



The National Park Service

Natural Resource Information Division
Fact Sheet Series

Fact Sheet 98-04
October 1998

PALEONTOLOGICAL RESOURCES IN NATIONAL PARK SYSTEM UNITS

By Vincent L. Santucci

The principal mission of the National Park Service is the preservation and protection of its natural and historic resources in a manner and by means that will leave them unimpaired for future generations. The preservation of fossils and the natural geologic processes are included in this mission.

Indeed, the diversity of the fossil record in the National Park System¹ is great. Petrified leaves, wood, pollen, shells, bones, teeth, eggshells, tracks, borrows, and coprolites have been found in more than 120 National Park System units. Collectively, these fossils provide a comprehensive history of life in the areas that are now national parks from the Precambrian stromatolites in Glacier National Park to mammal bones from the Ice Age throughout the Alaskan parks.

Threats to Paleontological Resources

The ever-present natural processes such as physical weathering, chemical weathering, and erosion threaten the long-term persistence of fossils in exposed rock

sites. Rain, surface water runoff, freeze-thaw cycles, and other factors apply forces that lead to the deterioration and destruction of exposed fossils. At the same time, these forces uncover previously buried fossils.

Anthropogenic activities also pose a challenge to the management and protection of paleontological resources. Unrestricted hiking can lead to trampling of fossils and may increase rates of erosion in fossiliferous areas. Fossils in national parks have inadvertently been damaged during recreation but have also been intentionally or thoughtlessly vandalized.

An escalating commercial market for fossils coincides with increased illegal fossil collecting on federal lands, including national parks. The regulations that guide the National Park Service require that natural and cultural objects may be collected only with specific permits. The collection of fossils without a permit in national parks is illegal, and the unauthorized possession of paleontological resources is subject to fines and other penalties.

¹National parks and other entities of the National Park Service such as national monuments, national rivers, wild and scenic riverways, national scenic trails, and others are called *units* and collectively constitute the *National Park System*.

Fossils

Fossils are evidence of past life preserved in a geological context. They can be physical components of a past biological organism such as leaves, teeth, or some indication of biological activity such as footprints or burrows. Each fossil provides scientific clues and information about past lifeforms, i.e., ancient plants and animals and their environments. Most fossil species occur within a limited timespan of the geologic record, called the fossil's *range zone*. Therefore, certain fossils can serve as indicators of specific periods of geologic time. Such specimens are known as *index fossils*. The best index fossils include swimming or floating organisms that evolved rapidly and were distributed widely such as graptolites and ammonites. Government agencies such as the National Park Service manage and protect fossils, commonly referred to as *paleontological resources*.

Management of Fossils in the National Park System

Fossils are non-renewable resources that require specific management. Management of paleontological resources on federal lands has gained considerable attention during the past decade and is now recognized as an independent discipline by the scientific community and land management agencies.

The management policies of the National Park Service stipulate that *Management actions will be taken to prevent illegal col-*

lecting [of fossil resources] and may be taken to prevent damage from natural processes such as erosion. Protection may include construction of shelters over specimens for interpretation in situ, stabilization of soils in the field, or collection, preparation, and placement of specimens in museum collections. The localities and geologic setting of specimens will be adequately documented when specimens are collected (NPS Management Policies 4:19). Protection may also include, where necessary, the salvage collection of threatened specimens that are scientifically significant.

Paleontology—the science that deals with the life of past geological periods as known from fossil remains—is an established and recognized discipline. In their search for clues about past life-forms, paleontologists examine fossils and the sediment in which they are preserved. In fact, paleontologists have become highly specialized and employ a wide range of scientific methodologies to collect data.

Resource managers of the National Park Service receive additional guidance for directing park paleontology programs from the Natural Resource Management Guidelines (NPS-77). These guidelines provide management objectives for (1) the identification of paleontological resources in National Park System units, (2) the evaluation of significance of the identified resources, (3) the adequate protection of the significant resources to preclude degradation of their historical and scientific values, and (4) the use of research results to support management objectives.

The NPS guidelines also address specific management that may be initiated in paleontological sites in parks such as:

Monitoring: Periodic re-examination of a known fossil locality to assess stability and need of management.

Cyclic Prospecting: In high erosion areas, periodic surveys should be made to check for the appearance of new fossil material at the surface.

Stabilization-Reburial: If excavation of fossil material is not recommended or feasible at a particular time, reburial may be an interim measure. Reburial can assist with slowing erosion and the destruction of fossil material. A fossil can be stabilized with a wide range of paleontological techniques and methodologies.

Shelter: Sites or specimens to be exhibited in situ usually require protective shelters. However, such structures may invite theft or vandalism and may present difficulties in preventing degradation.

Excavation: The removal and collection of a fossil from a rock unit may often be the appropriate management. Depending on the scientific significance, immediate threats or other variables, the careful collection of a fossil specimen may be warranted. Appropriate collecting permits must be secured for all collections.

Closure: A fossil locality may be better managed by the closure of the local area. Closed areas may be completely withdrawn from public use or restricted to ranger-led activities or research.

Patrols: Significant fossil sites require periodic checks by park staff or patrol rangers. Patrols are important for preventing or reducing theft and vandalism.

Management of paleontological resources should be distinguished from the management of archeological resources.



Paleontological resources are usually recognized as natural resources and should be managed accordingly.

Most of what is to be learned about the history of life remains buried in earth sediments. Through appropriate management in parks, partnerships, and the efforts of park paleontologists, resource managers, and interpreters, part of the story of life can be revealed and interpreted through the discovery of fossils in national parks.

For further information contact
Vincent L. Santucci, Paleontologist
National Park Service
Geologic Resources Division
P. O. Box 592
Kemmerer, Wyoming 83101
e-mail: vincent_santucci@nps.gov