

## 4.15 Paleontological Resources

Paleontological resources, or fossils, are the evidence of once-living organisms preserved in the geologic record. They include both the fossilized remains of ancient plants and animals and the traces thereof (e.g., track ways, imprints, burrows, eggshells, etc.). In general, fossils are greater than 5,000 years old (middle Holocene) and are typically preserved in sedimentary rocks. Although rare, fossils can also be preserved in volcanic rocks and low-grade metamorphic rocks under certain conditions. The LWEP EIR addressed paleontological resources in the LWEP EIR Section 3.12, *Paleontological Resources*, and concluded that impacts to paleontological resources would be less than significant with mitigation.

### 4.15.1 Environmental Setting

California can be divided into eleven geomorphologic provinces. Santa Barbara County lies at the junction of two of these provinces: the Transverse Ranges and the Coastal Ranges. The geology of Santa Barbara County is dominated by marine sediments ranging in age from Mesozoic to Pleistocene. Dibblee (1950) said of Santa Barbara County, “The complex structure and resultant physiography of Santa Barbara County were developed by the series of diastrophic event starting with the early Miocene Yuezan orogeny and culminating with Pleistocene Coast Range orogeny, caused by a recurrent stress system of increasing intensity, these events together constituting the local effect of the Cascadian revolution.”

Petroleum production and mining of diatomite have been the main mineral extraction enterprises in Santa Barbara County.

#### 4.15.1.1 Data Sources

##### Geologic mapping

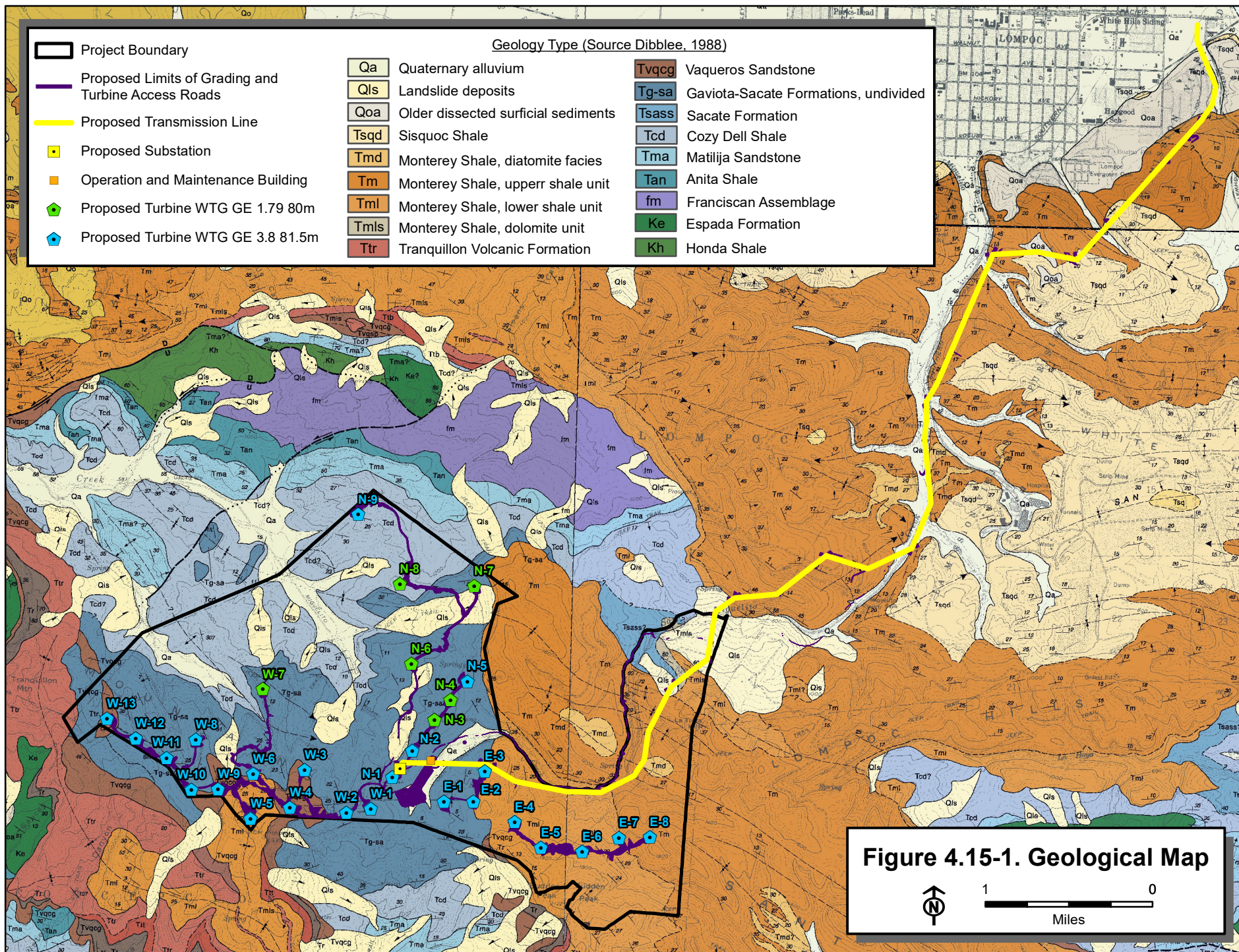
The LWEP EIR reviewed geological maps to determine what geologic units occur in the Project footprint and powerline route. The geologic units that were used in that document were the Franciscan Formation, Espada Formation, Anita Shale/Juncal Formation, Matilija Formation, Cozy Dell Shale Formation, Sacate-Gaviota (Coldwater) Formation, Tranquillon Volcanics, Vaqueros Sandstone, Rincon Sandstone, Monterey Shale, Sisquoc Shale, Older Quaternary Dissected Surficial sediments, Quaternary Landslide and Fluvial deposits, and Quaternary surficial sediments. The LWEP Final EIR concluded that the rocks at and near the surface of the Project area are composed primarily of Neogene (Miocene and Pliocene) marine sediments.

