	40.6%	149

Table 15. Number and percentage of buckwheat plants by age class on the Block Transects.
(126 Transects)

Year	Total	Number of Plants by Age Class							
		Seedlings		Juveniles		Mature		Senescent	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
2003	2,192	4	0%	131	6%	1,583	72%	474	22%
2004	2,246	4	0%	145	6%	1,507	67%	590	26%
2005	2,519	137	5%	232	9%	1,543	61%	607	24%
2006	2,575	120	5%	434	17%	1,508	59%	513	20%
2007	2,006	24	1%	329	16%	649	32%	1,004	50%
2008	2,185	15	1%	392	18%	872	40%	906	41%
2009	2,244	3	0%	222	10%	1,079	48%	940	42%
2010	2,348	12	1%	194	8%	1,507	64%	635	27%
2011	2,490	62	2%	304	12%	1,560	63%	564	23%
2012	2,640	73	3%	403	15%	1,569	59%	595	23%
2013	2,614	117	4%	395	15%	1,131	43%	971	37%
2014	2,818	207	7%	572	20%	894	32%	1,145	41%

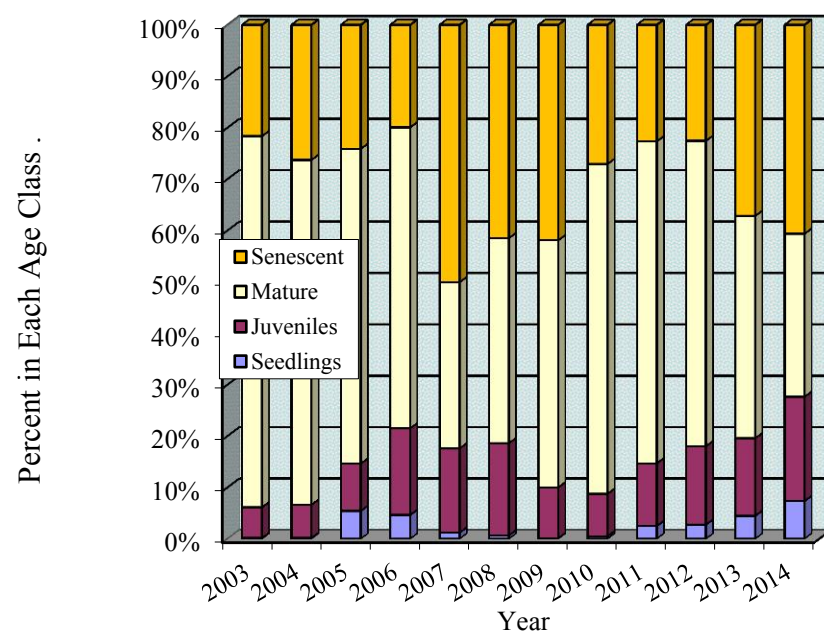
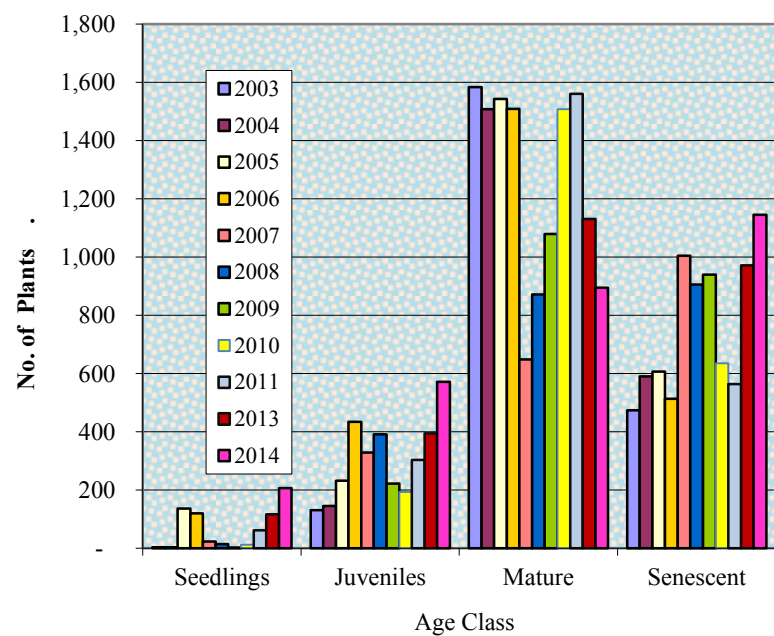


Table 16. Average number of flowerheads per plant by age class on the Block Transects
(126 Transects)

Year	Average All Plants	Average Flowerheads per Plant by Age Class			
		Seedlings	Juveniles	Mature	Senescent
2003	493	6	31	662	57
2004	412	5	27	586	65
2005	884	2	26	1,378	156
2006	997	3	18	1,642	159
2007	237	4	17	564	104
2008	517	2	18	1,132	150
2009	476	2	18	895	106
2010	528	2	14	755	155
2011	714	1	14	1,057	224
2012	600	4	19	947	156
2013	485	2	18	966	174
2014	316	2	13	801	149

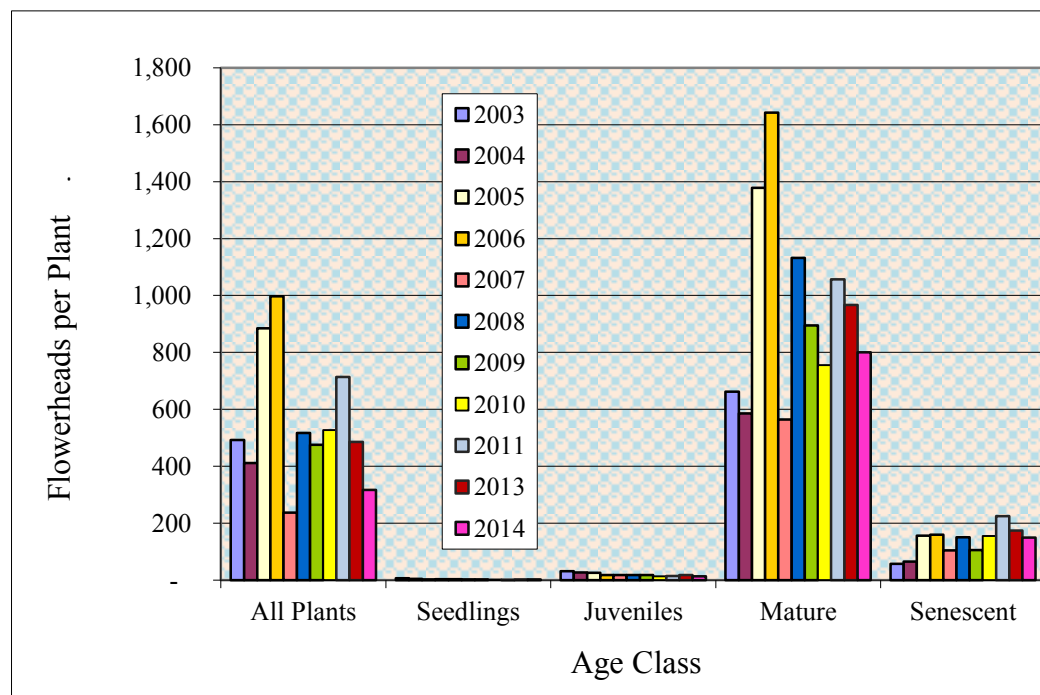


Table 17. Total number of buckwheat plants and flowerheads on the Block Transects
Total number of ESB butterflies observed during July Block Counts (2003 - 2014)

Year	Number of Plants	Number of Flowerheads	Number of ESB
2003	2,192	1,079,811	5,803
2004	2,246	924,629	2,645
2005	2,519	2,226,796	5,560
2006	2,575	2,566,623	7,642
2007	2,006	491,470	2,440
2008	2,185	1,130,301	4,447
2009	2,244	1,069,559	4,843
2010	2,348	1,238,803	5,675
2011	2,490	1,778,245	5,347
2012	2,640	1,585,224	4,061
2013	2,614	1,267,792	2,656
2014	2,818	891,677	1,488

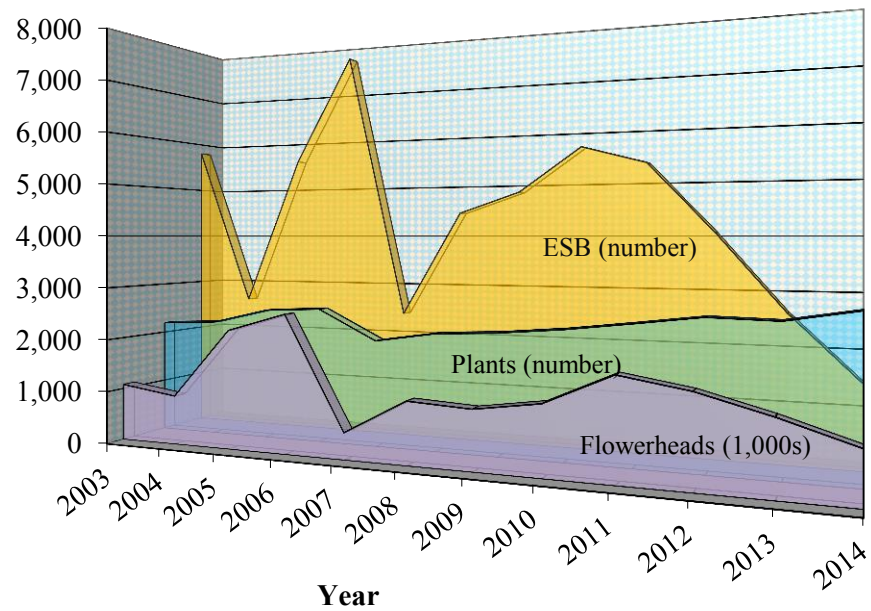


Table 18. Number of buckwheat plants by age class on the Block Transects.
(56 Common Transects)

Year	Total	Number of Plants by Age Class							
		Seedlings		Juveniles		Mature		Senescent	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
2002	906	8	1%	26	3%	410	45%	462	51%
2003	881	-	0%	33	4%	637	72%	211	24%
2004	906	2	0%	45	5%	620	68%	239	26%
2005	971	36	4%	72	7%	637	66%	226	23%
2006	963	43	4%	165	17%	585	61%	170	18%
2007	750	5	1%	131	17%	244	33%	370	49%
2008	865	6	1%	144	17%	315	36%	400	46%
2009	898	2	0%	80	9%	416	46%	400	45%
2010	932	2	0%	61	7%	581	62%	288	31%
2011	1,028	33	3%	168	16%	571	56%	256	25%
2012	1,103	48	4%	202	18%	598	54%	255	23%
2013	1,092	52	5%	189	17%	441	40%	410	38%
2014	1,186	95	8%	240	20%	389	33%	462	39%

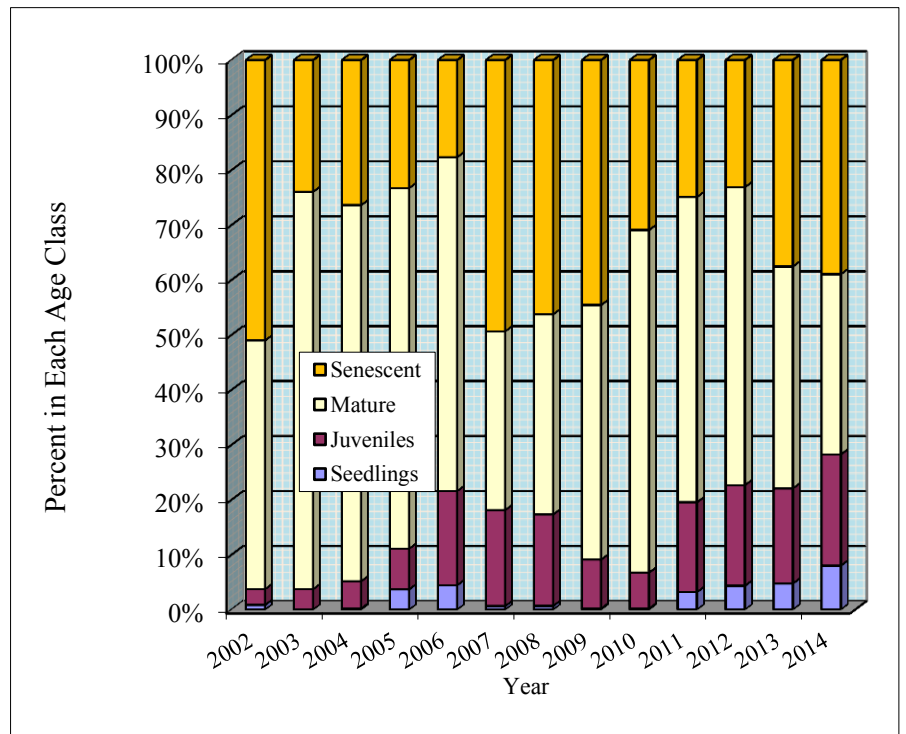
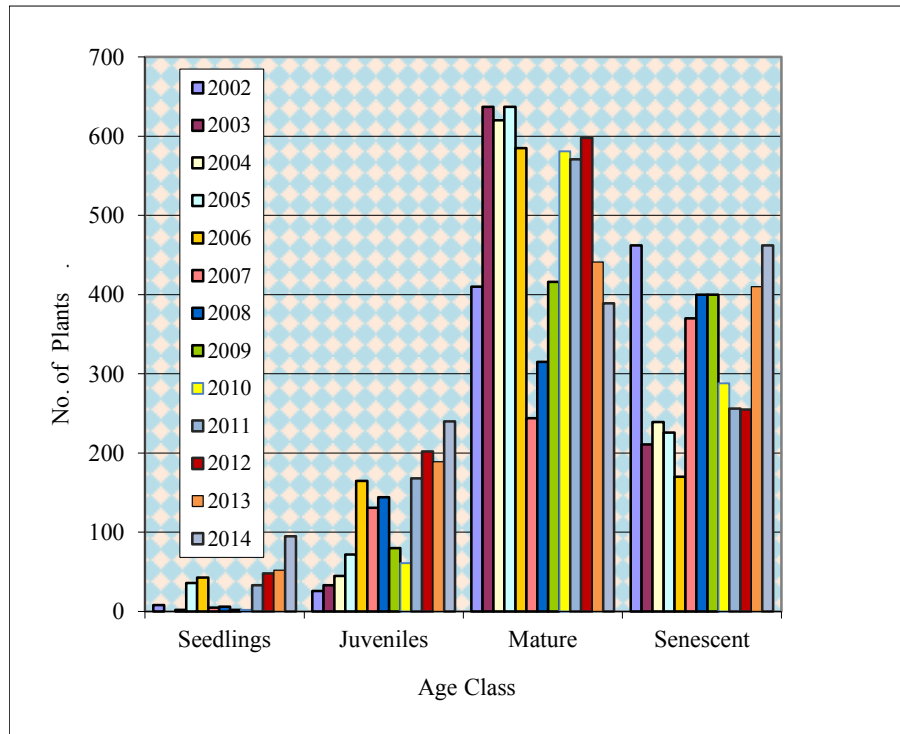


