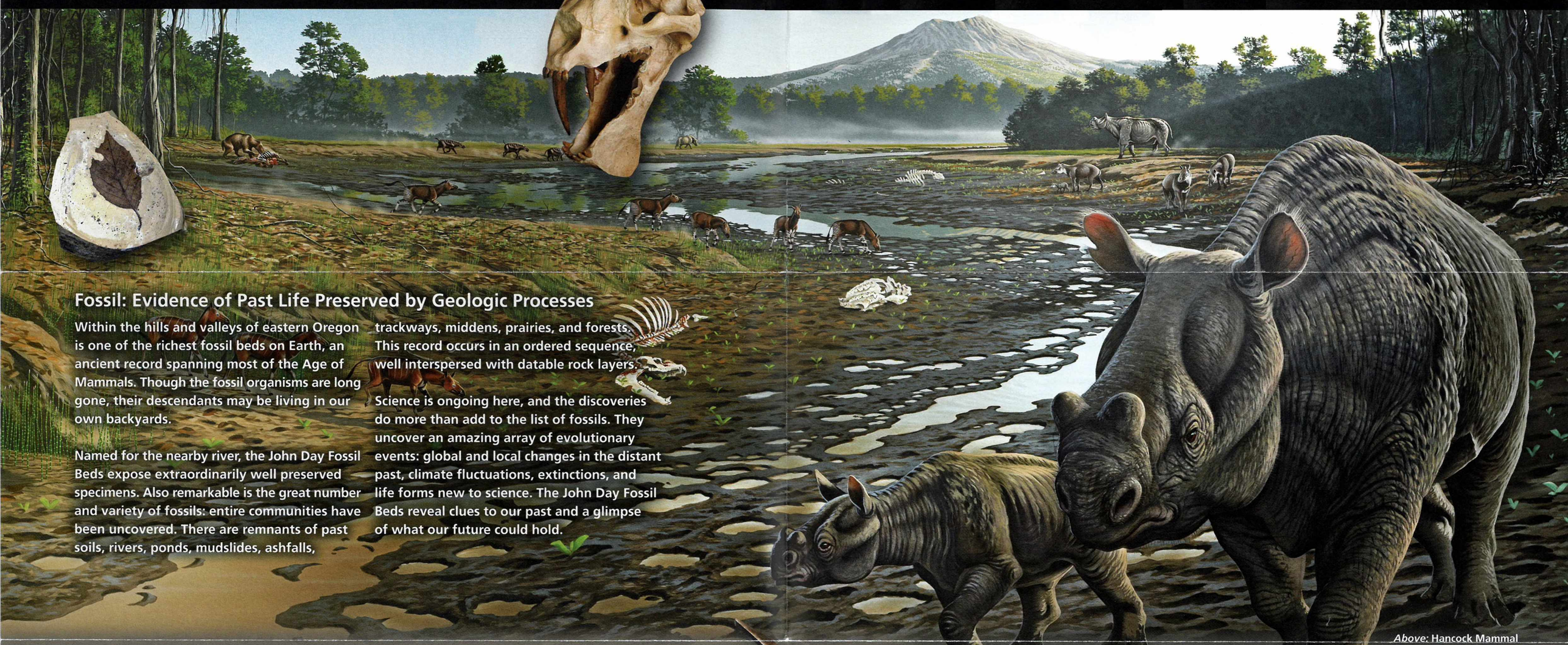
John Day Fossil Beds

John Day Fossil Beds
National Monument
Oregon

National Park Service
U.S. Department of the Interior



Above: Hancock Mammal Quarry mural shows life 40 million years ago. *Top: Alnus* leaf fossil and skull of the nimravid *Eusmilus*, a bobcat-sized predator from the Turtle Cove Assemblage.

ALL IMAGES THIS SIDE NPS / JOHN DAY FOSSIL BEDS NM

Fossil: Evidence of Past Life Preserved by Geologic Processes

Within the hills and valleys of eastern Oregon is one of the richest fossil beds on Earth, an ancient record spanning most of the Age of Mammals. Though the fossil organisms are long gone, their descendants may be living in our own backyards.