The geologic mapping on which this assessment is based are the pertinent 7.5' quadrangle mapping of the Thomas Dibblee Foundation, specifically the Lompoc, Lompoc Hills, and Tranquillon Mountains quadrangles (Dibblee, 1988a, 1988b, 1988c). The features of the Project are superimposed on these geologic maps in Figure 4.15.1.

##### Museum Record Searches

No paleontological survey was performed for the LWEP or for the present assessment. A paleontological records search was not requested for the LWEP, but there was a review of paleontological localities in Santa Barbara County from the UCMP paleontological locality online database. The conclusion was







that there were 127 total localities within Santa Barbara County and that 17 were from the Franciscan melange, 56 were from the Vaqueros Formation, 3 were from the Rincon Formation, 12 were from the Monterey Formation, and 21 were from the Sisquoc Formation.

Aspen requested a paleontological records search from the Vertebrate Paleontology Department of the Natural history Museum of Los Angeles County (LACM) for information on localities within the Project footprint and within one mile of it. Dr. Sam McLeod of that institution related that the institution had no localities in the Tranquillon Volcanics, Cody Dell Shale, or Gaviota-Sacate Formations undivided. He stated that there is a locality in the Vaqueros Formation just south of Lake Cachuma that produced five types of sharks.

LACM locality 6590 lies in the Monterey Formation just west of the northern part of the Project area less than one mile north of Miguelito Park. It has produced fossils of the herring *Etringus*. LACM locality 4156 is in a diatomite quarry just west of 6590 and has produced teeth of the shark *Isurus hastalis*, as well as the skeletons of many bony fish species, including *Xyne*, *Eclipes*, *Lompoquia*, sparids, flounders, rockfish, *Chauliodus*, *Hipposynghanthus*, a bird, a sea lion *Pithanotaria*, and the sperm whale *Scaldicetus*. In the White Hills east of LACM 6590 is a locality within the Monterey Formation. It has produced teeth of the shark *Isurus oxyrinchus*, and skeletons of numerous kinds of bony fishes. These include *Lampanyctus*, *Thrysocles*, *Lompoquia*, *Scomber*, *Protanthias*, *Rhythmias*, *Pleuronichthys*, *Bathylagus*, *Sebastodes*, *Cyclothone*, and *Argyropelecus*. The holotype of *Protanthias fossilis* came from this locality. Most of these specimens were published by Lore David in 1943. In the northeastern part of the Project area in the Santa Ynez Mountains is LACM locality 6589, listed as being in the Sisquoc Formation. Due to changing usages of the of the Sisquoc and Monterey formations, it is probable that some or all of these specimens come from the Monterey Formation. Bony fishes found there include serrivomerids, belonids, *Zelosis*, *Scomberesox*, *Etringus*, *Ganolytes*, *Xyne*, *Eclipes*, *Physiculus*, *Microlepidium*, *Lampanyctus*, scombrids, trichiurids, flounders, bathylagids, melanostomatids, *Chauliodus*, *Cyclothone*, *Argyropelecus*, and *Hipposyngnathus imporcitor*.

## Literature Search

The LWEP concluded that geologic and paleontological research in the specific Project area has been limited. Aspen found that there is an extensive body of literature on the geological and paleontological resources of western Santa Barbara County, but the paleontological literature focuses on the fossils of the Monterey and Sisquoc formations. Aspen searched a compilation of Fierstine et al. (2012) for fossil fishes published from the Lompoc vicinity. Fierstine et al. (2012) record at least 47 species of bony fish that have been named on specimens from the Monterey and Sisquoc formations of this part of Santa Barbara County. Most of these were published by Dr. David Starr Jordan, one-time chancellor of Stanford University. Referred specimens of at least four kinds of fish have been described from this rock.

Several kinds of birds and one mammal have been described from rocks of the Monterey and/or Sisquoc formations of the Project area.

Aspen also searched the compilations of Jefferson (1991a, 1991b) to determine whether any Pleistocene vertebrate fossils were listed for the area. None were listed.

## Paleosensitivity

Dr. McLeod advised in his records search report that excavations in the exposures of the Tranquillon Volcanics in the Project area will not uncover any recognizable fossils. Shallow excavations in the younger Quaternary Alluvium exposed in the drainages of the Project area are unlikely to encounter

significant vertebrate fossil remains. Deeper excavations in those deposits that extend down into older sedimentary deposits, or any excavations in the exposures of the Cozy Dell Shale, Gaviota-Sacate Formations undivided, Vaqueros Sandstone, Miocene Monterey Shale Formation, or Sisquoc Formation in the Project area; however, may well uncover significant vertebrate fossils.

Dr. McLeod advised that any substantial excavations in the sedimentary deposits in the Project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. He mentioned that sediment samples should be collected and processed to determine the small fossil potential in the Project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

The SVP standard guidelines contain a method of rating the paleontological sensitivity for any given formation. Other methods are utilized by the Bureau of Land Management. The LWEP employed the SVP methodology. Potential mitigation measures also follow an established protocol codified by the SVP. The present review utilizes the most recent version (2010) of the SVP guidelines.

An ancillary matter in ranking the paleontological sensitivity of rock units is how one defines a significant paleontological resource. The SVP guidelines (2010) define a significant paleontological resource as fossils and fossiliferous deposits of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radio-carbon years).

In the SVP system of sensitivity rating, rock units are described as having (a) high, (b) undetermined, (c) low, or (d) no potential for containing significant paleontological resources

The SVP system defines High Potential Rock Units as those from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcanoclastic formations (e. g., ashes or tephra), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both: (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils; and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units that contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units that may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

Undetermined Potential Rock Units are defined as units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these

rock units is required before a paleontological resource mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

Low Potential Rock Units are those which are poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically do not require measures to protect fossils.

No Potential Rock Units are those having no potential to contain significant paleontological resources as high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor mitigation measures relative to paleontological resources.