Table 19. Average number of flowers per plant by age class on the Block Transects
(56 Common Transects)

Year	Average All Plants	Average Flowerheads per Plant by Age Class			
		Seedlings	Juveniles	Mature	Senescent
2002	289	20	31	584	46
2003	552	-	32	744	54
2004	445	7	31	619	73
2005	913	2	26	1,325	178
2006	1,157	3	18	1,844	190
2007	282	3	19	664	127
2008	567	2	18	1,341	164
2009	433	2	20	826	109
2010	500	2	14	739	130
2011	675	1	14	1,112	224
2012	538	5	20	923	149
2013	471	2	19	995	177
2014	302	2	13	730	156

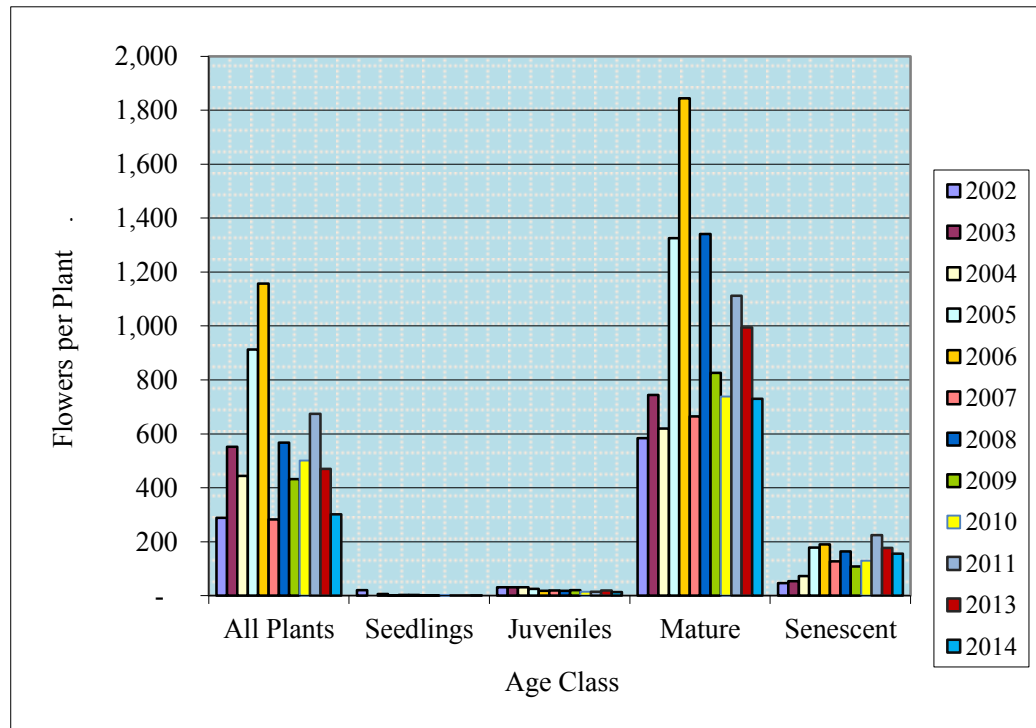


Table 20. Annual ESB Numbers (from the Block Counts), Annual Rainfall and Flowerheads (in 1,000s from the Block Transect Count)

Survey Year	ESB Numbers	Rainfall (July 1 - June 30)	Flowerheads /1,000
2003	5,803	10.38	1,080
2004	2,645	8.63	925
2005	5,560	26.51	2,227
2006	7,642	10.89	2,567
2007	2,440	2.63	491
2008	4,447	10.24	1,130
2009	4,843	8.13	1,070
2010	5,675	12.43	1,239
2011	5,347	17.85	1,778
2012	4,061	7.61	1,585
2013	2,656	6.89	1,512
2014	1,488	4.45	984

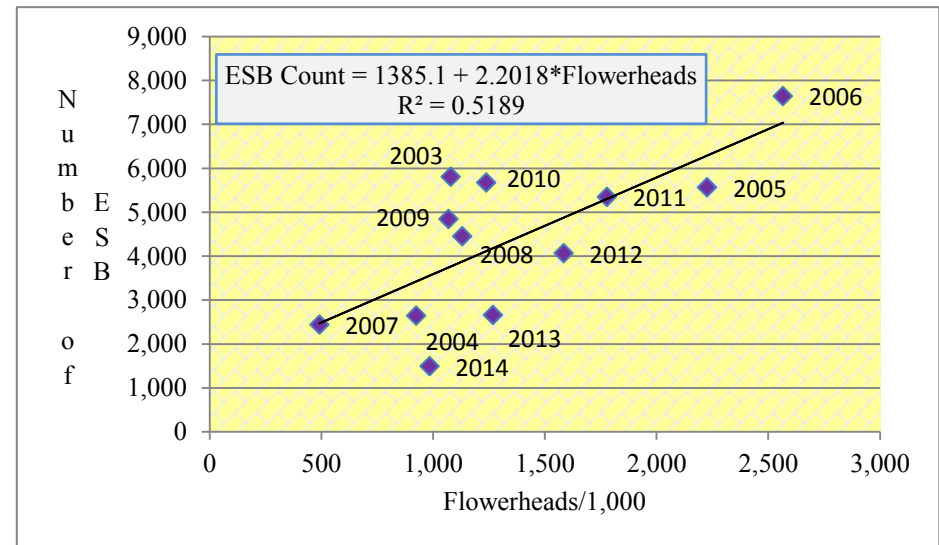
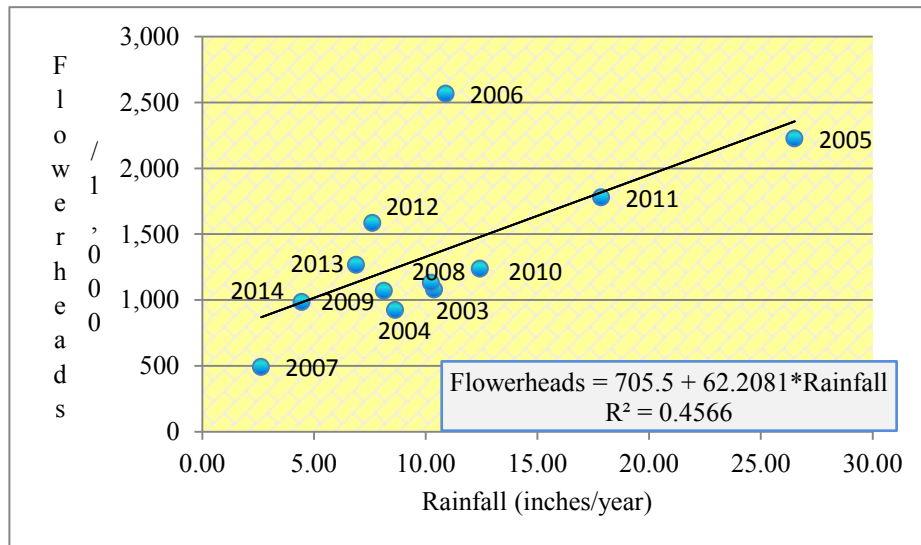
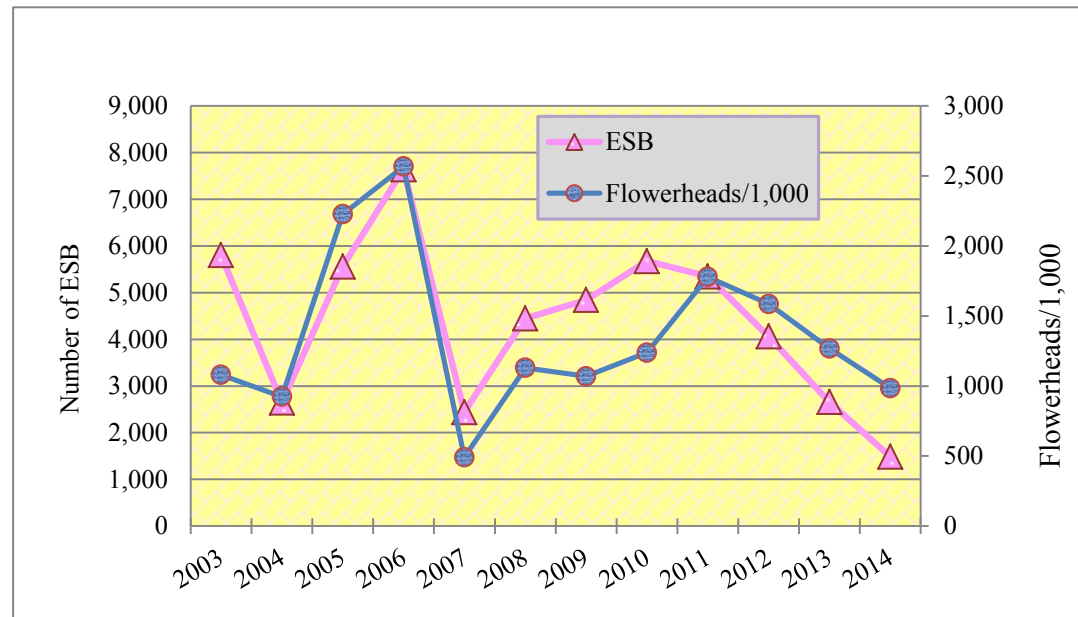


Table 21: Estimates of the number of flowerheads on Block Transects and ESB butterflies
observed in Block Census Counts
Estimates made using equations estimated using annual rainfall amounts and flowerhead counts

Equation Used (see note below)	Independent Variable		Dependent Variable		
			No. of Flowerheads in 2014 (in 1,000's)		
	Variable Name	Value	Estimate	Actual	Difference
2013 Equation (1)	Rainfall (inches)	4.45	982	984	2
2014 Equation (2)	Rainfall (inches)	4.45	982	984	2
			No. of ESB butterflies in 2014		
			Estimate	Actual	Difference
2013 Equation (3)	Flowerheads (1,000's)	982	3,833	1,488	(2,345)
2013 Equation (3)	Flowerheads (1,000's)	984	3,837	1,488	(2,349)
2014 Equation (4)	Flowerheads (1,000's)	984	3,552	1,488	(2,064)

Note: The equations used are summarized below

Flowerheads [F] (in 1,000's) = f(Rainfall [R] (in inches July 1 - June 30))

2013 Equation (1) $F = 705.00 + 62.239 \cdot R$

Used data from the 2003 - 2013 period

2014 Equation (2) $F = 705.50 + 62.208 \cdot R$

Used data from the 2003 - 2014 period

El Segundo Blue butterflies [ESB] = f(Flowerheads [F] (in 1,000's))

