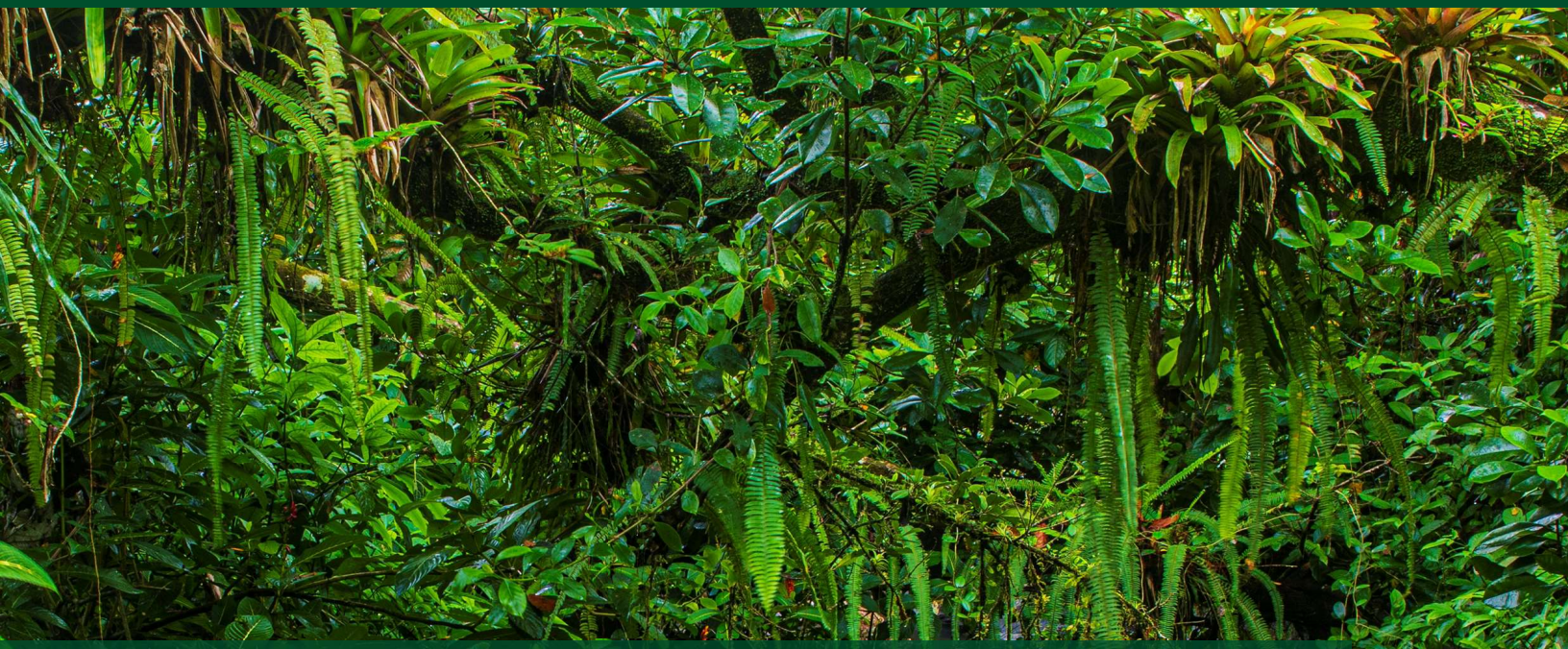
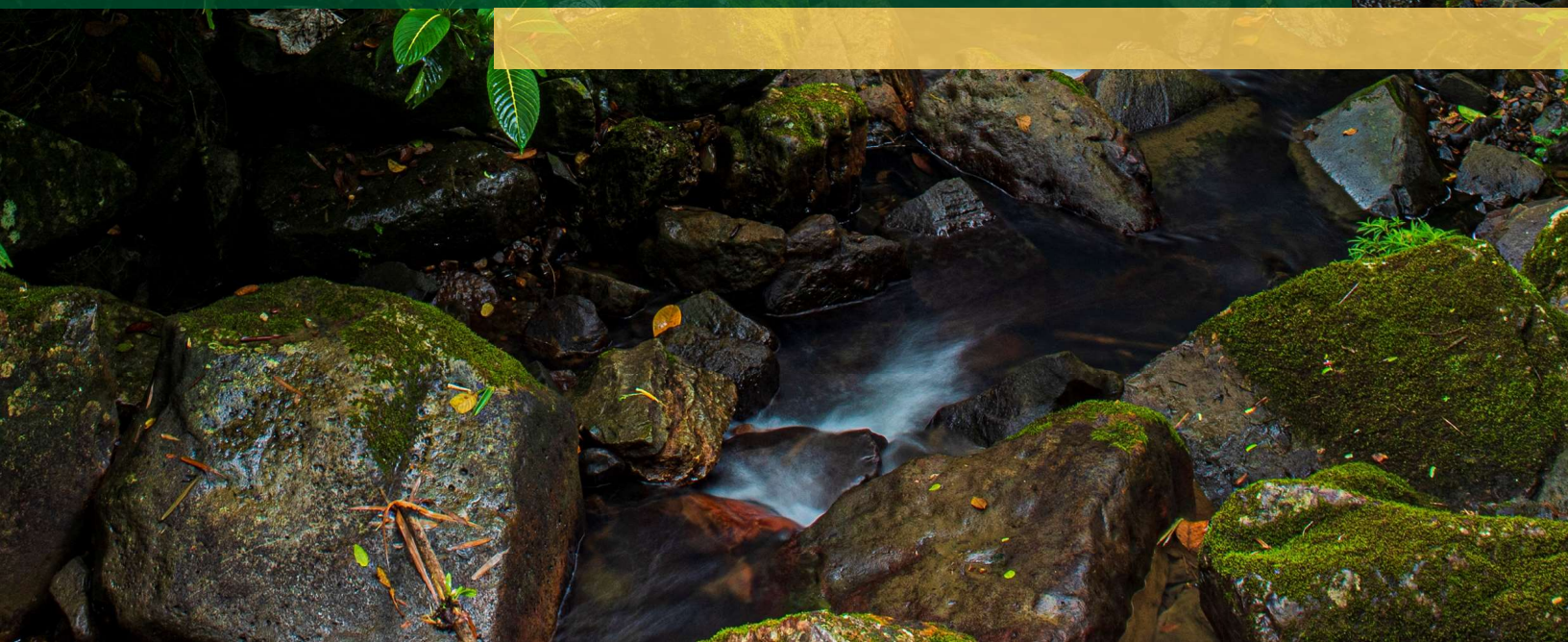
USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

International Institute of Tropical Forestry



Accomplishment Report 2024



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Cover page image caption: Luquillo Experimental Forest, forest interior. Photo by Gerald (Jerry) Bauer.

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Table of Contents

About the Institute 6

Business Operations 16

Facilities and Experimental Forests 21

International Cooperation 35

State, Private and Tribal Forestry 50

IITF Library 73

Research & Development 78

Many Units, One IITF 91

Publications 94

Director's Message



I am honored to present the International Institute of Tropical Forestry (IITF) Accomplishment Report for Fiscal Year 2024. This year marked exciting milestones for tropical forestry. The Institute's expertise, partnerships, and shared commitment to research and conservation are advancing the understanding and stewardship of tropical ecosystems across the nation. As one of the Forest Service's home for tropical research, IITF plays a key role in shaping how the agency responds to some of the world's most dynamic landscapes.

Our work is driven by the synergistic collaboration of our three major programmatic units: Research and Development; State, Private and Tribal Forestry; and International Cooperation. This unique composition allows us to serve diverse audiences, engage across a wide range of industries, and ensure our expertise reaches all the groups who can be impacted by our mission. Together, these units form a comprehensive, interconnected approach that supports tropical forestry from the scientific foundations to the practical applications and international partnerships that sustain resilient tropical ecosystems and communities.

Across Puerto Rico and the U.S. Virgin Islands, and through collaborations well beyond our region, our teams have demonstrated what a coordinated, mission driven Institute can achieve. Over the years, IITF has advanced tropical forestry conservation by developing innovative tools and resources for land managers, strengthening community preparedness, supporting post disaster recovery efforts, providing technical and financial assistance to local partners, and cultivating collaborations to protect biodiversity and promote sustainable practices. Our work reflects a commitment to science, people, partnerships, and capacity building.

It is easy to become absorbed in daily responsibilities, yet we must not lose sight of the profound impact of our mission. Every project, every study, every partnership contributes to something larger: supporting the communities we serve, fostering healthy landscapes, and advancing the mission of the Forest Service. Thank you for your contributions and commitment to our mission.

Sincerely,



Grizelle González
Director

About the Institute



International Institute of Tropical Forestry headquarters building.

The International Institute of Tropical Forestry (Institute), headquartered in Río Piedras, Puerto Rico, is a research and technology transfer institute that is dedicated to advancing tropical forestry on insular, national, and international levels, and developing and exchanging knowledge critical to sustaining benefits of tropical forests and grasslands. The Institute has been in continuous operation since its inception as the Tropical Forest Experiment Station in 1939.

Members of our community span a wide range of knowledge and skills, including natural and social scientists, natural resource managers, education outreach and technology transfer specialists, technicians, as well as contracted professionals, students and volunteers. Together these dedicated people engage with a network of external collaborators from the public, private, and non-profit sectors in order to carry out our mission and implement our programs.

The influence of the Institute stretches throughout Puerto Rico and the Caribbean, and beyond to several international sites in Latin America and around the globe. We integrate long-term scientific studies with applied investigation, quantitative modeling, and landscape analysis to better understand tropical forest systems and the effects of human-induced pressures, predict future scenarios, devise effective management and governance strategies, and promote sustainable natural resources stewardship.

Organizational Structure

The International Institute of Tropical Forestry in Río Piedras, Puerto Rico consists of four major work programs:

Business Operation	Oversees and supports budgeting, data management, engineering, facility maintenance, grants and agreements, recruitment and civil rights, office services, volunteer programs, and safety.
International Cooperation	Provides leadership, mentorship for technical assistance, technology transfer, and long-term research to international partners and collaborators.
Research and Development	Develops and executes the Institute's research agenda, focusing on advancing tropical forest science.
State, Private and Tribal Forestry	Works closely with state agencies, universities, private landowners, and non-profit organizations in Puerto Rico and the U.S. Virgin Islands, offering professional, technical, and financial assistance.

Additionally, the Institute houses the IITF Library, one of three in the National Forest Service Library, and the Caribbean Climate Hub, which operates under the USDA's Washington Office Research and Development Sustainable Forest Management Research Program.

Legal Authorities

McSweeney-McNary Forest Research Act of 1928 (P.L. 70-466; 16 USC 581) authorized a comprehensive research program for the U.S. Forest Service, including the development of a nation-wide system of forest experiment stations. The Act included authorization of a forest experiment station in the "tropical possessions of the United States in the West Indies", leading to the establishment of the Tropical Forest Experiment Station on the grounds of the Agricultural Experiment Station of the University of Puerto Rico in Río Piedras, Puerto Rico, in 1939.

Forest & Rangeland Renewable Resources Research Act of 1978 (P.L. 95-307) repealed and replaced the McSweeney-McNary Forest Research Act of 1928, authorizing the Secretary of Agriculture to establish a national research program to obtain, analyze, demonstrate, and disseminate scientific information about protecting, managing, and utilizing forest and rangeland renewable resources in rural, suburban, and urban areas. The Act expanded support for existing and new forest experiment stations, including the Tropical Forest Experiment Station in Puerto Rico.

International Forestry Cooperation Act of 1990 (16 U.S.C. 4501) authorized the Secretary of Agriculture to undertake and authorize forestry and related natural resource assistance, research, and related activities outside the U.S. and its territories and possessions, including the expansion of "the capabilities of and construction of additional facilities at the Caribbean National Forest and Institute of Tropical Forestry in Puerto Rico…" The Act expanded the mission and activities of the Tropical Forest Experiment Station in Puerto Rico, officially renaming the station as the Institute of Tropical Forestry. It also provided for the establishment of an Institute of Pacific Island Forestry in the State of Hawaii.

Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624; a.k.a. 1990 Farm Bill) is a 5-year omnibus bill focused on agriculture, forestry, rural development, organic certification, and commodity promotion programs. This Act authorized the Secretary of Agriculture to further expand the mission and activities of the Institute of Tropical Forestry in Puerto Rico and the Institute of Pacific Island Forestry in Hawaii. As documented in the hearings before the House of Representatives Subcommittee of Appropriations, President G.W. Bush supported and "proposed to expand the Forest Service's Institute of Tropical Forestry in Puerto Rico into a 'full-fledged international tropical forests institute,' to coordinate Forest Service technical assistance and training programs throughout Latin American and the Caribbean while continuing its historical mandate to conduct tropical forestry research." At the G7 Summit in 1992, Pres. Bush described the expanded Institute as an active player in global tropical forestry issues, especially when sharing information, research results, and practical approaches to sustainable tropical forest management (https://www.congress.gov/bill/103rd-congress/house-bill/2520/committees).

