LAX MASTER PLAN

MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

2013 ANNUAL PROGRESS REPORT

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Los Angeles World Airports

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Prepared by

Los Angeles World Airports

LAX Master Plan MMRP 2013 Annual Progress Report

Acknowledgements

LAWA Division/Group	Individual
Airports Development Group	Intissar Durham
Business & Job Resources Division	Michael Corrin Jamie Gutierrez Sontue Beacham
Capital Programming & Planning Group	Diego Alvarez Evelyn Quintanilla Patrick Tomcheck Robert Burlingham Brenda Martinez-Sidhom
Commercial Development Group	Vivian Howell
Community Relations Division	Ken Phan
Environmental Services Division	Robert Freeman Scott Tatro Jaideep Vaswani Jignasha Pandya Kathryn Pantoja Georgianna Streeter Norene Hastings Amylou Canonizado Peggy Nguyen Catalina Saldivar-Chavez Mary Reuschel Nancy Price
Facilities Engineering & Technical Services Division	Glenn Ito
Maintenance Services Division	Edward Melara Russell Lewis
Rideshare Division	Devon Demming

Consultant	
CDM Smith	Anthony Skidmore Robin Ijams

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Appendices:

A. LAX Master Plan MMRP as adopted December 2004 – Reference LAWA Website http://www.lawa.org/ourLAX/AnnualReports.aspx?id=8067 for a copy of the document

B. MMRP (SAIP, CFTP, and BWP-specific measures)

C. Final El Segundo Butterfly 2013 LAX Report dated January 2014

D. Three Sisters Reserve LAWA Restoration Project Annual Status Report dated March 28, 2013

E. Southern Tarplant Third Annual Monitoring Report for the Los Angeles International Airport Bradley West and Crossfield Taxiway American Airlines Employee Parking Lot Relocation Projects dated November 2013

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). The LAX Master Plan allows for the first major new facilities for, and improvements to, the airport since 1984, and plans how projected growth in passengers and cargo at LAX can be accommodated, in part, through the year 2015. The approved LAX Master Plan includes airfield modifications, development of new terminals, and new landside facilities to accommodate passenger and employee traffic, parking, and circulation. The LAX Master Plan serves as a broad policy statement regarding the conceptual strategic planning framework for future improvements at LAX and working guidelines to be consulted by Los Angeles World Airports (LAWA) as it formulates and processes site-specific projects under the LAX Master Plan program.

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 ninth 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 FEIR. The basic framework of, and requirements for, the MMRP were established in conjunction with approval of the LAX Master Plan and are anticipated to remain in effect throughout implementation of the Master Plan. If additional new mitigation measures are required in conjunction with subsequent environmental (i.e., CEQA) review of individual projects proposed under the Master Plan, such as the Bradley West Project (BWP), the MMRP will be updated in a similar manner to include such additional project-specific measures.

Additional project-specific mitigation measures were identified for the South Airfield Improvement Project (SAIP), Crossfield Taxiway Project (CFTP), and the Bradley West Project (BWP) Final Environmental Impact Reports (FEIRs), the second and third project-level tiered environmental review documents for the LAX Master Plan Program, respectively. Los Angeles City Council approved the SAIP and certified the FEIR on January 11, 2006, the CFTP and certified the FEIR on February 9, 2009, and the BWP and FEIR on October 14, 2009. The Los Angeles City Council adopted MMRPs for the SAIP, CFTP, and BWP 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 and the BWP 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. Please see Section 24.0 of this report for project-specific status updates.

Appendix B provides a comprehensive delineation of 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 ripe for such review. FAA continues to consider the project approved in the FAA's 2005 ROD and depicted in the LAX 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, 2013 through December 31, 2013.

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 this 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 includes 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→ In Progress:
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. LAWA plans to resubmit the full application to the FAA in 2014.

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."*

Status→ Ongoing:
LAWA requires submission of a Construction Noise Control Plan (CNCP) as a condition in all capital construction contracts at LAX. This is part of the standard LAWA specifications.

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."*

Status→ Ongoing:
LAWA requires this condition on all capital construction contracts at LAX.

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."*

Status→ Ongoing:
LAWA requires this condition on all capital construction contracts at LAX.

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)."*

Status→ Ongoing:
LAWA requires this condition on all capital construction contracts at LAX.

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 CNEL for the Courtyard by Marriott and the Four Points Sheraton)."*

Status→ No action required at this time:
This measure was not applicable during this reporting period because LAWA had not entered into the engineering or design phases of the APM Project.

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. Section 11 of the LAX Specific Plan incorporates all conditions of development, including the [Q] Conditions, described in Ordinance 159,526 into the Specific Plan.

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. On June 26, 2013 LAWA acquired 14.42 acres of surface parking lot north of the Skyview Center Complex (6033 and 6053 West Century Boulevard). The land use during this reporting period remained unchanged and required no additional maintenance, landscaping, or fencing.

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 avigation 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 avigation 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. The last full update was the 2005 ANMP which was submitted in October of 2006. 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).

- 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 program is voluntary.

- LAWA makes available land use mitigation funds as soon as the jurisdiction has met all program requirements and upon approval of 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) has allocated $450,000 to perform a study entitled, "Evaluating the Impact of Aviation Noise on Learning." This study is currently nearing completion, and should be released in 2014. A panel created by the TRB, including one LAWA staff member, has defined the scope and objectives of the study, selected the contractor to perform the work, evaluated the work, and has reviewed and commented on the draft and final report.

The objectives of the ACRP study, as currently defined, will be 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 is being finalized by ACRP and TRB staff.

A follow-on research project has been funded by ACRP in the amount of $600,000, and is currently in the RFP contractor selection process. This new study 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. During 2014, the panel will select the contractor to perform the study, and review and comment on the work as it proceeds.

Upon completion of either 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 avigation 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 avigation 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.

During 2012, the District contracted work related to those schools listed in their Year One Work Plan, including Felton Elementary School, Lennox Middle School, Jefferson Elementary School and new construction north of Jefferson Elementary School. Progress has been made on all of these projects, including the approval of designs by the Division of State Architects and acquisition and construction of temporary classrooms for the construction phase. Animo Leadership High School, the District's charter school under the management of Green Dot, was also in the Year One Work Plan and was completed in in September 2012.

The District continues to work on sound attenuation of instructional spaces identified in the Year One Work Plan, and will add on other projects in the Second Work Plan. Through June 30, 2013, the District had expended eligible costs of $2,353,596 on sound attenuation projects. It was anticipated that an additional $8 Million would be expended in Fiscal Year (FY) 2013-14. Felton Elementary School has acquired temporary classrooms to be used during construction, which is slated to begin in 2014. Lennox Middle School's planning and design portion of the project was completed and construction is scheduled to begin in 2014 as well. Jefferson Elementary School's sound attenuation plans were submitted to the Division of State Architect (DSA). Construction has begun at the site north of Jefferson Elementary.

No additional funding was provided to the District in 2013. The second installment of funds will be provided in early 2014. It was anticipated that LAWA would provide authorization for the next $10 million dollars to be spent for the Second Work Plan.

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 in the IUSD. The PFC application was submitted to the FAA on August 19, 2013 for $64 million dollars which would attenuate eight schools including:

Inglewood High School	Child Dev. Ctr at Woodworth Elementary
Morningside High School	Hudnall Elementary School
Monroe Middle School	Payne Elementary School
Woodworth Elementary School	Oak Street Elementary School

The FAA had 120 days to respond to the application unless additional information was requested. The FAA requested additional information which LAWA provided. The FAA's final response was expected in 2014.

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, ONT, and VNY airports that included the upgraded and expanded 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 ANOMS system, 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:
Deliveries that require lane closures in the Central Terminal Area (CTA) were reviewed by LAWA staff. 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→ No action required at this time:
The Specific Plan Amendment Study (SPAS) reevaluated the original designs for the surface transportation system and curbfront for the GTC and ITC, commercial vehicle staging areas and APM systems at LAX. In April 2013, the Los Angeles City Council authorized LAWA to move forward with studying a revised transportation system for LAX, which consists of an Automated People Mover (APM) system, Intermodal Transportation Facility (ITF) and Consolidated Rent-A-Car Center (CONRAC). LAWA is developing project detail and project level environmental analysis to accommodate all forecasted vehicular activity at LAX.

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 2013, and the GTC, ITC, and the APM were not under design in 2013.

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 staff reviews and approves worksite traffic control plans for construction projects within the CTA. These worksite traffic control plans include routing of construction vehicles.

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 staff reviews and approves 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) curbfront."*

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 2013.

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."*

Status→ Ongoing:
LAWA staff reviews and approves worksite traffic control plans for LAWA construction projects. These worksite traffic control plans include restrictions on construction deliveries requiring lane closures.

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."*

Status→ Ongoing:
All 2013 delivery schedules for the Bradley West Project were reviewed by LAWA staff to avoid peak traffic periods, whenever possible. In 2013, individually-reviewed waivers were occasionally granted for peak-hour deliveries on a case-by-case basis.

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."*

Status→ Ongoing:
All 2013 employee work schedules previously approved as part of the Construction Traffic Management Plan for the Bradley West Project were monitored for compliance, and there were no employee shift hours that coincided with the heaviest commuter traffic periods.

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."*

Status→ Ongoing:
Each haul route used in 2013 was approved by LAWA and the Los Angeles Department of Building and Safety (LADBS) to ensure that they were located away from sensitive noise receptors.

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."*

Status→ Ongoing:
Responsibility for maintenance of off-airport roadways falls under jurisdiction of the City of Los Angeles Bureau of Street Services. In 2013, there were no instances that required any off-airport street repairs along haul routes. LAWA did follow up with a project contractor to do street sweeping on an off-airport roadway.

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."*

Status→ Ongoing:
The LAWA-approved Construction Traffic Management Plan for the Bradley West project continued to be used in 2013; requests for modifications to the Plan were reviewed and approved by LAWA staff prior to implementation.

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→ Ongoing:
In 2013, existing roadways remained open unless a temporary detour route was available to serve the same function.

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→ Ongoing:
Multiple stockpile locations near work locations were utilized and approved by LAWA as needed.

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 this reporting period because eastern 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…."*

Status→ Ongoing:
Each designated route on City streets was approved by LADOT's Bureau of Traffic Management and LADBS.

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 2013, 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 2013.

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 2013.

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 2013.

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 2013.

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 2013 as the Intermodel Transportation Center (ITC) and the Ground Transportation Center (GTC) were not under design.

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 2013.

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 2013, LAWA's Coordination and Logistic Management (CALM) team worked in cooperation with LAWA staff including Terminal Operations, Airport Police, Capital Programming and Planning Group, and Commercial Development Group, to monitor construction traffic, coordinate lane and roadway closures and analyze the need for additional traffic controls. The CALM team ensured, to the extent feasible, that cumulative impacts related to the construction of the Central Utility Plant, New Face of the CTA, elevator/escalator upgrades and other LAX improvement projects were minimized. In addition, LAWA staff coordinated with Metro and its contractors regarding the plans for the Crenshaw/LAX Transit Project to minimize potential impacts of the project on area traffic.

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 2013.

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 2013 for the alternative off-site improvements.

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 2013.

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 at this reporting period, as no LAX Master Plan improvements requiring acquisition and relocation in the Alternative D Proposed Property Acquisition Areas occurred in 2013

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 2013, 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

LAWA has worked with local and contracting communities to develop programs that address the current and projected demands for qualified employees and contractors. Some of these programs are:

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 2013, LAWA continued to coordinate with the local school districts in developing aviation-related curriculum. In July, LAWA offered a one-week Aviation Careers 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 2013 for more than 250 kindergarten students. 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 22 local students participated in the program during the summer of 2013.

The Gateways Internship Program was launched by LAWA as a collaborative initiative of the Inglewood Unified School District, South Bay Private Industry Council, and the 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 the Los Angeles Unified School District, Centinela Valley High School District, and the 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 2013, 53 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. LAWA is working on a new Request-for-Proposal and the program is pending a new contract.

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 2013, LAWA coordinated with the Westchester Aviation and Science Magnet High School from the Los Angeles Unified School District to host Job Shadow Day for approximately 50 students. In 2013, LAWA also coordinated with the Judge Albert Monroe Middle School Honor Society from the Inglewood Unified School District to host Job Shadow Day for 23 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 offered one student per simulator, offering a more structured and personal class. In 2013, 66 students in the local communities participated in the flight simulation program. 22 were students from the Loyola Marymount University Reserve Officers’ Training Corps (ROTC).

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

LAX Airfield Construction Tours is an opportunity for students to learn about the various improvements being made at LAX while also learning about careers and jobs in aviation. In 2013, LAX Community Relations hosted the Zeta Rho Foundation, an organization that serves the Los Angeles inner-city and airport area minority students, to a tour to learn about the architecture of the Bradley West Project. Students were mentored by professional architects about careers, construction techniques and physical attributes of the LAX Bradley West Project. Approximately 36 students and 18 trainers attended the architectural educational training at LAX.

Passport to Success – Making Summer Learning Fun, 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 program by hosting the Flight Path Learning Museum at LAX to the FIS organization to promote aviation related career to students from preschool through 5th grade. During the summer of 2013, LAWA hosted 105 students from LAUSD and surrounding schools.

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 worked 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, CSUN, Cal State University Dominquez 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 works with 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 1100 students in a wide range of internship positions including: Accounting, Administrative, Airfield Operations, Airports Development, City Attorney Office, Commercial Development Group, IMTG, Engineering and Facilities Management, Environmental Management, Landside, Noise Management, Community Relations, Public Relations, and FAA-related.

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

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

In 2013, the BJRC placed 53 students through its three programs within various internships in LAWA Divisions. This is an increase over the 2012 placements. The 2013 level of placements was accomplished primarily through assistance from funding partners including community and faith based organizations and colleges.

The BJRC conducted extensive outreach to students by attending Career Day events 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 29 community job fairs. Additionally, the BJRC continued its relationship with Cerritos College to place Information Technology students with LAWA. The BJRC also continued to work with the City of Los Angeles Public Works High School Internship Program and the Brotherhood Crusade by placing their students into LAWA Divisions through LAWA's Gateways Internship Program.

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

For more information on The Gateways Internship Program, please visit the program website at http://www.lawa.org/bjrc/Education.aspx?id=2950.

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 Business and Job Resources Division (BJRD), 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). 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:	2013:	75	Program-to-Date:	769
Completed Training:	2013:	48	Program-to-Date:	444

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 Project Impact Area (PIA) and are comprised of South Los Angeles, El Segundo, Hawthorne, Inglewood and Lennox.

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 18,000 people have registered and posted their resumes on LAWA's ATS.

The Business and Jobs Resources Center (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.

The BJRC also participates in the Mayor's monthly roundtable with the Port of Los Angeles and the Los Angeles Department of Water and Power to discuss and work through workforce development initiatives and on the Mayor's South Los Angeles Initiative. The purpose of this initiative is to ensure job opportunities for those residents that experience disproportionate levels of poverty and unemployment compared to the general population, many of whom live in the designated Project Impact Area.

As new concessions contracts are being awarded, BJRC will be working with the prime contractors to coordinate Targeted Recruitment Events and bring prescreened

candidates for interview consideration. The opening of the Tom Bradley International Terminal (TBIT) in September 2013 and the Post-Screen Retail and Food Service Pavilion managed by Westfield brought significant new employment opportunities to LAWA.

During 2013, BJRC hosted targeted recruitment events for the following companies at BJRC Offices:

- *HMS Host Targeted Recruitment Job Fair – April 6*
- *Duty Free Shops (DFS) Targeted Recruitment Job Fair – May 6*
- *Sodexo Job Restaurant Employee Fair (Hilton Garden Inn - El Segundo) – May 3 & 24*
- *HMS Host Targeted Recruitment Job Fair – July 20*
- *HMS Host Targeted Recruitment Job Fair – July 27*
- *Duty Free Shops (DFS) Career Fair Event (Hilton - San Gabriel) – July 30*
- *Duty Free Shops (DFS) Beauty Career Fair – August 16*

Human Resources Managers from these companies utilized office space at BJRC to conduct interviews away from their confined space in the terminals. These events yielded many new hires for their respective companies.

As of 12/31/2013 - Actual

FSHP Referrals:	2013: 2,549	Cumulative: 11,622
FSHP Hires:	2013: 141	Cumulative: 1,137
FSHP Hires Living in PIA:	2013: 50	

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 2013 the SLO notified stakeholders of the following master plan projects:

- West Aircraft Maintenance Area
  - Notice of Availability of a Draft EIR and Public Workshop

- Midfield Satellite Concourse
  - Release of Notice of Preparation and Initial Study
  - Notice of Public Scoping Meetings
  - Notice of Availability of a Draft EIR and Public Workshop

8.0 Air Quality

8.0.A AQ-1 Air Quality Source Apportionment Study

The LAX Master Plan MMRP states in part:

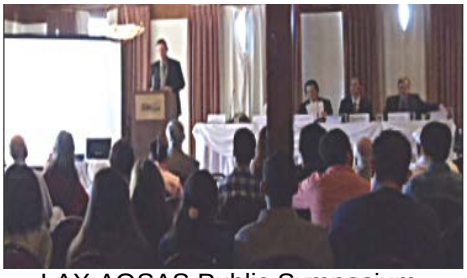
*"**Air Quality Source Apportionment Study.** LAWA will conduct an air quality source apportionment study to evaluate the contribution of on-airport aircraft emissions to off-airport air pollutant concentrations."*

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.

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 anticipated to be posted on the project website in 2014.

In 2013, 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 Management Award in the Outreach, Education and Community Involvement 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 2013 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 2013 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→ Completed:
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→ Completed:
LAWA completed a Construction-Related Mitigation Plan that set forth specific implementation requirements for the measures referenced in the FEIR. 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 were integrated into the CFTP construction specifications as appropriate. The execution of this implementation plan (i.e., the MM-AQ-2 Plan) will occur in conjunction with construction of each Master Plan project.

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:
LAWA operated four FlyAway routes between LAX and remote boarding locations at Van Nuys, Union Station, Westwood/UCLA and Expo/La Brea Metro Station in 2013. The Expo Station began operation in July 2013. In 2013, the entire network realized an average daily ridership of 4,049 passengers, reduced vehicle emissions by 36,800 pounds each day, and removed 3,164 vehicles trips per day, travelling a combined total of 63,580 miles per day on roads approaching LAX.

Table 1 (below) summarizes the FlyAway network mitigation data for years 2008 through 2013. Note that the ridership on the Westwood FlyAway was down in 2009, from 2008, but more emissions were mitigated due to increased efficiency (service reductions resulted in fewer bus trips for about the same number of passengers). LAWA continues to fine tune and economize FlyAway operations to find a balance that produces the most efficient and productive cost-benefit, taking into consideration emissions reductions, operating cost, customer convenience, safety and reliability.

The methodology and/or data used to calculate emissions and passenger characteristics is based on the most up-to-date models for calendar year 2013 to estimate vehicle emissions for FlyAway bus riders that would have otherwise used an alternate transportation mode. (Prior annual MMRP updates have been calculated using the most current EMFAC model, which was most recently released in 2013.) The emissions calculations also account for changes in the FlyAway operators and the introduction of newer equipment. Additionally, whereas prior MMRP updates relied upon a survey of all passengers at LAX to estimate air passenger transportation mode preferences, the 2013 update bases mode preferences on a more focused survey of FlyAway bus riders.

Promotion of the FlyAway routes in 2013 included: 1) A six-month advertising campaign for the Expo/La Station opening with paid advertising on Expo trains and rail stations, 2) Transit mapping for the FlyAway on Google maps, 3) Continued distribution of FlyAway brochures to Metro, Metrolink, Amtrak, UCLA and other interested parties, 4) LAWA promotion at various travel, aviation and community events, and, 5) complete information about the FlyAway on www.lawa.org, which is directly accessible from www.LAXFlyAway.org.

For 2014, new FlyAway locations are planned for Santa Monica at Main Street/Pico; in Hollywood, on Vine; at the planned Torrance Transit Park & Ride Regional Terminal

(465 Crenshaw Blvd); and at Victory/Woodley Blvd, connecting Orange Line passengers from Chatsworth to North Hollywood to FlyAway service in Van Nuys.

TABLE 1: LAX FlyAway Network Emissions Reduction Summary: CY 2008 thru 2013
(Emissions reported include NOX, CO, ROG, PM10 and CO2)

	2008	2009	2010	2011	2012	2013
Van Nuys (since 1975; rebuilt 12/05)						
Ridership	987,705	880,024	807,485	835,346	887,260	890,740
Vehicle Trips Saved	839,491	747,969	686,315	709,995	754,119	741,013
Reduction in Miles Traveled	17.6 million miles	15.7 million miles	14.4 million miles	14.9 million miles	15.8 million miles	15.6 million miles
Emissions reduced	7,400.6 tons	6,455.5 tons	5,595.2 tons	6,033.5 tons	6,296.8 tons	4,808.3 tons
Auto operating cost savings	$11.0 million	$9.8 million	$6.8 million	$8.4 million	$9.4 million	$9.5 million
Union Station (opened 03/06)						
Ridership	433,216	409,491	413,975	434,096	455,919	508,019
Vehicle Trips Saved	368,208	348,043	351,854	368,956	387,504	352,277
Reduction in Miles Traveled	7.3 million miles	6.9 million miles	6.9 million miles	7.3 million miles	7.7 million miles	6.9 million miles
Emissions reduced	2,549.8 tons	2,322.2 tons	2,328.9 tons	2,496.3 tons	2,674.3 tons	1,751.8 tons
Auto operating cost savings	$4.5 million	$4.3 million	$3.3 million	$4.1 million	$4.6 million	$4.2 million
Westwood (opened 06/07)						
Ridership	125,288	115,048	107,136	97,337	84,179	78,030
Vehicle Trips Saved	106,487	97,784	91,059	82,731	71,547	60,460
Reduction in Miles Traveled	1.3 million miles	1.2 million miles	1.1 million miles	1.0 million miles	0.9 million miles	0.7 million miles
Emissions reduced	67.7 tons	211.9 tons	204 tons	187.4 tons	158.2 tons	174.6 tons
Auto operating cost savings	$796,000	$731,000	$618,000	$562,000	$511,000	$441,000
Expo/La Brea Station (opened 7/13)						
Ridership	--	--	--	--	--	1,210
Vehicle Trips Saved	--	--	--	--	--	932
Reduction in Miles Traveled	--	--	--	--	--	7,000 miles
Emissions reduced	--	--	--	--	--	- 19.4 tons
Auto operating cost savings	--	--	--	--	--	$4,534
Irvine (opened 11/16/09 – closed 08/31/2012)			*Irvine partial year, below*			*Irvine partial year, below*
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	**1,546,209**	**1,406,063**	**1,342,200**	**1,383,283**	**1,439,255**	**1,477,999**
Vehicle Trips Saved	**1,314,186**	**1,195,295**	**1,140,791**	**1,175,709**	**1,223,282**	**1,154,682**
Reduction in Miles Traveled	**26.2 M. miles**	**23.8 M. miles**	**23.0 M. miles**	**23.9 M. miles**	**24.9 M. miles**	**121.8 million miles**
Emissions reduced	**10,018 tons**	**8,990 tons**	**7,966 tons**	**8,697 tons**	**9,134.8 tons**	**6,715.3 tons**
Auto operating cost savings	**$16.3 million**	**$14.9 million**	**$13.0 million**	**$13.5 million**	**$14.8 million**	**$14.1 million**

Locations open for first partial year are annualized for reporting purposes in this table (Known ridership and service is assumed as a constant for full year's data) * Irvine data for 2008 and 2012 are each partial year service; Irvine opened 11/16/2009 and closed on 8/31/2012.

LAWA's FlyAway Bus at LAX

The LAX Master Plan MMRP states in part:

*"**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 2013, over 59 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.

Current LAX GSE inventory includes emission-saving electric forklift

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

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 reporting period as there were no projects in 2013 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 reporting period as no historic buildings were proposed for demolition or partial demolition in 2013.

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 reporting period as no significant historic resources were proposed for demolition or partial demolition in 2013.

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 in June 2005. Master Plan projects comply with this plan and thus comply with this mitigation measure.

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:
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→ Ongoing:
This is an ongoing requirement.

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→ Ongoing:
This is an ongoing requirement in all LAWA capital project specifications.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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 was prepared and revised in December 2005.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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."*

Status→ Ongoing:
This is an ongoing requirement on all LAWA construction contracts requiring excavation deeper than 6 feet.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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→ Ongoing:
This is an ongoing requirement at LAWA.

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→ Ongoing:
This is an ongoing requirement at LAWA.

12.0 Biotic Communities

12.0.A 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 (ESB) Butterfly Habitat Restoration Area.

LAWA's ESB conservation program has three components:

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

Because human activity negatively impacts the ESB and its food plant buckwheat, the area is protected and activities are controlled to meet the restoration goals. A major threat to both the ESB and buckwheat are the invasive plant species that dominate the habitat. LAWA's Maintenance Services Division has a dedicated two-man crew that worked exclusively at the LAX dunes to perform regular trash and debris removal,

weeding, and other vegetation management activities. Numerous truckloads of trash (which continually blow onto the dunes from the adjacent Dockweiler State Beach), debris, and weeds are removed from the dunes regularly. In 2013, LAWA commenced the Coastal Dunes Improvement Project in the northern dunes area, that involved the restoration of 48 acres of coastal dunes habitat. LAWA also applied for numerous grant opportunities in an effort to obtain funding for an educational volunteer program in the dunes involving local schools and a partnership with a local botanic garden to outplant rare plants, for restoration efforts that would increase and improve coastal dunes and ESB habitat, and to update the specific plan for the dunes area and certify it as a local coastal plan for coastal dunes.

Detailed estimates of ESB population are performed annually through monitoring. The seasonal estimates indicate that ESB population further decreased in 2013 compared to the seasonal population estimates for 2012 most likely due to drought conditions, and due to the encroachment of invasive weeds. Further details can be found in Appendix C. The report shows that coastal buckwheat plants are being lost at a rate of 14 plants per year along the Historical Transect used to make population estimates, while populations are staying steady overall in the blocks used to make the block-based population estimates. LAWA began working on a grant proposal together with the US Fish and Wildlife Service in 2013, to implement restoration projects that would reverse this trend. LAWA also began to work on a renewed recovery permit with the USFWS that would allow LAWA to conduct more aggressive restoration activities in the dunes.

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

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

Source: Arnold, 2014.

In 2013, as part of the public awareness efforts, LAWA conducted four ESB preserve tours for LAWA employees, one tour for the California Coastal Commission, and one tour for environmental/natural resource management stakeholders and academicians. LAWA also created an updated dunes preserve activities sheet, created a webpage for the dunes, engaged the public at community events educating them about the ESB and the habitat restoration efforts, and hosted volunteer events in the dunes preserve in 2013.

Regarding the ESB conservation measures related to the Bradley West Project, prior to initiation of construction for the Bradley West Project, tarps were added to existing fencing on the western side of Pershing Drive to reduce the transport of fugitive dust particles related to construction activities. During construction, soil stabilization, watering and/or other dust control measures are being implemented to reduce fugitive dust emissions.

12.0.B 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 this reporting period. There are no current LAX Master Plan projects that would affect Lewis' evening primrose.

12.0.C 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 this reporting period as there were no current LAX projects that would result in the removal of mature trees.

Regarding the applicability of this measure to the Bradley West Project, please see MM-BC (BWP)-7 in the Project-Specific section of this report.

12.0.D 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 24.0, Project-Specific Mitigations. 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.

In 2011, Environmental Services Division (ESD) initiated an analysis of LAX Master Plan Alternative D impacts to biotic communities to-date. ESD, with the assistance of the LAWA Geographic Information System (GIS) unit, commenced a mapping project in 2012 to estimate the total area of biotic communities identified in the Master Plan that were impacted by all Master Plan projects to date, as there was some overlap in construction staging areas for the three projects (SAIP, CFTP, and BWP).

The estimated impact areas from the mapping project were used to calculate additional mitigation requirements beyond the 17.17 habitat units (rounded to 17.2 in the project-specific measure) identified in the SAIP EIR. The calculations show that a total of 21.43 habitat units require mitigation associated with SAIP, CFTP, and BWP. As noted above, 16.80 habitat units were restored in an offsite location. Replacement of the remaining 4.63 habitat units from 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. Native prairie grassland, dune scrub and coastal foredune habitat plant seeds were planted in areas where roads were removed (4 to 6 acres). The site will be restored in phases over a 3-year period. Restoration monitoring will take place for 5 years after project implementation to determine project success measured in relative percent cover of native and non-native vegetation. It is calculated that this project will achieve restoration of more than 4.63 habitat units, thereby completing the mitigation requirement for SAIP, CFTP and BWP.

Overall, it is calculated that this project will achieve a total restoration of 33.14 habitat units. When combined with the 16.8 habitat units previously restored, it is estimated that a total of 49.94 habitat units will have been restored, exceeding the LAX Master Plan requirement of 45.43 habitat units.

12.0.E 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 though 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:
As part of the Bradley West Project, LAWA conducted focused surveys for the Western Spadefoot Toad (Spea [=*Scaphiopus] hammondii,* a California Species of Special Concern, in March and April 2009. No Western Spadefoot were observed during the surveys. The removal of soil in the pool areas at LAX, as a condition of the Biological Opinion for the LAX Master Plan, resulted in modified site hydrology that no longer provides suitable breeding habitat for this species. For this reason, LAWA is not required to implement a relocation and monitoring plan for the Western Spadefoot.

San Diego black-tailed jackrabbit has not been seen on the AOA since surveys conducted in 2005 by LAWA's USDA Wildlife Hazard Biologist. This species was not detected during construction monitoring activities for the Bradley West project nor during 2011 general wildlife surveys at LAX. Subsequent to preparation of the LAX Master Plan MMRP, LAWA installed a perimeter security fence, around the LAX airfield operations area (AOA). The fence consists of a solid wall several feet in height topped by fencing, which has excluded any movement of San Diego black-tailed jackrabbit into the AOA. With installation of the perimeter security fence and implementation of hazardous wildlife management activities, the San Diego black-tailed jackrabbit is not expected to occur within the AOA in the future. For this reason, LAWA is not required to relocate the San Diego black-tailed jackrabbit as a result of Master Plan projects located within the AOA.

In 2013, for the LAX Coastal Dunes Improvement Project, pre-construction surveys were conducted of the project site for coastal California gnatcatcher, loggerhead shrike, silvery legless lizard, San Diego Horned Lizard, and other sensitive species identified in the California Natural Diversity Database (CNDDB) https://www.dfg.ca.gov/biogeodata/cnddb/ as potentially being present at the site. Although these sensitive species were not found, avoidance areas primarily identified by the vegetative type, were marked with flagging. Surveys included checking plywood boards that were placed months in advance. Grubbing and clearing was monitored by a biologist. No sensitive species were detected at the project site during pre-construction surveys or during the performance of clearing and grubbing activities.

12.0.F 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 reporting period, as there were no LAX Master Plan projects that would result in the loss of State-designated sensitive habitat within the Dunes Area.

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:
On April 20, 2004, the United States Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) based on their review of Alternative D of the Draft EIS/EIR for LAWA Master Plan for LAX and its effects on the federally endangered Riverside Fairy Shrimp (*Streptocephalus woottoni*, "RFS") in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The April 20, 2004 BO proposed several conservation measures (i.e. mitigation requirements) to offset direct and indirect impacts on the RFS. Subsequently, on April 8, 2005, the USFWS issued a BO based on their review of the proposed operations and maintenance activities for LAX and its effects on the RFS. Details of all of the conservation measures are described in both BOs and in Mitigation Measure MM-ET-1. To date LAWA has completed the following requirements:

- Salvage and storage of RFS cyst-bearing soils at LAX.
- On December 2, 2005, the FAA transmitted a letter confirming the completion of the RFS cysts conservation work to the USFWS.
- Submittal of conceptual and draft Final Habitat Creation, Enhancement, Maintenance and Monitoring Plans for mitigation at Madrona Marsh Preserve, Torrance, CA.