2013 Equation (3) $ESB = 1,902.6 + 1.9656 \cdot F$

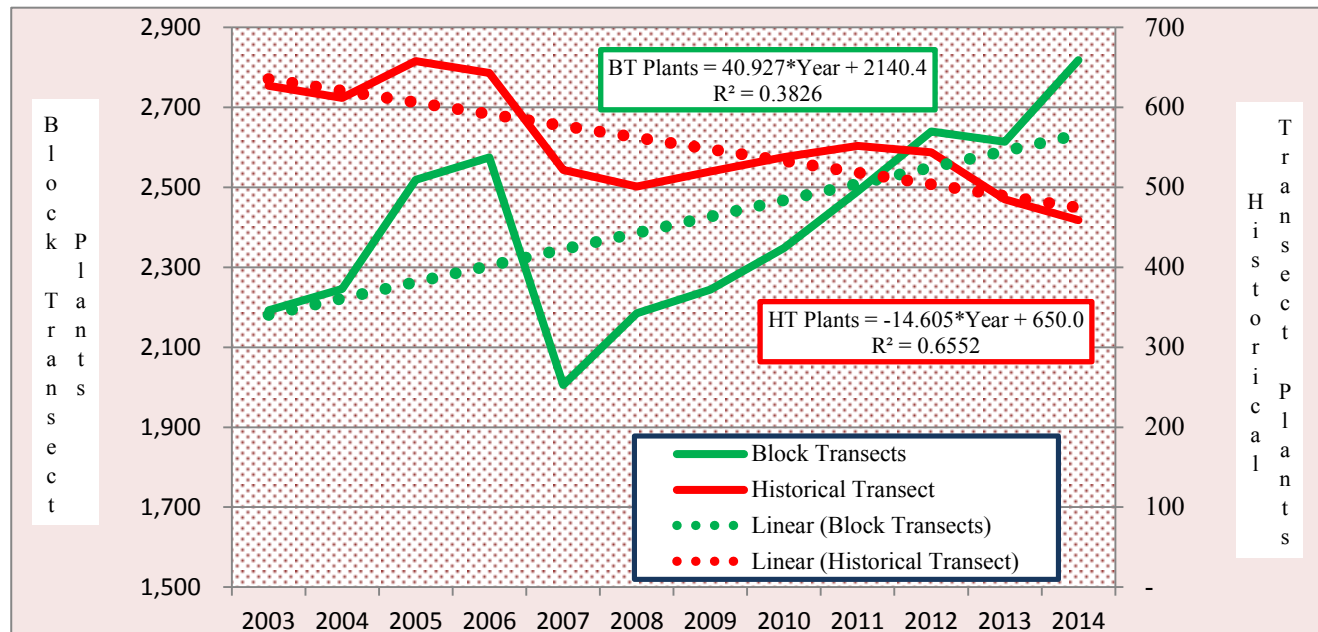
Used data from the 2003 - 2013 period

2014 Equation (4) $ESB = 1,385.1 + 2.202 \cdot F$

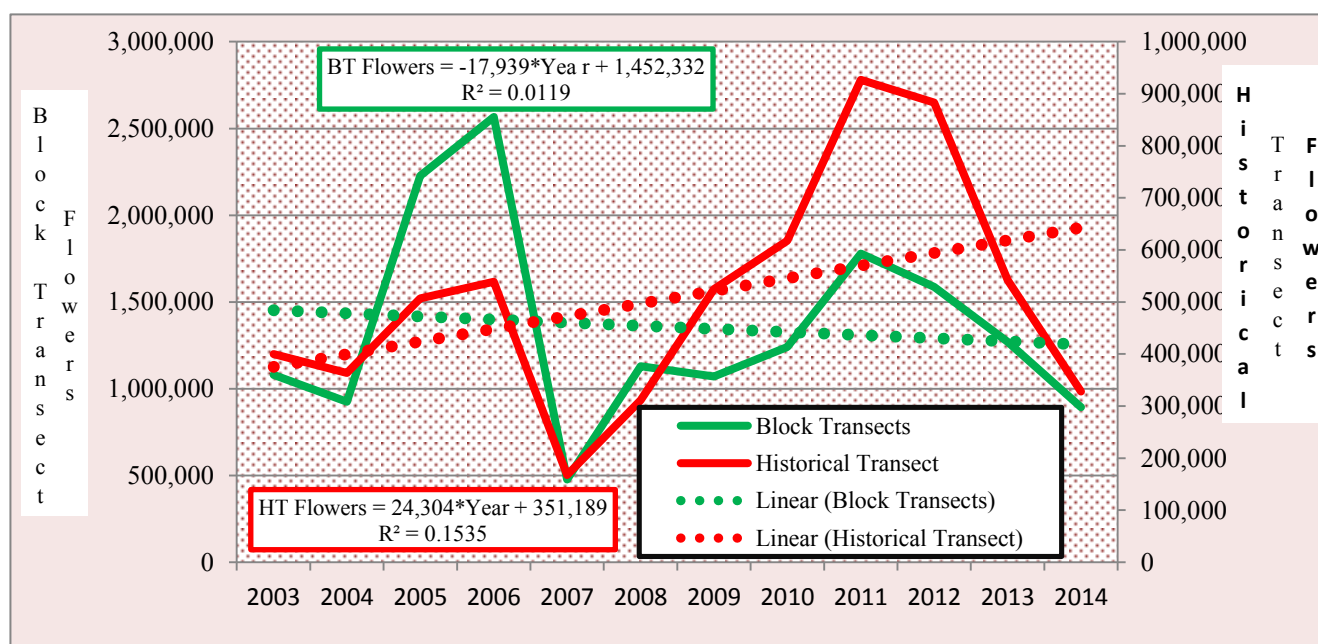
Used data from the 2003 - 2014 period

Table 22. Trends in the the Total Number of Buckwheat Plants and Flowerheads on the Historical Transect and Block Transects

Year	Number of Plants	
	Historical Transect	Block Transects
2003	627	2,192
2004	612	2,246
2005	658	2,519
2006	643	2,575
2007	522	2,006
2008	501	2,185
2009	520	2,244
2010	538	2,348
2011	552	2,490
2012	544	2,640
2013	485	2,614
2014	459	2,818



Year	Number of Flowerheads	
	Historical Transect	Block Transects
2003	399,783	1,079,811
2004	363,584	924,629
2005	506,994	2,227,099
2006	538,852	2,566,623
2007	167,649	476,552
2008	311,200	1,130,353
2009	524,599	1,069,559
2010	617,236	1,239,858
2011	926,982	1,779,673
2012	883,431	1,586,425
2013	541,616	1,269,247
2014	328,030	894,208



SECTION 8
FIGURES

Figure 1. Study Area for the El Segundo Blue Butterfly at the Los Angeles International Airport

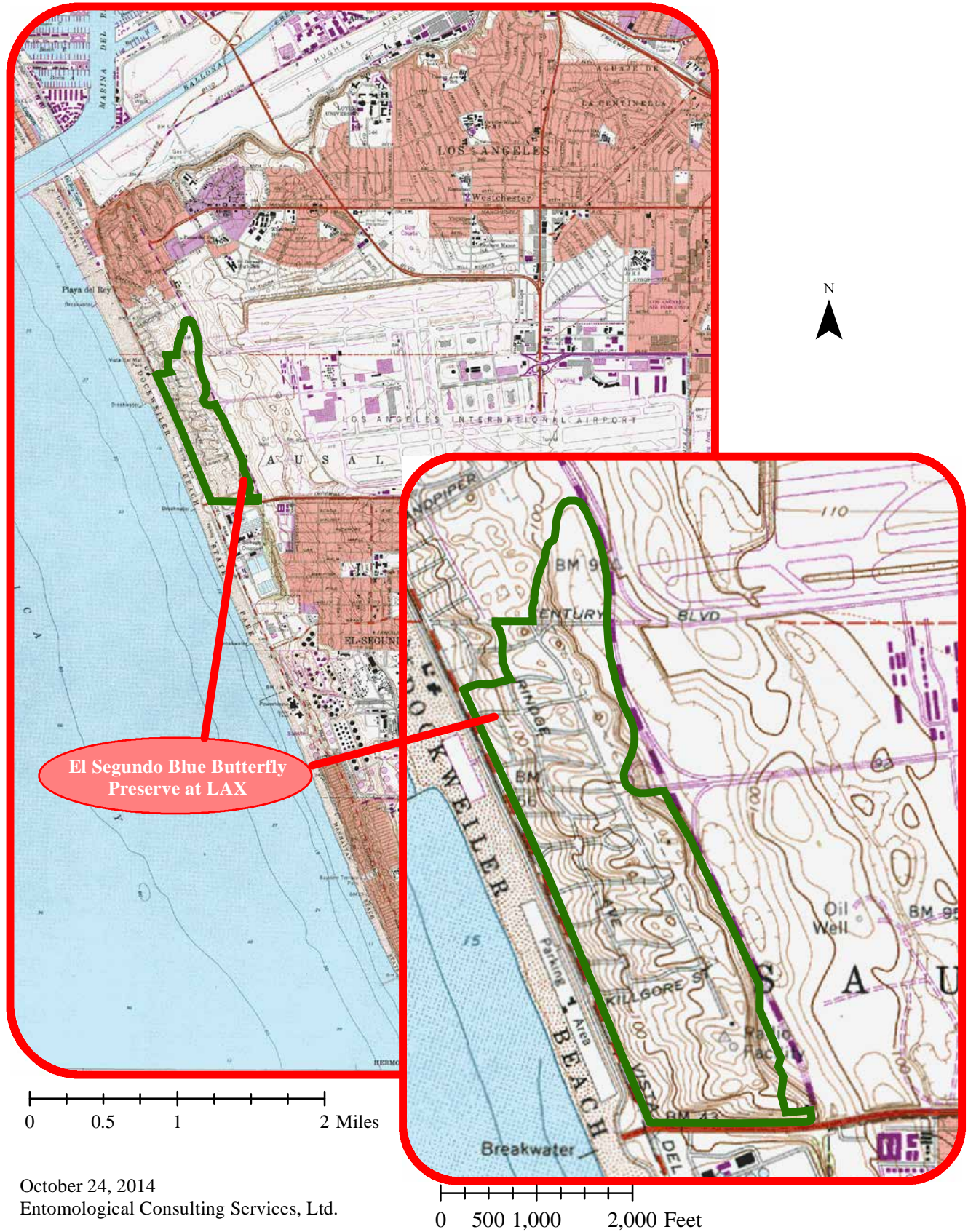
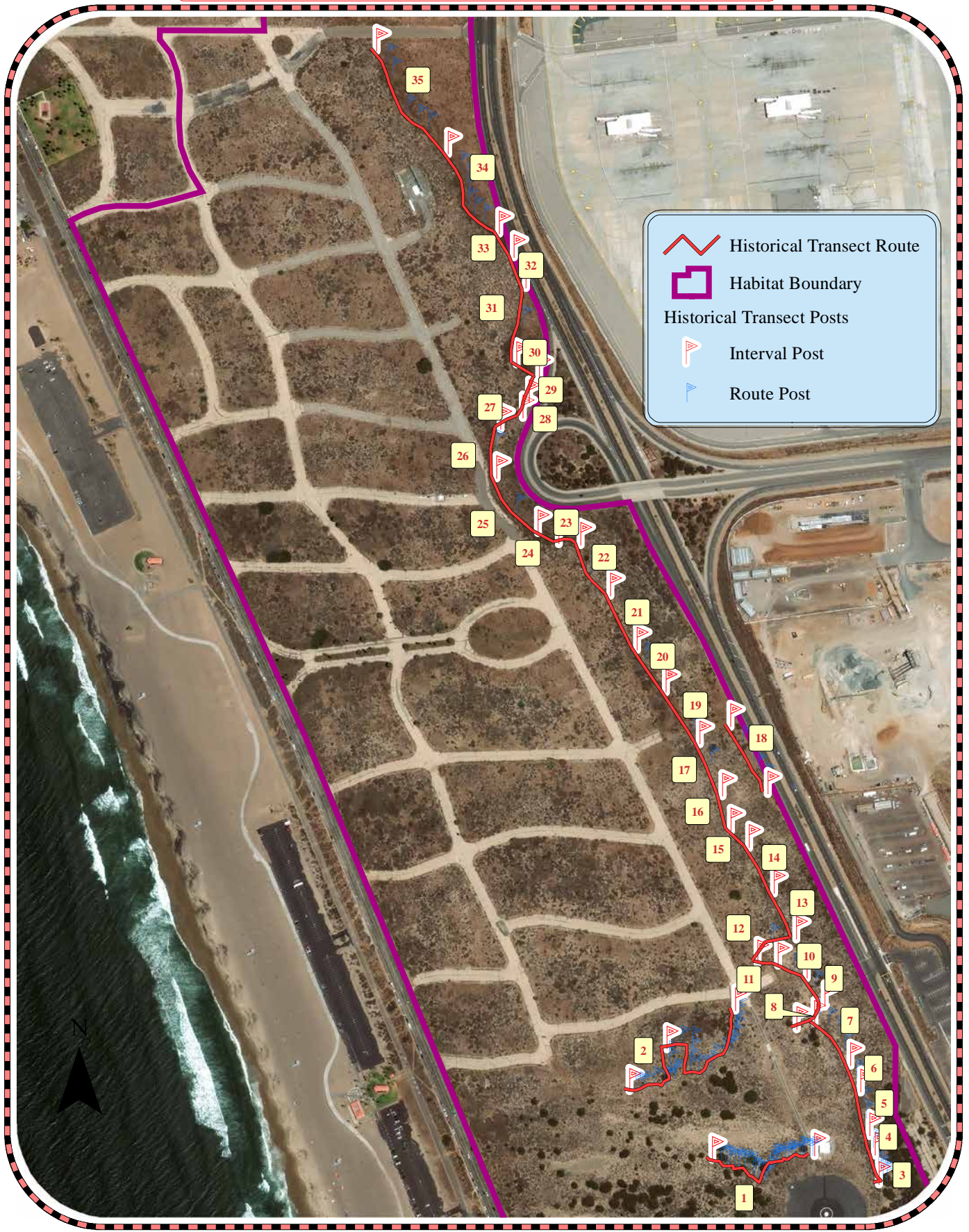


Figure 2. Historical Transect Route Intervals
El Segundo Blue Butterfly Preserve at LAX



October 24, 2014

Entomological Consulting Services, Ltd.

