

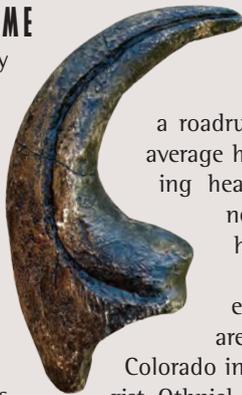
## ALLOSAURUS – FOOTPRINTS IN DEEP TIME

Because New Mexico contains a well-exposed, nearly complete record of the geologic formations through time (stretching back over 500 million years of the Paleozoic, Mesozoic, and Cenozoic Eras), the state has a phenomenally rich fossil record. The many local discoveries of dinosaurs, prehistoric reptiles, and extinct mammals include one of the earliest dinosaurs, many of the planet's fiercest predators, some of the largest animals to ever walk, and bizarre giant reptiles and birds. Due to its outstanding exposures of Mesozoic rocks that represent ancient river systems where creatures would congregate for food and water, the Rio Chama watershed is a hub of dinosaur discovery.

At the top of the Jurassic food chain was the theropod dinosaur *Allosaurus*, the largest land-based predator of the time. *Allosaurus* reigned supreme for 5 million years, from 155.7 to 150.8 million years ago. Although smaller than *T. rex* (the top Cretaceous predator) it was an imposing creature, growing over 30 feet long, 16 feet tall, and weighing over 3,300 pounds. The largest living theropod is the common ostrich, which grows to 9 feet tall and can weigh 320 pounds.

*Allosaurus* had a short neck and a huge, elongated skull. The mouth contained dozens of sharp, serrated teeth, which were commonly lost during feeding, but rapidly regrown. The teeth were thinner and sharper than *T. rex*, adapted to cut meat rather than crush bones. Despite its large skull, *Allosaurus* had a bite that was likely weaker than alligators, lions, or leopards.

*Allosaurus* had short, strong front limbs armored with three, hook-shaped claws. The massive body was supported by two powerful hind legs and a large tail. Each foot had three weight-bearing toes and an inner dewclaw. Models suggest *Allosaurus* could run up to 21 mph, about equal to the top speeds of a grizzly bear or