Named for the nearby river, the John Day Fossil Beds expose extraordinarily well preserved specimens. Also remarkable is the great number and variety of fossils: entire communities have been uncovered. There are remnants of past soils, rivers, ponds, mudslides, ashfalls, trackways, middens, prairies, and forests. This record occurs in an ordered sequence, well interspersed with datable rock layers.

Science is ongoing here, and the discoveries do more than add to the list of fossils. They uncover an amazing array of evolutionary events: global and local changes in the distant past, climate fluctuations, extinctions, and life forms new to science. The John Day Fossil Beds reveal clues to our past and a glimpse of what our future could hold.

In Search of Lost Worlds



Eastern Oregon was first recognized as an important paleontological region in the 1860s, thanks to the young frontier minister, Thomas Condon *(left)*. Paleontology, the study of ancient life, was still a new science at the time. Condon's discoveries spurred scientific interest. By the late 1800s, scientists from Yale, Princeton, and the Smithsonian Institution had acquired tons of fossil specimens from the area, which they classified and presented to the scientific community.

This early work set the stage for field paleontologists like John C. Merriam of the University of California, who in 1899 began placing the John Day fossils into their geological, chronological, and paleoecological context. His work helped preserve these fossil resources. John Day Fossil Beds National Monument was established in 1975.

Exploration and study continue today *(right and far right)*. Each year hundreds of specimens are added to the collections. Most are mere fragments—a few teeth, for instance—but each is accompanied by a wealth of field data: geographical location, stratigraphic position, and other facts about its recovery. This information, as well as that gained as the fossils are prepared and studied in the lab, becomes part of the global paleontological record.



The John Day Fossil Beds are dispersed across 20,000 square miles of eastern Oregon. The beds have yielded such a wealth of information that scientists can assemble and reconstruct ancient ecosystems.

Eight of these "assemblages" are re-created in the museum gallery of the Thomas Condon Paleontology Center. They are summarized below.



Deep Time in the John Day Fossil Beds

Millions of years ago

JOHN DAY FORMATIONS

approx. 5 mya

7 *mya*

RATTLESNAKE FORMATIONS

MASCALL FORMATION

15 *mya*

PICTURE GORGE BASALT

16 *mya*

20 *mya*

24 *mya*

29 *mya*

33 *mya*

CLARNO FORMATIONS

40 *mya*

44 *mya*

approx. 55 *mya*

RATTLESNAKE ASSEMBLAGE

Scientists have found more fossils here of grazing animals than browsers. These animals lived in a relatively cool, semi-arid climate dominated by grasslands *(illustration at right)*. Forests grew around lakes and rivers and at the higher elevations.

Many of these fossilized animals are very familiar to North America today: one-toed horses, pronghorn, beavers, ground squirrels, dogs, and true cats. Others, like elephants, rhinos, camels, and ground sloths, seem out of place, though they flourished in the Rattlesnake's prairie environment.

The fossil at right is the lower jaw of a young camel.



MASCALL ASSEMBLAGE

Sufficient rainfall and fertile soil fostered the growth of lush, nutritious grasses and mixed hardwood forests much like those found today from Illinois to Ohio. This savanna-like landscape had broad floodplains with scattered lakes.

The grass and forest environment was home to swift, long-legged, hoofed animals like early grazing horses and camels *(above)* that more resemble their modern relatives. Above right are the horns of the deer-like *Dromomeryx borealis*. The Mascall environment also attracted new-comers: true cats crossed over from Asia, along with four-tusked elephants called gomphotheres.