Figure 3. Habitat Boundary and Block Identification
El Segundo Blue Butterfly Preserve at LAX



Figure 4. Habitat Boundary and Locations of the Block Buckwheat Transects
El Segundo Blue Butterfly Preserve at LAX



0 500 1,000 2,000 Feet

October 24, 2014
Entomological Consulting Services, Ltd.

Figure 5. Locations of El Segundo Blue Butterflies Observed during the July 9 -13, 2013 Block Counts at the El Segundo Blue Butterfly Preserve at LAX

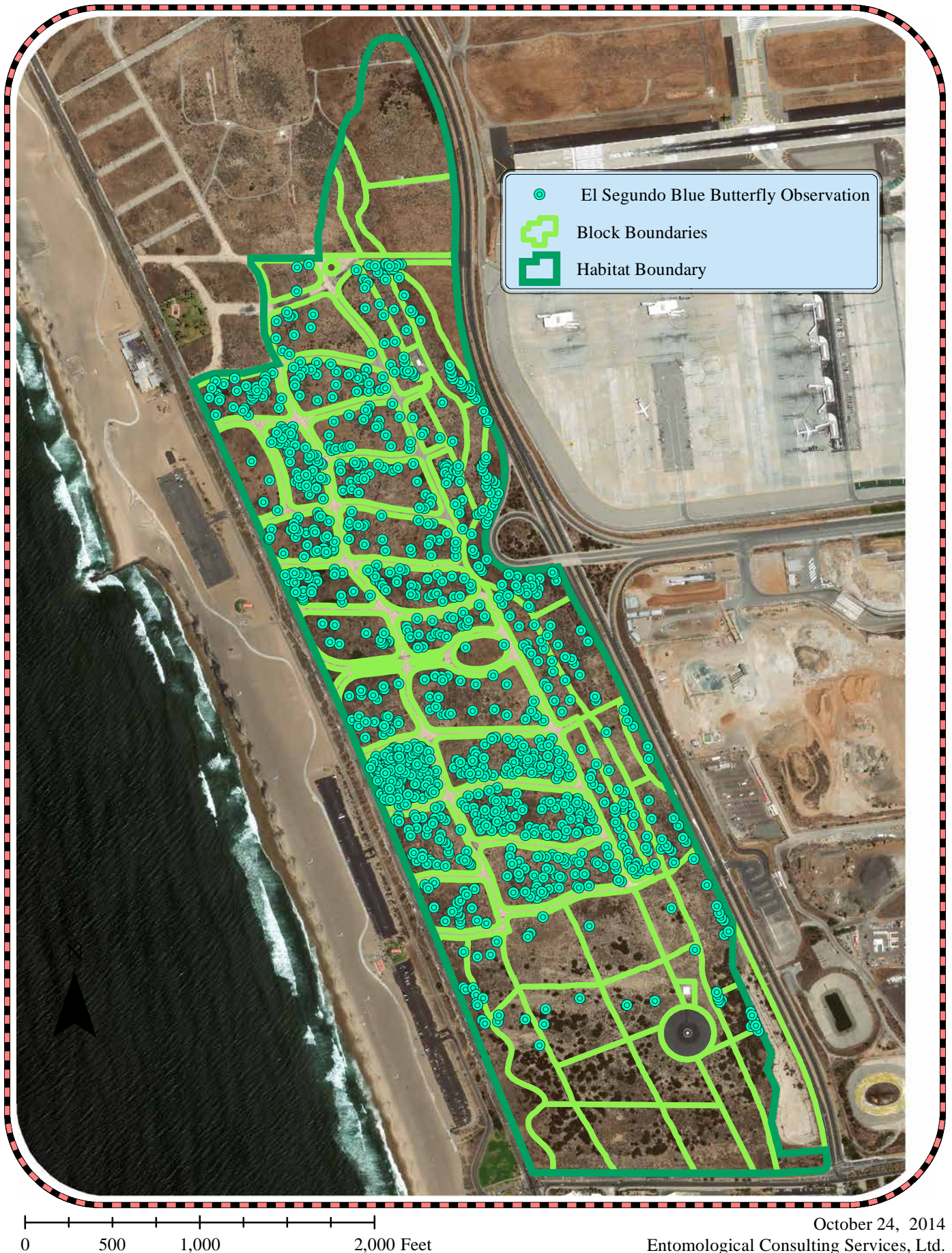


Figure 6. Overview of Buckwheat Plants on the Historical Transect:
Age Class and Flowerhead Counts, by Interval

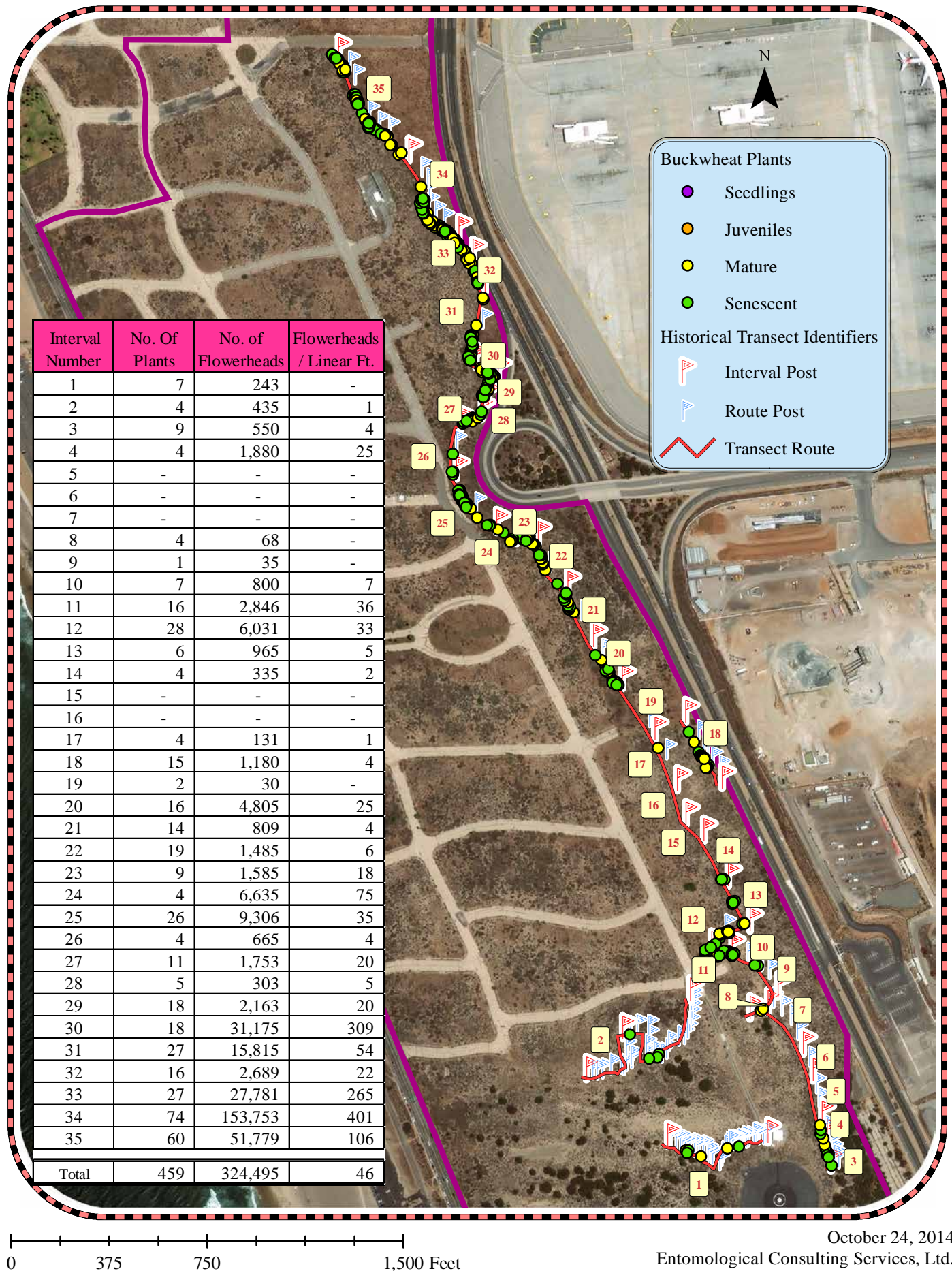


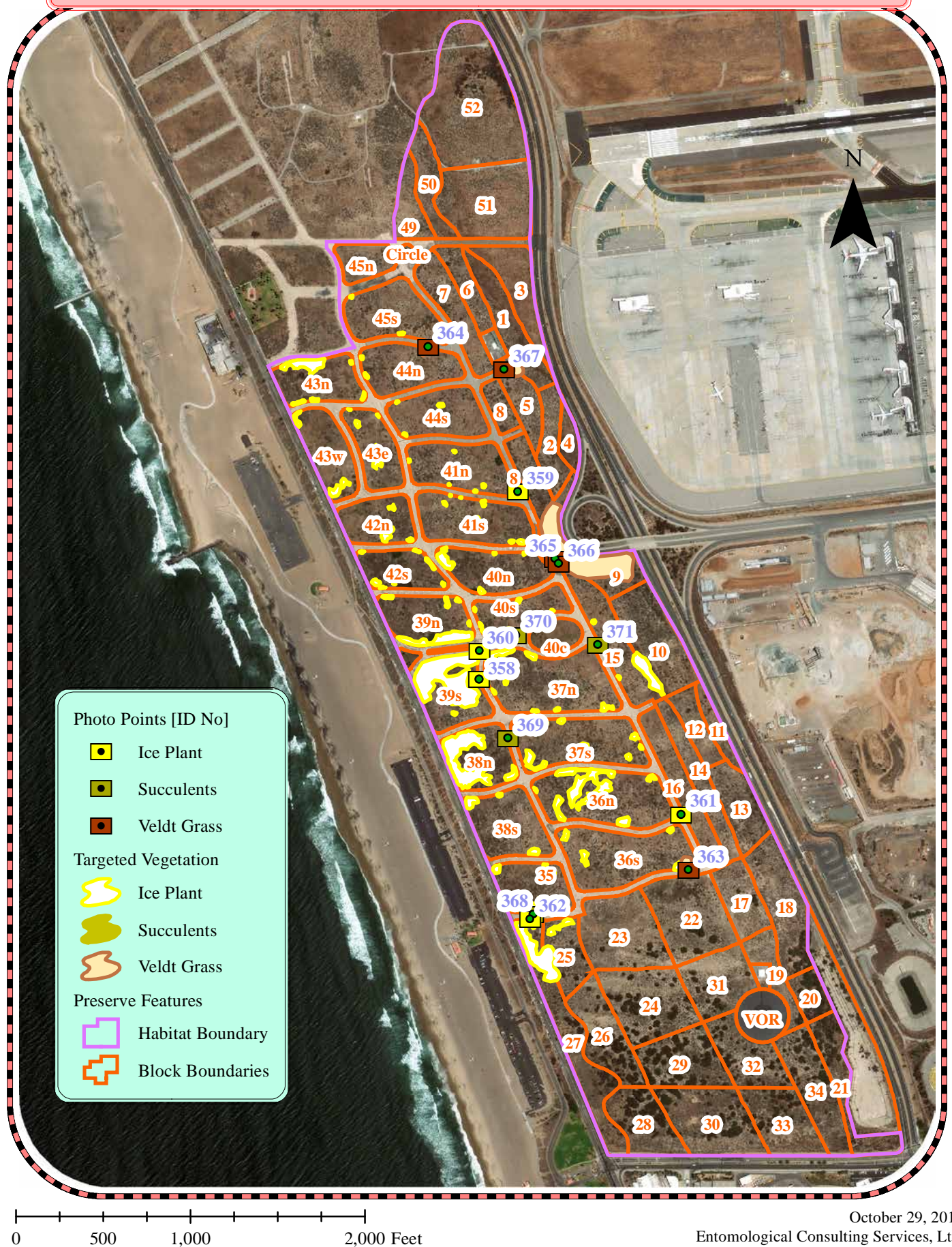
Figure 7. Overview of Buckwheat Plants on the Block Buckwheat Transects by Age Class



Figure 9. Example locations for removal of invasive buckwheats
[photograph locations are shown - photographs are in Appendix A]



Figure 10. Example locations for removal of Ice Plant, Succulents & Veldt Grass
[photograph locations are shown - photographs are in Appendix A]



