

3.12 Paleontological Resources

This section evaluates the potential impacts of the Proposed Action on paleontological resources. This evaluation includes an assessment of the direct and cumulative effects of the Proposed Action on paleontological resources (i.e., fossils). The evaluation was developed in coordination with the San Diego Natural History Museum.

3.12.1 Affected Environment

3.12.1.1 Environmental Setting

The following discussion describes the existing paleontological resources within the SV 100K study area.

Definition of Paleontological Resources and Sensitivity

Paleontological resources (i.e., fossils) are the remains and/or traces of prehistoric plant and animal life exclusive of humans. Fossil remains such as bones, teeth, shells, leaves, and wood are found in the geologic deposits (rock formations) within which they were originally buried. For the purposes of this EIR/EIS, paleontological resources can be thought of as including not only the actual fossil remains, but also the collecting localities and the geologic formations containing those localities. A geologic formation is a body of crustal rock identified by its lithic characteristics (e.g., grain size, texture, color, mineral content) and stratigraphic position. The fossil content of a formation may also be a defining characteristic of that formation.

The paleontological resource sensitivity of a geologic formation is directly related to the scientific significance of the fossils contained within. Therefore, a formation that has been found to contain scientifically significant fossils at other localities is considered to have paleontological resource sensitivity. A fossil is considered to be scientifically significant if it provides important information on evolution and/or paleoecology, demonstrates unusual or spectacular circumstances during the earth's history, is uncommon or rare and in danger of being depleted or destroyed, and/or is a vertebrate fossil. The following levels of sensitivity are assigned to individual geologic formations.

High Sensitivity

High resource potential and high sensitivity are assigned to geologic formations known to contain paleontological localities with rare, well preserved, critical fossil materials for stratigraphic or paleoenvironmental interpretation, and fossils providing important information about the paleobiology and evolutionary history (phylogeny) of animal and plant groups. In general, formations with high resource potential are considered to have the highest potential to produce unique invertebrate fossil assemblages or unique vertebrate fossil remains and are, therefore, highly sensitive.

Moderate Sensitivity

Moderate resource potential and moderate sensitivity are assigned to geologic formations known to contain paleontological localities with poorly preserved, elsewhere common, or stratigraphically uninformative fossil material. These geologic formations are judged to have a strong, but often unproven, potential for producing unique fossil remains.

Low Sensitivity

Low resource potential and low sensitivity are assigned to geologic formations that, based on their relatively young age and/or high-energy depositional history, are judged unlikely to produce unique fossil remains. Low resource potential formations rarely produce fossil remains and are assigned a low sensitivity rating for this reason. This is not to say that fossils will not be found, and when fossils are discovered in such formations, the fossils are often scientifically significant precisely for the reason that such formations rarely produce fossil remains.

Marginal Sensitivity

Marginal resource potential and marginal sensitivity are assigned to geologic formations that have a limited probability for producing fossils from certain sediments at localized outcrops. These formations are marginally sensitive.

Zero Sensitivity

Zero resource potential is assigned to geologic formations that are composed entirely of volcanic or igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations are not sensitive.

Unknown Sensitivity

Formations from which there are currently no known paleontological resources but which have the potential for producing such remains based on their sedimentary origin are assigned this classification. Formations with unknown sensitivity include landslides and Quaternary alluvium.

Paleontological Sensitivity of Geologic Units in the SV 100K Study Area

The geologic formations mapped within the SV 100K study area were discussed in Section 3.8 (Geology and Soils) of this EIR/EIS. The paleontological sensitivity of the geologic units is discussed below; sensitive geologic units are presented in Figure 3.12-1. Geologic map symbols for the geologic units are presented after the unit name.

Peninsular Ranges Pre Batholith and Batholithic Granitics (K_{g-gr} and K_{g-gdf})

Because of their origin directly from molten magma, these rocks have no potential to produce paleontological resources and are considered to have a paleontological resource sensitivity of zero.