In December 1992, the Institute was officially renamed the International Institute of Tropical Forestry, with expanded mission and programs that formally recognized international forestry and related research as a vital part of the Institute's mission and established State and Private Forestry and International Cooperation programs. The newly expanded International Institute of Tropical Forestry was designated to "serve as a gateway for collaborative efforts emphasizing forest research, demonstration forests, technology transfer, training, education, and networking". The State and Private Forestry programs, transferred from USDA FS Region 8, would cover the U.S. Caribbean (Puerto Rico and U.S. Virgin Islands) and the International Cooperation Unit would serve as "a base for Latin American and U.S. resource managers and researchers to interact and work cooperatively… balancing the research programs of the Institute with greater emphasis on technology transfer and outreach" (IITF Annual Letter 1992-1993).

Tropical Forest Conservation Act of 1998 (22 U.S.C. 2431) established the 'Debt-for-Nature Swaps' and underscores the values received by U.S. citizens from the protection of tropical forests and their associated goods, services, and values, reaffirming the importance of the mission, goals, and activities of the International Institute of Tropical Forestry. In 2018, the Act was expanded to include coral reef conservation and reauthorized through 2020. As of April 2021, a bill to reauthorize and extend through FY 2026 authority for debt-for-nature swaps and debt buyback programs that reduce or convert debt obligations from an eligible country to the United States into funding for nature conservation and protection efforts in that country had passed the House of Representatives and was scheduled to move to the Senate.

Our Team

- Director's Office
- Business Operations
- Library
- International Cooperation
- State, Private & Tribal Forestry
- Research & Development



Grizelle González
Director



José Díaz Godineaux
Office Automation Assistant



Diana Martínez González
Public Affairs Specialist



Marinelis Talavera
Assistant Director



Carmen M. Plaud
Support Service Specialist



Carolyn A. Pabón
General Engineer



Eduardo E. Castro Morales
Maintenance Worker



Janet Rivera-Rosado
Grants Management Specialist



Antonio J. Marquez Lespier
General Engineer



Omar Carrasquillo Calderón
Grants Management Specialist



Rosa Y. Ávila-González
Budget Officer



Juan Córdova Rodríguez
Technical Information Specialist



Gerald P. Bauer
Program Manager



Yanira L. Cortés-Escuté
Support Service Specialist



Magaly Figueroa Vázquez
Program Manager



Aixa R. Mojica-López
Program Support Assistant



Christina N. De Jesús Villanueva
Natural Resource Specialist



Maya Quiñones
Natural Resource Specialist



Andrés Jr. González Nieves
Natural Resource Specialist



Carlos J. Cruz Quiñones
Natural Resource Specialist



Andrés L. Pérez Cintrón
Natural Resource Specialist



Jo Ann López Sant
Natural Resource Specialist



Yariliz R. Quiles-Martínez
Technical Information Specialist



Evelyn Pagán Fernández
Library Technician

Our Team

- Director's Office
- Business Operations
- Library
- International Cooperation
- State, Private & Tribal Forestry
- Research & Development



Carlos R. Estrada Ruiz
Hydrologic Technician



Carlos Torrens
Biological Science Technician



Edgardo Valcarcel Ortíz
Biological Science Lab Technician



Edwin López-Soto Chemist



Eileen Helmer
Research Ecologist



Humberto Robles
Biological Science Technician



Ivan F. Vicens Forestry Technician (Research)



Jamarys Torres-Díaz
Administrative Support Assistant



Joel S. Olivencia
Electronic Technician



Kathleen McGinley
Research Project Leader



María M. Rivera Costa
General Biologist



Maribelis Santiago Márquez
Chemist



Maysaá Ittayem
Chemist



Michael M. Keller
Research Physical Scientist



Miriam Salgado Herrera
Operations Assistant



Olga M. Ramos
Biological Scientist



Omar Gutierrez Del Arrollo Santiago
Research Ecologist



Tamara Heartsill-Scalley
Research Ecologist



Tana E. Wood
Research Ecologist



Tischa Aimee Muñoz-Erickson
Research Social Scientist



Wayne J. Arendt
Research Wildlife Biologist

Our Team

Contractors, Interns and Fellows

- Director's Office
- Business Operations
- Library
- International Cooperation
- State, Private & Tribal Forestry
- Research & Development



Eladio Martínez
Maintenance Worker



Aramis Garay
Training Specialist Support Services



Edgardo Martínez
Project Inspector



Joel Mercado Díaz
Science Writer



Aaron Hogan
ORISE Fellow



Bianca Rodríguez Carmona
RAP Intern



Edna Irizarry Pagán
RAP Intern



Iana Grullón Penkova
RAP Intern



Jorge Rivera
RAP Intern



Luis Velázquez Román
RAP Intern



Nafiseh Haghtalab
ORISE Fellow



Alvin Rodríguez
RAP Intern



Damari Acosta
RAP Intern



Michael Vázquez
RAP Intern



Koralis Reyes
RAP Intern

Not pictured:
Felisha Félix, RAP Intern
Olga Vicente, ORISE Fellow

Volunteers

Volunteers are engaged at the very heart of the Forest Service and are critical assets that enable the agency to successfully achieve its mission. Since 1972, over 3 million volunteers and service participants have provided more approximately 130 million hours of service, supporting in that manner diverse United States Forest Service activities across the nation.

Except for performing law enforcement activities and fight fires, volunteers can perform a variety of jobs, ranging from office work to vigorous physical labor outdoors. Some typical volunteer activities include:

1. **Maintaining and hosting campgrounds**
2. **Answering phones, greeting visitors and answering mail at the Forest Service visitor centers and ranger stations**
3. **Working with computers in the Forest Service administrative offices**
4. **Taking photographs**
5. **Planting trees and seeding damaged areas**

As in other Forest Service units, the Volunteer Program at IITF is structured under the Volunteers in National Forests Act of 1972. Before passing this act, the Forest Service did not have the authority to accept voluntary services or to reimburse individuals for associated personal expenses. This Act officially recognized the public's interest in giving time and skills for community service. Enrolled under this Act, volunteers receive no salary or wages from the Forest Service and give their time and talents to further the agency's mission.

Volunteer Service Reports include the following programs:

1. International Volunteer Program (FSM1830)
2. Job Corps (FSM 1850)
3. Partnerships and Organizations Agreements (FSM 1810 & 1820) including 21CSC, Public Lands Corps, Resource Assistants Program, ACES, Citizen Scientists, Emeritus Scientists, Geo Corps, interns, service crews and corps engaged through agreements, excludes Youth Conservation Corps.
4. Volunteers (FSM 1830) Individuals and groups
5. Youth Conservations Corps (FSM 1840)

Volunteers - Fiscal year 2024



Joel Masanga
R&D (TRACE)



Malik Sankofa
R&D (TRACE)



Parker Bartz
R&D (TRACE)



Rob Tunison
R&D (TRACE)

IITF Committees

Safety Committee

IITF Safety Committee seeks to enhance safety and welfare of all IITF staff and visitors through education, awareness and prevention of accidents, and workplace hazards.

Members: Jose Díaz, Iana Grullón, Edna Irizarry, Edwin López, Olga Ramos, Maribelis Santiago, Miriam Salgado, Jamarys Torres, Eduardo Castro, Carolyn Pabón, Aixa Mojica



Emergency backpack, hard hat and fire extinguisher at IITF Headquarters.

Wellness Committee

Seeks to promote a culture of physical, psychological, and emotional well- being for our employees by providing activities and support that will result in a healthier lifestyle.

Members: Joel Olivencia, Edwin López, Carmen Plaud, Christina De Jesús Villanueva, Yarilis Quiles



IITF employees enjoy a team building activity at Hacienda Terruño cacao farm.

IITF Committees

Space Committee

With representation from all IITF units, this committee generates consensus on the viability of ideas of space requests by providing analysis and alternatives for consideration to the Management Team.

Members: Iana Grullón, José Díaz, Jamarys Torres, Aixa Mojica, Edna Irizarry, Maribelis Santiago, Carmen Plaud, Carolyn Pabón



Hallway at IITF Headquarters

Special Activities Committee

This committee coordinates and facilitates enjoyable and rewarding activities, or events by fostering an inclusive environment, strengthening relationships among employees, and works to attain a sense of comradery and community.

Members: Iana Grullón, José Díaz, Jamarys Torres, Aixa Mojica, Maysaa Ittayem, Juan Córdova, Edwin López, Edna Irizarry



Employee Holiday gathering decorations

Details

Employee	Position Title	Duty Station	Dates
Albertyadir De Jesús Román	Program Support Assitant	Río Grande, PR	06/30/2024-10/28/2024
José Díaz Godineaux	Administration Support Assistant	San Juan, PR	12/31/2023-04/28/2024
Aixa R. Mojica-López	Program Support Assitant	Río Piedras, PR	06/02/2024-09/29/2024
Jamarys Torres-Díaz	Administration Support Assistant	San Juan, PR	11/26/2023-03/23/2024
Juan Rodríguez	Safety & Occupational Health Specialist	San Juan, PR	06/30/2024-10/28/2024

Business Operations



Business Operations team meets at the IITF conference room.

Business Operations team:

Marinelis Talavera, Assistant Director for Business Operations / GA Director / Hiring

Rosa Ávila, Budget Officer

Juan Córdova Rodríguez, Technical Information Scpecialist

Carolyn Pabón, General Engineer

Eduardo Castro Morales, Maintenance Worker

Janet Rivera Rosado, Lead Grants Management Specialist

Omar Carrasquillo, Grants Management Specialist

Carmen Plaud, Support Service Specialist

Juan Rodríguez, Safety and Occupational Health Specialist (*Detail*)

Business Operations

Our staff delivers critical business operations services to Research and Development, International Cooperation and State, Private and Tribal Forestry programs. The Business Operations group manages and provides support in the areas of Budget, Data Management, Engineering, Contracts and Purchasing, Facilities Maintenance, Grants and Agreements, Hiring, Office Services and Volunteers Program, and Safety and Occupational Health. This includes planning, tracking, defending and presenting budgetary information at all levels as well as managing diverse sources of funding.

Accomplishments

A Grant and Agreements (G&A) record!

Over the past few years, the Institute has allocated between $1.8 million and $2.9 million annually in Grants and Agreements funding. But FY 2024 set a new precedent.

According to the Institute's G&A team, in FY 2024, the Institute obligated a staggering $28.1 million in funding to cooperators and partners—an unprecedented increase. This surge was largely driven by the Inflation Reduction Act (IRA), the Infrastructure Investment and Jobs Act, and the Bipartisan Infrastructure Law (BIL), all aimed at supporting a breath of communities nationwide. A key factor in this success was the flexibility in match requirements, including 100% waivers or reduced waivers for IRA- and BIL-funded projects, which enabled greater participation from cooperators and fostered new partnerships.

Repairs to the Institute's facilities affected by natural disturbances in the island were completed with Disaster Supplemental allocations.

This $28.1 million investment resulted in 38 new agreements—a record-breaking achievement for the Institute!

Revitalizing our Ecological Parking

Major strides towards revitalizing and upgrading the Institute's "Ecological Parking" were made during FY 2024. Funding of the Great American Outdoor Act (GAOA) supported activities associated with this project, which included the removal and replacement of the plastic grid structure, sediment accumulation removal and repairs to the stone paver entrance that leads to the entrance of the Headquarters Building in San Juan (from the parking area). Carolyn Pabón (General Engineer), Peter Lashoto (ACES), and Steven Romero (HACU intern) collaborated in the different stages of this project.



Carolyn Pabón, General Engineer, supervising work of grid removal of IITF parking.

Estate Thomas Experimental Forest and the Sabana Field Research Station get a "makeover"

The Estate Thomas Experimental Forest in St. Croix and the Sabana Field Research Station received long due improvements to their facilities and other equipment during FY 2024. With the guidance and assistance of Iván Vicens from Research & Development, the Business Operation unit visited Estate Thomas Experimental Forest in St. Croix and completed the installation of several signs, temporary reflective material, and locks replacement. The team also performed an assessment of the infrastructure, walking paths and other elements.



Newly installed signs at the entrance of Estate Thomas Experimental Forest in St. Croix.



Infrastructure at Estate Thomas Experimental Forest in St. Croix.

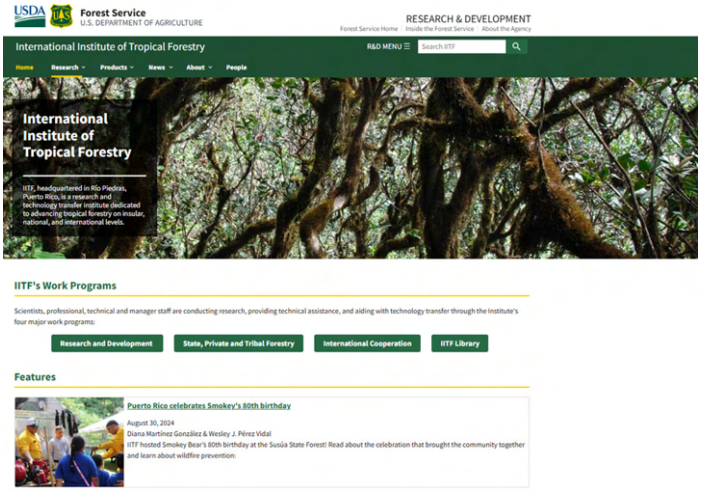
Infrastructure improvements were also completed at the Sabana Field Research Station (SFRS). Interior painting work for the buildings at the Station began in late January and continued until completion. The replacement of the water tanks and system components at Sabana Field Research Station was also successfully finished. José Díaz and Jamarys Torres collaborated to replace bedding components and pillows in the Sabana dormitories and to establish an organization and storage system to keep them in condition for a longer period. The main leads for these projects were IITF Engineers, Antonio Marques and Carolyn Pabón; Engineering technician, Steven Romero; and Maintenance Worker, Eduardo E. Castro.

