

# THE FOSSIL RECORD

A JOURNAL ABOUT THE JOHN DAY FOSSIL BEDS NATIONAL MONUMENT

*"A Monument to the Past — Preserved for the Future"*

VOL. I NO. II

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## In Search of a Buried Treasure.....

Few travellers are aware of the buried treasure all around them as they pass through the John Day Basin. Modern horses gallop across the graves of ancient ancestors. Sagebrush and juniper send down roots to bedrock containing the fossilized remains of palms and tree ferns. Evidence of the distant past lies hidden in these hills.

### A Land of Profound Changes

Fifty million years ago eastern Oregon was subtropical jungle. The plants and animals that flourished here were suited to their warm, wet, fertile home. Frequent rains of volcanic ash lined every pond and stream with fine-grained mud. Remains covered with that mud were often buried and preserved—fossilized. This scene was repeated countless times as North America cooled off, dried out, and eventually iced over.

Five distinctive units of rock (what geologists call "formations") are commonly found in the John Day Basin. These rock formations record key portions of the Age of Mammals in the Pacific Northwest. All of these formations are volcanic in origin—testimony to the constant upheaval this region continues to experience. Since four of the five formations contain fossils, a tremendous panorama of life has been preserved. Not just a snapshot of prehistory at a single time, but a moving picture of changing plants, animals, and climates from jungle to forest to prairie to the high desert of today.

### Ghosts in the Hills

Many strange creatures once inhabited this land. Bizarre at first glance, their relation to modern species becomes apparent with closer study. Tiny mouse-deer, gigantic boars, a wide variety of strange "ruminating swine," horned gophers, and huge "shovel-tusked" all had their day here. Sabertooths pounced and struck. Bear-dogs ran down their prey. Today, fossil hunters search the rocks for their petrified remains. Many hours are spent in the laboratory deciphering the intricate stories they tell. Here is evidence of adaptation and evolution—and extinction.

You might expect bones which have survived so long to be tough and durable, but this is not at all the case. Once natural erosion exposes them at the surface, they are extremely fragile and as brittle as glass. Such delicate treasures require special protection. Before excavation they must be stabilized with resins and plastics and often jacketed with plaster-soaked bandages as well.



### The Search Continues

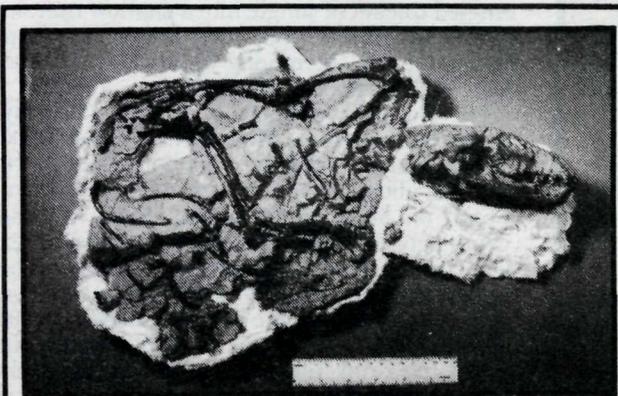
The significance of the John Day Fossil Beds has been known since the Reverend Thomas Condon first explored here in the 1860's. Early research work, though hampered by poor roads and primitive methods, left little doubt that this area had great potential for continuing study. Congress set aside a portion of the fossil-bearing rock in this region as John Day Fossil Beds National Monument in 1975. Monument lands are now a permanent scientific preserve. Paleontologists from museums and universities apply for permits to conduct new studies and recheck the findings of earlier work. All fossils collected on park lands remain in public ownership forever. These specimens are available for loan and study to scientists world-wide and form the basis of exhibits and displays at the park.

The business of finding fossils goes on. Visiting researchers and park scientists may be seen prospecting the badlands for that first small glimpse of bone or wood that can lead to a major find. Techniques vary depending on location and geologic formation. At the Sheep Rock Unit of the park, fossils are abundant, but widely dispersed. In most parts of the Clarno and Painted Hills Units, fossils are concentrated in small but rich "quarries."

