2.10 Paleontological Resources

This section of the environmental impact report (EIR) discusses existing conditions and potential impacts to paleontological resources resulting from implementation of Otay Ranch Village 14 and Planning Areas 16/19 (Proposed Project). The analysis is based on a review of existing paleontological resources; technical data; and applicable laws, regulations, and guidelines. It also identifies measures to mitigate impacts to paleontological resources.

Comments received in response to the Notice of Preparation did not address paleontological resources. A copy of the Notice of Preparation and comment letters received in response to the Notice of Preparation is included in Appendix 1-1 of this EIR.

This section tiers from the previously certified 1993 Otay Ranch Final Program EIR (Otay Ranch PEIR) (City of Chula Vista and County of San Diego 1993a) because the Proposed Project is within the boundaries of the Otay Ranch GDP/SRP (City of Chula Vista and County of San Diego 1993b), and development of the Project Area was analyzed in the Otay Ranch PEIR. The certified Otay Ranch PEIR determined that impacts to paleontological resources as a result of development planned in the 1993 Otay Ranch GDP/SRP would be significant. As a result, the Otay Ranch PEIR included mitigation measures to reduce the significant impacts, and determined that implementation of mitigation measures would reduce impacts to below a level of significance.

2.10.1 Existing Conditions

Paleontological resources are the remains and/or traces of prehistoric life, exclusive of remains from human activities, and include the localities where fossils were collected and the sedimentary rock formations from which they were obtained/derived. The defining character of fossils is their geologic age. Fossils or fossil deposits are generally regarded as older than 10,000 years, the generally accepted temporal boundary marking the end of the last Late Pleistocene glacial event and the beginning of the current period of climatic amelioration of the Holocene (County of San Diego 2009).

A unique paleontological resource is any fossil or assemblage of fossils, or paleontological resource site or formation that meets any one of the following criteria (County of San Diego 2009):

- The best example of its kind locally or regionally;
- Illustrates a paleontological or evolutionary principle (e.g., faunal succession; plant or animal relationships);
- Provides a critical piece of paleobiological data (illustrates a portion of geologic history or provides evolutionary, paleoclimatic, paleoecological, paleoenvironmental, or biochronological data);

- Encompasses any part of a "type locality" of a fossil or formation;
- Contains a unique or particularly unusual assemblage of fossils;
- Occupies a unique position stratigraphically within a formation; or
- Occupies a unique position, proximally, distally or laterally within a formation's extent or distribution.

Per the County of San Diego (County) Guidelines, paleontological sensitivity is defined as follows (County of San Diego 2009):

> ***High:*** 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 paleoclimatic, paleobiological, and/or 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.
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> ***Moderate:*** Moderate resource potential and moderate sensitivity are assigned to geologic formations known to contain paleontological localities. These geologic formations are judged to have a strong, but often unproven, potential for producing unique fossil remains.
>
> ***Low:*** 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 of scientific significance and are considered to have low sensitivity. However, when fossils are found in these formations, they are often very significant additions to our geologic understanding of the area.
>
> ***Marginal:*** Marginal resource potential and marginal sensitivity are assigned to geologic formations that are composed either of volcaniclastic (derived from volcanic sources) or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain formations at localized outcrops. Volcaniclastic rock can contain organisms that were fossilized by being covered by ash, dust, mud, or other debris from volcanoes. Sedimentary rocks that have been metamorphosed by heat and/or pressure caused by volcanoes or plutons are called metasedimentary. If the sedimentary rocks had paleontological resources within them, those resources may have survived the metamorphism and still be identifiable within the

metasedimentary rock, but since the probability of this occurring is so limited, these formations are considered marginally sensitive.

No Potential: No resource potential is assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations have no paleontological resource potential.

Geologic Setting

The Project Area's geological setting is described in more detail in Section 2.6, Geology and Soils. The Project Area is mainly underlain by two major rock types: metavolcanic rocks of the Santiago Peak Volcanics in the upslope parts of the Project Area, and sedimentary rocks of the Otay Formation in the lower-lying valley and southwestern parts of the Project Area. Minor exposures of upper Pleistocene (greater than 10,000 year old) older alluvium (Qoa) and colluvium are present on the east side of the southern part of the valley, and unconsolidated Holocene (less than 10,000 year old) alluvial deposits are present along the valley bottom and in the limited floodplain areas (Appendix 2.6-1).

The Lower Cretaceous (approximately 128 to 118 million year old) Santiago Peak Volcanics (Tan 2002; Todd 2004) consist of mildly metamorphosed volcanic and volcaniclastic rocks, but are predominantly andesite and dacite in composition. Metasedimentary parts of the Santiago Peak Volcanics, which elsewhere are known to contain Jurassic fossils (e.g., Fife et al. 1967), have not been identified locally. The Jurassic metasediments are regarded as a separate formation by Abbott (1999) and Walawender (2000) (Appendix 2.6-1).

