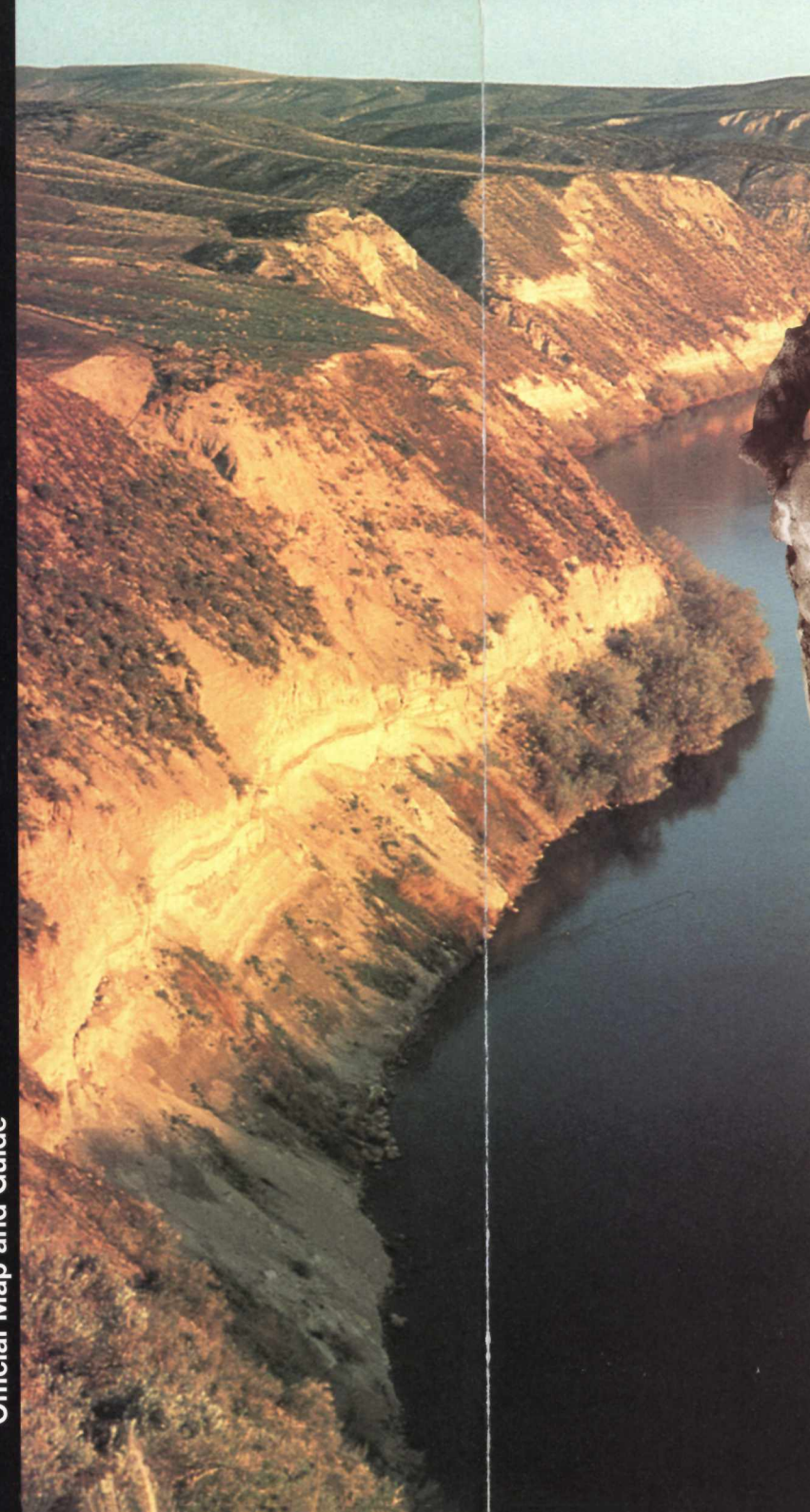


Hagerman Fossil Beds

National Monument
Idaho
National Park Service
U.S. Department of the Interior

Official Map and Guide



P A L E O Z O I C

Cambrian
590 mya

Ordovician
505 mya

Silurian
438 mya

Devonian
408 mya



Smithsonian Institution

Hagerman Fossil Beds National Monument is most famous for the horse that is Idaho's state fossil. It is most significant for its variety, quantity, and quality of fossils, evidence of animals or plants present in the Earth's crust.



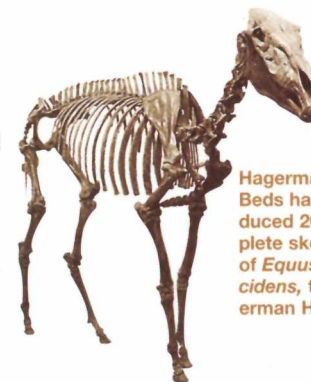
Paleontologists admire one of the quarry's fossils in 1934. The fossils occur in layered beds exposed in cliffs above the Snake River (photo at right).