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*Welcome!  
Enjoy Your  
Visit!*

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Part of the Puzzle

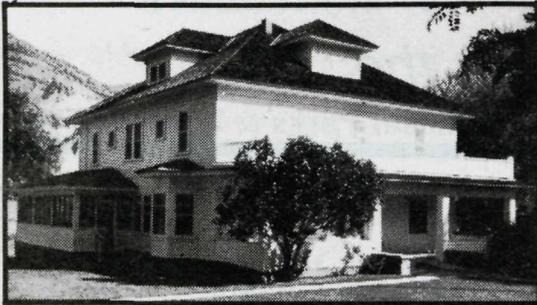
This fossil dog skeleton is one of the most recent finds at the park. See it at Park Headquarters.

# The Sheep Rock Unit

## Where History Meets Prehistory

Near the turn of the century, James Cant immigrated to eastern Oregon to start a sheep ranch. He and his family settled in the upper John Day Valley, an area surrounded by steep, colorful badlands. Scientists from prestigious universities visited the badlands to collect the bones of ancient mammals found there. Now a portion of the fossil-bearing badlands has become John Day Fossil Beds National Monument, and the ranch house built by the Cant family serves as its Visitor Center.

Today the fields are leased to a local rancher. In this way the traditional pastoral scene is also maintained. Under a special program authorized by an amendment to the National Historic Preservation Act, the proceeds from the lease are retained by the park to partially defray the costs of administering the lease and preserving the property.



The Sheep Rock Visitor Center is the main exhibit area for all three units of the John Day Fossil Beds National Monument. It is located two miles north of U.S. Highway 26 on State Highway 19 and is open daily from 8:30 a.m. to 6:00 p.m. Exhibits in the main house trace the past 50 million years of prehistory in the John Day Basin. Plant and animal fossils on display are clues to Oregon's ancient environments. This building is handicap accessible.

In the fossil laboratory behind the main house, you can watch technicians prepare fossils for exhibit and study. Exhibits in the old bunkhouse nearby tell of early fossil expeditions to the John Day Country. Other exhibits tell of local ranch history. These include antique furnishings and farm equipment from the early days of the Cant Ranch. The north orchard has been developed as a picnic area. Tables, fire grates, and running water are available.

### Where the Bones Are

Green and buff cliffs and badlands dominate the scene at the Sheep Rock Unit. This rock is part of the John Day Formation, composed of volcanic ash deposits weathered and cemented into claystone. The ash drifted into the area from a chain of volcanoes just west of the Cascade Range. Animal bones lying in and along creeks and lakes were buried in the muddy ash that collected in these low areas. The bones were buried under many additional layers of ash and lava. Pressure and the infiltration of mineralized ground water fossilized them. Erosion has now reexposed the John Day Formation. The ancient bones are on the surface again after 25 million years of entombment.

The John Day Formation can be seen at three separate areas within the Sheep Rock Unit: Sheep Rock Overlook, Blue Basin, and Foree.

### Sheep Rock Overlook

Sheep Rock and the John Day River are visible from the Sheep Rock Overlook just south of the Sheep Rock Visitor Center on State Highway 19. The layers of rock seen from this viewpoint represent the greatest span of time of any single exposure of John Day Formation in the Monument.

### Blue Basin

The Blue Basin Area is three miles north of the Sheep Rock Visitor Center on State Highway 19. Two trails diverge from the parking area. The Island in Time Trail (0.6 mile) follows a creek into Blue Basin. Many of the fossils exhibited at the Visitor Center were discovered in this colorful natural amphitheater. Along the trail are replicas of fossils which have been found nearby. The Blue Basin Overlook Trail (2 miles) leads past green, buff, and pink exposures to a ridgetop offering a spectacular view into Blue Basin and down the valley. To protect near-surface fossils from trampling, the entire Blue Basin area is closed to off-trail use. Please stay on the two developed trails when visiting here.

### Foree

The Foree Area is seven miles north of the Visitor Center. Shaded picnic tables and drinking water make the Foree Area a good picnic stop. Spring wildflowers are abundant along the creek.



