

QUICKNOTES

Ecosystem Services

There are many types of ecosystems—communities of organisms that interact with each other as well as the non-living components of their physical environment (e.g., air and water). Ecosystems provide a range of benefits, or ecosystem services, to human populations. These include clean air and water, carbon sequestration, and flood control, among many others.

Defining Ecosystem Services

Human populations rely on the many benefits provided by aquatic and terrestrial ecosystems. *The Millennium Ecosystem Assessment*, which examines how ecosystem services impact human well-being, defines four types of ecosystem services: supporting, provisioning, regulating, and cultural. *Supporting services* are those ecosystem services not used directly by people, but which are necessary for all other ecosystem services. They include soil formation, photosynthesis, and nutrient and water cycling. *Provisioning services* refer to products produced by ecosystems that are used by or directly impact human populations, including food, fuel, and fresh water. *Regulating services* relate to ecosystem process regulation and include air quality, climate, water, and pollination. Finally, *cultural services* are the human benefits obtained through ecosystem services, such as cultural diversity, recreational opportunities, or aesthetic amenities.

Ecosystem services face a range of challenges. Pollution can result in acidification of soil and water sources and can have impacts on plants and wildlife. Land-use change and urbanization can reduce and fragment open space, impacting the health of ecosystems. Meanwhile, climate change is fundamentally altering the composition of ecosystems and the services provided by those systems across the globe.

Assigning Value to Ecosystem Services

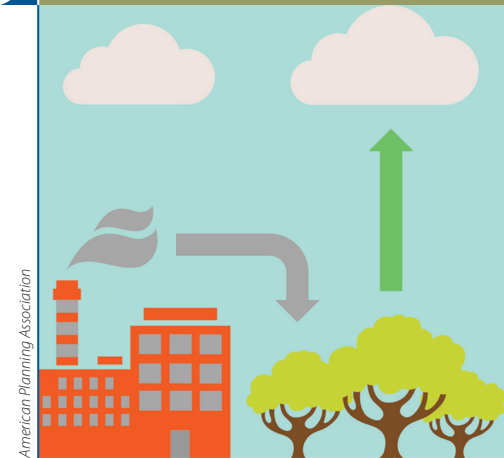
Ecosystem services provide many benefits that have economic value. For example, forests play a critical role in maintaining water quality, and healthy forests reduce the costs of treating drinking water for local governments. However, because ecosystem services have traditionally been treated as a public good, their value has not been captured in decision-making processes.

There are two main ways to assign value to ecosystem services: avoided costs and replacement costs. Avoided costs refer to costs that are not incurred because ecosystem services are protected or preserved (i.e., a local government not having to pay for additional water treatment due to efforts to protect forest health). Replacement costs refer to the costs of engineered systems to replace ecosystem services (i.e., engineered stormwater systems to replace natural functions).

Ecosystem services markets have emerged to compensate landowners for the benefits their land provides. Through these markets, buyers (governments, non-governmental organizations, corporations) purchase credits from sellers (landowners), who provide ecosystem services through conservation or sustainable land management practices. Examples of successful markets include those for sulfur dioxide emissions and wetlands. However, there are challenges to developing these markets, including assigning value to services that have generally been considered free. This can result in undervaluing ecosystem services.

Using Ecosystem Services to Inform Planning Decisions

Local officials are responsible for making a variety of decisions related to community growth and change, and many of these decisions directly affect ecosystem services. For example, decisions concerning the location, timing, and design of new development—including public infrastructure and facilities—have significant impacts on the extent to which existing ecosystems will be able to provide services to community.



Trees provide ecosystem services by removing pollution associated with human activities from the air.



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In many cases, protecting existing natural resources or establishing new natural resources (e.g., by planting trees or engineering new wetlands) is more cost effective than building or expanding facilities or installing devices to protect the quality of the air we breathe and the water we use. Consequently, it makes sense for planners and local officials to consider the concept of ecosystem services when developing long-range plans for community growth and change and when evaluating the likely community impacts of specific development proposals.

Tools for Protecting Ecosystem Services

Many ecosystem services are provided on land that is privately owned. For example, 56 percent of the 751 million acres of forestland in the U.S. is in private ownership. There are a number of tools (in addition to the ecosystem services markets discussed above) to incentivize conservation and sustainable land management on private property. Commonly used tools include land acquisition, conservation easements, and tax incentives. They also include sustainable land management programs, which focus on the sustainable management and use of resources.

Land acquisition. Fee simple land acquisition—the purchase of land for conservation and management by a local government or nonprofit organization, such as a land trust or conservancy—is a key tool for protecting important ecosystems and their component services. Land acquisition can help conserve high-value ecological and cultural resources.

Conservations easements. Governments or nonprofit organizations can purchase conservation easements or landowners may voluntarily donate them. The easement is a legally binding agreement through which the property remains in private ownership but development is prohibited or certain uses are restricted. The easement may be in perpetuity or be in effect until ownership of the land changes hands.

Tax incentives. Tax abatements and tax credits can be powerful tools for incentivizing conservation practices on private land. In 2015, Congress enacted the enhanced federal tax incentive for conservation easements. This incentive, which was first temporarily enacted in 2006, allows landowners to take a deduction of 50 percent of their income for donating a conservation easement (and qualifying farmers and ranchers can deduct up to 100 percent of their income) for a period of 15 years. Many states also offer tax incentives for conservation.

Sustainable land management programs. Sustainable land management programs can also be a tool for incentivizing sustainable practices that protect ecosystem services. Sustainable land management practices promote ongoing sustainable management of resources for productive use. For example, the U.S. Forest Service's Forest Stewardship Program provides assistance to landowners through the state and private forestry program to promote land stewardship and agroforestry practices that will result in long-term sustainability of forest resources and landscapes.

Conclusion

The services provided by ecosystems, including forests, grasslands, and deserts, provide a range of supporting, provisioning, regulating, and cultural benefits to human populations. These include clean air and water, food production, and opportunities for recreation. Because these ecosystem services have traditionally been considered a public good, they are often not accounted for in decision-making processes. Assigning value to the range of services provided by ecosystems can help ensure that these benefits are addressed when decisions are made. Additionally, tools including land acquisition, conservation easements, and tax incentives can help ensure conservation or sustainable land management practices that protect important ecosystem services.

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FURTHER READING

1. Published by the American Planning Association

Lewis, Megan. 2013. "Valuing Ecosystem Services to Inform Conservation and Development Decisions." *PAS Memo*, January/February. Available at planning.org/pas/memo/2013/jan.

Rouse, David C., and Ignacio F. Bunster-Ossa. 2013. *Green Infrastructure: A Landscape Approach*. PAS Report No. 571. Chicago: American Planning Association. Available at planning.org/pas/reports/archive.htm.

2. Other Resources

Land Trust Alliance. 2016. "Income Tax Incentives for Land Conservation." Available at tinyurl.com/hgrugo5.

Millennium Ecosystem Assessment. 2005. "Ecosystems and Human Well-Being: A Framework for Assessment." Available at millennium-assessment.org/en/Framework.html.

U.S. Forest Service. 2016. "Ecosystem Services." Available at fs.fed.us/ecosystems-services.