The new internet "face" of the Institute

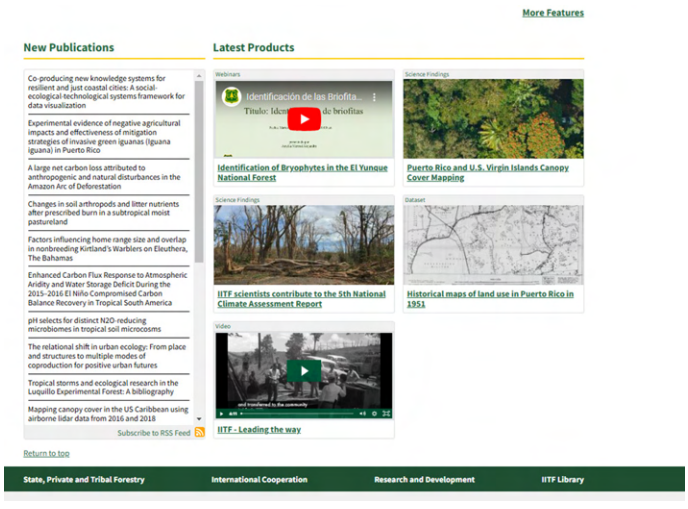
One of the most significant achievements of the International Institute of Tropical Forestry (IITF) in FY 2024 was the launch of its new website. This milestone was achieved through the dedication of the Institute's Data Manager, Juan Córdova, the R&D Web Administrators, and the contributions of other IITF employees and collaborators. Together, they undertook the task of migrating and creating new content for this upgraded platform.

In addition to better representing the plurality of programs managed and sponsored by the Institute, the new website marks a pivotal step in aligning with national efforts to transition all research stations, the Forest Products Lab, and the Institute to a unified, agency-level public web platform. This integration represents a major stride toward a cohesive R&D presence!

Some of the changes implemented include: 1) A more modern and user-friendly display, 2) A design that accommodates IITF's unique multi-unit structure to the Drupal and USFS framework, 3) A centralized repository of IITFs products, 4) Home page style sites for the IITF Library, SP&TF, International Cooperation and Research and Development, among others, and 5) Integration to the USFS R&D structure (National Research Taxonomy, Treesearch, Research Data Archive, etc.).



New interface of the IITF website.



The "Latest Products" section is one of several new features that are available in new IITF website.

Processing of important datasets

Moving to File GeoDatabases

The US Forest Service terminated support and access for the Geographic Information System (GIS) program ArcMap and required users to migrate to the newer ArcPro GIS program. The many long-term research and historic spatial datasets of the Institute were stored on personal geodatabases (.mdb), an outdated form of data storage that is not compatible with the ArcPro.

To help with the transition, the office of the Chief Information Officer (CIO) provided a tool that creates an inventory of all files within a folder with a certain extension name, however, the use of Spanish characters in the Institute's files and folders rendered the tool unsuccessful. To ensure access and conversion of these datasets, IITF Ecologist, Olga Ramos collaborated with the Institute's Data Manager, Juan Córdova and the CIO, to develop several programming tools to address this challenge. The tools, which included Python scripts that flagged and distinguished "Microsoft Access" or "Personal Geodatabase" .mdb files and looped through the inventory files to convert all data located within a .mdb database to the corresponding files in .gdb (File GeoDatabase) format, helped effectively generate this important file inventory for the Institute.

El Verde 3 historic data

The El Verde 3 dataset is a vital repository of biological data derived from tree censuses historically conducted at the El Verde 3 one-hectare plot located at the El Verde Field Station within the Luquillo Experimental Forest (also known as El Yunque National Forest).

In FY 2024, Research Ecologist, Tamara Heartsill-Scalley, and the Institute's Data Manager, Juan Córdova, collaborated to advance the processing of this important dataset. Their cross-unit efforts included cleaning and standardizing census data collected at El Verde 3 since 1943. Some of their achievements include the generation of unique identifiers for individual trees and the creation of a comprehensive database encompassing all trees ever measured in these censuses. This meticulous screening process also revealed 800 trees with multiple measurements, a key step in enhancing the dataset's accuracy and usability. These efforts have rendered the data more accessible for broader distribution and analysis within the scientific community.

SynTreeSys dataset

A common challenge for many organizations managing tree census data is the fragmentation of records across multiple datasets and formats. Addressing this issue, the SynTreeSys dataset emerged as a major international initiative to unify and standardize tree census data worldwide.

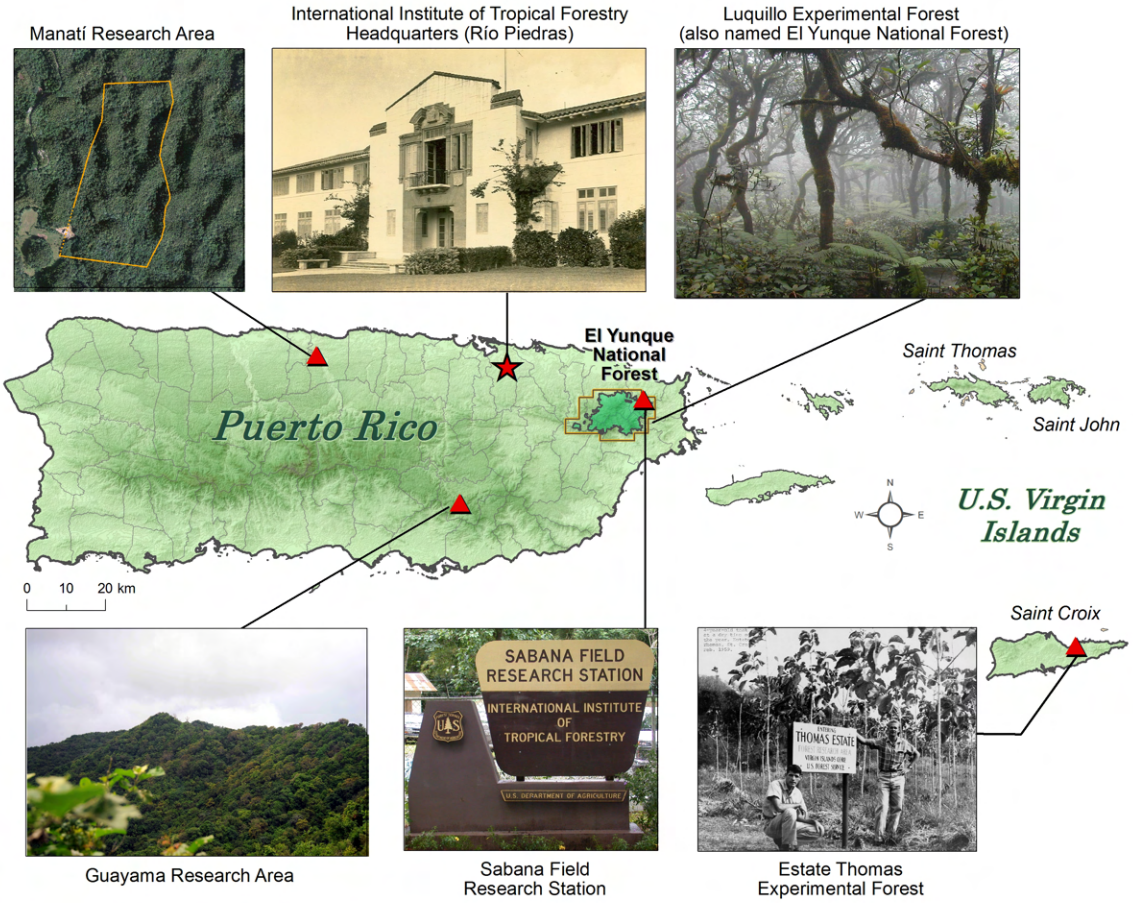
In FY 2024, Research Ecologist, Tamara Heartsill-Scalley, and IITF's Data Manager, Juan Córdova, took significant steps to standardize and merge the Institute's tree census data for integration into this global initiative. Their work culminated in the submission and integration of the Caribbean Forester (aka. IITF's consolidated dataset), which include data for over 130,000 trees across 1,259 plots and spanning seven different countries. The dataset covers nearly 80 years of data and include multiple measurements per tree ordered in chronological order. The map showing the plots included in this initiative is available here: https://syntreesys.github.io/plotmap/.



Plots that are part of the SyntreeSys network. Obtained from https://syntreesys.github.io/plotmap/.

Facilities and Experimental Forests

The International Institute of Tropical Forestry (IITF) manages two main facilities and four experimental areas in Puerto Rico. The IITF headquarters in Río Piedras serve as a hub for research, education, and outreach, while the Sabana Field Research Station in the Luquillo Mountains provides a base for field ecological studies in northeastern Puerto Rico. The Manatí and Guayama Research Areas, along with the Luquillo Experimental Forest and Estate Thomas Experimental Forest in St. Croix, span diverse tropical landscapes, offering scientists unique opportunities to study forest dynamics, biodiversity, and as well as the effects of extreme events in both terrestrial and aquatic systems. Together, these resources drive innovation in tropical forestry research and conservation science.



IITF Headquarters



Institute Headquarters building in April 1943 (top) and at present (bottom).

The International Institute of Tropical Forestry Headquarters house facilities that have been instrumental for tropical forest research for 82 years. The Headquarters feature 50,000 square feet of modern, state-of the art facilities that are secure, functional, and accessible, and that service the scientific community of the Institute and its collaborators.

History

Originally, the grounds where the Headquarters building was erected were part of an experimental station owned by the Sugar Producers Association. The property included 200 acres of land, 50 of them dedicated to experimental sugar cane crops and the remaining acreage to other crops.

In 1911, the association transferred ownership to the People of Puerto Rico, with control and administration entrusted to the newly created Agriculture Commission Board. In August 1933, the property was transferred to the University of Puerto Rico. In 1941, the U.S. Department of Agriculture, represented by Mr. Arthur Bevan, Director of the Tropical Forest Experiment Station, signed the first lease agreement with the University of Puerto Rico for the use of lands where the building was erected and in 1942, construction began on what is today the Institute's headquarters building.

In 2008, renovation of the headquarters was initiated. Restoration efforts initially aimed to tackle historic deterioration and users' accessibility and safety; however, the initiative eventually prompted improvements that fully modernized the buildings. Buildings and infrastructure were also made more environmentally responsible and energy efficient while keeping their historic values. The headquarters, restored with the distinctive architectural characteristics of the Spanish Revival style, popular at the time it was built in the early 1940s, were officially inaugurated on July 18, 2012. After an evaluation of the building by the State Preservation Office, it was concluded that the headquarters building is eligible for inclusion in the National Register for Historic Places.

Using sustainable design concepts, the renovation project was designed to meet the "Silver Certification Level" of the United States Green Building Council. Leadership in Energy and Environmental Design (LEED) elements were incorporated into the renovation, which included a fresh-air system, lighting, and thermal insulation. This project shows that historic buildings can be made highly energy-efficient while maintaining their historical value and providing for contemporary use.



Facilities and Amenities

The Headquarters complex is in the University of Puerto Rico Botanical Gardens in Río Piedras, within the Metropolitan Area of San Juan, Puerto Rico, and includes the following amenities:

Headquarters

The Headquarters building, a historical structure fully restored and modernized into a high-performance sustainable building.

Library

A Forest Service National Library, containing major publications in English and Spanish on forestry, ecology, management, and utilization of tropical forests as well as other documents and materials related to tropical forests around the world.

Chemistry Laboratory

A chemistry laboratory that focuses on analytical chemistry of plant tissues, water, soils, and air. In a typical year, more than 50,000 analyses on samples collected from tropical ecosystems around the world are completed by laboratory personnel.

Spatial Analysis Laboratory

A spatial analysis laboratory to study landscape ecology using geographic information systems, remote sensing, and field studies. This laboratory develops information, methods, and products using spatial data and analyses at multiple scales, which are made available through maps, publications, and training.

Conference Room

A technology transfer conference center with capabilities for multiple use combinations for meetings, trainings, and conferences. This facility has a food serving area and accessible restrooms.

Multipurpose Building

A multipurpose building that houses a dormitory, gym, general storage area, office space, and lunch area.

Storage

An area for sample preparation and long-term storage.

Amenities

Three back-up generators to ensure that electrical power is available for continuous operation during power blackouts, and a 3,400-gallon potable water tank that can provide drinking water during water shortages.

Sabana Field Research Station



Sabana Field Research Station facilities.

The Sabana Field Research Station is situated adjacent to the Luquillo Experimental Forest (LEF, also known as El Yunque National Forest). Remodeled in 2012, the station has all the amenities to accommodate individuals and groups interested in completing scientific work in the surrounding areas located within the LEF, including the nearby Sabana River and Bisley Experimental Watersheds.



