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## **4.9.2 Paleontological Resources (CEQA)**

### **4.9.2.1 Introduction**

The paleontological resources analysis addresses the potential for the Master Plan alternatives to result in the disturbance or unrecoverable loss of significant paleontological resources, as defined below. Conclusions regarding the significance of impacts provided in this section are strictly for the purposes of CEQA.

### **4.9.2.2 General Approach and Methodology**

Paleontology is a branch of geology that studies the life forms of the past, especially prehistoric life forms, through the study of plant and animal fossils. Paleontological resources represent a limited, non-renewable, and impact-sensitive scientific and educational resource. As defined in this section, paleontological resources are the fossilized remains or traces of multi-cellular invertebrate and vertebrate animals and multi-cellular plants, including their imprints, from a previous geologic period. Fossil remains such as bones, teeth, shells, and leaves are found in the geologic deposits (rock formations) where they were originally buried. Paleontological resources include not only the actual fossil remains, but also the collecting localities, and the geologic formations containing those localities.

Paleontological resources preserve an aspect of Southern California's scientific prehistory that is important in understanding the development of the region as a whole. The difficulty in protecting these resources is not knowing their exact location until sometimes irreversible damage occurs. Protection of these sites can be achieved by estimating the probability of finding such resources in the project area, looking for formations in which they occur, and taking precautions, such as construction monitoring in areas with equivalent or similar formations, to avoid damaging sites.

An assessment of paleontological resources within the existing airport property and acquisition areas was developed based on a review of published and unpublished paleontologic and geologic literature and maps of LAX and vicinity, a paleontologic archival search at the Los Angeles County Museum of Natural History which contains collections from the University of California at Los Angeles and the California Institute of Technology, and a 1996-97 field survey of LAX proper and vicinity conducted by RMW Paleo Associates.

The study area for paleontological resources includes areas within the current and proposed future boundaries of LAX under the build alternatives, with focus on areas where grading and excavation would occur. This area is referred to as the Master Plan boundaries. Potential impacts were assessed by identifying the nature and likelihood of paleontological resources occurrences within the study area, and identifying locations where proposed activities could directly or indirectly (by vibration, for instance) affect potential paleontological resources.

### **4.9.2.3 Affected Environment/Environmental Baseline**

#### **State Regulations**

##### **California Environmental Quality Act (CEQA)**

Paleontologic resources are afforded protection by environmental legislation set forth under CEQA. Appendix G (part V) of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, indicating that a project would have a significant impact on paleontological resources if it will disturb or destroy a unique paleontological resource or site or unique geologic feature. Section 5097.5 of the California Public Resources Code specifies that any unauthorized removal of paleontological remains is a misdemeanor. Further, California Penal Code Section 622.5 sets the penalties for damage or removal of paleontological resources.

#### **Local Regulations**

##### **City of Los Angeles**

Statutory provisions for the preservation of paleontological resources and mitigation of adverse environmental impacts on paleontological resources are found in Section III of the Conservation Element of the City of Los Angeles General Plan, which states that:

## 4.9.2 Paleontological Resources (CEQA)

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- ◆ Endangered paleontological sites shall be protected by an ordinance that provides for permits, procedures, and provisions for salvage excavations of sites to be adversely affected.
- ◆ Upon application for grading, building, demolition, or other construction permits, the Cultural Heritage Commission shall be notified of any known paleontological sites. If any such sites should be discovered during the course of work performed under permits, the Cultural Heritage Commission shall be promptly notified.
- ◆ The City shall attempt to avoid disturbance of paleontological deposits. In the event this is not feasible, the City shall notify organizations such as the Natural History Museum and local universities to allow sufficient time to study the site.