LAWA and the FAA pursued implementation of the mitigation project at the former Marine Corps Air Station El Toro until 2008. In August 2006, the proposed RFS habitat creation site was the subject of discussions between the FAA and the Federal Bureau of Investigation (FBI) regarding the future compatibility of the site between FBI training and creation of a RFS habitat. After further investigation, in May 2008, it was determined that the El Toro site did not have suitable soil for developing RFS habitat.

With the concurrence of the USFWS and the FAA, LAWA pursued a mitigation site at the Madrona Marsh location in City of Torrance until 2012. Studies of the Madrona Marsh site were initiated beginning in 2005, and a conceptual design was developed in 2009. Soil studies and surveys were completed, and a hydrogeological model of the restoration site was been developed from the data. A conceptual design and restoration plan that meets the requirements of the mitigation measure and BOs were presented to the FAA, USFWS, California Department of Fish and Game (CDFG), and City of Torrance stakeholders, i.e., Friends of Madrona Marsh Preserve, in November and December 2011. The restoration plan was not finalized. Instead, in 2012, USFWS decided to pursue the acquisition of critical habitat in Riverside County that had been identified the previous year as an alternative means for LAWA and FAA to meet this requirement.

USFWS identified properties in Menifee, CA, associated with a vernal pool currently occupied by the federally threatened species spreading navarretia (Navarretia fossalis) that LAWA could acquire as an alternative means for LAWA and FAA to meet this requirement. LAWA has researched the properties and learned that there are 8 to 10 private owners. LAWA is currently working with USFWS to determine if there are willing sellers and to develop the mechanism for completing this alternative.

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:
See MM-BC-1 above.

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 this 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:
Mitigation began in advance per instructions in the USFWS Biological Opinion in subsite 23 of the LAX El Segundo Dunes. The subsite was planted with 325 propagated buckwheat seedlings in November 2011, and irrigated. The 2013 survey showed that 116 plants had survived with a 35 percent survival rate. A progress report is included in Appendix C.

"…LAWA shall coordinate with the USFWS to create educational materials on the El Segundo blue butterfly for integration into LAWA's public outreach program."

Status → In Progress:
Fact sheets were created in 2013 for the ESB Habitat Restoration Area to provide information about the ESB. These facts sheets were posted on the LAWA website at http://www.lawa.org/laxDunes.

14.0 Energy Supply

14.0.A E-1 Energy Conservation and Efficiency Program

The LAX Master Plan MMRP states in part:

"Energy Conservation and Efficiency Program. *LAWA 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."*

Status→ Ongoing:
This requirement is addressed through the sustainable construction standards in the Los Angeles Green Building Code (LAGBC) and LAWA's Design and Construction Handbook, which establish broad design and construction guidelines for all infrastructure, terminal buildings, renovations, and other public facilities owned, operated or maintained by LAWA.

Bradley West Gates opened in September 2013. The project was designed to achieve a Leadership in Energy and Environmental Design (LEED) Silver certification and was awarded LEED Silver from the U.S. Green Building Council. Energy reducing features include efficient lighting fixtures and controls with occupancy sensors throughout the terminal to reduce lighting costs and save energy during off-peak hours, and heating,

ventilation, and air conditioning controls that reset temperatures to maximum efficiency without sacrificing occupant comfort.

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."*

Status→ Ongoing:
This requirement is implemented with each Master Plan development project prior to issuance of applicable permits.

In addition, in 2013, LAWA continued to meet with the City of Los Angeles Department of Water and Power on a monthly basis to discuss long-term improvements to the electrical distribution system to provide an additional feed and redundant power source to LAX.

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."*

Status→ Ongoing:
This is an ongoing requirement in all LAWA capital development projects.

15.0 Light Emissions

15.0.A L1-2 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."*

Status→ Ongoing:
This is an ongoing requirement in LAWA specifications.

15.0.B L1-3 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."*

Status→ Ongoing:
LAWA is committed to integrating sustainable practices in the areas of Sustainable Design, Energy and Atmosphere, Materials and Resources, Water Efficiency, Transportation Resources, and Administrative Processes into operations and administrative processes throughout the organization. Accordingly, all lighting plans are approved by LAWA prior to issuance of any permits which include lighting to ensure that new lights or changes in lighting will not have an adverse effect on airport operations.

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 LAWA's Maintenance Services Division's Recycling and Source Reduction Program for calendar year 2013 was 24,160 tons, which equated to 67.06% recycled.


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 9,615 tons
- Mixed paper and cardboard 8,067 tons
- Wood/pallets 2,582 tons
- Plastics 765 tons
- Metals 562 tons
- Green materials 394 tons

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."*

Status→ Ongoing:
This is a standard requirement in LAWA specifications on all capital construction projects.

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."*

Status→ Ongoing:
This is a standard requirement in all LAWA specifications on capital construction projects.

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."*

Status→ Ongoing:
This measure is an ongoing requirement in all of LAX's capital projects to the extent possible.

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."*

Status→ Ongoing:
This measure is an ongoing requirement in all of LAWA's capital development projects.

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 2013, 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 to which 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 2013. The updated plan is scheduled to be completed in 2014.

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 2013 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."

Status→ Ongoing:
This ongoing requirement is implemented on each capital construction project prior to issuance of work permits, and throughout the construction stage for each project.

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."*

Status→ In Progress:
Comprehensive soil investigation is required prior to commencement of any capital project design and construction activity at the airport. All required remediation efforts are carried out as needed.

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.

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."*

Status→ Ongoing:
This is an ongoing requirement on capital construction projects where reclaimed water is available and is implemented prior to approval of building and landscaping plans for qualifying projects.

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.

In 2013, some landscaped areas at LAX were 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 though 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.

In 2013, LAWA installed infrastructure to enable the Central Utility Plant (CUP) cooling towers and toilet flushing in the new Bradley West terminal to utilize high quality reclaimed water once the connection to a suitable, treated recycled water system is available from the Los Angeles Department of Water and Power (LADWP).

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*."

Status→ Ongoing:
This is an ongoing requirement in all LAWA capital design projects.

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."*

Status→ No action required at this time:
No action was required during the reporting period as there were no demolition construction, or circulation changes affecting relevant fire and police facilities in 2013.

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."*

Status→ No action required at this time:
No action was required during the 2013 reporting period for any on-airport fire and police facilities.

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 is notified of all pending development and construction activities and they update local law enforcement agencies on a regular basis and as needed.

23.0.B LE-2 Plan Review

*"**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."*

Status→ Ongoing:
This is an ongoing requirement in all LAWA design contracts.

24.0 Project-Specific Mitigations

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

The SAIP 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:
On August 6, 2007, the BOAC approved an MOU between LAWA and the Palos Verdes Peninsula Land Conservancy (PVPLC) for the development of approximately 21 acres of coastal sage/needle grass habitat (equivalent to 16.8 habitat units) in near fulfillment of LAWA's MM-BC (SA)-1 commitment (17.17 habitat units) and partial fulfillment of LAWA's MM-BC-8 commitment (45.43 habitat units). This mitigation plan was approved by both the USFWS and CDFG. The new location near the coast, unlike the previously proposed location at El Toro, is better suited as a replacement site. LAWA funded PVPLC in the amount of $610,938 for this conservation work to be performed over a three year period. Each year, PVPLC will provide an annual progress report documenting the result of their effort.

PVPLC staff has monitored the progress of the project through vegetation transect sampling and bird surveys. Year 1 monitoring occurred in May 2010. The 2010 status report stated that coastal sage scrub container plants have become established and are growing, but that native plant coverage is sparse. The report stated that 2010 vegetation transects in the grassland restoration area show low germination.

The "Annual Status Report 2011-2012" (March 31, 2013), stated that in fall 2011, PVPLC staff implemented a grow and kill program in the grassland in preparation for drill seeding of 7.7 acres which took place in December 2011. They also weeded several times over the course of the year. Staff collected seed and propagated plants for additional fill-in planting in the coastal sage scrub area. Eight thousand container plants were installed in 2011, and 665 in 2012, increasing the native plant cover. Vegetation monitoring reports indicated plant establishment and growth in the coastal sage scrub, and low germination of the seeded grass in the grassland restoration area in 2011 and 2012. However, the 2011 and 2012 monitoring reports did show increases in percent cover of native plants in the restored grasslands while percent cover declined in the reference grasslands. The native cover in the two restored grasslands in 2011 was 14 and 19 percent, and in 2012 was 22 and 33 percent, compared to 34 percent (2011) and 38 percent (2012) in the reference grassland site. Species diversity also increased, with 21 species present in 2012 compared to 15 in 2009. Native grass numbers were low possibly due to the use of the transect survey method.

PVPLC continued to control weeds in the coastal sage scrub in 2013 to allow the installed plants to establish. PVPLC plans to switch to the California Native Plant Society vegetation assessment method rather than transects so that grasses at the peripheries can be accounted for. PVPLC also plans to continue weed control activities, as needed, to maintain the grassland in the future. The last report required of PVPLC was provided to LAWA on March 31, 2013 and includes the data presented above as documented in Appendix D. This project is complete.

24.0.B 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. The initial mitigation program that commenced in 2010 was unsuccessful. Remedial mitigation commenced in fall of 2010 for MM-BC (CFTP)-1 and MM-BC (BWP)-1 at a new mitigation site in the southwest corner of the airport near the water retention basins along Pershing Street. The new site is located east of the previous site, and contains clayey soils and existing southern tarplant individuals. The mitigation plan was revised to reflect the new site.

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. Quarterly monitoring and annual reporting will continue as required. See Appendix E for the Southern Tarplant Third Annual Monitoring Report.

24.0.C 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→ Completed:
On July 1, 2013, LAWA began FlyAway service between LAX and the Exposition Light Rail line at LaBrea Avenue. Marketing included FlyAway signage in the Exposition light rail vehicles and at prominent station platforms.

24.0.D 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 2013, the design for this intersection improvement was completed.

24.0.E 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.

24.0.F 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→ No action required at this time:
In 2013, there were 17.8 million international annual passengers at LAX. No action is required until the number of international passengers at LAX reaches 19.7 million annual passengers.

24.0.G MM-ST (BWP)-5 Modify the Intersection of Arbor Vitae Street and Aviation Boulevard (Intersection of Imperial Highway and Sepulveda 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 2013, there were 17.8 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.

24.0.H 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 2013, there were 17.8 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.

24.0.I 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 2013, there were 17.8 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.

24.0.J 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 2013, there were 17.8 million international annual passengers at LAX. This measure will be triggered when the number of international passengers at LAX reaches 18.7 million annual passengers.

24.0.K 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 17.8 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.

24.0.L 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.

24.0.M 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 (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."*

Status→ Completed:
This project was completed on February 14, 2012.

24.0.N 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."*

Status→ Ongoing:
This is an ongoing requirement until construction is completed.

24.0.O 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."*

Status→ Ongoing:
LAWA has retained an on-site CRM. This is an ongoing requirement until construction is completed.

24.0.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."*

Status→ Ongoing:
LAWA has retained a professional paleontologist for the Bradley West Project site. This is an ongoing requirement until construction is completed.

24.0.Q 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 fossilferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur."*

Status→ Ongoing:
This is an ongoing requirement until construction is completed.

24.0.R 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 24.0.B. As indicated in that discussion, the initial mitigation program that commenced in 2010 was unsuccessful, and was, therefore, followed by a remedial effort in 2011 in a different site on LAWA property. The remedial effort exceeded Year 1 and 3 success criteria.

24.0.S 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.

24.0.T 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.

24.0.U 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.

24.0.V 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.

24.0.W 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.

24.0.X 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 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.

24.0.Y 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.

24.0.Z 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, 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."*

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.

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, AND BWP-SPECIFIC MEASURES)

SOUTH AIRFIELD IMPROVEMENT PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES[1]

	Master Plan Commitments/ Mitigation Measures	Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	Biotic Communities				
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 MEASURES[1]

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 MEASURES[1]

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 fossilferous 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 fossilferous deposits and notification procedures in accordance with the PMTP

CROSSFIELD TAXIWAY PROJECT
MITIGATION MONITORING & REPORTING PROGRAM
FOR NEW MITIGATION MEASURES[1]

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**	**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. 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. 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: ◆ *Responsibilities and qualifications of the personnel to implement and supervise the plan.* 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 MEASURES[1]

CFTP-Specific Mitigation Measures		Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	◆ *Site selection.* 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. ◆ *Site preparation and planting implementation.* 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. ◆ *Schedule.* A schedule shall be developed, which includes planting, to occur in late fall and early winter (between October and January 30). ◆ *Maintenance plan/guidelines.* 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 MEASURES[1]

	CFTP-Specific Mitigation Measures	Potential Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	◆ *Monitoring plan.* The monitoring plan shall include the following success criteria: - 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. If these success criteria are not met, or are unlikely to be met within the required time periods, remedial measures will be required. 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. *Long-term preservation.* 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.				

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

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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.			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	

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

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

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

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)-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

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
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	

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)-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

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

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

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
Historical/Architectural and Archaeological/Cultural Resources					
MM-HA (BWP)-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 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

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
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 fossilferous deposits and in the correct procedures for notifying the relevant individuals should such a discovery occur.	Potential to unexpectedly encounter and impact subsurface paleon-tological 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 fossilferous deposits and notification procedures in accordance with the PMTP

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
Biotic Communities					
MM-BC (BWP)-1 **Monitoring Agency:** **LAWA**	**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. 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. 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: ◆ *Responsibilities and qualifications of the personnel to implement and supervise the plan*. 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

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	qualifications of the personnel who will supervise and implement the mitigation plan, including LAWA, Technical Specialists, and Maintenance Personnel. ◆ *Site selection*. 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. ◆ *Site preparation and planting implementation*. 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				

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	wattles); and (6) seed application. ◆ *Schedule*. A schedule shall be developed, which includes planting, to occur in late fall and early winter (between October and January 30). ◆ *Maintenance plan/guidelines*. 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. ◆ *Monitoring plan*. The monitoring plan shall include the following success criteria: − 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. 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. This plan may include qualitative and quantitative monitoring. Qualitative monitoring includes site visits at regular intervals (i.e., monthly, quarterly,				

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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. ◆ *Long-term preservation*. 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**	**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.	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

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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.		Project		

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-BC (BWP)-3 **Monitoring Agency:** **LAWA**	**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. 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,	Potential loss of California spineflower 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 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	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	If required, preparation of special status plant mitigation program; periodic monitoring report, at least annually

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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.				
MM-BC (BWP)-4 **Monitoring Agency:** **LAWA**	**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	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

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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." 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		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	protection of active burrows between February 1 and August 31	until entire staging area is in use

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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. 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.				
MM-BC (BWP)-5 **Monitoring Agency:** **LAWA**	**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"	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

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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

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-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. It 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,

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

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	greater in biological value, as determined by the USFWS. 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. 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		Construction Staging/Parking Area; Implementation per Mitigation Plan	annually in year 10	

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	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. 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 chucks, 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. 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				

Bradley West Project-Specific Mitigation Measures		Impact Being Addressed	Timing of Implementation	Monitoring Frequency	Actions Indicating Compliance
	to be determined in consultation with USFWS for off-site relocation over a 10-year period: ◆ 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 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.				

APPENDIX C

FINAL EL SEGUNDO BUTTERFLY 2013 LAX REPORT DATED JANUARY 2014

REPORT
LOS ANGELES INTERNATIONAL AIRPORT
EL SEGUNDO BLUE BUTTERFLY
2013

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

REPORT OF EL SEGUNDO BLUE BUTTERFLY MONITORING ACTIVITIES IN 2013 AT THE LOS ANGELES INTERNATIONAL AIRPORT

Conducted under USFWS Permit
PRT-797233 issued to Richard A. Arnold, Ph.D.

Prepared for:
Ninyo & Moore
Geotechnical & Environmental Sciences Consultants
475 Goddard, Suite 200
Irvine, CA 92618

and

Environmental Management Division
Los Angeles World Airports
7301 World Way West
Los Angeles, CA 90045

and

U.S. Fish & Wildlife Service,
Carlsbad Field Office
6010 Hidden Valley Road
Carlsbad, CA 92009

Prepared by:
Richard A. Arnold, Ph.D.
Entomological Consulting Services, Ltd.
104 Mountain View Court
Pleasant Hill, CA 94523-2188
(925) 825-3784
bugdctr@comcast.net

Final Report:
January 2014

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SECTION 1
INTRODUCTION

This report describes the findings of monitoring surveys for the federally-listed, endangered El Segundo Blue (ESB) butterfly (*Euphilotes battoides allyni*) and its foodplant, Coast Buckwheat (*Eriogonum parvifolium*) that occurred in May through September 2013, 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 ESB's adult flight season in 2013, the following butterfly and habitat monitoring activities were performed at LAX:

a) Surveys were conducted in May to check on the flowering status of the ESB's food plant, Coast Buckwheat and estimate the start of the butterfly's flight season;
b) 13 counts of ESB adults were conducted along the historical transect route;
c) a single block count of ESB adults throughout the entire dune preserve area was conducted at the peak of the butterfly's 2013 flight season;
d) a seasonal population estimate was calculated for the entire 2013 flight season of the ESB 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 2013 ESB monitoring activities and findings. The 2013 monitoring results are compared to findings from previous years to discern year-to-year trends in the ESB population numbers plus buckwheat plant and flowerhead numbers at LAX, as well as to identify habitat management actions.

In addition, 325 seedlings of Coast Buckwheat, the sole larval food plant and primary adult nectar plant for the ESB, were outplanted during November of 2011 at LAX. This report provides details on the survival of these buckwheat plants as of May 16, 2013.

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 ESB 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^{o}F. Winter, spring, and fall temperatures are generally mild, with a daytime high in the 70s F and nightly low in the 50s 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 ESB'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 ESB'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 ESB block count. Blocks to the north and northwest of the Habitat Restoration Area are also checked annually during the block count, but the ESB 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. 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 ESB 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 ESB. 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 flowerheads. This is the life stage of greatest value to the ESB 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 ESBs that colonized these newly restored habitat locations.

At all locations the ESB 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 ESB 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 2013 ESB flight season, the historical transect route was surveyed on 13 days between June 4th and August 6th. Additional specific survey dates included June 9, 14, 22 and 28, July 7, 9, 11, 14, 21, and 26, plus August 1. Richard Arnold conducted all transect counts during 2013.

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 ESB'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 ESBs 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 ESBs 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 ESB activity, usually greater than 68^{o} F and winds less than 5 mph, and as evidenced by ESB 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 ESB 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 ESB population throughout the entire 200-acre Habitat Restoration Area.

ESB 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 ESB's flight season. In 2013, these counts were performed between July 9^{th} and 13^{th} by Richard Arnold. Using the information gathered from the counts along the historical transect route, the timing of the approximate peak of the ESB 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 ESB 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 ESBs are captured or otherwise handled. When possible, behaviors were also noted. All 86 blocks were surveyed in five 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 ESB 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 ESB 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 5-day period in 2013 (4 days for the ESB occupied blocks in the Habitat Restoration Area and a fifth 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 5-day period, some unknown quantity of births and deaths occurred during this period, thus the ESB 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 ESB 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 ESB population,

document its fluctuations and detect any trends, and to provide insight for maintenance, monitoring, and restoration recommendations that will benefit the ESB and LAX dunes.

3.3 Seasonal Population Estimate for the ESB.

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 ESB 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 studies[1] of the ESB (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 yet, 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 ESB'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 ESB adult numbers closely tracks a normal bell shape or Gaussian curve, which can be described mathematically.

On any particular day of the ESB'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 ESB at the Chevron refinery in El Segundo and at LAX were derived from prior capture-recapture studies of the ESB (Arnold 1983 and 1986). These capture-recapture studies also revealed that the maximum residence for ESB 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 ESB 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 ESB's flight season can be expressed as:

$$P(x) = P_1(x) + P_2(x) + P_3(x) + P_4(x) + P_5(x) + P_6(x) \qquad \textbf{(1)}$$

[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.

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):

$$dN/dt = -a\,N \qquad \textbf{(2)}$$

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 ESB 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:

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

$$= 0 \quad 6 < t$$

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

$$P(x) = 1.00\,P_1(x) + 0.37\,P_1(x) + 0.14\,P_1(x) + 0.05\,P_1(x) + 0.02\,P_1(x) + 0.01\,P_1(x) \qquad \textbf{(4a)}$$

or

$$P(x) = 1.59\,P_1(x) \qquad \textbf{(4b)}$$

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 ESB at LAX. A capture-recapture study at the Chevron preserve for the ESB indicates that this factor may be as low as 1.21 (Arnold 1986).

For the entire flight season, the total ESB 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:

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

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

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

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 ESB 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 2013 ESB transect survey data, in conjunction with the trapezoidal numerical approximation method, were used to estimate the total seasonal population number of ESB for the transect route in 2013.

After establishing the total seasonal ESB 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 ESB, the scaling factor is simply the ratio of the block count to the transect peak value. Thus, the ESB 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 ESB at LAX during the past several years has revealed that population numbers of the ESB 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.

Arnold (1985) demonstrated the positive correlation that exists between buckwheat plant and flowerhead numbers with ESB 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 ESB numbers increase or decrease annually, monitoring of the buckwheat was initiated in 2002 and has been performed annually since. At LAX the 2013 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 2013 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 Technololgy, 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 ESB. 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 Relationship Between Rainfall, Buckwheat Flowerheads and ESB Numbers.

The relationships between annual rainfall, the annual number of buckwheat flowerheads, and annual numbers of ESB 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 ESB 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 2013.

SECTION 4
RESULTS AND DISCUSSION

4.1 Timing and Length of the ESB's 2013 Flight Season.

The first adults of ESB at LAX in 2013 were observed on June 4th. This date is 12 days earlier than the first ESB observation of 2012 (Arnold 2012a). One, very worn female ESB was observed during a historical transect count that was performed on August 6th, and based on its physical condition is presumed to have died on that date. Thus, the butterfly's flight season was at about 64 days during 2013 or approximately 9 weeks in duration. In prior years, the ESB flight season has ranged from 64-76 days in length (Arnold 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005a, 2007a, 2007b, 2009, 2010, 2011, 2012b, plus Arnold and Rios 2000). Thus the timing and duration of the ESB's 2013 flight season was very comparable to that of most recent years, but at the shorter end of the range of observed durations.

4.2 Historical Transect Survey.

A total of 1,319 adult ESBs were observed on the 13 survey dates in 2013, including 888 males and 431 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 ESB adults observed by survey date. The transect counts suggest that the seasonal population peak occurred on July 9th, when 225 butterflies were observed. Observed ESB numbers per interval of the historical transect throughout the 2013 flight season ranged from 0 in six intervals to 86 within intervals #32 and #35 (Table 3).

Table 4 summarizes the annual ESB counts for the historical transect at LAX for the years 1984 through 2013. 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 ESB adults was the highest seasonal total observed. The 2013 ESB seasonal total is only 28% of the 2011 seasonal total and the seasonal total declined approximately 52% in 2013 compared to the 2012 seasonal total. Furthermore, the 2013 seasonal EBS total was well below the 29-year average seasonal total of 1,746 adults.

4.3 Block Count Survey.

In 2013, a total of 2,656 adult ESBs were observed during the block count, including 1,688 males and 968 females (Table 5). Each block, as illustrated on the attached map of the LAX dunes (Figure 3), was visited only once during the period July 9th – 13th. Table 5 summarizes the numbers of ESBs that were observed in every block during 2013.

Figure 5 is a map that illustrates the location of every ESB adult noted during the 2013 block count. Behaviors of adult ESBs observed during the block counts are also summarized in Table 5 for each block where butterflies were seen. The vast majority of individuals (72.8%) were observed flying, while smaller percentages of individuals exhibited perching (5.5%), basking (6.1%), courtship (5.2%), mating (1.8%), foraging (i.e., nectaring, 7.7%), or oviposition (0.9%) 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 ESB adults observed during the 2013 block count ranged from zero individuals in 6 blocks to 249 individuals in block #38N. Outside of the Habitat Restoration Area (blocks #46 - #48 and #53 - #60), no ESBs were observed.

Annual block count data presented in Table 6 indicates that during the 18-year period, 1996-2013, ESB 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 ESB population numbers declined about 35% in 2013 compared to 2012 (Table 7).

4.4 Seasonal Population Estimate for the ESB.

Using the trapezoidal numerical integration method, the 2013 seasonal population estimate for the ESB throughout the entire Habitat Restoration Area at LAX was 43,492 to 45,406 individuals (Table 8). These seasonal estimates indicate that ESB population numbers decreased about 50% in 2013 compared to the seasonal population estimates for 2012 (Arnold 2012a).

4.5 Year-to-Year ESB Population Trends.

All three population estimation techniques, the historical transect counts (52%), the block count (35%), and the seasonal population estimate (50%), indicate that the ESB numbers decreased in 2013 compared to 2012. Table 8 summarizes the seasonal population estimates for the ESB for the years 1998 through 2013. During this 16-year period, estimated seasonal population numbers have fluctuated from a low of 36,624 in 1999 to 142,727 in 2006, a factor of 3.9 times. The 2013 ESB estimates are near the lows of this 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 ESB. 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 ESB), may individually or collectively affect population numbers.

One factor that influences annual ESB 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 2013. 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 ESB numbers, as measured during the block counts, ranged from 2,093 to 5,675 individuals. The graph associated with Table 9 illustrates the correlation between ESB numbers and annual rainfall during this 16-year period.

During this monitoring program, dramatic fluctuations in ESB population numbers have been witnessed even between consecutive generations of the butterfly. For example, ESB 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, as well as the 68% decline between 2006 and 2007. These dramatic increases and decreases in annual numbers are likely within the "normal" range of population fluctuations for the ESB. 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 15 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 ESB 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 2013. It also summarizes the numbers of plants and flowerheads in each of the 35 intervals. Four intervals supported no buckwheat plants, 16 intervals supported between 1 and 10 plants, 8 intervals supported between 11 and 20 plants, 4 intervals supported between 21 and 30 plants, 1 interval supported between 31 and 40 plants, 0 intervals supported between 41 and 50 plants or between 51 and 60 plants, and 2 intervals had between 61 and 72 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 2013. Survey results indicated that approximately 63% of the buckwheats were mature plants, while 28% were senescent, 8% were juveniles, and less than 1% were seedlings.

A total of 485 Coast Buckwheat plants grew within the historical transect route during 2013, which represents an 11% decrease in plant numbers between 2012 and 2013 (Table 11). These plants produced an estimated total of 537,186 flowerheads in 2013, which represents a 39% decrease from the 2012 tally. The number of flowerheads in a particular transect interval ranged from 0 (4 intervals) to 210,606 (Figure 6). As in recent past years, five transect intervals, #30, #31, #33, #34, and #35 accounted for approximately 85% of the buckwheat flowerheads observed along the entire historical transect route in 2013.

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 2013 plant numbers declined to only 485, the lowest number throughout the period of 2002 through 2013.

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 2013 being a second consecutive year of drought (57% of average annual rainfall), the decline of flowerhead numbers continued (Table 12).

Arnold (1985) described the strong positive correlation between buckwheat plant numbers, flowerhead numbers, and ESB adults. Table 13 details this relationship for the historical transect during the period of 2002 through 2013.

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 2013.

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 the11-year period, 2003 through 2013. Although the overall numbers of buckwheats declined only 0.9% in 2013 compared to 2012, mature buckwheats declined by 28% during the same period (Table 15). The proportion of seedlings and juveniles in the buckwheat population remained steady between 2012 and 2013, while the proportion of senescent plants increased from 23% to 37% during this period. The average number of flowerheads on all buckwheat plants, regardless of age class, declined about 20% between 2012 and 2013 (Table 16).

Table 17 summarizes the annual block counts of ESB, buckwheat plants, and buckwheat flowerhead numbers for the period of 2003 through 2013 at the LAX dunes. It also graphically illustrates the correlations between ESB and buckwheat plant (including all age classes) numbers, as well as the ESB and flowerhead numbers. Although the increases and declines in ESB numbers correlate well with changes in buckwheat plant numbers, an even stronger positive correlation exists between ESB numbers and buckwheat flowerhead numbers.

Tables 18 and 19 summarize the same information for the 56 transects that were surveyed during the 12-year period, 2002 through 2013. 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 11-year period.

4.7 Relationship Between Rainfall, Buckwheat Flowerheads, and ESB Numbers.

Table 20 and its associated graphs illustrate the strong positive correlation between ESB adult numbers from the block counts and the buckwheat flowerhead numbers. Both flowerhead and ESB numbers are positively correlated with annual (July 1 – June 30) rainfall. The flowerhead/rainfall and ESB/rainfall correlation coefficients are 0.66 and 0.51, respectively.

A graph and regression equation of the relationships between buckwheat flowerheads and annual rainfall is provided. The regression equation describes the relationship of flowerhead numbers as a function of annual rainfall. The "goodness of fit" measure is 43%. A similar graph and regression equation of the relationships between ESB numbers and buckwheat flowerheads is also shown. The regression equation describes the relationship of ESB numbers as a function of flowerhead numbers. The "goodness of fit" measure of this equation is 54%.

The regression equations that were estimated in 2012 (data from 2002 – 2012) were used to predict the estimated numbers of buckwheat flowerheads and ESB to be tallied in 2013. A similar prediction was made using regression equations estimated in 2013 (data from 2002 – 2013). 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.

The predictions are shown in Table 21. The total rainfall for the 2013 growing season (July 1, 2012 – June 30, 2013) was 6.89 inches. The estimated number of flowerheads was 1,113 and 1,134 using the 2012 and 2013 equations, respectively. Both equations slightly underestimated the actual number of flowerheads observed (1,268). The underestimates are 155 (14%) and 134 (12%) for the 2012 Equation (1) and the 2013 Equation (2), respectively. Additional years of observations and/or a more refined measure of rainfall during critical periods might improve the ability of this approach to more accurately estimate flowerhead numbers. Total rainfall in 2013 was the second lowest in the 11 years of observation, yet the flowerhead numbers were the fifth highest.

The estimated numbers of ESB adults in 2013 are 4,284 using the estimated number of flowerheads (1,113) and 2012 Equation (3). Similarly the estimated number of ESB adult butterflies is 4,578 and 4,395 using the observed number of flowerheads (1,268) and 2012 Equation (3) and 2013 Equation (4), respectively. All three estimates were higher than the actual number of ESB butterflies (2,656) counted during in block counts in July. As shown in Table 21, the overestimates were 1,628 (38%), 1,922 (42%) and 1,739 (40%), respectively. While the regression equations show there is a strong positive relationship between the number of flowerheads and ESB butterflies observed, other factors also influence butterfly numbers. For example, due to the drier past couple of rainy seasons, the ESB pupae may have experienced a lower mortality rate, thus contributing more adults to the 2012 and 2013 generations. Since pupae are generally buried in the sand, prolonged wet soil conditions would favor the growth of bacteria and other pathogens that may increase mortality of this life stage.

Additionally the data set is relatively small. Eleven or twelve years of observations is not very many to estimate statistical models described in this section, as statisticians typically want a minimum of 30 observations (i.e., 30 years of ESB, buckwheat flowerhead, and rainfall data in this case) to draw statically significant conclusions. As encouraging as the results to date has been, additional years of observation should help to refine the relationships between rainfall, flowerheads and ESB butterflies, as well as the predictive power of the statistical analyses.

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 ESB 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 fasiculatum*, dead palm trees, and castor bean has been performed at various locations.

As in my 2012 annual report, I recommend that the crew refocus its weed removal efforts to the other blocks of the Habitat Restoration Area where the ESB 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 ESB but also other dune endemic plants and animals.

To guide the crew's weed control efforts, Figures 8, 9, and 10 illustrate selected locations of three non-endemic buckwheats *Eriogonum fasiculatum*, *E. grandiflorum, and E. cinereum)*, acacia, pine, and ice plant within the Habitat Restoration Area at the LAX dunes that particularly need attention. Most of these same areas were also noted in my 2012 annual report (Arnold 2012a). 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 should 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, Appendix A of my 2012 annual report provide ground-level photographs for additional problem locations illustrated in Figures 8, 9, and 10.