Carlos Estrada Ruiz and Joel Olivencia show weather station equipment to students at the Sabana Field Research Station.

History

The Sabana Field Research Station (SFRS) was originally established by the USDA Forest Service in 1938 with the objective of maintaining security and surveillance of all surrounding forest areas, and for a time, the Civilian Conservation Corps conducted training there. The Sabana property also housed a district office and ranger home. Later, between the 1970s and the 1980s, the station was a staging area for processing logs used at a nearby sawmill. Around 1995, the Forest Supervisor transferred the use of the property to the Institute, including the provision of office space for scientists. At the time of this transfer, the old ranger house was used as a dormitory facility, while the old district office was used for offices of field technicians working primarily in the Institute's Bisley Experimental Watershed program. Since then, the SFRS has served as a research site for the study of tropical forest wildlife, plant and fungal ecology, and taxonomy.

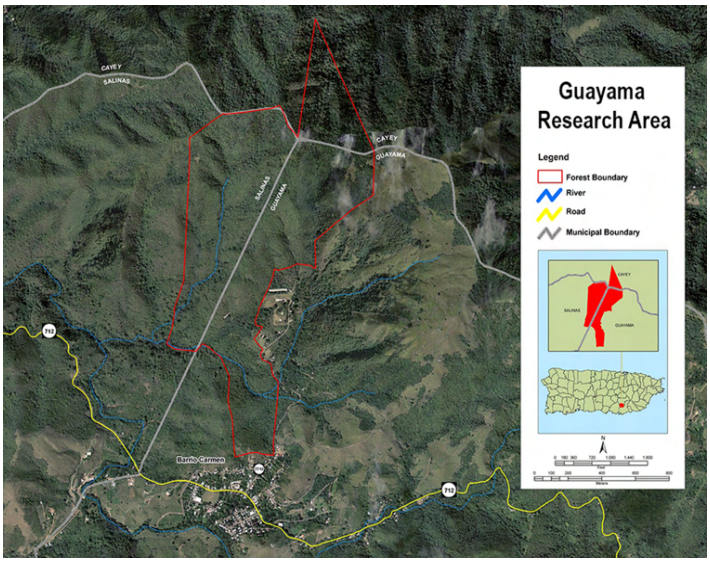
The Sabana Field Research Station is also the home of the Tropical Responses to Altered Climate Experiment, the only experiment in the world studying the interactive processes between climate and hurricane disturbance on tropical forests, particularly the effects on carbon and nutrient cycling (https://www.forestwarming.org/).

The Sabana Field Research Station is comprised of facilities and specialized equipment that support numerous research programs and projects from domestic and international agencies and institutions. There are several buildings in the station complex, including:

- Administrative building with conference room
- Laboratory building for wet and dry analyses
- Storage building
- Office buildings for Forest Service scientist and technicians
- Multipurpose building including office space, laboratory space, oven room, sample preparation room, storage areas, laundry room, and a flammable storage area
- Dormitory building, with restrooms, kitchen, living and balcony areas

Guayama Research Area

The Guayama Research Area is located on the southeast side of Puerto Rico where the Guayama, Cayey, and Salinas municipalities meet. This property, transferred to the Institute by the USDA Farm Service Administration in 2010, has an area of approximately 141 hectares (348 acres). It is intersected by a creek that traverses the property from east to west (Quebrada del Palo) and several other intermittent streams. Diverse plant communities and numerous microhabitats characterize this research area which also has a steep topographic profile.



Aerial photos of the Guayama Research Area boundary in 2007.

Physical environment

As many areas in south-eastern Puerto Rico, the Guayama Research Area has a climate typical to tropical dry-to-moist forests in the island. The region tends to have significant rainfall most months, with a short dry season. Average annual temperature for the Guayama municipality is 24.7 °C and mean annual precipitation is about 1293 mm (https://en.climate-data.org/). Soils in the region are overall shallow, well drained, moderately permeable soils on side slopes and summits and are generally formed by residuum and colluvium material weathered from basalt, chert, and rhyolite (https://soilseries.sc.egov.usda.gov/).

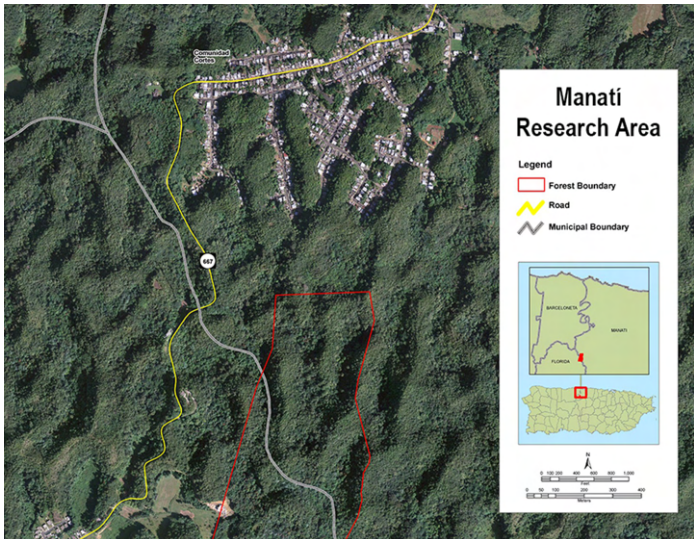
Facilities and amenities

The property, which is currently being surveyed, has a small network of old, unpaved farm roads that provide access from its east side and from its north side, the latter through Cayey. Improvements to these dirt roads are expected and will be pivotal for supporting future research activities in this area.

In 2015, a new weather tower was installed in the Guayama Research Area. The tower and sensors received extensive damage during Hurricane María in September 2017. In March 2018, the Southern Research Station Coweeta Hydrologic Laboratory assisted the Institute in repairing this tower, as well as other instruments housed in other experimental forests and research areas.

Manatí Research Area

Along with the Guayama Research Area, the Manatí Research Area was also transferred to the Institute in 2010. This property has 27 hectares (66 acres) and is in the northern part of the island's northern karst region, specifically along the boundary of the Manatí and Florida municipalities. While surveys of this property are still pending, aerial and satellite photos indicate it is mostly comprised of closed secondary forest.



The Manatí Research Area boundary mapped in the 2007 aerial photos.

Physical environment

The Manatí Research Area features a climate typical to the tropical moist forests in the northern inland limestones of the island. Average annual precipitation is about 2,300 mm whereas average annual air temperatures are around 24 °C, varying a few degrees from winter to summer. The northern karst region, where the Manatí Research Area is embedded, is overlain by thick limestone formations of Oligocene to Miocene Age. There is a broad diversity of soil types in this region, but in general, these limestones are covered by blanket sands and alluvial soils.

Facilities and amenities

At present, there are no facilities or amenities in the Manatí Research Area. Infrastructure to be developed in the future is expected to facilitate research centered on ecological dynamics in secondary moist karst forests which contrast with karstic dry forests in Guánica and secondary forests on other substrates in the Luquillo Experimental Forest.

Estate Thomas Experimental Forest

Located in the St. Croix, U.S. Virgin Islands, the 60 ha (148 acres) Estate Thomas Experimental Forest is the easternmost experimental forest and the oldest tropical dry forest in the USDA Forest Service Experimental Forest and Range system. It is located at an elevation of 76-37 m above sea level, 5.4 km west of Christiansted, St. Croix.



Estate Thomas Experimental Forest. Source: IITF Library Photo Collection, date unknown.

History

The St. Croix Sugar Factory, Inc. owned Estate Thomas in 1917 when the U.S. government purchased St. Croix from Denmark. The West Indies Sugar Factory bought the land in 1928 and sold it in 1931 to the Chabert Family. The U.S. government bought it in 1934 and the Forest Service acquired the tract from the Virgin Islands Corporation in 1963 for tropical dry forest research. Forest Service Chief, Ed Cliff, designated the Estate Thomas Experimental Forest on March 11, 1964. The International Institute of Tropical Forestry administers Estate Thomas in collaboration with the U.S. Virgin Islands Government. The vegetation is representative of the dry forests of the Virgin Islands, and by its location near the geographic center of St. Croix, it is a strategic area of open space in a densely populated island.

Research at the Estate Thomas began in 1930. It started with the planting of small-leaf mahogany and other timber species which served to address questions related to the adaptability of tropical timber species to dry conditions in St. Croix. The Forest Service used the results from research at the forest to improve tree productivity on nearby private lands. Today, Estate Thomas research focuses on the restoration of tropical dry forests following deforestation and other disturbances.

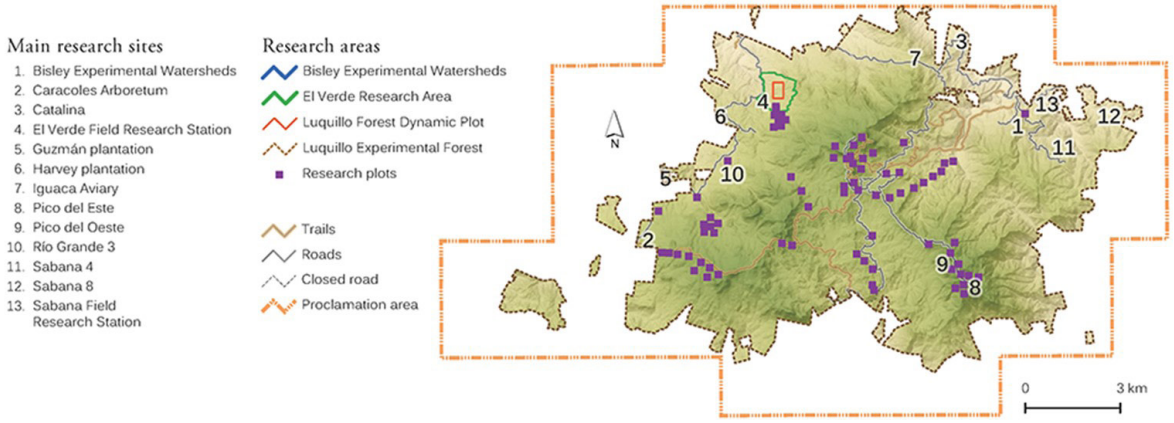
Physical Environment

Dry forests of Estate Thomas experience an annual rainfall that averages 1,100 mm. Mean annual temperature is close to 26.7 °C, varying daily by 8 °C. The property has hilly slopes with shallow and very stony and well drained clay soils. Estate Thomas vegetation also includes secondary forests that emerged naturally after the abandonment of agriculture, and tree plantations established by the Forest Service for experimental purposes.

Facilities and amenities

Estate Thomas is available for studying secondary forest succession on abandoned agricultural lands in dry life zones. A pavilion atop a high concrete slab was built in 2012 to support research, education and outreach activities. The forest boundary is fenced in its entirety and in addition to the pavilion, it includes an environmentally friendly composting restroom. The pavilion, fencing and restroom help support educational activities with students of all ages in the U.S. Virgin Islands.

Luquillo Experimental Forest



Map of the Luquillo Experimental Forest with the main research sites and areas.

The Luquillo Experimental Forest (LEF) is the largest tropical forest in the USDA Forest Service Experimental Forest and Range system. It overlaps in its entirety with the El Yunque National Forest (EYNF), the only tropical forest in the US National Forest System and only National Forest in Puerto Rico. Comprising about 11,540 ha (28,516 acres), the LEF has been studied for over 100 years and is one of the most intensively studied tropical forests in the world. The Luquillo Experimental Forest comprises the largest area of primary forests in Puerto Rico and the most pristine rivers in the island, including several wild and scenic rivers.

Physical environment

The Luquillo Experimental Forest features moist to very wet tropical (rain) forests. Along its 1,000-meter elevation gradient (100 to 1,075 m asl), LEF mean annual temperatures range from 25 to 19 °C. Mean annual rainfall varies from 2,000 to 5,000 mm. The average annual rainfall for the forest is 3,880 mm. Dominant soils are deep, highly weathered, and leached clays with low acidity. Nearly 240 tree species form the different forest types found in this protected area. While natural fires do not occur, storms, hurricanes and droughts change forest conditions periodically, mostly over decadal time scales.



View from El Portal Visitor Center.

History

The forests of the LEF have been formally protected since1876 when the lands were set aside by the Spanish King Alfonso XII to protect its water, soil, and wood under the rule of the Spanish crown. After ceding Puerto Rico to the United States, the forested lands in this area were designated as the Luquillo Forest Reserve by President Theodore Roosevelt in 1903. Recognizing the growing importance of tropical forest research, the forest in its entirety was designated as the Luquillo Experimental Forest in 1956. The United Nations declared the LEF/EYNF as a biosphere reserve in 1976, and in collaboration with the University of Puerto Rico, the LEF was incorporated to the Long-Term Ecological Research (LTER) program in 1988.

