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## Using remote sensing in selecting and conserving lands for biodiversity

Protected areas are a cornerstone of conservation. They provide places in which populations and species can persist and communities and ecosystems can carry out ecological functions. Such areas help to preserve Earth's biodiversity in the face of growing human populations, intensified land use, landscape fragmentation, and climate change. As the need for larger protected areas and the importance of the surrounding landscape have become more evident and the pace of environmental change has quickened, it has become increasingly difficult to obtain the on-the-ground information needed for conservation planning.

In a paper published with colleagues from The Nature Conservancy in *Remote Sensing of Environment*, we considered how remote sensing can provide information not easily obtained through direct, on-the-ground observations. Drawing from experiences in three areas where The Nature Conservancy works, we asked how remote sensing – chiefly satellite and aerial imagery -- can help to establish priority places for conservation, assess the status of conservation targets, and evaluate the effectiveness of conservation and management practices. In the Connecticut River watershed, remote sensing was used to verify flood regimes at specific sites and separate floodplain forest communities from other riparian community types, providing critical information for identifying conservation areas. At Eglin Air Force Base in Florida, remote sensing has provided information to assess the effectiveness of management strategies to restore fire to the longleaf pine ecosystem, control invasive species, and prioritize annual prescribed burns at multiple scales. And in several forests in eastern U.S., remote sensing is being used to assess forest cover changes across large areas with different forest types and management goals,

supporting the development of strategies for management under a variety of conditions.

These case studies demonstrate how remote sensing can be used in conservation, but they also highlight several issues. The resolution of remote-sensing data must be matched to the relevant scales of biodiversity, threats, and management actions. Remote sensing is by definition remote, so what is detected should be confirmed by on-the-ground observations. Remote sensing can also generate a deluge of data, so it is important to target the analysis carefully. Remote sensing has enormous potential to enhance conservation, but like any tool it must be used judiciously.

### Management Implications

- Remote sensing provides information to managers and conservation practitioners that is otherwise unavailable, particularly over large areas.
- Remote sensing can help to identify and prioritize places for conservation action, assess the status of conservation targets, and evaluate the effectiveness of management practices.
- Although remote sensing is a valuable tool, it is not a panacea for all challenges to conservation monitoring and management. It must be used judiciously.

### Paper citation

Wiens, J., R. Sutter, M. Anderson, J. Blanchard, A. Barnett, N. Aguilar-Amuchastegui, C. Avery, and S. Laine. 2009. Selecting and conserving lands for biodiversity: The role of remote sensing. *Remote Sensing of Environment* 113:1370-1381.