

Managing protected areas as surrounding land use changes

TWO COMPLEMENTARY JOURNAL ARTICLES explore management of protected areas in a world of changing land use. To show ways in which land use in surrounding areas can influence protected areas, the authors draw upon case studies that include the Greater Yellowstone Ecosystem (Yukon, Canada, to western United States), Clakmul Biosphere Reserve (southern Yucatán Peninsula), and Wolong Nature Reserve (Sichuan, China). The first article, Hansen and DeFries (2007), introduces a synthetic framework for predicting the effects of changes in surrounding land use on protected areas. The framework consists of a comprehensive set of ecological mechanisms for assessing the vulnerability of protected areas to land use. These mechanisms are effective size of the ecosystem, flow zones of ecological processes (e.g., natural disturbances), crucial habitats (e.g., seasonal migrations and population “source” areas), and proximity to humans (e.g., exposure to hunting, poaching, exotic species, and disease).

The central thesis of this article and DeFries et al. (2007) is that protected areas are often part of larger ecosystems, for example,

the greater Yellowstone, Everglades, and Serengeti ecosystems. A classic North American example of this thesis showed that the needs of grizzly bears could not be met solely within the borders of Yellowstone National Park (e.g., Craighead 1979). Another tenet of the thesis is that land use change in the unprotected portion of the ecosystem may rescale the ecosystem, leading to changes in ecological functioning and biodiversity within the protected area.

The second article, DeFries et al. (2007), serves as a follow-up to Hansen and DeFries (2007) and proposes scientifically based management alternatives for striking a balance between surrounding land use and protected areas. The authors point out that “the historical view of protected areas as islands isolated from surrounding areas and neighboring communities is superseded by the reality that effective management in and around protected areas must account for human use of natural resources.” Their approach is to identify small loss–big gain opportunities that maintain ecological functioning of the protected area (“big gain”) and result in minimal negative consequences for human land use and well-being (“small loss”). They propose three factors—management objectives, biophysical setting, and socioeconomic setting—and related questions to help identify such management opportunities: Which attributes of biodiversity are of greatest concern? What is the spatial extent of interactions among protected areas and their surroundings? What are the conflicts between biodiversity and land use in and around the protected area? According to the authors, the challenge to developing scientifically based, regional land use management approaches “pertains to both the development community to incorporate ecological principles in land management and the ecological community to consider growing human needs for ecosystem services in management recommendations.”

References

- Craighead, F. 1979. Track of the grizzly. Sierra Club Books, San Francisco, California, USA.
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