Santiago Peak Volcanics (KJ_{ms} and KJ_{mv})

The pyroclastic and hypabyssal intrusives portion of the Santiago Peak Volcanics has been assigned a paleontological resource sensitivity of zero because of the volcanic origin of these rocks. Fossils of marine invertebrates (belemnites and pelecypods) have been recovered from detrital sedimentary outcrops of the Santiago Peak Volcanics (KJ_{ms}) elsewhere in San Diego County (Jones and Miller, 1982). The marine sedimentary portion of the Santiago Peak Volcanics has been assigned a high paleontological resource sensitivity (Deméré and Walsh, 2003) based on the scarcity and scientific significance of the fossils that have been found within these deposits.

Poway Group (T_{st} and T_p)

The Poway Group consists of three formations including from oldest to youngest: the Stadium Conglomerate, Mission Valley Formation, and Pomerado Conglomerate (Kennedy, 1975). Both the Stadium Conglomerate (T_{st}) and Pomerado Conglomerate (T_p) have been mapped within the SV 100K study area by Tan (2002). The Mission Valley Formation does not crop out in the vicinity of the Proposed Action.

Strata of the Stadium Conglomerate have yielded large, scientifically significant collections of fossil marine invertebrates (Dusenbury, 1932; Steineck et al., 1972; Givens and Kennedy, 1979) and terrestrial mammals (Walsh, 1996). These mammal fossils include examples of extinct opossums, insectivores, primates, rodents, carnivores, rhinoceros, and artiodactyls. The Stadium Conglomerate has been assigned a high paleontological resource sensitivity value (Deméré and Walsh, 2003).

Strata of the Pomerado Conglomerate have yielded scientifically significant fossils of terrestrial mammals including *Hypertragulus*, *Hyaenodon*, *Mesohippus*, numerous opossums, insectivores, and rodents (Walsh and Gutzler, 1999). For this reason the Pomerado Conglomerate has been assigned a high paleontological resource sensitivity (Deméré and Walsh, 2003).

Debris flows - landslides (Q_{ls})

Because of the high energy nature of deposition and the presumed recent age, these deposits are generally assigned a paleontological resource sensitivity of zero to low.

Alluvium/colluvium (Q_{ya})

Surficial alluvial deposits generally do not contain paleontological resources. At various localities throughout the region, deeper excavations into sedimentary deposits mapped as Quaternary alluvium have yielded fossilized remains of Pleistocene-age (“Ice-Age”) mammals. The depth below the surface at which paleontological resources can be found in sedimentary deposits mapped as alluvium is case dependant and is influenced by a number of factors including overall thickness of the alluvial deposits; topology of the contact between the alluvium and the underlying basement rocks; and the type of deposits (e.g., alluvial fan deposits versus fluvial channel deposits). These alluvial deposits are assigned an unknown paleontological resource sensitivity value.

While fossilized remains of Pleistocene-age mammals are occasionally discovered in colluvial deposits, these occurrences are considered rather rare (due to the high energy and short duration of deposition). For this reason, colluvial deposits are generally assigned a low or marginal paleontological resource sensitivity value.

3.12.1.2 Regulatory Setting

The following addresses state policies relevant to paleontological resources issues of the Proposed Action.

According to Appendix G of the CEQA Guidelines, “A project will normally have a significant effect on the environment if it will disrupt or adversely affect a...paleontological site except as part of a scientific study.”

3.12.2 Project Design Features

The Proposed Action would include design features to minimize paleontological resource impacts. These design and construction features could include, but would not be limited to, the following:

- A qualified paleontologist will attend pre-construction meetings to consult with grading and exaction contractors in all areas of high or moderate sensitivity.
- A paleontological monitor will be on site during original cutting of previously undisturbed sedimentary deposits of high or moderate sensitive geologic formations to inspect cuts for contained fossils. In the event that fossils are discovered, it may be necessary to increase the field monitoring time. Conversely, if fossils are not observed, then monitoring time can be reduced. A paleontological monitor is not needed during grading, etc., in areas with no paleontological resource sensitivity (i.e., basement rocks, the pyroclastic and hybabysal intrusives portion of Santiago Peak Volcanics, and debris flow deposits).