Paleontological Resource Potential

Paleontologists at the San Diego Natural History Museum divide the fossiliferous Otay Formation into three informal members: an upper siltstone-sandstone-mudstone member, a middle gritstone member, and a basal angular-clast fanglomerate member (Deméré and Walsh 1993). On local geologic maps, the formation is divided into an upper member (Appendix 2.10-1 and Todd 2004) and a lower pebbly conglomerate, gritstone, and sandstone member (Tan 2002; Todd 2004). Numerous fossil localities have been discovered in the upper siltstone-sandstone-mudstone member and the middle gritstone member, but have yet to be recorded from the basal fanglomerate member (Deméré and Walsh 1993). Deméré and Walsh (1993) assign a "high paleontological resource sensitivity" to the upper member of the Otay Formation, and a "moderate paleontological resource sensitivity" to the middle and lower members of the Otay Formation. Quaternary alluvial deposits are assigned a low paleontological sensitivity by Deméré and Walsh (1993) and the County of San Diego (County of San Diego 2009) (Appendix 2.6-1).

2.10.2 Regulatory Setting

State Regulations

CEQA

The California Environmental Quality Act (CEQA) requires lead agencies to consider the potential effects of a project on unique paleontological resources. CEQA requires an assessment of impacts associated with the direct or indirect destruction of unique paleontological resources or sites that are of value to the region or state.

Local Regulations

County of San Diego General Plan — Conservation and Open Space Element

The following goals and policies identified in the County General Plan Conservation and Open Space Element are applicable to the Proposed Project (County of San Diego 2011):

- **Goal COS-9: Education and Scientific Uses.** Paleontological resources and unique geologic features conserved for educational and/or scientific purposes.
    - **Policy COS-9.1: Preservation.** Require the salvage and preservation of unique paleontological resources when exposed to the elements during excavation or grading activities or other development processes.
    - **Policy COS-9.2: Impacts of Development.** Require development to minimize impacts to unique geological features from human related destruction, damage, or loss.

County of San Diego Grading Ordinance

The County Grading Ordinance requires that projects involving grading, clearing, and/or removal of natural vegetation obtain a grading permit, unless the project meets one or more of the exemptions listed in Section 87.202 of the Grading Ordinance. The grading permit is discretionary and requires compliance with CEQA. Section 87.430 of the Grading Ordinance provides that the County official (e.g., permit compliance coordinator) may require a paleontological monitor during all or selected grading operations to monitor for the presence of paleontological resources. If fossils greater than 12 inches in any dimension are encountered, then all grading operations in the area of discovery must be suspended immediately and not resumed until authorized by the County official. The Grading Ordinance also requires immediate notification of the County official regarding the discovery. The County official must determine the appropriate resource recovery operation, which the permittee must carry out prior to the County official's authorization to resume normal grading operations (County of San Diego 2012).

2.10.3 Analysis of Project Effects and Determination as to Significance

Guidelines for the Determination of Significance

For purposes of this EIR, the County's Guidelines for Determining Significance, Report Format and Content Requirements – Paleontological Resources (County of San Diego 2009) applies to both the direct and cumulative impact analyses. As stated in the County's guidelines, the significance criterion is whether a project would directly or indirectly destroy a unique paleontological resource or site. A project could cause a significant impact to paleontological resources if project-related grading or excavation will disturb the substratum or parent material below the major soil horizons in any paleontologically sensitive area of the County, as shown on the County's Paleontological Resources Potential and Sensitivity Map that is included in the County Guidelines (County of San Diego 2009).

Based on a paleontological collections and records search conducted by the Department of Paleontology at the San Diego Natural History Museum in August 2014 (Appendix 2.10-1), there are no previously recorded fossil localities within the boundaries of the Project Area. However, the Project Area is partially underlain by the Otay Formation. As discussed in Section 2.10.1, Deméré and Walsh (1993) assign a "high paleontological resource sensitivity" to the upper member of the Otay Formation, and a "moderate paleontological resource sensitivity" to the middle and lower members of the Otay Formation. Further, there are at least 18 recorded fossil localities known from the Otay Formation within a 1-mile radius of the southwestern-most part of the Project Area (Appendix 2.10-1). Eleven of these localities represent the upper siltstone-sandstone-mudstone member of the Otay Formation, six localities represent the middle gritstone member, and data are not available for one locality. These localities have yielded important and diverse assemblages of terrestrial vertebrate fossils, including lizard, snake, tortoise, a variety of small rodent-sized animals, rabbit, dog, fox, small animals called oreodonts (e.g., Sespia spp. and others), and rhinoceros. A list of species found at each of the documented localities follows each locality description in Appendix 2.10-1.

County guidelines state that for projects within areas of high or moderate paleontological resource potential that propose excavation equal to or greater than 2,500 cubic yards, the services of a Project Paleontologist and a Paleontological Resources Monitor are required (County of San Diego 2009). Therefore, excavation in areas underlain by the Otay Formation would result in **potentially significant impacts** to paleontological resources (**Impact PR-1**).

The Proctor Valley Road North Option would have similar underlying geologic setting as the Proposed Project and, thus, would have the potential to result in the same potentially significant impact to paleontological resources. The Perimeter Trail Option is also within the Development Footprint of the Proposed Project and, thus, would have the potential to result in the same

potentially significant impact to paleontological resources. Therefore, impacts associated with the Proctor Valley Road North and Perimeter Trail Options would be included in **Impact PR-1**. The Preserve Trails Option would not result in grading and, thus, impacts for this option would be less than significant.