The LWEP EIR found that it would appear that the older Franciscan (including the Espada) Formation, and the younger, chiefly Neogene marine sequence (Vaqueros Sandstone and Rincon, Monterey, and Sisquoc shales) are paleontologically productive. The LWEP rated Qa (surficial sediments) as low sensitivity, but rated here as high, because of Dr. McLeod's warning that older Quaternary sediments could underlie Qa sediments.

Table 4.15-1 below shows the paleosensitivities assigned to the various rock units in the Project area by the LWEP EIR and by the present analysis.

**Table 4.15-1. Paleosensitivity of the Project Site Rock Units**

Map symbol	Name of rock unit	LWEP Paleontological Sensitivity	SWEP Paleontological Sensitivity
Qa	Surficial sediment	Low	High
Qlsl	Landslide debris	Moderate	Low
Qoa	Older dissected surficial Sediments	Low	High
<b>Neogene Marine Rocks</b>			
Tsqd	Sisquoc Shale	High	High
Tml, Tmls, Tm, and Tmd	Monterey Shale	High	High
Tr	Rincon Shale	High	High
Tvqcg	Vaqueros Sandstone	High	High
Ttr	Tranquillon Volcanics	Low	Low
<b>Paleogene Marine Rocks</b>			
Tsass	Sacate-Gaviota (Coldwater) Sandstone	Moderate	High
Tcd	Cozy Dell Shale	Low	Low
Tma	Matailija Sandstone	Low	Low
Ta	Anita Shale / Juncal Formation	Low	Low
<b>Mesozoic Rocks</b>			
Ka	Espada Formation	Low	Low
fm	Franciscan melange	Moderate	High

## 4.15.2 Regulatory Setting

### Local

The County of Santa Barbara General Plan has no provisions for, and no references to, paleontological resources. The City of Lompoc General Plan has no provisions for, and no references to, paleontology.

### Professional Standards

The Society of Vertebrate Paleontology (SVP) is an international organization for vertebrate paleontologists. The SVP has formulated standards for mitigation of project-related impacts to significant paleontological resources. These standards were updated nearly a decade ago (SVP, 2010). Numerous state and local jurisdictions recognize these standards. The LWEP EIR recognized earlier versions of these standards, but the paleontology portion of the LWEP EIR was written prior to the 2010 update.

## 4.15.3 Significance Thresholds

The County of Santa Barbara has no significance threshold for paleontological resources.

The LWEP EIR recognized that The California Environmental Quality Act (CEQA) applies to the Project. CEQA Guidelines (Appendix G, Section V, Part c) refer to whether or not implementation of a project would “directly or indirectly destroy a unique paleontological resource.” Additionally, the Public Resources Code, Section 31244, states that “where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.” SWEP will also use these thresholds of significance.

## 4.15.4 Environmental Impacts and Mitigation Measures

Table 4.15-2 below lists the impacts and mitigation measures identified for paleontological resources in the LWEP EIR. These same impacts are addressed in this section for the SWEP. The right-hand column of the table below indicates whether the LWEP impacts or mitigation measures have been modified for the SWEP.

**Table 4.15-2. LWEP Impacts and Mitigation Measures – Paleontological Resources**

Impact No.	LWEP Impact Statements	LWEP Mitigation Measures	SWEP Changes
PALEO-1	<b>Exposure and Potential Destruction of Significant Paleontological Resources.</b> Ground-disturbing activities such as mechanical excavation, drilling, or trenching could affect paleontological resources.	PALEO-1: Pre-construction Workshop PALEO-2: Implement Monitoring PALEO-3: Discovery of Fossils	Updated impact discussion. Revised/updated mitigation. Added new mitigation.
PALEO-2	<b>Unauthorized Fossil Collection.</b> Unauthorized collection of fossils by construction workers or operational personnel may occur.	PALEO-1: Pre-construction Workshop	Revision mitigation. New mitigation added.