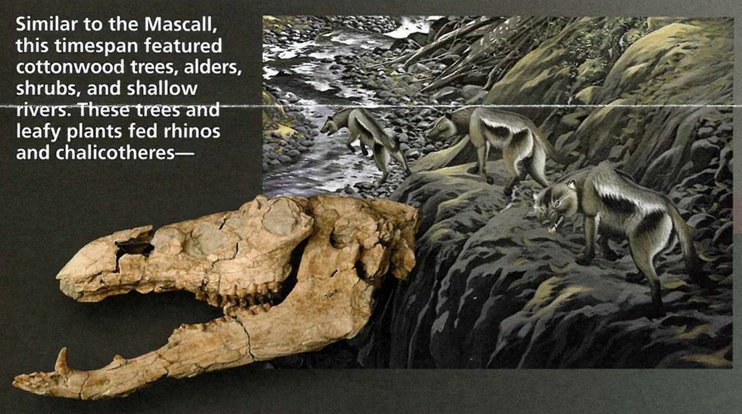


As forests receded and competitors changed, some groups like oreodonts headed toward extinction.

HAYSTACK VALLEY ASSEMBLAGE

Similar to the Mascall, this timespan featured cottonwood trees, alders, shrubs, and shallow rivers. These trees and leafy plants fed rhinos and chalicotheres—large, clawed creatures related to horses, tapirs, and rhinos. They were joined by open habitat species like camels *(skull at left)* and horses, both more suited to the newly developing grasslands.

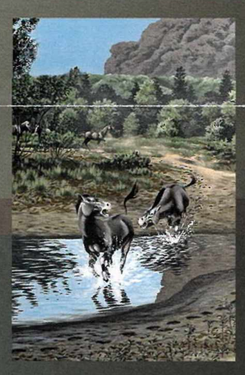
Daphoenodon, a bear-dog the size of a wolf *(illustration at left)*, was a common predator. Bear-dogs are extinct today.



KIMBERLY ASSEMBLAGE

Geologic evidence suggests that large amounts of soft, ashy soils laid down during the Kimberly time allowed tiny burrowing animals to be fossilized. The number and variety of burrowing rodent fossils *(skull at lower right)* reflect more open habitat.

The habitat was forest and field, with elm, birch, oak, maple, fir, spruce, pine, and smaller plants and shrubs. Grasses may have just started to appear in the region. A very diverse population of oreodonts *(skull above)* browsed the forests and fields along with three-toed horses and rhinos.





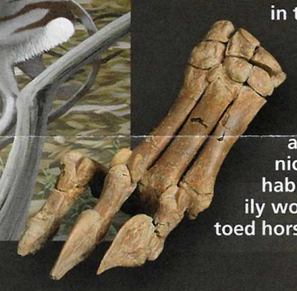


TURTLE COVE ASSEMBLAGE



During the Turtle Cove time, the climate continued to cool and dry. Hardwood forests similar to those growing in the eastern United States today were inundated with ash and pumice from abundant volcanic eruptions. The habitat was primarily woodland. Three-toed horses, mouse-deer, burrowing beavers, and oreodonts *(foot bones and illustration at left)* browsed on the many leafy plants.

Prey were hunted by dogs, bear-dogs, nimravids—saber-toothed, catlike animals of varied sizes—and entelodonts, creatures that looked like giant pigs and were as tall as bison.



BRIDGE CREEK FLORA



The Bridge Creek Flora shows evidence of one of Earth's cooling trends. As the region gradually became cooler and drier, it had forests, lakes, and swamps that resembled the parts of the southeastern United States.

Many trees in this ancient forest are related to modern alders, elms, maples, and oaks. The deciduous conifer *Metasequoia*, or dawn redwood *(fossil at left)*, was widespread. *Metasequoia* is Oregon's state fossil.

The Bridge Creek Flora has fossils of leaves, fish, amphibians, birds, and insects preserved like pressed flowers in a book. Mammal fossils, like a rare bat, are unusual in these ashy lakebed sediments.

HANCOCK MAMMAL QUARRY

The scene at the top of this page recreates a warm, humid forest; the plants are vaguely familiar. A scalding volcanic mudflow (lahar) has recently torn through the jungle-like foliage. Dozens of beasts gather in the newly opened area, the mud littered with plant and animal remains.

