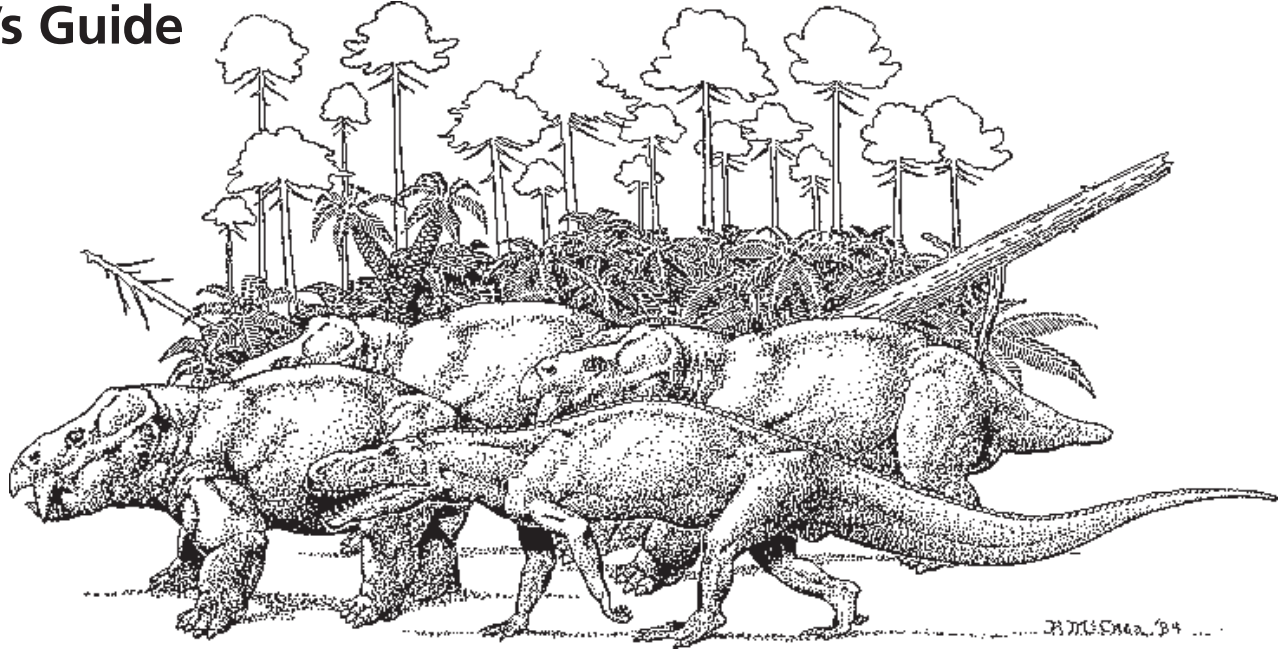




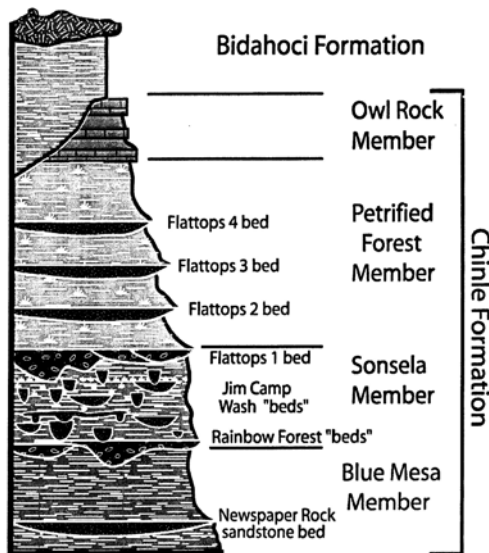
## A Student's Guide



Petrified Forest National Park is a globally significant exposure of fossils from the Triassic Period more than 200 million years ago. The paleontological and stratigraphic information exposed on park land is an invaluable source for the study of these ancient organisms and their environment.

Petrified Forest also contains a functioning remnant of an increasingly rare shortgrass prairie ecosystem, and archeological sites representing a continuum of human use and occupation from 10,000 years ago to the present.

### Geological Formations



#### The Chinle Formation:

Sedimentary rocks laid down during the Mid to Late Triassic Period (200 to 230 million years ago) make up the majority of the landforms in the park. The Chinle consists mostly of

bentonite clay soils, mudstones, siltstones, and sandstones. The Chinle Formation is subdivided into four members (main layers, oldest to youngest): Blue Mesa, Sonsela, Petrified Forest, and Owl Rock Members. All divisions are based on relative age and soil composition.

