

BIODIVERSITY THROUGH TIME

Typically we do not consider fossils as being relevant for assessing the conditions of present-day ecosystems in the National Park System. However, researchers often lament that the lack of long-term data is a critical gap in their knowledge, and resource managers dream of long-term records upon which to base their resource management decisions. Willis et al. (2005) points out that long-term data is available but is not filtering through to people assessing biodiversity. The article states that “contrary to popular belief, it is possible to obtain high-resolution temporal and taxonomic analyses that reveal annual variations in communities over hundreds to thousands of years.” The source is paleoecology.

Paleoecological research includes the use of fossil packrat middens and fossil pollen. Paleoecological data from packrat middens and other natural archives have been useful for defining baseline conditions of vegetation communities, determining histories and rates of species range expansions and contractions, and discriminating between natural and cultural causes of environmental change (Swetnam et al. 1999).

Basing a decision on a 50-year record, for instance, may be acceptable for some herbaceous plants and animals. However, the average generation time of many organisms, such as trees, is greater than this. Hence, the use of longer-term data is often necessary for managing present-day ecosystems. Paleoecology may provide the very information that resource managers need (e.g., time-series data, data on abundance and how it varies, and long-term distribution data). Willis et al. (2005) argues that

managers should routinely incorporate long-term records into planning and management frameworks to provide a direct measure of ecosystem changes through time.

References

- Swetnam, T. W., C. D. Allen, and J. L. Betancourt. 1999. Applied historical ecology: using the past to manage for the future. *Ecological Applications* 9(4):1189–1206.
- Willis, K. J., L. Gillson, T. M. Brncic, and B. L. Figueroa-Rangel. 2005. Providing baselines for biodiversity measurement. *Trends in Ecology and Evolution* 20(3):107–108.