## Impact Assessment Methodology

The SVP standard guidelines contain a method of rating the paleontological sensitivity for any given formation. Other methods are utilized by the Bureau of Land Management. The LWEP EIR employed

the SVP methodology. Potential mitigation measures also follow an established protocol codified by the SVP. The present review utilizes the most recent version (2010) of the SVP guidelines.

An ancillary matter in ranking the paleontological sensitivity of rock units is how one defines a significant paleontological resource. The SVP guidelines (2010) define a significant paleontological resource as fossils and fossiliferous deposits of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radio-carbon years).

In the SVP system of sensitivity rating, rock units are described as having high, undetermined, low, or no potential for containing significant paleontological resources.

The impacts of the proposed SWEP on paleontological resources are discussed below.

### **PALEO-1 Exposure and Potential Destruction of Significant Paleontological Resources.** Ground-disturbing activities such as mechanical excavation, drilling, or trenching could affect paleontological resources.

The LWEP EIR stated that ground-disturbing activities that could affect paleontological resources include mechanical excavation, drilling, or trenching that either (1) extends to sufficient depth to affect sediments that are unaltered by soil development and undisturbed and that possess moderate to high paleontological sensitivity, or (2) affects exposed fossiliferous rocks such as in road cuts, natural outcrops, and arroyo walls. If a unique paleontological resource or site were destroyed, the impact is capable of being mitigated to a less-than-significant level (Class II). Activities such as clearing, grubbing, and blading to prepare site surfaces and laydown areas are examples of construction-related work that would not be expected to adversely affect paleontological resources.

The impact described in the LWEP EIR has changed in two respects. First, the current system of sensitivity ranking employed by the Society of Vertebrate Paleontology (SVP 2010) does not have a “medium” category, so the categories now are “low” and “high”. For the sake of consistency, all the sedimentary units classified as “medium” sensitivity in the LWEP are now classified as “high”. Thus, the term “moderate” no longer applies. Second, the concept that activities such as clearing, grubbing, and blading would not be expected to adversely affect paleontological resources may not be correct. The impact of clearing and grubbing on vegetated surfaces depends on how near the surface sensitive sediments lie. Where sensitive sediments lie just below the surface, or where they are exposed at the surface, grubbing might affect paleontological resources. Blading would very likely impact paleontological resources. MM PALEO-1 requires a Qualified Professional Paleontologist to submit a Paleontological Resource Mitigation and Monitoring Plan (PRMMP) to the County for review and approval; MM PALEO-2 requires paleontological resources monitoring of mechanical disturbance only in Project areas known to have high sensitivity sediments; and MM PALEO-3 requires a Qualified Professional Paleontologist and the Paleontological Resource Monitor(s) to temporarily halt surface disturbing actions in the immediate vicinity of a fossil find until an assessment of the find is completed. Implementation of MMs PALEO-1, PALEO-2, and PALEO-3 would reduce the adverse effects from ground-disturbing activities on paleontological resources to a less-than-significant level (Class II).

## Mitigation Measures

The following three mitigations are from the LWEP EIR; however, they have been expanded to provide more specificity and additional requirements.

**MM PALEO-1 Pre-construction Workshop.** The Applicant shall retain the services of a paleontologist who meets the SVP (2010) criteria of a Qualified Professional Paleontologist and who is County qualified. Prior to any ground disturbance, the Qualified Professional Paleontologist shall submit a Paleontological Resource Mitigation and Monitoring Plan (PRMMP) to the County for the review and approval. The County shall review the plan for sufficiency prior to acceptance. The PRMMP shall be prepared and implemented under the direction of the Project Paleontologist and shall address and incorporate Mitigation Measures PALEO-1 through PALEO 4. The PRMMP shall be prepared at the sole expense of the Applicant and be based on SVP assessment and mitigation guidelines. A monitoring plan must minimally address the following:

