

10. Paleontological Resources

10.1 BACKGROUND AND CONTEXT

Paleontological resources refer to the fossilized remains or indications of once living plant and animal life. *Paleontological resources* are present in many of the geologic formations in Ventura County. The region is part of the Transverse Range, which is an east-west trending Tertiary (70 to 1 million years ago) sedimentary mountain corridor that encompasses many kinds of fossilized organisms. These fossil remains provide a record of lifeforms over millions of years. In Ventura County, paleontological remains include examples from throughout most of geological history, including the Paleozoic (600-225 million years ago), the Mesozoic (225-70 million years ago), and the Cenozoic (70 million years ago to the present) Eras. The coastal and interior zones of Ventura County contain areas with marine and terrestrial *fossils* that are among the best in Southern California. Careful scientific study of fossilized life forms preserved in the sedimentary and metamorphic rocks of the Ventura County region can result in the identification of local paleo-environmental conditions and biological evolutionary trends. In addition, certain fossil remains are only found in isolated outcrops in Ventura County and are therefore of unique scientific interest.

10.2 THRESHOLDS OF SIGNIFICANCE

The determination of significance shall be made on a case-by-case basis and evaluated using the following thresholds of significance as specified below.

PAL-1 A project may have a significant impact if the project would directly or indirectly destroy a unique *paleontological resource* or site.

10.3 IMPACT ANALYSIS

Guidance on addressing the questions from the Initial Study Checklist is provided below. In order to determine whether project impacts exceed or meet the criteria of the thresholds of significance in Section 10.2, the level of impact shall be evaluated based on the appropriate assessment methodologies as outlined below.

(a) *Would the project directly or indirectly destroy a unique paleontological resource or site?*

Direct impacts may include, but are not limited to, grading and excavation of fossiliferous rock, which can result in the loss of scientifically important fossil specimens and associated geological data. *Indirect impacts* may include, but are not limited to, increased access opportunities and unauthorized collection of fossil materials from sites that contain unique *paleontological resources*.

Preliminary Assessment

The preliminary assessment should be done by the *Lead Agency*. The *Lead Agency* should first determine the *paleontological importance* of geological formations exposed in the proposed project's disturbed area. A qualified consultant may be retained by the project applicant to determine the geologic formations on which the project is located. The Paleontology map layer on the Ventura County *Resource Management Agency Geographic Information System (RMA GIS) Viewer* is available to determine *paleontological importance*. The goal of this review is to determine where sensitive resources may exist on the site and to locate new development in areas that would avoid adverse impacts to *paleontological resources* to the maximum extent *feasible*. Potentially significant impacts to *paleontological resources* that cannot be avoided through siting and design alternatives shall be mitigated.

The geologic formation in which proposed projects would be located can be used to establish the likelihood of *paleontological resources* being present and their relative importance. Table 10-1 shows a ranking of *paleontological importance* of geologic formations in the Ventura County area. Formation names are taken after Dibblee Geological Foundation quadrangle maps, various dates.

Table 10-1. Ranking of Paleontological Importance of Geologic Formations

Formation	Geologic Age	Paleontological Importance
Santa Susana	Paleocene	High
Llajas	Eocene	High
Sespe	Oligocene	High
Saugus	Pliocene/ Pleistocene	High
Las Posas Sand	Pliocene/ Pleistocene	Moderate to High
Vaqueros Sandstone	Oligocene	Moderate to High
Pico	Pliocene	Moderate to High
Monterey	Miocene	Moderate
Topanga Group	Oligocene / Miocene	Moderate
Chatsworth	Cretaceous	Moderate
Caliente	Miocene	Moderate
Sisquoc	Miocene	Moderate
Santa Margarita	Miocene	Moderate
Quatal	Pliocene	Low
Lockwood Clay	Pliocene	Low
Plush Ranch	Oligocene / Miocene	Low
Rincon Shale	Miocene	Low
Coldwater Sandstone	Eocene	Low
Cozy Dell Shale	Eocene	Low

Formation	Geologic Age	Paleontological Importance
Matilija Sandstone	Eocene	Low
Juncal	Eocene	Low
Towsley	Pliocene / Miocene	Low
Castaic	Miocene	Low
Conejo Volcanics	Miocene	None

Quaternary deposits represent the last 2.6 million years of geological history and include alluvial deposits and landslides, which have the potential for low to no resource importance. If the project involves disturbance activities located in an area of Quaternary Deposits (alluvium), or Moderate, Low, or None level of *paleontological importance*, no further assessment is needed. If the project involves disturbance activities located in an area of "High," or "Moderate to High" *paleontological importance*, a qualified consultant assessment will be required.