Scenic outcrops of the John Day Formation can be seen on either of two short trails.



Help Protect and Preserve Your National Parks. Be a Part of the Park Watch Program.

- If you observe criminal activity, do not attempt to take action yourself. That is a job for a ranger. Please note the location, description of the people involved, license numbers, and report the incident as soon as possible.
- Grass fires are a danger in dry weather. If you spot a fire, please report it to any park employee. These fires spread rapidly.

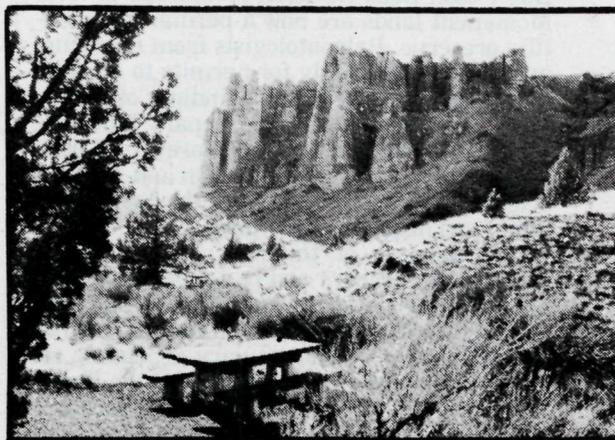
# The Clarno Unit

## Echoes of the Distant Past

Aquatic rhinoceroses and their long-extinct cousins, the titanotheres, crash through a tangled thicket of jungle into a shallow marsh. Overhead, palms, figs, and magnolias drop their fruit into the muddy water. Dawn of the Age of Mammals: Clarno Time.

The oldest fossil-bearing rock in John Day Fossil Beds National Monument is found at the Clarno Unit, a 2,000 acre section of the park located about 20 miles west of the town of Fossil on State Highway 218. Forty million years ago, the environment of the Clarno area was quite different than it is today. The Cascade Range did not exist. Moisture laden clouds from the Pacific brought more than 100 inches of rain each year. A subtropical rain forest covered the landscape. During this time, volcanic ash from numerous eruptions showered this region. Heavy rains turned ash to mud. Massive mudflows covered plants and animals with just the right combination of water and minerals necessary to insure

fossilization. The dry, rugged landscape of today contrasts sharply with the lush scene of Clarno's prehistoric past.



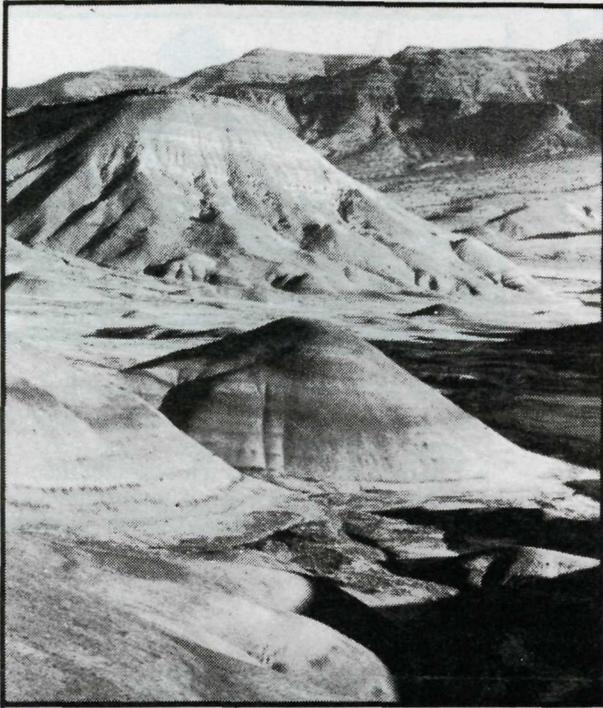
The area is named for Andrew Clarno, an early pioneer who settled on the John Day River in 1867 and operated a ferry crossing there for many years. Ancient mudslides which have been deeply eroded form the principal scenic feature, the Clarno Palisades. The picnic area nearby offers wayside exhibits, picnic tables, drinking water, restrooms and a 1/4-mile trail which follows the base of the palisades. At the end of this path are two nature trails. A small parking pull-out on State Highway 218 also serves this trailhead. A printed trail guide directs visitors to points of interest along the Trail of the Fossils: Actual fossil specimens naturally occurring in large boulders can be examined here. The Clarno Arch Trail climbs 150 feet to a rock arch in the palisades. Near the top of the trail, an interpretive sign identifies petrified logs. These 1/4-mile trails can be walked in about 30 minutes.

