

the site. But the question of how much grass was present during the Late Pleistocene at the site remains unanswered. We present new records of vegetation from fossil phytoliths extracted from the asphaltic sediments of Rancho La Brea. Although preliminary, our results suggest that C₃ pooid grasses were a dominant component of the herbaceous plant cover in deposits and that C₄ PACMAD grasses were present, but rare in agreement with carbon isotope data and climate models. Future and ongoing research aims to track changes in grass composition throughout the Late Pleistocene and Holocene.

17. FLORA OF THE LA BREA TAR PITS: DROUGHT, FIRE, AND THE CHANGING FACE OF LOS ANGELES

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The challenges presented by the Anthropocene are many. Conservation in the face of climate change and maintaining biodiversity in an increasingly urbanized world requires a deeper understanding of environmental change across time rather than a single static baseline. The fossil deposits at the La Brea Tar Pits have continuously preserved about 60 ka (ka = 1,000 calendar years before present) of vegetation in the Los Angeles basin, from the Late Pleistocene into the Holocene, and provide a unique opportunity to explore vegetation response to climatic and biotic forcings over that 60-thousand-year period. The plant material, however, has not been previously radiocarbon dated and because of the unique characteristics of asphaltic fossil deposits, has lacked any chronological context. To rectify this, we first identified and then used accelerator mass spectrometry (AMS) radiocarbon dating to date 188 plant macrofossil specimens to create a chronological record of plant presence at the La Brea Tar Pits. Using paleoclimate proxies, co-occurrence analysis, and paleo and modern fire records, we found drought and fire to be the most likely factors influencing the vegetation of the Los Angeles basin. We documented three major periods of reorganization, from closed cone pine coastal forest to oak-juniper woodland, and finally sagebrush/grassland species. These ancient communities provide deeper insight into challenges faced by Western North American flora today, as well as a broader perspective on what a “native local flora” can look like when it comes to re-greening more novel urban spaces.

18. WHAT DO LA BREA TAR PITS TURTLES TELL US ABOUT PAST CLIMATE CHANGE?

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Turtles and tortoises (collectively, chelonians) are a useful taxon for paleoenvironmental inference as many species have constrained temperature and humidity requirements and limited geographic distributions. However, at Rancho La Brea (RLB), the world’s richest Pleistocene fossil site, only one species of chelonian (*Actinemys marmorata*) has been identified, and no studies of chelonians have been published since the 1950s. We evaluated all the chelonian material from RLB’s Hancock Collection. Our research indicates the presence of three different turtle species: the Southwestern pond turtle *Actinemys* cf. *pallida*, a desert tortoise *Gopherus agassizi*, and a mud turtle *Kinosternon* sp. The Southwestern Pond Turtle is still present in the Los Angeles area today, but the tortoise and mud turtle have distribution ranges restricted to Southeastern California. We use ecological niche models to infer the

paleodistribution of these species during the Pleistocene-Holocene. These range changes suggest environmental changes during the late Quaternary. Radiocarbon dating of these three species will help clarify the timing of these range shifts and their relationship with climatic and anthropogenic landscape changes across the past 55,000 years in the Los Angeles Basin.

19. THE ELEPHANT IN THE ROOM: WHAT DO WE KNOW ABOUT PROBOSCIDEANS AT RANCHO LA BREA?

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Proboscideans are among the most abundant, latest-surviving, and best-studied Pleistocene megafauna in North America, yet their record at Rancho La Brea (RLB; California, USA), the world's richest Pleistocene terrestrial locality, is surprisingly sparse. In contrast with the remains of thousands of saber-toothed cats and dire wolves, along with hundreds of bison, horses, and camels, the site preserves fewer than 50 mammoths (*Mammuthus columbi*), and only around 30 mastodons (*Mammut pacificus*), and neither species has a well-resolved chronology at the site. Notably, mammoths (but not mastodons) are completely absent from the site's youngest-dated deposits, suggesting that they may have become extirpated from the region well before the regional megafaunal ecosystem collapse or the continent-wide extinction of their species. In this talk we will use various lines of evidence to explore some of the longstanding mysteries about the proboscidean community at RLB, including: *What is the chronology of Mammut and Mammuthus presence at RLB, did they ever coexist at the site, and when did each species disappear from Southern California?*; *What were the ecological niches of Mammut and Mammuthus in Southern California, and how did they compare with populations in other regions?*; *How did ecosystem structure across the last 50,000 years of the Pleistocene impact the presence of proboscideans at RLB, and vice-versa?*; and, *Why are most of the proboscidean remains at this site concentrated in a single deposit (Pit 9), and when and how did this deposit form?*

20. UNEXPECTED DIVERSITY OF THE PLEISTOCENE DUNG BEETLE ASSEMBLAGE AT RANCHO LA BREA

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Dung beetles play an important role in decomposing and incorporating nutrients from animal excrement and carcasses into the soil. Modern diversity of dung beetles comprises over 6,200 species and about 267 genera worldwide, but their fossil record is much smaller, with only 21 fossil taxa confidently assigned to Scarabaeinae from the early Eocene to the late Pleistocene. Based on trace fossils (ichnogenus *Coprinspherus*), it appears dung beetles may have coevolved with dinosaurs in the Cretaceous, and following the dinosaur extinction adapted to process mammalian feces. The late Pleistocene extinction of the megaherbivores had a secondary impact as dung beetles also suffered major extinctions and local extirpations. This has been documented in Southern California, where 3 of the 5 species identified at the Rancho La Brea locality (RLB) are extinct (*Copris pristinus*, *Phanaeus labreae*, and *Onthophagus everestae*). All of these species likely had highly specialized interactions with megafauna and could not adapt to their disappearance. Here we report new records of dung beetle taxa from RLB as members of