2.10.3.1 Consistency with Applicable Plans, Policies, and Ordinances

The Proposed Project would be consistent with Goal COS-9 of the County General Plan Conservation and Open Space Element (County of San Diego 2011). County guidelines state that for projects within areas of potential high or moderate paleontological resources that propose excavation equal to or greater than 2,500 cubic yards, the services of a Project Paleontologist and a Paleontological Resources Monitor are required (County of San Diego 2009). Excavation in areas underlain by the Otay Formation would comply with County guidelines for monitoring paleontological resources during excavation to minimize impacts, and require salvage and preservation of any discovered paleontological resources. The Proposed Project would be consistent with Policies COS-9.1 and COS-9.2.

2.10.4 Cumulative Impact Analysis

Cumulative projects (shown in Figure 1-16, Cumulative Projects, and listed in Table 1-7 in Chapter 1, Project Description) would have the potential to result in a cumulative impact associated with paleontological resources from extensive grading, excavation, or other ground-disturbing activities that are located in an area of high or moderate sensitivity. Cumulative projects would be regulated by state and local regulations, including CEQA and the County Grading Ordinance.

As discussed in Section 2.10.2, the Proposed Project is subject to the County Grading Ordinance, which requires a paleontological monitor to be present during grading or excavating activities at the discretion of the County; mandates the suspension of grading operations upon the discovery of fossils greater than 12 inches in any dimension; and gives the appropriate County official the authority to determine the appropriate resource recovery operations, which would be carried out prior to the County official's authorization to resume normal grading operations (County of San Diego 2012). Additionally, cumulative projects that propose extensive excavation in areas of moderate or high paleontological sensitivity would be required to retain a Project Paleontologist and a Paleontological Resources Monitor during excavations, similar to the Proposed Project. Therefore, the Proposed Project would **not result in a cumulatively considerable impact** to unique paleontological resources.

2.10.5 Significance of Impacts Prior to Mitigation

Impact PR-1 Excavation in areas underlain by the Otay Formation would result in potentially significant impacts to paleontological resources.

2.10.6 Mitigation Measures

M-PR-1 A Qualified Paleontologist shall supervise a Paleontological Monitoring Program. A Qualified Paleontologist is a person who has, to the satisfaction of the County of San Diego Director of Planning & Development Services:

- a Ph.D. or M.S. or equivalent in paleontology or closely related field (e.g., sedimentary or stratigraphic geology, evolutionary biology);
- demonstrated knowledge of Southern California paleontology and geology; and
- documented experience in professional paleontological procedures and techniques.

The Qualified Paleontologist shall conduct or supervise the following mitigation tasks:

- Monitoring of excavation operations to discover unearthed fossil remains, generally involving monitoring of ongoing excavation activities (e.g., sheet grading pads, cutting slopes and roadways, basement and foundation excavations, and trenching). A Paleontological Resources Monitor must have at least 1 year of experience in field identification and collection of fossil materials.
- Salvaging of unearthed fossil remains, typically involving simple excavation of the exposed specimens, but possibly also plaster-jacketing of individual large and/or fragile specimens, or more elaborate quarry excavation of richly fossilferous deposits.
- Recording of stratigraphic, geologic, and geographic data to provide a context for the recovered fossil remains, including accurate plotting (mapping) on grading plans and standard topographic maps of all fossil localities, description of lithologies of fossil-bearing strata, measurement and description of the overall stratigraphic section (unless considered by the Project Paleontologist to be infeasible), and photographic documentation of the geologic setting.

- Laboratory preparation (cleaning and repair) of collected fossil remains to the point of identification (not exhibition), generally involving removal of enclosing sedimentary rock material, stabilization of fragile specimens (using glues and other hardeners), and repair of broken specimens.
- Curating prepared fossil remains, typically involving scientific identification and cataloguing of specimens, and entry of data into one or more accredited institutional (museum or university) collection (specimen/species lot and/or locality) databases. Curation is necessary so that the specimens are available for scientific research.
- Transferal, for archival storage, of cataloged fossil remains and copies of relevant field notes, maps, stratigraphic sections, and photographs to an accredited institution (museum or university) in California that maintains paleontological collections, preferably one of the following:
    - San Diego Natural History Museum
    - Los Angeles County Museum
    - San Bernardino Museum of Natural History
    - University of California Museum of Paleontology, Berkeley
    - Anza-Borrego Desert State Park (if the fossils were salvaged in the desert)
- Preparation of a final report summarizing the results of the field investigation, laboratory methods, stratigraphic information, types and importance of collected fossils, and any necessary graphics to document the stratigraphy and precise fossil collecting localities.

2.10.7 Conclusion

Excavation in areas underlain by the Otay Formation would result in potentially significant impacts to paleontological resources (**Impact PR-1**). Retention of a Project Paleontologist and Paleontological Resources Monitor during excavation in paleontologically sensitive areas (**M-PR-1**) would reduce potentially significant impacts to **less than significant**.