# The Painted Hills Unit

## Quick Change Artist

A small but turbulent rain squall blots out the sun. You find yourself in a cold, driving downpour. Ten minutes ago you were standing in a 110 degree furnace. Veteran visitors always look forward to returning to the Painted Hills. It never looks the same way twice.

The Painted Hills Unit of John Day Fossil Beds National Monument is 10 miles northwest of Mitchell (three miles west on U.S. 26, then six miles north of U.S. 26 on a well-marked County road). The unit contains ap-



proximately 3,000 acres. The dominant scenic feature of the area is a series of smoothly sculptured hills and ridges startlingly colored in deep red, green, black and buff. Long colored striations run laterally from hill to hill. The multilayered Columbia River Basalt flows dominate the skyline to the east of the unit. These are the remains of tremendous flows of lava which covered much of Oregon, Washington and Idaho.

The Painted Hills picnic area adjoins a small information station near the park entrance. Facilities include picnic tables, drinking water, restrooms, and informational displays. This area is handicap accessible.

Wayside exhibits may be seen at the Painted Hills Overlook. A short, well-maintained trail leads from the overlook to a scenic viewpoint. A small parking area at the turnout leading to the overlook is the starting point of the Carroll Rim Trail. This 3.4-mile trail leads to the top of Carroll Rim and offers a spectacular view of the Painted Hills and nearby Sutton Mountain. Walking time is about 1½ hours.

There is more to see beyond the overlook turnout, but visitors in large motorhomes or pulling large trailers may have problems getting turned around beyond this point, especially in wet weather. If in doubt, consult with a ranger or park at the overlook and continue on foot. A right-hand turn at the next junction leads to the Painted Cove Trail. A trail guide is available at the trail head. This easy ¼ mile walk offers a close-up view of the clay and cinder hills of the John Day Formation, and leads into the heart of the brilliantly colored hills of Painted Cove. The road to Painted Cove dead-ends on private land. A man-made lake at the end of the unit is a favorite spot with bird watchers. Please keep on the road-

way and respect private property.

Although petrified wood and mammal fossils are found within the boundaries, the principal fossil resource of the Painted Hills Unit is the Bridge Creek Flora. Thirty million years ago, leaves from a warm-temperate hardwood forest fell into shallow pothole lakes in this area. Ash from volcanic eruptions of the early Cascades buried the leaves. Time and the weight of overlying sediments transformed the ash deposits into beds of shale.

The area where these shales occur in the Painted Hills Unit is not completely developed for visitor access. Until a trail is developed and exhibits completed to provide for visitor access in a manner that does not damage the fragile resource, please contact a ranger for a guided tour of this site. Digging or collecting in the National Monument is not permitted.

## Superintendent's Corner

Welcome to John Day Fossil Beds National Monument. This new unit of the National Park System was established by Congress in 1975 to protect, preserve, and interpret the paleontological resources of the upper John Day Basin. Our work here toward that end has only begun. Even so, I think you'll find much to experience and enjoy in this scenic, colorful, and largely undiscovered corner of Oregon.

The John Day Fossil Beds are world renowned--and world class. During the past twelve years we've come a long way in our understanding of the nature and value of the very special lands we manage. The development of trails, exhibits, and brochures is work most visible to visitors. But much more goes on, and must go on, below the surface if these unique components of our American heritage are to yield their full value. Without careful protection, renewed research, and professional museum curation, these resources become little more than curios. We're determined to guard against such a loss, but we can't hope to succeed without your help.

