Climate Change and Ecosystem Services: Bridging the Gap Between Science and On-the-Ground Decision Making

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Abstract: Ecosystems provide extensive benefits to people, such as clean water, grassland forage, and protection from flooding. Climate change threatens to impact people and the ecosystem services they depend upon in many ways, and at the same time ecosystem-based approaches to climate adaptation have the potential to play a major role in the response to climate change. Identifying how to respond to climate change will require and understand of the intersection between climate change and ecosystem services. Different systems will experience different climate change impacts, and responses will need to be tailored to specific places throughout the world. To accomplish this, tools are needed that translate cutting-edge climate science into relevant information for people and ecosystems on-the-ground. Projections of climate exist from the Intergovernmental Panel on Climate Change modeling efforts, but generally do not provide specific information about ecosystem services. And ecosystem-service models exist—for example the InVEST tool—but are generally applied to climate change questions in an ad hoc and non-systematic manner. Here I present a general framework and provide specific examples of tools for geographically assessing the intersection between climate change and ecosystem services—including river flows, grassland forage, and coastal protection. This framework includes assessment of climate uncertainty and avenues for making climate impact information accessible to a broad range of audiences. This approach can help provide a more systematic, streamlined, and accessible approach for assessing how ecosystem services will be impacted by climate change and how these services can play a role in helping people adapt to the changes likely to come.

Summary: Climate change threatens to impact people and the ecosystem services they depend upon. Here I present a framework and provide specific examples of tools for assessing the impact of climate change on ecosystem services—including river flows, grassland forage, and coastal protection—and how these services can help people adapt.