### Existing Conditions

#### **Paleontological Setting**

The LAX property lies in the northwestern portion of the Los Angeles Basin, a broad structural syncline with a basement of older igneous and metamorphic rocks overlain by thick younger marine and terrestrial deposits. The western portion of the Master Plan boundaries is within the El Segundo Sand Hills, recent and older sand dunes that stretch from Ballona Creek, north of LAX, to the Palos Verdes Hills, far to the south. Easterly, the sand dunes grade into the Torrance Plain, on which the balance of LAX and the acquisition areas lie. The Torrance Plain reaches some distance to the north and east of the airport property to meet the Baldwin Hills and the Rosecrans Hills. Both of these latter features are uplifts associated with the Newport-Inglewood Fault.<sup>454</sup>

Sand dune deposits are exposed throughout the entire study area. Exposed within the study area are sand dune deposits of the Venice Plain, a gradually sloping surface extending from the Baldwin Hills to the Pacific Ocean. The margin of this plain is covered by sand dunes of the El Segundo dune field. The age of these dune deposits is uncertain. They may be late Pleistocene or they may be more recent deposits derived from the current beach sands. Pleistocene age fossils have been collected from excavations in the LAX area in the past. Whether these fossils came from these sand dune deposits or the older underlying Palos Verdes Sand is unknown. The importance of these earlier discoveries is that they record the presence of fossils within the deposits that are likely to be reached by excavations associated with development on the existing airport property and within proposed acquisition areas.

The older deposits that underlie the LAX area are assigned to the Palos Verdes Sand formation.<sup>455</sup> The Palos Verdes Sand formation is one of the better known Pleistocene age deposits in southern California. This unit was deposited in a shallow sea that covered the region some 124,000 years ago.<sup>456</sup> The record search information identifies the Palos Verdes Sand formation as a high potential formation for yielding unique paleontological deposits. The Palos Verdes Sand formation covers half of the LAX area, beginning at Sepulveda Boulevard and extending easterly beyond the project site. Though portions of the eastern half of the airport, including Runways 25L and 25R, contain exposed surfaces, most of the project area encompassing the Palos Verdes Sand formation is paved.

#### **Paleontological Resources - Survey Results**

**Table F4.9.2-1**, Previously Recorded Paleontological Resources in the LAX Vicinity, presents the findings of the record search conducted by the Los Angeles County Museum of Natural History. As shown, the records search identified the presence of two vertebrate fossil occurrences within the study area, three more in the immediate vicinity of the study area, and one beyond the study area within two miles from the center of LAX proper. These fossils were found at depths ranging from 13 to 70 feet. The deposits within which these resources were found to underlie the entire LAX area and surrounding vicinity.

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<sup>454</sup> Yen, Bing, Technical Memorandum, Earth Resources - Existing Conditions, for LAX Master Plan EIR, 1995.

<sup>455</sup> Schoelhamer, J.E., Vedder, J.G., and Yerkes, R.F., Geology of the Los Angeles Basin. Plate 1 accompanying Geology of Los Angeles Basin by Woodford, A.O., Bulletin 170, Chapter II, Contribution 5, California Division of Mines, 1954.

<sup>456</sup> Lajoie, K.R., Ponti, D.J., Powell, C.L., Mathieson, S.A., and Sarna-Wojcicki, A.M. "Emergent Marine Strandlines and Associated Sediments, Coastal California; A record of Quaternary sea-level fluctuations, vertical tectonic movements, climatic changes, and coastal process." In The Regressive Pleistocene Shoreline Southern California, Annual Field Trip Guide Book No. 20, South Coast Geological Society, Inc., 1992.

Table F4.9.2-1

## Previously Recorded Paleontological Resources in the LAX Vicinity

Locality	Depth Found	Type Site	Location of Site
3264	25 feet	Proboscidean bones (elephants)	WSA
Uncatalogued	65-70 feet	Marine mammal bones (fur seals and sea lions)	WSA
3789	14+ feet	Fossil remains of mammoths, rodents, and fish	VNSA
1180	13 feet	Mammoth and horse fossils	VNSA
4942	16 feet	Mammoth, bison, and fossil rabbit bones	VNSA
1024	N/A	Fauna of marine invertebrates and vertebrates	NSA

WSA = Within Study Area.

VNSA = Very Near Study Area.

NSA = Near Study Area.

Source: Los Angeles County Museum of Natural History, 1995 and 1999.

The fossils discovered in the LAX area record life in southern California at the close of the Pleistocene age. Whether these remains came from the older Palos Verdes Sand formation or the overlying sand dune deposits is unknown because their exact stratigraphic position within the sequence of rocks is uncertain. The importance of these earlier discoveries is that they record the presence of fossils within the deposits that are likely to be reached by excavations associated with development on the existing airport property.