- Should important fossils be discovered, the paleontologist or paleontological monitor will recover them. As a result, it may be necessary to halt or divert work in cases that require longer periods of time to complete the recovery (e.g., removing a large mammal skeleton). Further, it may be necessary to set up a screen-washing operation on the site depending on the types of fossils discovered.
- Fossils recovered during the monitoring will be prepared, identified, cataloged and deposited with copies of all pertinent field notes, photographs, and maps in an appropriate regional repository such as the San Diego Natural History Museum.
- Prior to inundation, a detailed survey of surface exposures between 590 and 766 AMSL of paleontologically high or moderate sensitive geologic units that crop out within the reservoir will be conducted by a qualified paleontologist. Sensitive geologic units to be surveyed are mapped in Figure 3.12-1. The stratigraphic context of any fossil localities discovered will be recorded and fossils collected. Recovered fossils will be prepared, identified, cataloged and deposited with copies of all pertinent field notes, photographs, and maps in an appropriate regional repository such as the San Diego Natural History Museum.
- A final report will be completed that outlines the results of the monitoring report. This report will include discussions of the methods used, stratigraphy exposed, fossils collected, and the scientific significance of recovered fossils.

3.12.3 Direct and Indirect Effects

3.12.3.1 Thresholds of Significance

Thresholds used to evaluate potential impacts on paleontological resources are based on applicable criteria in the State CEQA Guidelines (CCR §§15000-15387), Appendix G. A significant impact on paleontological resources would occur if the Proposed Action would:

1. Directly or indirectly destroy a unique paleontological resource or site or geologic feature.

3.12.3.2 Impact Analysis

Methodology

As described in Section 3.12.1.1, a direct relationship exists between a geologic formation and the fossils that occur within it. The paleontological sensitivity of mapped geologic units within the Proposed Action study area was determined using the paleontological sensitivity ratings defined in Section 3.12.1.1 (Figure 3.12-1). Impacts on paleontologically sensitive geologic units associated with the construction of the Proposed Action were then assessed by a qualified paleontologist.

Analysis

Threshold 1: Directly or indirectly destroy a unique paleontological resource or site or geologic feature

Construction activities in the immediate vicinity of the existing dam have the potential to affect Jurassic/Cretaceous-age sedimentary deposits of the Santiago Peak Volcanics (high paleontological resource sensitivity) and Quaternary-age alluvium (unknown paleontological resource sensitivity). However, paleontological impacts due to construction activities would be reduced with the implementation of the project design features listed in Section 3.12.2 and, therefore, paleontological resource impacts from this activity would be less than significant.

Proposed excavation and grading for the relocated marina in the side canyon drainage along the southwest shore of the reservoir would affect Eocene-age sedimentary deposits of the Stadium Conglomerate (high paleontological resource sensitivity) and Pomerado Conglomerate (high paleontological resource sensitivity). However, paleontological impacts due to excavation and grading of the marina would be reduced with the implementation of the project design features listed in Section 3.12.2 and, therefore, paleontological resource impacts from this activity would be less than significant.

Raising the water level of the reservoir has the potential to result in significant impacts on paleontological resources by destroying localities that may occur at the surface within exposures of paleontologically sensitive units that crop out below 766 feet AMSL. Geologic formations that crop out at the surface within the inundation area include the Stadium Conglomerate (high paleontological resource sensitivity) and Pomerado Conglomerate (high paleontological resource sensitivity). Inundation would cause fossils or geologic formations at the surface to be in direct contact with water. Water contact accelerates the chemical weathering process, damaging or destroying any fossils (and associated contextual data) that may exist at the surface within the proposed inundation area. However, paleontological impacts due to inundation would be reduced with the implementation of the project design features listed in Section 3.12.2 and, therefore, impacts from this activity would be less than significant.