Mammals include *Haplohippus*, a small four-toed horse, huge rhino-like animals called brontotheres *(a mother and calf are shown at top right)*, an early rhino *Teletaceras (skull at right)*, and *Plesiocolipirus*, an early tapir.

A variety of animal remains was preserved at this site, which is probably a former bend in a stream with high sedimentation.

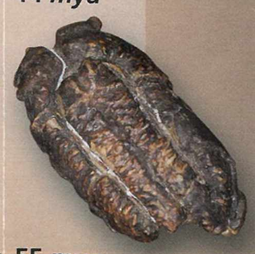


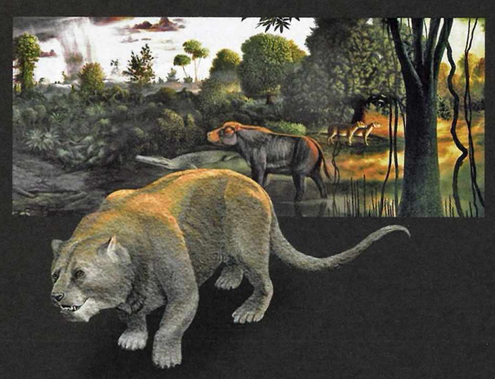
CLARNO NUT BEDS

This was a wet, lush, semitropical forest with many vines and creepers—similar to Panama's jungles today.

Over 300 plant species have been found here—175 species of fruits and nuts alone, including chestnuts, walnuts, bananas, and moonseeds *(left)*. Early magnolias and palms were common. These plant fossils are more than just leaf impressions, evidenced by one of the most diverse collections of petrified wood found anywhere.

Browsing mammals, like early four-toed horses and brontotheres, inhabited the forest. The catlike creodont *Patriofelis (right)* was a major predator.





Your Guide to John Day Fossil Beds

John Day Fossil Beds National Monument encompasses 14,000 acres in three separate units: Painted Hills, Sheep Rock, and Clarno. Driving routes between units pass by stunning scenery, colorful geological features, and abundant wildlife.

The best place to start your visit and to see fossils is the Thomas Condon Paleontology Center, the park visitor center. It is open daily year-round; in winter it is closed on federal holidays.

Trails and picnic facilities are open year-round. Drinking water is available year-round at the paleontology center, and from Memorial Day to Labor Day at Cant Ranch, Painted Hills picnic area, and Clarno picnic area.

Camping, lodging, food, gas, RV parks, and other services are available near the park units. All park roads and parking areas allow bus and trailer access.

ACCESSIBILITY
We strive to make our facilities, services, and programs accessible to all. For more information, ask a ranger, check at the visitor center, or visit the park website.

STAY SAFE, PROTECT THE PARK
Fossil collecting is strictly prohibited. Researchers may collect fossils only with a valid research permit issued by the park superintendent, and must carry permit at all times. Federal law protects all fossils and other natural and cultural features in the park. Do not collect, dig, or disturb them in any way.

When hiking, please stay on trails and wear appropriate footwear and sun protection. Carry plenty of water. • Watch out for rattlesnakes, ticks, scorpions, black widow spiders, and puncture vine. Don't put your hands or feet where you cannot clearly see what's there.