What the Scientists Found Here

No other fossil beds preserve such varied land and aquatic species from the time period called the Pliocene Epoch. More than 180 animal species of both vertebrates and invertebrates and 35 plant species have been found in hundreds of individual fossil sites. Eight species are found nowhere else, and 43 were found here first. The Hagerman Horse, *Equus simplicidens*, exemplifies the quality of fossils. From these fossil beds have come both complete and partial skeletons of this zebra-like ancestor of today's horse.

In 1929, paleontologists from the Smithsonian Institution in Washington, D.C., made the first scientific excavations at Hagerman Fossil Beds. A local rancher, Elmer Cook, had shown the fossil beds to a government geologist, Dr. Harold Stearns. The Smithsonian finds led to more expeditions in the 1930s. Its National Museum of Natural History excavated 120 horse

skulls and 20 complete skeletons from an area now called the Horse Quarry. The Smithsonian exchanged some of these Hagerman Horse skeletons with other museums. This has resulted in their display around the world. Additional scientific expeditions have been conducted over the years by other museums, universities, and the National Park Service. More than 200 published scientific papers now focus on the Hagerman fossil species.



Hagerman Fossil Beds has produced 20 complete skeletons of *Equus simplicidens*, the Hagerman Horse.



This Hagerman Horse skull, now in the collection of the Smithsonian Institution, closely resembles that of today's zebra.

Smithsonian Institution

Clues in the Landscape

The 600-foot-high bluffs rising above the Snake River and comprising the Hagerman Fossil Beds reveal the environment at the end of the Pliocene Epoch. Grassy plains dotted with ponds and forest stands then received over twice today's 10 inches of yearly precipitation. Mastodons, sabretooth cats, beavers, muskrats, otters, camels, antelope, deer, ground sloths, hyena-like dogs, and fish, frogs, snakes, and waterfowl lived here. The sediment layers from river level to bluff tops span some 550,000 years: from 3.7 million years old at river level to 3.15 million years old atop the bluff. These layers were deposited when rivers flowing into ancient Lake Idaho flooded the countryside. The much later Bonneville

Flood, 15,000 years ago, carved the high bluffs, exposing the layers and fossils. This flood also deposited fields of so-called melon gravel—lava boulders ranging in size from a compact car to watermelons—from today's river level to gravel bars 225 feet higher.

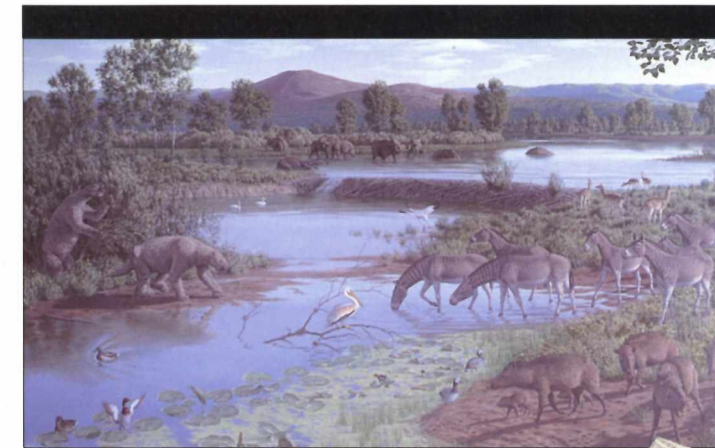
The sediments in the bluffs include river sands, thin shale layers deposited in ponds, clay flood deposits, and occasional volcanic deposits such as ash and basalt. It is the radioactive elements such as potassium 40 in the volcanic ashes that allowed scientists to determine the age of the fossils by measuring the rate at which one radioactive element breaks down into another.

M E S O Z O I C

Triassic
248 mya

Jurassic
213 mya

Cretaceous
144 mya



In Pliocene times the climate was more wet here and the vegetation far more lush, as shown in the painting at left.

Jay H. Matthews

Adapt, Migrate, or Become Extinct

As significant environmental change happens most plants and animals will have three options: adapt, migrate, or become extinct. The ancient ecosystem of Hagerman's fossil plants and animals shows each response as this region changed from a wetter grassland savanna to the drier high-desert conditions here today. **Adapted:** Fossils of beaver and muskrat and many birds are similar or ancestral to today's species. **Migrated:** Llamas migrated to South America, while camels and horses crossed the Bering Land Bridge into Eurasia. **Extinct:** Ground sloths went extinct. So did mastodons and other large herbivores. As their primary prey disappeared, sabretooth cats and hyena-like dogs also became extinct.

Hagerman Fossil Beds is one of the few sites that preserves the necessary variety and quantity of fossil evidence to study past climates and ancient ecosystems. Fossil

studies also add to contemporary research on biodiversity, wetlands ecology, and evolutionary patterns.