We need your help to preserve these treasures for all Americans, present and future. Toward that end, we have initiated a Park Watch program encouraging a partnership between citizens and park management. You'll find more information on this program elsewhere in the paper. Above all, as we celebrate the 200th anniversary of the Constitution, we urge you to TAKE PRIDE IN AMERICA. The documents that form the cornerstone of our nation invest us with the ownership of and responsibility for these riches. Remember: THIS LAND IS YOUR LAND.

I wish to extend my personal greeting to you and welcome you to our young and developing park. I hope you will enjoy your stay enough to want to return and visit us again. John Day Fossil Beds has the potential to become one of the most interesting and significant units of the National Park System. With your help and your continued interest we won't just get older--we'll get better.

Benjamin F. Ladd,  
Superintendent

## Safety First

Weather in eastern Oregon can be extreme. Temperatures range from below zero to above 100 degrees Fahrenheit. Plan your hikes accordingly. Hiking in hot weather can lead to heat exhaustion or heat stroke; be sure to carry water and wear a hat. In the winter, wear several layers of clothing that can be peeled off as the day warms up. Late spring and early fall weather is the most pleasant for hiking. Some trails are steep and rocky, so wear sturdy shoes.

Although rattlesnakes are found in the area, they are rarely seen on the trails. The Pacific rattlesnake is not aggressive; if you see one, just give it a wide berth. Please report sightings to a ranger. Problem snakes are relocated away from trail area.

### National Park Service regulations:

1. The removal, disturbance, or possession of natural features, such as fossils, rocks, or plants is prohibited. Leave them for all to enjoy.

2. Hiking at the Blue Basin Area, Sheep Rock Unit, is limited to the developed trails. Hiking on the clay hills at the Painted Hills Unit is prohibited. Off-trail use in these fragile areas is dangerous and can mar features and destroy fossil specimens.

3. Hunting and/or the possession of loaded firearms within the park is prohibited. The Monument is a favorite hiking area for non-hunting vacationers during hunting seasons. Please keep their safety in mind, especially if you hunt lands near the park boundary.

## For Your Information

**CAMPING:** Although camping is not available in the park, there are several campgrounds in the area. Ask at the Visitor Center, Sheep Rock Unit, or at the contact station, Painted Hills Unit, for a campground leaflet. Camping information is also posted at all three units.

**PICNICKING:** At the Sheep Rock Unit, picnic tables and drinking water are available at the Visitor Center and the Foree Area. The Painted Hills Unit and the Clarno Unit also have picnic areas with water available.

**GROCERIES, GAS AND LODGING:** These services can be found at John Day, Mt. Vernon, Mitchell and Fossil. Gas and groceries are also available at Dayville, Kimberly, Service Creek and Spray.

**INFORMATION:** The Sheep Rock Visitor Center, Sheep Rock Unit, is the park's main exhibit area. The Visitor Center is located two miles north of U.S. Highway 26 on State Highway 19. It is open daily 8:30 a.m. to 6 p.m. from mid-March through October. At the Painted Hills Unit, visit the contact station at the picnic area. At the Clarno Unit, current information is posted on the bulletin board at the picnic area. Visit Park Headquarters at 420 West Main Street, John Day, for information and exhibit viewing. Headquarters is open Monday through Friday, 8 a.m. to 4:30 p.m.

**HIKING:** At the Sheep Rock Unit, hike the trails through the fossil beds at Blue Basin. The Painted Hills and Clarno Units each have several hiking trails. Check the park brochure, available at all three units, for more information.

# Questions?

## Q. Who was John Day?

A. The man whose name is affixed to nearly everything from a dam to the fossil beds was just passing through. Born in Virginia, John Day didn't come to the Northwest until he was 40 years old. In 1811 he joined the Wilson Price Hunt expedition to Astoria, where a fur trading post was being established. Day and another man, Ramsey Crooks, became separated from the main group. The two men were following the Columbia River when Indians robbed them of all their belongings. The attack occurred near the mouth of a river, which then became known as John Day's River. The town, dam, and a rock formation all took the name of the river. The Monument was named for this fossil-bearing rock formation, the John Day Formation.