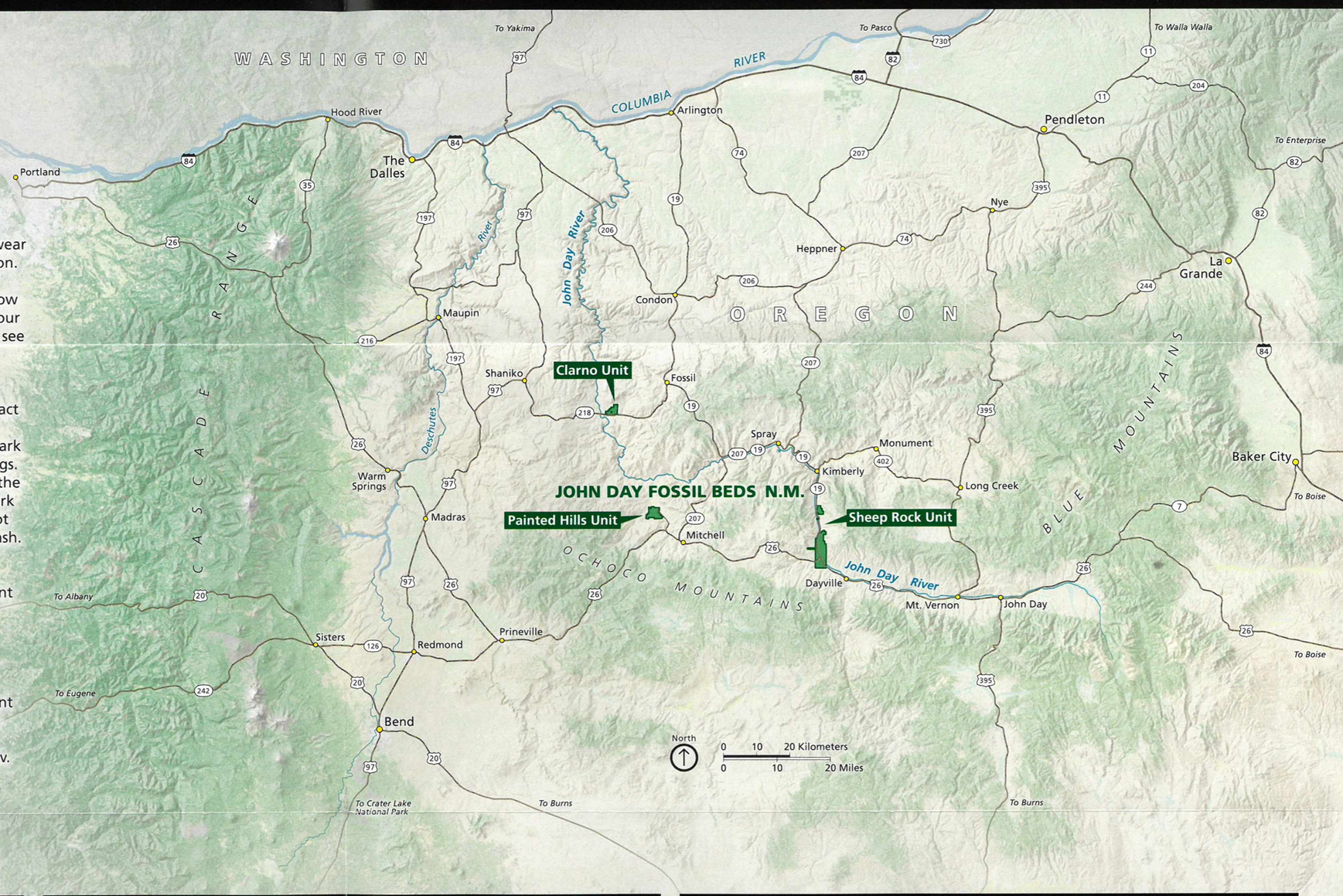
Fishing requires a valid Oregon fishing license. • For firearms regulations, contact the park staff or visit the park website. • There is private property within the park boundary. Please respect posted warnings. • Pets must be on a 6-foot leash under the owner's control. Pets are allowed on park trails, overlooks, and roads. They are not allowed in buildings, off-trail, or off-leash.

MORE INFORMATION
John Day Fossil Beds National Monument
32651 Hwy. 19
Kimberly, OR 97848
541-987-2333
www.nps.gov/joda

