

Managing ecosystems in a changing climate

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Global warming may impair the ability of ecosystems to perform vital services—such as providing food, clean water and carbon sequestration—says the nation's largest organization of ecological scientists. In a statement released today, the Ecological Society of America (ESA) outlines strategies that focus on restoring and maintaining natural ecosystem functions to mitigate and adapt to climate change.

"Decision-makers cannot overlook the critical services ecosystems provide," says ESA President Mary Power. "If we are going to reduce the possibility of irreversible damage to the environment under [climate change](#), we need to take swift but measured action to protect and manage our ecosystems."

ESA recommends four approaches to limiting adverse effects of climate change through ecosystem management:

Prioritize low-alteration strategies. Many ecosystems sequester a sizable amount of carbon—simply allowing them to function naturally can significantly help mitigation efforts. Deforestation, for example, has a two-fold impact: removing agents of carbon sequestration—trees in this instance—while simultaneously releasing stored carbon. Therefore, preserving forests is a straightforward way to both reduce and offset emissions.

Critically evaluate management-intensive strategies. Management strategies that seek to increase [carbon sequestration](#) above natural levels

should undergo thorough life-cycle analysis and evaluation prior to implementation. For example, increasing [carbon uptake](#) on agricultural lands—one approach to enhancing the sequestration potential of ecosystems—typically requires more fertilizer than standard processes; the tradeoff, therefore, is higher emissions and pollution associated with fertilizer production.

Acknowledge the ecological implications of geoengineering. Understand the potential risks associated with engineering the environment, called geoengineering, and the unintended negative impacts that could emerge from long-term or widespread use. For example, injecting sulfur particles into the atmosphere to reflect solar rays would have a cooling effect but could also increase acid rain and destabilize weather patterns.

Address long-term risks. Assess the far-reaching consequences of ecosystem alterations. Monitor carbon stores sequestered under given management practices and develop or apply models to forecast ecosystem responses several decades into the future.

In addition to mitigating climate change, steps should be taken to prepare ecosystems to withstand climate change impacts. Human activity has impaired the natural resilience of many [ecosystems](#). ESA outlines four adaptation strategies to safeguard ecosystem services in the face of climate change:

Take additional steps to protect water quality and quantity. Freshwater resources are at particular risk from the interaction of climate change and intensification of human use. Rising temperatures have already lowered river flows, warmed surface waters and dried out wetlands. Sustaining freshwater resources is critical to both environmental and public health.

Enable natural species migration across human dominated landscapes.

Provided by Ecological Society of America

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