Appendix B provides copies of the work logs for the crew for the period of January through December 2013. 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. 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. I encourage LAWA to find alternative solutions for the on-going trash issue so the dune crew can devote its time to vegetation management rather than trash pickup and removal.

Staff was minimal in LAWA's landscape services sector of the Construction and Maintenance Services Division for three months, May through July, of 2013. As a result crews did not work at the dunes during that period. Also, LAWA's El Segundo Blue permit, which had authorized the crew to undertake these activities at the LAX dunes, expired during 2013. Because the permit lapsed, weed removal activities were more limited during 2013. It is my understanding that an application for renewal of this permit has been submitted to the Carlsbad office of the US Fish and Wildlife Service.

5.2 Buckwheat Outplanting in Block #23.

A total of 330 Coast Buckwheat seedlings were outplanted at the LAX dunes on November 29, 2011 in block #23. The buckwheats were planted in groups of five seedlings at 66 locations (Figure 11). This block was chosen for the outplanting effort because it had only a few naturally occurring buckwheats, but is situated between neighboring areas on all sides that support larger patches of the ESB's food plant. Prior to the outplanting, acacias, non-native cacti, and ice plant were removed (Figure 11) and a drip irrigation system was installed to provide supplemental water to the buckwheat plants in the event that rainfall was insufficient to facilitate survival and establishment of these new plants. In Figure 11, drip lines start at the 10 irrigation valves (#1 - #10) next to the street curb and extend southward into block #23. The outplants were propagated by The Tree of Life Nursery (San Juan Capistrano, CA) using seeds collected at the LAX dunes.

These outplants were monitored twice during 2013, on March 18th and May 13th. As of the last visit, 116 of the original 330 outplants were still alive, which is a 35% survival rate. Table 22 summarizes the numbers of outplants that were surviving during monitoring visits conducted between November 2011 and May 2013. A separate report, dated May 17th, was provided to LAWA that summarizes this monitoring effort and includes photographs of selected buckwheat plants. No additional monitoring visits to assess buckwheat survival rates are planned at this time.

5.3 Need for Additional Buckwheat Outplanting at LAX.

Long term survival and maintenance of the ESB butterfly population at the LAX dunes preserve is dependent on the replacement of the aging buckwheat plants that characterize much of the habitat. As described earlier in this report, 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 ESB's larval and adult food plant. Although drought conditions in recent years have caused a substantial decline in the estimated annual numbers of the ESB, the observed decline has been further exasperated by a decline in the numbers of buckwheat plants and their floweheads.

This observed decline has been particularly evident along the Historical Transect route at the dunes. Information collected on the Historical Transect is especially important because it serves as the basis for population estimates for the entire Habitat Restoration Area at the LAX dunes preserve. Thus a comparative analysis of the trend of buckwheat plant numbers throughout the Habitat Restoration Area (based on data from the 126 block transects) with those buckwheats on the Historical Transect over the past 11 years was undertaken. The data and results of this analysis are presented in Table 23.

The number of buckwheat plants counted on the 126 block transects (BT) and the historical transect (HT) were plotted (solid red or green lines) and a trend line for each data set (dotted red or green lines) was estimated using regression analysis (Table 23). While the trend line for the plant numbers on the block transects is upward, the slope of the trend line is not statistically significantly different from 0 (the 95% confidence interval is -11.0 to 72.5). This finding suggests that the trend of the buckwheat population on the block transects has remained fairly stable during this 11-year monitoring period. In contrast, the trend line for the historical transect plant numbers is downward (averaging a loss of about 14 plants per year) and the slope is statistically significantly different from 0 (the 95% confidence interval is -22.8 to -4.7).

While 11 years of observation is a relatively short period, the conclusions reached in this trend analysis suggest that remedial actions are needed to reverse the observed decline in Coast Buckwheat numbers, especially along the HT. If the observed decline in the number of buckwheat plants along the historical transect continues, it raises a concern regarding its basis for estimating annual ESB population numbers for the entire Habitat Restoration Area. Also, while the trend for plant numbers throughout the 126 block transects has been fairly steady during the past 11-year observation period, this trend needs to be closely monitored to avoid a decline in the aging buckwheat population that characterizes the block transects. Coast Buckwheats often require several years of survival and growth to produce adequate flowerhead numbers to benefit the ESB. 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 ESB 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 or improving the health of the LAX dunes preserve for the ESB 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 ESB.

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)
1	662
2	430
3	540
4	557
5*	787
6*	766
7	71
8	139
9*	168
10*	178
11*	201
12*	230
13*	277
14*	295
15*	329
16*	430
17	191
18	233
19	276
20	301
21*	295
22*	259
23*	245
24*	244
25*	562
26*	556
27*	535
28*	384
29*	507
30*	498
31*	493
32*	467
33	231
34	239
35	274
36	317
37	318
38	317
39	860
40	411
41	461
42*	320

Transect Number	Length (feet)
43*	287
44*	255
45*	243
46	240
47	269
48	279
49	278
50	314
51	259
52	268
53	248
54	248
55	254
56	252
57	283
58	164
59	254
60	240
61	238
62	702
63	924
64	830
65	858
66*	175
67*	133
68*	176
69*	213
70	261
71	288
72	286
73	284
74	401
75	411
76	390
77	384
78*	170
79*	198
80*	191
81*	157
82*	398
83*	321
84*	322

Transect Number	Length (feet)
85*	379
86	958
87	959
88	300
89	256
90	257
91	281
92	352
93	361
94	369
95	333
96*	379
97*	379
98*	420
99*	442
100*	285
101*	292
102*	307
103*	318
104	987
105	1,171
106*	309
107*	304
108*	309
109*	292
110*	369
111*	244
112*	239
113*	270
114*	1,432
115*	1,432
116	1,422
117	1,454
118	897
119	846
120	1,015
121	744
122	603
123	835
124	674
125	39
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 2013 (M = male, F = female).

Transect Interval Number	ESB Counts by Survey Date and Transect Number																								Seasonal Total		
	4-Jun		9-Jun		14-Jun		22-Jun		28-Jun		7-Jul		9-Jul		11-Jul		14-Jul		21-Jul		26-Jul		1-Aug		6-Aug				
	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	M+F
1	1	0	3	0	2	1	4	2	7	2	8	4	11	3	9	5	6	4	3	2	1	1	0	0	0	0	55	24	79
2	0	0	2	0	1	1	3		4	1	7	3	7	4	8	4	6	3	2	2	1	1	0	0	0	0	41	19	60
3	0	0	2	0	2	0	3	1	2	1	4	3	5	4	7	3	4	4	1	2	0	2	0	0	0	0	30	20	50
4	0	0	0	0	1	0	3	0	2	1	4	2	5	4	7	3	5	4	2	1	0	1	0	0	0	0	29	16	45
5	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	0	0
6	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	0	0
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	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	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	0	0
10	0	0	0	0	0	0	1	0	1	1	3	2	6	3	5	2	4	1	2	0	0	0	0	0	0	0	22	9	31
11	0	0	0	1	1	0	3	0	2	1	5	2	4	3	6	2	4	3	2	3	0	0	1	0	0	0	28	15	43
12	0	0	1	0	3	1	3	0	2	1	4	2	5	2	4	3	3	4	2	3	1	2	0	1	0	0	28	19	47
13	0	0	0	0	0	0	0	1	1	0	3	0	2	1	2	2	3	3	0	0	1	2	0	0	0	0	12	9	21
14	0	0	0	0	1	0	1	0	2	1	4	1	4	1	3	1	2	2	0	1	0	0	0	0	0	0	17	7	24
15	0	0	0	0	0	0	0	0	1	0	0	1	2	1	2	2	2	3	1	1	1	0	1	0	0	0	10	8	18
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	0	0
17	0	0	0	0	1	0	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	6	4	10
18	0	0	1	0	1	0	2	1	4	1	6	3	7	4	5	2	6	3	3	4	1	2	0	1	0	0	36	21	57
19	0	0	0	0	0	0	2	1	1	1	2	2	2	0	1	0	2	1	2	0	1	0	0	0	0	0	13	5	18
20	0	0	2	1	1	1	1	1	3	0	5	2	4	2	4	2	4	1	4	2	2	2	0	1	0	0	30	15	45
21	0	0	0	0	1	1	2	0	2	1	5	1	5	2	3	1	4	2	3	2	1	3	1	0	0	0	27	13	40
22	0	0	1	0	1	0	1	1	4	1	6	1	5	2	7	3	5	3	2	2	0	2	0	1	0	0	32	16	48
23	0	0	2	0	3	0	2	0	2	1	4	3	3	2	3	3	3	2	4	1	1	0	0	0	0	0	27	12	39
24	0	0	1	0	0	0	2	0	1	1	2	1	4	1	3	2	2	1	0	1	0	1	0	1	0	0	15	9	24
25	0	0	1	0	2	0	1	1	2	0	2	1	4	0	3	1	2	0	0	0	0	0	0	0	0	0	17	3	20
26	0	0	0	0	1	0	2	1	2	1	2	1	1	1	0	1	1	1	1	1	0	0	0	1	0	0	10	8	18
27	0	0	1	0	1	1	2	1	1	1	3	2	3	1	2	1	2	1	0	1	1	0	0	1	0	0	16	10	26
28	0	0	0	0	0	0	2	0	1	1	4	2	2	0	4	1	3	1	2	0	1	1	0	0	0	0	19	6	25
29	0	0	1	0	0	0	2	1	4	1	7	2	8	1	8	2	6	3	2	1	1	1	1	0	0	0	40	12	52
30	0	0	0	0	2	0	4	2	4	1	8	2	9	3	7	2	9	4	5	4	2	3	1	1	0	1	51	23	74
31	0	0	2	0	2	1	2	1	4	1	9	2	11	4	9	5	7	4	4	4	2	3	1	2	0	0	53	27	80
32	0	0	1	0	1	1	3	1	5	1	9	2	10	4	12	3	10	4	6	3	3	2	2	3	0	0	62	24	86
33	0	0	1	1	2	0	4	0	4	1	9	2	9	3	8	5	6	1	3	3	1	2	1	2	0	0	48	20	68
34	0	0	0	0	3	0	3	0	4	1	8	3	11	5	9	4	10	5	5	6	2	2	1	3	0	0	56	29	85
35	0	0	0	0	1	0	3	1	6	1	9	2	10	4	9	3	12	6	6	7	2	2	0	2	0	0	58	28	86
Daily Total	1	0	22	3	34	8	62	17	79	25	143	55	159	66	151	69	134	74	67	58	26	35	10	20	0	1	888	431	1319
M+F	1		25		42		79		104		198		225		220		208		125		61		30		1				
Sex Ratio	1.00		0.88		0.81		0.78		0.76		0.72		0.71		0.69		0.64		0.54		0.43		0.33		0.00				

Table 4. Summary of Annual ESB Historical Transect Counts at LAX for 1984-2013

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

Table 5. 2013 El Sequndo Blue Block Counts and Observed Behaviors (Census dates July 9 - 13, 2013)

Block No.	No. of ESB Observed		No. of ESB Observed by Type of Behavior						
	Female	Male	Fly	Perch	Bask	Nectar	Court	Mate	Oviposit
1	24	48	66	2	2	2	-	-	-
2	15	26	33	-	-	-	2	6	-
3	-	1	1	-	-	-	-	-	-
4	8	20	25	-	1	1	-	-	1
5	2	3	5	-	-	-	-	-	-
6	8	8	16	-	-	-	-	-	-
7	12	11	13	-	-	10	-	-	-
8	6	21	25	-	-	1	-	-	1
9	26	59	60	6	8	7	4	-	-
10	14	20	28	-	1	2	2	-	1
11	1	10	11	-	-	-	-	-	-
12	-	1	1	-	-	-	-	-	-
13	23	38	55	-	-	2	-	2	2
14	24	35	43	5	5	6	-	-	-
15	17	48	37	11	7	6	4	-	-
16	16	27	25	4	4	4	6	-	-
17	-	1	-	1	-	-	-	-	-
18	16	29	29	3	4	3	2	4	-
19	1	3	4	-	-	-	-	-	-
20	13	23	12	8	6	4	4	2	-
21	2	1	1	2	-	-	-	-	-
22	-	4	4	-	-	-	-	-	-
23	2	3	5	-	-	-	-	-	-
24	-	4	4	-	-	-	-	-	-
25	5	12	17	-	-	-	-	-	-
26	3	7	7	1	1	1	-	-	-
27	10	16	17	3	2	2	2	-	-
28	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-
31	4	6	9	1	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-
35	29	44	60	-	-	1	6	6	-
36N	82	133	181	8	11	11	4	-	-
36S	43	59	83	4	4	5	6	-	-
37N	33	56	60	9	9	9	2	-	-
37S	86	116	155	12	14	14	6	-	1
38N	103	146	194	-	5	10	28	10	2
38S	41	70	91	-	-	-	14	6	-
39N	9	15	14	-	1	4	4	-	1
39S	21	36	57	-	-	-	-	-	-
40C	4	11	10	1	1	1	2	-	-
40N	30	77	55	15	16	15	6	-	-
40S	22	47	40	9	7	9	4	-	-
41N	16	45	41	4	7	7	2	-	-
41S	38	51	52	13	16	8	-	-	-
42N	21	44	45	-	3	11	-	6	-
42S	28	59	58	-	3	12	4	4	6
43N	26	40	42	-	2	10	8	-	4
43E	26	26	39	-	-	5	4	2	2
43W	3	5	6	-	-	-	-	-	2
44N	23	55	42	8	11	11	6	-	-
44S	24	46	42	8	8	8	4	-	-
45N	1	3	2	2	-	-	-	-	-
45S	7	19	13	5	3	3	2	-	-
46-60	-	-	-	-	-	-	-	-	-
Circle	-	-	-	-	-	-	-	-	-
TOTALS	968	1,688	1,935	145	162	205	138	48	23
F + M	2,656								
% Males	63.6%								

Table 6. Summary of Annual ESB Block Counts at LAX (1996 - 2013)

Block No.	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	18-Year Totals
1	107	51	96	64	3	110	77	365	119	260	256	124	132	105	186	158	115	72	2,400
2	34	25	170	72	80	123	27	166	69	134	134	38	52	74	67	58	51	41	1,415
3	0	0	14	1	0	9	119	9	15	9	10	7	5	2	6	1	1	1	209
4	22	1	1	16	1	6	66	95	30	59	43	15	61	36	107	92	56	28	735
5	26	3	10	18	10	13	18	68	9	46	25	6	12	21	27	23	14	5	354
6	8	1	13	9	125	16	19	51	14	37	28	13	25	22	55	48	30	16	530
7	23	1	8	4	24	47	40	111	40	70	88	39	64	49	101	98	52	23	882
8	103	9	147	46	47	127	42	179	47	139	161	45	58	86	71	61	29	27	1,424
9	221	48	539	286	310	258	198	512	94	493	456	74	230	200	304	293	157	85	4,758
10	54	18	134	60	28	66	86	120	55	175	135	34	84	59	131	103	85	34	1,461
11	14	1	0	1	7	3	21	61	13	106	79	24	37	10	73	60	31	11	552
12	85	55	66	57	33	53	35	5	4	0	3	2	5	15	12	9	2	1	442
13	152	35	113	92	65	107	96	168	38	340	139	33	59	103	169	135	116	61	2,021
14	5	3	19	9	15	14	26	133	30	68	121	49	71	139	117	112	117	59	1,107
15	55	0	108	27	38	81	75	234	39	128	222	50	110	186	103	96	104	65	1,721
16	6	0	36	15	13	35	47	59	12	23	73	52	83	117	94	90	51	43	849
17	3	0	1	0	1	5	0	1	0	0	1	1	1	1	2	2	2	1	22
18	47	28	120	75	65	90	48	106	15	188	83	39	80	59	137	137	88	45	1,450
19	10	10	16	27	37	30	24	2	0	0	1	1	1	1	0	0	1	4	165
20	50	75	169	245	175	346	87	133	85	118	190	16	64	70	122	86	73	36	2,140
21	11	5	37	6	7	3	0	0	1	2	3	0	0	0	0	1	2	3	81
22	1	0	4	0	1	2	7	5	2	14	9	15	16	14	9	5	11	4	119
23	1	0	0	0	1	0	1	0	0	2	4	4	5	4	3	3	8	5	41
24	18	0	20	6	23	34	0	34	6	7	6	3	9	6	4	3	6	4	189
25	0	0	4	28	53	48	33	62	19	39	53	17	42	39	16	14	23	17	507
26	6	0	4	19	25	22	0	5	10	5	14	5	18	20	17	9	17	10	206
27	0	1	0	2	0	18	6	27	14	57	49	22	56	50	26	26	27	26	407
28	1	0	1	0	2	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	25
30	1	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	289
32	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
34	1	0	0	0	0	1	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	1,311

Table 6. Summary of Annual ESB Block Counts at LAX (1996 - 2013) - continued

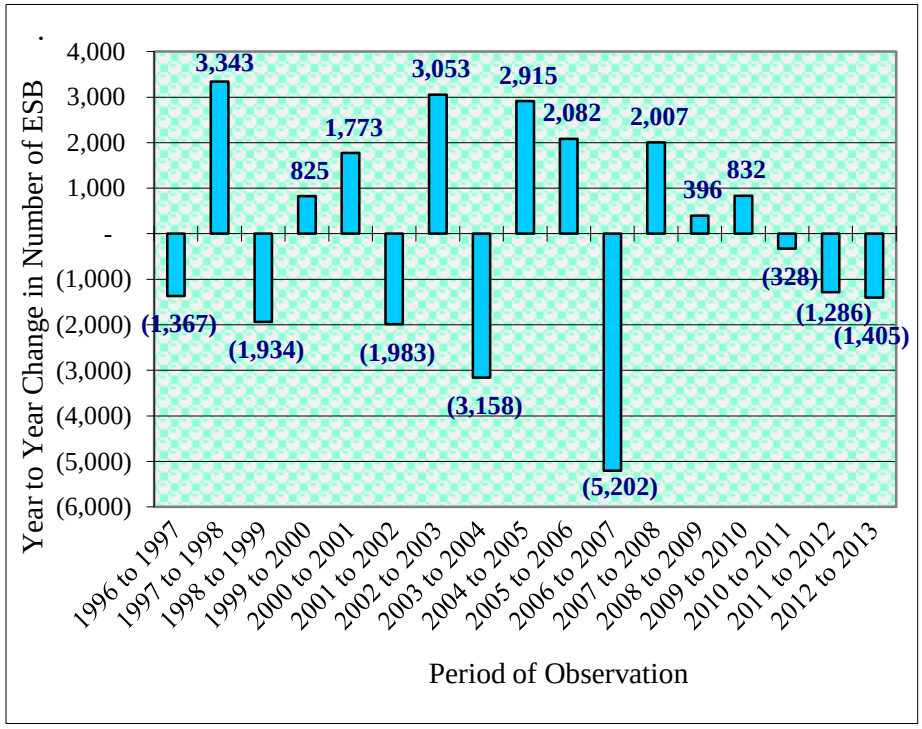
Block No.	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	18-Year Totals
36N	56	10	141	19	64	269	139	333	179	307	569	145	309	307	301	282	303	215	3,948
36S	36	1	46	16	68	60	56	95	34	117	134	29	147	150	97	103	122	102	1,413
37N	47	14	112	42	41	116	49	103	98	109	173	40	82	119	148	143	146	89	1,671
37S	59	5	76	19	64	156	105	255	162	198	333	143	238	264	329	334	232	202	3,174
38N	77	100	269	113	169	309	172	439	232	359	935	302	367	393	699	674	339	249	6,197
38S	52	6	32	48	82	148	67	130	72	145	271	77	197	226	180	196	162	111	2,202
39N	40	1	65	25	26	42	25	41	33	53	101	33	48	83	92	74	63	24	869
39S	29	3	74	36	58	75	38	93	38	93	143	40	55	71	119	101	70	57	1,193
40C	24	9	28	9	33	23	20	33	29	25	45	25	38	29	31	25	31	15	472
40N	91	26	385	65	161	274	163	198	184	370	461	148	239	216	262	266	178	107	3,794
40S	53	6	113	8	35	51	27	46	58	99	126	32	55	98	84	82	83	69	1,125
41N	19	0	16	18	23	80	14	41	33	79	110	49	87	108	83	83	89	61	993
41S	88	3	88	35	50	124	55	154	102	126	226	83	87	133	107	101	120	89	1,771
42N	39	11	51	27	87	122	53	177	60	93	108	82	196	229	232	218	161	65	2,011
42S	179	86	466	229	277	306	187	218	103	200	495	113	148	187	181	171	123	87	3,756
43N	27	29	45	70	108	170	73	135	67	114	115	41	66	121	251	247	112	66	1,857
43E	31	13	92	51	122	283	114	234	133	188	284	97	233	218	78	90	111	52	2,424
43W	28	29	34	39	77	126	49	75	26	39	64	26	51	52	42	33	21	8	819
44N	15	0	20	8	46	98	71	86	110	155	205	86	131	99	150	160	86	78	1,604
44S	7	1	12	6	43	37	19	47	51	51	76	42	87	85	109	105	77	70	925
45N	0	0	1	0	6	3	0	15	6	7	29	5	10	4	3	10	12	4	115
45S	2	0	2	2	8	23	0	3	5	18	51	13	27	14	32	25	33	26	284
46N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	5	0	9	0	0	0	0	0	0	0	1	0	1	1	0	0	17
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6. Summary of Annual ESB Block Counts at LAX (1996 - 2012) - continued

Block No.	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	18-Year Totals
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55M	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
55S	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
56N	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
57N	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
58N	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
59N	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
60M	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
60S	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	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	70,585

Table 7. Year-to-year changes in number and percentage change in Block ESBs Census (1996 - 2013)

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
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)
Percent	-65%	460%	-48%	39%	60%	-42%	111%	-54%	110%	37%	-68%	82%	9%	17%	-6%	-24%	-35%



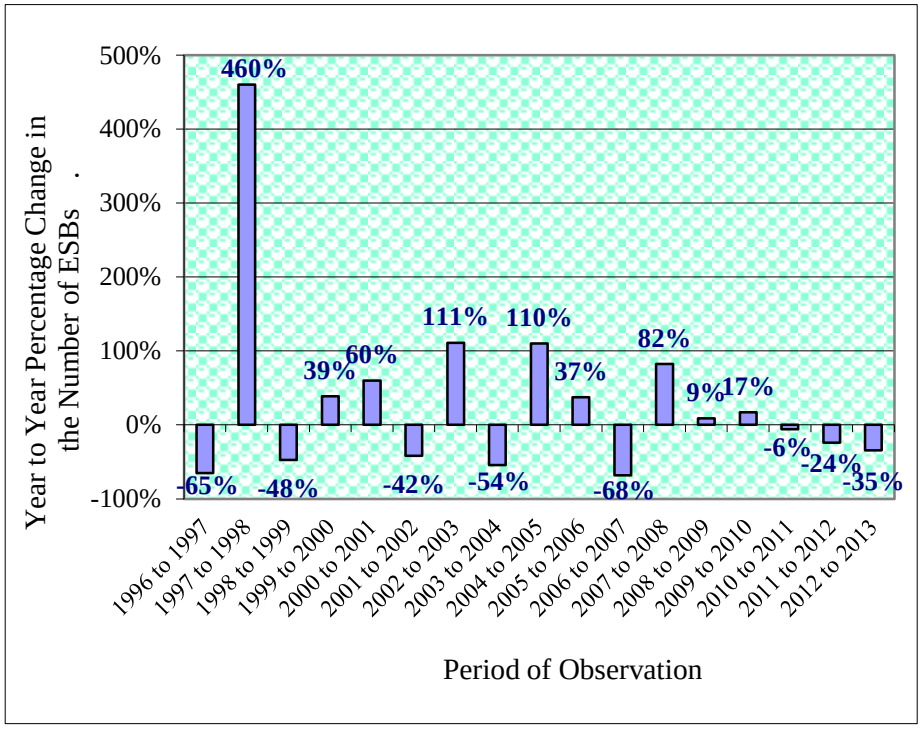


Table 8. Comparison of ESB Seasonal Population Estimates for 1998 - 2013

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

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

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

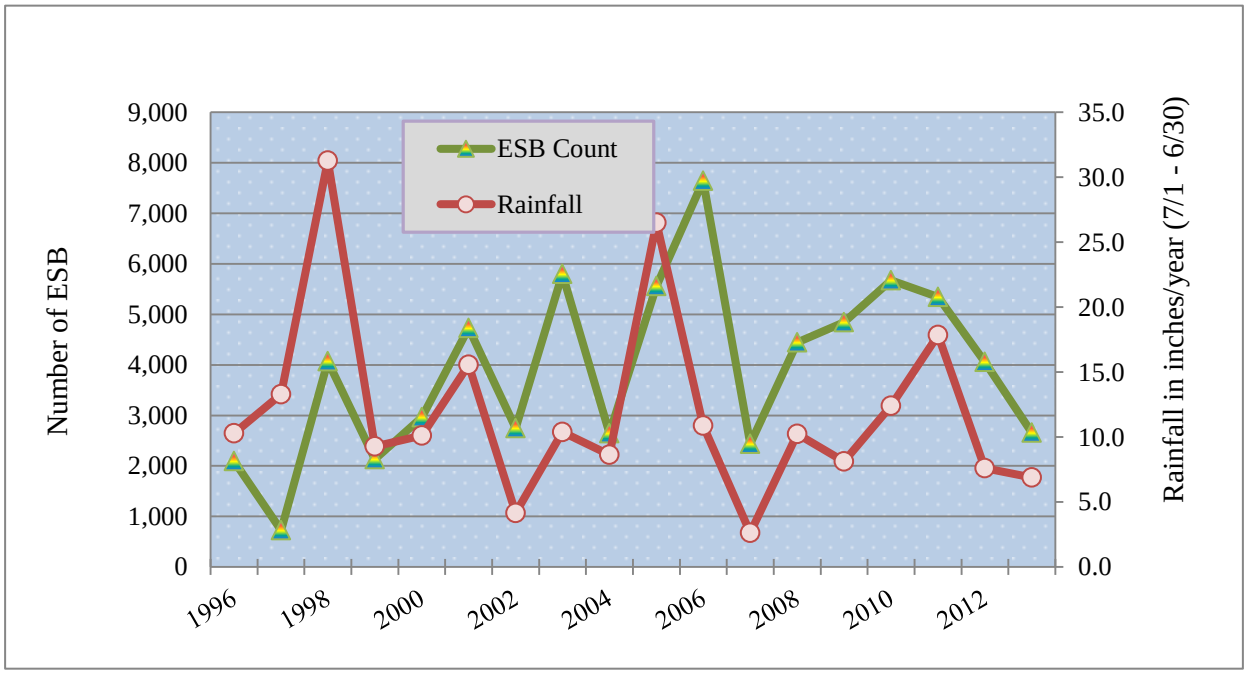
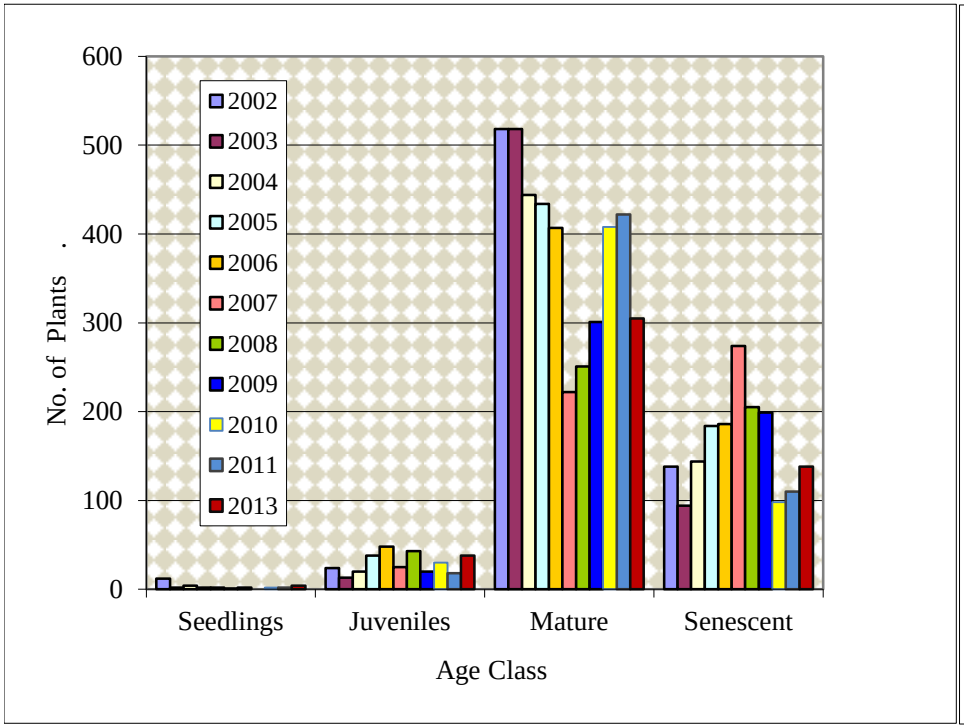


Table 10. 2013 Summary of Buckwheat Plants on the Historical Transect: Age Class and Flowerheads per Plant

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	12	124	0	0.0%	0	2	16.7%	28	8	66.7%	159	2	16.7%	83
2	8	188	0	0.0%	0	0	0.0%	0	4	50.0%	300	4	50.0%	76
3	15	269	0	0.0%	0	0	0.0%	0	9	60.0%	382	6	40.0%	99
4	4	269	0	0.0%	0	0	0.0%	0	3	75.0%	333	1	25.0%	75
5	0	na	0	na	na	0	na	na	0	na	na	0	na	na
6	0	na	0	na	na	0	na	na	0	na	na	0	na	na
7	0	na	0	na	na	0	na	na	0	na	na	0	na	na
8	5	23	0	0.0%	0	1	20.0%	10	3	60.0%	22	1	20.0%	40
9	1	150	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	150
10	8	54	2	25.0%	3	1	12.5%	14	1	12.5%	250	4	50.0%	40
11	10	415	0	0.0%	0	2	20.0%	2	6	60.0%	642	2	20.0%	150
12	27	368	2	7.4%	3	7	25.9%	9	10	37.0%	756	8	29.6%	289
13	8	137	0	0.0%	0	0	0.0%	0	6	75.0%	173	2	25.0%	29
14	4	146	0	0.0%	0	0	0.0%	0	1	25.0%	185	3	75.0%	133
15	1	20	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	20
16	0	na	0	na	na	0	na	na	0	na	na	0	na	na
17	2	71	0	0.0%	0	1	50.0%	6	1	50.0%	135	0	0.0%	0
18	24	267	0	0.0%	0	3	12.5%	24	13	54.2%	447	8	33.3%	66
19	1	90	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	90
20	18	403	0	0.0%	0	2	11.1%	26	5	27.8%	742	11	61.1%	317
21	12	301	0	0.0%	0	2	16.7%	16	6	50.0%	462	4	33.3%	201
22	16	378	0	0.0%	0	0	0.0%	0	13	81.3%	451	3	18.8%	62
23	9	245	0	0.0%	0	2	22.2%	20	5	55.6%	385	2	22.2%	120
24	8	708	0	0.0%	0	0	0.0%	0	5	62.5%	1,080	3	37.5%	87
25	30	328	0	0.0%	0	0	0.0%	0	25	83.3%	365	5	16.7%	140
26	4	160	0	0.0%	0	0	0.0%	0	3	75.0%	180	1	25.0%	100
27	8	392	0	0.0%	0	0	0.0%	0	4	50.0%	656	4	50.0%	128
28	7	136	0	0.0%	0	3	42.9%	18	2	28.6%	213	2	28.6%	238
29	15	273	0	0.0%	0	2	13.3%	20	5	33.3%	300	8	53.3%	320
30	17	1,813	0	0.0%	0	3	17.6%	14	9	52.9%	2,939	5	29.4%	865
31	30	2,554	0	0.0%	0	1	3.3%	5	26	86.7%	2,873	3	10.0%	633
32	15	814	0	0.0%	0	0	0.0%	0	11	73.3%	985	4	26.7%	344
33	33	1,460	0	0.0%	0	4	12.1%	25	22	66.7%	2,098	7	21.2%	275
34	72	2,925	0	0.0%	0	1	1.4%	21	61	84.7%	3,411	10	13.9%	249
35	61	1,451	0	0.0%	0	1	1.6%	30	38	62.3%	2,163	22	36.1%	287
Total	485	1,108	4	0.8%	3	38	7.8%	17	305	62.9%	1,666	138	28.5%	238

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

Year	Total Plants	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%



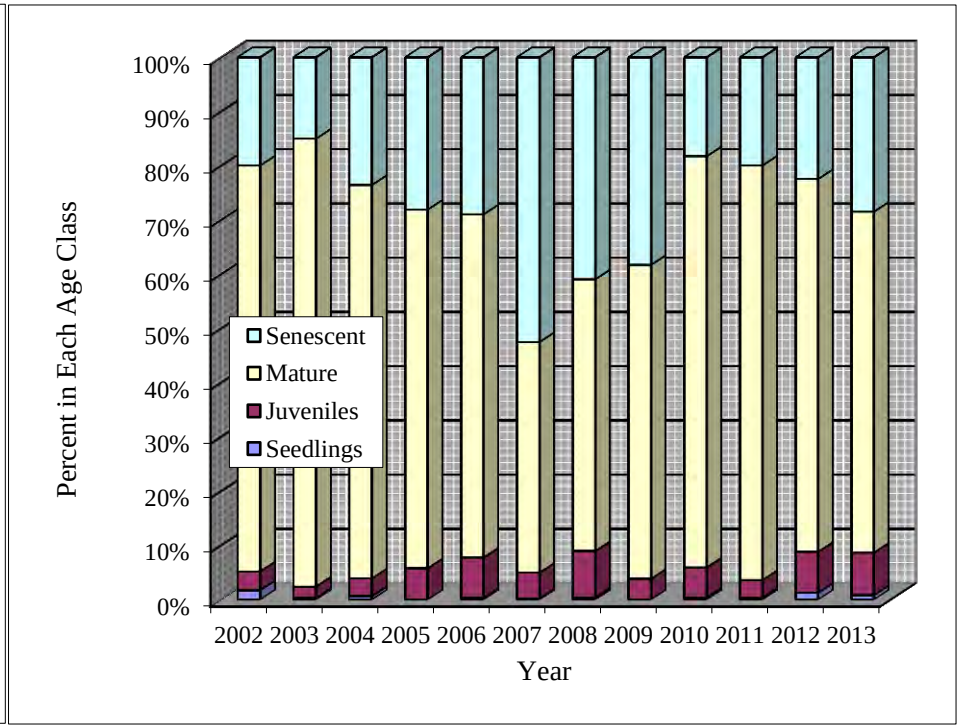


Table 12. Average number of flowerheads per plant by age class on the Historical Transect.

