

Evaluating ecosystem services

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Environmental conservation efforts have traditionally focused on protecting individual species or natural resources. Scientists are discovering, however, that preserving the benefits that whole ecosystems provide to people is more economically and environmentally valuable. At the Annual Meeting of the Ecological Society of America (ESA), ecologists will explore the application of ecosystem services approaches to conservation.

Ecosystem services are the benefits that humans reap from natural areas where living and non-living things function in concert with each other. These services include a range of human essentials, such as food production, clean water and clean air. For example, grasslands and forests support pollinators, which promote healthy crops, while wetlands filter and purify our water supply.

An example of a managed area that provides many ecosystem services is tiny Lake Wingra, near Madison, Wisconsin. This 1-mile-square, 9-foot-deep lake is used for recreational fishing and swimming and houses one of the most biodiverse plant communities in the area. Amy Kamarainen, a graduate student at the University of Wisconsin-Madison wondered if the historical management decisions at the Lake Wingra watershed have affected the ecosystem services it provides today. She found that urbanization and filling of adjacent wetlands for agriculture and recreation have altered the lake's water quality and purity. Additionally, management decisions have not always been local, but sometimes at the regional and even national level: a national program that aimed to increase food resources in the early 1900s dictated the stocking of many

non-native fish in the lake. Kamarainen believes these far-reaching management decisions have affected the lake's ecosystem services.

"Taking a long-term perspective on ecosystem services highlights tradeoffs among services and points to the level at which management actions will be effective," she says. "It's important to keep these tradeoffs in mind in order to develop realistic management goals."

One such trade-off occurs in a much larger lake system: the Great Lakes. The St. Lawrence Seaway provides an access route to ship goods from the Atlantic Ocean to the central U.S. and Canada, but also increases the likelihood of non-native species invading the lakes by hitching a ride in ships' ballast water. Since the 1959 opening of the Seaway, an estimated 57 plant and animal species have been introduced to the lakes by shipping. John Rothlisberger, a graduate student at the University of Notre Dame, surveyed experts in the fields of ecology, fisheries biology and environmental management to put a price tag on the damage done by these invasive species.

Rothlisberger notes that unlike his survey method, traditional biodiversity studies focusing on high-profile species have limited economic usefulness because they can't be extrapolated to a broad scale. His novel approach shows that in 2006, the lakes sustained hundreds of millions of dollars in estimated losses to commercial and recreational fishing.

"We often wring our hands trying to figure out how to put values on ecosystem services," he says. "We hope policy makers will take notice that there are costs associated with these economic activities that haven't been accounted for previously."

While a graduate student at Stanford University, Rebecca Goldman also wanted to understand the implications of ecosystem service approaches,

but from the perspective of stakeholder donations. She found that in the Western Hemisphere, ecosystem services projects receive on average four times more money from corporations than do their traditional biodiversity counterparts, making them much more economically viable. Further, because ecosystem services programs have a tangible impact on people's lives, they also tend to recruit and integrate more interested parties.

"Ecosystem services projects are far more likely to engage a wider variety of stakeholders, drawing in private, agricultural landowners and engaging funds from sources such as private corporations," says Goldman, who now works at The Nature Conservancy. She believes that this higher funding rate and broader diversity of stakeholders increase the chances that ecosystem service projects will be successful.

Source: Ecological Society of America

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