1. Identification and mapping of impact areas of high sensitivity what will be monitored during construction;
2. A coordination strategy to ensure that a Qualified Professional Paleontologist or a qualified Paleontological Resource Monitor will conduct Monitoring at the appropriate locations at the appropriate intensity;
3. The significance criteria to be used to determine which resources will be avoided or recovered for their data potential;
4. The need for Paleontological Resource Monitors to test loose sediment for microvertebrate remains and to secure, store and process a standard sample [as defined by the SVP Guidelines (2010)] of sediment from each formation that shows signs of preserving identifiable microvertebrate fossils;
5. The need for spoils from excavation and borings in diatomite sediments to be set aside until the Qualified Professional Paleontologist and/or the Paleontological Resource Monitor(s) can split the larger piece to test for the presence of significant fossils;
6. Procedures for the discovery, recovery, preparation, and analysis of significant paleontological resources encountered during construction, in accordance with standards for recovery, reporting, and curation established by the SVP (2010);
7. Stipulation that the Qualified Professional Paleontologist will oversee preparation, identification, and reporting of significant fossils recovered;
8. Stipulation that the methods employed to monitor and recover fossils in each formation shall be included in the final report;
9. Stipulation that the significance of the fossils recovered be analyzed in the final report;
10. Provisions for verification that the Applicant has an agreement with a recognized paleontological repository, as defined by the guidelines of the SVP (2010), for the disposition of recovered fossils and that the fossils shall be



prepared prior to submittal to the repository as required by the repository (e.g., stabilized, prepared, analyzed, curated, and catalogued);

11. Description of monitoring reports that will be prepared which shall include daily logs, monthly reports, and a final report with an itemized list of specimens found to be submitted to the County Planning Department, the Applicant, and the designated repository within 90 days of completion of monitoring;
12. Person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between Project construction management and the mitigation and monitor team shall be identified;
13. All impact avoidance measures (such as flagging or fencing to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation shall be described. Any areas where these measures are to be implemented shall be identified. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related impacts

The County and the Qualified Professional Paleontologist shall conduct a pre-construction workshop with construction workers and other Project personnel. The workshop shall inform personnel what fossil resources are and what they look like, what do and who to notify in case of a paleontological discovery, and penalties for the illicit disturbance of fossils. The workshop shall inform personnel that the Qualified Professional Paleontologist and the Paleontological Resource Monitor(s) are authorized to halt construction in the vicinity of a suspected fossil find so that it may be investigated. Attendees will receive sticker for hardhat. Construction personnel not permitted on site without sticker.

**Plan Requirements.** All construction personnel must receive training. All construction personnel must have designated sticker. The Applicant will keep training records onsite for review by the County, if requested.

**Timing.** Training will occur prior to commencement of any construction-related activity.

**Monitoring.** County staff will receive and review the PRMMP. County staff will receive and review the training material prior to any training, spot check construction staff to ensure construction staff have required sticker, and request training attendance records, if determined necessary.

**MM PALEO-2 Implement Monitoring Program.** Paleontological resources monitoring of mechanical disturbance only in Project areas known to have high sensitivity sediments shall occur concurrently with those construction activities. The Qualified Professional Paleontologist shall supervise the monitoring for paleontological resources. Monitoring shall be performed by one or more individuals meeting the SVP (2010) criteria for a Paleontological Resource Monitor and who is determined by the County to be qualified to identify paleontological resources. Based on field data, the Qualified Professional Paleontologist may decrease or increase in the monitoring of specific activities and areas. The Qualified Professional Paleontologist will ensure that all monitoring and specimen recovery be conducted in a manner consistent with the PRMMP.

**Plan Requirements and Timing.** Prior to start of construction, a contract or Letter of Commitment between the Applicant and Qualified Professional Paleontologist and the Paleontological Resource Monitor, consisting of a project description and scope of work, shall be prepared. The contract shall be executed and submitted to the County for review and approval prior to the issuance of the zoning clearance for the first phase of construction and all subsequent construction phases.

**Monitoring.** County staff will confirm monitoring through the Qualified Professional Paleontologist and County grading inspectors shall spot check field work.