#### The Bidahochi Formation:

A section of the Bidahochi Formation outcrops at the north end of the park. Composition consists of basaltic lava and sedimentary rock (mudstones and siltstones) which were laid down about 3-6 million years ago. Lava flows erupted into and onto sedimentary rock in a freshwater lake environment to make up the Bidahochi

Formation. This formation sits directly on top of the Chinle Formation in the park. The Chinle/Bidahochi interface represents a substantial gap in the geologic record called an *unconformity*. Erosion, uplift, or other interruptions of deposition caused this geologic gap. At Petrified Forest National Park the 225 million year old Chinle Formation is capped by the 3-6 million year old Bidahochi layers. This gap represents about 200 million years of missing geologic history.

#### Recent Deposits (Quaternary):

Surface deposits of windblown sand and alluvium (deposited by flowing water) create extensive layers on the mesas, valleys and plateaus of the park. These soil

deposits support the shortgrass prairie that covers much of the area. Scattered parts in the park also contain sand dune deposits. These formations range in age from 500,000 years old to the present.



#### Common Rock Types

**Sedimentary Rocks:** Mudstones, siltstones, sandstones, shales, conglomerates

**Igneous Rock:** Basalt

#### Common Mineral Types

**Quartz** (silicon dioxide) - numerous varieties and most common mineral  
**Iron ores** (ferrous and ferric forms) - limonite and hematite predominate  
**Selenite** (hydrated calcium sulfate) - crystalline gypsum  
**Calcite** (calcium carbonate) - several crystalline and massive varieties

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## Petrified Wood Composition & Coloration

Most fossilization processes, including petrification, used silicon dioxide. In some rare cases calcified and carbonized fossils have been found. The brilliant colors in the

logs come mainly from three minerals. Pure quartz = white. Carbonized organic compounds and residues = black, tan and brown. Iron ores (hematite and goethite in ferric and ferrous states = most other colors.

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## Park Issues and Concerns



### Resource Theft:

Everything in a national park is referred to as resources, including the plants, animals, geological formations, archaeological artifacts, even the air. Resource theft is a continuing problem for the park. Each year several tons of petrified wood is stolen. Many areas have been stripped clean of small, easily removed pieces. Visitors also steal other minerals and cultural artifacts (pottery shards, arrowheads, e.g.) from park sites. This cheats future visitors of the chance to experience

their heritage.

Park staff work to slow the theft of park resources through strict enforcement of park regulations via fines or arrest. Staff also educate the visiting public about the significance of the environment and the irreplaceable information it contains. Park publications, displays and exhibits are designed to increase visitor awareness of these resources, leading to a stewardship ethic and desire to protect Petrified Forest National Park for these and future generations.

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### Environmental:

A functioning shortgrass prairie environment with spots of high desert covers a large portion of the park. Over one thousand species of plants and a variety of associated wildlife coexist within park boundaries. Residents include American pronghorn, Gunnison's prairie dog, bobcat, prairie rattlesnake, prairie falcon, and golden eagle.



The park acts as a sanctuary for many reptile and amphibian species, including the milk snake. There are some species of lichen, which have been found only inside

the park. Although most of the flora and fauna are not listed as endangered or threatened at this time, the entire shortgrass prairie ecosystem is steadily disappearing from the American landscape.

The rapid spread of nonnative species like tamarisk and Russian thistle is becoming a significant problem in the park. Without natural enemies, they often out-compete and displace native species. Most invasive species have been introduced by human activity.

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## Current Research



Surveys and research are ongoing. As studies are completed the information is made available to the public.

- Recent trace fossil finds include bee burrows in some petrified logs, termite nests, and crayfish burrows.
- An aetosaur, *Stagonolepis welllesi*, was discovered and excavated in 2002. Paleontological surveys continue throughout the park with possible excavations in the future.
- Archeological site surveys and documentation are ongoing with site identification and monitoring as the

current focus. No excavations are occurring at this time.

- Petrified wood theft studies continue to document loss and research prevention and protection methods. Current research tests the success of educational and psychological deterrent techniques.
- Research on botany, small mammals and reptile/amphibian surveys has continued. Results may influence future resource management practices.
- Park staff, in cooperation with other agencies, monitors air quality in the region.

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## Petrified Forest National Park Resource Management Plan

This plan details how park resources will be managed. By identifying, defining, and programming, the resources are monitored, inventoried, and researched. In addition, strategies for mitigation of theft and damage of park resources are coordinated with enforcement activities.

Primary tasks of the plan are to:

- Preserve park resources.
- Provide for public enjoyment and visitor experiences.

These tasks should be met via:

- Improving baseline resource data through research to help guide future management.
- Addressing resource theft issues and improving protection of resources.
- Addressing potential impacts brought about by development inside and outside the park.
- Monitoring and protecting air quality.
- Improving integration of new information into interpretive programs for the public.

