

Florissant Fossil Beds

Fossil Vertebrates

National Park Service
U.S. Department of the Interior

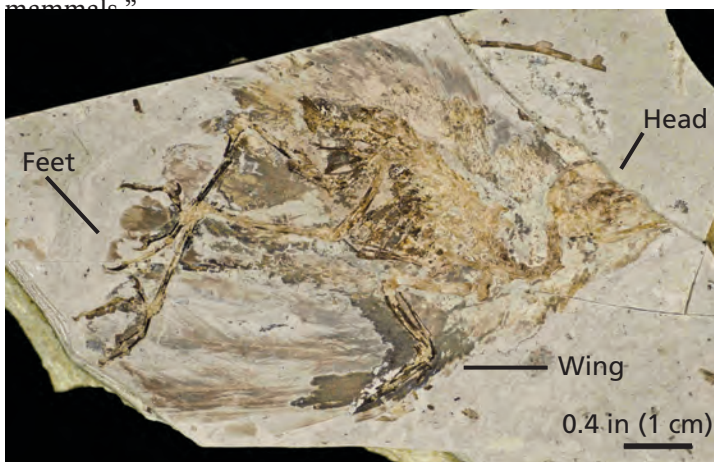
Florissant Fossil Beds
National Monument
Colorado



From snakes to mammoths, fossils of more than two dozen species of vertebrates have been found at Florissant. Vertebrate fossils are rare because of the environmental conditions necessary for their preservation. Of the fossil vertebrates found, fish skeletons and mammal teeth are the most abundant. Many of the mammals that lived 34 million years ago are unlike any living today. Scientists are still describing new species of animals from Florissant fossils.

Where are the dinosaur fossils?

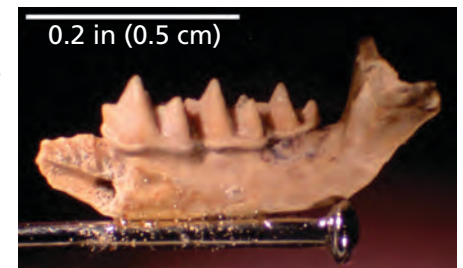
Almost all of the animals that fossilized at Florissant lived 34 million years ago, in the late Eocene geologic time epoch. The “age of dinosaurs” ended about 30 million years earlier, at the end of the Cretaceous time period, when an asteroid struck near the Yucatán Peninsula, Mexico. There are no non-avian dinosaurs preserved at Florissant, but fossils from other sites, such as Dinosaur National Monument and Garden Park Fossil Area, show that *Allosaurus*, *Stegosaurus*, and other dinosaurs lived throughout Colorado. They probably roamed the Florissant area as well, but the rock layers that would have contained their fossils eroded there by the late Eocene. All dinosaurs except one lineage, which evolved into birds, went extinct at the end of the Cretaceous. Since then, another group—mammals—has diversified and evolved to fill dinosaurs’ ecological roles. Florissant fossils come from the Cenozoic era (65 million years ago to the present day), also called the “age of mammals.”



This bird is preserved in Florissant shale with wings spread. FLFO-9661

What are the most common vertebrate fossils?

Mammal teeth are the most abundant fossils from animals with backbones. Fortunately for paleontologists, teeth are unique to almost every mammal species. Several Florissant mammals, including the extinct rabbit *Palaeolagus*, have been identified by fossil teeth alone. Teeth and other bones are sturdy enough to remain intact after the rest of the body decays or breaks apart in a stream. They turn into fossils as groundwater deposits small crystals of dissolved minerals in the tissue pores, a process called permineralization.



This fossil jaw fits on a pinhead.

Occasionally, delicate structures like bird feathers or fish scales are preserved in Florissant lake shales, which also contain many fossil plants and insects. In a few rare cases, entire bird or fish skeletons were compressed in shale.



Bones become fossils as minerals form in the small internal spaces. UCM-73039

How many kinds of animals lived at Florissant?

Paleontologists have named more than 30 species of vertebrate animals from Florissant fossils. As new specimens are excavated, it is likely that more species will be described. By number of individuals and number of species, most of the species found at Florissant are plants and insects, and only a small proportion of fossils belonged to vertebrates. Plants and insects are still the most abundant multicellular life forms today, although they often go unnoticed. The particular environmental conditions of ancient Florissant, such as the acidity of the lake or the periodic input of volcanic ash, may have contributed to the large amount of leaves and insects but small number of vertebrates fossilized.

Fish

Fish are the most abundant animals with whole skeletons preserved at Florissant. Many of the fossil fish were bowfins (Amiidae), some of which reached 1 ½ feet (45 cm) in length. Fossil suckers (Catostomidae), catfishes (Ictaluridae), and pirate perches (Aphredoderidae) have been found as well. A paleontologist famous for naming dinosaurs, E.D. Cope, described species of Florissant fish in the 1870s.

Amyzon suckers (Catostomidae) were freshwater fish that grew up to about 5 inches (13 cm). They likely lived along the bottom of Lake Florissant, feeding on plants and small invertebrates. *Amyzon* fish went extinct at the end of the Paleogene, 23 million years ago, but related lineages of Catostomidae fish still live in North America. UCM-38711



Birds

At least half a dozen fossil birds have been found in Florissant lake shales, including a shorebird, roller (Coraciidae), cuckoo (Cuculidae), and passerine or perching bird. Isolated feathers are also found in shale. In some feathers, individual filaments are visible.



An artist's drawing of a fossil that has been interpreted as a rail (Rallidae) shows this slender shorebird wading in shallows. Its long beak can probe the mud and dig out small animals to eat.

Marsupial Mammals

Marsupial mammals are born relatively undeveloped and then mature in a mother's pouch. Most live in Australia, as kangaroos do, for instance. The Virginia opossum is the only marsupial that lives in North America today. Florissant fossils show that an extinct species of small opossum lived in Colorado in the late Eocene.



An opossum (Didelphidae) is the only mammal that has been found in shale from Florissant. The other mammals were preserved in stream deposits.

Placental Mammals

Fossils from rodents, rabbits, horses, and other extinct mammals have all been documented at Florissant. Horses evolved in North America but then went extinct there, until Europeans reintroduced them. Unlike horses today, the Eocene horse *Meshippus* had three toes, browsed on shrubs and trees, and stood only three feet (about a meter) high.



Teeth from the extinct horse *Meshippus* show that it ate leaves and twigs, not grasses. UCM-65951

The largest animals to roam the Eocene Florissant valley were brontotheres (Brontotheriidae). These giants grew to reach 8 feet (2.4 m) tall and weigh about two tons (nearly two tonnes). They sported a huge horn above their nose that forked into two prongs. Brontotheres likely used this weapon to fight off predators or settle rivalries among competing males.

Brontotheres were the largest animals at Florissant in the Eocene, 34 million years ago. Although they resemble rhinoceroses, they are an extinct group.



Images courtesy of Florissant Fossil Beds National Monument (FLFO), Smithsonian National Museum of Natural History (USNM), and University of Colorado Museum (UCM).

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