**MM PALEO-3 Discovery of Fossils.** If fossils are found by the monitor or by construction personnel, the Qualified Professional Paleontologist and the Paleontological Resource Monitor(s) shall have the authority to temporarily halt surface disturbing actions in the immediate vicinity until an assessment of the find is completed, and the following actions will be taken:

- Construction activity shall cease within 50 feet of the find;
- Follow appropriate notification procedures consistent with the PRMMP;
- Assessment of the find, usually in the field by the Project paleontologist and determination of recovery procedures;
- Construction activity avoidance of the designated area until a find is assessed and, if recovery is called for, scientifically recovered; construction-related excavations would continue in other areas away from the discovery;
- Continued monitoring of construction in all appropriate areas while the find is being recovered;
- Post-field initial study, preparation, reporting, and subsequent curation.

**Plan Requirements.** Fossils that may be discovered during construction must first be assessed to determine whether they are scientifically significant and whether recovery measures are warranted. If recovery is recommended, it shall be completed in a manner reflecting scientific standards currently applied to paleontological excavations. Within those limits, all appropriate measures shall be taken to expedite recovery and to minimize interference with construction scheduling. The County shall be notified within 48 hours of a paleontological resource discovery assessed by the Project paleontologist to be significant and warranting recovery. The paleontological monitor shall periodically update the County during the recovery and notify them upon completion of recovery.

**Timing.** This measure shall be in effect throughout all construction phases.

**Monitoring.** County staff shall ensure that this measure is implemented through regular contact with the monitor and site visits as appropriate.

## **PALEO-2 Unauthorized Fossil Collection.** Unauthorized collection of fossils by construction workers or operational personnel may occur.

As described in the LWEP EIR, the unauthorized collection of fossils by construction workers or operational personnel may occur where newly exposed sediment reveals fossil-bearing strata. This impact may be significant but can be reduced to a less-than-significant level with implementation of MMs PALEO-1 and PALEO-4 (Class II). MM PALEO-1 requires a Qualified Professional Paleontologist to submit a Paleontological Resource Mitigation and Monitoring Plan (PRMMP) to the County for review and approval. MM PALEO-4 requires a Qualified Professional Paleontologist to conduct or supervise a pedestrian survey of parts of the Project footprint on high sensitivity sediments to determine where clearing, grubbing, and grading could affect paleontological resources.

### **Mitigation Measures**

MM PALEO-4 was not included in the LWEP EIR but is required for SWEP because the results of the required pedestrian survey must be utilized to design the PRMMP stipulated in MM PALEO-1.

**MM PALEO-1 Pre-construction Workshop.** Described under Impact PALEO-1 above.

**MM PALEO-4 Pre-construction Pedestrian Survey.** A Qualified Professional Paleontologist shall conduct or supervise a pedestrian survey of parts of the Project footprint on high sensitivity sediments to determine where clearing, grubbing, and grading could affect paleontological resources. The results of this survey must be utilized to design the PRMMP stipulated in Mitigation Measure PALEO-1. The boundaries of the areas having high paleontological sensitivity and to be cleared, grubbed, or graded shall be programmed into a GPS device so that the places where sensitive sediments lying not far below the ground surface can be defined.

**Timing.** Survey will occur prior to completion of the PRMMP.

**Monitoring.** County staff shall ensure that this measure is implemented prior to receiving PRMMP to review.

## **4.15.5 Cumulative Effects**

### **Scope and Geographic Extent**

The scope for considering cumulative impacts on paleontological resources includes projects that would potentially disturb paleontological resources through ground disturbance, as these were the type of potential impacts identified for the proposed project. No identified paleontological resources would be impacted by the proposed project. Therefore, the geographic extent of the analysis of cumulative impacts on paleontological resources is limited to construction impacts on previously unidentified paleontological resources that could occur as a result of the proposed Project, and where the same unidentified resources could also be affected by construction of other projects. The geographic context of the scope is west central Santa Barbara County (specifically, the City of Lompoc and the White Hills, Lompoc Hills, and Santa Ynez Mountains).

