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11 January 2012

TRC
123 Technology Drive
Irvine, CA 92618

Attn: Susan Underbrink, Project Manager / Senior Archaeologist

re: Paleontological resources for the proposed South Orange County Reliability Enhancement Project, Reference # C156845, Orange and San Diego Counties, project area

Dear Susan:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed South Orange County Reliability Enhancement Project, Reference # C156845, Orange and San Diego Counties, project area as outlined on the map covering portions of the San Juan Capistrano and San Clemente USGS topographic quadrangle maps that you sent to me via e-mail on 10 January 2012. We do not have any vertebrate fossil localities that occur directly along the proposed project route boundaries, but we do have localities nearby from the same deposits that occur within the proposed project route area.

Around the western terminus of the proposed project area route the surficial deposits consist of younger Quaternary Alluvium, primarily derived as fluvial deposits from the Arroyo Trabuco drainage. As the proposed project area route proceeds eastward across the hills around the San Diego Freeway (I-5) down to the Ortega Highway (SR 74), the lower elevations have exposures of Quaternary terrace deposits while the upper elevations have exposures of the Capistrano Formation, with surficial fluvial deposits of younger Quaternary Alluvium in the Horno Creek drainage. Further southeastward, in the San Juan Creek drainage, there are surface deposits of primarily fluvially derived younger Quaternary Alluvium. In the hills on the southeastern side of San Juan Creek there are initially some exposures of older Quaternary terrace deposits crossed by the proposed project area route, but more extensive exposures of the Capistrano Formation, including as the proposed project area route turns south-southeast just east of the San Juan Capistrano corporate boundary.

From just northwest of Segunda Deshecha Cañada to about the San Diego County line the proposed project area route crosses exposures of the marine late Miocene Monterey Formation. For the segment that turns south then east around the San Diego County line, the proposed project area route crosses exposures of the terrestrial late Eocene Santiago Formation.

For the younger Quaternary Alluvium, exposed in all the drainages and especially in Arroyo Trabuco and San Juan Creek in the northwestern portion of the proposed project route area, significant vertebrate fossils are unlikely to be encountered, at least in the uppermost layers, and we have no vertebrate fossil localities anywhere nearby from such deposits. Likewise for the Quaternary terrace deposits, also found in the northwestern portion of the proposed project area, we have no vertebrate fossil localities nearby from these or similar deposits.

For the Capistrano Formation deposits, exposed broadly in the hills of the proposed project route area, however, we have a great number of vertebrate fossil localities in southern Orange County. Our closest vertebrate fossil locality from the Capistrano Formation is LACM 5792, situated just north of the northwestern portion of the proposed project route area in the hills on the northwestern side of Horno Creek. Locality LACM 5792 produced a substantial fossil fauna, primarily of marine vertebrates such as sharks, bony fishes, sea lions, whales, and sea cows, but also including some terrestrial and freshwater specimens, including elephants and pond turtles. A faunal list from locality LACM 5792 is provided in an appendix.

For the Monterey Formation deposits, exposed in the southeastern portion of the proposed project route area in Orange County, we have numerous localities in southern Orange County, primarily northwest of the northwestern portion of the proposed project route area and particularly concentrated on the ridge where the Chet Holifield Federal Building was constructed between Alicia Parkway and La Paz Road south of the San Joaquin Hills Transportation Corridor (SR 73), including localities LACM 1101, 3185, 3510, 3541, 5065-5083 and 6901-6906. These localities have produced a rich and diverse assemblage of fossil vertebrates including sharks, rays, bony fishes, sea turtles, sea birds, sea lions, sea cows and dolphins [see appendix for a composite fossil fauna from these Monterey Formation localities].

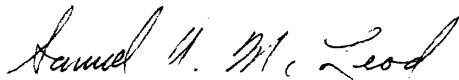
For the Santiago Formation deposits, exposed in the southeastern portion of the proposed project area route on the west side of Cristianitos Creek in Orange and San Diego Counties, we have no fossil vertebrate localities from this rock unit in Orange County, but we do have several localities from this rock unit in San Diego County. Our closest vertebrate fossil locality from the Santiago Formation is LACM 5347, situated southeast of the southeastern terminus of the proposed project area route in San Onofre Canyon that produced fossil specimens of the insectivore *Sespedectes*.

Shallow excavations in the younger Quaternary Alluvium and Quaternary terrace deposits in the northwestern portion of the proposed project route area, around Arroyo Trabuco and San Juan Creek, are unlikely to significant vertebrate fossils. Deeper excavations in those areas, as well as any excavations in the Capistrano Formation, the Monterey Formation or the Santiago Formation,

exposed in the elevated portions of the rest of the proposed project route area, may well encounter significant fossil vertebrate remains. Any substantial excavations in the proposed project route area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in cursive script that reads "Samuel A. McLeod".