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

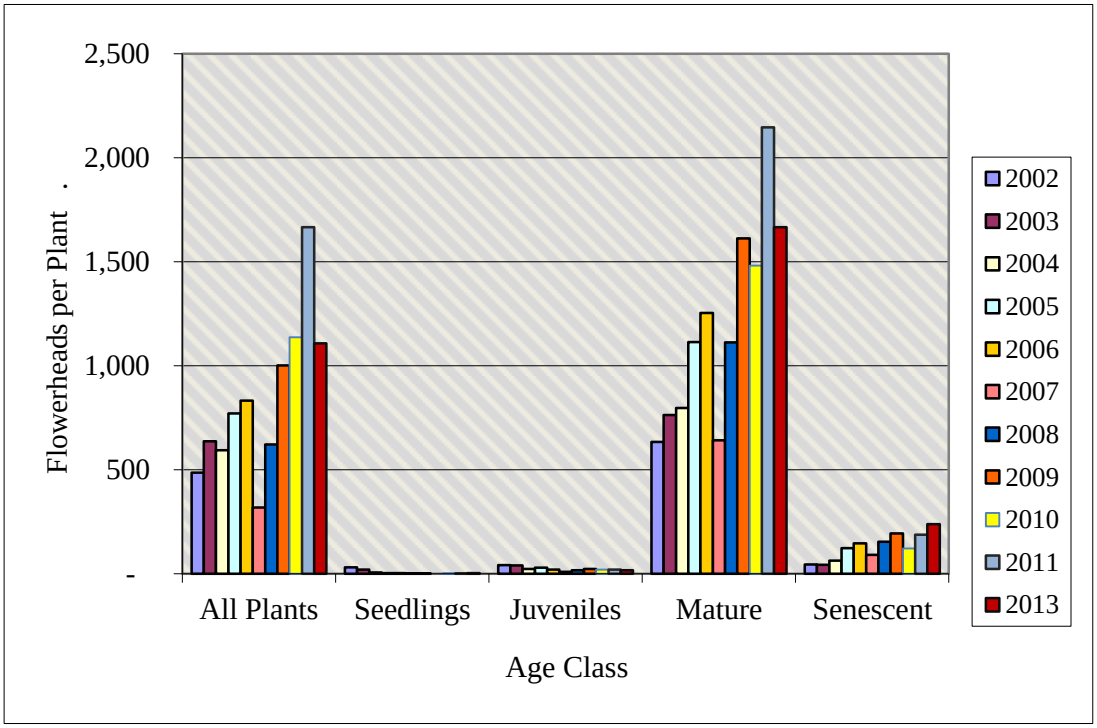


Table 13. Total number of buckwheat plants, flowerheads and ESB butterflies on the Historical Transect (2002 - 2013)

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

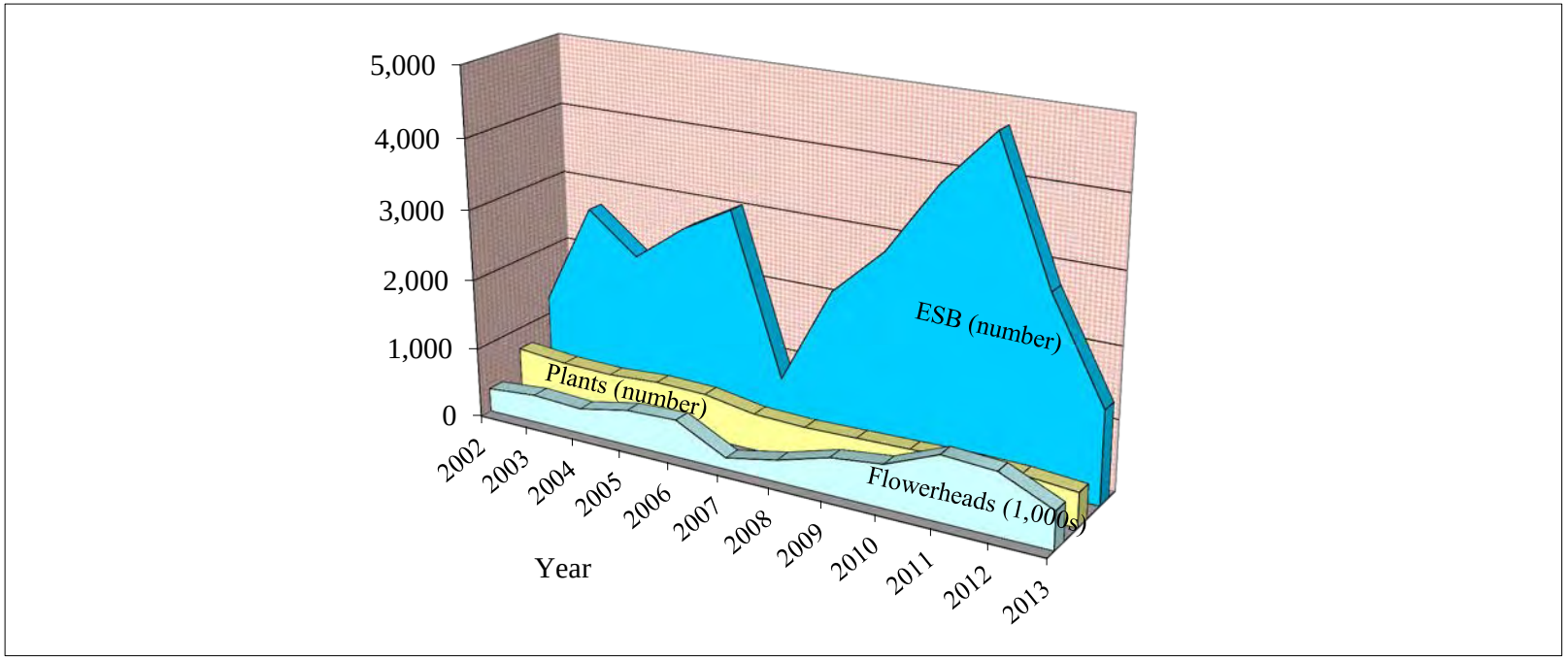


Table 14. 2013 Summary of Buckwheat Plants on Buckwheat Block Transects: Age Class and Flowerheads per Plant
El Segundo Blue Butterfly Preserve at LAX

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	28	2,361	0	0.0%	0	0	0.0%	0	23	82.1%	2,834	5	17.9%	185
2	3	900	0	0.0%	0	0	0.0%	0	3	100.0%	900	0	0.0%	0
3	18	273	0	0.0%	0	2	11.1%	23	11	61.1%	359	5	27.8%	182
4	27	116	5	18.5%	2	6	22.2%	22	9	33.3%	276	7	25.9%	74
5	83	123	19	22.9%	2	18	21.7%	17	23	27.7%	284	23	27.7%	146
6	53	80	0	0.0%	0	13	24.5%	13	12	22.6%	128	28	52.8%	91
7	0	na	0	na	na	0	na	na	0	na	na	0	na	na
8	3	30	0	0.0%	0	0	0.0%	0	0	0.0%	0	3	100.0%	30
9	3	1,188	0	0.0%	0	1	33.3%	5	1	33.3%	3,500	1	33.3%	60
10	2	138	0	0.0%	0	0	0.0%	0	0	0.0%	0	2	100.0%	138
11	2	1,913	0	0.0%	0	0	0.0%	0	2	100.0%	1,913	0	0.0%	0
12	0	na	0	na	na	0	na	na	0	na	na	0	na	na
13	11	1,313	0	0.0%	0	1	9.1%	13	4	36.4%	2,944	6	54.5%	443
14	3	362	0	0.0%	0	1	33.3%	12	1	33.3%	275	1	33.3%	800
15	5	862	0	0.0%	0	0	0.0%	0	3	60.0%	1,350	2	40.0%	130
16	0	na	0	na	na	0	na	na	0	na	na	0	na	na
17	29	747	3	10.3%	2	3	10.3%	9	10	34.5%	1,899	13	44.8%	203
18	7	193	0	0.0%	0	1	14.3%	19	5	71.4%	232	1	14.3%	175
19	14	129	0	0.0%	0	0	0.0%	0	8	57.1%	159	6	42.9%	88
20	14	721	0	0.0%	0	1	7.1%	6	6	42.9%	1,458	7	50.0%	191
21	11	104	0	0.0%	0	5	45.5%	22	5	45.5%	157	1	9.1%	250
22	18	256	1	5.6%	3	7	38.9%	24	6	33.3%	654	4	22.2%	129
23	38	174	0	0.0%	0	16	42.1%	19	12	31.6%	380	10	26.3%	174
24	12	920	0	0.0%	0	2	16.7%	9	6	50.0%	1,663	4	33.3%	263
25	3	342	0	0.0%	0	0	0.0%	0	1	33.3%	700	2	66.7%	163
26	4	1,856	0	0.0%	0	0	0.0%	0	2	50.0%	3,500	2	50.0%	213
27	6	105	0	0.0%	0	2	33.3%	16	2	33.3%	270	2	33.3%	30
28	11	411	0	0.0%	0	2	18.2%	26	3	27.3%	707	6	54.5%	392
29	40	903	0	0.0%	0	2	5.0%	26	20	50.0%	1,636	18	45.0%	187
30	41	324	0	0.0%	0	6	14.6%	18	23	56.1%	510	12	29.3%	118
31	61	558	4	6.6%	1	13	21.3%	27	20	32.8%	1,419	24	39.3%	221
32	61	312	8	13.1%	2	3	4.9%	25	26	42.6%	607	24	39.3%	133

Table 14. 2013 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	12	346	1	8.3%	1	2	16.7%	8	6	50.0%	634	3	25.0%	108
34	10	425	0	0.0%	0	2	20.0%	25	8	80.0%	525	0	0.0%	0
35	12	1,678	0	0.0%	0	0	0.0%	0	10	83.3%	1,937	2	16.7%	388
36	10	653	4	40.0%	2	0	0.0%	0	4	40.0%	1,506	2	20.0%	250
37	8	995	0	0.0%	0	0	0.0%	0	3	37.5%	2,450	5	62.5%	122
38	12	100	0	0.0%	0	2	16.7%	14	4	33.3%	163	6	50.0%	88
39	34	304	0	0.0%	0	2	5.9%	14	10	29.4%	680	22	64.7%	159
40	44	157	3	6.8%	1	7	15.9%	14	13	29.5%	332	21	47.7%	119
41	48	349	0	0.0%	0	5	10.4%	9	10	20.8%	1,106	33	68.8%	171
42	26	273	2	7.7%	2	3	11.5%	26	13	50.0%	477	8	30.8%	102
43	10	670	0	0.0%	0	0	0.0%	0	5	50.0%	980	5	50.0%	360
44	8	59	0	0.0%	0	1	12.5%	16	5	62.5%	46	2	25.0%	113
45	37	478	0	0.0%	0	3	8.1%	26	10	27.0%	1,318	24	64.9%	185
46	6	78	0	0.0%	0	0	0.0%	0	6	100.0%	78	0	0.0%	0
47	20	487	8	40.0%	2	0	0.0%	0	9	45.0%	1,014	3	15.0%	200
48	65	267	0	0.0%	0	9	13.8%	23	24	36.9%	406	32	49.2%	231
49	26	434	0	0.0%	0	2	7.7%	27	14	53.8%	711	10	38.5%	127
50	26	132	1	3.8%	2	9	34.6%	7	8	30.8%	368	8	30.8%	52
51	14	68	0	0.0%	0	5	35.7%	17	4	28.6%	191	5	35.7%	20
52	21	267	6	28.6%	2	3	14.3%	9	6	28.6%	588	6	28.6%	342
53	33	604	0	0.0%	0	3	9.1%	10	16	48.5%	1,099	14	42.4%	166
54	11	758	0	0.0%	0	0	0.0%	0	6	54.5%	1,350	5	45.5%	49
55	12	1,929	0	0.0%	0	0	0.0%	0	9	75.0%	2,306	3	25.0%	800
56	12	773	0	0.0%	0	5	41.7%	18	4	33.3%	2,225	3	25.0%	95
57	11	558	0	0.0%	0	0	0.0%	0	5	45.5%	1,075	6	54.5%	127
58	22	436	0	0.0%	0	0	0.0%	0	9	40.9%	914	13	59.1%	105
59	6	1,300	0	0.0%	0	0	0.0%	0	4	66.7%	1,738	2	33.3%	425
60	26	467	0	0.0%	0	4	15.4%	14	7	26.9%	1,280	15	57.7%	209
61	16	1,036	0	0.0%	0	0	0.0%	0	15	93.8%	1,058	1	6.3%	700
62	46	256	0	0.0%	0	7	15.2%	9	17	37.0%	370	22	47.8%	246
63	11	782	0	0.0%	0	0	0.0%	0	9	81.8%	908	2	18.2%	213
64	72	203	7	9.7%	2	14	19.4%	18	30	41.7%	406	21	29.2%	103

Table 14. 2013 Summary of Buckwheat Plants on Buckwheat Block Transects: Age Class and Flowerheads per Plant
El Segundo Blue Butterfly Preserve at LAX - continued

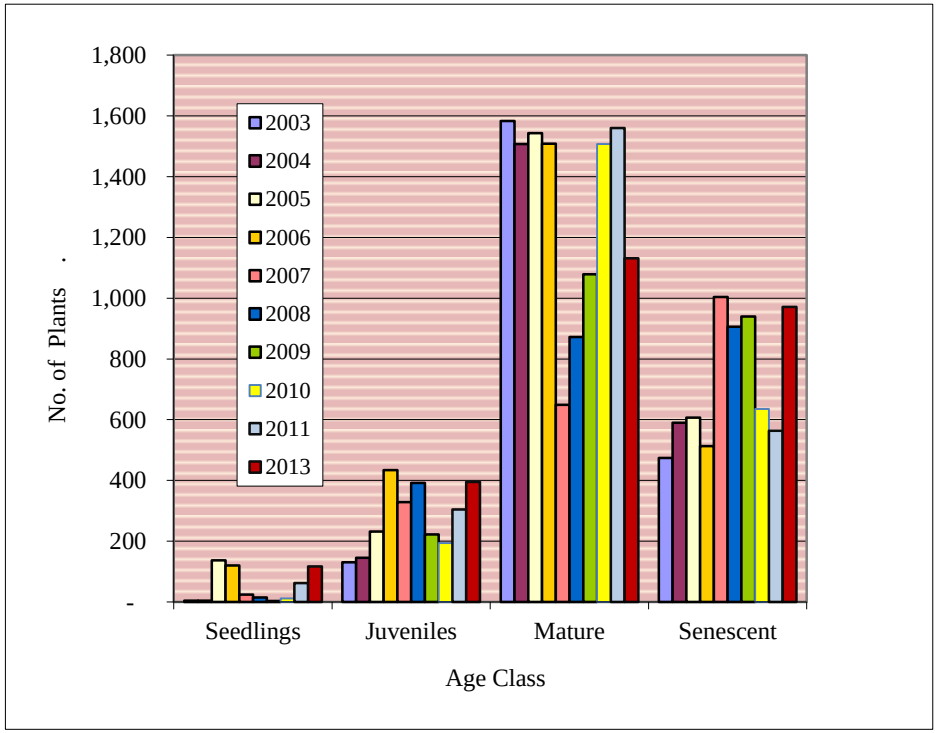
Block Transect Number	All Age Classes		Seedlings			Juveniles			Mature			Senescent		
	Total Plants	Average Flowerheads per Plant	Total Plants	Percent Seedlings	Average Flowerheads per Plant	Total Plants	Percent Juveniles	Average Flowerheads per Plant	Total Plants	Percent Mature	Average Flowerheads per Plant	Total Plants	Percent Senescent	Average Flowerheads per Plant
65	50	396	0	0.0%	0	5	10.0%	18	29	58.0%	594	16	32.0%	157
66	13	807	0	0.0%	0	3	23.1%	16	4	30.8%	2,288	6	46.2%	215
67	1	120	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	120
68	11	1,918	0	0.0%	0	3	27.3%	14	6	54.5%	3,383	2	18.2%	375
69	18	524	0	0.0%	0	0	0.0%	0	11	61.1%	752	7	38.9%	164
70	23	211	0	0.0%	0	4	17.4%	22	0	0.0%	0	19	82.6%	250
71	7	622	3	42.9%	2	1	14.3%	33	2	28.6%	1,283	1	14.3%	1,750
72	1	32	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	32
73	8	2,017	0	0.0%	0	1	12.5%	39	7	87.5%	2,300	0	0.0%	0
74	4	488	0	0.0%	0	1	25.0%	32	1	25.0%	1,700	2	50.0%	110
75	9	279	0	0.0%	0	0	0.0%	0	6	66.7%	363	3	33.3%	113
76	12	624	0	0.0%	0	0	0.0%	0	6	50.0%	1,066	6	50.0%	182
77	6	296	0	0.0%	0	0	0.0%	0	2	33.3%	338	4	66.7%	275
78	4	2,014	0	0.0%	0	0	0.0%	0	2	50.0%	3,900	2	50.0%	128
79	1	1,200	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	1,200
80	1	1,300	0	0.0%	0	0	0.0%	0	1	100.0%	1,300	0	0.0%	0
81	1	1,600	0	0.0%	0	0	0.0%	0	1	100.0%	1,600	0	0.0%	0
82	26	441	3	11.5%	2	4	15.4%	12	6	23.1%	1,567	13	50.0%	154
83	5	130	0	0.0%	0	0	0.0%	0	2	40.0%	225	3	60.0%	67
84	1	1,600	0	0.0%	0	0	0.0%	0	1	100.0%	1,600	0	0.0%	0
85	16	1,218	0	0.0%	0	2	12.5%	31	10	62.5%	1,865	4	25.0%	195
86	147	259	14	9.5%	2	41	27.9%	17	56	38.1%	571	36	24.5%	148
87	71	295	8	11.3%	2	18	25.4%	17	35	49.3%	553	10	14.1%	124
88	28	536	0	0.0%	0	2	7.1%	22	13	46.4%	928	13	46.4%	223
89	27	790	0	0.0%	0	1	3.7%	10	13	48.1%	1,577	13	48.1%	64
90	21	1,043	0	0.0%	0	2	9.5%	20	14	66.7%	1,503	5	23.8%	164
91	11	1,026	0	0.0%	0	1	9.1%	30	10	90.9%	1,126	0	0.0%	0
92	27	1,294	0	0.0%	0	0	0.0%	0	22	81.5%	1,521	5	18.5%	299
93	25	803	0	0.0%	0	3	12.0%	24	16	64.0%	1,122	6	24.0%	342
94	7	1,484	0	0.0%	0	0	0.0%	0	6	85.7%	1,714	1	14.3%	100
95	10	423	0	0.0%	0	0	0.0%	0	2	20.0%	1,138	8	80.0%	244
96	36	593	5	13.9%	1	4	11.1%	30	15	41.7%	1,262	12	33.3%	190

Table 14. 2013 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	32	439	0	0.0%	0	6	18.8%	30	13	40.6%	938	13	40.6%	129
98	44	352	3	6.8%	1	19	43.2%	16	10	22.7%	1,304	12	27.3%	179
99	17	766	0	0.0%	0	2	11.8%	14	12	70.6%	1,002	3	17.6%	325
100	45	941	0	0.0%	0	3	6.7%	12	33	73.3%	1,231	9	20.0%	187
101	30	430	0	0.0%	0	0	0.0%	0	16	53.3%	710	14	46.7%	110
102	20	667	0	0.0%	0	2	10.0%	24	11	55.0%	1,022	7	35.0%	293
103	6	3,044	0	0.0%	0	1	16.7%	12	3	50.0%	5,733	2	33.3%	525
104	65	283	2	3.1%	3	11	16.9%	14	22	33.8%	603	30	46.2%	166
105	47	417	0	0.0%	0	1	2.1%	32	18	38.3%	749	28	59.6%	217
106	7	633	0	0.0%	0	0	0.0%	0	6	85.7%	738	1	14.3%	5
107	15	514	0	0.0%	0	1	6.7%	23	9	60.0%	604	5	33.3%	450
108	8	87	4	50.0%	2	1	12.5%	15	3	37.5%	225	0	0.0%	0
109	8	155	0	0.0%	0	2	25.0%	21	3	37.5%	258	3	37.5%	142
110	55	293	3	5.5%	3	21	38.2%	18	16	29.1%	863	15	27.3%	129
111	36	202	0	0.0%	0	11	30.6%	15	8	22.2%	574	17	47.2%	149
112	13	87	0	0.0%	0	0	0.0%	0	3	23.1%	200	10	76.9%	53
113	5	437	0	0.0%	0	1	20.0%	10	4	80.0%	544	0	0.0%	0
114	14	236	0	0.0%	0	2	14.3%	15	3	21.4%	317	9	64.3%	259
115	54	372	0	0.0%	0	2	3.7%	16	24	44.4%	661	28	51.9%	149
116	34	160	0	0.0%	0	1	2.9%	19	14	41.2%	276	19	55.9%	82
117	40	496	0	0.0%	0	6	15.0%	19	24	60.0%	781	10	25.0%	99
118	19	73	0	0.0%	0	7	36.8%	33	3	15.8%	162	9	47.4%	74
119	6	53	0	0.0%	0	3	50.0%	41	2	33.3%	75	1	16.7%	45
120	2	83	0	0.0%	0	0	0.0%	0	1	50.0%	100	1	50.0%	65
121	1	28	0	0.0%	0	1	100.0%	28	0	0.0%	0	0	0.0%	0
122	1	90	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	90
123	1	40	0	0.0%	0	0	0.0%	0	0	0.0%	0	1	100.0%	40
124	15	2,473	0	0.0%	0	0	0.0%	0	15	100.0%	2,473	0	0.0%	0
125	3	1,983	0	0.0%	0	0	0.0%	0	3	100.0%	1,983	0	0.0%	0
126	5	434	0	0.0%	0	2	40.0%	34	3	60.0%	700	0	0.0%	0
Total	2,614	485	117	4.5%	2	395	15.1%	18	1,131	43.3%	966	971	37.1%	174

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%



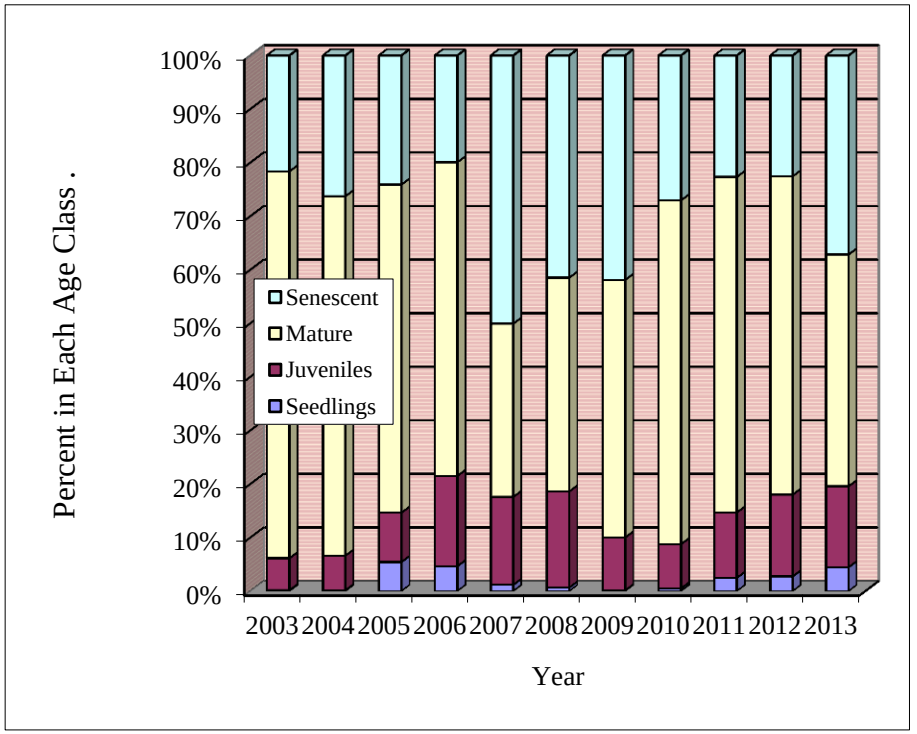


Table 16. Average number of flowerheads per plant by age class on the Block Transects (126 Transects)

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

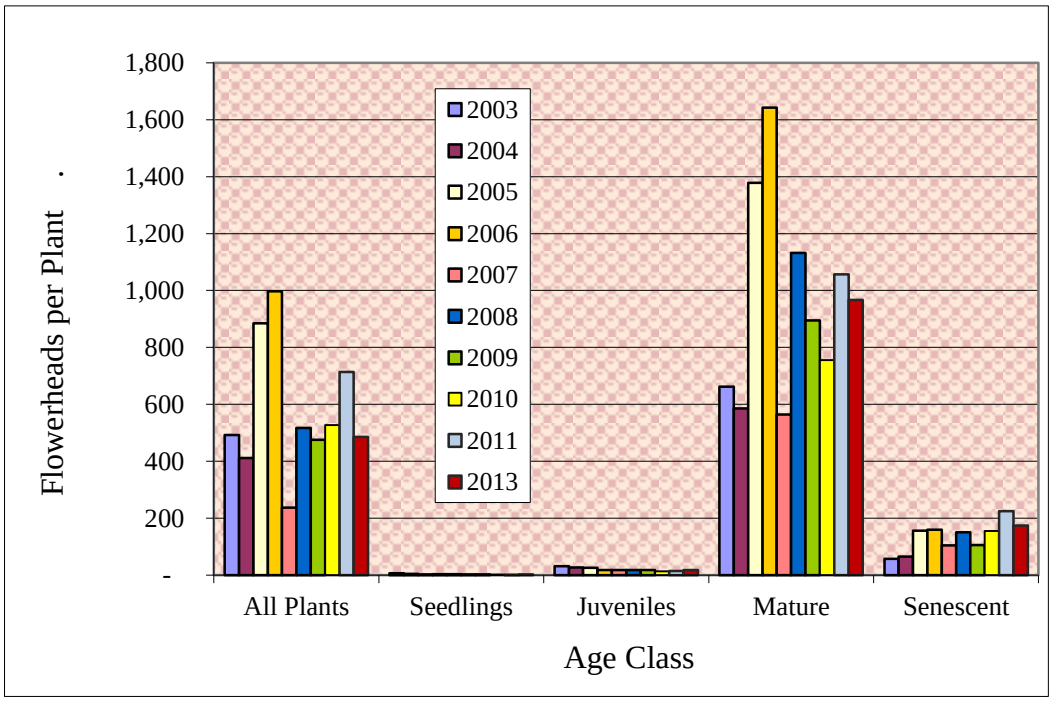


Table 17. Total number of buckwheat plants and flowerheads on the Block Transects
Total number of ESB butterflies observed during July Block Counts (2003 - 2013)