Qualified Consultant Assessment

Prior to conducting paleontological field surveys and submitting paleontological studies if required, consultants must first demonstrate that they meet the minimum qualifications as defined below.

- **Education:** A Bachelor of Science degree in Paleontology, Geology or related discipline.
- **Experience:** A minimum of five years of experience performing paleontological, geological, or related studies is required.
- **Local and State Expertise:** Evidence of expertise in local and regional vertebrate and invertebrate paleontology. Evidence of conducting fossil collection, curation, and reporting is necessary.
- **Professional Registration or Certification:** Verification of certification in the paleontological field by membership in a professional society is required. For professional geologists, verification of professional registration as a professional geologist in the State of California is required, which may be indicated by signature and professional stamp within the paleontological report.

The assessment procedures described below must be performed by a qualified paleontological or geological consultant, or both, as necessary. A qualified consultant is one that meets the minimum qualifications as described above.

The qualified consultant shall verify the potential presence of a unique *paleontological resource* based on the geologic formation on which the project is located, and provide appropriate responses and mitigation measures to the Initial Study Checklist based on the assessment procedures outlined below:

1. Conduct literature and archival reviews within the project area to document locations of recorded fossil sites.
2. Verify or modify the level of *paleontological importance* assigned to each formation in the project area.

3. Conduct a field survey of the appropriate formations (not including areas covered by soil or Quaternary Deposits). If vertebrate *fossils* (i.e., fossils of animals containing a spine or endoskeleton) are found, document the location of vertebrate *fossils*. If megainvertebrate *fossils* (i.e., fossils of animals containing no bony or cartilaginous material) are found, determine the level of significance and document the location of representative samples, as necessary. Document these sites on topographic maps of the project area. Vertebrate and megainvertebrate *fossils* are considered highly important because they are comparatively rare and allow precise age determinations and environmental reconstructions for the strata in which they occur. Microinvertebrate *fossils*, also known as microfossils, are much more abundant and are often of economic importance. For this reason and because of their small size, microinvertebrate *fossils* would not be adversely impacted to the same degree as vertebrate and megainvertebrate *fossils*. For the purposes of *paleontological resources*, the project area is defined as only the area of the property that is disturbed by or during the construction of the proposed project. Fossil remains are considered a unique *paleontological resource* if they meet the following qualifications:
 - well preserved;
 - identifiable;
 - type/topotypic specimens;
 - age diagnostic;
 - useful in environmental reconstruction;
 - represent rare and/or endemic taxa;
 - represent a diverse assemblage; and/or
 - represent associated marine and non-marine taxa.
4. Subsurface geotechnical studies requiring excavation or drilling must be monitored and reported as in (e3) above.
5. As determined necessary by the qualified consultant, other selected stratigraphic levels within the project may be documented for future collection of matrix samples to process for *microinvertebrate fossil* remains.
6. Identify adverse impacts and assess degree of impact to each formation and/or significance of the unique *paleontological resource* in the project area that would be impacted by the proposed project.
7. Develop a project specific program to monitor and/or collect *fossils* documented in (e3), (4), and (d5) above during construction and address mitigation of project related impacts.
8. Evaluate past, present, and reasonably foreseeable probable future projects to determine whether the project would result in significant cumulative impacts to *paleontological resources* for their scientific and educational value, including the substantial loss of *paleontological resources* in Ventura County.
9. Prepare a separate supporting technical report consisting of sensitive data and submit to the appropriate public agency. Summarize the technical report for the environmental document determination.