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosures: appendices, draft invoice

Fossil fauna from the Capistrano Formation at locality LACM 5792

Chondrichthyes	
Carcharhiniiformes	
Carcharhinidae	- requiem sharks
<i>Carcharhinus obscurus</i>	
<i>Hemipristis serra</i>	
Hexanchiformes	
Hexanchidae	- cow sharks
<i>Hexanchus</i>	
Lamniformes	
Lamnidae	- mackerel sharks
<i>Carcharocles megalodon</i>	
<i>Carcharodon carcharias</i>	
<i>Isurus hastalis</i>	
<i>Isurus oxyrinchus</i>	
<i>Isurus planus</i>	
<i>Lamna</i>	
Myliobatiformes	
Myliobatidae	- eagle rays
<i>Myliobatis</i>	
Osteichthyes	
Perciformes	
Labridae	- wrasses
<i>Semicossyphus pulcher</i>	
Chelonia	
Emydidae	- pond turtles
<i>Clemmys marmorata</i>	
Aves	
Pelecaniformes	
Phalacrocoracidae	- cormorants
Podicipediformes	
Podicipedidae	- grebes
<i>Podiceps parvus</i>	
Mammalia	
Artiodactyla	
Antilocapridae	- pronghorn antelopes
Camelidae	- camels
Carnivora	
Otariidae	- sea lions & walruses
Odobeninae	
Otariinae	
Cetacea	
Balaenidae	- right whales
Balaenopteridae	- rorqual whales
Cetotheriidae	- primitive baleen whales
Delphinidae	- dolphins
<i>Stenella</i>	
Phocoenidae	- porpoises
Physeteridae	- sperm whales
<i>Scaldicetus</i>	
Pontoporiidae	- "fresh water" dolphins
<i>Parapontoporia</i>	
Proboscidea	- elephants
Sirenia	
Dugongidae	- sea cows

Composite fossil fauna
from LACM localities in the Monterey Formation near the Chet Holifield Federal Building

Chondrichthyes	
Carcharhiniformes	
Sphyrnidae	- hammerhead sharks
<i>Sphyrna</i>	
Chimaeriformes	
Chimaeridae	- chimaeras
<i>Hydrolagus colliei</i>	
Hexanchiformes	
Hexanchidae	- cow sharks
<i>Hexanchus</i>	
Lamniformes	
Cetorhinidae	- basking sharks
<i>Cetorhinus maximus</i>	
Lamnidae	- mackerel sharks
<i>Isurus hastalis</i>	
Myliobatiformes	- eagle rays
Myliobatidae	
Osteichthyes	
Acipenseriformes	
Acipenseridae	- sturgeons
Clupeiformes	
Clupeidae	- herrings
<i>Ganolytes cameo</i>	
Perciformes	
Carangidae	- jacks, amberjacks & pompanos
<i>Decapterus</i>	
Embiotocidae	- surfperches
<i>Amphistichus argenteus</i>	
Gempylidae	- snake mackerals
<i>Thyrsocles kriegeri</i>	
Istiophoridae	- billfishes
Labridae	- wrasses
<i>Pimelometopon</i>	
Percichthyidae	- temperate basses
Scaridae	- parrotfishes
Sciaenidae	- croakers
<i>Cynoscion</i>	
Scombridae	- mackerels & tunas
Serranidae	- groupers
<i>Epinephelus</i>	
Sparidae	- porgies
Pleuronectiformes	
Bothidae	- halibut
<i>Paralichthys californicus</i>	
Salmoniformes	
Salmonidae	- salmon
<i>Smilodonichthys rastrosus</i>	

Amphibia	
Anura	
Bufonidae	- true toads
Reptilia	
Chelonia	
Cheloniidae	- sea turtles
<i>Chelonia</i>	
Dermochelyidae	- leatherback turtle
<i>Psephophorus</i>	
Squamata	
Colubridae	- common colubrid snakes
Aves	
Charadriiformes	
Alcidae	- auks, murre & puffins
<i>Aethia</i>	
<i>Cephus</i>	
<i>Praemancalla wetmorei</i>	
<i>Uria</i>	
Gaviiformes	
Gaviidae	- loons
<i>Gavia brodkorbi</i>	
Pelecaniformes	
Pseudodontornithidae	- false-toothed birds
<i>Osteodontornis orri</i>	
Sulidae	- boobies
<i>Miosula media</i>	
<i>Morus lompocanus</i>	
<i>Morus magnus</i>	
Procellariiformes	
Diomedidae	- albatrosses
<i>Diomedea californica</i>	
Oceanodromidae	- storm petrels
<i>Oceanodroma</i>	
Procellariidae	- shearwaters & fulmars
<i>Puffinus barnesi</i>	
Mammalia	
Artiodactyla	
Antilocapridae	- pronghorn antelope
Carnivora	
Canidae	- dogs
Otariidae	- sea lions & walruses
<i>Allodesmus kernensis</i>	
Arctocephalinae	
Desmatophocinae	
<i>Imagotaria downsi</i>	
Imagotariinae	
Otariinae	
<i>Pithanotaria starri</i>	
<i>Pontolis</i>	

Mammalia

Cetacea

- Albireonidae - extinct dolphins
- Balaenopteridae - rorqual whales
- Cetotheriidae - extinct baleen whales

Mixocetus

Nannocetus

Delphinidae - dolphins

- Kentriodontidae - extinct primitive dolphins

Pithanodelphis nasalis

Monodontidae - narwhals & belugas

Phocoenidae - porpoises

Physeteridae - sperm whales

Scaldicetus

Rhabdosteidae - extinct long-snouted dolphins

Ziphiidae - beaked whales

Desmostylia

- Desmostylidae - extinct quadrupedal marine mammals

Desmostylus

Sirenia

- Dugongidae - sea cows

Dusisiren jordani