SECTION 9
APPENDIX A:
PHOTODOCUMENTATION OF INVASIVE PLANTS

LAX ESB Preserve
Photodocumentation of Selected Areas Needing Vegetation Control



Photo Pt 122 - Block 8



Photo Pt 123 - Block 31



Photo Pt 124 - Block 20



Photo Pt 125 - Block 23



Photo Pt 126 - Block 16



Photo Pt 127 - Block 37n

LAX ESB Preserve
Photodocumentation of Selected Areas Needing Vegetation Control



Photo Pt 128 - Block 36s



Photo Pt 129 - Block 36s



Photo Pt 130 - Block 36n



Photo Pt 131 - Block 37s



Photo Pt 220 - Block 3



Photo Pt 221 - Block 6

LAX ESB Preserve
Photodocumentation of Selected Areas Needing Vegetation Control



Photo Pt 222 - Block 6



Photo Pt 223 - Block 7



Photo Pt 224 - Block 15



Photo Pt 225 - Block 37s



Photo Pt 358 - Block 39s



Photo Pt 359 - Block 41n

LAX ESB Preserve

Photodocumentation of Selected Areas Needing Vegetation Control



Photo Pt 360 - Block 39s



Photo Pt 361 - Block 16



Photo Pt 362 - Block 27



Photo Pt 363 - Block 36s



Photo Pt 364 - Block 44n

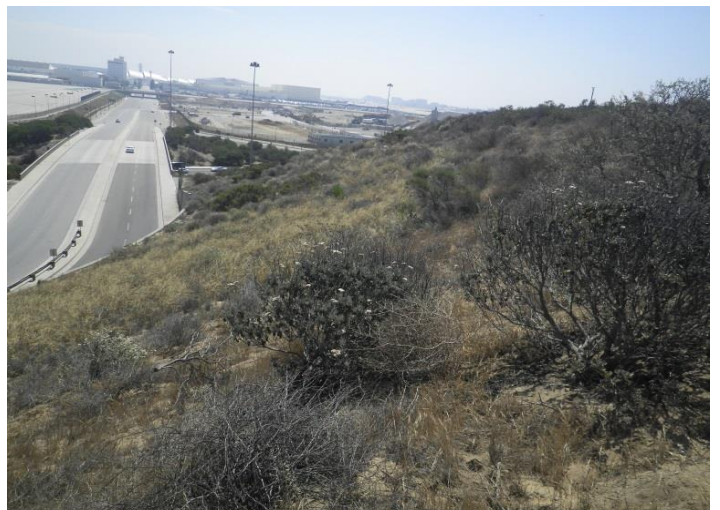


Photo Pt 365 - Block 9

LAX ESB Preserve
Photodocumentation of Selected Areas Needing Vegetation Control



Photo Pt 366 - Block 9



Photo Pt 367 - Block 5



Photo Pt 368 - Block 35



Photo Pt 369 - Block 38n



Photo Pt 370 - Block 40s



Photo Pt 371 - Block 15

SECTION 10
APPENDIX B: WORK LOGS

2014

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
1/6/14	2 18hrs	Litter Pick UP All over the Dunes cut down some Castor bean	
1/7/14	2 18hrs	Litter Pick UP	Water View
1/8/14	2 18hrs	Litter Pick UP cut and Remove some Acacia Trees New growth.	Water View Imperial Slope
1/8/14	2 18hrs	Litter Pick UP cutting some branches for the 200 acacia, Ficus	North side of the Dunes
1/10/14	2 18hrs	Litter Pick UP work on the Imperial Slope.	All throughout
1/15	2 18hrs	Litter Pick UP cutting and Removing Acacia from the 200	Water View North Side Dune
1/16	2 18	Litter Pick UP Cutting and Removing Acacia trees for the 200.	
1/17	1	Litter Pick UP cutting and Removing some Castor Bean, Buck Wheel	Water View
1/21	2 18hrs	Litter Pick UP	All throughout
1/22	2 18hrs	Litter Pick UP took out alot of tumble weeds. Removed some Duck Whirt.	Pensky Side

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
1/27	2	Litter Pick UP	
1/27	2 18hrs	Litter Pick UP Cutting and Removing new Growth Acacia Trees.	All through area Pending stage 2
1/28	2 18hrs	Litter Pick UP Removing thimble weeds and some Buck wheat	Water View
1/29	2 18hrs	Litter Pick UP Removed some more thimble weeds. AT DALL some Brush on Water View	Water View Pending Final Law
1/30	2 18hrs	Litter Pick UP Cutting and Removing Acacia trees and Ficus trees from the ZOO.	Water View North side of the Dunes
1/31	1 8hrs	Litter Pick UP	Water View
2/3	2 18hrs	Litter Pick UP Cutting and Removing some Acacia Trees North side Dunes	All through out North side of the Dunes
2/4	2 18hrs	Litter Pick UP Cleaning the side walk on the West side of the Dunes. cutting and Removing some Acacia Trees	Water View North side Dunes
2/5	2 18hrs	Litter Pick UP	Water View
2/6	2 18hrs	Litter Pick UP Cutting and Removing some Acacia trees and some Ficus Branches for the ZOO. Leaving about the Broken blades and what to Look For.	Water View

2014

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
2/10	2 18hrs	LITTER PICK UP cutting and Removing some New Growth Acacia trees.	All Thru Out North side Pershing side
2/11	2 18hrs	LITTER PICK UP Clean up of the Imperial side of the Dunes. Help Peggy installed a EXCLUSIONARY netting	Water View Imperial side North side Dunes
2/12	2 18hrs	Litter Pick UP cutting and Remove some Acacia trees. Remove Birch which Palm Fronds.	Water View North side Pershing side Dunes
2/13	2 18hrs.	Cutting Branches for the ZOO Acacia, Ficus 130 Pieces of Acacia, 60 Pieces of Ficus	
2/18	2 18hrs	Litter PICK UP	All Thru Out
2/19	2 18hrs	Litter PICK UP cutting and Removing new growth Acacia trees. West side of the Dunes	Water View Vista Del mar side
2/20	2 18hrs	Litter Pick UP cutting Acacia trees, and Ficus tree for the ZOO.	North side Dunes
2/24	2 18hrs	Litter Pick UP cut & Remove some acacia	All Thru Out Pershing side

FEB 2014 \$march

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
2/25	2 18hrs	Litter Pick UP cut and removed new growth Acacia trees Pick up palm Pine.	Water View Northside Dunes North side Dunes
2/26	NO Valley		
2/27	2 18hrs	Litter Pick UP cutting and removing some Acacia trees, and Ficus in the Zoo.	North side
3/3	2 18hrs	Litter Pick UP	All throughout
3/4	2 18hrs	Litter Pick UP cutting and removing Acacia trees.	Water View North side
3/6	2 18hrs	Litter Pick UP cutting trees for the Zoo Acacia, Ficus.	North side
3/10	2 18hrs	Litter Pick UP	All throughout
3/11	2 18hrs	Litter Pick UP cutting and removing some Buckwheat & some weeds	
3/12	Valley		
3/13	2 18hrs	Litter Pick UP cutting and removing some Acacia trees from the Zoo NO Ficus today	North side
3/17	2 18hrs	Litter Pick UP cutting and removing some new growth Acacia trees.	

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
3/18	2	18hrs. / Litter Pick up Cutting and Removing mud grass	
3/19	2	18hrs cutting and Removing Castor Beans and some Quercus cleaned up some weeds.	
3/20	2	18hrs Litter Pick up	
* 3/21	2	18hrs Litter Pick up cutting down the acacia & Ficus for the Zoo.	
3/24	2	18hrs Litter Pick up All Through OUT	All over the Dunes
3/25	2	18hrs Cut and Remove some Castor Beans and Buck wheat.	
3/26	2	18hrs Litter Pick up Working on the Pershing Slough cutting down some Acacia trees and some weeds.	Pershing Slough
* 3/27	2	18hrs Working on the north side of the coastal Dunes cutting Acacia, Ficus for the Zoo.	Northern side

APRIL 2014

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
4/1	2 18hrs	Litter Pick UP California Buck wheat Trailing.	All through out
4/2	2 18hrs	Litter Pick UP Removing grass from and the California Buck wheat. Removing Some New growth Acacia trees	
4/3	2 18hrs	Cutting and Removing Acacia, Ficus For the LA ZOO. About 60 pieces of acacia 100 pieces of FICUS	
4/4	2 18hrs	Litter Pick UP Removing Some Castor Bean	All throughout Pershing hillside
4/8	2 18hrs	Litter Pick UP Starting Cleaning Area "23" getting all the grass and Weeds	Water View
4/9	2 18hrs	Litter Pick UP Working on Area "23" Removing new growth acacia and Castor Beans.	Water View Area "23"
4/10	2 18hrs.	LITTER PICK UP & the coastal Dunes. Cutting and Removing some Acacia trees For the ZOO. <u>(NO FICUS TODAY)</u>	Water View North Side
4/14	2 18 hrs	Litter Pick UP CUT and Remove some Weeds.	All through out
4/15	2 18hrs	Litter Pick UP w/ot and Remove some Weeds and New growth Acacia trees.	Water View Area 23

EL SEGUNDO DUNES MAINTENANCE

285-178
014

may

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.		WORK PERFORMED	LOCATION
5/1	2	18	Litter PICK UP cutting and removing some Acacia, Ficus trees 200	
5/5	2	18	Litter Pick up Pick up alot of down Palms.	All Throught
5/6	2	18	Litter Pick UP Clean up Area #23. Remove some Cactus Bean North side Dunes.	Water View North Side dunes
5/8	3	27	cutting acacia trees and Ficus from the 200. 103 pieces of acacia 600 Ficus	
5/12	3	27	Litter PICK UP Pick up down Palms Cleaning out weeds	Water View Area 23
5/13	2	18	Litter PICK UP clean out Radish on the North side Dunes cut down Acacia trees.	North side
5/19	2	18	Litter PICK UP Clean out some weeds cut down some prickly pears	All Throught the Dunes
5/20			Litter Pick UP cutting and removing some New Growth Acacia trees and weeds.	

[illegible][illegible]

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.		WORK PERFORMED	LOCATION
6/2	2	18	Litter Pick UP	All thing out
6/3	2	18	Litter Pick UP clean out weeds and Castor Beans.	
6/4	2	18	Valley	
1				
6/5	2	18	Litter Pick UP Cutting and Removing acacia trees for the "ZOO."	
6/9	2	18	Litter Pick UP Both Side of the Dunes	All Through out the.
6/10	2	18	Cutting and Removing Castor Beans and new growth Acacia trees.	North side
6/11	2	18	Cutting new growth Acacia and some weeds.	Perching Slap
6/12	2	18	Cutting Acacia Trees for the "LA ZOO" 115 Pies	North side Dunes
6/17	3	27	Litter Pick UP Removing some Castor Beans and cutting some Weeds.	
6/19	3	27	Litter Pick UP cutting and removing Acacia trees for the "LA ZOO" 120 Pies	North Side Dunes
6/23	3	27	Litter Pick UP Removing some Castor Beans North side Dunes	All thing out the Dunes

June & July

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
6/24	3 27	Litter Pick up cutting and removing new growth Acacia trees.	Pending day
6/26	3 27	Litter Pick up cutting and removing some Buck wheat and New growth Acacia trees.	
6/28	2 18	Cutting Acacia trees and Ficus for the LA ZOO. 120 pieces of Acacia 70 of Ficus	
6/30	3 27	Litter Pick up	Although out the Dunes
7/1	3 27	Litter Pick up cutting and removing Castor beans. New growth acacia and some weeds.	
7/2	6 Valley 27	Valley	
7/3	1 9 hrs	Litter Pick up cutting some Acacia for the LA ZOO.	North Side Dunes
7/7	2 18	Litter Pick up cut and remove some Acacia trees and weeds.	All through out South Side Dunes
7/8	2 18	Litter Pick up	
7/9	2 18	Litter Pick up and remove some new growth of Acacia	
7/10	3 27	Cutting down some Acacia trees for the LOS ANGELES ZOO.	

2014

JULY

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.		WORK PERFORMED	LOCATION
7/14	2	18	Litter Pick up clean up Area #23	All Throughout the Dunes
7/15	2	18	Litter Pick up clean up Area #23 cut and Remove some cactus beam.	
7/16	VALLEY			
7/17	2	18	Cutting Acacia Trees and Ficus For the Los Angeles Zoo. Remove 20 Acacia Remove 70 Ficus	
7/21	2	18	Litter Pick up	All throughout the Dunes.
7/22	2	18	Cut and Remove some New growth Cactus Beam and some tumble weeds	
7/28	2	18	Litter Pick up cut down some tumble weeds pick up some Ice plants.	All through the Dunes
7/29	2	18	Litter Pick up Cutting and Removing some New growth Acacia and Ice plant tumble weeds.	
7/30	2	18	VALLEY	
7/31	2	18	Cut down Acacia and Ficus For the Los Angeles Zoo.	North Side Dunes

AUGUST

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.		WORK PERFORMED	LOCATION
8/4	2	18	Litter Pick UP Remove Castor Bean the South Side Dunes	All through out the Dunes
8/5	2	18	Litter Pick UP Clean out Weeds and Castor Beans	South side Dunes
8/6	2	18	Litter Pick UP Cutting and Removing New growth Acacia Trees, Bamboo	Water View / and Dunes
8/7	2	18	Litter Pick UP Cutting and Removing "5" Acacia Trees No Zoo today	
8/10	2	18	Litter Pick UP Remove Tumble Weeds	All through out
8/12	2	18	Litter Pick UP Cutting and Removing some Castor bean "2" trunks and some Ice plants	
8/13	2	18	Valley	
8/14	2	18	Litter Pick UP Remove some Castor bean No Zoo today Cut Down "two" Acacia Trees and Pick up Down Palms	Pending Sleep
8/18	2	18	Litter Pick UP clean up down Palms	All through out the Dunes & Water View
8/19	2	18	Work on the Imperial Sleep cut down "3" Acacia trees	Imperial Sleep

2014 AUGUST

DATE _____

NUMBER OF
EMPLOYEES/Total Hr.

WORK PERFORMED

LOCATION

8/20

2

18

Picked up down palm
and 4 bags of ILC plants.

8/2/

2

18

Cut down one Acacia tree. The Zoo NO Show
Pick up Litter on water view.