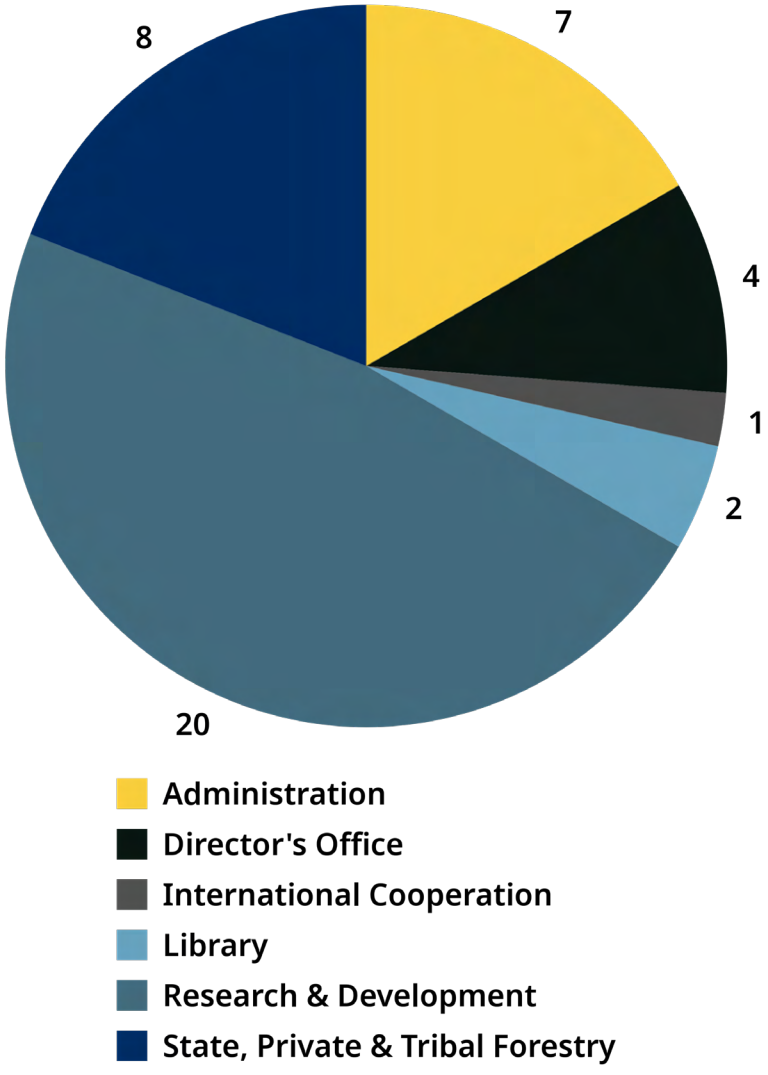
Research studies in the Luquillo Experimental Forest range from plantation forestry, reforestation, land rehabilitation, tree growth, and ecosystem structure and function, to wildlife ecology, geomorphology, and disturbance and landscape ecology. The Bisley Experimental Watersheds within the LEF also offer important research areas within the forest, particularly for studies focusing on hydrological and plant ecological dynamics. The LEF currently provide research areas to more than 30 cross-site experiments. Many long-term data records from these experiments are available on the Luquillo LTER web page (https://luquillo.lter.network/).

Facilities and Amenities

The Luquillo Experimental Forest offers opportunities for research in tropical forestry and related fields. Programs such as those of the USDA Forest Service, the National Science Foundation, the US Geological Survey, and the University of Puerto Rico are available for research collaboration in all fields of the natural sciences.

Besides the facilities available at the Sabana Field Research Station, the LEF also has living quarters and laboratory facilities for up to 25 scientists at the El Verde Field Station. This station is managed by the Department of Environmental Sciences and the Institute for Tropical Ecosystem Studies, both at the University of Puerto Rico in Río Piedras. The station provides collections of local plants and animals, a laboratory with light meters, balances, microscopes, pH meters, hoods, and other research equipment. The Biology Department of the University of Puerto Rico (Río Piedras) also maintains a second field station in the LEF, at a site near a Palo Colorado Forest.

Employee Distribution by Unit

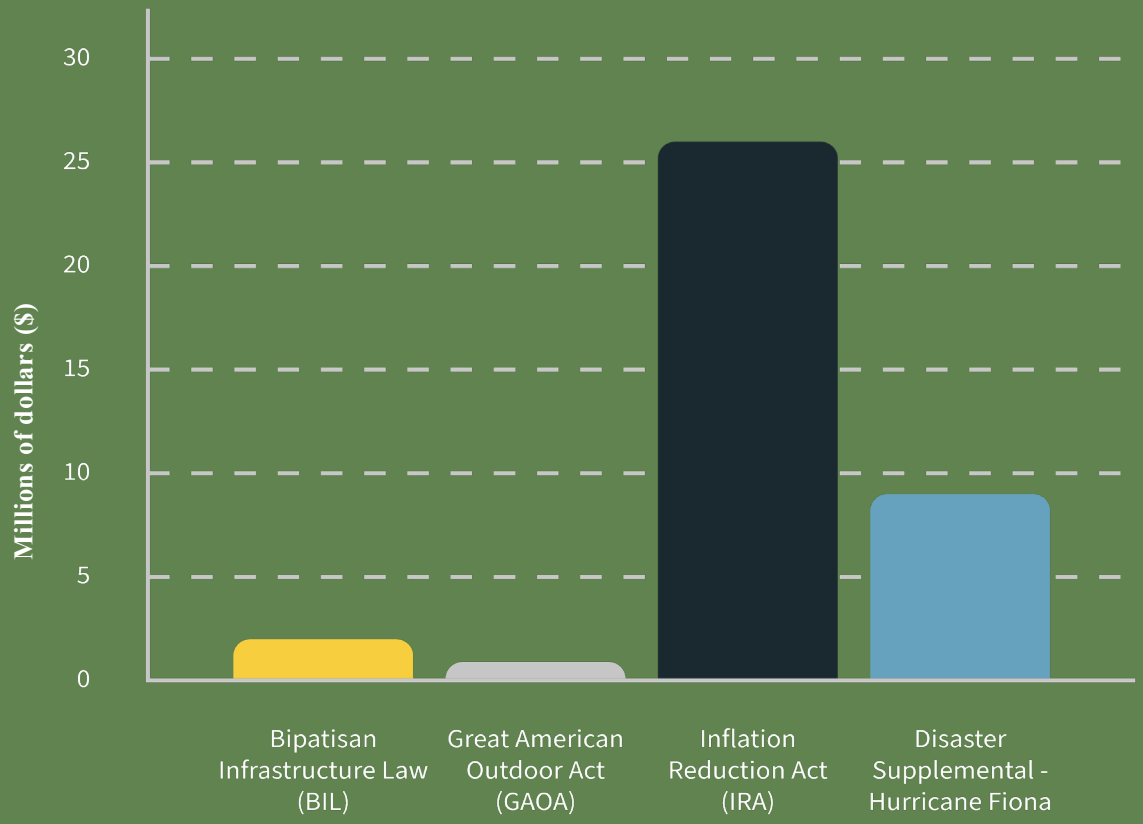


Budget and Funding

Programmatic Funds and Salary

Unit	Programmatic Funds	Salary	Total
Administration	$ 613,454	$ 1,314,912	$ 1,928,366
Research & Development	$ 386,516	$ 2,747,054	$ 3,133,570
State, Private & Tribal Forestry	$ 1,604,246	$ 564,463	$ 2,168,709
International Cooperation	$ 121,119	$ 182,794	$ 303,913

Special Funds



Partners

Cooperators who received funding from the Institute

Non-Governmental Organizations

- Caribbean Regenerative Community Development, Inc
- Community Foundation of the Virgin Islands
- Effective Environmental Restoration (EER), Inc.
- National Experienced Workforce Solutions Inc
- Protectores de Cuencas Inc.
- Puerto Rico Forestal Inc.
- St. Croix Environmental Association
- The St. George Village Botanical Garden of St. Croix, Inc.
- Virgin Islands Trail Alliance Inc

Private Industry

- Proyecto Coqui Incorporado

Universities

- Colorado State Universiy
- University of Puerto Rico - Río Piedras Campus
- University of Puerto Rico - Agricultural Extension Service
- University of Wisconsin
- Virginia Polytechnic Institute & State University

State Government

- Puerto Rico Firefighters Corps
- Puerto Rico Department of Natural and Environmental Resources
- U.S. Virgin Islands Department of Agriculture
- U.S. Virgin Islands Fire Department

Federal Agencies

- Department of Energy, Oak Ridge Associated Universities

Cooperators Who Provided Funds to the Institute

- U.S. Department of Energy

International Cooperation

International Cooperation provides leadership, mentorship for technical assistance, technology transfer, and long-term research to partners and collaborators in more than 20 countries, mostly in the Latin America and Caribbean region. The assistance provided focuses on numerous activities related to biodiversity conservation, sustainable tourism development, conservation of urban green, blue, gray and brown spaces, and adaptation to climatic variation in communities and major urban centers at both local and regional levels. The focal geographic regions of this unit for FY 2024 were Dominican Republic, El Salvador, and Nicaragua, but services to other partners throughout Central America, the Caribbean and other parts of the world are also provided. International Cooperation also coordinates with and supports IITF and cooperating scientists with funding and creates opportunities to expand long-term research throughout the world.



IC Program Manager, Jerry Bauer, discussing forest therapy with participants and Forest Therapy guides at the USDA People's Garden in Washington, DC.

International Cooperation team:

Gerald Bauer, International Cooperation Team Leader/ Biological Scientist

Yanira L. Cortés-Escuté, International Specialist & Event Coordinator

Accomplishments

Global Big Day: Celebration of migratory birds in Dominican Republic

IITF International Cooperation and Research & Development Wildlife Scientist, Wayne Arendt, joined forces to provide support to the Global Big Day and Celebration of Migratory Birds in Dominican Republic. During the event, held on October 29, 2023, both units provided technical assistance and guidance to several NGO's, including Grupo Acción Ecológica (GAE), la Asociación de Propietarios y Residentes de la Ciudad Colonial (APRECC), among others.



Maria Paulino, Executive Director, NGO Grupo Acción Ecológica (GAE) leading a conservation activity with local community members and youths to teach about migratory birds in Santo Domingo, Dominican Republic.



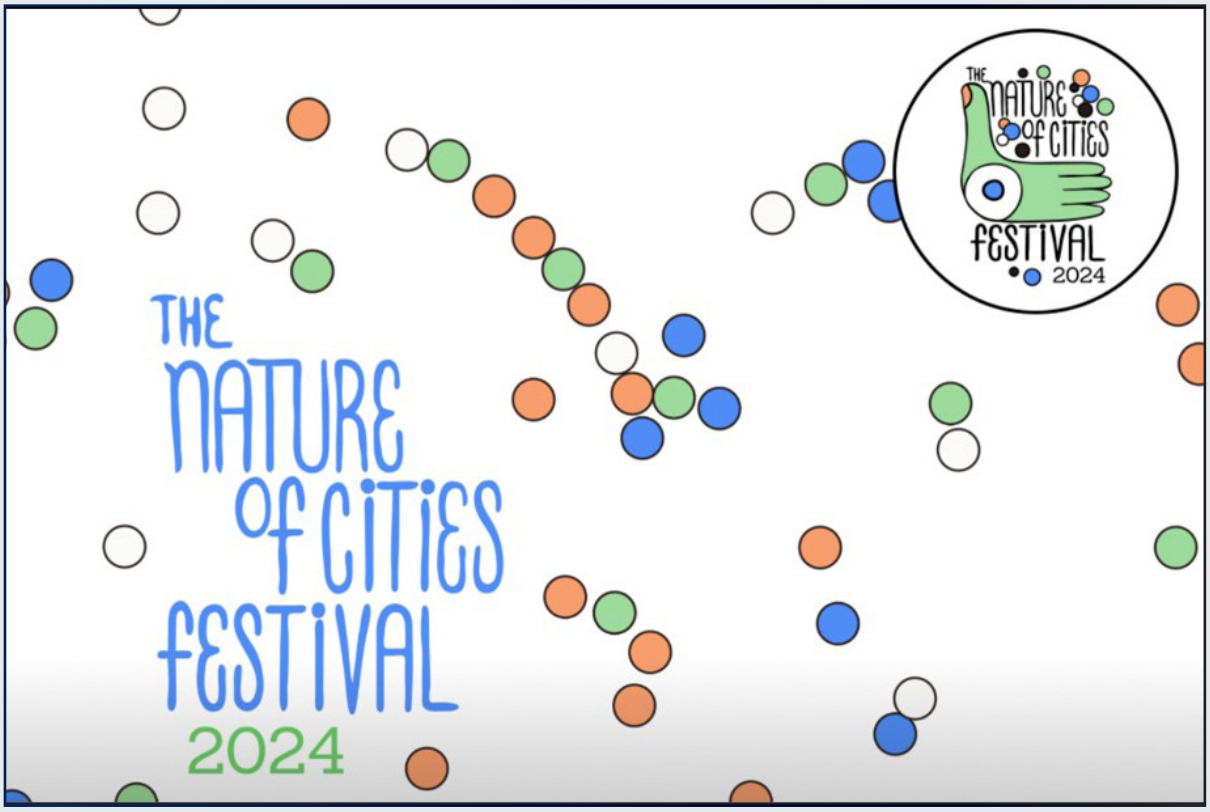
City youths participating in conservation activity in the Colonial City, Santo Domingo as part of Global Big Day celebration of migratory birds.