Implementation of the project design features listed in Section 3.12.2 would avoid impacts on paleontological resources. Therefore, impacts of the Proposed Action would be less than significant.

3.12.3.3 Mitigation Measures

Impacts on paleontological resources would be less than significant. Therefore, no mitigation measures are required.

3.12.3.4 Residual Impacts after Mitigation

No residual impacts would occur.

3.12.4 Cumulative Effects

3.12.4.1 Other CIP Projects

As described in Section 3.2 (Cumulative Projects) of this EIR/EIS, it was determined that the Slaughterhouse Terminal Reservoir would be the only CIP project with the potential to contribute cumulative impacts when combined with the Proposed Action because they are located within two miles of one another. As documented in the Regional Water Facilities Master Plan PEIR, the Water Authority would implement a paleontological monitoring program to mitigate impacts on any paleontological resources that are discovered during grading activities associated with the Slaughterhouse Terminal Reservoir. This conclusion is incorporated into the cumulative paleontological resources analyses in Section 3.12.4.3 below.

3.12.4.2 ESP Projects

Grading activities have been completed for the San Vicente Pipeline tunnel portal and the San Vicente Pump Station/Surge Control Facility; therefore, these ESP projects would not contribute to cumulative paleontological resources impacts, and are not addressed in the cumulative paleontological impact analyses in Section 3.12.4.3 below.

3.12.4.3 Other Planned Projects with CIP and ESP Projects

This section evaluates the cumulative paleontological resource impacts of the Proposed Action when considered in conjunction with the other planned projects listed in Table 3.2-1 (Section 3.2 [Cumulative Projects for the Proposed Action] of this EIR/EIS), and incorporates the cumulative impacts associated with the Slaughterhouse Terminal Reservoir (CIP) project described in Section 3.12.4.1 above. The following analysis addresses the significance threshold listed in Section 3.12.3 above.

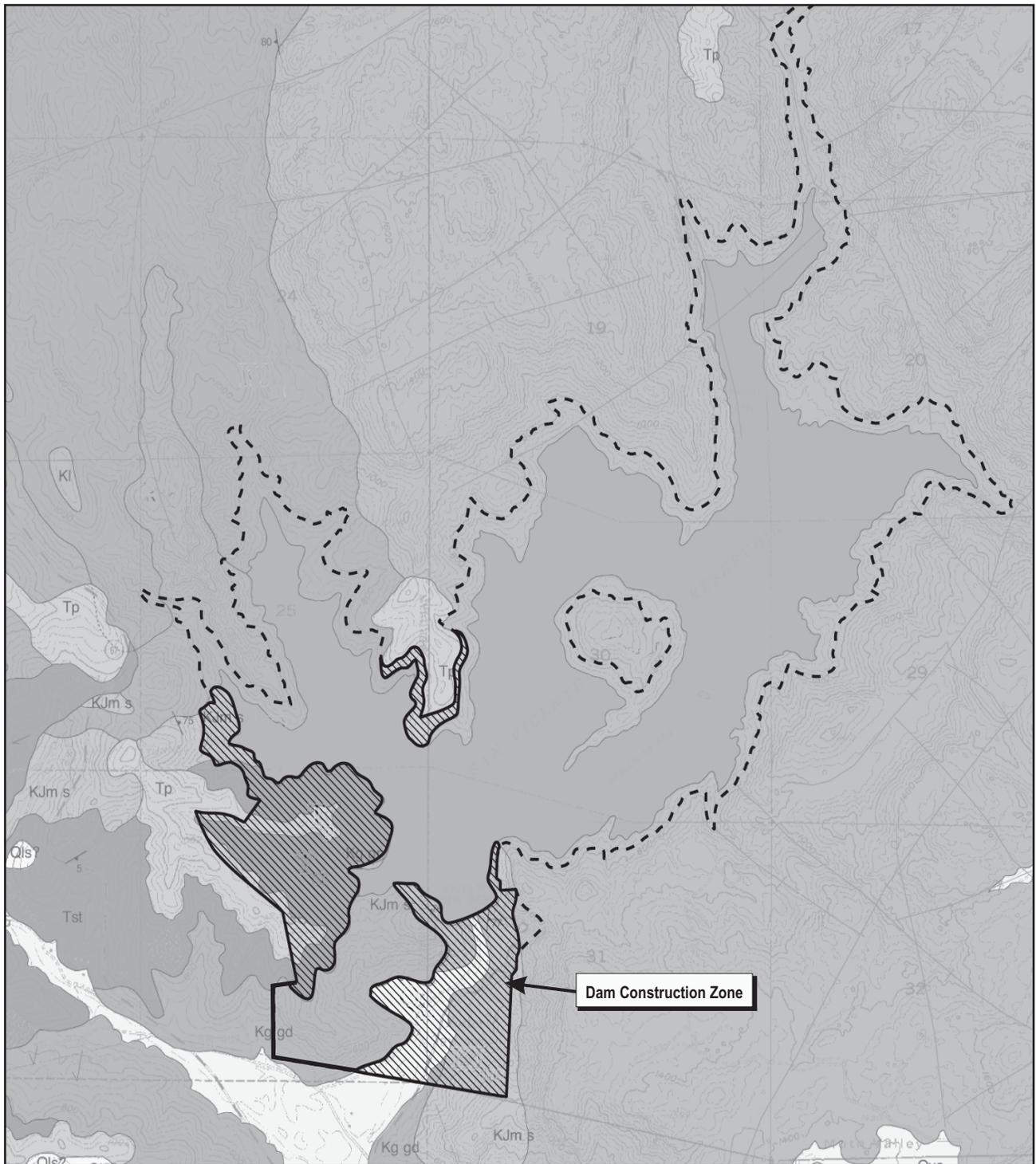
Cumulative Threshold 1: Directly or indirectly destroy a unique paleontological resource or site or geologic feature