## Q. How were the fossils preserved?

A. To become fossils, bones or plant materials must be protected for a long time from scavengers, decomposition and weathering. This is generally accomplished through quick burial. Most fossils in the John Day Basin were buried in volcanic ash. Fine-grained and sterile, volcanic ash is an excellent packing material and preservative. These buried remains have become mineralized. Ground water charged with minerals gradually filled the cavities in the buried bone and wood, stabilizing them. But even after millions of years, some of the original plant and animal materials still remain.

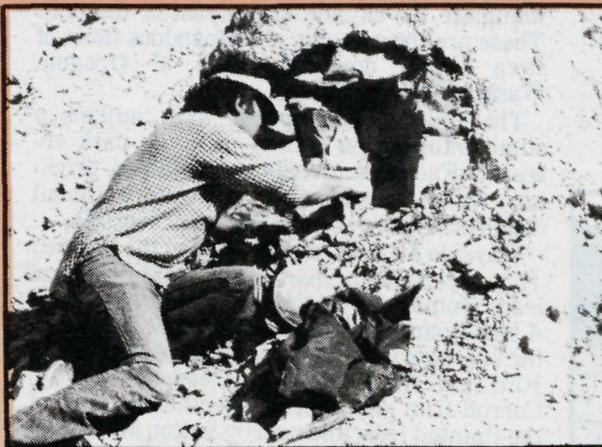
## Q. What should we do if we find a fossil in the park?

A. Don't pick it up! Fossils are extremely brittle. If you pick up an imbedded bone or tooth, there is a chance that it will break. Proper removal by trained technicians will ensure its survival. Also, scientist need to know the exact location of a fossil find, best determined if it is still in place when examined. So, if you find a fossil, don't pick it up. Do mark its location with a stack of two or three rocks and report it at the Visitor Center. Thanks for helping us care for this unique record of Oregon's past.

## Q. Is the Park Service still finding fossils?

A. Yes. Fossils are scattered throughout the green and buff rock of the John Day Forma-

tion. Winter storms wash away the soft surface clays, uncovering new specimens. In the summer, trained field crews prospect for new discoveries. Recent finds include a beaver skull and a dog skeleton, both exhibited at park headquarters in John Day.



## Q. Can we watch technicians work with the fossils?

A. You are encouraged to watch technicians prepare fossils for study and display in the Monument's Fossil Laboratory. The fossil in its encasing rock arrives at the lab wrapped in a plaster jacket. The jacket, which protected the fossil during transport, is partially removed. Tiny jackhammers and sandblasters are used to remove the rock surrounding the fossil material. The laboratory, located behind the Sheep Rock Visitor Center at the Sheep Rock Unit, is open daily.

## Q. What are the horses used for?

A. The National Park Service does not allow motorized vehicles in backcountry sections of the park. Horses and other pack animals provide rangers and maintenance crews a means of transportation into these areas. Typical uses at this monument include boundary patrol, fence repair and transport of materials for trail construction and maintenance.

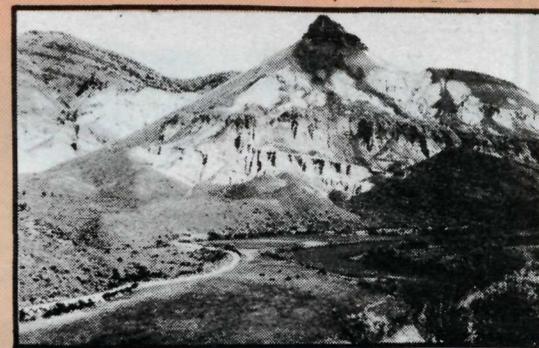
## Q. What is the weather like?

A. Summers are hot and dry with temperatures climbing above 100 degrees for several weeks. Winters are mild and relatively wet with snow at higher elevations. Rainy

seasons occur in the spring and late fall, with an average annual rainfall of 12 to 14 inches.