Conservation photography for scientists and artists

Self-described as an "idea hive", The Nature Of Cities (TNOC) is a nonprofit organization founded in 2012 that has the mission of combining art, science, and practice in innovative and publicly available engagements for knowledge-driven, imaginative, and just green city making. For more than 24 years, IC has been a cooperating partner with TNOC, particularly through the U.S. Forest Service Urban Field Station Collaborative Artist in Residence Program (https://ufsarts.com/) created in year 2000.

The Nature of Cities Festival is likely the most important yearly celebration that the organization carries out. The event gathers people from all corners of the world and challenges them to reimagine cities as better places for both people and nature. IC Program Manager, Jerry was proud to represent the Institute at this global event by offering his interactive presentation, "Combining Conservation Photography for Scientists and Artists".

Keeping in perspective that the goal of conservation photography is to combine photography, art, culture, science, and land ethics for the protection of natural resources and the conservation of wildlife and habitats for the benefit of ecosystems and society, Jerry shared with participants his views on how photography can be used as a tool to link scientists, artists, stakeholders, and communities to work together for conservation. His 2-hour session was attended by ten participants representing seven countries on three continents. Jerry has been teaching conservation photography in Latin America and Caribbean for more than 30 years. His work, which has been awarded in different forums in the past, demonstrate how to use visual arts as a tool for scientist and artist to collaborate on "conservation diplomacy".



Event art for The Nature of Cities Festival 2024. This was a virtual conference held from April 15-26, 2024, that brought together the global community of changemakers, mixing art, science, and urban practice to build better cities for nature and people.

Endemic Bird Festival

When it comes to offering technical support and guidance to collaborators, IC Program Manager, Jerry Bauer and Research Wildlife Biologist, Wayne Arendt, are among the first to step up. The "Caribbean Endemic Bird Festival" held during FY 2024 in Dominican Republic was one of those unique instances where they had the chance to lend a hand.

In that occasion, Jerry and Wayne aided their long-term partners María and Luis Paulino from Grupo Acción Ecológica (GAE). Among the many activities carried out, María and Luis offered a presentation and led the youth group Green Brigade of the Abriendo Camino Foundation and other participants during a field trip. The presentation, offered on April 30, 2024, emphasized endemic birds, their importance to ecosystem services, their songs, and species identification. In fact, multiple photographs of endemic birds taken throughout the country as part of IC's multiple year technical assistance and research projects featured prominently in Maria and Luis' presentati on.

After the presentation, and with assistance and key suggestions from Jerry and Wayne, students and staff from the Jardín Botánico Nacional Rafael María Moscoso went for the field trip. The experience consisted of a hike that allowed participants to practice bird and song identification. At the conclusion of the event, twenty-seven students, three teachers and many other collaborators from BirdsCaribbean and the Jardín Botánico Nacional, took with them basic skills for successful bird identification and new knowledge about the unique avifauna of this biodiverse country.



Twenty-seven youths and three teachers from the Green Brigade of the Abriendo Camino Foundation participated in the Caribbean Endemic Bird Festival at the Jardín Botánico Nacional Rafael M. Moscoso in Santo Domingo on April 30, 2024.



María and Luis Paulino, Founders of Grupo Acción Ecológica (GAE), led an educational bird observation field trip for youths from the Green Brigade of the Abriendo Camino Foundation at the National Botanical Garden in Santo Domingo, Dominican Republic.

Digital Photography for Biologists

Digital photography is undoubtedly a fundamental tool for any person interested in biodiversity and conservation work. For those participants of V Simposio Nacional de Biodiversidad y Conservación that may have lagged in this undertaking, the symposium's virtual workshop "Fotografía Digital para Biólogos" provided unique opportunity to begin mastering this important skill.

The workshop, offered by International Cooperation Program Manager, Jerry Bauer, Research Wildlife Biologist, Wayne Arendt, and IC partners, Adelayde Rivas (Global Communication Resources), Dayla Selva, and Marvin Tórrez (SetNet Communication), exposed participants to the main aspects of digital photography for biological research and conservation. Attended by 15 participants from Salvadorian universities and Salvadorian NGOs, the event was also fitting for the commemoration of the World Environmental Day, which was celebrated on June 5, 2024.



The symposium was organized by the Sociedad Mesoamericana de Biología y Conservación (SMBC) and was held between June 3-4, 2024, in the Museo Nacional de Antropología David J. Guzmán in San Salvador, El Salvador. The SMBC is a regional NGOs that was founded in 1996 with technical support and mentorship from Jerry and Wayne. Since its founding, chapters have been established in every country in Mesoamerica, with more than 20,000 young Hispanic biologists having received training through the SMBC.



Screen shot of a brochure design developed as part of the virtual conservation photography short course. This design demonstrates how to use high-quality conservation photography.

BirdsCaribbean International Conference

International Cooperation (IC) Program Manager, Jerry Bauer; Research Wildlife Biologist, Wayne Arendt; and IC partner Adelayde Rivas, from Global Communication Resources, actively participated in the 24th BirdsCaribbean International Conference "From Mangroves to Mountains, Safeguarding Our Avian Treasures", held on Santo Domingo, Dominican Republic from July 18-22, 2024.



Participants in the Conservation Photography short course presented at the 24thBirdsCaribbean International Conference held in Santo Domingo, Dominican Republic. A total of 12 attendees from 5 countries participated in this short course led by IC Program Manager, Jerry Bauer

Overarching contributions by the IC + R&D team and its partners included presentations, posters, workshops, etc., including:

Presentations:

- Title: Developing bird-watcher site guides to support community bird tourism and conservation.

Authors: Wayne J. Arendt, Jerry Bauer, Adelayde Rivas Sotelo and Marvin Tórrez.

- Title: Conexión: The Cape May warbler, linking scientists and artists to support bird conservation in the Dominican Republic.

Authors: Jerry Bauer, Kilia Llano, Wayne J. Arendt, Adelayde Rivas Sotelo.

Poster:

- Title: Conservation Photography, a Tool to Increase Awareness and Engage Stakeholders in Conservation of Birds- Experiences from Central America and the Caribbean.

Authors: Jerry Bauer, Wayne J. Arendt, and Adelayde Rivas Sotelo.

Workshop:

- Design and implementation of workshop on "Conservation Photography for Biologists, Artists, and Stakeholders". The purpose of this workshop was to provide participants an introduction to conservation photography and how it can be used as a tool to support, promote and market bird and biodiversity conservation.

Oral interviews:

Conducted 20+ video interviews with conference participants. These interviews will be shared with BirdsCaribbean for promoting and marketing of the conference and bird conservation. Social Media Post:

- Designed 15+ social media post for Facebook, Instagram and YouTube. During the conference these were posted and shared on partner social media sites.

Photography:

- Photo bank of 100+ high-quality photographs. These will be shared with partners and collaborators for social media, and marketing and promotion of their conservation activities.

Videos:

- Video bank of high-quality video clips. These will be shared with partners and collaborators for social media, and marketing and promotion of their conservation activities.



Jerry Bauer showing Conservation Photography short course participant, Luis Paulino, Dominican Republic, a bird photography technique during the field session at the 24th BirdsCaribbean International Conference held in Santo Domingo, Dominican Republic.

IITF-International Cooperation partners going all out for spider monkey conservation in El Salvador

FY 2024 also witnessed major accomplishments from IITF-International Cooperation (IC) partners at the American Society of Primatologist (ASP) conference, which was held both virtually and in-person in the Riviera Maya, Mexico, from September 9-12, 2024. Among the most noteworthy was the technical talk, "Little Seeds, an environmental education program for the conservation of spider monkeys and their habitat in Jucuarán, El Salvador", offered by Melissa Rodríguez (currently Director of Ecosistemas Terrestres ATVES and Coordinator of the Grupo de Interés Temático de Murciélagos of the Sociedad Mesoamericana de Biología y Conservación), and her colleagues, Karla Zaldaña, Debora Elías, Carlos Funes, y Jorge González-Linares. The conservation of spider monkeys' project in El Salvador highlighted in the talk represents one of the few ongoing efforts to understand the status and threats affecting Salvadorian populations of this charismatic species. This initiative received financial support from the ASP and ReWild grant "Saving primates where they live".

The "Little Seeds ("Semillitas") youth conservation STEM program was started in 2022 with support from IITF-IC and modeled after the "Girls with Wings" program founded and IITF-IC partner Setnet Communication/Global Communication Resources.



"Semillitas" presentation at the Conservation Committee symposium, American Society of Primatologists conference (ASP) recently held in Rivera Maya, Mexico.



"Semillitas" youth learning how to use binoculars to monitor biodiversity, including spider monkeys, in the Río Sapo Watershed, El Salvador.

Human Capital Development

Supporting rising scientists

IITF collaborator and IC partner, Solhanlle Bonilla Duarte, and other collaborators offered oral presentations at the XIX Congreso Internacional de Investigación Científica (XIX CIC-2024), in Santo Domingo, Dominican Republic, from June 11-14, 2024. These presentations are part of the Urban Long Term Research Area (ULTRA) and iTree projects' activities, which are jointly coordinated by the Instituto Tecnológico de Santo Domingo (INTEC), the University of Puerto Rico (UPR) and the IITF.

A primary objective of these activities is to train local scientists and help build a collaborative network in the Dominican Republic amongst scientists, institutions and stakeholders. The titles for the talks presented are as follow:

1. Rol de la escuela en la evaluación de los servicios ecosistémicos de los bosques urbanos y periurbanos: diagnóstico en la ciudad de Santiago de los Caballeros.
   Authors: Gabriela Liranzo Encarnación, Ulises Jauregui, Solhanlle Bonilla Duarte. Presentadora: Gabriela Liranzo Encarnación.

2. Servicios ecosistémicos de los bosques urbanos y periurbanos de la ciudad de Santiago de los Caballeros y su potencial de adaptación al cambio climático.
   Authors: Luis Alejandro Acosta Martínez, Ulises Jauregui, Solhanlle Bonilla.

3. Contaminación del aire por material particulado (PM2.5 y PM10) en el Distrito Nacional, Santo Domingo, República Dominicana.
   Authors: Carime Matos Espinosa, Ramon Antonio Delanoy de la Cruz, Jose Ramón Martínez Batlle, Anel Hernández Garces, Ulises Jauregui, Solhanlle Bonilla, Claudia Caballero.

4. Impacto del Cambio de Uso de Suelo en la provisión de Servicios Ecosistémicos Urbanos en el Polígono Central de Santo Domingo, República Dominicana.
   Authors: Solhanlle Bonilla, Gilkauris Rojas, Alma Liz Vargas de la Mora, Julio Peña, Constantinos Saliaris, Winston González, Rafael García Estévez.

Technical Reports

The following is a list of reports and audiovisual materials developed with the assistance of the IITF IC program during FY 2024. These are available upon request to the IITF IC Program Manager.

1. Rivas Sotelo, Adelayde. Informe Técnico “Comunidades y Poblaciones Latinas Vulnerables Centraoamérica, El Caribe y EE.UU”, Programa de Apoyo a organizaciones ambientales, sociales y culturales de las comunidades latinas en Centroamérica, el Caribe y Texas, para la conservación de la biodiversidad y la mitigación del cambio climático”.
2. Jerry Bauer, A. Rivas Sotelo, W. Arendt. 2024. Technical Report: US Forest Service, International Institute of Tropical Forestry Participation in BirdsCaribbean 24th International Conference, from mangroves to mountains safeguarding our avian treasures. Santo Domingo, Dominican Republic. August 2024.
3. Jerry Bauer, A. Rivas Sotelo, W. Arendt. 2024. Technical Report: Conservation Photography for Biologists, Artists and Stakeholders. BirdsCaribbean 24th International Conference, from mangroves to mountains safeguarding our avian treasures. Santo Domingo, Dominican Republic. August 2024.



Other Reports

The following set of technical reports summarize IC activities in the *Second World Forum on Urban Forests (WFUF).* The event was held between October 16-20, 2023, in Washington DC. The reports were produced in collaboration with Conservation Conexions and Global Communication Resources.

1. Conway, Tamberly and Adelayde Rivas. 2023. World Forum on Urban Forest Affiliated Event. Nature and Forest Therapy Participant Primer, Urban Forest Field Tour and Therapeutic Urban Forest Immersion at the Old Goucher District, Baltimore, MD. Organized by Baltimore Climate Resilience Coalition.
2. Conway, Tamberly and Adelayde Rivas. 2023. World Forum on Urban Forest Affiliated Event, Nature and Forest Therapy Participant Primer, Healing Power of Nature, Forest Therapy in Action, USDA People's Garden, Washington D.C.
3. Conway, Tamberly and Jennifer Conje. 2023. Technical Report, World Forum on Urban Forest (WFUF), Special Session, with Won Sop Shin. US Forest Service International Programs Office (USFS IP) Forest Therapy Reception, Meet & Greet.
4. Bauer, Jerry, Tamberly Conway, and Adelayde Rivas Sotelo. 2023. Technical Report, Urban Forestry and Forest Therapy Field Excursions, Old Goucher Neighborhood, Baltimore, Maryland and USS People's Garden, Washington DC.
5. Bauer, Jerry and Adelayde Rivas Sotelo. 2024. Photographic Report, Urban Forestry and Forest Therapy Field Excursions, Old Goucher Neighborhood, Baltimore, Maryland. 2nd World Forum on Urban Forest (WFUF), Washington DC.
6. Bauer, Jerry and Adelayde Riva Sotelo. 2024. Photographic Report, Urban Forestry and Forest Therapy Field Excursions, USDA People's Garden.