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

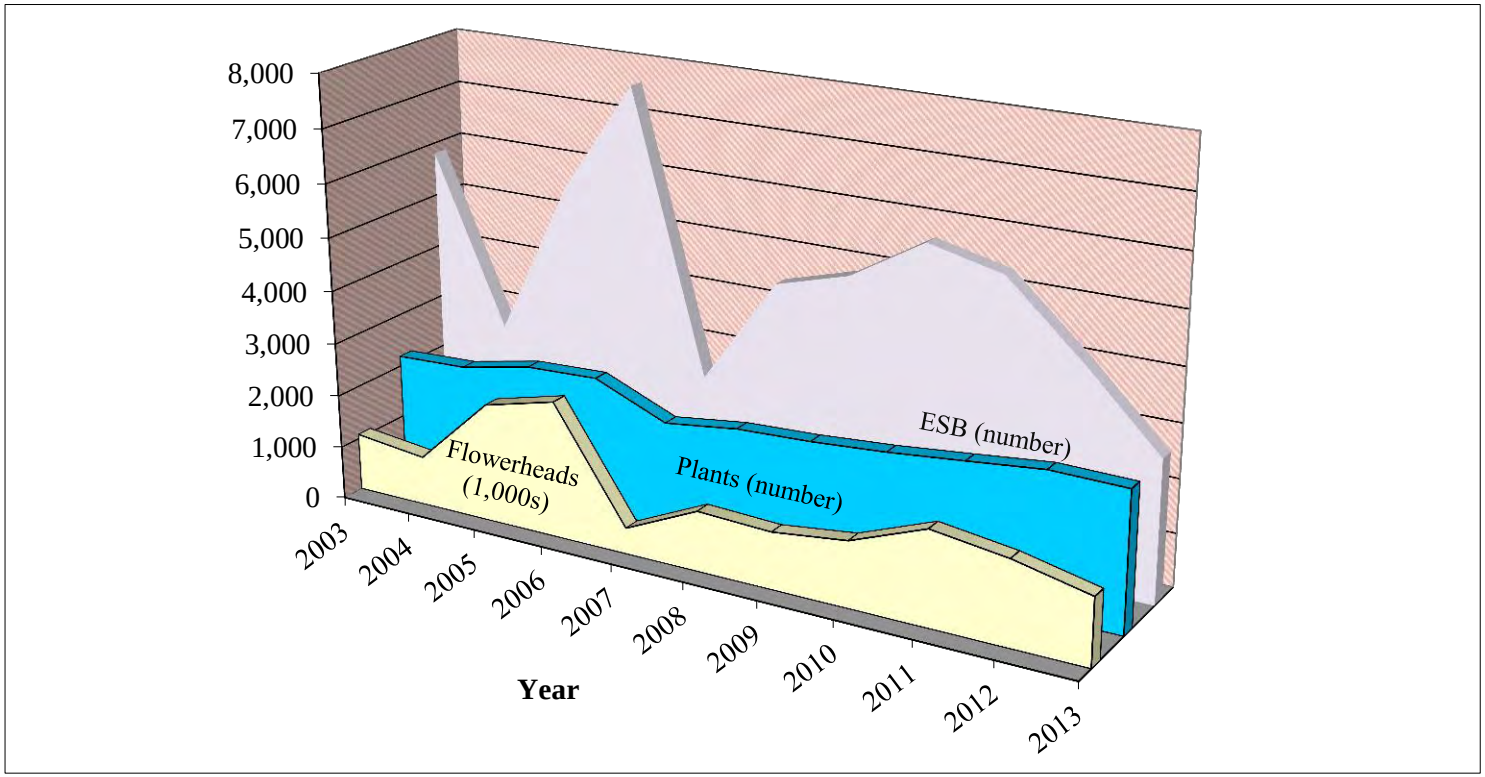
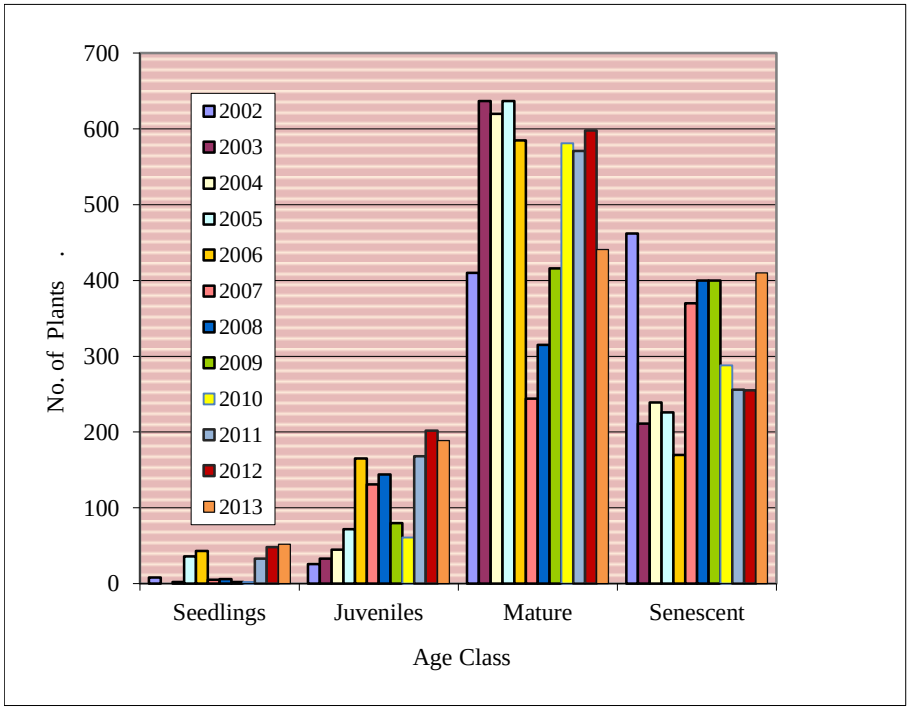


Table 18. Number of buckwheat plants by age class on the Block Transects.
(56 Common Transects)

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%



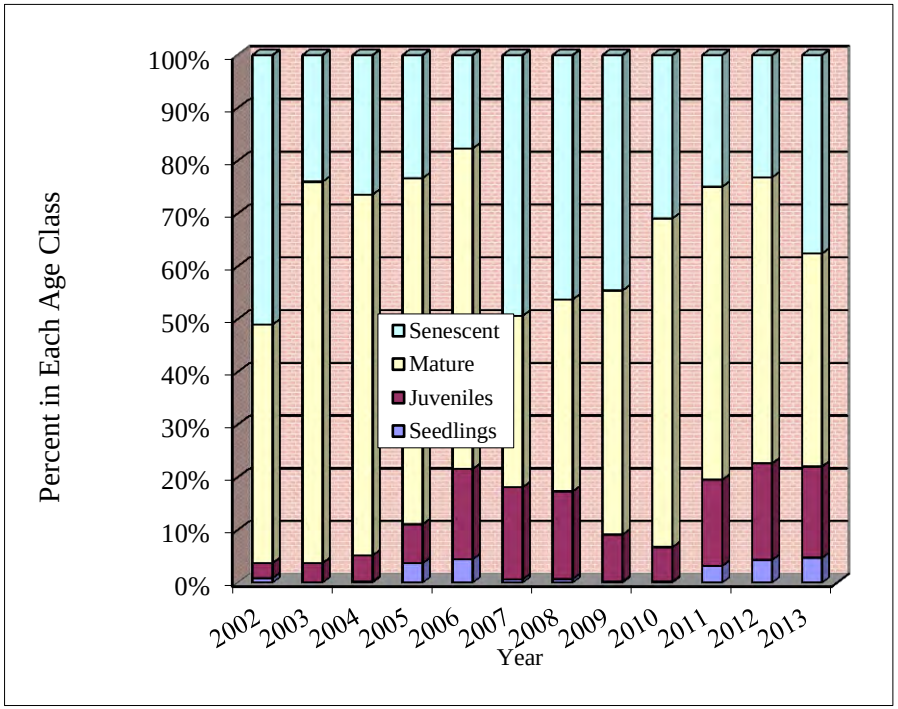
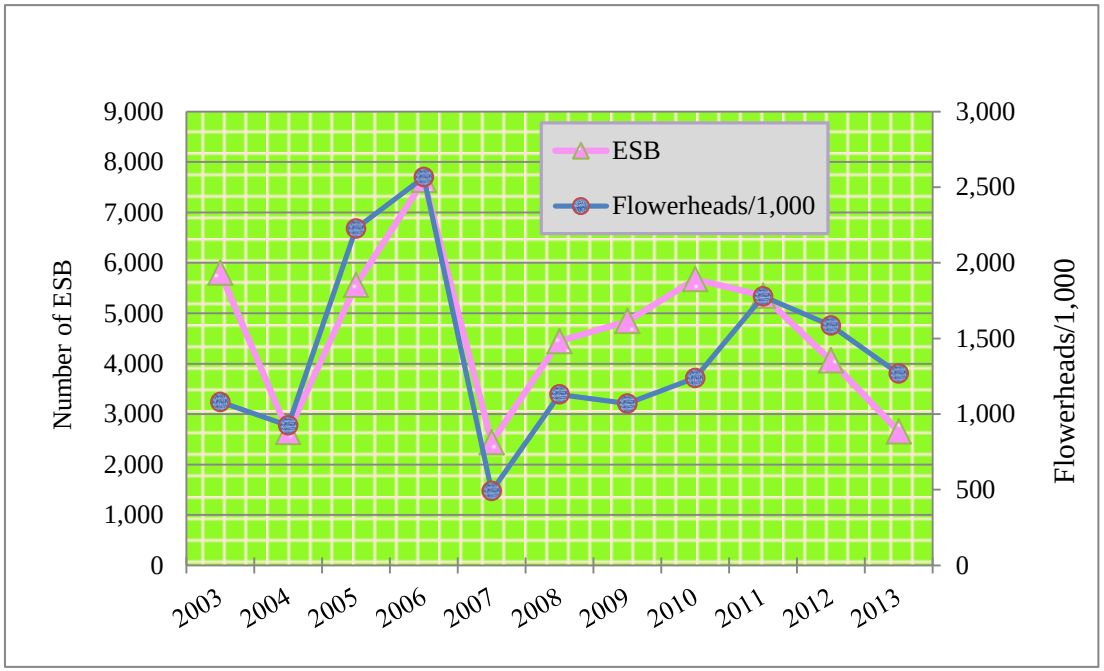


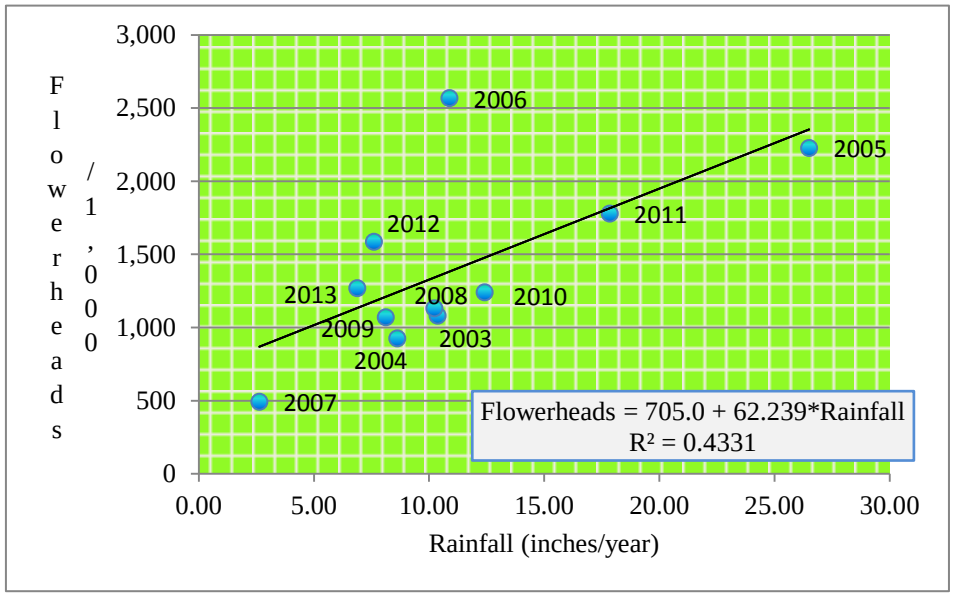
Table 19. Average number of flowerheads per plant by age class on the Block Transects (56 Common Transects)

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

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





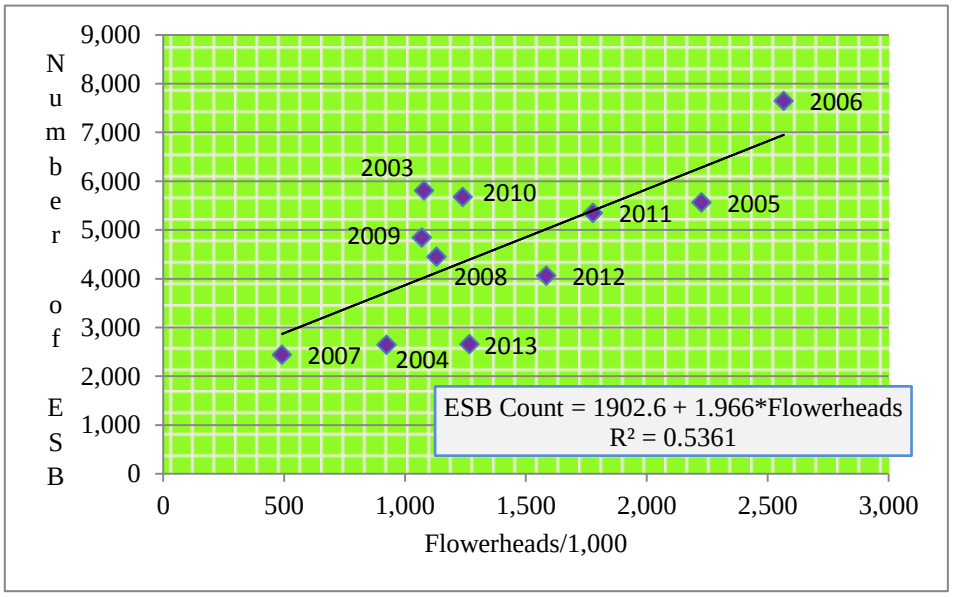


Table 21: Estimates of the number of flowerheads on Block Transects and ESB butterflies observed in Block Census Counts

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 2013 (in 1,000's)		
	Variable Name	Value	Estimate	Actual	Difference
2012 Equation (1)	Rainfall (inches)	6.89	1,113	1,268	155
2013 Equation (2)	Rainfall (inches)	6.89	1,134	1,268	134
			No. of ESB butterflies in 2013		
			Estimate	Actual	Difference
2012 Equation (3)	Flowerheads (1,000's)	1,113	4,284	2,656	(1,628)
2012 Equation (3)	Flowerheads (1,000's)	1,268	4,578	2,656	(1,922)
2013 Equation (4)	Flowerheads (1,000's)	1,268	4,395	2,656	(1,739)

Note: The equations used are summarized below

Flowerheads [F] (in 1,000's) = f(Rainfall [R] (in inches July 1 - June 30))

2012 Equation (1) F = 672.91 + 63.854*R Used data from the 2003 - 2012 period

2013 Equation (2) F = 705.00 + 62.239*R Used data from the 2003 - 2013 period

El Segundo Blue butterflies [ESB] = f(Flowerheads [F] (in 1,000;s))

2012 Equation (3) ESB = 2,173.1 + 1.8970*F Used data from the 2003 - 2012 period

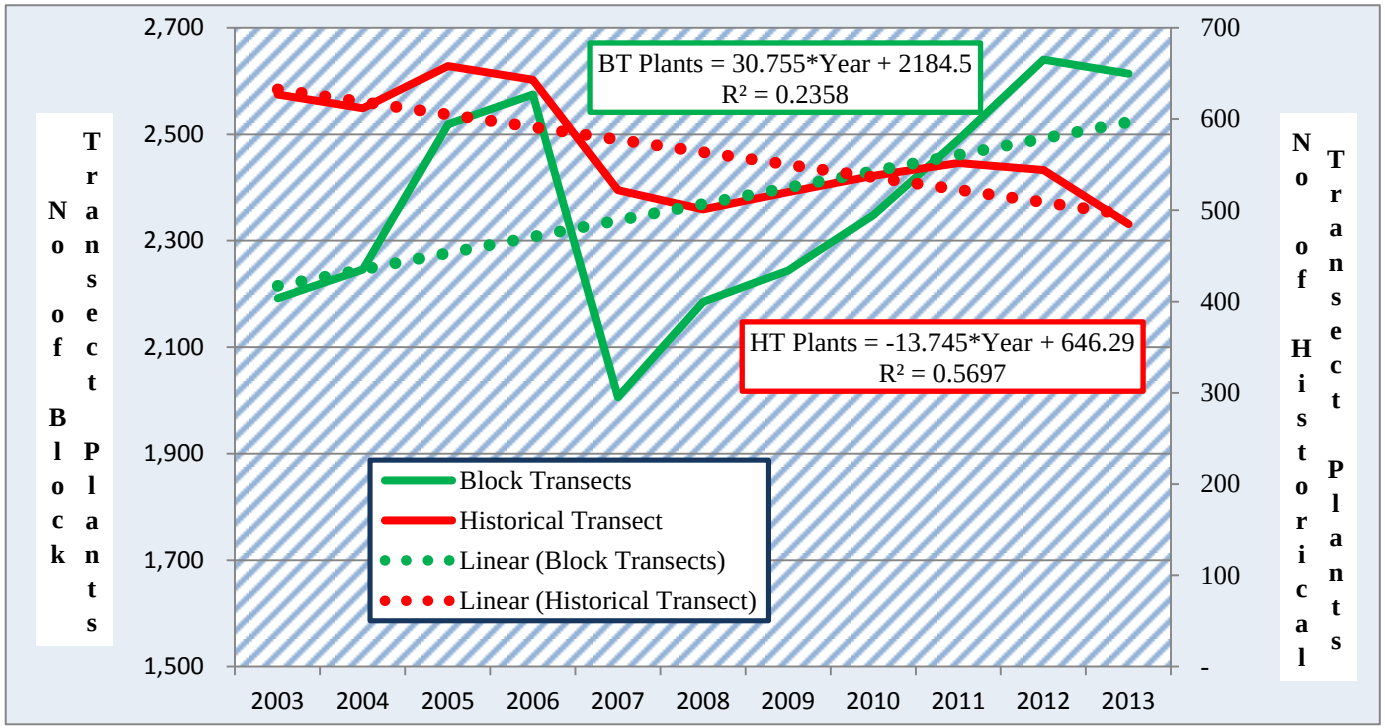
2013 Equation (4) ESB =1,902.6 + 1.9656*F Used data from the 2003 - 2013 period

Table 22. Number of Surviving Buckwheat Plants
at Outplanting Site in Block 23

Drip Line ID	No. Planted 11/29/2011	Number of Successful Plants On:						
		16-Jan-12	29-May-12	17-Jul-12	24-Aug-12	27-Nov-12	18-Mar-13	13-May-13
1	30	30	28	24	23	18	13	13
2	30	30	25	24	24	13	6	6
3	40	40	36	34	32	18	15	17
4	30	30	25	25	23	15	13	13
5	35	34	32	26	26	18	15	15
6	25	25	24	18	15	11	9	11
7	25	24	21	20	19	11	8	8
8	40	40	34	32	31	21	16	16
9	35	35	28	24	23	14	8	8
10	40	40	33	29	28	15	7	9
Total	330	328	286	256	244	154	110	116
Percent	100%	99%	87%	78%	74%	47%	33%	35%

Table 23. Trends in the the Total Number of Buckwheat Plants 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



SECTION 8
FIGURES

Figure 1. Study Area for the El Segundo Blue Butterfly at the Los Angeles International Airport

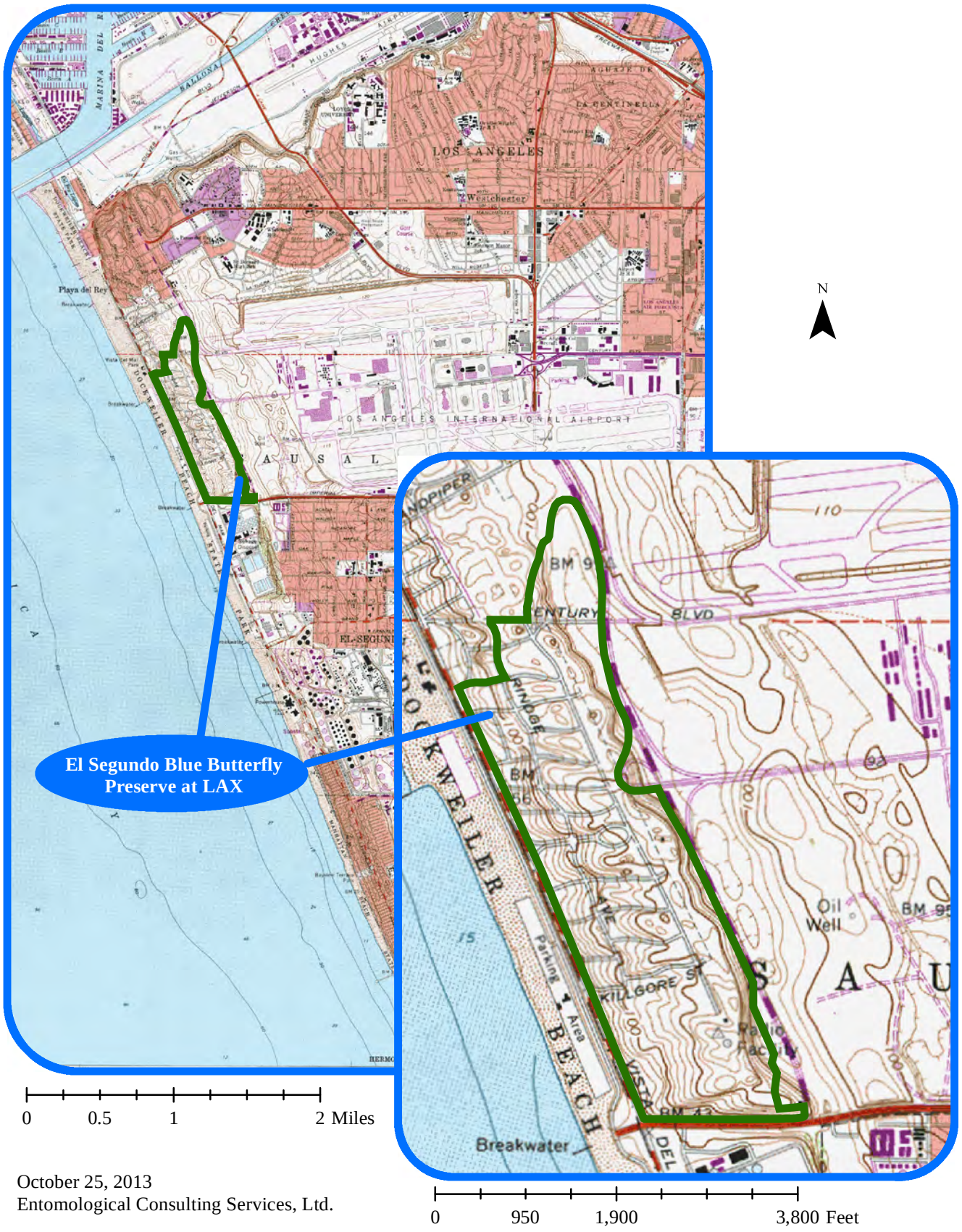


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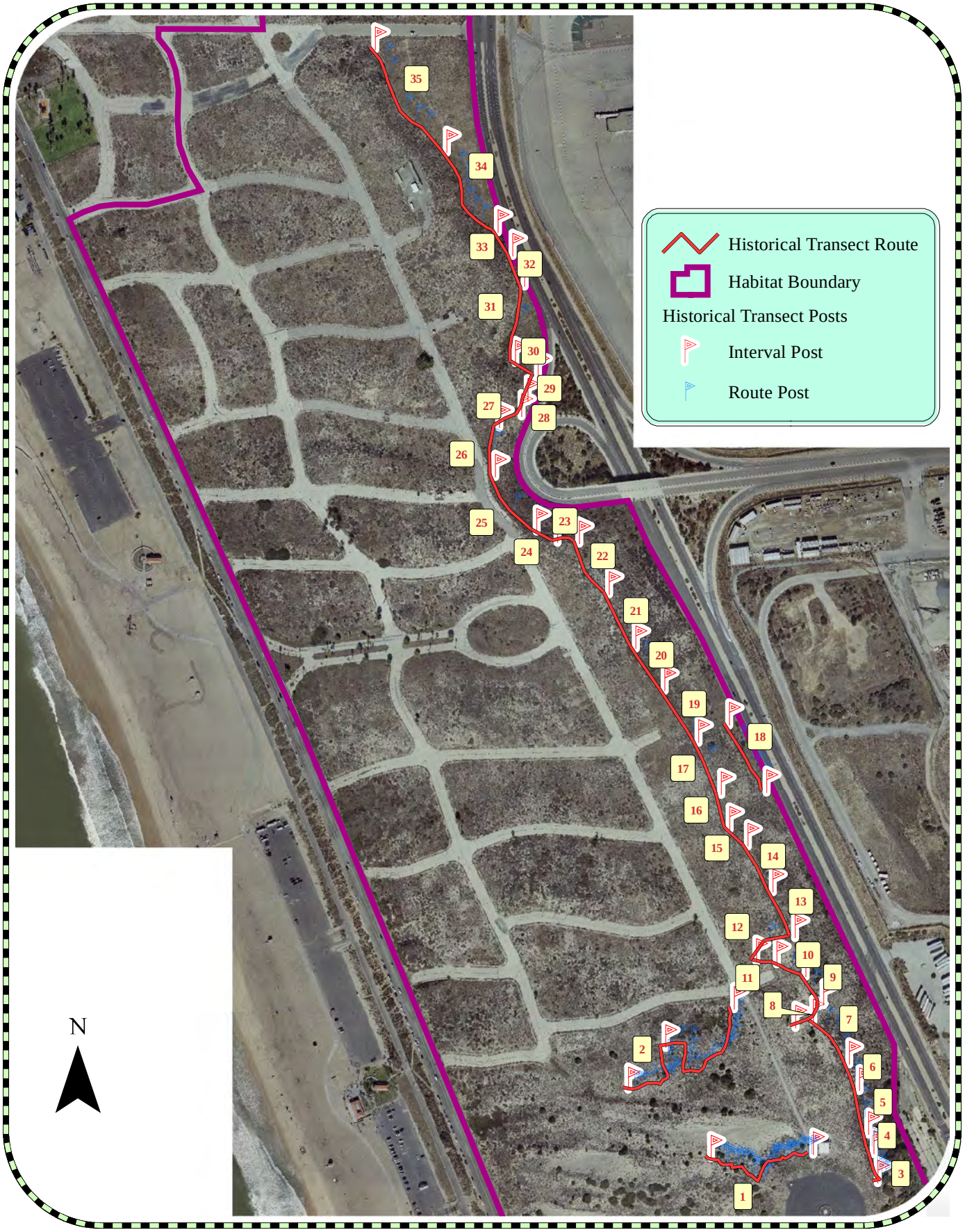
Figure 2. Historical Transect Route Intervals
El Segundo Blue Butterfly Preserve at LAX



0 375 750 1,500 Feet

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Figure 3. Habitat Boundary and Block Identification
El Segundo Blue Butterfly Preserve at LAX

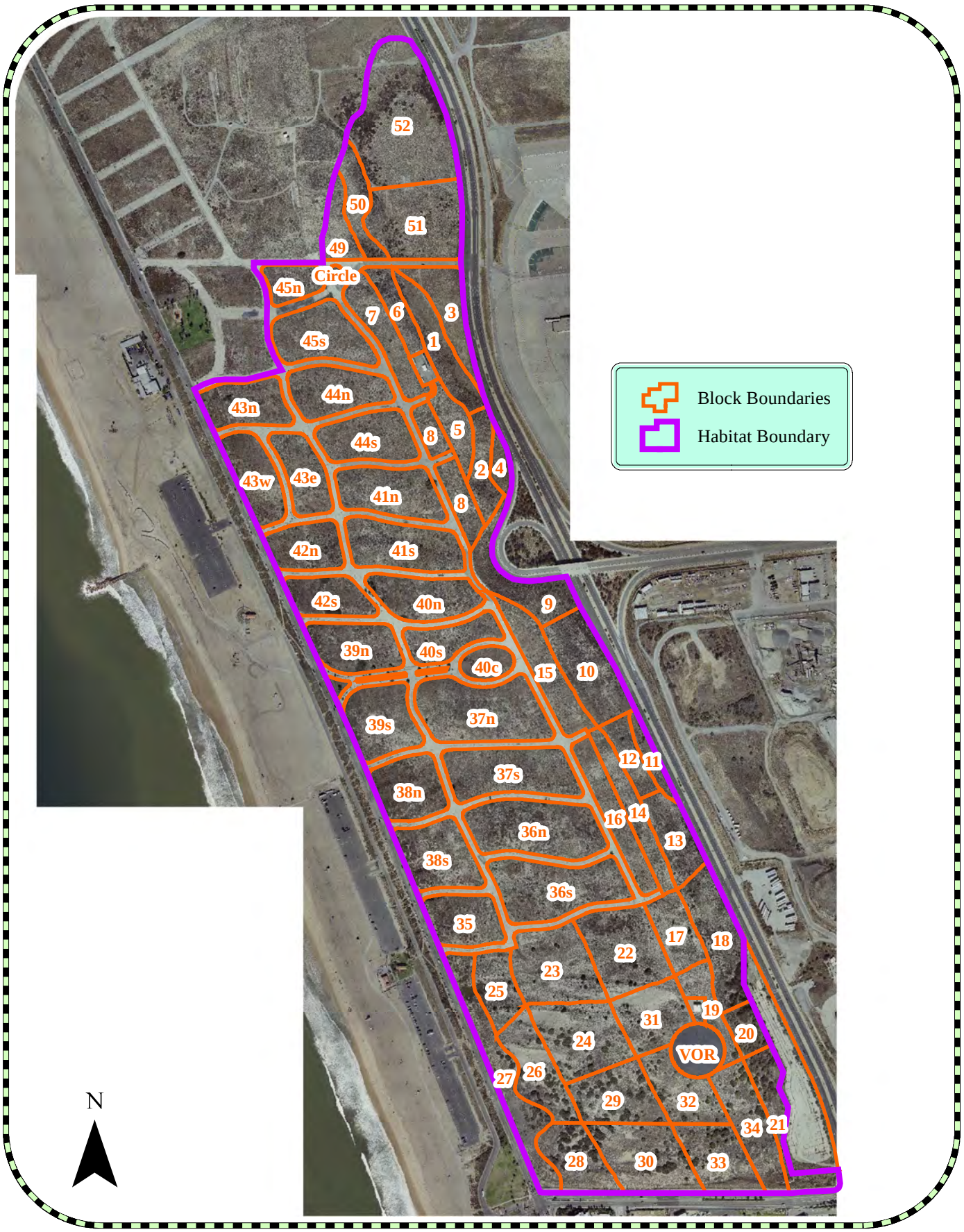

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Figure 4. Habitat Boundary and Locations of the Block Buckwheat Transects
El Segundo Blue Butterfly Preserve at LAX

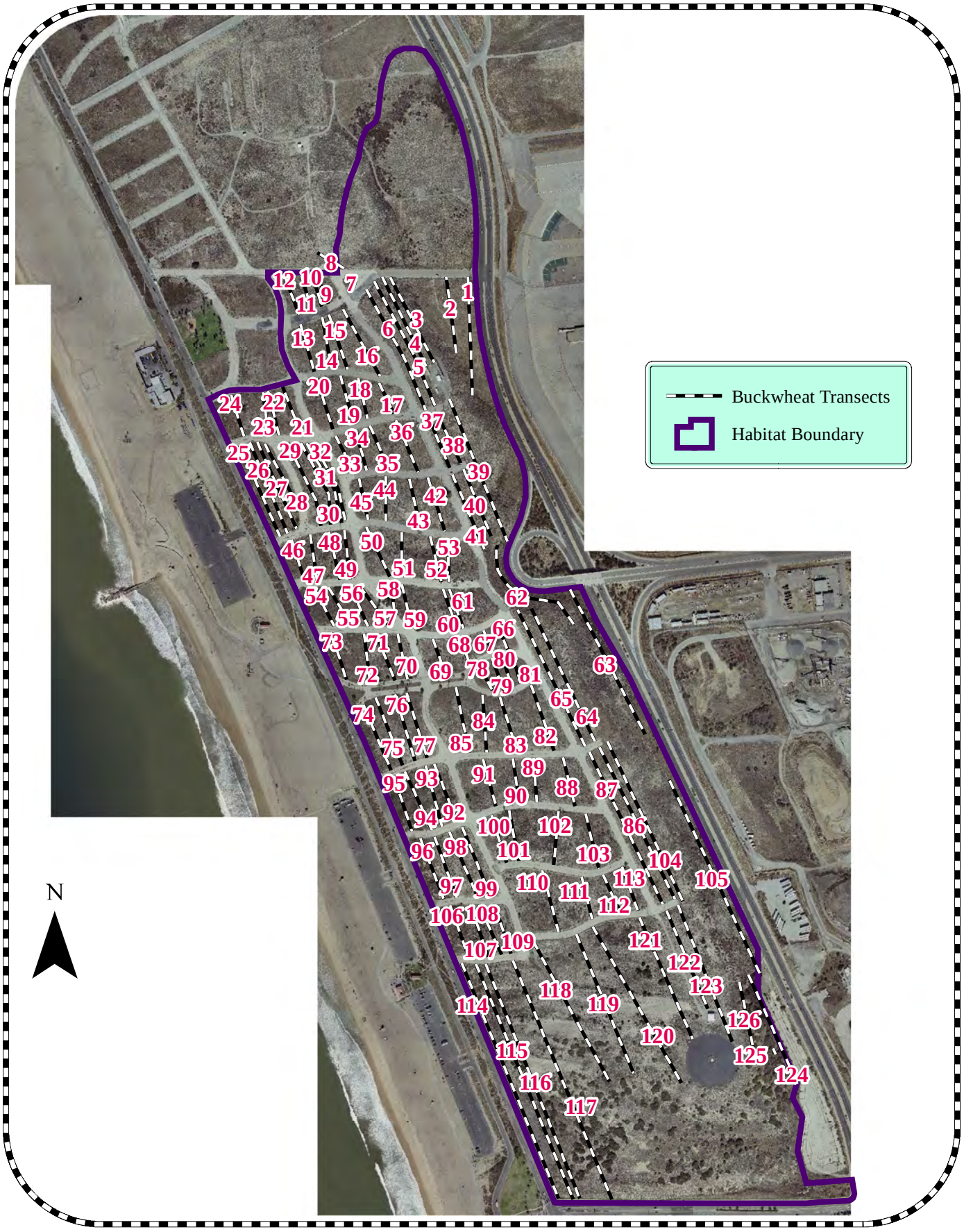

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Figure 5. Locations of El Segundo Blue Butterflies Observed during the July 9 -13, 2013 Block Counts at the El Segundo Blue Butterfly Preserve at LAX