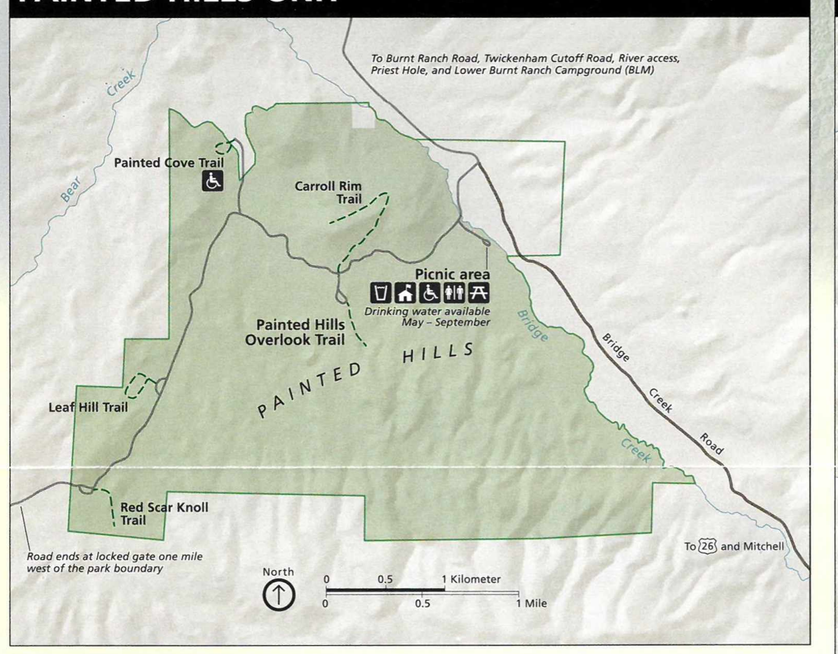
John Day Fossil Beds National Monument is one of over 400 parks in the National Park System. To learn more about the National Park Service, visit www.nps.gov.

National Park Foundation
Join the park community.
www.nationalparks.org

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PAINTED HILLS UNIT



Painted Hills Unit, 9 miles northwest of Mitchell, OR, off US 26, has restrooms, water (summer only), shaded picnic tables, exhibits, and trails. Roads in the unit are dirt and gravel.

Painted Hills Overlook and Trail Best seen in the hours before sunset. Take in spectacular views of color-splashed hills, part of the lower John Day Formation. The short, 0.5-mile trail is one of the park's most picturesque.

Carroll Rim Trail A moderate climb, this 1.5-mile trail leads to an outstanding overview of the Painted Hills landscape and Sutton Mountain to the east.

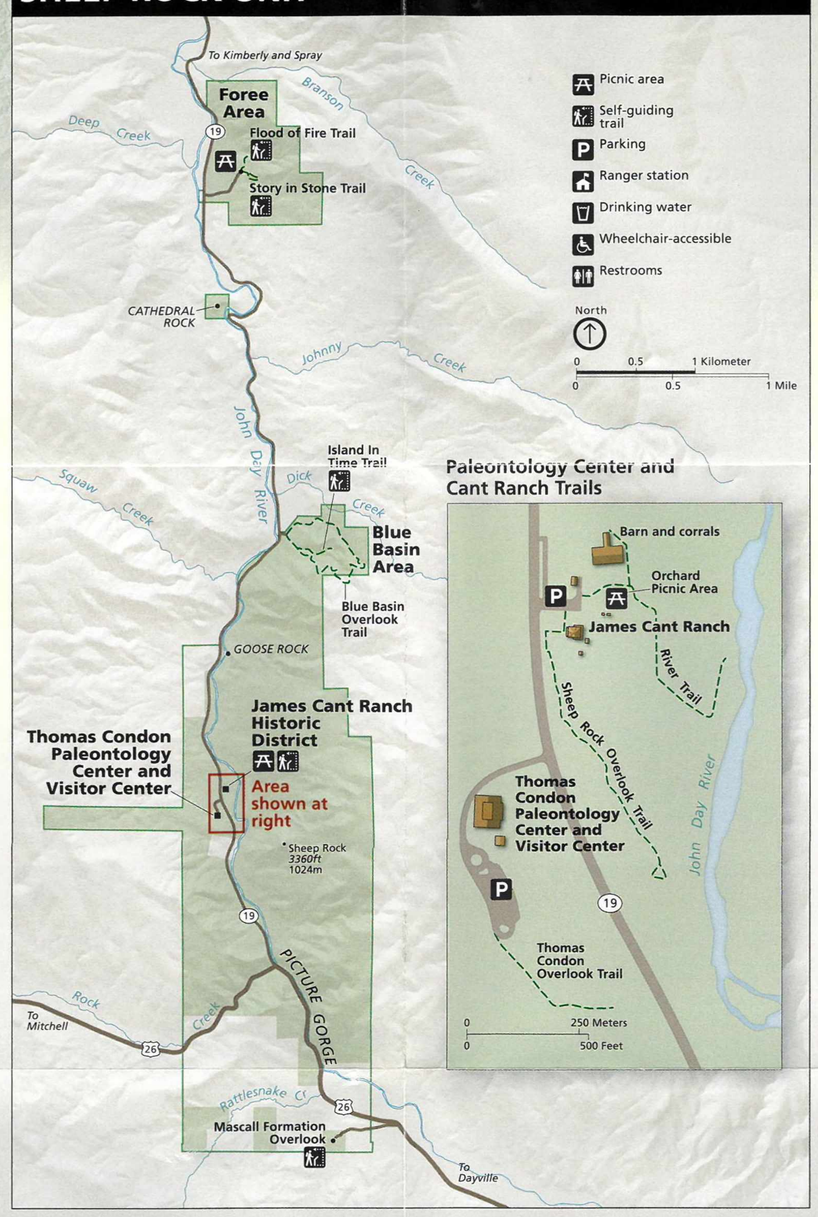
Leaf Hill Trail is a 0.25-mile loop around a hill where thousands of fossils have been excavated, giving us our first glimpse of the **Bridge Creek Flora**. *Hiking and collecting fossils on Leaf Hill itself are strictly prohibited.*