#### 4.9.2.4 Thresholds of Significance

##### 4.9.2.4.1 CEQA Thresholds of Significance

A significant impact on paleontological resources would occur if the direct and indirect changes in the environment that may be caused by the particular build alternative would potentially result in the following future condition:

- ◆ The direct or indirect destruction of a unique paleontologic resource or site.

This threshold was utilized because it addresses potential impacts to paleontological resources associated with the proposed Master Plan alternatives. The threshold is consistent with the Environmental Checklist Form provided in Appendix G of the State CEQA Guidelines.

##### 4.9.2.4.2 Federal Standards

There are no federal standards that define significance thresholds for paleontological resources impacts.

##### 4.9.2.5 Master Plan Commitments

No Master Plan commitments for paleontological resources are proposed.

##### 4.9.2.6 Environmental Consequences

###### 4.9.2.6.1 No Action/No Project Alternative

The No Action/No Project Alternative (described in Chapter 3, *Alternatives*) involves activities that trigger an analysis of paleontological impacts. Some of these activities include the excavation and grading for proposed taxiway improvements, parking structures, and cargo facilities. Excavation and grading activities would also occur for the development of the LAX Northside and Continental City projects.

Record searches and other literature received and reviewed as part of this study indicate that the likelihood of finding fossils within the study area is relatively high, particularly given the record of fossils found within the Palos Verdes Sand Formation. This suggests that construction-related activities (such as grading and excavation) involving depths generally greater than six feet are likely to expose potentially important fossils.

## **4.9.2 Paleontological Resources (CEQA)**

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### **4.9.2.6.2 Alternatives A, B, and C**

Alternatives A, B, and C (described in Chapter 3, *Alternatives*) involves activities that trigger an analysis of paleontological impacts. Some of these activities are the excavation and tunneling of Aviation Boulevard and Sepulveda Boulevard; development of Westchester Southside; excavation and grading for construction of the West Terminal and parking facilities; and excavation for underground utility infrastructure.

The abundance of fossils within the study area at depths generally greater than six feet strongly suggests that grading and excavations for a variety of construction activities are likely to expose and damage potentially important fossils. This potential destruction of fossils during development of Alternatives A, B, and C would be a significant impact on the region's paleontological resources. Furthermore, the exposure of the fossil sites, and the accompanying potential for making the site accessible for unauthorized fossil collection, could result in the loss of additional fossil remains, associated scientific data, and fossil sites.

### **4.9.2.6.3 Alternative D - Enhanced Safety and Security Plan**

Alternative D (described in Chapter 3, *Alternatives*) involves activities that trigger an analysis of paleontological resources. Alternative D would involve substantially less building, roadway and infrastructure development than the other build alternatives. Some of the activities associated with Alternative D are the development of LAX Northside; the excavation and grading for construction of the GTC and parking facilities; the excavation, infill, grading, and construction for the ITC; and the excavation and grading for underground utility infrastructure. With less excavation and grading required for improvements under Alternative D, the magnitude of potential impacts on paleontological resources would be reduced. As with the other build alternatives, the abundance of fossils within the study area at depths generally greater than six feet strongly suggests that grading and excavations for a variety of construction activities are likely to expose and damage potentially important fossils. This would be a significant impact on the region's paleontological resources. Furthermore, the exposure of the fossil sites, and the accompanying potential for making the site accessible for unauthorized fossil collection, could result in the loss of additional fossil remains, associated scientific data, and fossil sites.

### **4.9.2.7 Cumulative Impacts**

#### **4.9.2.7.1 No Action/No Project Alternative**

The No Action/No Project Alternative, in combination with other past, present, and probable future projects, could result in cumulative impacts due to the loss of as-yet unrecorded fossil sites. Such impacts would be reduced by mitigation implemented on a project-by-project basis.

#### **4.9.2.7.2 Alternatives A, B, and C**

Grading and excavation activities associated with Alternatives A, B, or C in combination with other past, present, and probable future projects in the project area could contribute to the progressive loss of fossil remains, as-yet unrecorded fossil sites, associated geologic and geographic site data, and the fossil-bearing strata. Compliance with existing regulations for the protection and recovery of paleontological resources in combination with implementation of mitigation measures on a project-by-project basis would reduce potentially significant cumulative impacts to paleontological resources to a level that is less than significant. Moreover, implementation of these mitigation measures would produce scientific and cultural benefits from potential access to increased paleontologic artifacts and scientific knowledge.

