

# Cultural Resources and the U.S. Geological Survey

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**T**he U.S. Geological Survey (USGS) is not normally associated with cultural resource management (CRM) within the Department of the Interior. USGS is a research bureau. It does not regulate or manage federal lands and rarely initiates “undertakings” that disrupt land surfaces and affect historic or archeological sites. Although USGS plays a limited role in the federal CRM program, it is responsive to federal and state laws on historic preservation and complies with the CRM and permitting programs of the federal agencies with which it works. There are many other ways, however, in which the USGS contributes to cultural, historic, and archeological studies.

The USGS has a longstanding interest in and appreciation of the history, prehistory, and ethnology of the United States. The post-Civil War mapping and assessment of the American West by geographical and geological surveys led by Ferdinand Hayden, Clarence King, John Powell, and George Wheeler led to the formation of the USGS in 1879. These predecessor surveys collected ethnographic, as well as geologic records. The Anasazi ruins at Mesa Verde and Chaco Canyon, for example, were brought to public attention by Hayden’s and Wheeler’s surveys, largely through the artwork and photography of William Henry Jackson. The Bureau of Ethnology established in 1879 within the Smithsonian Institution received the ethnological collections from Powell’s survey and he devoted much of his life to anthropology.<sup>1</sup> A wealth of information on Native American culture was gathered and preserved at that time as the direct result of the dedication of Powell and his colleagues.

Apart from this late-19th-century awareness, USGS has gone on to help provide an earth science context to historical, ethnographic, and archeological studies. Until 1996 when the National Biological Service was incorporated within the USGS as a new program division, the

agency emphasized mapping and studies of geology and water resources. These main topic areas—land and water as portrayed on detailed maps—form frameworks for organizing modern cultural resource studies.

## *Spatial Organization*

Human culture is not static, but it is difficult to study language, myth, or trade systems without a comparative framework. For culture history, archeology, and cultural geography, maps form a clear and concise aid for describing patterned group behavior on scales from village to region. Archeologists, historians, and CRM programs throughout the country use up-to-date USGS maps for plotting sites. The USGS mapping program, combining the cadastral land survey system and a Universal Transverse Mercator (UTM) grid, has linked the U.S. by detailed topographic, geologic, and geographic maps. The history of mapping in the USGS over the past 119 years is itself a cultural resource. Historic maps prepared by the USGS trace the development of Euro-American culture in the United States and its interactions (both positive and negative) with Native American, as well as former colonial French and Spanish, land use systems.

Modern advances in mapping, especially remote sensing, mark the course for the future study of human geography, past and present. When the first civilian remotely sensed imagery became available in 1972 with the launch of ERST-1 (Earth Resource Technology Satellite), USGS managed the effort at its EROS Data Center in Sioux Falls, SD. Satellite imagery, when first available, seemed to provide only the most general impression of landscape analysis, due to its large scale and poor definition. After 25 years of development and the end of the cold war, remotely sensed images are now highly detailed and give definition and identification of soil types, vegetation, and landforms. These attributes help define present and past settlement systems and give clues for the location of prehistoric archeological sites. Computers have brought

## John Wesley Powell

John Wesley Powell held a key role in the history of the USGS and Interior because of his broad view of scientific research and its value for more rational decisions on public land use. He and his team mapped and assessed lands



Photo by J. K. Hillers, 1872.  
U.S. Geological Survey files.

and resources in the Southwest during the early 1870s, using Interior funds supplied to the Smithsonian Institution, until they were transferred to Interior in 1874. The Powell Survey was discontinued by the funding legislation that established the USGS in 1879.

Powell's principal scientific interest passed from geology to anthropology during this period. He was fascinated by Native American culture, as well as by the ruins and artifacts he encountered. During months spent among the tribes

of the Southwest, Powell attempted to catalog vocabularies and dialects. To allow him to continue these studies, the Secretary of the Smithsonian supported a section of Interior's 1879 appropriations to establish a Bureau of Ethnology (led by Powell) in the Smithsonian's National Museum, provided that Powell's ethnological collections came to the museum as well. Powell became the second director of the USGS in 1881, and merged some of the staff of the Bureau into the USGS. When he resigned as USGS Director in 1894, he continued as Chief of the Bureau until his death in 1902.

about major changes in mapping at USGS as they have to most other parts of society. The ability to store data and print large files on command now makes it possible to create digital overlays on base maps of specific data sets such as roads, rivers, vegetation, soils, and archeological sites. These data, combined as a geographic information system (GIS), lead to an understanding of man and the land that cultural resource managers could only speculate about a few decades ago. USGS cartographers continue to develop new techniques with private industry and will continue to offer state-of-the-art technologies for cultural, historical, and archeological research.

## Land and Water

Land, water resources, and climate are the backdrop to human settlement. As such they are important variables in understanding cultural development and change through time. So long as researchers rely on material culture within a landscape to help reconstruct the human past, land, water and climate will be critical components for understanding ecosystems. Research into geomorphology, Quaternary geology, surface and groundwater flow, and climate change are major areas of inquiry at the USGS. Apart from 19th-century links to anthropology mentioned above, geomorphological studies, especially those carried out before the formal advent of CRM in the 1970s, have utilized archeological dating to better understand episodic changes in rivers and other environmental systems. The study of earth processes goes hand-in-hand with archeological investigation.