Preparation of Initial Study Checklist

Based on the results of the qualified consultant assessment outlined above, the *Lead Agency* should review the supporting technical report and responses to the Initial Study Checklist and, if required, include the consultant's mitigation recommendations.

The *Lead Agency*, based on review of the various available maps, publications and/or field information, shall determine the project impacts to the *paleontological resources* and complete the Initial Study Checklist in consultation with the qualified consultant.

A determination of **No Impact (N)** shall be made if the project is not within a geologic formation of High, or Moderate to High *paleontological importance*.

A determination of **Less Than Significant Impact (LS)** shall be made if the project is within a geologic formation of High or Moderate to High *paleontological importance*, but unique *paleontological resources* are buried at depth beneath alluvium in the area of the project disturbance, and the project will not directly or indirectly impact the *paleontological resource*.

A determination of **Less Than Significant Impact with Mitigation Incorporated (LS-M)** shall be made if the project would result in potentially significant impacts to a unique *paleontological resource*, but mitigation measures have been identified by a qualified consultant. Mitigation may include, but are not limited to the following measures:

1. If determined necessary by the *Lead Agency*, a paleontological monitor shall be retained to monitor ground-disturbing activities and/or construction activities. The paleontological monitor shall document all monitoring activities, regardless of whether any paleontological discoveries are made.
2. In accordance with General Plan Program COS-II, if any paleontological materials or artifacts are discovered during ground disturbance and/or construction activities, such activities shall halt until a qualified consultant can access the discovery. A report or memorandum shall be prepared by the qualified paleontological monitor documenting any findings and identifying recommendations for protection or avoidance of discovered resources. Recommendations or mitigation identified by the qualified paleontological monitor shall be implemented prior to resuming ground disturbance and/or construction activities.
3. Projects shall be designed to protect existing resources and shall avoid potential impacts to the maximum extent *feasible*. However, if a qualified consultant determines that the discovered resource is a unique *paleontological resource*, and avoidance or protection in place is not *feasible*, divert construction activities to other areas until the resource has been collected or removed by a qualified consultant, and curated at a location satisfactory to the *Lead Agency*. The qualified paleontological monitor shall document the findings, its importance, and the curated location in a report or memorandum.
4. In accordance with General Plan Program COS-KK, during project-level ground disturbance activities in areas where paleontologically rich sites are known to be present, project sites shall be secured during non-construction hours to ensure that the unauthorized access and the unlawful curation of fossil materials does not occur. Such security measures may include construction fencing, unauthorized access signage, security lighting, and security cameras. For large-scale development, a security plan may be prepared prior to construction activities to detail security measures and protocol for the project site.

Ventura County Initial Study Assessment Guidelines

A determination of **Potentially Significant Impact (PS)** shall be made and further analysis shall be addressed in an EIR if there is *substantial evidence* that the project lies in a geologic formation of High, or Moderate to High *paleontological importance*, and the project would have a significant impact on unique *paleontological resources*.

Update Paleontological Database

The qualified consultant shall provide to the *Lead Agency* a copy of any paleontological report, as well as any GIS layers of the *paleontological resources* identified by the qualified consultant, including fossil location, fossil name, fossil age, and geologic formation name. The *Lead Agency* shall update its records and the Paleontology map layer on the Ventura County *Resource Management Agency Geographic Information System (RMA GIS) Viewer* accordingly.

10.4 RESOURCES & REFERENCES

Source	Managing Agency/Organization	Online Access
Resources		
Ventura County CEQA Implementation Manual	Ventura County Resource Management Agency (RMA) Planning Division	PDF Website
Ventura County Initial Study Assessment Guidelines: Introduction	Ventura County RMA Planning Division	PDF Website
Ventura County Initial Study Checklist Template	Ventura County RMA Planning Division	PDF Website
References		
Ventura County General Plan, Conservation and Open Space Element	Ventura County RMA Planning Division	PDF Website
Ventura County RMA Geographic Information Systems Viewer	Ventura County Information Technology Services	Website