## Existing Cumulative Conditions

Twenty-nine projects in the cumulative scenario (see project nos. 81-92, 94-95, 100-102, 109, 111, 113-116, and 119 in Section 3) are located in or around the disturbed urban areas of the City of Lompoc and would impact Quaternary alluvium. Only two of the projects (16 and 20) are in rural areas southeast of Lompoc. The sediments impacted there are Miocene marine sediments (Sisquoc and Monterey formations). These have a much greater probability of impacting significant paleontological resources. Ground-disturbing activities, such as those that would take place as part of the proposed project, could disturb unknown paleontological resources.

## Cumulative Impact Analysis

As discussed in Section 4.15.4 above, the proposed Project could disturb unknown subsurface or paleontological resources through excavation and ground disturbance. Several other projects in the cumulative scenario could take place in the same area as the proposed Project components. There is some potential that the proposed Project and another project could affect the same unknown resource or result in cumulatively significant impacts on unknown resources. However, the proposed Project has adequate mitigation measures for impacts to paleontological resources, even if the others do not. Therefore, the Project's contribution to the total potential impacts on unknown paleontological resources within the cumulative study area is not considerable.

### 4.15.6 Residual Impacts

With implementation of proposed mitigation measures, residual effects from Impacts PALEO-1 and PALEO-2 would be less than significant.

### 4.15.7 Impact and Mitigation Summary

Table 4.15-3 below provides a summary of the SWEP's impacts related to paleontological resources. The table also indicates the mitigation measures proposed to reduce each significant impact.

**Table 4.15-3. SWEP Impact and Mitigation Summary – Paleontological Resources**

Impact No.	Impact Statement	Mitigation Measures	Significance Conclusion
PALEO-1	<b>Exposure and Potential Destruction of Significant Paleontological Resources.</b> Ground-disturbing activities such as mechanical excavation, drilling, or trenching could affect paleontological resources.	PALEO-1: Pre-construction Workshop. PALEO-2: Implement Monitoring. PALEO-3: Discovery of Fossils.	Class II
PALEO-2	<b>Unauthorized Fossil Collection.</b> Unauthorized collection of fossils by construction workers or operational personnel may occur.	PALEO-1: Pre-construction Workshop. PALEO-4: Pre-construction Pedestrian Survey.	Class II

**Class I.** Significant unavoidable adverse impact.

**Class II.** Significant environmental impacts that can be feasibly mitigated or avoided.

**Class III.** Adverse impacts found not to be significant.

**Class IV.** Impacts beneficial to the environment.



### 4.15.8 References

- Dibblee, T. W. 1950. Geology of southwestern Santa Barbara County, California: Point Arguello, Lompoc, Point Conception, Los Olivos, and Gaviota quadrangles. California Division of Mines and Geology Bulletin 150. Scale 1:62,500.
- Dibblee, T. W. 1988a. Geologic Map of the Lompoc Hills and Point Conception quadrangles, Santa Barbara County, California. Dibblee Foundation Map DF-18. Scale 1:24,000.
- Dibblee, T. W. 1988b. Geologic Map of the Lompoc Hills and Conception quadrangles, Santa Barbara County, California. Dibblee Foundation Map DF-19. Scale 1:24,000.
- Dibblee, T. W. 1988c. Geologic Map of the Pont Arguello and Tranquillon Mountain quadrangles, Santa Barbara County, California. Dibblee Foundation Map DF-20. Scale 1:24,000.
- Fierstine, H. L., R. W. Huddleston, and G. T. Takeuchi. 2012. Catalog of the Neogene Bony Fishes of California and Systematic Inventory of all Published Accounts. Occasional Papers of the California Academy of Sciences 159:1-206.
- Jefferson, G. T. 1991a. A catalogue of Late Quaternary vertebrates from California: Part One, non-marine lower vertebrate and Avian Taxa. Natural History Museum of Los Angeles County Technical Report No. 5
- Jefferson, G. T. 1991b. A catalogue of Late Quaternary vertebrates from California: Part Two, Mammals. Natural History Museum of Los Angeles County Technical Report No. 7

This page intentionally left blank.