#### **4.9.2.7.3 Alternative D - Enhanced Safety and Security Plan**

Grading and excavation activities associated with Alternative D in combination with other past, present, and probable future projects in the vicinity of LAX, could contribute to the progressive loss of fossil remains, as-yet unrecorded fossil sites, associated geologic and geographic site data, and fossil-bearing strata. As with the other build alternatives, compliance with existing regulations for the protection and recovery of paleontological resources in combination with implementation of mitigation measures on a project-by-project basis would reduce potentially significant cumulative impacts to paleontological resources to a level that is less than significant. Moreover, implementation of these mitigation measures

would produce scientific and cultural benefits from potential access to increased paleontologic artifacts and scientific knowledge.

### 4.9.2.8 Mitigation Measures

If the following proposed mitigation measures are implemented, grading and excavation associated with the project could produce some beneficial impacts by providing a more comprehensive paleontologic resource inventory of the project site and region than is now available.

◆ **MM-PA-1. Paleontological Qualification and Treatment Plan (Alternatives A, B, C, and D).**

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 selection of the paleontologist and the development of 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.

◆ **MM-PA-2. Paleontological Authorization (Alternatives A, B, C, and D).**

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.

◆ **MM-PA-3. Paleontological Monitoring Specifications (Alternatives A, B, C, and D).**

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

◆ **MM-PA-4. Paleontological Resources Collection (Alternatives A, B, C, and D).**

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.

◆ **MM-PA-5. Fossil Preparation (Alternatives A, B, C, and D).**

Fossils shall be prepared to the point of identification and catalogued before they are donated to their final repository.

◆ **MM-PA-6. Fossil Donation (Alternatives A, B, C, and D).**

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.

◆ **MM-PA-7. Paleontological Reporting (Alternatives A, B, C, and D).**

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.

### 4.9.2.9 Level of Significance After Mitigation

#### 4.9.2.9.1 Alternatives A, B, and C

Implementation of the above mitigation measures would not necessarily ensure that all potential direct and indirect impacts from Alternatives A, B, and C would be avoided. The alternatives could still result in residual, but not significant, impacts because scientifically important fossil remains, associated geologic data, unrecorded fossil sites, and fossiliferous rocks could be lost or made inaccessible by ground-disturbing activities, the covering with fill or structures, or the unauthorized collecting of fossils. With implementation of Mitigation Measures MM-PA-1 through MM-PA-7, potential significant impacts related to paleontological resources would be reduced to a less than significant level.

## **4.9.2 Paleontological Resources (CEQA)**

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The fresh exposure of fossiliferous rocks and the discovery of as-yet unrecorded fossil sites would allow the recovery of some scientifically important fossil remains that otherwise might not have been exposed. Moreover, these remains and associated geologic data, instead of being lost to grading and excavation, construction, or unauthorized fossil collecting, would be preserved in an institution where they would be available for future study by qualified investigators.

Even with mitigation measures in place, such as monitoring and recovery, with cumulative development, certain fossils would be lost or made inaccessible. However, mitigation implemented on a project-by-project basis would reduce cumulative impacts to a less than significant level and could, conversely, produce scientific and cultural benefits from potential access to increased paleontologic artifacts and knowledge.

### **4.9.2.9.2 Alternative D - Enhanced Safety and Security Plan**

As described above for Alternatives A, B, and C, Alternative D would have residual, but not significant impacts following mitigation because scientifically important fossil remains, associated geologic data, unrecorded fossil sites, and fossiliferous rocks could be lost or made inaccessible by ground-disturbing activities, covering with fill or structures, or unauthorized fossil collecting. Mitigation implemented on a project-by-project basis would reduce cumulative impacts to a less than significant level. Overall cumulative effects on paleontological resources would be less than significant and mitigation could produce scientific and cultural benefits that would not otherwise be realized by increasing the availability and study of paleontologic artifacts.