

2.9 Paleontology

2.9.1 Regulatory Setting

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils.

A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects.

- 23 United States Code (USC) 1.9(a) requires that the use of Federal-aid funds must be in conformity with all federal and state laws.
- 23 United States Code (USC) 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431-433 above and state law.

Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

2.9.2 Affected Environment

This section is based on the *Paleontological Identification Report/Paleontological Evaluation Report for the State Route 133 (Laguna Canyon Road) Safety Project* (ICF International, 2016), the *Supplemental Paleontological Identification Report/Paleontological Evaluation Report for the State Route 133 Safety Project* (LSA, 2018), and the *Paleontological Identification Report/Paleontological Evaluation Report for the State Route 133 Shoulder Widening and Drainage Improvement Project* (LSA, 2018).

Paleontological resource locality searches for any known localities within and surrounding the project site were completed through the Natural History Museum of Los Angeles County (LACM) in September 2016 and June 2017 and through the San Diego Natural History Museum (SDNHM) in June 2017. Relevant geologic maps and geological and paleontological literature were reviewed. Pedestrian surveys of different components of the project area were conducted on August 9, 2016; September 28–29, 2017; and March 21, 2018.

The project area is within the northern Peninsular Ranges Geomorphic Province, a large structural block that extends from the Transverse Ranges in the north to the tip of Baja California. Within this larger region, the project area is located in the Los

Angeles Basin, which is a broad alluvial plain bounded by mountains to the north and east and the Pacific Ocean to the west and south.

Geologic mapping indicates the project area is underlain by Holocene to late Pleistocene (less than 126,000 years ago) Young Axial Channel Deposits, Holocene to late Pleistocene Young Landslide Deposits, and the middle Miocene (11.62–15.97 million years ago) Topanga Group. Although not mapped, Artificial Fill is likely present from the surface to varying depths throughout much of the project area where it was placed during construction of the existing State Route 133 (SR-133). Because of its disturbed context, Artificial Fill does not have the potential to contain scientifically important paleontological resources. The upper 10 feet (ft) of the Young Axial Channel Deposits are unlikely to contain scientifically important paleontological resources because of their young age (likely less than 4,200 years). However, the sediments of the Young Axial Channel Deposits below a depth of 10 ft may be old enough to contain scientifically important paleontological resources. Because the Young Landslide Deposits have been transported from their original location and context, they are unlikely to contain scientifically important paleontological resources. The Topanga Group has produced scientifically important fossils near the project area and in the region and therefore may contain scientifically important fossils within the project site.

According to the locality searches conducted by the LACM, there are no vertebrate fossil localities within the project area, nor does the LACM have any localities near the project area from what the LACM calls younger Quaternary alluvium overlying older Quaternary Alluvium (i.e., Young Axial Channel Deposits). However, the LACM has records of several fossil localities near the project area from the Topanga Group. The closest vertebrate fossil locality recorded by the LACM in the Topanga Group is located southeast of the project area on the ridge northeast of Temple Hill and west of Wood Canyon. This locality, LACM 7249, produced a specimen of fossil sea cow (*Dioplotherium allisoni*). Also southeast of the project area, at the head of Rim Rock Canyon south of Temple Hill Drive, locality LACM 4007 produced a fossil specimen of an undetermined sea cow (*Dugongidae*). Farther southeast of the project area, on the west side of Aliso Creek approximately east of the intersection of Pacific Coast Highway and Bluebird Canyon Drive, locality LACM 3222 produced a rare fossil specimens of an extinct hippopotamus-like marine mammal (*Desmostylus*).

The SDNHM has records of several fossil localities within five miles of the project area from deposits similar to those mapped in the project site. One of these fossil

localities recorded by the SDNHM is in the Young Axial Channel Deposits and is located east of the project area near the intersection of Alicia Parkway and Paseo de Valencia. This locality, SDNHM 6219, produced a variety of terrestrial and freshwater vertebrates, including gars, sticklebacks, frogs, turtles, lizards, snakes, birds, rodents, rabbits, and camelids. The remaining fossil localities near the project area are from the Topanga Group east of the project area. Localities SDNHM 4891, 4312, 4520, and 4521 produced trace fossils (sponge borings, worm tubes, shipworm borings, and burrows), marine invertebrates (foraminifers, coral, bryozoans, brachiopods, snails, clams, mussels, oysters, scallops, barnacles, and sea urchins), and marine vertebrates (sharks, rays, and bony fish).

The pedestrian surveys indicated that most of the project area is underlain by Artificial Fill. Other sediments observed are consistent with the Young Axial Channel Deposits and the Topanga Group mapped in the project site.

2.9.3 Environmental Consequences

2.9.3.1 Temporary Impacts

Alternative 1 (Build Alternative)

The construction of the Build Alternative would not result in temporary effects to paleontological resources because the effects to those types of resources during construction would be considered permanent as described in Section 2.9.3.2.

Alternative 2 (No Build Alternative)

Under the No Build Alternative, none of the proposed improvements to SR-133 would be constructed. The No Build Alternative would maintain the existing conditions; therefore, the No Build Alternative would not result in temporary effects related to paleontological resources as a result of construction activities.

2.9.3.2 Permanent Impacts

Alternative 1 (Build Alternative)

Excavation depths for the various components of the Build Alternative range from one inch to 12 ft. Replacement of the detector loops would involve excavation to a depth of one inch to 1.5 inches. Construction of the new pavement and installation of the Midwest Guardrail System (MGS) would extend up to approximately six ft below the existing ground surface. Excavation associated with the drainage features of the Build Alternative, including the check dam, the reinforced concrete box (RCB), the articulated block-lined channel, and storm drain inlets would extend to depths up to approximately six ft below the existing surface. Relocating the utility poles would

involve drilling holes approximately 15 inches in diameter to depths of up to seven ft. Excavation for the utility undergrounding and vaults would extend up to approximately 12 ft deep. Regrading of the existing slope on southbound SR-133 south of El Toro Road to accommodate the widening would involve excavation into the slope up to approximately 9.5 ft vertically and up to approximately 90 ft horizontally. Some of these excavation activities would occur in deposits that are sensitive for paleontological resources. As such, excavation for some of these construction activities may have the potential to impact paleontological resources, hence Measure PAL-1 would be implemented to minimize effects.

Alternative 2 (No Build Alternative)

Under the No Build Alternative, none of the proposed improvements to SR-133 would be constructed. The No Build Alternative would maintain the existing conditions; therefore, the No Build Alternative would not result in permanent adverse effects related to paleontological resources as a result of construction activities.

2.9.4 Avoidance, Minimization, and/or Mitigation Measures

The potential effects of the Build Alternative would be avoided or minimized through the following Measure PAL-1:

PAL-1 **Paleontological Mitigation Plan.** A Qualified Paleontologist will prepare a Paleontological Mitigation Plan (PMP) following the guidelines in the California Department of Transportation (Caltrans) Standard Environmental Reference (SER), Environmental Handbook, Volume 1, Chapter 8 – Paleontology (June 2016 or more current) and guidelines developed by the Society of Vertebrate Paleontology (SVP 2010). The PMP will be prepared concurrently with final design plans during the Plans, Specifications, and Estimates (PS&E) phase.