

FOR IMMEDIATE RELEASE: March 1, 2024

In the Wake of a Powerful Cyclone, Two NYBG Scientists and Their Colleagues Find that a Pacific Island’s Forests Stage a Remarkable Recovery

New Study Finds That Stewardship Practices Contribute to Forest Resilience on the Island of Tanna in Vanuatu, Providing Potential Lessons as Climate Change-Driven Storms Intensify



These photos show the rapid recovery of the forest canopy on Tanna, an island that is part of the nation of Vanuatu in the South Pacific, following Cyclone Pam in 2015. Photos are from 2015 (left), 2017 (middle), and 2019 (right).

Bronx, NY—After one of the most intense cyclones in world history tore through the island of Tanna in the South Pacific nation of Vanuatu, new research by a team that included two scientists at The New York Botanical Garden (NYBG) shows the resilience of the island’s forests.

In the Pacific islands, climate change is expected to increase the intensity and frequency of cyclones, causing huge potential risks to forests and the people who depend on them. In March 2015, Cyclone Pam touched down on Tanna as the strongest Pacific island cyclone in history at the time. With sustained winds reaching 165 miles per hour, Pam pounded the island for 18 hours.

A new study published February 29 in the journal *Science of the Total Environment* has documented the remarkable recovery of Tanna’s forests after Cyclone Pam. The team—

which, in addition to NYBG, included researchers from the University of Hawai‘i at Mānoa (UH Mānoa), the University of the South Pacific, the Vanuatu Cultural Centre, and the Vanuatu Department of Forestry—examined post-cyclone recovery across eight forested sites on Tanna over five years.

“Compared to cyclones on other Pacific Islands, Pam caused relatively low levels of severe damage to Tanna’s trees,” said UH Mānoa School of Life Sciences Professor Tamara Ticktin, the lead author of the paper. “In addition, there was high resprouting, widespread recruitment of most tree species present, and basically no spread of invasive species.”

The latter is especially surprising because invasive species often spread rapidly after Pacific Island cyclones.

Cyclone History and Stewardship Practice Are Key to Resilience



Team members monitor tree regeneration in study plots on Tanna in the aftermath of Cyclone Pam.

The authors conclude that Tanna’s historical cyclone frequency likely fostered the abundance of resilient species and that Tanna’s customary stewardship practices appear to augment the capacity for resilience. This is because they promote a diversity of tree species, life histories and life stages, and a wide range of pathways for regeneration.

“Tanna stewards value a wide range of species useful for food, medicines and building materials,” explained ethnobotanist and co-author Michael J. Balick, Ph.D., NYBG’s Vice President for Botanical Science and Director and Senior Philecology Curator of the Institute for Economic Botany. “And customary stewardship involves management practices that enhance the survival and reproduction of these species.”

Co-author Jean-Pascal Wahe of the Vanuatu Cultural Centre noted that after a cyclone, stewards weed around native tree species and even plant them. These actions can help ensure their regeneration while decreasing dominance of weedy understory species.

The study also showed that forests that had previously been subject to grazing by cattle and pigs were slower to recover and will likely be more vulnerable to future cyclones.

"This highlights the key role of forest management in building resilience to climate change," said senior author Gregory M. Plunkett, Ph.D., NYBG's Director and Curator of the Cullman Program for Molecular Systematics. Dr. Plunkett, who has been studying the plants of Vanuatu for two decades, was carrying out research on Tanna along with Dr. Balick and co-author Marika Tuiwawa of the University of the South Pacific when Cyclone Pam hit. They experienced the terror of the cyclone first-hand and were delighted to also witness forest recovery.

"As the world comes to grips with more frequent extreme weather events, our work suggests that the right kind of human interaction can play a significant role in the survival of forests," said Dr. Plunkett.

This study is part of NYBG's wider *Plants and People of Vanuatu* program, led by Drs. Balick and Plunkett, and was supported by the National Science Foundation, the Critical Ecosystem Partnership Fund, and the National Geographic Society.

"High resilience of Pacific island forests to a category-5 cyclone" is available at the following free-access link until April 19, 2024: <https://authors.elsevier.com/c/1igzIB8cd0I9q>

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.

###

The New York Botanical Garden is located at 2900 Southern Boulevard, Bronx, New York 10458. For more information, visit 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 Contacts

NYBG: Stevenson Swanson at sswanson@nybg.org, 718.817.8512

UH Mānoa: Marc Arakaki at marcra@hawaii.edu, 808-829-0750