Potentially sensitive paleontological resources exist within the cumulative projects study area (refer to Figure 3.2-1 in Section 3.2 [Cumulative Projects for the Proposed Action] of this EIR/EIS). Construction activities associated with the Proposed Action have the potential to significantly affect Jurassic/Cretaceous-age sedimentary deposits of the Santiago Peak Volcanics (high paleontological resource sensitivity), Quaternary-age alluvium (unknown paleontological resource sensitivity), Stadium Conglomerate (high paleontological resource sensitivity), and Pomerado Conglomerate (high paleontological resource sensitivity). However, incorporation of project design features in Section 3.12.2 would reduce impacts on paleontological resources due to the Proposed Action to a level considered less than significant.

The Slaughterhouse Terminal Reservoir (CIP) and the cumulative projects in the vicinity of the Proposed Action (refer to Figure 3.2-1) could involve excavation (including grading or digging)

in formations that could contain fossils. Mitigation for these potential impacts would be required of all projects, either incorporated as project design features or designated as mitigation measures. Therefore, effects would not be cumulatively considerable, and the cumulative impact would be less than significant.

The Proposed Action, the Slaughterhouse Terminal Reservoir (CIP) project and other cumulative projects in the vicinity of the Proposed Action would have the potential to affect geologic formations with high paleontological resource sensitivity. However, the Proposed Action's contribution to cumulative impacts would be avoided by incorporation of the project design features listed in Section 3.12.2 above. Therefore, cumulative paleontological resource impacts due to construction of the Proposed Action, when combined with construction impacts associated with the Slaughterhouse Terminal Reservoir (CIP) project and the other cumulative projects in the area, would be less than significant.



	766' Contour and Downstream Construction Area		Paleontologically Sensitive Geologic Units
<small>SOURCE: S.D. Natural History Museum 2006, U.S.G.S. San Vicente, CA 7.5' Quadrangle</small>			<small>Not to Scale</small>

**PALEONTOLOGICALLY SENSITIVE GEOLOGIC UNITS
IN THE SV 100K FOOTPRINT**

FIGURE 3.12-1