Painted Cove Trail This short, 0.25-mile trail winds through yellow, crimson, and lavender hills, giving you a close view of the popcorn-textured claystones that distinguish the Painted Hills. Part of the trail is accessible by boardwalk.

Red Scar Knoll Trail This short, 0.25-mile trail ends at a strikingly bisected hill of tan and red claystone.


Painted Hills

SHEEP ROCK UNIT



Sheep Rock Unit is at the intersection of OR 19 and US 26. The trails and overlook offer interpretive exhibits and restrooms.

Foree Area A picnic site and two short trails, each under 0.5 mile, offer views of sculpted green claystone capped by volcanic flows.

Cathedral Rock This roadside stop highlights a colorful greenish outcrop of the John Day Formation, capped with reddish ignimbrite.

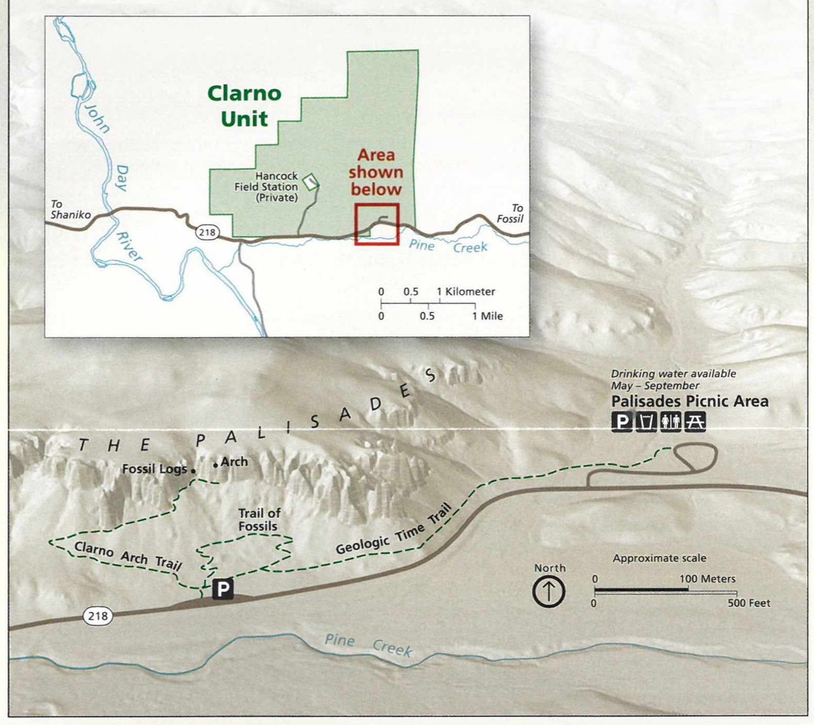
Blue Basin The **Island In Time Trail**, an easy 1.3-mile walk, leads you into colorful banded badlands layers deposited 28–31 million years ago. The 3.25-mile **Overlook Trail** climbs high to the rim of the basin and rewards you with valley vistas. *Off-trail hiking in Blue Basin is strictly prohibited.*

