



ECOSYSTEM SERVICES RESEARCH PROGRAM

RESEARCHERS MAP ECOSYSTEM SERVICES TO PRODUCE NATIONAL ATLAS

Issue:

The nation's ecosystems provide a vast array of services to humans from clean and abundant water to recreational opportunities. The benefits of nature or "ecosystem services" are often taken for granted and not considered in environmental decision-making. In some cases, decisions about one ecosystem service are made in isolation without consideration of impacts on other critical services.

EPA's Ecosystem Services Research Program (ESRP) is seeking to effectively measure and communicate the type, quality, and magnitude of services that humans receive from ecosystems so that their true value is considered in decision-making. An effective tool for visualizing and analyzing multiple ecosystem services is through the use of maps and graphs.

EPA researchers are creating a National Atlas of Ecosystem Services, which will allow the user to interact with a web-based, easy-to-use, mapping application to view and analyze multiple ecosystem services for the contiguous United States.

The challenges facing the Atlas effort fall into three major categories: 1) developing the science necessary to quantify ecosystem services across the United States; 2) creating an effective mapping application that will appeal to a broad collection of users, including decision-makers ranging from the public to national policy-makers and researchers; and 3) developing national data sets (e.g., soils or crop type) that are critical to the calculation of ecosystem services.

The science necessary to quantify ecosystem services draws from a number of disciplines including

landscape ecology, hydrology, zoology, forestry, agronomy, soil science, demography and ecological economics. The Atlas will be a collaborative tool with many types of contributors and users from researchers to government officials. Collaborators currently contributing to the Atlas include the Natural Resources Conservation Service, the United States Geological Survey, the National Geographic Society, NatureServe, and City College of New York.

Scientific Objective:

The overall goal of the Atlas is to employ and develop the best available science to map indicators of ecosystem services production, demand, and drivers for the nation. The categories of ecosystem services to be included in the Atlas are:

- Clean water for drinking

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- Clean water for recreation and aquatic habitat
- Adequate water supply
- Food, fuel and fiber
- Recreation, cultural and aesthetic amenities
- Climate regulation
- Protection from hazardous weather
- Habitat and the maintenance of biodiversity
- Clean air

The Atlas will present the data summarized by 12 digit hydrologic unit codes (HUCs) of which there are about 83,000 in the US. HUCs provide a convenient reporting unit that reflects drainage patterns and allows users to navigate and explore throughout an entire watershed. The application also will allow the user to simultaneously view multiple ecosystem services with the use of graphing tools.

The Atlas will include more detailed information for at least 150 communities across the nation. Within the communities, a suite of metrics, such as availability of green space and heat stress caused by the built

environment, will be explored and related to vulnerable sectors of the community's residents.

Application and Impact:

The Atlas will provide users with a visual method for interpreting the benefits of nature (ecosystem services) and understanding how they can be conserved and enhanced for a sustainable future. The maps will provide users with an ability to assess choices in a spatially explicit context. Where possible, the Atlas will identify the beneficiaries of services who may reside locally, downstream, or in an area remote from the production site of the services.

The data will help guide newly formulated methods for valuation of, and payment for, ecosystem services. The data presented in the Atlas can also help to guide where best to preserve or restore ecosystems. In some cases, this may be the restoration of natural systems or it could also be relevant constructed ecosystems, such as wetlands.

An additional application of the Atlas will be to raise awareness of the importance, magnitude and

fragility of a natural system's ability to provide ecosystem services.

The first version of the Atlas will be released in 2011 with subsequent releases following as more data becomes available.

REFERENCES

Millennium Ecosystem Assessment (MEA). 2005. Ecosystems and Human Well-Being: Wetlands and Water Synthesis. World Resources Institute, Washington, DC. 68p.
<http://www.maweb.org/documents/document.358.aspx.pdf>

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