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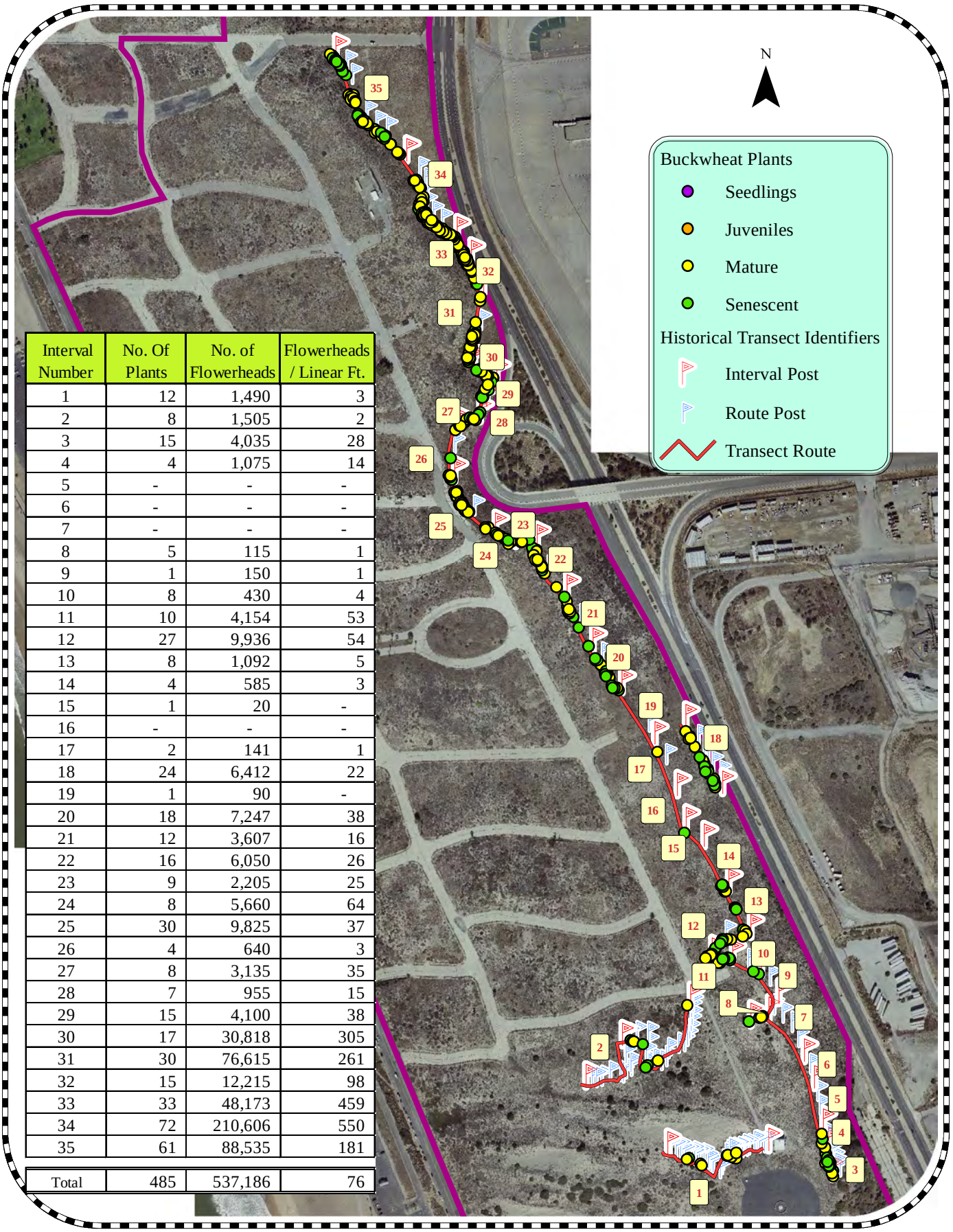
Figure 6. Overview of Buckwheat Plants on the Historical Transect: Age Class and Flowerhead Counts, by Interval



Interval Number	No. Of Plants	No. of Flowerheads	Flowerheads / Linear Ft.
1	12	1,490	3
2	8	1,505	2
3	15	4,035	28
4	4	1,075	14
5	-	-	-
6	-	-	-
7	-	-	-
8	5	115	1
9	1	150	1
10	8	430	4
11	10	4,154	53
12	27	9,936	54
13	8	1,092	5
14	4	585	3
15	1	20	-
16	-	-	-
17	2	141	1
18	24	6,412	22
19	1	90	-
20	18	7,247	38
21	12	3,607	16
22	16	6,050	26
23	9	2,205	25
24	8	5,660	64
25	30	9,825	37
26	4	640	3
27	8	3,135	35
28	7	955	15
29	15	4,100	38
30	17	30,818	305
31	30	76,615	261
32	15	12,215	98
33	33	48,173	459
34	72	210,606	550
35	61	88,535	181
Total	485	537,186	76

0 375 750 1,500 Feet

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Figure 7. Overview of Buckwheat Plants on the Block Buckwheat Transects by Age Class

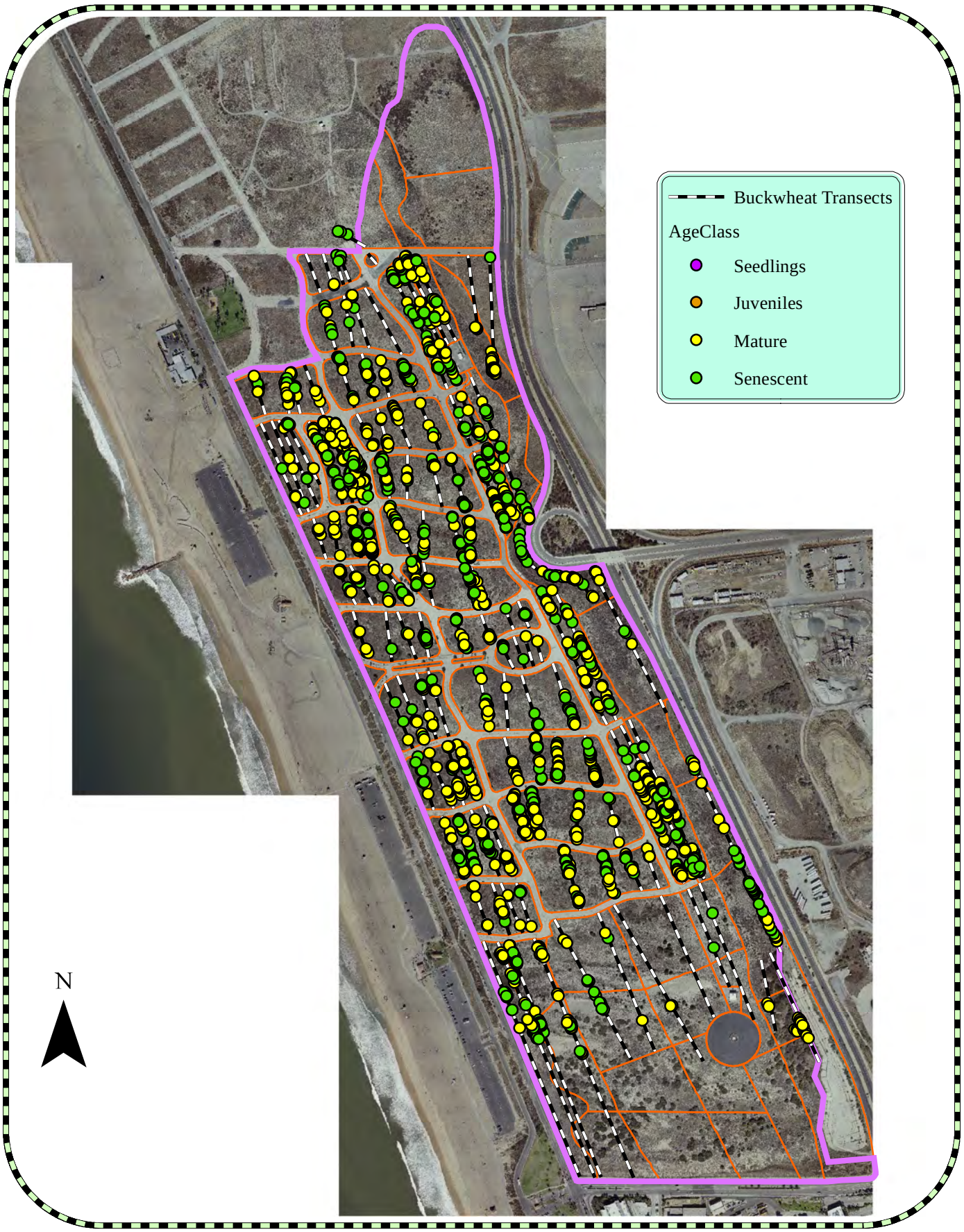

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Figure 8. Example locations for removal of Acacia, Shrubs & Pine
[photographs locations are shown - photographs are in Appendix A]

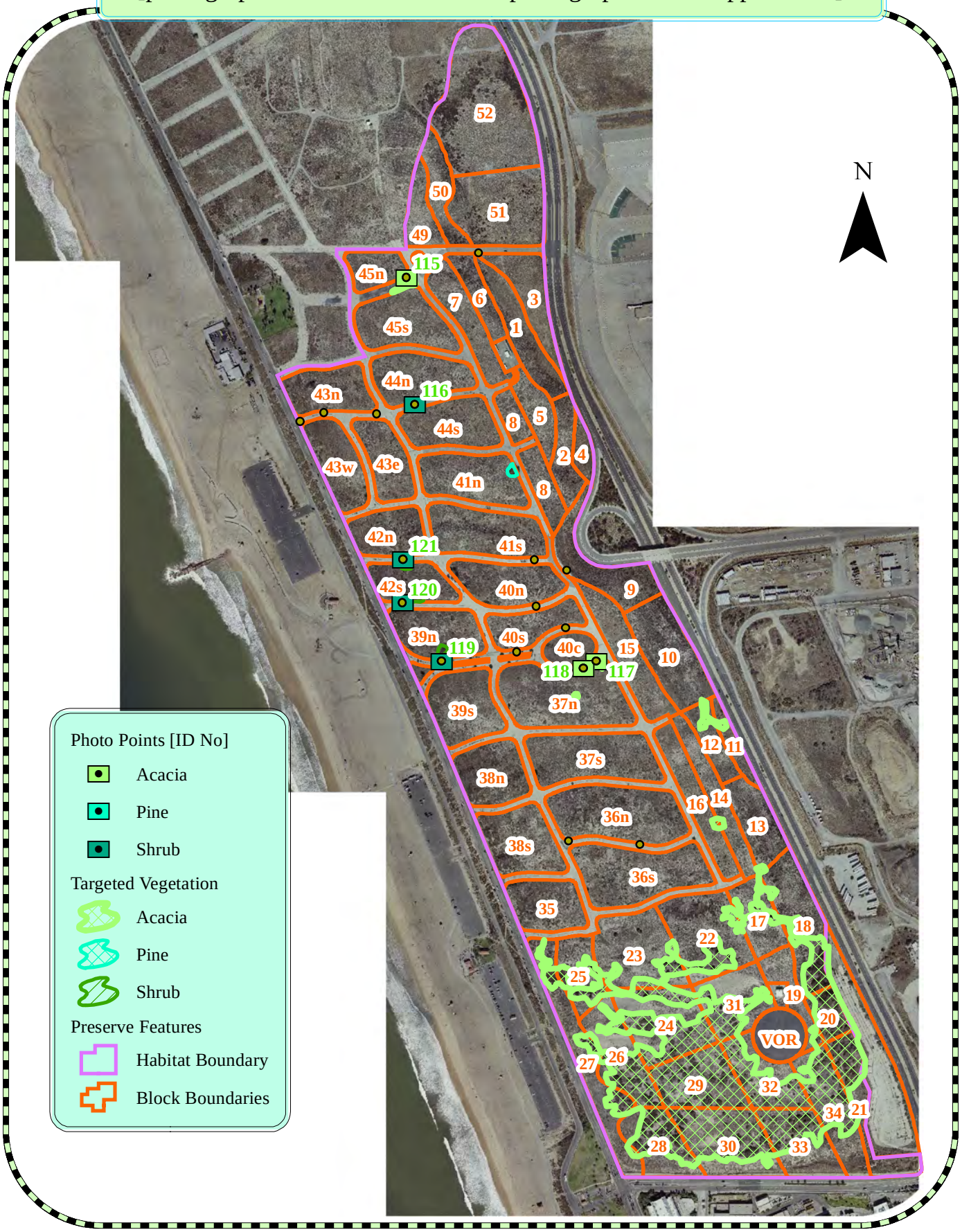

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Figure 9. Example locations for removal of invasive buckwheats
[photograph locations are shown - photographs are in Appendix A]

0 500 1,000 2,000 Feet

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Figure 10. Example locations for removal of Ice Plant
[photograph locations are shown - photographs are in Appendix A]

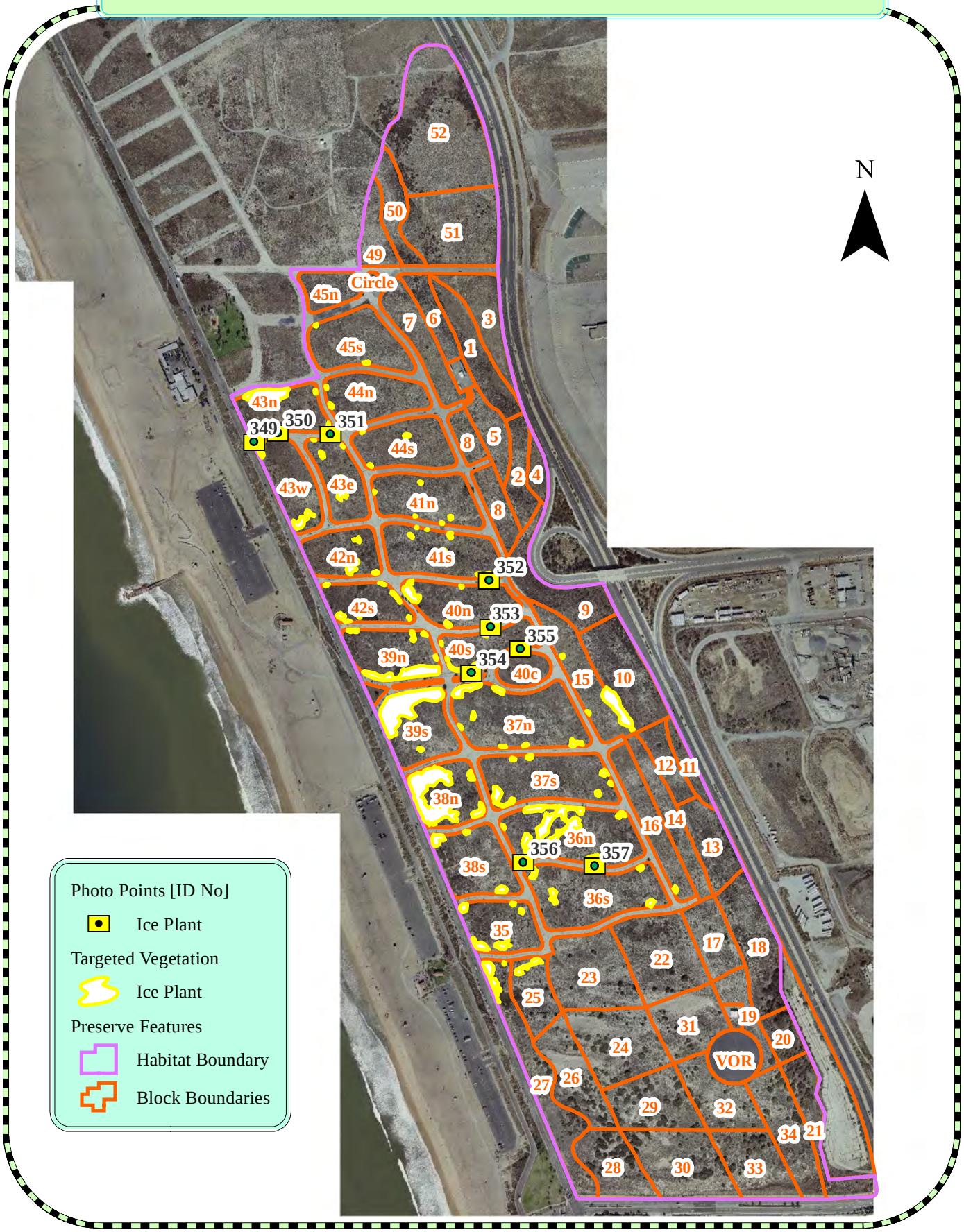

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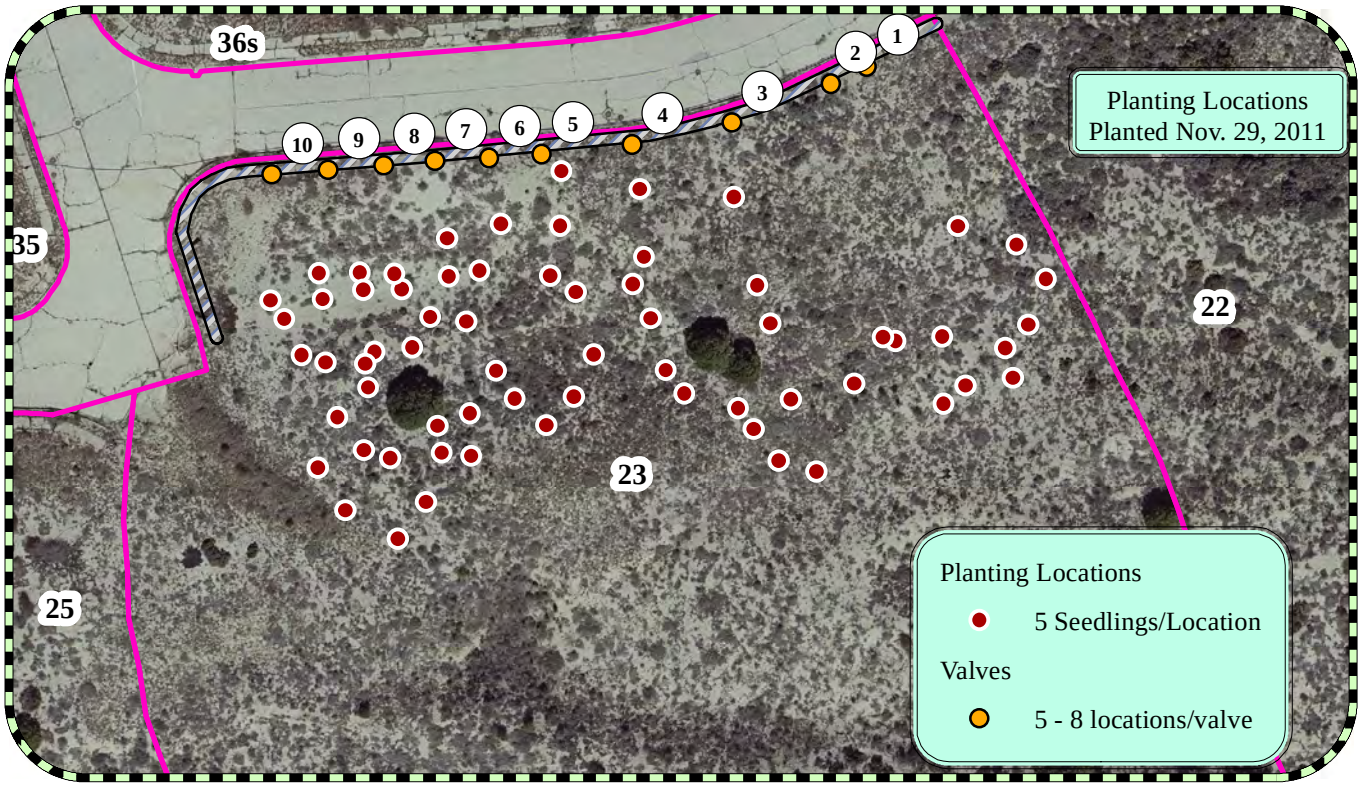
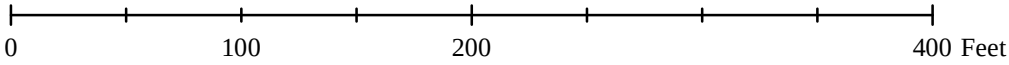
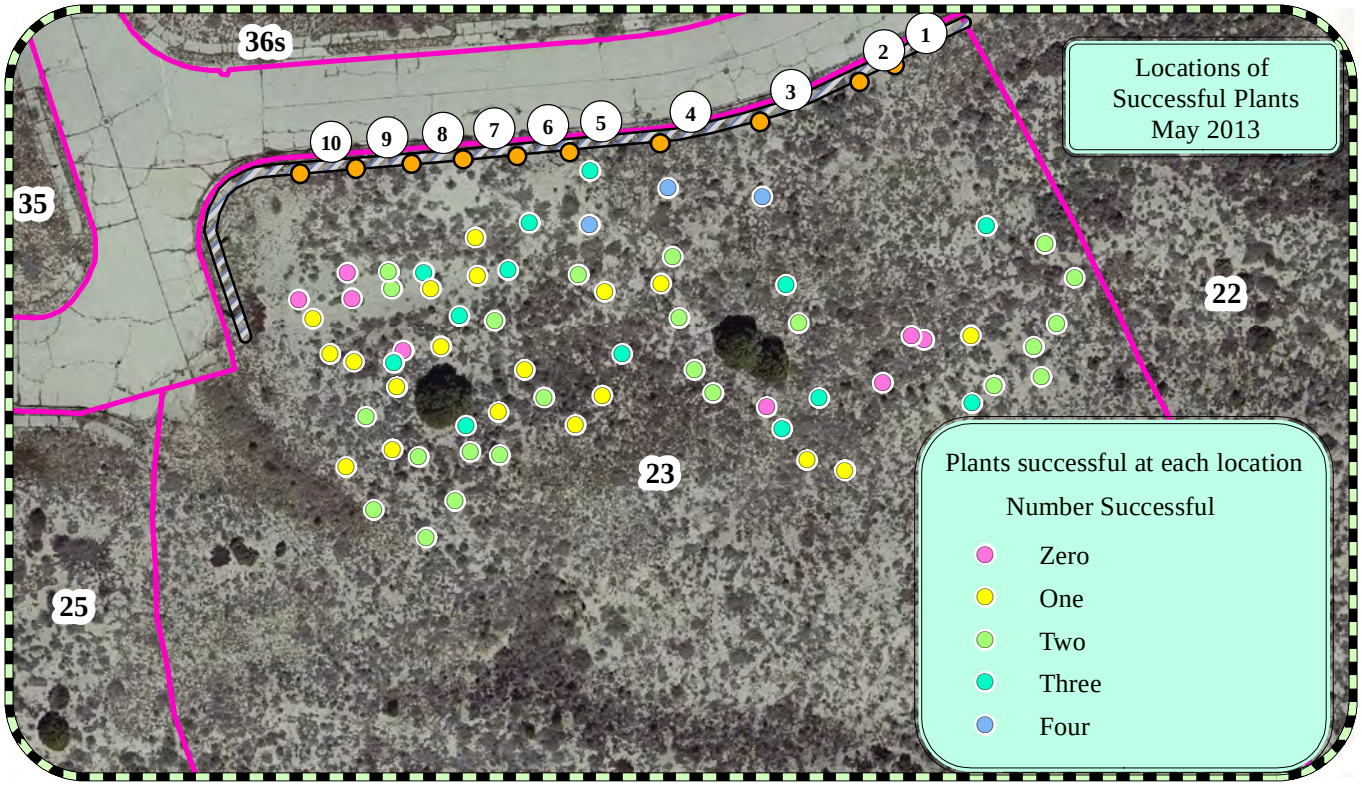
Figure 11. Buckwheat Mitigation on Block 23
Planting locations and May 2013 survey results







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October 31, 2013
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SECTION 9
APPENDIX A:
PHOTODOCUMENTATION OF INVASIVE PLANTS

LAX ESB Preserve

Photodocumentation of Selected Areas Needing Vegetation Control

Photo Pt 115 - Block 45s

Photo Pt 116 - Block 44s

Photo Pt 117 - Block 37n

Photo Pt 118 - Block 37n

Photo Pt 119 - Block 39n

Photo Pt 120 - Block 42n

LAX ESB Preserve

Photodocumentation of Selected Areas Needing Vegetation Control

Photo Pt 121 - Block 42s

Photo Pt 217 - Block 3

Photo Pt 218 - Block 9

Photo Pt 349 - Block 43w

Photo Pt 350 - Block 43n

Photo Pt 351 - Block 43n

LAX ESB Preserve

Photodocumentation of Selected Areas Needing Vegetation Control

Photo Pt 352 - Block 41s

Photo Pt 353 - Block 40s

Photo Pt 354 - Block 40s

Photo Pt 355 - Block 40s

Photo Pt 356 - Block 36s

Photo Pt 357 - Block 36n

SECTION 10
APPENDIX B: WORK LOGS

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
1/2/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
1/3/13	TWO / 18 HR	CUT CALIF BUCKWHEAT NEW GROWTH.	AREA 51
1/7/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
1/8/13	TWO / 18 HR	PICKED UP ALL PALM LEAFS FROM ROADS.	AREA 39N, 42S, 40N, 44S, 46S, 41N.
1/14/15	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
1/15/13	TWO / 18 HR	CUT CALIF BUCKWHEAT NEW GROWTH.	AREA 52
1/16/13	TWO / 18 HR	CUT CALIF BUCKWHEAT NEW GROWTH.	AREA 52
1/17/13	TWO / 18 HR	CUT CALIF BUCKWHEAT NEW GROWTH.	AREA 52
1/22/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
1/23/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT	AREA 51
1/28/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
1/29/13	TWO / 18 HR	RECORDED ALL WORK DONE EN DUNES HABITAT SINCE 2006 ON A MAP.	
1/30/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 51
1/31/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 51
2/4/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
2/5/13	TWO / 18 HR	CUT AND SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 52

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
2/6/13	TWO/18 HR	CUT AND SPRAYED CALIF BUCKWHEAT. NEW GROWTH.	AREA 52
2/7/13	TWO/18 HR	CUT AND SPRAYED CALIF BUCKWHEAT NEW GROWTH	AREA 52
[illegible]	[illegible]	[illegible]	
2/11/13	TWO/18 HR	LITTER PICKUP	ALL THROUGHOUT
2/12/13	TWO/18 HR	CUT CALIF BUCKWHEAT.	AREA 43 W
2/13/13	TWO/18 HR	CUT CALIF BUCKWHEAT.	AREA 43 W
2/14/13	TWO/18 HR	SPRAYED CALIF BUCKWHEAT	AREA 43 W
2/19/13	TWO/18 HR	LITTER PICKUP	ALL THROUGHOUT
2/20/13	TWO/18 HR	CUT AND SPRAYED CALIF BUCKWHEAT.	AREA 41 S
2/25/13	TWO/18 HR	LITTER PICKUP	ALL THROUGHOUT
2/26/13	TWO/18 HR	CUT AND SPRAYED CALIF. BUCKWHEAT.	AREA 41 S
2/27/13	TWO/18 HR	CUT AND SPRAYED CALIF BUCKWHEAT.	AREA 40 N
2/28/13	TWO/18 HR	CUT AND SPRAYED CALIF BUCKWHEAT.	AREA 15
3/4/13	TWO/18 HR	LITTER PICKUP	ALL THROUGHOUT
3/5/13	TWO/18 HR	CUT CALIF BUCKWHEAT	AREA 9
3/6/13	TWO/18 HR	CUT CALIF BUCKWHEAT	AREA 9
3/7/13	TWO/18 HR	CUT CALIF BUCKWHEAT	AREA 9
3/11/13	TWO/18 HR	LITTER PICKUP	ALL THROUGHOUT

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
3/18/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHTOUT
3/19/13	TWO / 18 HR	CUT AND REMOVED CALIF BUCKWHEAT.	AREA 9
3/20/13	TWO / 18 HR	CUT AND REMOVED CALIF BUCKWHEAT.	AREA 9
3/21/13	TWO / 18 HR	CUT AND REMOVED CALIF BUCKWHEAT.	AREA 9
3/26/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHTOUT
3/27/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 52
3/28/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 52
4/1/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHTOUT
4/2/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 53
4/8/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHTOUT
4/9/13	TWO / 18 HR	REMOVED PALM LEAFS FROM ROADS.	ALL THROUGHTOUT
4/10/13	TWO / 18 HR	REMOVED PALM LEAFS FROM ROADS.	ALL THROUGHOUT
4/11/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 53
4/15/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHTOUT
4/16/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH	AREA 53

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
4/17/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 51
4/22/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 51
4/23/13	TWO / 18 HR	LITTER PICKUP	ALL THROUGHOUT
4/29/13	TWO / 18 HR	SPRAYED CALIF BUCKWHEAT NEW GROWTH.	AREA 51
	DUE TO SHORT STAFF FROM DATES 4/24-7/29 MINIMAL MAINTENANCE PERFORMED IN DUNES. WORK LIMITED TO KEEPING UP WITH LITTER AND SOME NEW GROWTH.		
	7/29-8/12 TRAINING NEW EMPLOYEE FOR DUNES		

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
8/12	Two 18Hrs	Litter Pick UP Water View 2 Bags	All Through out
8/13	two men / 18Hrs	Litter Pick UP Water View. Cut Some Acacia trees New Growth	All Trough out Parking Slop
8/14	two men / 18Hrs	Litter Water View Pick UP Broken Cement around Water View Cut acacia ~~trees~~ Tree	Water View Northside Water View
8/15	2MEN/18Hrs		
8/19	Two 18 Hrs	Litter Pick UP cutting Acacia trees	All through out
8/20	Two 18 Hrs	Litter Pick UP Water View	north side
8/21	two 18Hrs	Litter Pick UP cut Some buck Wheat	North side Pershing ST
8/22	Two 18Hrs	Litter Pick UP	Water View
8/26	Two 18 Hrs	Litter Pick UP	All Trough out
8/27	two 18 Hrs	Litter Pick UP cut Acacia TREE	Water View Pershing slop
8/28	Two 18Hrs	Litter Pick UP Knock down Weeds cut down acacia tree	Water View West side of the Dunes
8/29	two 18 Hrs	Litter Pick UP cut Some buck Wheat	on Pershing
8/30			