In some ways, archeological geology gained a foundation within the USGS. Former USGS geomorphologist and Harvard professor Kirk Bryan,<sup>2</sup> who trained in the Southwest and at Chaco Canyon, mentored subsequent USGS geomorphologists like Luna Leopold, M. Gordon ("Reds") Wolman, Stanley Schumm, and John T. Hack. Their research involved earth processes in a human time framework, which has been instrumental in building bridges between geologists and archeologists. Their classical studies continue to influence current research directions.

Quaternary geology, processual geomorphology, and climate change have gained importance in the past 25 years. USGS scientists are among those most active in these fields. Outstanding research in support of archeology ranges from palynological reconstructions of climate change using packrat-midden deposits in the Southwest<sup>3</sup> to archeological site and feature identification using geophysical methods.<sup>4</sup> USGS research that relies on archeology includes archeological dating of seismic events in the Wabash River valley of Indiana,<sup>5</sup> determination of sedimentation rates and fluvial events in Piedmont North Carolina,<sup>6</sup> and the fluvial geomorphology of Anasazi sites in southwestern Colorado.<sup>7</sup>

Although archeological and historical research is not a formal part of the USGS mission, it is often an integral part of the earth science research we perform. As societies seek a better understanding of human impact upon the earth, cultural resources will play an increasingly

important role in interpreting past environmental change and understanding future impacts of dynamic earth systems.

### **Flora and Fauna**

In 1996 the National Biological Service was discontinued as a separate bureau of Interior and was transferred to the USGS. This action added important new research skills and direction to the agency. One of its key roles within the USGS is to service the biological research needs of Interior bureaus on virtually all aspects of living resources. At the same time, zooarcheology and archeobotany are growing subdisciplines in both academic and government archeology programs. The biological research potential for floral and faunal studies in connection with federal CRM programs is great and is available for use.

### **Summary**

USGS is not a cultural resource manager. Historic and archeological research is a sidebar to

the USGS mission, and land and resource management is left to other bureaus. USGS, however, is a scientific resource for cultural resource managers throughout the federal government. Maps, biological resources, geology, and water are each aspects of cultural resource research and viable CRM programs. It is sometimes difficult to define a cultural resource role for the USGS because its research is so broad in scope and official USGS publications rarely pertain to history and archeology. Yet, when primary sources of data are used for studying the human past, USGS research is often one of the first resources chosen.

### **Notes**

- 1 M.C. Rabbitt, *Minerals, Lands, and Geology for the Common Defence and General Welfare, Vol. 1, Before 1879* (Washington, DC: Government Printing Office, 1979); M.C. Rabbitt, *Minerals, Lands, and Geology for the Common Defence and General Welfare, Vol. 2, 1879-1904* (Washington, DC: Government Printing Office, 1989).
- 2 K. Bryan, *The Geology of Chaco Canyon, New Mexico, in Relation to the Life and Remains of the Prehistoric Peoples of Pueblo Bonito* (Washington, DC: Smithsonian Miscellaneous Collections, 1954), 122.
- 3 J.L. Betancourt and T.R. Van Devende, "Holocene Vegetation in Chaco Canyon, New Mexico," *Science* 21 (1981): 656-658.
- 4 J.C. Wynn, "Applications of High-Resolution Geophysical Methods to Archeology," in N.P. Lasca and J. Donahue, eds., *Archeological Geology of North America* (Boulder, CO: Geological Society of America Centennial Special Volume 4, 1990), 603-617.
- 5 P.J. Munson, S.F. Obermeier, C.A. Munson, and E.R. Hajic, "Liquefaction Evidence for Holocene and Latest Pleistocene Seismicity in the Southern Halves of Indiana and Illinois: A Preliminary Interpretation," *Seismological Research Letters* 68 (1997):521-53.
- 6 C.E. Larsen and J. Schuldenrein, "Depositional History of an Archeologically Dated Flood Plain, Haw River, North Carolina," in N.P. Lasca and J. Donahue, eds., *Archeological Geology of North America* (Boulder, CO: Geological Society of America Centennial Special Volume 4, 1990), 161-181.
- 7 E.R. Force and W.K. Howell, *Holocene Depositional History and Anasazi Occupation in McElmo Canyon, Southwestern Colorado* (Tucson: Arizona State Museum Archeological Series 188, University of Arizona, 1997).

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## **Web Sites for Interior Agencies and Programs**

Bureau of Indian Affairs	< <a href="http://www.doi.gov/bureau-indian-affairs.html">www.doi.gov/bureau-indian-affairs.html</a> >
Bureau of Land Management	< <a href="http://www.blm.gov">www.blm.gov</a> >
Bureau of Reclamation	< <a href="http://www.usbr.gov/cultural">www.usbr.gov/cultural</a> >
Department of the Interior	< <a href="http://www.doi.gov">www.doi.gov</a> >
Department of the Interior Museum	< <a href="http://www.doi.gov/museum">www.doi.gov/museum</a> >
Fish and Wildlife Service	< <a href="http://www.refuges.fws.gov/NWRSfiles/CulturalResources/CulturalResources.html">www.refuges.fws.gov/NWRSfiles/CulturalResources/CulturalResources.html</a> >
Minerals Management Service	< <a href="http://www.mms.gov">www.mms.gov</a> >
National Park Service— <i>Links to the Past</i>	< <a href="http://www.cr.nps.gov">www.cr.nps.gov</a> >
Office of Surface Mining	< <a href="http://www.osmre.gov/osm.htm">www.osmre.gov/osm.htm</a> >
U.S. Geological Survey	< <a href="http://www.usgs.gov">www.usgs.gov</a> >

Also see the articles in this issue of *CRM* for many relevant web sites.