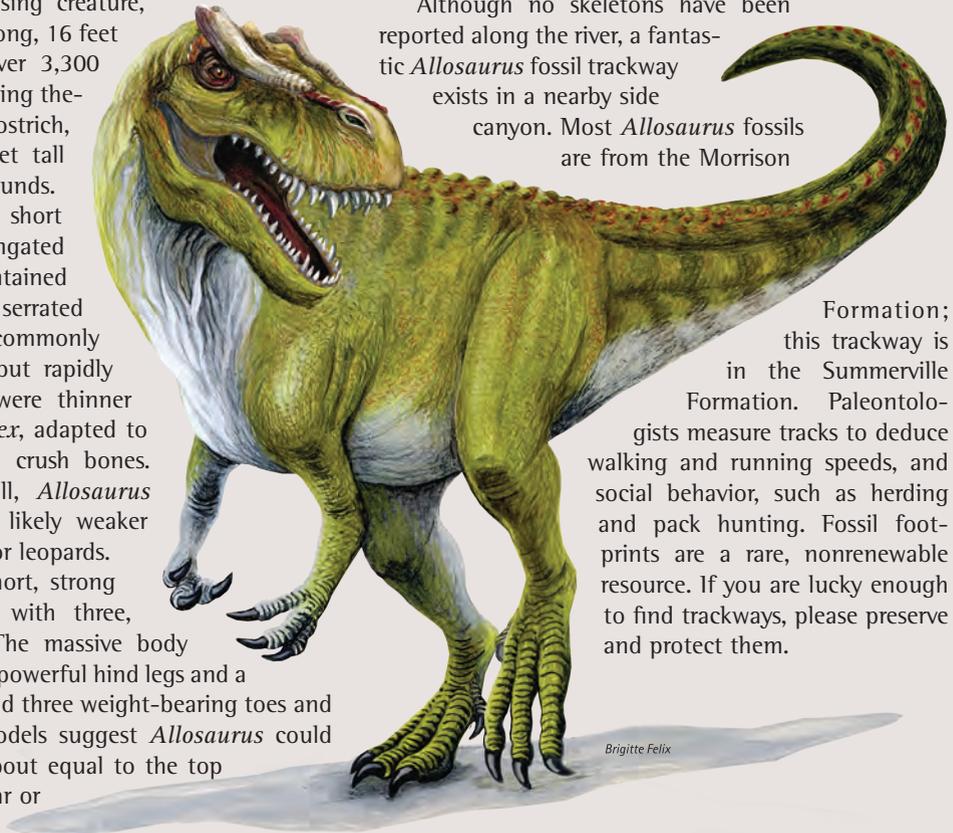


This casting of a 9-inch, adult *Allosaurus* toe claw was found in the Morrison Formation of central Utah.

a roadrunner, and considerably faster than an average human. *Allosaurus* was capable of killing healthy, medium-sized sauropods (long-necked herbivores), and they may have hunted in packs.

*Allosaurus* was among the earliest dinosaur discoveries, and its fossils are abundant. It was first unearthed in Colorado in 1877, and named by Yale paleontologist Othniel Charles Marsh. The name *Allosaurus* is derived from the Greek “allos” (different) and “sauros” (lizard), so-named because its vertebrae differed from other known dinosaurs. Although Marsh's specimen consisted of only a few fragments of the dinosaur, many more were later collected, and in 1991, a Wyoming team unearthed “Big Al” which was 95 percent complete.

Although no skeletons have been reported along the river, a fantastic *Allosaurus* fossil trackway exists in a nearby side canyon. Most *Allosaurus* fossils are from the Morrison



Formation; this trackway is in the Summerville Formation. Paleontologists measure tracks to deduce walking and running speeds, and social behavior, such as herding and pack hunting. Fossil footprints are a rare, nonrenewable resource. If you are lucky enough to find trackways, please preserve and protect them.

**GEOLOGY** At this point the river has cut down from the Jurassic rocks (Entrada Sandstone) into the underlying Triassic rocks (Chinle Group).

**HIKE** RIO CEBOLLA AND NAVAJO PEAK. The Rio Cebolla (Spanish for onion) flows westward from near Red Mountain to its confluence here with the Rio Chama. The Hart Canyon Trail leads from the river to Navajo Peak (7,451 ft), with a stunning 180-degree view of the Rio Chama valley nearly 1,000 feet below. From there, the trail loops eastward to Lobo Canyon, and then south where it follows the Rio Cebolla back to the Rio Chama.

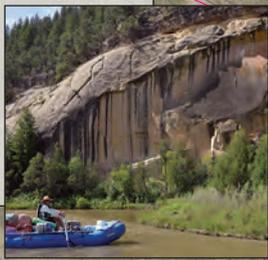
No stopping on the private land with cabins on the right.

**DARK CANYON RAPID (III)** is a long boulder field, including several large rocks at the top that must be avoided.

**HIKE** DARK CANYON is an easy hike to an *Allosaurus* dinosaur trackway. Land on right bar, and follow the trail downstream into Dark Canyon. Always stay on the trail to avoid destroying the delicate cryptobiotic soils. Dinosaur prints are protected under Federal law.

**GEOLOGY** TIGER WALL is named for the dark, vertical stripes on the Entrada Sandstone cliffs. Known as desert varnish, the thin stripes are mostly composed of tiny clay particles that are rich in iron and manganese.

The stripes are at least partly created by mineral-rich water running down the cliffs, and wind-blown clay dust sticking to the cliff faces.



Fossil foot impression of an adult *Allosaurus* from the Dark Canyon dinosaur trackway. Also shown is 1999 Rio Chama river guide for scale.

**DOWNPOUR RAPID (II)** was formed by a blowout in 1988.

