Chapter 21

Applications of Remote Sensing to the Understanding and Management of Cultural Heritage Sites

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Abstract: Remote Sensing imagery can be used as the baseline dataset in documenting and analyzing the historical and contemporary effects of human activities at cultural heritage sites. An integrated Remote Sensing (RS)/Geographic Information System (GIS) allows cultural resource managers, historians, planners, and engineers to catalogue and assess the organizational and structural patterns of such sites, and determine sustainable tourism and urban development within their regions. A regional dynamics survey can be used for analysis of cultural heritage resources by applying a multiscale remote sensing approach to demonstrate patterns of land use and land cover. This method can be used to create an urban dynamic model that visualizes future consequences of environmental and man-made threats, thereby enabling mitigation and management of these non-renewable resources.

1. UNDERSTANDING CULTURAL HERITAGE RESOURCES

S. A. Drury, a pioneer in remote sensing research, wrote “Humanity, its economy, and all the attendant activities are inseparable from the natural world” (Drury, 1998:16). This statement could not be any truer than when we examine cultural heritage sites. Cultural heritage sites are immovable,
human-made, physical evidence fixed within the landscape that are inseparably connected to the natural environment. Like other forms of cultural heritage, they are the present manifestation of the human past (Sullivan, 2000). Whether these sites comprise one structure or several within a widespread area, they indicate spatial patterns and provide clues to past activities relative to human settlement on earth. Spatial and temporal investigations of these sites provide information about a region’s past and present socio-economic, political, religious, and environmental aspects.

Physical cultural heritage resources are tangible artifacts representing a defined time, place, and culture in and of the built environment. These fragile, irreplaceable archives belong to humankind’s collective identity and reveal its history, artistic mastery, and technological advancement. Thus, interpretation and protection of cultural heritage resources are as critical as conservation of our natural resources. Cultural resource managers and other decision makers who shape our world now realize that culture and heritage provide outstanding value to humankind and our common identity, growth, and sustainability (UNESCO, 2003a).

1.1. Characteristics of Cultural Heritage Conservation and Archaeology

Cultural heritage conservationists and archaeologists use similar reasoning when examining heritage resources. Onsite, archaeologists focus on identifying and understanding the people who lived there, how they lived, how they were sustained, and what became of them, among other issues. Heritage conservationists apply information gathered by archaeologists when deciding how to conserve, present, and manage selected sites for contemporary use. Fundamentally, both archaeologists and heritage conservationists are concerned with the history and interpretation of sites, and understand that their most important task is documentation of these extant tangible cultural resources, which are finite and non-renewable.

Both specialists observe how human interaction with the physical environment may have changed the social and historical contexts of a site and its surrounding area. Each seeks to identify signatures, or imprints, on a site’s features—whether an individual building or an entire cultural landscape—in order to determine societal patterns and meanings across time. Archaeologists and heritage conservationists aim to interpret how heritage sites reflect the relationship between humans and their environments, and to present this knowledge to the general public.

The difference is one of timeline: archaeologists investigate the past to piece together how a site has arrived at its present condition, while heritage conservationists work to conserve and protect the site for posterity. Conservation of cultural heritage resources requires an understanding of the past