North Side Demos

8/25

2

18

Letten Pick up
Clean up North side Driv
40 Bags of topsoil weeds
and 2 truck loads.

All through out
North side Dunes

8/20

18

Litter Pick up Club
 up some Ice Plants "4"
 Bas. Sprayed the weeds
 on the North side dunes.

Water View
North Side Diner

52 ~~PA~~
8/27

2

18

Litter Pick up.
Spraying all the weeds and clearing
out the new growth Acacia's.

water View
North Side Diner

8/28

2

18

Removing all new growth
Acacia & Castor beds.

North side Dunes

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
9/8 ²	2 18	Litter Pick up Removed some Acacia tree.	Thru out the Dunes
9/8 ³	2 18	Litter Pick up	Water View
9/8	2 18	Litter Pick up Clean up the North side "40" Bags of weeds and Ice plants.	All Thru out the Dunes
9/9	2 18	Litter Pick up and Clean up some down palms. one thick load of tumble weeds	
9/10	2 18	Clean up. Removing down cut and Remove some Cactus Branch and some tumble weeds	North side DUNES
9/11	2 18	cut and Remove Acacia tree & some Ficus for the LA ZOO. "100" Pieces of Acacia "18" of the Ficus	North side
9/15	2 18	Litter Pick up Water View the Coastal Dunes	All Thru out the Dunes
9/16	2 18	Cut and Remove some Acacia and some Cactus Branch. 4 Bags Acacia 2 Bags Cactus	

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
9/18	2 18	cutting Acacia trees & Ficus For the Los Angeles ZOO. "100' pieces off Acacia "21' pieces of FICUS	North side Dunes
9/22	2 18	Litter Pick up	All trash at the Sunset & Water View
9/23	2 18	Litter Pick up at the Sunset and Remove some Castor Bean 4 bags. Pick up down PALMS and some Ice Plants.	Coastal Dunes
9/24	2 18	Litter Pick up cut some Acacia trees and Pick up Ice Plants.	Water View North side
9/25	2 18	cutting some Acacia trees For the Los Angeles ZOO. "100' pieces of Acacia "20' pieces of FICUS	North side
9/28	2 18	Litter Pick up Along the Dunes.	
9/30	2 18	Litter Pick up Spraying the weeds and grass. Remove some Ice Plant and some New growth Acacia.	Water View North side

October

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
10/1	2 18	Litter Pick up spraying the weeds on the North Side Dunes. Removing new growth Acacia.	North Side
10/2	2 18	Litter Pick up cutting the Acacia and Ficus trees for the LA ZOO.	Water View North Side
		100' Pieces of Acacia 25' Pieces of Ficus	
10/6	2 18	Litter Pick up sprayed some weeds and cut down some Castor bean and cleared up down palms.	Altogether out the Dunes Coastal Dunes
10/7	2 18	Litter Pick up removed some new growth Acacia Penshing Slap. 5" Bags and some Ice Plants	Penshing Slap
10/8	2 18	Valley	
10/9	2 18	Litter Pick up NO LOS ANGELES ZOO today. We still did some cutting #1 acacia trees. 2 truck loads.	Water View
10/14	1 9	Litter Altogether out the Dunes and Water View 5 Bags.	
10/15	1 9	Took out 5 new growth Acacia trees and cleared out some Castor bean.	Penshing Slap
10/16	2 18	cutting the Acacia trees for the Los Angeles ZOO.	

100 Pieces of ACACIA

18 OF FICUS

2014

EL SEGUNDO DUNES MAINTENANCE

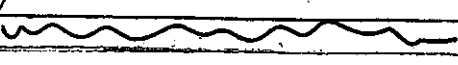
DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
10/20	1 9	Litter Pick UP. Although out the Dunes. Cleaned up some Ice plants and tumble weeds 11 BAGS. 1 1/2 Load of tumble weeds.	North side Dunes
10/21	2 18	Litter Pick up Wastes on the North side Dunes. Remove some New growth Acacia and some Tobacco Plants. "8 BAGS"	North side
10/23	2 18 Thursday	Cutting the Acacia and Ficus For the LOS Angeles ZOO. 120' Pieces of Acacia 20' Pieces of Ficus	
10/27	2 18	Picking up Litter all around the Dunes. Spraying Acacia trees New growth.	Although out the Dunes
10/28	2 18	Remove some old Castor Bean and tumble weeds, 3 trips and one truck Load.	Perching slope
10/29	2 18	Litter Pick up "Spraying" Garden on New growth Acacia and some weeds. Cleaned out some Ice plants "3" BAGS.	North side Dunes Water View.
10/30	1 9	Litter Pick UP NO LA ZOO today. I cut down one Acacia tree "2" Full Loads Remove some weeds.	North side

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
11/3	2	18	Litter Pick up
			cleaning up coastal Dunes remove trash, weeds and ICE plants 4 bags one truck load.
			Although out the Dunes
11/4	2	18	Litter Pick up Remaining
			coastal Dunes and some dune PALMS.
			Coastal Dunes
11/5	2	18	Valley
11/6	2	18	Litter Pick up
			Cut down one Acacia tree and some Ficus for the Los Angeles Zoo.
			"120" piece Acacia "20" piece Ficus
			North Side Dunes
11/10	1	9	Litter Pick up ATD Branch
			out the Dunes. Removed some new growth Acacia.
11/12	2	18	Litter Pick up Repair
			some ICE plants at Coastal Dunes New growth Acacia.
			Coastal Dunes North Side
11/13	2	18	cutting the acacia for the
			Los Angeles Zoo.
			"120" piece 20
11/17	2	18	Litter Pick up Although
			out the Dunes.
11/18	2	18	Cut some ICE plants and
			removed some Coastal Dunes New growth Acacia.
			Coastal dunes North side

Total "10 BAGS"

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
11/19	Volley		
11/20		Los Angeles Zoo came out Took 100 Pieces of Acacia "20" Pieces of Ficus	North side
11/24	1 9	Litter Pick up All the the Dunes.	
11/25	2 18	Litter Pick up Removed new growth Acacia Casten bean and some FCC plants. Cut down "1" Acacia tree. 10 Bags 2 Trucks Loads Acacia	North side
12/1	2 18	Litter Pick up Although out The Dunes.	
12/2	1 9	Litter Pick up Rainy Day	
12/3	2 18	Working on the North side Removing weeds and New growth Acacia and Casten Bean 4 BAGS	
12/4	2 18	Working on the North side Dunes Cutting Acacia trees for the Los Angeles Zoo. 100 Pieces Acacia 20 Pieces Ficus	
12/9	2 18	Litter Pick up Removing some Acacia trees and Casten bean.	Castel Dunes

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/Total Hr.	WORK PERFORMED	LOCATION
12/10	2 18	Cutting and Removing Acacia trees and some ECE plants and some Tumble Weeds.	North Side Dunes
12/11	2 18	Cutting ACACIA trees for the Los Angeles ZOO.	North side Dunes
1		"100" Pines Acacia "20" Ficus Cleaned out Ice Plants and some Palms. 10 BAGS	Coastal Dunes
12/15	2 18	Litter Pick UP Although out the Dunes. Pick up Palms and some Ice Plants. "5 BAGS" Tumble Weeds 3 more Caddis.	Coastal Dunes North side
12/16	2 18		
12/17	2 18	Litter Pick UP cut down some New growth Acacia and cleaning out some Weeds. "10 BAGS"	Coastal Dunes
12/18	2 18	Cut down Acacia trees for the Los Angeles ZOO. Cut and Remove some Ficus. 100' Acacia 20 Ficus	
12/22	2 18	Litter Pick UP Although out the Dunes, cut and Remove some New growth Acacia and some Weeds.	

APPENDIX D

SOUTHERN TARPLANT RESTORATION PROJECT FOURTH ANNUAL MONITORING REPORT DATED OCTOBER 2014

SOUTHERN TARPLANT RESTORATION PROJECT

Fourth Annual Monitoring Report

Prepared for
Alta Environmental
3777 Long Beach Blvd, Annex Building,
Long Beach, CA 90807

October 2014



SOUTHERN TARPLANT RESTORATION PROJECT

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SOUTHERN TARPLANT RESTORATION PROJECT

Fourth Annual Monitoring Report – October 2014

Introduction

Environmental Science Associates (ESA) conducted the fourth annual monitoring of Southern Tarplant Restoration required for the Bradley West Expansion Project and the Crossfield Taxiway American Airlines Employee Parking Lot Relocation Project (Project). In accordance with the Southern Tarplant Mitigation Plan (STMP) (LAWA et al., 2011a), a total of five consecutive years of monitoring is required of the mitigation areas to ensure success criteria and performance measures are met. This report also constitutes the third quarter qualitative monitoring report for 2014.

Project Location

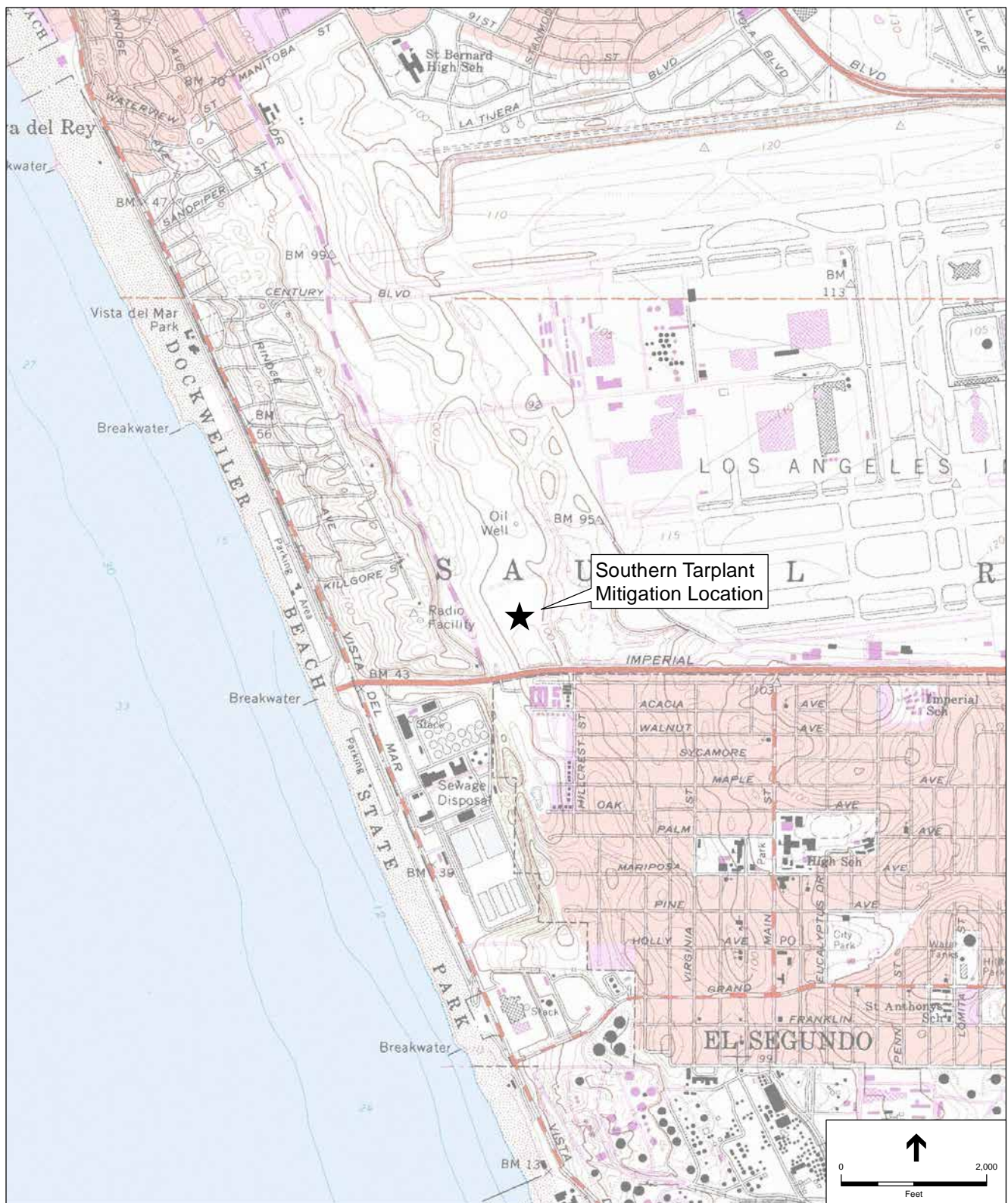
The project is located at the Los Angeles International Airport (LAX), One World Way, Los Angeles, CA 90045, at the southwest corner of the airport in an area designated as open space (**Figure 1 – Regional Location Map**). This open space area is bound by Pershing Drive to the west and to the north, and to the east and south by various structures and development associated with LAX.

Background

As shown in **Figure 2 - BWP and CFTP Mitigation Areas**, the one-acre mitigation site is divided into six sub-plots (1a, 1b, 2, 3, 4a and 4b). In an effort to increase the probability of establishing a viable population, each sub-plot received a different source of seed. Seed was either purchased from a distributor or collected within vicinity of the mitigation site, and was either described as clean (outer seed husk removed) or rough (outer husk retained). Sowing of the mitigation site took place in January and February of 2011 and scheduled watering of the mitigation site took place between November of 2011 and June 2012. Watering of the subplots discontinued following spring rains that occurred prior to the second annual monitoring event.

