

# What's nature worth? New computer models tell all

**Breathe in. The air is free. But we'd all agree it's not worthless. So, what's the price tag on benefits provided by nature? In 1997, the University of Vermont's Robert Costanza and his co-authors put the answer at \$33 trillion per year in a now-famous paper in the journal *Nature*.** In the decade following, the science of "ecosystem services" has bloomed. This young discipline studies how nature--through climate regulation, soil formation, crop pollination, flood protection, and so on--supports human welfare, and estimates its value in economic terms.

Now, Costanza and his colleagues at UVM's Gund Institute for Ecological Economics have launched a project to solve a central problem that this young science faces: creating a fast way for policy-makers to understand the specific ecosystem services in their area--and the impacts of different land use decisions--whether looking at a local watershed or whole continent.

Over the next year, with an \$813,000 grant from the Gordon and Betty Moore Foundation, Costanza and his team will create a set of computer models and tools that will give a sophisticated portrait of the ecosystem dynamics and value for any spot on earth.

"Land use planners, county commissioners, investment bankers, anyone who is interested," Costanza said, "will be able to go on the Web, use our new models, and be able to identify a territory and start getting answers."

For example, if a town council is trying decide the value of a wetland--compared to, say, building a shopping mall there--these models will help them put a dollar value on it. If a country wants to emulate Costa Rica's program of payments to landowners to maintain their land as a forest, they'll better be able to figure the ecosystem value of various land parcels to establish fair payments.

To build the new models, Costanza's team will gather experts on a range of ecosystems to two extended meetings in Burlington, one this fall and another next spring. In small teams, they'll link together the latest understandings of how forests, grasslands, wetlands, open ocean, and other ecosystem types function with detailed maps of where these natural communities occur and other geographic information.

Next, these models will be informed by new methods of estimating the value of ecosystems. Conventional economics has relied on the rather clunky notion of "willingness to pay" to determine how much a product is worth. This approach doesn't apply well to many ecosystem services that are either indispensable--like air to breathe--or exceedingly subtle--like global climate regulation.

"Instead, we're looking for effects of ecosystems on human welfare, whether people perceive them or not--rather than just asking them how much they'd pay for this service," Costanza said.

And finally, next year, the project will put out its results through an interactive website--perhaps a bit like Google Earth for ecosystems services--journal articles, and other reports.

Recent studies have made it clear that not only do ecosystem services provide a majority of income for poor people in developing countries, but, more startling, that the economic value of the world's ecosystems is much larger than the value of all the products and services usually put under the umbrella of "the global economy."

Ultimately, Costanza hopes the project will help policymakers realize that conservation is not a luxury; it

must be a key economic goal. If his project succeeds, "it will allow us to move beyond the counterproductive conservation vs. development debate to thinking about conservation as a form of development," he writes.

Source: University of Vermont

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