A Paleoecological Approach

To Managing Paleontological Resources

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The significant values and information associated with a fossil are often not fully understood until long after the remains have been collected from the field. Appropriate field collecting techniques combined with detailed field data acquisition are essential in the science of paleontology. Museums around the world contain fossils that possess inadequate data. Past collecting habits have generated cabinets full of fossils that lack important scientific information. Attempts to reconstruct missing information can result in compromising the scientific integrity of the data. A holisitic and multidisciplinary approach to managing paleontological resources provides the greatest opportunities to interpret the ancient landscape. Paleontologists interested in conducting research within National Park Service areas should employ holistic strategies as part of their field collection of fossils and the associated geological and paleoecological data.

As new methods and technologies reshape the paleontologist's approach to excavating fossilized remains, the ability to assimilate new levels of information increases. In some cases, "conservation paleontology" or preserving fossils *in situ* is the preferred resource management decision. This strategy is based upon the assumption that future technology may be able to extract greater amounts of information from the paleontological resources.

A paleoecological approach to managing non-renewable paleontological resources is a holistic strategy for research and field collection. The study of paleoecology, like modern ecology, considers the relationships between organisms and the environment. Thus ecosystems and paleoecosystems are defined by both biological and physical components. In our efforts to define an ecosystem, or even a paleoecosystem, we attempt to define the natural boundaries. Researchers and resource managers are cognizant that ecological boundaries do not generally coincide with adminstrative boundaries (i.e., ranges of bison, grizzlies, or wolves existing within and around Yellowstone).

Ecosystems are dynamic entities and evolve over time. The interrelationships between organisms and the changing environment will be continually redefined. A paleoecological perspective incorporates a temporal component to understanding ecosystems. The paleoecological perspective provides an opportunity to assess the factors related to temporal changes such as climatic trends or extinction events.

There is some value in viewing ecosystems from a dual-uniformitarian perspective. This view recognizes that the "present is the key to the past" and that the "past is the key to the future." Our ability to best understand our universe, from the limited slice in time we occupy, is enhanced by any knowledge gained from the past.

A multidisciplinary approach to understanding past ecosystems is the recommended approach to managing paleontological resources. Research collecting should look beyond the fossilized floral and faunal specimens. All paleontological resource collecting should require that researchers obtain any associated geologic or paleoecologic data. This associated information can enable greater levels of interpretation of ancient sedimentary environments, past climates, historical biogeography of paleospecies and other information.

Just as modern ecosystems don't end at park boundaries, likewise, paleoecosystems extend beyond these same geographic boundaries. Fossil Butte preserves approximately 8,000 acres of ancient Fossil Lake. Within the park boundaries are important exposures of the deep water portion of the fossiliferous Green River Formation. Fossil rich deposits representing near shore and shallow water segments of the lake, which preserve a different assemblage of organisms, are not within the monument. Since the fossil record does not end at the park boundary, research should consider the resources outside of the park.

In 1994, The Morrison Formation Extinct Ecosystem Project, was initiated as a multidisciplinary endeavor designed to determine the nature, distribution, and evolution of ancient ecosystems that existed in the Western Interior of the United States during the Late Jurassic. A team of specialists were assembled to gain a more complete picture of the Morrison ecosystem. Isotopic dating, regional tectonics, and trace fossil analysis were some of the lines of evidence used to interpret the ancient climate and changes in the paleohydrology.

The value of a multidisciplinary approach, one that goes beyond park boundaries, provides greater opportunities for interpreting ancient landscapes to the public. Part of the responsibility within the National Park Service is to provide the highest level of scientific understanding to the park visitor. Presenting a broad perspective of the ancient setting can often be a very effective means of interpreting paleontological resources to the park visitor. ⌟

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