Videos

The following videos capture several activities during the *Second World Forum on Urban Forests (WFUF)*. The event was held between October 16-20, 2023, in Washington DC. The videos are the result of a collaboration between the IITF IC unit with Conservation Conexions and Global Communication Resources.

1. Video interview, Tamberly Conway with Won Sop Shin. "Healing Powers of Nature: Forest Therapy in Action" During the 2023 World Forum on Urban Forests in Washington, DC. 9:23 minutes. https://www.youtube.com/watch?v=HfiakT-dQTc.
2. Video interview, Tamberly Conway withMartha Liliana Perdomo, Director of el Jardín Botánico, Bogotá, Colombia, "Hispanos en el 2do Foro Mundial de Bosques Urbanos". World Urban Forum on Urban Forest (WUFU). 8:32 minutes. https://www.youtube.com/watch?v=C_BIXfCoghY.
3. Video interview, Adelyade Riva with Mateusz Rózanski, Executive Director Baltimore Climate Resiliency Coalition (BCRP)". World Urban Forum on Urban Forest (WUFU). 2:56 minutes. https://www.youtube.com/@globalcommunicationresources.
4. Video, Inmersión de Terapia de Bosque en Washington DC. World Urban Forum on Urban Forest (WUFU). 8:55 minutes. https://www.youtube.com/watch?v=sg2nzYpDyxY.
5. Video, Foro Mundial de Bosques Urbanos – Washington DC. 2.55 minutes. https://www.youtube.com/watch?v=UbHc8sRsNlU&t=9s.
6. Video, Foro Mundial de Bosques Urbanos – Washington DC. 2:01 minutes. https://www.youtube.com/watch?v=9mQgKh18gqI.

The Extended International Cooperation Family

Besides the core IITF staff, the International Cooperation team consists of numerous experts that collaboratively assist the IC program in its mission. This group of contracted specialists, volunteers, citizen scientists, and field technicians are:

- Tamberly Conway, Conservation Conexions, Founding/Executive Director
- Juan Pablo Domínguez, Biosistemas Network, Founding Director
- Patricia Lamelas, Centro para la Conservación y Ecodesarrollo de la Bahía de Samaná y su Entorno (CEBSE), Founding Director
- David Maddox, The Nature of Cities (TNOC), Founding Director
- Adelayde Rivas Sotelo, SetNet Communications/Global Communication Resources, Founding/Executive Director
- Sara Otterstrom, Paso Pacífico, Founding/ Executive Director
- Maria Paulino, Grupo Acción Ecologica, Founding/Executive Director

Nicaragua technical team:

- Marvin Tórrez, Wildlife Biologist/Field Research Coordinator/Trainer
- Marlon Sotelo, Wildlife Biologist/Field Research Coordinator/Trainer
- Norma Jovel Amaya, Biologist/Trainer
- Dalya Selva, Graphic Design/Photography
- Santos Padilla, Videographer/Studio Technician

Dominican Republic technical field team:

- Liliana Peralta, Graphic Design
- Luis Paulino, Assistant Wildlife Field Technician
- Grisel Francisco Uribe, Field Technician
- Alvin Montero, Field Technician
- Giovanny Paulino, Field Technician
- Ana Pou Espinal, Field Technician
- Claudia Caballero, Field Technician
- Leonardo Cortés, Field Technician
- Juan Calcaño, Citizen Scientist
- Modesto “Acho” Nuñez, Citizen Scientist
- José Alberto Tavares, Citizen Scientist
- Kilia Llano, Art Resident
- El Salvador technical team:
- Raquel Pérez, Project Assistant
- Armando Gutiérrez, Administrative Assistant
- Julieta Castillo, Coordinator National Programs
- Jose del Carmen Romero Arias

Partner Organizations

The IC team also collaborate directly with numerous organizations and universities devoted to biodiversity and conservation work in Latin America, the Caribbean, the US and abroad. These are:

Costa Rica:
- Sociedad Mesoamericana para la Biología y la Conservación – Capítulo Costa Rica (SMBC)

Dominican Republic:
- Altagracias Tourism Cluster
- AgroFrontera
- Ayuntamiento Distrito Nacional
- Grupo Acción Ecológica
- Ingeniería y Soluciones Ambientales, SRL (INSOAM)
- Ministry of Environment and Natural Resources of Dominican Republic
- Ministry of Culture of Dominican Republic
- Ministry of Tourism of Dominican Republic
- Ministry of Education of Dominican Republic
- Santo Domingo Tourism Cluster
- Pontificia Universidad Católica Madre y Maestra (PUCMM)
- Instituto Tecnológico de Santo Domingo (INTEC)
- Universidad Nacional Evangélica (UNEV)
- Red Ambiental de Universidades Dominicanas (RAUDO)
- Universidad APEC
- Universidad Autónoma de Santo Domingo (UASD) Escuela de Biología
- Universidad Central del Este (UCE)
  Universidad Iberoamericana (UNIBE)
- Universidad Nacional Pedro Henríquez (UNPHU)
- Centro de Investigación de Biología Marina (CIBIMA-UASD)
- Universidad de Ciencias Comerciales (UCC)
- Universidad Iberoamericana de Ciencia y Tecnología (UNICIT)
- Universidad Centroamericana (UCA) Estación Biológica Juan Roberto Zarruk

El Salvador:
- Biosistemas Network
- Fundación Naturaleza
- Ministry of Environment and Natural Resources of El Salvador
- Sociedad Mesoamericana para la Biología y la Conservación – Capítulo El Salvador (SMBC)
- Territorios Vivos
- The Center for Conservation and Ecological Development of the Bay of Samaná and its Surroundings (CEBSE)
- The Zoological Foundation of El Salvador (FUNZEL) (through Alliance with Paso Pacífico)

Germany:
- German Agency for International Cooperation (GIZ)

México:
- Sociedad Mesoamericana para la Biología y la Conservación – Capítulo México (SMBC)

Nicaragua:

- Arboretum Benito Salidas
- Agua Para La Vida
- Arenica
- Asociación Cambio
- Birdwatching Granada
- Biosistemas Network
- Bone Events & Turismo
- Eco-Develoment
- Eco-Way
- Eco-Comunica
- El Niño y La Bola
- Cámara de Recicladores Nicaragüense (CARENIC)
- Centro de Producción Más Limpia
- Chinandega Birders Club
- Creaciones Elizabeth
- Comisión Ambiental
- Encuentro de Amor y Esperanza (Hope & Love Foundation)
- Encuentro Latino
- Fundación Cocibolca
- Fundación Nicaragüense para el Desarrollo Sostenible
- Fund-Naturesa
- Hanter Metals Ltd. (HM)
- Huevos Marfeli
- La Unión Nicaragüense para la Responsabilidad Social Empresarial (uniRSE)
- Loto Nicaragua
- Manualidades Arociris
- Mambume
- NicaWomanTech
- Paso Pacífico
- Portal XOLO
- Programa de Conservación de los Murciélagos (PMC)
- Programa de Producción Más Limpia (CPML)
- Red de Empresarias de Nicaragua (REN)
- Reserva Concepción de María
- Reserva Mákina
- Reserva Natura
- Reserva Silvestre Privada Concepción de María
- Reserva Silvestre Privada Los Guatuzos
- Reserva Silvestre Privada Montibelli
- Reserva Silvestre Privada Natura
- Reserva de Vida Silvestre El Chocoyero
- Score Foundation
- Sociedad Mesoamericana para la Biología y la Conservación – Capítulo Nicaragua (SMBC)
- Unión Nicaragüense de Empresas Socialmente Responsables (UniRSE)
- Vivero Nambume
- Vladimar Kayak Boat

USA:

- Américas por la Conservación + las Artes
- Biodiversity Research Institute
- Biosistemas Network
- Cornell Lab of Ornithology
- Conservation Conexion
- Counterpart International
- Dartmouth College
- Environment of the Americans
- Festival Ecológico de las Américas
- Houston Audubon
- Partners in Flight
- Que Onda Magazine
- Tetra Tech
- The Nature Conservancy
- U.S. Agency for International Development (USAID)
- United Nations Development Program (UNDP)
- United for Change Center (U4C)
- We Americans Foundation

State, Private and Tribal Forestry

The State, Private and Tribal Forestry (SP & TF) collaborates and provides professional, technical, and financial assistance to state government agencies, universities, private landowners, and non-profit organizations within Puerto Rico (PR) and the U.S. Virgin Islands (USVI) in accordance with the Cooperative Forestry Act of 1978. The unit collaborates closely to deliver its mission with the Puerto Rico Department of Natural and Environmental Resources, the Puerto Rico Fire Department, the Virgin Islands Department of Agriculture, and the U.S. Virgin Islands Fire Service.

Through targeted technical and financial assistance and conservation education, federal resources are leveraged to protect and support sustainable management of the islands' forests and ecosystems to produce goods and services that are important to many communities. This assistance is focused on cooperative forestry, forest health, urban and community forestry, cooperative fire protection, and landowner and legacy assistance programs.



IITF SP & TF team members, Andrés Pérez and Andrés González, exchanging ideas about sustainable agricultural practices and conservation with UCF Program Coordinator for the US Virgin Islands, Preston Brooks.



State, Private and Tribal Forestry staff lend a hand at the Cambalache forest tree nursery.

State, Private and Tribal Forestry team:

Magaly Figueroa Vázquez, Program Manager (Supervisory Biologist)

Aixa R Mojica-López, Program Support Assistant

Andrés Jr. González Nieves, Natural Resources Specialist

Andrés L. Pérez Cintrón, Natural Resources Specialist

Carlos J. Cruz Quiñonez, Natural Resources Specialist

Christina N. De Jesús Villanueva, Natural Resources Specialist

Jo Ann N. Santana López, Partnership Coordinator

Maya Quiñones, Natural Resources Specialist



Scope

All IITF SP & TF programs have been designed to tackle key issues concerning forest resources and management in PR and the USVI, including:

1. Sustainable use of private forest lands.
2. Fragmentation of forest ecosystems.
3. Water resources and watershed conservation strategies.
4. Education and information for the public related to the benefits local forest lands and trees provide.
5. Disaster forest management, planning and restoration related to hurricanes, floods, drought, wildland fires, pests, etc.
6. Concerns over invasive species
7. Economic opportunities and alternative market development

Goals

- Conserve and manage working forest landscapes for multiple values and uses.
- Support our State Forestry agencies to develop and implement strategic forest recovery and conservation strategies in state and private forests in Puerto Rico and the US Virgin Islands to restore function and structure of rural forests, ecological corridors, private forest lands, agroforestry, and urban forests.
- Protect forests from harm. Identify threats affecting forested landscapes, identify ways to control or reduce impact, reduce risks, and mitigate effects.
- Enhance public benefits from trees and forests; maximizing services of trees and forests: protect and enhance water quality and quantity; improve air quality and conserve energy; assist communities reducing forest health risks; maintain and enhance economic benefits and values of trees; protect, conserve, and enhance wildlife and fish habitat; connect people to trees and forests, and promote stewardship activities; manage forests to mitigate and adapt to climatic challenges.

Accomplishments

Community Forests and Open Space

Agroforestry Fair 2024 at Río Hondo Community Forest

As part of their efforts to engage with communities in conservation and forestry initiatives, the State, Private and Tribal Forestry (SP & TF) unit and the IITF Library visited the Río Hondo Community Forest in Mayagüez to participate in the Agroforestry Fair 2024 on April 19th, 2024.

In collaboration with the board of directors of the Río Hondo Community Forest, the Caribbean Regenerative Community Development (CRCD), and Boricorps, the event attracted more than 200 members of the community, including students from several schools. The SP & TF unit shared information about their programs at the Fair's Conservation and Forestry hub, which was shared with members of the Caribbean Climate Hub team. The Fair also included a farmer's market and an artisanal market. Community members also participated in guided walks through the Río Hondo Community Forest. Members of the unit also assisted at the different hubs and coordinating logistics prior to the event.

This was a highly successful event for the International Institute of Tropical Forestry and a pivotal step towards promoting conservation education, community engagement, and strengthening relationships with partners and the community.

