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A Global System to Monitor Nature's Benefits to Society

A new paper proposes a framework to take the pulse of Earth's life-support systems

A new paper appearing in the November issue of *Bioscience* presents a way to monitor ecosystem services on a global scale. The conceptual framework they suggest to do this was envisioned by the GEO BON Ecosystem Services Working Group and designed to integrate national statistics, numerical models, remote sensing, and in situ measurements to regularly track changes in ecosystem services across the globe. Although this may sound overly ambitious, the paper outlines an achievable approach that would fill the pulse-taking role well. Entitled "A Global System for Monitoring Ecosystem Change," the paper was led by Heather Tallis, Lead Scientist at the Natural Capital Project. Its authors present a tangible plan to coordinate, standardize, and broaden access to existing databases that track and monitor the delivery of ecosystem services. Their work contributes to the worldwide effort of the Group on Earth Observations (GEO), to improve the availability of information on the global environment.

Being able to take the pulse of our planet's health and respond accordingly is undeniably one of the most important requirements if we are to achieve global sustainability. Earth's life-support systems are changing, as is their ability to provide services such as clean air and water. Currently there is no centralized system to monitor and report these changes. Increasing environmental pressures around the world underscores the urgency to devise centralized methods of monitoring the changes in services nature provides to society.

As part of the GEO BON Ecosystem Services (ES) group, the focus of Tallis and her colleagues is to coordinate the reporting of temporal and spatial patterns in the production, delivery and value of global ecosystem services. The 2005 conclusion of the Millennium Ecosystem Assessment - that 60% of basic ecosystem services supporting human well-being have been degraded - highlights the crucial need for this comprehensive, ongoing monitoring.

By coordinating and combining data streams, identifying gaps in current information systems, and proposing consistent frameworks of benefit analysis, the GEO BON ES working group outlines a path towards achieving a broader understanding of the Earth's biodiversity and socio-ecological systems. Their scheme of metrics for monitoring ecosystems and the services they provide to humanity is a pioneering step in the effort to take global stock of our planet's life-support systems.

Systematic data collection and monitoring of ecosystem services will require unprecedented international cooperation among scientists and pooling of data at varying scales. While their framework emphasizes data at the national scale because of available statistics on biophysical and social trends, it also calls for the inclusion of local scale field-based observations. In combination with calibrated data from remote sensors on global land-use and numerical models to simulate

biophysical processes, a complete GEO BON ES platform will be able to inform local, regional, and global research and decisions related to the environment and society.

The GEO BON ES approach calls for standardized metrics of ecosystem services that separately account for the biophysical supply of a resource, the service it provides, and its social benefits and value. These metrics will enable analysts to account for ecosystem benefits that economic markets currently fail to capture. For example, traditional valuation approaches do not incorporate the benefits of improved air and water quality or climate regulation because nature provides them as public goods. Similarly, economic benefits of agricultural crop production might exclude the nutritional benefits provided to the world's poorest individuals, who may not pay for food through a formal market.

To account for these oversights, Tallis and the GEO BON ES working group advocate the inclusion of broader benefit metrics to supplement the monetary valuation of ecosystem services. These metrics will be useful the CBD and IPBES and others in the international biodiversity and policy arena in helping them prioritize where and how to allocate their resources and carry out regular assessments of biodiversity and ecosystem services globally. The paper proposes the inclusion of separate benefit metrics to track distributional equity of ecosystem services – particularly relevant to the needs of women, indigenous groups and poor communities.

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The Natural Capital Project (NatCap) is a partnership among Stanford University, The Nature Conservancy, the World Wildlife Fund, and the University of Minnesota that works to develop and provide practical ecosystem service approaches and tools, apply them in select areas around the world, and engage influential leaders to advance change in policy and practice through mainstreaming the approaches.

A Global System for Monitoring Ecosystem Service Change
Heather Tallis, Hal Mooney, Sandy Andelman, Patricia Balvanera, Wolfgang Cramer, Danny Karp, Stephen Polasky, Belinda Reyers, Taylor Ricketts, Steve Running, Kirsten Thonicke, Britta Tietjen, and Ariane Walz.
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- Information on GEO BON and its working groups can be found on their website.
- Visit The Natural Capital Project for more on ecosystem service valuation

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