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
9/3	Two 18Hrs	Litter Pick UP	All Thruout
9/4	Two 18Hrs	Litter Pick UP cut some weeds	Water View
9/5	Two 18Hrs	Litter Pick UP cut down some Acacia Trees	Water View Westside of the Dunes
9/9	Two 18Hrs	Litter Pick UP	All thruout
9/10	Two 18hrs	Litter Pick UP cutting down Weeds	Water View Westside of the Dunes
9/11	Two 18Hrs	Litter Pick UP cut & Removed some cactus Backwhat Pershing Side cut & Removed salty weeds.	Water View
9/12	Two 18Hrs	Litter Pick UP	All thruout
9/13	No		
9/16	Two 18Hrs	Litter Pick UP	All Thruout
9/17	Two 18hrs	Litter Pick UP Remove Weeds Cut & Removed Acacia Trees	Water View westside of Dunes
9/18	Two 18hrs	Litter Water View cut and Removed Acacia Tree Pershing Blvd	
9/19	Two 18hrs	Litter Pick UP cutting down some Weeds Pershing Boulevard	Water View Pershing side

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
9/23	Two / 18 Hrs	Litter Pick UP	All Throughout
9/24	Two / 18 hrs	Litter Pick UP Cutting & Removing Acacia trees.	Water View
9/25	Two 18 Hrs	Sick	
9/26	Two / 18 Hrs	Litter Pick UP Cutting some Acacia Trees ad Removl some Weeds.	Water View
9/27	Two / 18 hrs	Litter Pick UP	Water View
9/30	Two / 18 hrs	Litter Pick UP Remove some Acacia	All throughout
10/1	Two / 18 hrs	Litter Pick UP Cutting some Buckwheat & Removing some Acacia trees.	Water View
10/2	Two / 18 Hrs	Litter Pick UP cut down some more weeds and Trim Picking up Acacia Branches.	Water View
10/3	Two / 18 hrs	Litter Pick UP cutting and Removing Acacia trees from the ZOO.	Water View.
10/7	Two / 18 hrs	Litter Pick UP	All throughout
10/8	Two / 18 Hrs	Litter Pick UP cut down some more weeds and Remove some Buckwheat	

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
10/10	two / 18 hrs	Litter Pick UP Cut and Removal. some Acacia Trees for the ZOO	Water View
10/11 10/14	Holiday	Holiday	
10/15	Two / 18hrs	Litter Pick UP Cut and Remove Weeds	All throughout
10/16	two / 18hrs	[redacted] Valley	[redacted]
10/17	two / 18hrs	[redacted] Litter Pick UP Acacia Tree cutting For the ZOO	Water View
10/18	Two / 18hrs		
10/20	two / 18hrs	Litter Pick UP cutting and Removing Acacia Trees [redacted]	All throughout Parking hillside
10/22	Two / 18 hrs	Litter Pick UP Cutting and Removing Acacia Trees and some Lavender	Water View
10/23	two / 18 hrs	Litter Pick UP cutting and Removing Buckwheat	Water View
10/24	two / 18 hrs	Litter Pick UP Cutting & Removing Acacia Trees For the ZOO	Water View
10/25		Litter Pick UP	Water View
10/28	two / 18 hrs	Litter Pick UP	All Throughout
10/29	two / 18hrs	Litter Pick UP Cutting and Removing Acacia Trees	Water View

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
10/30	two 18 hrs	Litter Pick up cutting down some Buckwheat	Water Park
10/31	two 18 hrs	Litter Pick up Cutting and Removing some acacia trees For the ZOO.	
11/4	two 18hrs	Litter Pick up cutting down a palm trees and Some California Buckwheat.	All Through out
11/5	Two 18hrs	Litter Pick up cutting and Removing [illegible] tree	Water View
11/6	two 18hrs	Litter Pick up	
11/7	two 18hrs	Litter ~~[illegible]~~ Pick up Cutting and Removing the acacia trees For the ZOO	Water View
11/8			
11/11	two 18hrs	Litter Pick up cutting	all through out
11/12	Two 18hrs	Litter Pick up Cutting and Removing acacia trees.	Water View
11/13	Two 18hrs	Working on the Water View Project. Found a SCORPIN and a huge Rat.	
11/14		Litter Working on the Water View project.	
11/18	two 18hrs		

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
12/2	two / 18 hrs	Litter PICK UP	All throughout
12/3	two - 18 hrs	Litter Pick UP Cutting and Pulling Removing brush and Acacia Trees. Found a Legless Lizard.	Water View
12/4	two - 18 hrs	Litter Pick UP Cutting and Removing some Acacia trees on the Perching hillside	
12/5	two - 18 hrs	Cutting Trees From the ZOO	
12/6			
12/9	two - 18 hrs	Litter Pick UP Cutting some California Buckwheat	All throughout
12/10	two - 18 hrs	Cutting and Removing some brush and Picking up patrons	
12/11			
12/12	two - 18 hrs	Litter Pick UP Water View Cutting and Some Acacia Branches From the ZOO.	North side of Dune
12/16	two 18 hrs	Litter Pick UP	All Through out
12/17	two 18 hrs	Litter Pick UP Cutting and Removing Acacia trees on the Perching slope	Water View
12/18	two 18 hrs	Finish the cutting and Removing the acacia trees on the Perching slope.	

EL SEGUNDO DUNES MAINTENANCE

DATE	NUMBER OF EMPLOYEES/ Total Hr.	WORK PERFORMED	LOCATION
12/19	Two	Cutting some branches For the LA Zoo. Bagging up the seeds. Litter Pick up	North side Dunes / Water View
12/20	One 9hrs	Litter Pick up All Day	
12/23	one 9hrs	Litter Pick up Cutting some acacia trees.	
12/24	One 9 Hrs	Cutting Back Some Weeds	All over
12/26	one 9hrs	Litter Pick up Walking around the sand house.	
12/30	one 9hrs	Litter Pick up Cutting back Some Weeds by Water View	
12/31	One 9hrs	Cutting some back what on Parking Side. Litter Pick up.	
	2014		
1/2/14			
1/3/14			
1/6/14	2 18hrs	Litter Pick up All over the Dunes.	
1/7/14	2 18hrs		

APPENDIX D

THREE SISTERS RESERVE LAWA RESTORATION PROJECT
ANNUAL STATUS REPORT
DATED MARCH 28, 2013

PALOS VERDES PENINSULA LAND CONSERVANCY

PRESERVING LAND AND RESTORING HABITAT FOR THE EDUCATION AND ENJOYMENT OF ALL

March 31, 2013

Peggy Nguyen
Los Angeles World Airports
Environmental Management Division
One World Way, 10th Floor
Los Angeles, CA 90009-2216

RE: Three Sisters Reserve LAWA Restoration Project Annual Status Report

Ms. Nguyen:

Please find enclosed the 2012 Annual Status Report for the LAWA Three Sisters Reserve Restoration Project. The status report details the restoration activities that took place at Three Sisters Reserve during 2009. If you need further information, do not hesitate to contact me at (310) 541-7613 ext. 203.

Respectfully,

Danielle LeFer
Conservation Director

Encl. Annual Status Report

Annual Status Report 2011-2012

LAWA 21-Acre Habitat Restoration
Three Sisters Reserve, Rancho Palos Verdes, CA

Prepared for:
Los Angeles World Airports

Prepared by:
Palos Verdes Peninsula Land Conservancy
Contact: Danielle LeFer

March 28, 2013

STAFF

Staff members Andrea Vona, Danielle LeFer, Cris Sarabia, Ann Dalkey, Adrienne Bosler, Nely Gonzalez, Daniel Feldman, Humberto Calderon, Hugo Morales and Damian Morando worked on the project during the reporting period.

RESTORATION PLANNING

No specific restoration planning took place in 2011 and 2012.

NATIVE PLANT PROPAGATION

Staff collected seed and propagated plants for additional fill-in planting in the coastal sage scrub. 8,000 container plants were grown in 2011, and 665 in 2012. The propagation process included seed collection and cleaning, seed germination in flats of soil, then transplanting the seedlings into larger containers to mature in size before planting.

RESTORATION SITE PREPARATION

The purpose of this habitat restoration is to establish ecologically appropriate native habitats in disturbed areas to enhance the ecological functions of the adjacent native habitats within the Three Sisters Reserve.

Weed control is an important component of restoration, reducing competition from non-native weeds. PVPLC completed a fourth year of weed control in 2012. Staff systematically moved through the entire restoration area several times over the course of the year, removing weeds such as fennel, mustard and non-native annual grasses. Both mechanical, hand removal, and herbicide application was used to remove weeds in the restoration area.

Special attention was given to the grassland area to increase germination success of the native grasses. In November 2011, staff started a grow and kill program in the grassland in preparation for drill seeding of 7.7 acres on December 19-22, 2011.

IRRIGATION INSTALLATION

Staff maintained the temporary irrigation system and undertook minor repairs.

RESTORATION SITE INSTALLATION

In the coastal sage scrub, staff and volunteers installed an additional 8,000 fill-in plants in 2011, and 665 in 2012.

RESTORATION MONITORING

Restoration site monitoring was conducted through 2012 (the fourth year after installation). The monitoring includes both qualitative photo documentation and quantitative transect monitoring. The annual performance monitoring was scheduled in mid-spring and conducted by a qualified plant ecologist. Photo documentation began in 2008 (see Attachment 1 *Photo Point Monitoring*). To provide baseline data, monitoring transects were established and sampled in 2009 prior to planting. Year 3 monitoring took place on May 25 and 27, 2011, and year 4 monitoring took place June 14, 19, and 26 2012. The additional year of monitoring was to better track success of the grassland and fill-in planting in CSS.

In addition to the transect habitat monitoring, a volunteer bird survey has taken place on a monthly basis in the restoration area since 2008. This survey will aim to assess the effects of habitat restoration on the local bird communities. Results of survey are not yet available.

RESTORATION MONITORING RESULTS AND RECOMMENDATIONS

In the CSS, the container plants have gotten established and have been growing.
The vegetation transects from 2011 and 2012 show low germination in the grassland restoration area. The results of drill seeding in Fall 2011 are expected to become more noticeable after a year of higher rainfall.

ACTION ITEMS FOR NEXT REPORTING PERIOD (2014)

The following tasks will be addressed during the next period:

1. Continue weed control activities
2. Reseed portions of the grassland
3. Continue monitoring, using CNPS vegetation assessment method rather than transects.

ENCLOSED ATTACHMENTS

1. Restoration Monitoring Report for 2011 and 2012.

Restoration Monitoring Report
for
2011 and 2012

TRANSECT SURVEY RESULTS

Coastal Sage Scrub (CSS)

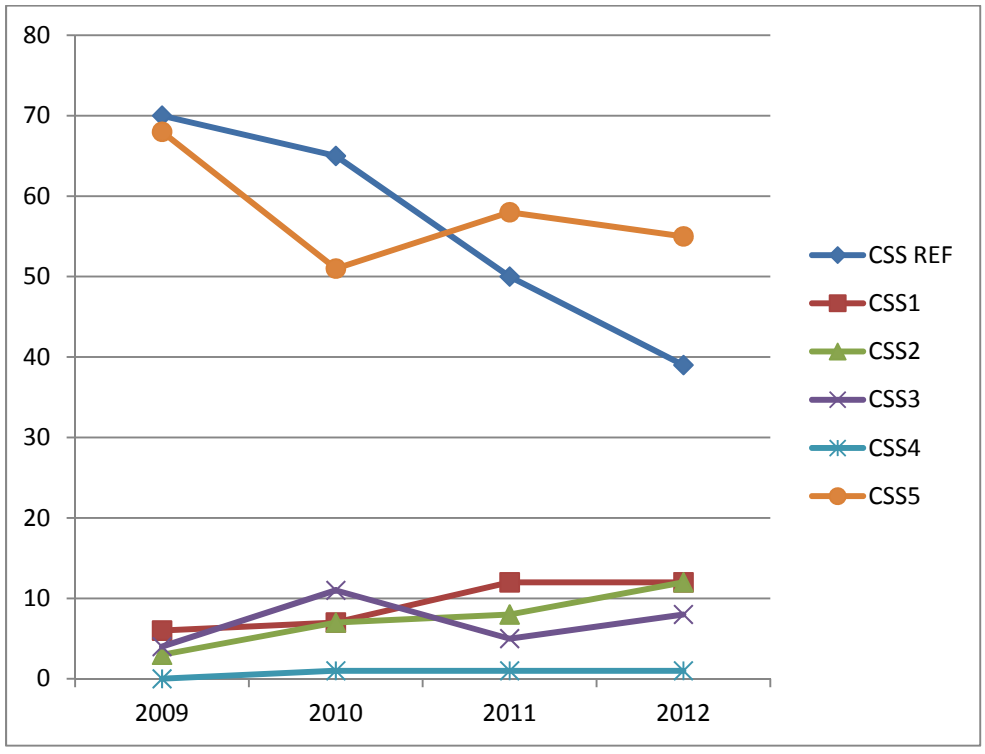
The number of individual plants counted in the reference transect was 43 in 2009, 36 in 2010, 32 in 2011, 29 in 2012 (Table 1). The number of plants counted in the restoration sites ranged from 0 to 42 in 2009, 1 to 31 in 2010, and 1 to 32 in 2011 and 2012 (Table 1). The abundance of native plants has been increasing incrementally in the restoration transects, even after two years with low precipitation, reflected in a decrease in percent cover of native plants in the reference transect (Table 1).

Native plant cover in the reference CSS site decreased in the last two years from 69% (2009) to 50% (2011), and 39% (2012) (Table 2, Figure 1). Native percent cover in CSS5 remained stable after a drop in 2010 (Figure 1). Percent native cover in 3 transects increased slightly over time Figure 1). Native cover in CSS4 remained low (1%).

In 2012, eight native species were identified in the restored transects, and *Encelia californica*, *Nassella*, and *Opuntia* had the highest relative percent cover (Table 3).

Shrub height at the reference site in 2012 ranged from 1.0 feet to 2.0 feet (Table 5). In all restoration transects, *Encelia*, the most common shrub, grew taller between 2009 and 2012 (Table 4).

Figure1. Percent Cover of Native Plants in CSS from 2009 to 2012.



Grassland

In the grassland, the number of native plants counted in the reference transect from 2009 to 2012 ranged from 12 to 22 (Table 1). In the restoration transects, the number of native plants counted ranged from 4-5 in 2009, 5-11 in 2011, and 12-20 in 2012 (Table 1).

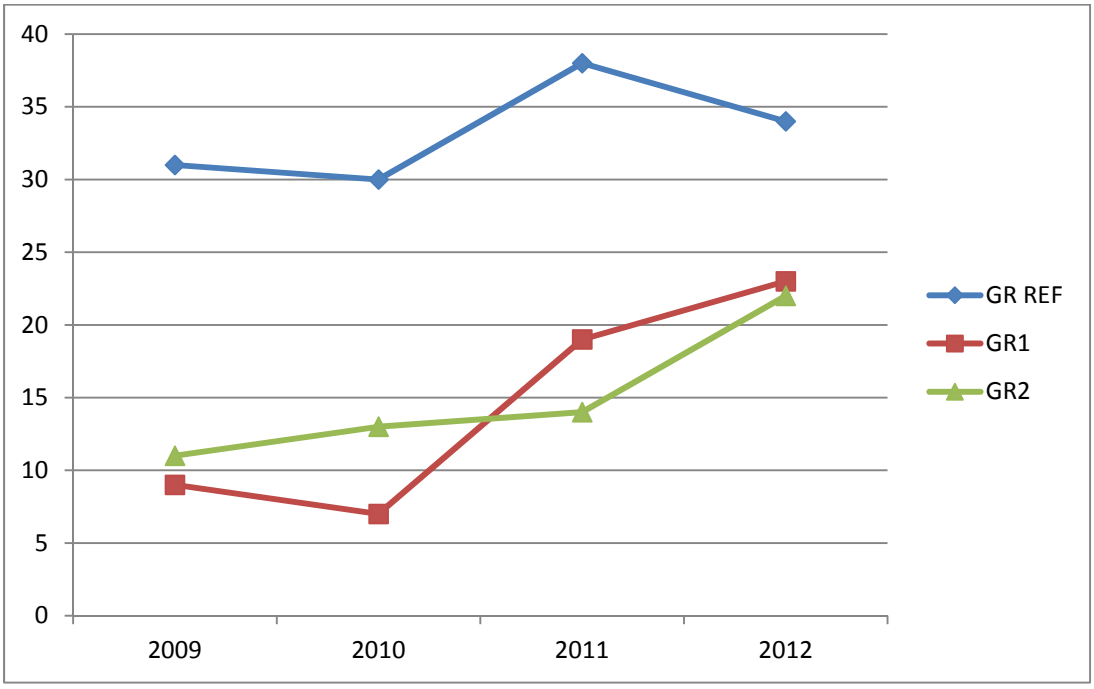
Native plant cover in the reference grassland site was 31% in 2009, increased to 38% in 2011, then decreased to 34% in 2012 (Table 2, Figure 2). The native cover in restored grasslands in 2011 was 14 and 19% (Table 2, Figure 2). The native cover in restored grasslands in 2012 was 22 and 33% (Table 2, Figure 2).

The percent bare ground in the reference site was 76% in 2009, 42% in 2011, and 66% in 2012 (Table 2). The average percent bare ground in the restoration sites in 2011 ranged between 79% and 84%.The average percent bare ground in the restoration sites in 2012 ranged between 41% and 79%.

In 2012, low numbers of bunch grasses (*Nassella sp.*) were detected in the reference transect, and no bunch grasses appeared in the restoration transects (Table 3). At the restoration sites, *E. californica* had the highest relative cover (GS1=16%; GS2=5%).

At the reference and restoration sites, shrub height was lower in 2011 and 2012 than in previous years (Table 4). Bunch grass (*Nassella sp.)* height in 2011 and 2012 was lower than in previous years (Table 4).

Figure 2. Percent Cover of Native Plants in Grassland from 2011 to 2012.



PLANT INVENTORY

A plant inventory conducted during transect monitoring identified 15 native species in 2009, and 24 native species in 2010 and 2011, and 21 in 2012 (Table 5).

PHOTOPOINTS

Photopoints in 2012 were taken at the start and end of transects, and are therefore not directly comparable to previous years' photopoints (Figure 3, Appendix I, Appendix II). However, they provide a good gauge regarding the status of the reference transects and the restorations. The CSS reference photopoints show good shrub coverage, with some gaps with bare ground. The CSS1 and CSS2 photopoints show some good native plant cover, with low-growing shrubs, and some bare ground. The photopoints for CSS3 and CSS4 show smaller shrubs with more weeds growing among them. Transect CSS5 shows some high shrub coverage, adjacent to some mature shrubs. The GR Reference photopoint shows high percent cover of native bunchgrasses, alongside native shrubs. Photopoint GR1 shows low native grass percent cover, but also low weed numbers. Transect GR2 shows high weed coverage.

CONCLUSIONS AND RECOMMENDATIONS

In the CSS, the container plants have gotten established and have been growing. Fill-in planting has increased the native cover in the CSS restoration area. PVPLC will continue to control weeds in 2013 to allow CSS plants to establish.

In 2012, transects in the grassland reference site and the restoration sites showed low numbers of native grasses. However, the field sheets indicate that native grasses were at times adjacent to transects but were not counted because they were small and did not touch the tape. Native grasses occur at the site, but due to poor rain, and the grasses were small. PVPLC will add more seed to the grassland restoration area in Fall 2013 to continue to increase native cover.

Table 1. Number of plants per 50 m transect with line intercept method, 0.5 m intervals.

2009

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	6								
Encelia californica	26	4	2	2		25	4	4	4
Eriogonum cinereum	4								
Eriogonum fasciculatum						2			
Gutierrezia californica	5								
Hazardia squarrosa						1			
Nassella lepida						10	7		
Opuntia littoralis	2					4			
Rhus integrifolia							1	1	
Total Native Plants	**43**	**4**	**2**	**2**	**0**	**42**	**12**	**5**	**4**
Bare	39	85	68	93	100	48	76	92	90

2010

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	3	1							
Encelia californica	22	4	3	4		16	6	3	10
Eriogonum cinereum	5								
Eriogonum fasciculatum						3			
Gutierrezia californica	2								
Hazardia squarrosa						1			
Mirabilis californica						1			
Nassella lepida							1		
Nassella pulchra	1	1	1	4		6	9		1
Opuntia littoralis	3				1	3			
Plantago erecta									1
Rhus integrifolia						1	2	1	
Total Native Plants	**36**	**6**	**4**	**8**	**1**	**31**	**18**	**4**	**12**
Non-native annual grass	34	1	1	48	47	28	51	85	63
Non-native plants	8	2	8	30	38	27	34	5	7
Total Non-native Plants	**42**	**3**	**9**	**78**	**85**	**55**	**85**	**90**	**70**
Bare	10	92	85	38	48	19	21	41	26

Table 1 Cont'd. Number of plants per 50 m transect with line intercept method, 0.5 m intervals.

2011

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	5		1						
Encelia californica	18	4	3	3		17	8	7	3
Eriogonum cinereum	5								
Eriogonum fasciculatum						5			
Gutierrezia californica	2								
Hazardia squarrosa						1			
Malacothrix saxatilis								3	1
Nassella lepida	1	2	2			4	3		
Nassella pulchra		5	1				9		
Nassella sp.							1		
Opuntia littoralis	1				1	4			
Plantago erecta									1
Rhus integrifolia						1	1	1	
Total Natives Plants	**32**	**11**	**7**	**3**	**1**	**32**	**22**	**11**	**5**
Non-native annual grass	40	39	12			59	47	9	4
Non-native broad-leaved plants	6	50	20			19	10	1	3
Total Non-native Plants	**46**	**89**	**32**			**78**	**57**	**10**	**7**
Bare	32	55	69	94	97	8	42	78	84

2012

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	3		1						
Encelia californica	18	3	2	5		16	9	11	4
Eriogonum cinereum	5								
Eriogonum fasciculatum			1			4	1		
Hazardia squarrosa						1			
Malacothrix saxatilis									11
Malosma laurina						1			
Nassella pulchra							2		
Nassella sp.	2	8	7			3	5		
Opuntia littoralis	1				1	6			
Plantago insularis									4
Rhus integrifolia						1	1	1	
Salvia leucophylla				1					
Stephanomeria virgata									1
Total Native Plants	**29**	**11**	**11**	**6**	**1**	**32**	**18**	**12**	**20**
Non-native annual grasses	3	53	36	3		16		1	
Non-native plants	24	23	37	58	36		1	15	47
Total Non-native plants	**27**	**76**	**73**	**61**	**36**	**16**	**1**	**16**	**47**
Bare	48	94	77	77	94	58	66	78	41

Table 2. Plant percent cover at 50 m monitoring transects, 0.5 m intervals.

2009

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	9								
Encelia californica	42	6	3	4		40	7	5	11
Eriogonum cinereum	9								
Eriogonum fasciculatum						8			
Gutierrezia californica	6								
Hazardia squarrosa						2			
Nassella lepida						11	7		
Opuntia littoralis	4					7			
Rhus integrifolia							17	4	
Total Native Cover	**70**	**6**	**3**	**4**	**0**	**68**	**31**	**9**	**11**
Bare ground	39	85	68	93	100	48	76	92	90

2010

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	7	1							
Encelia californica	38	5	6	6		26	9	6	11
Eriogonum cinereum	13								
Eriogonum fasciculatum						11			
Gutierrezia californica	2								
Hazardia squarrosa						2			
Mirabilis californica						1			
Nassella lepida							1		
Nassella pulchra	1	1	1	5		7	9		1
Opuntia littoralis	4				1	3			
Plantago erecta									1
Rhus integrifolia						1	11	1	
Total Native Cover	**65**	**7**	**7**	**11**	**1**	**51**	**30**	**7**	**13**
Non-native annual grasses	34	1	1	48	47	28	51	85	64
Non-native plants	8	2	8	30	38	27	34	5	7
Total Non-native plants	**42**	**3**	**9**	**78**	**85**	**55**	**85**	**90**	**71**
Bare ground	10	92	85	38	48	19	21	41	26

Table 2 Cont'd. Plant percent cover at 50 m monitoring transects, 0.5 m interval.

2011

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	9		2						
Encelia californica	24	5	3	5		28	14	11	11
Eriogonum cinereum	12								
Eriogonum fasciculatum						15			
Gutierrezia californica	3								
Hazardia squarrosa						2			
Malacothrix saxatilis								3	2
Nassella lepida	1	2	2			4	3		
Nassella pulchra		5	1				9		
Nassella sp.							1		
Opuntia littoralis	1				1	8			
Plantago erecta									1
Rhus integrifolia						1	11	5	
Total Native Plants	**50**	**12**	**8**	**5**	**1**	**58**	**38**	**19**	**14**
Non-native annual grasses	40	41	12			60	47	9	4
Non-native plants	6	51	20			19	10	1	3
Total Non-native Plants	**46**	**92**	**32**	**0**	**0**	**79**	**57**	**10**	**7**
Bare	33	55	69	95	99	8	42	79	84

Table 2 Cont'd. Plant percent cover at 50 m monitoring transects, 0.5 m interval.

2012

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	7		2						
Encelia californica	23	4	2	7		22	11	16	5
Eriogonum cinereum	6								
Eriogonum fasciculatum			1			15	1		
Hazardia squarrosa						2			
Malacothrix saxatilis									12
Malosma laurina						1			
Nassella pulchra							2		
Nassella sp.	2	8	7			3	5		
Opuntia littoralis	1				1	9			
Plantago insularis									4
Rhus integrifolia						3	15	7	
Salvia leucophylla				1					
Stephanomeria virgata									1
Total Native Plants	**39**	**12**	**12**	**8**	**1**	**55**	**34**	**23**	**22**
Non-native annual grasses	3	53	36	3		16		1	
Non-native plants	24	23	37	59	36		1	16	48
Total Non-native Plants	**27**	**76**	**73**	**62**	**36**	**16**	**1**	**17**	**48**
Bare	48	94	77	77	94	58	66	79	41

Table 3. Relative percent cover along 50 m line transects with line intercept method, 0.5 m intervals.

2009
Data not available due to missing data for non-native plants.

2010

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	5.5	0.5							
Encelia californica	29.9	2.6	3.2	3.6		18.1	5.7	3.4	8.1
Eriogonum cinereum	10.2								
Eriogonum fasciculatum						7.6			
Gutierrezia californica	1.6								
Hazardia squarrosa						1.4			
Mirabilis californica						0.7			
Nassella lepida							0.6		
Nassella pulchra	0.8	0.5	0.5	3.0		4.9	5.7		0.7
Opuntia littoralis	3.1				0.5	2.1			
Plantago erecta									0.7
Rhus integrifolia						0.7	7.0	0.6	
Total Native Plants	**51.2**	**3.6**	**3.8**	**6.7**	**0.5**	**35.4**	**19.1**	**3.9**	**9.6**
Non-native annual grass	26.8	0.5	0.5	29.1	25.8	19.4	32.5	47.5	47.1
Non-native plants	6.3	1.0	4.3	18.2	20.9	18.8	21.7	2.8	5.1
Total Non-native Plants	**33.1**	**1.5**	**4.8**	**47.3**	**46.7**	**38.2**	**54.1**	**50.3**	**52.2**
Bare	7.9	47.4	45.7	23.0	26.4	13.2	13.4	22.9	19.1

2011

Species	CSS REF	CSS 1	CSS 2	CSS 3	CSS 4	CSS 5	GR REF	GR1	GR2
Artemisia californica	7.8		1.4						
Encelia californica	20.7	4.1	2.1	2.6		37.8	11.5	6.2	6.0
Eriogonum cinereum	10.3								
Eriogonum fasciculatum						20.3			
Gutierrezia californica	2.6								
Hazardia squarrosa						2.7			
Malacothrix saxatilis								1.7	1.1
Nassella lepida	0.9	1.6	1.4			5.4	2.5		
Nassella pulchra		4.1	0.7				7.4		
Opuntia littoralis	0.9				0.5	10.8			
Plantago erecta									0.5
Rhus integrifolia						1.4	9.0	2.8	
Total Native Plants	**43.1**	**9.8**	**5.5**	**2.6**	**0.5**	**78.4**	**31.1**	**10.7**	**7.7**
Non-native annual grass	34.5	33.6	8.2			81.1	38.5	5.1	2.2
Non-native plants	5.2	41.8	13.7			25.7	8.2	0.6	1.6
Total Non-native Plants	**39.7**	**75.4**	**21.9**	**0.0**	**0.0**	**107**	**46.7**	**5.6**	**3.8**
Bare	39.8	82.1	89.6	95.0	99.0	12.1	52.5	80.6	85.7

2012

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	6		1						
Encelia californica	20	2	1	5		17	11	13	5
Eriogonum cinereum	5								
Eriogonum fasciculatum			1			12	1		
Hazardia squarrosa						2			
Malacothrix saxatilis									11
Malosma laurina						1			
Nassella pulchra							2		
Nassella sp.	2	4	4			2	5		
Opuntia littoralis	1				1	7			
Plantago insularis									4
Rhus integrifolia						2	15	6	
Salvia leucophylla				1					
Stephanomeria virgata									1
Total Native Cover	**34**	**7**	**7**	**5**	**1**	**43**	**34**	**19**	**20**
Non-native annual grasses	3	29	22	2		12		1	
Non-native plants	21	13	23	40	27		1	13	43
Total Non-native Cover	**24**	**42**	**45**	**42**	**27**	**12**	**1**	**14**	**43**
Bare	42	52	48	52	72	45	65	66	37

Table 4. Average plant height (ft) at each transect.

2009

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	2.4								
Encelia californica	1.3	0.5	0.8	0.9		1.4	1.4	1.4	2.0
Eriogonum cinereum	1.6								
Eriogonum fasciculatum						3.4			
Gutierrezia californica	1.5								
Hazardia squarrosa						1.7			
Nassella lepida						0.4	0.6		
Opuntia littoralis	1.1					1.8			
Rhus integrifolia							2.4	3.0	
Average of all plants	1.6	0.5	0.8	0.9		1.7	1.5	2.2	2.0

2010

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	2.5	0.4							
Encelia californica	1.2	1.3	1.2	1.4		1.6	1.2	1.4	1.9
Eriogonum cinereum	1.4								
Eriogonum fasciculatum						2.2			
Gutierrezia californica	0.7								
Hazardia squarrosa						1.3			
Mirabilis californica						1.0			
Nassella lepida							3.0		
Nassella pulchra	1.1	0.3	0.4	1.1		2.3	1.4		0.3
Opuntia littoralis	0.9				0.7	1.4			
Plantago erecta									0.2
Rhus integrifolia						1.3	3.2	2.0	
Average of all plants	1.3	0.7	0.8	1.2	0.7	1.6	2.2	1.7	0.8

Table 4 (Cntd.). Average plant height (ft) at each transect.

