

Heritage Resources as Emerging Urban Environments: A Methodology of Affecting Site Management and Policy with Remote Sensing

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Beginning in the late 1970's, archaeologists have been using remotely sensed images to discover evidence of buried cities and other features of past civilizations, including ancient trails or roadways, and irrigation canals. Through this application, heritage resource conservators have begun to understand the value that remote sensing has on management, intervention, planning, and policy of these sites. The focus of The Strategic Plan for the US Integrated Earth Observation System is "on specific and achievable societal benefits" and "builds on existing and evolving scientific and technical plans...intended to improve our understanding, monitoring and prediction of changes to the Earth system (including atmosphere, land, fresh water, ocean, and ecosystems)." This plan fits well within the realm of heritage resource management and conservation, and particularly promotes the use of remote sensing to understand environmental changes and plan for regulation and monitoring of urban growth around heritage sites. Once heritage sites are accessible in the public domain, they become an economic multiplier encouraging and enabling urban development of the surrounding area and region. In this manner heritage sites quickly materialize as urban organisms with their own particular metabolism and ecosystem. This dynamic is visible at the World Heritage Site of Angkor in Cambodia where an influx of tourists and a shift from agriculture to a service-based economy has increased overall population and density, and created sprawling development and congestion in the nearby town of Siem Reap. In turn, this has increased strains on air quality, water supply, energy and food consumption, and waste removal and transportation systems. Many heritage sites in undeveloped areas are emerging urban environments. Exploitation of heritage resources is often more extensive in developing countries, which experience rapid urban growth but have insufficient development regulations in place. To address such situations, UNESCO recently adopted principles of sustainable tourism that seek to devise strategies for long-term conservation of cultural and natural heritage areas, Remote sensing will play a large role in helping regulate land use/land cover change in these areas. Studies have demonstrated that remote sensing can provide two basic types of information on urban areas. The synoptic detection of physical properties, such as reflected radiance, surface temperature and surface texture makes it possible to distinguish urban areas from other types of land cover, and provides quantitative measurements of physical conditions in the urban area. Distinguishing elements in the urban mosaic from other types of land cover provides a systematic means of mapping urban spatial extent and quantifying urban growth and morphology. Quantitative measurements of the physical properties of the urban mosaic provide a way to quantify and monitor urban environmental conditions. Understanding the dynamics of cultural heritage sites as specialized urban environments contributes to more effective management principles and procedures. The environmental issues affecting heritage sites span existing spheres of policy at local, national, and even international scales. The innovations in remote sensing and the wealth of data available will better enable heritage conservators to affect and enforce these policies, and fits well within the goals of the USIEOS.