The Second Annual Monitoring Report (Tetra Tech, 2012) confirmed that an estimated 688 individuals successfully bloomed and/or seeded within the mitigation site. Of those individuals, approximately 98% occurred within Subplot 3; however, the occurrence numbers far exceeded the Year-Two success criteria required in accordance with the STMP. The third Annual Monitoring Report (ESA, 2013) confirmed that approximately 310 individuals successfully bloomed and/or seeded within the mitigation site. Approximately 40% of the observed individuals occurred within Subplot 1a as opposed to Subplot 3 in 2012, while the remaining individuals were distributed relatively evenly throughout the remainder of the mitigation site.

Figure 1 Regional Location Map



SOURCE: ESRI

Southern Tarplant - Annual Monitoring Report . 130072

Figure 1
Project Location

Figure 2 BWP and CFTP Mitigation Areas



SOURCE: UltraSystems Environmental Inc. 2011.(Mitigation Areas)

Southern Tarplant - Annual Monitoring Report . 130072

Figure 2
BWP and CFTP Mitigation Areas

It was noted that the overall number of individuals dropped by over half between 2012 and 2013; however, numbers remained in line with the Year-Three success criteria. This (Fourth) annual monitoring report outlines the results of the 2014 quantitative and third qualitative monitoring event and discusses conclusions and recommendations for moving forward.

Pursuant to the STMP, all impacts made to southern tarplants during the construction of the Project were required to be mitigated at a 1:1 ratio. A total of 329 individual plants were initially documented prior to construction within the impacted areas. Based on these findings, it was established that a minimum of 329 individuals would be required to sustain (i.e., germinate, flower and set seed) by the completion of the five year monitoring period. **Table 1** below outlines the performance standards outlined in the STMP.

TABLE 1
PERFORMANCE STANDARDS

Year	Minimum Number of Southern Tarplant Individuals
One	198 (60% of Required Number)
Three	264 (80% of Required Number)
Five	329 (100% of Required Number)

**Includes all individuals that are germinating, flowering and/or setting seed.*

An unsuccessful seeding effort took place in 2009; however, to remain in compliance with the 1:1 replacement ratio within the five year monitoring period, LAWA reinitiated seeding efforts in 2010 to establish and maintain a viable population. A new mitigation site was established and seeded in January and February 2011. A 90-Day Establishment report, followed by Quarterly Monitoring letter reports (LAWA et al., 2011b; LAWA et al., 2011c, respectively) were prepared in 2011 to present an overview of the reseeding success in the new mitigation site during the first year of monitoring. In 2012, a Second Annual Monitoring Report (Tetra Tech, 2012); and in 2013, a Third Annual Monitoring Report (ESA, 2013) was drafted to document the overall status of the mitigation site two and three years, respectively after seeding.

Methodology

On September 17, 2014, ESA's botanist Robert Sweet conducted the fourth annual monitoring event between the hours of 1200 and 1400. Weather was relatively moderate during the survey with temperatures ranging between 77°F and 82°F under intermittent cloud cover. In an effort to accurately document the status of the subplots, a quantitative and qualitative study of the restoration site was conducted. The methodology used for these surveys is described in detail below.

Quantitative Survey

Pursuant to methods outlined in the STMP, linear transects were conducted at approximately ten meters apart to obtain 100 percent visual coverage of each subplot. As required in the STMP, all tarplant individuals observed to be germinating, flowering, setting seed or in dormancy

(senescence) were tallied within each subplot, as the presence of these life stages suggests possible active recruitment and regeneration of the introduced populations.

Qualitative Survey

While conducting quantitative surveys, the overall health and distribution of southern tarplants in each subplot was studied. Other notable observations included plant density (including other native and non-native species), presence of weed species, trash, herbivory, vandalism, and overall environmental conditions.

Results

The overall growing condition of the six subplots was relatively good for germination and natural recruitment; however, tarplant germination and overall distribution was less than half of the 2013 results. A summary of the Quantitative Survey and Qualitative Survey results is provided below.

Quantitative Survey

A total of 138 tarplant individuals were observed within the mitigation site during the fourth annual monitoring event. **Table 2** below shows the results of Southern Tarplant individuals identified within the mitigation site between 2012 and 2014. As indicated below, the number of tarplants within each subplot was less than in 2013.

TABLE 2.
SOUTHERN TARPLANT DISTRIBUTION OBSERVED IN 2013 COMPARED TO 2012

Subplot	2012 Results	2013 Results	2014 Results
1a	0	121	88
1b	13	33	5
2	1	4	1
3	671	63	20
4a	3	31	13
4b	0	58	11
Total	688	310	138

As reported in the Second Annual Monitoring Report (Tetra Tech, 2012), 98% of southern tarplants observed were in Subplot 3. However, as shown in Table 2, the number of individuals observed within Subplot 3 decreased substantially in 2013, and even more so in 2014. Overall, there has been a 97% reduction in Subplot 3 from 2012 to 2014. In contrast, no southern tarplants were observed in Subplot 1a and 4b in 2012; whereas in 2013, 121 and 58 individuals were recorded within these subplots, respectively. However, the numbers dropped within these subplots in 2014. Nonetheless, the majority of tarplants continue to be located in Subplot 1a compared to all other subplots, which is consistent with the 2013 results, and the total number of

tarplant individuals within all subplots has decreased drastically between 2012 and 2014; with total numbers reduced by almost one-half each year, recorded at 688, 310 and 138, respectively.

Qualitative Survey

The overall condition of the six subplots was unchanged from the last monitoring period. In general, the subplots are sparsely vegetated with non-native herbaceous cover and include patches of bare ground, providing decent conditions for seed dispersal, germination and recruitment of southern tarplant. The majority of vegetation observed in the subplots consisted of non-native grasses and forbs, with various native and non-native shrubs interspersed throughout. For the most part, the presence of weeds is not inhibiting the available area for tarplant germination and recruitment; however, Bermuda grass (*Cynodon dactylon*) comprises a dense thatch layer in portion of Subplots 1a, 1b, 2 and 3, which inhibits the available surface for germination of tarplant seeds.

Some natural degradation of the rope and rebar delineating each subplot was observed; and rope within Subplot 1a and 1b has fallen. All other rope boundaries within the mitigation site are intact and functional. In addition, neither trash nor vandalism of the mitigation site was observed during the survey. Two groupings of tarplant (flowering and senesced) were observed within Subplot 1a and 1b and one small group of individuals was observed within Subplot 3. In addition, sporadic occurrences were observed to a lesser degree throughout the remaining subplots.

Subplots 1a and 1b

Subplots 1a and 1b are immediately adjacent to each other and are very similar in condition and plant composition. They both are generally dominated by non-native grasses and forbs with some native herbaceous species occurring intermittently throughout. Dominant non-natives generally include common plantain (*Plantago major*) and an unidentified ornamental daisy (*Asteraceae*) interspersed with dense mats of Bermuda grass, mostly common in the central portion of the subplots when viewed collectively. Other non-native species observed included Australian saltbush (*Atriplex semibaccata*), wild oats (*Avena fatua*), red brome (*Bromus madritensis* ssp. *rubens*), rigput brome (*B. diandrus*), redstem filaree (*Erodium cicutarium*), greenstem filaree (*E. moschatum*) and bur clover (*Medicago polymorpha*). Native species observed within Subplots 1a and 1b includes deerweed (*Acmispon glaber*) and telegraph weed (*Heterotheca grandiflora*).

The density of vegetation and composition within this subplot was relatively unchanged from the July 2014 qualitative survey. However, the majority of the annual herbaceous cover has seeded and since senesced with less than 30 percent observed flowering. Approximately 80 tarplant individuals were observed throughout the north central and south central portion of Subplot 1a, extending slightly into Subplot 1b. All tarplants observed within Subplot 1a were located in areas with relatively sparse vegetation, allowing for viable seeds to germinate and establish. In areas dominated by Bermuda grass, no tarplant individuals were observed.

It was noted that LAWA maintenance staff had disked an approximate 300 ft² test plot within Subplot 1b in an effort to clear non-native vegetation and encourage tarplant growth. Per discussion with the maintenance crew, it was determined that disking activities took place between May 23

and June 5, 2014. Very little vegetative growth, primarily non-native grasses and forbs was observed within the test plots during the monitoring event.

Subplot 2

Subplot 2 is sparsely vegetated with a dominance of Bermuda grass interspersed with four large native mulefat shrubs (*Baccharis salicifolia*) and numerous non-native acacia sprouts (*Acacia retinoides*) were also observed along the west side of the subplot. Other non-native species observed during surveys include bur clover, greenstem filaree, red brome, redstem filaree, riggut brome, curly dock (*Rumex crispus*) and wild oats. Native species observed within this subplot includes deerweed and telegraph weed. One senesced tarplant individual was observed within this subplot.

Subplot 3

The central and eastern portion of Subplot 3 was densely vegetated with a mat of Bermuda grass, while the western portion was much less dense with a dominance of common plantain interspersed with non-native grasses and forbs. Non-native species observed during surveys include bur clover, greenstem filaree, red brome, redstem filaree, riggut brome and wild oats. Native deerweed and wire lettuce (*Stephanomeria exigua*) was observed growing along the southern perimeter of the subplot as well. The density and distribution of the vegetation within this subplot has remained relatively unchanged. Twenty tarplant individuals were detected within the central portion of the subplot, outside of the dense Bermuda grass thatch, in an area with sparse vegetation.

Subplot 4a

Subplot 4a was sparsely vegetated with non-native grasses and forbs throughout with a dominance of common plantain. Additional species observed during surveys include Bermuda grass, bur clover, greenstem filaree, red brome, redstem filaree, riggut brome and wild oats. The density and distribution of the vegetation was relatively unchanged; however, 13 tarplant individuals were observed spaced evenly throughout the subplot during this monitoring period.

Subplot 4b

Subplot 4b was sparsely vegetated with non-native grasses and forbs, dominated by common plantain. Native mulefat and red willow (*Salix laevigata*) shrubs were observed along the north side of the plot. Other species observed during surveys include Bermuda grass, bur clover, greenstem filaree, red brome, redstem filaree, riggut brome and wild oats. The density and distribution of the vegetation within this subplot remained relatively unchanged since June monitoring; however, 11 tarplant individuals were observed spaced evenly throughout the subplot.

Discussion and Recommendations

A total of 138 tarplants were counted during the fourth annual monitoring period. As shown in Table 1, this amount is short of the performance standards for Year-Four by approximately 48

percent. 2014 yielded less germination than in 2012 and 2013, and overall abundance has steadily dropped, even though 2012 and 2013 monitoring results far exceeded performance standards.

Weed Control

As discussed in detail in the June 2014 monitoring report, areas dominated with a herbaceous layer having little bare ground present (such as areas dominated with Bermuda grass in Subplots 1a, b, 2 and 3) may inhibit seed germination and out-compete tarplant seedling for nutrients and water. In an effort to control the Bermuda grass throughout the mitigation site, it is recommended that area of dense Bermuda grass be controlled to decrease competition and improve the growing conditions for tarplants. Bermuda grass is classified as stoloniferous and rhizomatous; therefore it can be very difficult to control without the proper maintenance. Pulling or killing the aboveground stolons does not affect the rhizomes present underground. Therefore, it is recommended that the thatches of Bermuda grass throughout the mitigation site be treated with a grass-selective herbicide during the growing period for the species in order to penetrate the rhizomes and control the spread of this invasive grass species. In addition, using a grass-selective herbicide would be ideal, as the active ingredients sethoxydim, fluazifop and clethodim specifically target Bermuda grass and avoid impact to many other species of herbs, shrubs and trees, and most importantly, Southern Tarplants.

Manufacturer recommendations state that the best time to apply the grass-selective herbicide is in early spring, before the new vegetative growth has reached six inches; followed by another application before regrowth has reached six inches. This process should be repeated throughout the early spring, prior to the flowering period for the tarplant (May-November) to effectively control the Bermuda grass. It is expected that this recommendation implemented in 2015 will control the Bermuda grass onsite and better support germination and establishment of the tarplants within the mitigation site.

Supplemental Irrigation

It is important to acknowledge that Southern California has been in one of its biggest droughts ever recorded for the past three years, which has likely contributed to a lower germination rate of tarplant seedlings throughout the mitigation site; markedly during 2014. Biologists working in Southern California have noticed a decline in many plant species as a result of the drought, from annual herbs, perennial woody species, succulents (cacti), as well as native oak trees (Robert Sweet, personal observations). Based on previous monitoring results, it is anticipated that a seed bank of southern tarplant is present in the soil within the subplots and germination may be greater in 2015 if higher frequency and longer duration of rain events occur. In an effort to increase germination within the mitigation site, and if a water source is available, it is recommended that supplemental irrigation be temporarily implemented during the (historically) typical rainy season between the months of November and May. Supplemental irrigation may be applied using a water truck or by a temporary above-ground irrigation system with water supplied through local water supply (i.e., DWP). A supplemental irrigation schedule should be based on soil and weather conditions (i.e., temperature and humidity).

References

Environmental Science Associates (ESA). 2013. Southern Tarplant Restoration Project - Third Annual Monitoring Report.

Environmental Science Associates (ESA), 2014. Southern Tarplant Restoration Project – March 2014 Qualitative Monitoring Report.

LAWA/UltraSystems/Endemic Environmental, April 2011a. Southern Tarplant (*Centromadia parryi* ssp. *australis*) Mitigation Plan.