2011

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	2.4		2.4						
Encelia californica	1.4	0.8	1.5	1.6		1.4	1.2	1.5	1.8
Eriogonum cinereum	1.6								
Eriogonum fasciculatum						2.3			
Gutierrezia californica	1.6								
Hazardia squarrosa						1.9			
Malacothrix saxatilis								1.5	1.3
Nassella lepida	0.9	0.4	0.9			1.2	0.9		
Nassella pulchra		0.9	1.3				1.3		
Opuntia littoralis	0.1				0.5	1.6			
Plantago erecta									0.2
Rhus integrifolia						2.3	2.7	3.3	

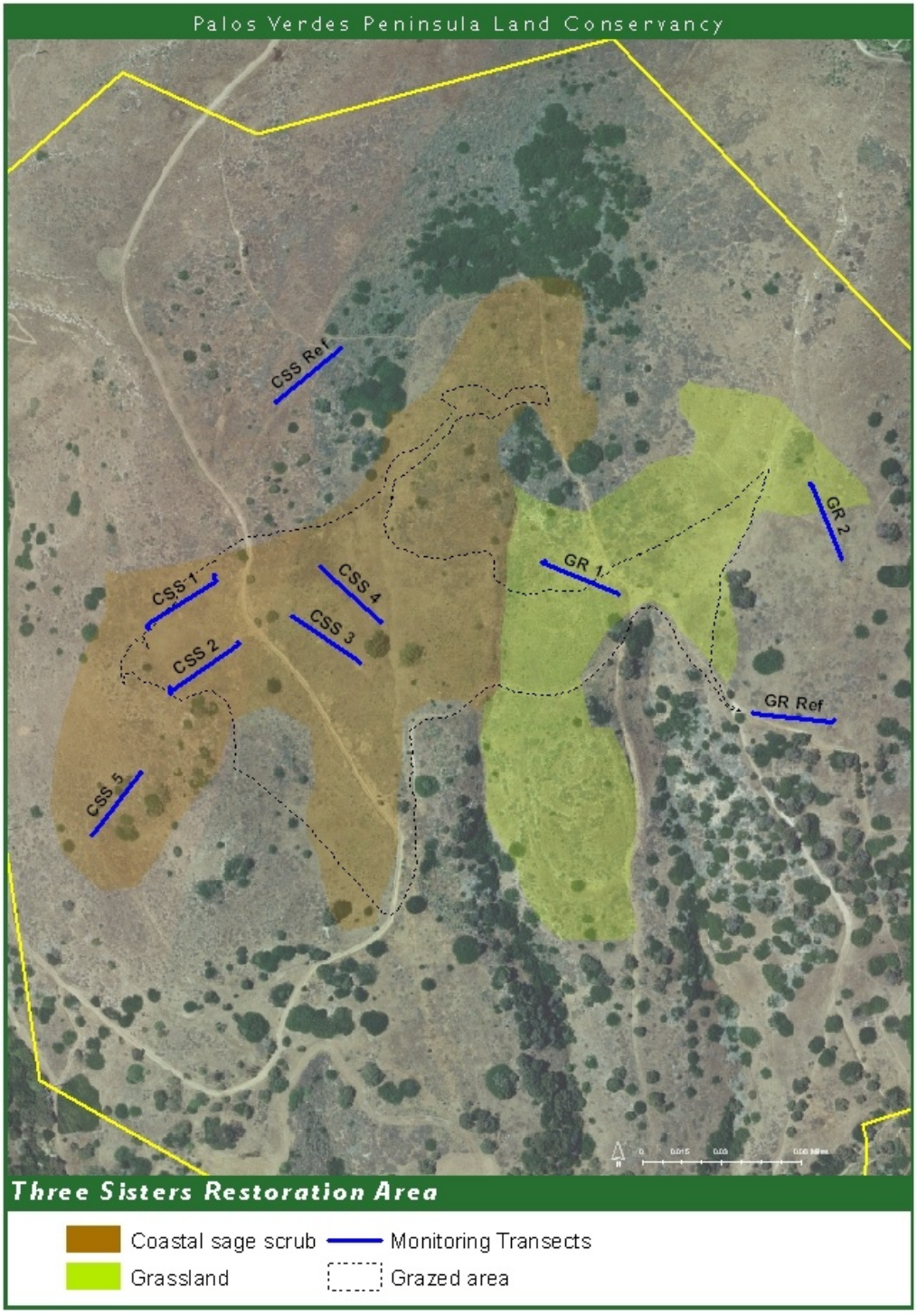
2012

Species	CSS REF	CSS1	CSS2	CSS3	CSS4	CSS5	GR REF	GR1	GR2
Artemisia californica	2.0		1.9						
Encelia californica	1.2	1.1	1.0	1.4		1.2	1.1	1.3	1.3
Eriogonum cinereum	1.3								
Eriogonum fasciculatum			0.8			1.9	0.9		
Hazardia squarrosa						1.3			
Malacothrix saxatilis									1.3
Malosma laurina						3.3			
Nassella pulchra							0.6		
Nassella sp.	1.0	0.3	0.3			1.3	1.1		
Opuntia littoralis	1.0				0.33	1.3			
Plantago insularis									0.2
Rhus integrifolia						2.8	2.8	1.8	
Salvia leucophylla				0.8					
Stephanomeria virgata									0.5

Table 5. Plant inventory at restoration site.

2009	2010	2011	2012
Native Species			
Artemisia californica	*Amsinkia menziesii*	*Amsinkia menziesii*	*Artemisia californica*
Cylindroopuntia prolifera	*Artemisia californica*	*Artemisia californica*	*Asclepias fascicularis*
Encelia californica	*Asclepias fasciculata*	*Asclepias fasciculata*	*Baccharis pilularis*
Eriogonum cinereum	*Baccharis pilularis*	*Baccharis pilularis*	*Baccharis salicifolia*
Eriogonum fasciculatum	*Calochortus catalinae*	*Calochortus catalinae*	*Cylindropuntia prolifera*
Gutierrezia californica	*Castilleja exserta*	*Castilleja exserta*	*Encelia californica*
Hazardia squarrosa	*Cylindroopuntia prolifera*	*Cylindroopuntia prolifera*	*Eriogonum cinereum*
Malosma laurina	*Dichellostoma capitatum*	*Dichellostoma capitatum*	*Eriogonum fasciculatum*
Marah macrocarpa	*Encelia californica*	*Encelia californica*	*Gnaphalium californicum*
Mirabilis californica	*Eriogonum cinereum*	*Eriogonum cinereum*	*Hazardia squarrosa*
Nassella lepida	*Eriogonum fasciculatum*	*Eriogonum fasciculatum*	*Isomeris arborea*
Nassella pulchra	*Gutierrezia californica*	*Gutierrezia californica*	*Malacothrix saxatilis*
Opuntia littoralis	*Hazardia squarrosa*	*Hazardia squarrosa*	*Malosma laurina*
Plantago erecta	*Lupinus succulentus*	*Lupinus succulentus*	*Nassella pulchra*
Rhus integrifolia	*Malacothrix saxatilis*	*Malacothrix saxatilis*	*Nassella sp.*
	Malosma laurina	*Malosma laurina*	*Opuntia littoralis*
	Marah macrocarpa	*Marah macrocarpa*	*Phacelia ramosissima*
	Mirabilis californica	*Mirabilis californica*	*Plantago insularis*
	Nassella lepida	*Nassella lepida*	*Rhus integrifolia*
	Nassella pulchra	*Nassella pulchra*	*Salvia leucophylla*
	Opuntia littoralis	*Opuntia littoralis*	*Sambucus mexicana*
	Phacelia ramosissima	*Phacelia ramosissima*	*Stephanomeria virgata*
	Plantago erecta	*Plantago erecta*	
	Rhus integrifolia	*Rhus integrifolia*	
	Salvia leucophylla	*Salvia leucophylla*	
	Sambucus mexicanus	*Sambucus mexicanus*	
Introduced Species			
Acacia cyclops	*Acacia cyclops*	*Acacia cyclops*	*Acacia cyclops*
Brassica nigra	*Brassica nigra*	*Brassica nigra*	*Brassica nigra*
Bromus spp.	*Bromus* spp.	*Bromus* spp.	*Centaurea melitensis*
Centaurea melitensis	*Centaurea melitensis*	*Centaurea melitensis*	*Foeniculum vulgare*
Foeniculum vulgare	*Foeniculum vulgare*	*Foeniculum vulgare*	*Lactuca serriola*
Malva sp.	*Malva* sp.	*Malva* sp.	*Picris echioides*
Nicotiana glauca	*Picris echioides*	*Picris echioides*	
Picris echioides			

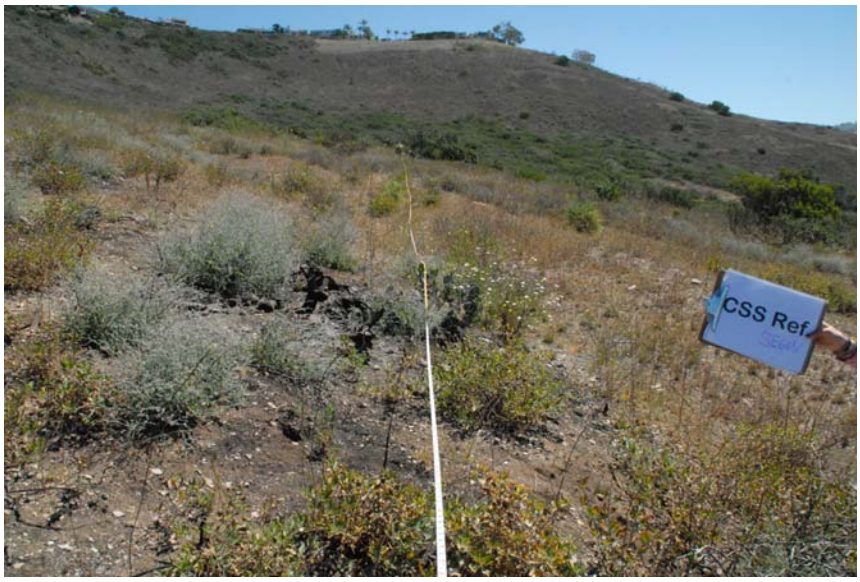
Figure 3. Transect and 2012 Photopoint Locations.



APPENDIX I. Photo Points 2012

2012 Transect Photopoints

Transect CSS Ref Start



Transect CSS Ref End

Transect CSS1 Start

Transect CSS1 End

Transect CSS2 Start

Transect CSS2 End

Transect CSS3 Start

Transect CSS3 End

Transect CSS4 Start

Transect CSS4 End

Transect CSS5 Start

Transect CSS5 End

Transect GR Ref Start

Transect GR Ref End

Transect GR1 Start

Transect GR1 End

Transect GR2 Start

Transect GR2 End

APPENDIX II. Photo Points 2009-2011

Photo Point 1: January 28, 2009

Photo Point 1: February 19, 2009

Photo Point 1: February 26, 2010

Photo Point 1: April 27, 2011

Photo Point 2: January 28, 2009

Photo Point 2: February 19, 2009

Photo Point 2: February 26, 2010

Photo Point 2: April 27, 2011

Photo Point 3: January 28, 2009

Photo Point 3: February 19, 2009

Photo Point 3:February 26, 2010

Photo Point 3: April 27, 2011

Photo Point 4: January 28, 2009

Photo Point 4: February 19, 2009

Photo Point 4: February 26, 2010

Photo Point 4: April 27, 2011

Photo Point 5: January 28, 2009

Photo Point 5: February 19, 2009

Photo Point 5: February 26, 2010

Photo Point 5: April 27, 2011

Photo Point 6: January 28, 2009

Photo Point 6: February 19, 2009

Photo Point 6: February 26, 2010

Photo Point 6: April 27, 2011

Photo Point 7: January 28, 2009

Photo Point 7: February 19, 2009

Photo Point 7: February 26, 2010

Photo Point 7: April 27, 2011

APPENDIX III. Restoration Goals and Monitoring Methodology

RESTORATION GOALS

Restoration criteria have been developed to assess the functions and values of each habitat, as stated in the goals for the restoration. Thus, the restoration will be assessed as the habitats develop trends in cover, species diversity, as well as soil development so that the habitat quality of the site is restored. Specifically, the restoration will be evaluated by the following criteria for each habitat type:

Perennial Grassland

- The site does not require significant maintenance measures during the last two years of the establishment period as documented by the restoration specialist's or PVPLC biologist's annual monitoring report.
- The native grasses set seed.
- The site demonstrates 70 percent of the native plant species originally planted in Zone A of the restoration site, after one season of average or above average rainfall

Coastal Scrub

- The site does not require significant maintenance measures during the year of the establishment period as documented by the restoration specialist's or PVPLC biologist's annual monitoring report.
- The majority of plant species set seed, and seedlings of at least five native grassland/coastal sage scrub species demonstrate recruitment in the site in the final year of monitoring based on information from quantitative monitoring.
- The site demonstrates 70 percent of the native plant species originally planted in Zone B of the restoration site.

QUANTITATIVE MONITORING METHODOLOGY

The selection of variables measured for the final quantitative performance monitoring will be based on the goals of the restoration program, development characteristics of each plant community, and the restoration goals outlined above. Variables will include native species cover, exotic species cover, percent bare ground and litter, as well as species frequency and seedling frequency in monitoring transects. Where applicable, shrub height will also be measured to provide an additional parameter to assess habitat suitability. The number of sampling units in each habitat will be determined by areas to ensure statistical confidence based on the variation over the site, but generally one transect for every three acres for each habitat type is sufficient.

4.2.1 Coastal Sage Scrub Quantitative Vegetation Sampling

Vegetation sampling in coastal sage scrub will utilize the point-intercept method to measure vegetation cover. This method is best suited to measure scrub vegetation and will provide the most efficient method for estimating cover and species composition over the mitigation site.

Locations of transects will be determined randomly within the restoration area, and the same transect locations will be used each year. At each randomly selected site, a 50-

meter point-intercept transect will be performed. A 50-meter (m) tape will be stretched taut, at the randomly selected locations. One hundred points are sampled along a randomly placed 50-m tape at 0.5 m intervals starting at 0.5 m and ending at 50 m. A one meter long, 1/4 inch round steel bar is placed vertically at each sampling point, consistently on the same side of the tape. There shall be at least four transects established and monitored for the coastal sage scrub.

All live species that contact the bar, or in the case of overhanging vegetation, intercept the upward projection of the bar are counted. If no vascular plants are intercepted at a sample point, it is recorded as "bare." Total cover is based simply on how many points are covered by vascular plants, regardless of the number of plant species overlapping a given point. In other words, total cover is based on how many points are not recorded as bare of vascular plants. Since several plants often overlap a single point, the sum of individual species covers is generally more than the total cover.

Seedlings will be identified for shrubs and sub-shrubs and will be determined by being small in size, having a non-woody base, and usually the result of germination during the same year as the transect reading. Juveniles and adults will be identified as definitely woody at the base of the stem, with adults in flower and/or with seed. Litter will be recorded in areas of no vegetative cover but with dead vegetative matter covering the ground. Data on the height of the shrubs will also be recorded for all woody shrubs contacted by the bar along each transect.

Cover will be reported as total percentage of points with native plants; cover will also be reported for individual native species and exotic species. Percent cover is determined for a species simply by dividing the number of points covered by that species by the total number of sample points. Total cover is similarly determined. Relative cover for a species is determined by dividing the percent cover for an individual species by the sum of the percent covers for all species (not by total cover). Frequency data will be reported as the percent of transects a species is reported to occur. Height data will be reported as the average height of the shrub species. Species diversity will be a measure of the number of species encountered in transects.

Additionally, the restoration area will be walked and a list prepared of all species observed. This species list will be reported in the annual report in addition to the transect data.

Perennial Grassland Vegetation Sampling

Vegetation sampling in perennial grassland habitats will utilize the point-intercept method to estimate vegetation cover and species diversity. This method will provide the most efficient method for estimating cover and species composition over the mitigation site.

Locations of transects will be determined randomly within the restoration area, and the same transect locations will be used each year. At each randomly selected site, a 50-m point-intercept transect will be performed. A 50-m tape will be stretched taut, at the randomly selected locations. One hundred points are sampled along a randomly placed 50-m tape at 0.5 m intervals starting at 0.5 m and ending at 50 m. A one meter long, 1/4 inch round steel bar is placed vertically at each sampling point, consistently on the same side of the tape. There shall be at least two transects established and monitored for the

native grassland restoration area.

All live species that contact the bar, or in the case of overhanging vegetation, intercept the upward projection of the bar are counted. If no vascular plants are intercepted at a sample point, it is recorded as "bare." Total cover is based simply on how many points are covered by vascular plants, regardless of the number of plant species overlapping a given point. In other words, total cover is based on how many points are not recorded as bare of vascular plants. Since several plants often overlap a single point, the sum of individual species covers is generally more than the total cover.

Seedlings will be identified for shrubs and sub-shrubs and will be determined by being small in size, having a non-woody base, and usually the result of germination during the same year as the transect reading. Juveniles and adults will be identified as definitely woody at the base of the stem, with adults in flower and/or with seed. Litter will be recorded in areas of no vegetative cover but with dead vegetative matter covering the ground.

Cover will be reported as total percentage of points with native plants; cover will also be reported for individual native species and exotic species. Percent cover is determined for a species simply by dividing the number of points covered by that species by the total number of sample points. Total cover is similarly determined. Relative cover for a species is determined by dividing the percent cover for an individual species by the sum of the percent covers for all species (not by total cover). Frequency data will be reported as the percent of transects a species is reported to occur.

Species diversity will be a measure of the number of species encountered in transects. Additionally, the restoration area will be walked and a list prepared of all species observed. This species list will be reported in the annual report in addition to the transect data.

APPENDIX E

SOUTHERN TARPLANT THIRD ANNUAL MONITORING REPORT FOR THE LOS ANGELES INTERNATIONAL AIRPORT BRADLEY WEST AND CROSSFIELD TAXIWAY AMERICAN AIRLINES EMPLOYEE PARKING LOT RELOCATION PROJECTS DATED NOVEMBER 2013

SOUTHERN TARPLANT RESTORATION PROJECT

Third Annual Monitoring Report

Prepared for
Alta Environmental
3777 Long Beach Blvd, Annex Building,
Long Beach, CA 90807

November 2013

SOUTHERN TARPLANT RESTORATION PROJECT

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21650 Oxnard Street
Suite 1680
Woodland Hills, CA 91367
818.703.8600
www.esassoc.com

Los Angeles

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Third Annual Monitoring Report

SOUTHERN TARPLANT RESTORATION PROJECT

Third Annual Monitoring Report – November 2013

Introduction

ESA was retained by Alta Environmental to conduct the third annual monitoring of Southern Tarplant Restoration required for the Bradley West Expansion Project and the Crossfield Taxiway American Airlines Employee Parking Lot Relocation 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 restoration areas to ensure success criteria and performance measures are met.

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, east and south by various structures and development associated with LAX.

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 restoration site, and was either described as clean (outer seed husk removed) or rough (outer husk retained). Sewing 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 two-year success criteria required in accordance with the STMP.

Background

Pursuant to the STMP, all impacts made to southern tarplants during the construction of the Bradley West Expansion and Crossfield Taxiway American Airlines Employee Parking Lot Relocation Projects 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. New restoration sites were 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 restoration areas during the first year of mitigation. In 2012, a Second Annual Monitoring Report was drafted to document the overall status of the restoration sites two years after seeding (Tetra Tech, 2012).

Methods

On November 4, 2013, ESA biologist's Greg Ainsworth and Robert Sweet conducted the third annual monitoring event for the project between the hours of 1200 and 1400. Weather was relatively moderate during the survey with temperatures ranging between 66ºF and 68ºF 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, biologists conducted linear transects 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.

SOURCE: ESRI

Southern Tarplant - Annual Monitoring Report . 130072

Figure 1

Project Location

SOURCE: UltraSystems Environmental Inc. 2011.

Figure 2

BWP and CFTP Mitigation Areas

Qualitative Survey

While conducting quantitative surveys, biologists studied the overall health and distribution of southern tarplants in each subplot. 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 condition of the six subplots was relatively good. A summary of the Quantitative Survey and Qualitative Survey results is provided below.

Quantitative Survey

A total of 310 tarplant individuals were observed within the mitigation site during the third annual monitoring event. **Table 2** below shows the results of Southern Tarplant individuals identified in 2013 compared to 2012 results.

TABLE 2
SOUTHERN TARPLANTS DISTRIBUTION OBSERVED IN 2013 COMPARED TO 2012

Subplot	2012 Results	2013 Results
1a	0	121
1b	13	33
2	1	4
3	671	63
4a	3	31
4b	0	58
Total	688	310

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. 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. With the exception of Subplot 3, the distribution of southern tarplants increased overall throughout all other subplots between 2012 and 2013. In general, tarplant populations tended to be distributed evenly throughout the subplots, as opposed to being primarily restricted to one subplot, as in 2012.

Qualitative Survey

The tarplants observed throughout the mitigation site were in good health and most were in bloom or near completion, and many had set seed or were in senescence. The highest number of individuals that were in senescence was located in Subplot 3; however, several flowering

individuals were observed here as well. No signs of herbivory were observed and the boundaries used to delineate each subplot remained in good condition, with no signs of vandalism.

Native vegetation species observed within the restoration site include deerweed (*Acmispon glaber*), annual bursage (*Ambrosia acanthacarpa*), mulefat (*Baccharis salicifolia*), saltgrass (*Distichlis spicata*) and telegraph weed (*Heterotheca grandiflora*), with salt grass observed in greatest densities throughout. Non-native species observed within the subplots include Acacia (*Acacia* sp.), Australian saltbush (*Atriplex semibaccata*), wild oats (*Avena fatua*), red brome (*Bromus rubens*), common plantain (*Plantago major*) and ice plant (*Carpobrotus edulis*), with red brome being most abundant overall. Salt grass tended to dominant low-lying areas within the subplots, while red brome and wild oat were observed in greatest densities in higher elevation areas and along the margins of the subplots. It should be noted that common plantain was also abundant in Subplot 1a. Multiple acacia sprouts and mulefat shrubs were observed within Subplot 4b and 2, respectively, dominating a large portion of the area available for tarplant germination and growth.

Discussion and Recommendations

A total of 310 tarplants was counted during the third annual monitoring period. As shown in Table 1, this amount exceeds the performance standards for Year-Three by 17 percent and is at 94 percent of meeting the total number for Year-Five of 329 plants.

With the exception of Subplot 3, the overall distribution and number of tarplant individuals increased throughout the subplots over the past year. The increase in distribution is evidence that many of the southern tarplants that were seeded in 2010 are successfully reproducing, which is an indication that the restoration sites are able to sustain the introduction of southern tarplants and recruitment is now occurring naturally. Based on the 2013 monitoring observations, it is clear that southern tarplants thrive in depressed portions of the subplots where the water table is likely higher compared to areas of higher elevation. Moreover, areas that are dominated with a herbaceous layer having little amount of bare ground, such as areas dominated with salt grass in Subplot 3, may inhibit seed germination and out-compete tarplant seedling for nutrients and water. Lastly, it is important to note that Southern California has been in one of the biggest droughts ever recorded for the past two years, which has likely contributed to a lower germination rate of tarplant seedlings within Subplot 3. It is anticipated that a good seed bank of southern tarplant is present within the subplots and germination may be greater in 2014 if higher frequency and longer duration of rain events occurs.

Based on the qualitative observations made during the 2013 monitoring period, it is recommended that hand pulling of weeds throughout the restoration site is conducted, in particular the acacia sprouts within Subplot 4b, as well as areas dominated with red brome and other species growing around the established tarplants that may be suppressing the germination of southern tarplant seedlings. It is not typical to suggest the removal of native species; however, selective partial clearing of salt grass in Subplot 3 may encourage germination of tarplant seeds. This will expose areas where seed is present and allow tarplant seeds to germinate, grow and eventually mature. Because salt grass spreads readily by rhizomes, the salt grass will naturally and eventually re-establish within one or two years.

References

Baldwin, Bruce. 2012. *The Jepson Manual: Vascular Plants of California, 2nd edition*

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*) 90-days Establishment 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

Photo 1. Facing south at northeast corner of Subplot 1a. A high density of southern tarplant tends to be distributed evenly throughout the southern portion of the subplot. Saltgrass can be seen dominating the foreground of the photo.

Photo 2. Facing southwest at northeast corner of Subplot 1b. Photo depicts a dense patch of salt grass dominating this portion of the subplot. Southern tarplant occurs sporadically throughout the central portion of the subplot.

Photo 3. Facing southeast at northwest corner of Subplot 2. Photo depicts multiple mule fat shrubs and dense patches of salt grass occurring throughout. Four southern tarplants were observed within this subplot.

Photo 4. Facing southeast at northwest corner of Subplot 3. Photo depicts a dense mat of salt grass dominating the ground cover. A total of 63 southern tarplants were observed evenly distributed throughout this subplot.

Photo 5. Facing east at southwest corner of Subplot 4a. Photo depicts a vegetative layer, dominated by non-native grasses. Southern tarplant was observed mainly throughout the northwest portion of the subplot, likely due to sparse vegetative cover in this area.

Photo 6. Facing northwest at southwest corner of Subplot 4b. Photo depicts a vegetative layer dominated by non-native grasses. Non-native acacia sprouts can be seen in the northwest corner of the subplot, while southern tarplant was observed mainly within the southwest corner, in an area with less vegetation.

APPENDIX B
Field Data Sheets

ESA Biological Resources

2013 LAWA Southern Tarplant Annual Monitoring

Site Location: ~~[illegible]~~ LAX

Observers: RCS, GCA

Date: 11/04/13

Cloud Cover (%): 40%

Time: 1210

Temperature (F): 66°F

Plot #: 1A

General Site Conditions:

Relatively low veg. density w/ some native / non-native ~~non-native~~ Species inc Common plantain, Lotus scoparius, Heterotheca grandiflora, Distichlis spicata. Common plantain seems to be dominant. also obs. bromus madritensis

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		X	
Irrigation Required		X	
Vandalism		X	
Photos Taken	X		
Herbivore Damage		X	
Weed Species Present	X		
Southern Tarplant Present	X		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating	~~X~~	X
Seeding	X	
Senecence	X	
Flowering	X	
Healthy	X	
Disease		X
Wilting		X
Yellowing		X

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
Seeding Flowering		
卌||| 卌卌卌|		
卌卌 卌卌卌卌卌		
卌||| ||||		
GCA - 68		

ESA Biological Resources

Observations/Recommendations:

recommend hand weeding the common plantain and red brome. Low density ~~of target~~ of overall veg. is beneficial for growth of Southern tarplants

LAWA Escort: Peggy Nguyen

Name of botanist onsite: Robert Sweet

Signature of botanist onsite: [signature]

For questions please contact:

Robert Sweet

Wildlife Biologist

ESA, Biological Resources

Office: 818-703-8600

Cell: 805-279-2569

Email: rsweet@esassoc.com

ESA Biological Resources

2013 LAWA Southern Tarplant Annual Monitoring

Site Location: LAX

Observers: RCS, C-CA

Date: 11/04/13

Cloud Cover (%): 20%

Time: 1253

Temperature (F): 66°F

Plot #: 1 & 3

General Site Conditions:

low overall veg. density. Relatively high native density w/a dominance of D. spicata. additional native species include Lotus Scoparius, annual bursage and Heterotheca grandiflora. Non-native species include avena fatua, red brome and atriplex semibiccata + carpobrotus edulus + common plantain

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		X	
Irrigation Required		X	
Vandalism		X	
Photos Taken	X		
Herbivore Damage		X	
Weed Species Present	X		hand pull
Southern Tarplant Present	X		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		X
Seeding	X	
Senecence	X	
Flowering	X	
Healthy	X	
Disease		X
Wilting		X
Yellowing		X

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
Seeding Flowering		
111 11		
ECA - 24		

ESA Biological Resources

Observations/Recommendations:

Hand pull weedy species ie common plantain, Avena fatua and redbrome.

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

ESA Biological Resources

2013 LAWA Southern Tarplant Annual Monitoring

Site Location: LAX

Observers: RCS, C-CA

Date: 11/04/13

Cloud Cover (%): 20%

Time: 1318

Temperature (F): 67°F

Plot #: 2

General Site Conditions:

Semi-mature

Site supports some mule fat shrubs w/ relatively sparse vegetative ground cover dom by Rx spicata and red brome.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		X	
Irrigation Required		X	
Vandalism			
Photos Taken			
Herbivore Damage			
Weed Species Present			
Southern Tarplant Present			

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		X
Seeding	X	
Senecence	X	
Flowering	X	
Healthy	X	
Disease		X
Wilting		X
Yellowing		X

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
seeding flowering		
1 1		
C-CA-2		

ESA Biological Resources

Observations/Recommendations:

Hand pull red-brome within upland portions of plot. Generally, it seems that the seasonal flooding of the plot allows native, water + salt tolerant D. Spicata to dominate. Water material lowers site ability to support S. terrplant by reducing available space for the annual species to grow.

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

ESA Biological Resources

2013 LAWA Southern Tarplant Annual Monitoring

Site Location: LAX

Observers: RCS / [illegible]

Date: 11/04

Cloud Cover (%): 15%

Time: 1339

Temperature (F): 66°F

Plot #: 3

General Site Conditions:

Relatively low weed density w/ a dom. of D. Spicata likely due to seasonal flooding. Overwhelming dom. of D. Spicata throughout.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		X	
Irrigation Required		X	
Vandalism		X	
Photos Taken	X		
Herbivore Damage		X	
Weed Species Present	X		
Southern Tarplant Present	X		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		X
Seeding	X	
Senecence	X	
Flowering	X	
Healthy	X	
Disease		X
Wilting		X
Yellowing		X

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
Seeding or Sen. / Flowering		
1 / 卌 卌 卌 卌		
卌 卌 卌 卌		
卌 卌 卌 卌		
11		

ESA Biological Resources

Observations/Recommendations:

light hand pulling of weeds along margins. Otherwise, site is relatively sound.

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

ESA Biological Resources

2013 LAWA Southern Tarplant Annual Monitoring

Site Location: 4a - LAX **Observers:** GREG AINSWORTH

Date: 11/4/2013 **Cloud Cover (%):** 20

Time: 1339 **Temperature (F):** 67

Plot #: 4a

General Site Conditions:

SITE CONDITIONS ARE FAVORABLE FOR ESTABLISHMENT + NATURAL REGENERATION + RECRUITMENT. NON-NATIVE WEEDS WERE LOW, W/ COMMON PLANTAIN MOST DOMINANT NON-NATIVE PRESENT. TOTAL COVERAGE WAS FAIRLY UNIFORM THROUGHOUT PLOT.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		X	
Irrigation Required		X	
Vandalism		X	
Photos Taken	X		
Herbivore Damage		X	
Weed Species Present	X		
Southern Tarplant Present	X		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		X
Seeding	X	
Senecence	X	
Flowering	X	
Healthy	X	
Disease		X
Wilting		X
Yellowing		X

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
5 5 5 5		
5 5 1 (31)		

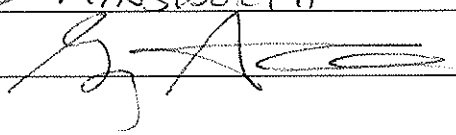
ESA Biological Resources

Observations/Recommendations:

See General Site Conditions. No recommendations

LAWA Escort: Peggy Nguyen

Name of botanist onsite: Greg Ainsworth

Signature of botanist onsite: 

For questions please contact:

Robert Sweet

Wildlife Biologist

ESA, Biological Resources

Office: 818-703-8600

Cell: 805-279-2569

Email: rsweet@esassoc.com

ESA Biological Resources

2013 LAWA Southern Tarplant Annual Monitoring

Site Location: LAX

Observers: C-CA

Date: ~~10/29~~ 11/04/13

Cloud Cover (%): 20%

Time: 1349

Temperature (F): 67°F

Plot #: 46

General Site Conditions:

Relatively low vegetative density w/ a co-dom. of common plantain, non-native acacia + Lotus Salix sp. is present in plot, taking away space for Centromadia to grow.

Qualitative Site Observations:

Item	Yes	No	Remedial Actions
Trash Present		X	
Irrigation Required		X	
Vandalism		X	
Photos Taken	X		
Herbivore Damage		X	
Weed Species Present	X		
Southern Tarplant Present	X		

Overall S. Tarplant Condition:

Description	Yes	No
Germinating		X
Seeding	X	
Senecence	X	
Flowering	X	
Healthy	X	
Disease		X
Wilting		X
Yellowing		X

Southern Tarplant Metrics:

Quantity (# of individuals)	Estimated Density (Quant./m2)	Estimated Density (Quant./Plot)
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸		
𝍸 𝍸 𝍸 𝍸 111		

Observations/Recommendations:

See General Site Conditions ~~and Recommendations~~
Remove acacia Sprouts and common plantain by hand pulling.

LAWA Escort: Peggy Nguyen

Name of botanist onsite: Greg Ainsworth

Signature of botanist onsite: [signature]

For questions please contact:

Robert Sweet

Wildlife Biologist

ESA, Biological Resources

Office: 818-703-8600

Cell: 805-279-2569

Email: rsweet@esassoc.com