Adapted: Beaver that lived here in Pliocene times adapted to change, and their descendants live here today.



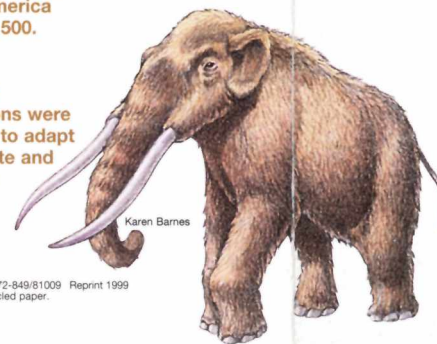
National Geographic Society

Migrated: Horses migrated to Eurasia when habitat conditions changed here. Spaniards reintroduced horses to North America around 1500.



Karen Barnes

Extinct: Mastodons were not able to adapt or migrate and became extinct.



Karen Barnes

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C E N O Z O I C

Paleocene

Eocene

Oligocene

Miocene

Pliocene

Pleistocene

Holocene

Epochs of the CENOZOIC

Holocene present

Horses reintroduced into North America by Spanish 1500's
Extinction of North American megafauna, including horses 11 - 10,000 BP
Bonneville Flood 15,000 BP
Damming of Snake River by McKinney Butte Basalt 50,000 BP
Immigration of bison into North America from Eurasia 400,000 BP
Lake Idaho drains 1.7 million years ago
Immigration of mammoth into North America from Eurasia 1.9 mya

Pleistocene 2 mya

First appearance of modern horse *Equus* at Hagerman 3.2 mya
Volcanic eruption at Yellowstone deposits Peters Gulch Ash at Hagerman 3.7 mya
Ancestral Snake River begins depositing sediments at Hagerman 4 mya
First appearance of modern beaver, *Castor* 4.8 mya
Extinction of rhinos in North America 4.8 mya

Pliocene 5 mya

Banbury Basalt forms floor of what is now the Hagerman Valley 8 - 11 mya
Bruneau-Jarbridge eruption south of Hagerman deposits ash as far east as Nebraska 11 mya
First elephants (*Gomphotheres*) immigrate into North America from Eurasia 14.5 mya

Miocene 25 mya

Gap in the record
First appearance of beavers 35 mya

Oligocene 38 mya

Volcanism in the Challis area begins 51 mya

Eocene 55 mya

First horse, *Hyracotherium* 57.5 mya

Paleocene 65 mya

Extinction of dinosaurs 65 mya
Gap in the record

Native vegetation of the Hagerman area typifies species adapted to high desert conditions. Sagebrush and rabbit brush dominate, along with grasses.

Native American peoples now called the Shoshone-Bannock and Shoshone-Paiute tribes have lived in the Hagerman Valley for some 12,000 years. They caught and dried salmon, steelhead trout, whitefish, and other fish, including sturgeon weighing 1,500 pounds or more. They dug camas-lily and other roots for food and harvested various seeds, fruits, and other plants. They hunted mostly small game but also mountain sheep, elk, and deer.

A black and white photograph of a covered wagon pulled by two mules, with a third mule visible on the right. A small flag is attached to the wagon. The scene is set in a field of tall grass under a clear sky.

Bounded on the east by basalt cliffs formed from past lava flows, the valley boasts many springs. Their water exits the ground at a consistent temperature ideal for raising trout commercially. Because the springs also keep the river from freezing in winter, some migrating waterfowl spend the winter here.

A temporary visitor center offers information and fossil displays across from Hagerman High School along U.S. Highway 30 in town (221 N. State Street) from 9:00 a.m. to 5 p.m. daily in summer. At other times call ahead, (208) 837-4793, for hours of operation. Schedules of educational programs are listed in *The Fossil Record* newsletter. For more information write to: Superintendent, Hagerman Fossil Beds National Monument, P.O. Box 570, Hagerman, ID 83332.

For an easy view of the monument, drive south from Hagerman on Highway 30 past the road to Wendell and take the next right turn (0.25 mile), marked "Sportsman's Access." Follow the signs to the Bell Rapids boat dock on the Snake River for fishing, water sports, or viewing birds along the scenic shoreline. The 4,281-acre monument, across the river, includes seven miles of shoreline.

At points along the road there are nice views of the Snake River, Hagerman Valley, and the slopes exposing the fossil beds. You should return along this same road. Before driving this or any other road in the monument, please check at the visitor center for complete directions, important safety warnings, and private prop-

Regulations and Safety Do not move or take any fossil, rock, or plant. All plants and animals are protected by law, even rattlesnakes and scorpions and other noxious insects. Beware and give them room. Most areas are closed to public use. Check with a ranger before venturing out.

If you see a fossil, please do not pick it up; report its location to a ranger so important information can be gathered. Many fossils are fragile and must be protected by trained experts before they can be moved safely.