Goose Rock These cliffs are made up of material that flowed into the ocean about 90 million years ago.

Picture Gorge These imposing lava layers are part of the **Picture Gorge Basalt**, a subgroup of the Columbia River flood basalt group spread over the Pacific Northwest.

Mascall Formation Overlook The view from this point takes in the upper John Day Valley, Strawberry Mountain Range, Picture Gorge, and the Mascall and Rattlesnake formations.

CLARNO UNIT



Clarno Unit is 18 miles west of Fossil, OR, off OR 218. There is a picnic area and restrooms. This unit also has two significant fossil sites not open to the public: **Clarno Nut Beds** and **Hancock Mammal Quarry** *(see other side of brochure)*.

Trails Three short trails with interpretive displays let you explore the towering **Palisades**. These craggy cliffs looming up to 150 feet over the valley were formed when a succession of ash-laden mudflows (lahars) swept through a forested landscape 45 million years ago. A jumble of fossils is embedded in the rocks.

The 0.25-mile **Trail of the Fossils** allows you to see actual fossils embedded in rock. The **Clarno Arch Trail** is a 0.5-mile climb to a natural arch in The Palisades.

Hancock Field Station Operated by the Oregon Museum of Science and Industry, this camp offers educational programs on geology, paleontology, and ecology. Please visit by appointment only. For additional information, visit www.omsi.edu.



Palisades

THOMAS CONDON PALEONTOLOGY CENTER

Located in the Sheep Rock Unit, the Thomas Condon Paleontology Center is a National Park Service research facility dedicated to the John Day Fossil Beds. It is also the park visitor center and fossil museum. Picture windows let you view the working laboratory and collections room with over 60,000 specimens.

In the fossil museum gallery, you can walk through nearly 50 million years of the Age of Mammals. Hundreds of fossil specimens are displayed, along with eight large murals depicting plants and animals of the time. Each display explains the geology then and now.

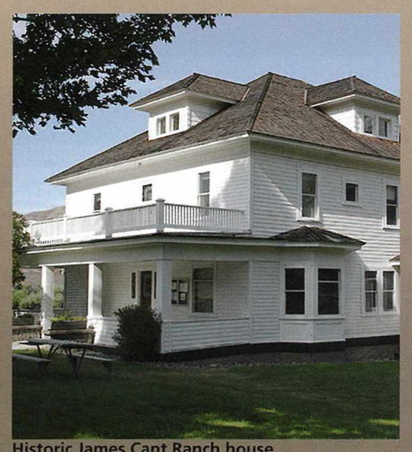

Fossil Museum Gallery


Sheep Rock

JAMES CANT RANCH

The dry hills of eastern Oregon provided ideal grazing land for livestock, mainly sheep and cattle. James and Elizabeth Cant, Scottish immigrants, bought this land in the early 1900s. The Cant family operated the ranch until the National Park Service purchased it in the 1970s.

The 1917 ranch house has been renovated to host park headquarters and a museum telling the human story of the area, from the first native inhabitants through to the sheep and cattle ranchers of the 20th century. The 0.6-mile **River Trail** passes by the barn and historic orchard. The 0.5-mile **Sheep Rock Overlook Trail** offers views of the John Day River.


Historic James Cant Ranch house