## Q. Can you float the river?

A. The John Day River, a State Scenic Waterway along its lower reach, can usually be floated from March through June when the river flow is above 1,500 cfs. To check the river flow before attempting to float, call (503) 249-0666 for a recorded message. The most popular section is from Service Creek to Cottonwood Bridge on State Highway 206. Road access is limited to three places in between: Twickenham, Burnt Ranch, and Clarno.



## Q. Why is it called Sheep Rock?

A. Lewis A. McArthur reports in his book, *Oregon Geographic Names*, "--this rock was not named for any fancied resemblance to a ram's head, but because of the prevalence of mountain (Bighorn) sheep nearby in pioneer days."

## Managing the Natural Resources

John Day Fossil Beds National Monument is a relatively new park, established in 1975. Since then, numerous studies and projects have been undertaken to preserve and improve the park's non-paleontological natural resources. Past projects have included revegetation studies, plant inventories, and wildlife surveys. Current projects include streambank stabilization, noxious (exotic) plant removal, and boundary fence construction.

Some sections of stream banks and riverbanks at the Sheep Rock and Painted Hills Units have been eroding rapidly. This has caused loss of topsoil, reduction of critical streamside waterlife habitat, and lowering of the water table due to loss of water storage capability. Since the first step in improving the Monument's riparian zones is to slow down erosion, vulnerable sections of stream banks have been lined with large rocks. This will be followed with the planting of native grasses, reeds and trees.

Another ongoing project is the effort to reduce noxious (exotic) plants and revegetate with native grasses. Because of the adaptability of plants such as Russian knapweed, a combination of methods is required to eliminate them. Results are compared to determine the most effective treatment program. Treated areas are being planted in bluebunch wheatgrass and basin wildrye. These two native species once dominated this area.

The fencing of park boundaries is near completion. This fence will eliminate uncontrolled grazing by livestock drifting in from neighboring land and will clearly delineate park boundaries. The Painted Hills Unit, which was fenced a number of years ago, has shown excellent recovery of native plant species and subsequent increase in wildlife.

## Keeping It Green and Clean

The National Park Service wants its facilities to be in top shape for your visit. The Monument's maintenance crew makes it happen. Each morning, you'll find them cleaning the Sheep Rock Visitor Center and working on necessary repairs. They water and mow the lawns, maintain flower beds, and prune trees. Each spring the crew clears the Monument's trails and readies them for the hiking season.

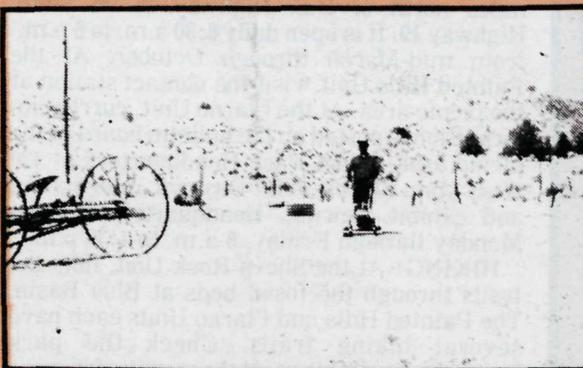
In addition to routine maintenance, the crew is busy with a number of special projects. These include rehabilitation of historic structures, trail construction, and carpentry work for new exhibits.

Old age is catching up with historic structures at the Cant Ranch. In the past few years maintenance personnel have rehabilitated the log cabin and bunkhouse, which now house exhibits, and the ranch workshop which is now used as the park maintenance shop. This year the historic corrals near the barn will be rebuilt.

Steep slopes and unstable soils make trail construction in the Monument a challenge. Trails are stabilized by spreading a gravel base. Horses and mules are used to haul

gravel because motor vehicles are too hard on the fragile backcountry.

As the park's fossil collection and information base grow, so do its exhibits. Many of the exhibit cases now in use were custom built right here at the park. This year an exhibit table for the Painted Hills Information Station will be constructed.



Welcome! Enjoy your visit to John Day Fossil Beds National Monument. We keep it green and clean for YOU.