LAWA/UltraSystems/Endemic Environmental, April 2011b. Southern Tarplant (*Centromadia parryi* ssp. *australis*) Quarterly Report.

LAWA/UltraSystems/Endemic Environmental, April 2011c. Southern Tarplant (*Centromadia parryi* ssp. *australis*) Quarterly Report.

Tetra Tech and UltraSystems Environmental, Inc. 2012. *Southern Tarplant Second Annual Monitoring Report for the Los Angeles International Airport, Bradley West Expansion and Crossfield Taxiway Relocation Projects, Los Angeles County.*

APPENDIX A

Photographic Log

Subplots 1a and 1b



Photo 1. Facing southwest at northeast corner of Subplot 1a. Photo depicts relatively sparse vegetation with a dominance of common plantain in the foreground and patches of Bermuda grass in the distance. Flowering and senesced tarplant can be seen denoted by pin flags.



Photo 2. Facing south at the northern boundary of Subplot 1a and 1b. Photo depicts relatively sparse vegetation with a dominance of common plantain in the foreground and patches of Bermuda grass in the distance. Flowering and senesced tarplants can be seen denoted by pin flags.



Photo 3. Facing northeast at southwest corner of Subplot 1a. Photo depicts generally sparse vegetation dominated by common plantain with dense patches of Bermuda grass present in the central portion of the subplot. Flowering and senesced tarplants can be seen denoted by pin flags.



Photo 4. Facing north at the southern boundary of Subplot 1a. Photo depicts generally sparse vegetation dominated by common plantain with small dense patches of Bermuda grass present throughout the central portion of the subplot. Flowering and senesced tarplants can be seen denoted by pin flags.



Photo 5. Facing north at southern boundary of Subplot 1b. Photo depicts dense patches of Bermuda grass in the foreground.



Photo 6. Facing northwest at southeast corner of Subplot 1b. Photo depicts dense patches of Bermuda grass in the foreground.



Photo 7. Facing southwest at northeast corner of Subplot 1b. Photo depicts a small section of the subplot, tilled by LAWA maintenance crews in early June of 2014, in the foreground. This area supports minimal vegetative growth. Relatively sparse vegetation with dominance of Bermuda grass can be seen in the distance.



Photo 8. Facing south at boundary of Subplot 1a and 1b. Photo depicts a relatively sparse vegetative layer with an escaped cultivar (*Asteraceae*) dominating the northern convergence of the two subplots.

Sub-plot 2



Photo 1. Facing north at southwest corner of Subplot 2. Photo depicts a relatively sparse vegetative layer dominated by Bermuda grass, and a large mulefat shrub in the distance.



Photo 2. Facing northwest at southeast corner of Subplot 2. Photo depicts a relatively sparse vegetative layer with a dominance of Bermuda grass occurring throughout the subplot.



Photo 3. Facing southwest at northeast corner of Subplot 2. Photo depicts a relatively sparse vegetative layer with a dominance of Bermuda grass and a mulefat shrub in the distance.



Photo 4. Facing south at northwest corner of Subplot 2. Photo depicts a relatively sparse vegetative layer with a dominance of Bermuda grass.

Subplot 3



Photo 1. Facing northeast at southwest corner of Subplot 3. Photo depicts a relatively sparse vegetation dominated by common plantain in the foreground with dense thatch layer of Bermuda grass in the distance.



Photo 2. Facing southeast at northwest corner of Subplot 3. Photo depicts a relatively sparse vegetation dominated by common plantain. Dense Bermuda grass can be seen in the distance.



Photo 3. Facing southwest at northeast corner of Subplot 3. Photo depicts a relatively sparse vegetative layer in the foreground, consisting of a mix of non-native grasses and forbs. The density of Bermuda grass increases to the west toward the central portion of the subplot.



Photo 4. Facing northwest at southeast corner of Subplot 3. Photo depicts a relatively sparse vegetative layer, consisting of a mix of non-native grasses and forbs. The density of Bermuda grass increases to the west toward the central portion of the subplot.

Subplot 4a



Photo 1. Facing northeast at southwest corner of Subplot 4a. Photo depicts a relatively sparse vegetative layer with a dominance of common plantain.



Photo 2. Facing southeast at northwest corner of Subplot 4a. Photo depicts a relatively sparse vegetative layer with a dominance of common plantain.



Photo 3. Facing southwest at northeast corner of Subplot 4a. Photo depicts a relatively sparse vegetative layer with a dominance of common plantain.



Photo 4. Facing northwest at southeast corner of Subplot 4a. Photo depicts a relatively sparse vegetative layer with a dominance of common plantain.

Subplot 4b



Photo 1. Facing northeast at southwest corner of Subplot 4b. Photo depicts a relatively sparse vegetative layer with a dominance of common plantain.



Photo 2. Facing southeast at northwest corner of Subplot 4b. Photo depicts a relatively sparse vegetative layer with a dominance of common plantain, while non-native acacia sprouts can be seen here as well.



Photo 3. Facing southwest at northeast corner of Subplot 4b. Photo depicts a relatively sparse vegetative dominated by common plantain with a red willow shrub present as well.



Photo 4. Facing northwest at southeast corner of Subplot 4b. Photo depicts a relatively sparse vegetative layer dominated by non-native grasses and forbs.

APPENDIX B

Field Data Sheets

2014 LAWA Southern Tarplant Quantitative Monitoring

Site Location: LAX

Observers: RCS

Date: 09/17/14

Cloud Cover (%): clear

Time: 1130-1210

Temperature (F): 87°F

Plot #: 1A

General Site Conditions:

Majority of cover is senesced. outer portions of plot known to be dominated by common plantain. Central portion of plot tends to be dominated by Bermuda grass. rope needs to be replaced. Species overall / dominance is common plantain. Bermuda grass seems to have been reduced. Same species as before, add *Stephanomeria*

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		<input checked="" type="checkbox"/>	
Irrigation Required	<input checked="" type="checkbox"/>		
Vandalism		<input checked="" type="checkbox"/>	
Photos Taken	<input checked="" type="checkbox"/>		
Herbivore Damage		<input checked="" type="checkbox"/>	
Weed Species Present	<input checked="" type="checkbox"/>		
Southern Tarplant Present	<input checked="" type="checkbox"/>		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		<input checked="" type="checkbox"/>
Seeding	<input checked="" type="checkbox"/>	
Senescence	<input checked="" type="checkbox"/>	
Flowering	<input checked="" type="checkbox"/>	
Healthy	<input checked="" type="checkbox"/>	
Disease		<input checked="" type="checkbox"/>
Wilting		<input checked="" type="checkbox"/>
Yellowing		<input checked="" type="checkbox"/>

Southern Tarplant Metrics:

	Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
A	 20		
D	 + 46 68		
	48 total		

Observations/Recommendations:

*Continue weeding by hand year round and
applying chemical for mechanical prior to forplant
flowering period.*

LAWA Escort:

Peggy Nguyen

Name of botanist onsite:

Robert Sweet

Signature of botanist onsite:

Robert Sweet

For questions please contact:

Robert Sweet

Wildlife Biologist

ESA, Biological Resources

Office: 818-703-8600

Cell: 805-279-2569

Email: rsweet@esassoc.com

2014 LAWA Southern Tarplant Quantitative Monitoring

Site Location: LAWA

Observers: RCS

Date: 09/17/14

Cloud Cover (%): Clear

Time: 1240

Temperature (F): 79°F

Plot #: 1B

General Site Conditions:

Same as 1a, however a higher density at Bermuda.
Dom. is Bermuda. replace rope.
Species: slender leaved.
Dom. along w. trail tends to be Aster cultivar.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		✓	
Irrigation Required	✓		
Vandalism		✓	
Photos Taken	✓		
Herbivore Damage		✓	
Weed Species Present	✓		
Southern Tarplant Present	✓		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		✓
Seeding	✓	
Senescence	✓	
Flowering	✓	
Healthy	✓	
Disease		✓
Wilting		✓
Yellowing		✓

Southern Tarplant Metrics:

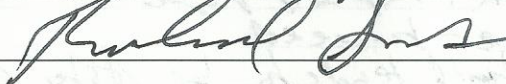
	Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
A	11		
D	111		

Observations/Recommendations:

Cont. same as la. take time to
remove aster cultivar from N. bank of Subplot.

LAWA Escort: Peggy Nguyen

Name of botanist onsite: Robert Sweet

Signature of botanist onsite: 

For questions please contact:

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2014 LAWA Southern Tarplant Quantitative Monitoring

Site Location: LAW

Observers: RCS

Date: 09/17/14

Cloud Cover (%): Clear

Time: 1257

Temperature (F): 78°F

Plot #: 2

General Site Conditions:

Relatively sparse vegetation. Co-dominance of senesced Bermuda grass & Con. Plantain. Acacia beginning to establish withing red willow. 2 mature mullet and one sprout present. Avena and red brome present as well. Rope in decent condition

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		✓	
Irrigation Required	✓		
Vandalism		✓	
Photos Taken	✓		
Herbivore Damage		✓	
Weed Species Present	✓		
Southern Tarplant Present	✓		

Overall S. Tarplant Condition:

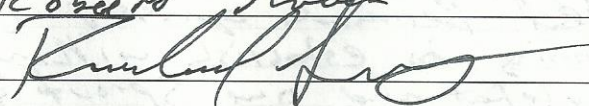
Description	Yes	No
Germinating		✓
Seeding		✓
Senescence	✓	
Flowering		✓
Healthy		✓
Disease		✓
Wilting		✓
Yellowing		✓

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
1		

Observations/Recommendations:

Continue handpulling and possibly
mechanical or ~~grass~~ selective herbicide to
control Bermuda & plantain.

LAWA Escort: Peggy Nguyen
Name of botanist onsite: Robert Sweet
Signature of botanist onsite: 

For questions please contact:

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2014 LAWA Southern Tarplant Quantitative Monitoring

Site Location: LAX

Observers: RCS

Date: 09/17/14

Cloud Cover (%): Clear

Time: 1309

Temperature (F): 77°F

Plot #: 3

General Site Conditions:

Dense Patch of Bermuda throughout majority,
w/ com. plantain dom in west portion. Tarplant,
obs. only in areas w/ little vegetation.
species; yellow star thistle.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		✓	
Irrigation Required	✓		
Vandalism		✓	
Photos Taken	✓		
Herbivore Damage		✓	
Weed Species Present	✓		
Southern Tarplant Present	✓		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		✓
Seeding	✓	
Senescence	✓	
Flowering	✓	
Healthy		✓
Disease		✓
Wilting		✓
Yellowing		✓

Southern Tarplant Metrics:

	Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
A	111		
D	111 111		

Observations/Recommendations:

Weed Bermuda as it is choking out ability for
per plant to take hold.

LAWA Escort:

Peggy Nguyen

Name of botanist onsite:

Robert Sweet

Signature of botanist onsite:

Robert Sweet

For questions please contact:

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2014 LAWA Southern Tarplant Quantitative Monitoring

Site Location: LAX Observers: RCS
 Date: 9/17/14 Cloud Cover (%): Clear
 Time: 13:20 Temperature (F): 81°F
 Plot #: 4a

General Site Conditions:

Rope in good condition. Relatively sparse
vegetation. Com. plantain is dominant.
Species: Salsoia frangula.
2 tarplants senesced in SE corner of plot.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present			
Irrigation Required			
Vandalism			
Photos Taken			
Herbivore Damage			
Weed Species Present			
Southern Tarplant Present			

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		<input checked="" type="checkbox"/>
Seeding		<input checked="" type="checkbox"/>
Senescence	<input checked="" type="checkbox"/>	
Flowering		<input checked="" type="checkbox"/>
Healthy		<input checked="" type="checkbox"/>
Disease		<input checked="" type="checkbox"/>
Wilting		<input checked="" type="checkbox"/>
Yellowing		<input checked="" type="checkbox"/>

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
<u>11</u>		

Observations/Recommendations:

Weed common plantain to make room for
Southern Hemp plant.

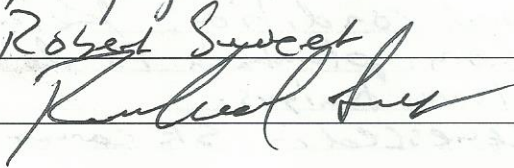
LAWA Escort:

Peggy Nguyen

Name of botanist onsite:

Robert Sweet

Signature of botanist onsite:



For questions please contact:

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2014 LAWA Southern Tarplant Quantitative Monitoring

Site Location: LAX

Observers: RCS

Date: 09/17/14

Cloud Cover (%): clear

Time: 1330

Temperature (F): 81°F

Plot #: 46

General Site Conditions:

Same as 4a, however arrays willow is present in east side. Dom. of Com. plantain. Rope in good condition. The R. tarplants are occurring sporadically throughout the western portion of the subplot, west of willow.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		✓	
Irrigation Required	✓		
Vandalism		✓	
Photos Taken	✓		
Herbivore Damage		✓	
Weed Species Present	✓		
Southern Tarplant Present	✓		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		✓
Seeding		✓
Senescence	✓	
Flowering		✓
Healthy		✓
Disease		✓
Wilting		✓
Yellowing		✓

Southern Tarplant Metrics:

D

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
13		

Observations/Recommendations:

Continue weeding.

LAWA Escort:

Peggy Nguyen

Name of botanist onsite:

Robert Sweet

Signature of botanist onsite:

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