

Leaping Lizards, Frolicking Frogs, Swimming Salamanders, and Minute Mammals: The Non-Dinosaurs of Dinosaur National Monument

By Daniel J. Chure

Although dinosaurs are the most spectacular terrestrial animals during the Age of Reptiles, they were not the only component of the vertebrate community at that time. Secreted amongst rocks, up in trees, along the forest floor, and in ponds, rivers, and lakes there lived a diverse community of small vertebrates – a community which until recently has been very poorly known in upper Jurassic rocks such as those in Dinosaur National Monument. Many of these non-dinosaurian members of the fauna were relatively small and their fragile bones were easily destroyed before they could be fossilized. Nevertheless, under the right conditions they could be preserved. It is these “windows” which are yielding paleontological treasures and providing a fuller understanding of the Morrison ecosystem.

Frogs, salamanders, and fish are all closely tied to aquatic habitats and are found in Morrison pond deposits in Dinosaur. At least three new genera of

salamanders have been identified, one of which is the first record of the family Karauridae outside of Asia. Frog discoveries of equal importance also have been made (see article by Amy Henrici elsewhere in this issue). Fish remains include species related to *Amia*, the living bowfin, lungfish of the genus *Ceratodus*, and a possible fresh-water shark.

Lizards and their relatives, the sphenodontids, are common small reptiles in the Morrison. A skull of *Paramacellodus*, measuring only 1.5 cm in length, is the first complete skull ever found of that lizard. An isolated jaw of *Dorsetisaurus* is only the third specimens of that genus known from North America. Other partial skeletons and isolated lizard bones belong to several genera and species that are new to science. Two skulls of the sphenodontid *Opisthias* are only the second and third skulls ever found for that animal. Both juvenile and adult sphenodontid specimens have been collected and fragmentary material indicate that sphenodontids other than *Opisthias* are present.

While less diverse than lizards, turtles and crocodiles were not uncommon. All of the turtles are referable to *Glyptops*, although fossils include large adults and very small individuals (hatchlings?). At least one large crocodilian is present (*Goniopholis*), while a partial skeleton and skull indicate the presence of a smaller species, one which may be new to science.

Morrison mammals were shrew to rat sized and were abundant and diverse within Dinosaur. Nineteen species in 7 families have been identified to date including 5 new genera and 10 new species. Among these mammal fossils are several complete or partial skulls, one of which is the best multituberculate mammal skull known anywhere in the world during the Jurassic.

These fossils are important in themselves for what they can tell us about the morphology and evolution of their particular groups. However, they are also part of a larger research project at Dinosaur aimed at providing a more detailed understanding of the extinct ecosystem which is buried in the sediments of the Morrison Formation. Over the last several years a multi-disciplinary approach has been taken to unraveling the secrets of the Morrison. This approach involves stratigraphers, sedimentologists, radiometric dating, paleobotanists, palynologists, and vertebrate and invertebrate paleontologists (see articles by Englemann, and Turner and Peterson elsewhere in this issue). The geologists have developed a detailed framework for the Morrison Formation within Dinosaur and have correlated the beds with major fossil localities in the formation beyond the monument boundaries. In addition, they have identified the major environments present during Morrison times and how these environments changed through time.

Using this framework, paleontologists have examined fossil vertebrates, plants, pollen, trackways, ostracods, conchostracans, and charophytes to help refine the faunal, floral, and paleoenvironmental analyses developed through geological studies.

This project will not only allow for an inventory and evaluation of the fossil resources within the monument, but will aid in developing management actions, future research programs, and in selecting localities for further excavation and study. Finally, all of the major dinosaur localities within the Morrison Formation will be correlated with each other and with the Carnegie Quarry within the monument, and for the first time paleontologists will have a clear understanding of how these quarries are related in space and time.

Literally thousands of fossils have been collected from the Morrison Formation within Dinosaur over the last 7 years. More than half of the fauna and nearly all of the flora known from the Morrison within the monument has been found during that same time period and similar rates of discovery are expected to continue at least into the near future. Although gone and buried, the Morrison ecosystem is not forgotten and in Dinosaur it is beginning once again to see the light of day.

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