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**In a Landmark Global Study, an NYBG Scientist and Colleagues Find That Reforestation Stands Out among Plant-Based Climate-Mitigation Strategies as Most Beneficial for Wildlife Biodiversity**

**Impact on Biodiversity Needs to be Considered When Choosing a Large-Scale Strategy to Combat Climate Change, Scientists Assert in New Paper in *Science***



A new study by an NYBG scientist and her colleagues finds that, of the three large-scale, plant-based climate mitigation strategies, reforestation stands out as most beneficial for biodiversity. Shown here is the Amazonian rain forest in the Brazilian state of Rondônia, where an NYBG research program is documenting its plant life and conducting training programs for sustainable forest management.

**Bronx, NY**—In the global effort to combat climate change, large-scale, plant-based strategies such as planting forests and cultivating biofuels are an increasingly important part of countries' plans to reduce their overall carbon emissions, but a landmark new study in the journal *Science* finds that well-intended strategies could have unforeseen impacts on biodiversity and that, in general, restoring forests has the most beneficial effect on wildlife.

The authors, including New York Botanical Garden (NYBG) Assistant Curator Evelyn Beaury, Ph.D., argue that policy makers and conservation officials should consider impacts on biodiversity when evaluating the most effective tools to mitigate climate change.

“As efforts to address climate change accelerate, it is urgent to ensure that in deploying LBMS we do not inadvertently imperil biodiversity,” Dr. Beaury and her colleagues write, using the acronym for land-based mitigation strategies, which use plants to store carbon.

Dr. Beaury is an Assistant Curator in NYBG’s Center for Conservation and Restoration Ecology, which is working to expand NYBG’s collaborations with conservation initiatives worldwide; strengthen conservation capacity building, including training future biodiversity leaders; and advance conservation by fostering the sustainable use of plant resources locally and globally.

Many net-zero emissions plans call for implementing plant-based mitigation strategies across millions of acres of land. The most common approaches are reforestation (restoring forests in places where they have historically grown), afforestation (adding forests in places like savannahs and grasslands), and bioenergy cropping (farming plants such as switchgrass for renewable energy). Until now, it has been challenging to predict these strategies’ impacts on biodiversity because they affect species in multiple, complex ways.

The new study, published online and in the print edition of this week’s *Science*, is the first of its kind to evaluate the potential biodiversity impacts of those three climate change mitigation strategies globally. The team of scientists—led by Dr. Jeffrey Smith, Ph.D., an Associate Research Scholar at Princeton University’s High Meadows Environmental Institute—modeled the impact of these mitigation strategies on over 14,000 animal species, from creatures smaller than a mouse to larger than a moose.

Most countries worldwide, from Austria to Zimbabwe, have committed to using these methods to reach their climate targets. However, as Dr. Beaury notes: “Plant-based mitigation strategies do not have the same effect on the climate or on biodiversity everywhere they are deployed. Our research suggests that we cannot assume plant-based solutions always indirectly reduce the biodiversity crisis.”

The team of scientists—which also included Jonathan Levine, Ph.D., Professor of Ecology and Evolutionary Biology at Princeton, and Susan C. Cook-Patton, Ph.D., Senior Forest Restoration Scientist at The Nature Conservancy—found that reforestation will benefit many species both locally, by increasing habitat, and globally, by mitigating climate change. These include many iconic forest species from spotted salamanders and red-bellied woodpeckers to jaguars.

The outcomes for planting monocultures of bioenergy crops or converting natural savannahs and grasslands to forests are not as rosy. While these efforts may help address climate change and reduce climate threats to biodiversity, they will also lead to immediate habitat loss. Replacing biodiverse meadows with bioenergy crops would be hugely

detrimental for species from grouse to elk. Similarly, converting savannahs to forests would lead to the decline of iconic species such as ostriches and lions. The study found that the loss of habitat due to afforestation and bioenergy would be far greater than the benefit they would provide to biodiversity by helping mitigate climate change globally.

While ecologists have long suspected that some of these interventions would mean less habitat for wildlife, this study provides the first quantitative assessment of the potential impacts. “Reforestation is an obvious ‘win-win’ for biodiversity,” said Dr. Beaury, an ecologist and biogeographer whose expertise includes invasive plants. “Restoring lost forest provides habitat as well as reduces the impacts of climate change.”

“Variable impacts of land-based climate mitigation on habitat area for vertebrate diversity” is available at the following link: <https://www.science.org/doi/10.1126/science.adm9485>

### **About The New York Botanical Garden**

The New York Botanical Garden (NYBG) has been a connective hub among people, plants, and the shared planet since 1891. For more than 130 years, NYBG has been rooted in the cultural fabric of New York City, in the heart of the Bronx, its greenest borough. NYBG has invited millions of visitors to make the Garden a part of their lives, exploring the joy, beauty, and respite of nature. NYBG’s 250 acres are home to renowned exhibitions, immersive botanical experiences, art and music, and events with some of the most influential figures in plant and fungal science, horticulture, and the humanities. NYBG is also a steward of globally significant research collections, from the LuEsther T. Mertz Library collection to the plant and fungal specimens in the William and Lynda Steere Herbarium, the largest such collection in the Western Hemisphere.

The plant people of NYBG—dedicated horticulturists, enthusiastic educators, and scientific adventurers—are committed to helping nature thrive so that humanity can thrive. They believe in their ability to make things better, teaching tens of thousands of kids and families each year about the importance of safeguarding the environment and healthy eating. Expert scientists work across the city, the nation, and the globe to document the plants and fungi of the world—and find actionable, nature-based solutions to the planet’s dual climate and biodiversity crises. With eyes always looking forward, they train the next generation of botanists, gardeners, landscape designers, and environmental stewards, ensuring a green future for all. At NYBG, it’s nature—or nowhere.

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The New York Botanical Garden is located at 2900 Southern Boulevard, Bronx, New York 10458. For more information, visit [nybg.org](http://nybg.org)

The New York Botanical Garden is located on property owned in full by the City of New York, and its operation is made possible in part by public funds provided through the New York City Department of Cultural Affairs. A portion of the Garden's general operating funds is provided by The New York City Council and The New York State Office of Parks, Recreation, and Historic Preservation. The Bronx Borough President and Bronx elected representatives in the City Council and State Legislature provide leadership funding.

**Media Contact:** Stevenson Swanson at [sswanson@nybg.org](mailto:sswanson@nybg.org)