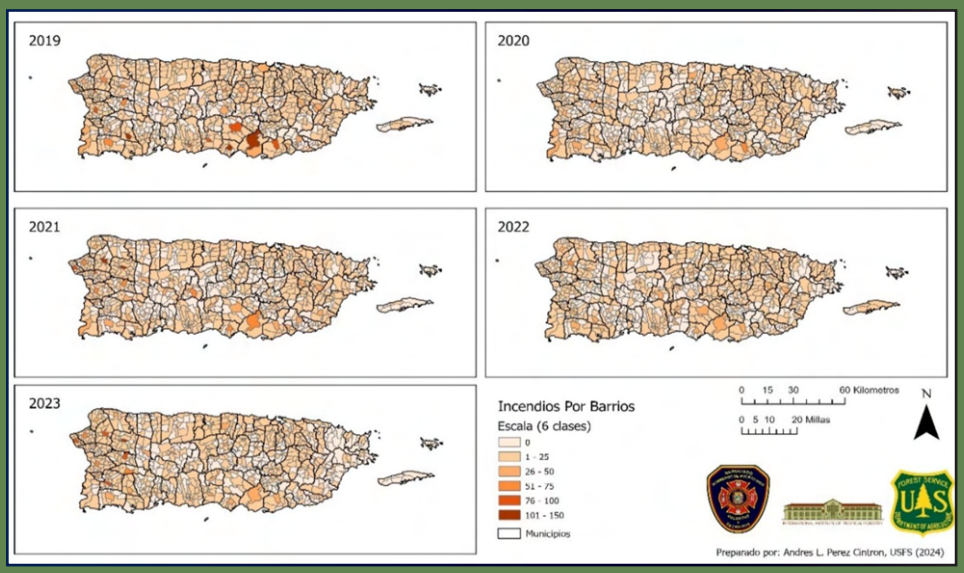


Group picture of SP & TF and CCH employees and interns with personnel from the CRCD, Boricorps, and board members of the Río Hondo Community Forest during the recent Agroforestry Fair 2024 in Mayagüez.

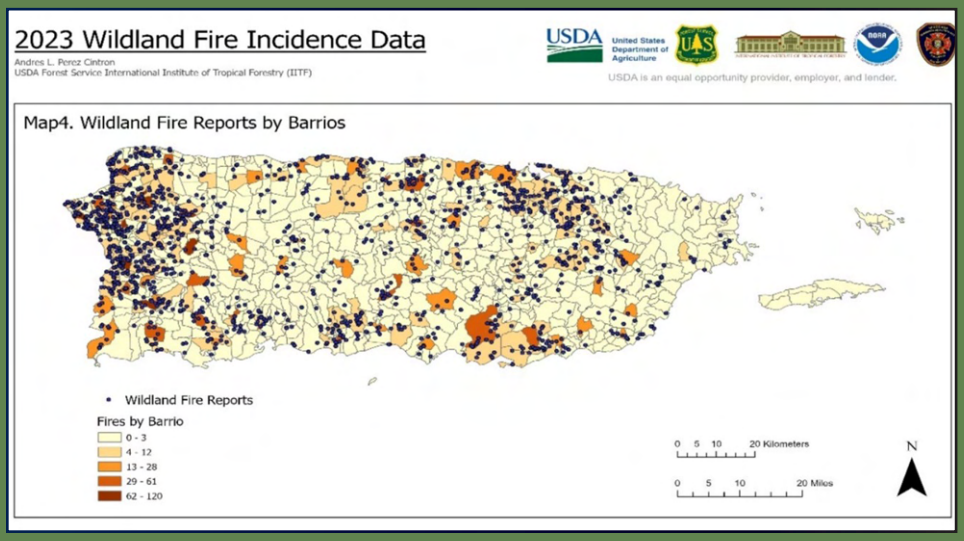
Cooperative Fire Program

A spatial approach to wildland fire incidence analysis in Puerto Rico and the US Virgin Islands

Knowledge about many aspects of the spatial scale of fires across forested landscapes in Puerto Rico is still quite limited. To begin addressing these shortcomings, Natural Resources Specialist, Andrés Pérez Cintrón, retrieved data and statistics on wildland fire incidence from the Puerto Rico Fire Department. Andres' goal is to perform formal spatial analyses to identify high fire incidence areas in Puerto Rico and the US Virgin Islands. While the work is still ongoing, Andrés has already processed several datasets and performed preliminary analyses. Results from this work will allow him, the SP & TF Cooperative Fire Program team and their network of collaborators, to identify vulnerable communities. These efforts will facilitate carrying out targeted wildfire management and implementing preventive measures in these areas.



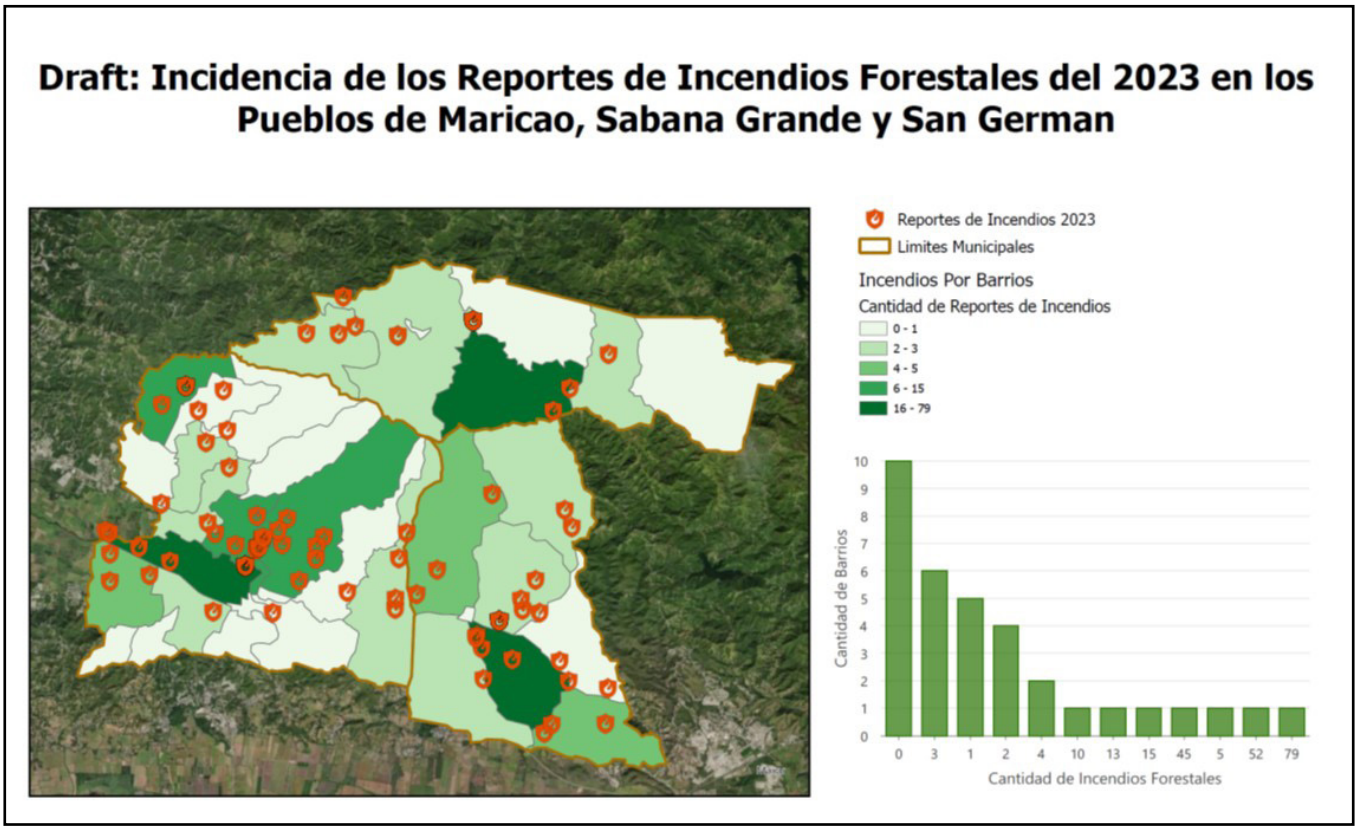
Geographic analysis identifying high fire incidence areas in Puerto Rico. Identifying communities within these areas allow agencies to carry out targeted wildfire management and prevention efforts.



Map showing wildfire incidence data for Puerto Rico in 2023. Data presented is stratified by "barrio".

Mapping *Pinus caribaea* var. *hondurensis* for understanding wildland fires

An increase in the number of fires in the municipalities of Maricao, Sabana Grande, and San Germán, including a significant fire that occurred in this region on March 2023, caught up the attention of the Department of Natural and Environmental Resources, partners, and other SP & TF collaborators by early 2023. Among these collaborators was the Caribbean Pine Working Group (CPWG), an initiative that aims to understand the composition, behavior and colonization of pine tree stands. Responding to a request by the CPWG, Natural Resource Specialist, Andrés Pérez Cintrón, begin mapping fire incidents in the areas within these municipalities where the *Pinus caribaea* var. *hondurensis* is present. His work has been confirming their suspicions: areas with higher abundance of Caribbean pines are witnessing larger and more frequent fires. This useful analysis by Andrés is part of the implementation of the Community Wildland Fire Defense Program led by the SP & TF Cooperative Fire Program. Furthermore, these entities are already applying for funds to develop a Community Wildland Fire Defense Plan for the areas affected by these fires. This represents a pivotal step towards reducing the impact of these major disturbances.



Areas in the Maricao, Sabana Grande and San Germán municipalities where fires have been reported during 2023.

Identifying wildland fires in USVI

Addressing concerns about wildlife fires in the US Virgin Islands is also a major priority for SP & TF's Cooperative Fire Program. Within that backdrop, the SP & TF unit organized a participatory mapping workshop at the Administrative and Prevention Office of the US Virgin Islands Fire and Emergency Medical Services (VIFEMS) in St. Croix. The workshop, which focused analyzing wildland fire incidence data from the USVI, was attended by the Acting Director, Antonio O. Stevens, the Deputy Chief of Operations, Paul Christian, and the Chief Financial Officer, Charmaine Hewlett and SP & TF personnel.

During the first part of the gathering, the USFS Community Navigator, Dennys Vázquez Ortiz, and Natural Resources Specialist, Andrés L. Pérez Cintrón, facilitated a discussion about the causes and consequences of the wildland fires in the USVI, the availability of critical infrastructure, fire culture in the islands, and the needs and current capabilities of VIFEMS to address these incidents. The participatory mapping exercise that followed facilitated the identification of key areas and communities that are most affected by the wildland fires. This information can help guide actions to prevent and prepare communities for future wildland fires.

The second part of the meeting was conducted virtually by SP & TF Program Manager, Magaly Figueroa, and it focused on funding opportunities available. One of these is the Bipartisan Infrastructure Law (BIL) State Fire Assistance (State Forest Action Plan) which assists with all fire management activities including training, planning, hazardous fuel treatment, and purchase and maintenance of equipment. Alternatively, the Community Wildfire Defense Program (CWDP) provides technical assistance to assist developing or revising Community Wildfire Protection Plans, and to implement projects described in those plans. As a result of the discussion held, the group identified the priorities for the use of these funds:

1. Acquisition of GPS equipment and training to collect data on the wildland fire incidents in the islands.
2. Training in data collection and analysis.
3. Procure contracting services of a cartography specialist to map wildland fire incidents.
4. Design of a wildland fire prevention outreach and education campaign.
5. Produce educational materials on wildland fire prevention and mitigation.

This meeting helped to strengthen the relationship between the two agencies and facilitated a discussion about the best ways of communication between both and about how to be more effective in ongoing and future collaborations.



Participatory mapping with the VIFEMS and the SP & TF team to identify areas with higher wildland fire incidence. From left to right: Andrés L. Pérez Cintrón (USFS); Antonio O. Stevens (VIFEMS); Paul Christian (VIFEMS); Dennis Vázquez Ortiz (USFS).

Support for developing Community Wildfire Defense plans

The Community Wildfire Defense Grant Program supports communities in the preparation of their Community Wildfire Defense Plans and the implementation of fire prevention practices included in up-to-date plans. In Fiscal Year 2024, two entities in Puerto Rico received funding for the development of plans in areas that have high risk of wildfires.

1. Protectores de Cuenca- Landscape Scale Wildfire Prevention Planning for Southern Puerto Rico

This Community Wildfire Defense Plan includes communities with high wildfire risk on the western section of the Guánica State Forest and the Municipalities of Yauco and Guayanilla. The plan will include practices such as fuel reduction and community education to reduce wildfire risk and building resiliency to the impacts of wildfires.

2. Caribbean Regenerative Community Development, Inc.- Guánica/Maricao Joint Priority Landscape Community Wildfire Prevention Plan

This project includes the creation of the first Community Wildfire Protection Plan for the communities within the Guánica/Maricao Joint Priority Landscape. These communities have been suffering from increases in fire events stimulated by fuel accumulation which has resulted in increased vulnerability for those communities. The plan includes practices for reducing wildfire risk and building community and forest resilience to the impacts of wildfires.

Forest Health and Protection



Humfredo Marcano guides Forest Health Symposium attendees through Forest Inventory and Analysis survey workshop.

The US Caribbean Forest Health and Protection Program hold their Second Annual Symposium

The Second Annual Forest Health Symposium, held on May 23rd at the University of Puerto Rico in Mayagüez, was a pivotal event for IITF's 2024 forest health initiatives. This in-person and online event was done in collaboration with the Puerto Rico Department of Natural and Environmental Resources (DNER) and the US Forest Service, and was organized by Forest Health and Protection Program Manager,Christina De Jesús Villanueva, and Resources Assistant Program Intern, Koralis Reyes Maldonado. With the support of the University's Biology Department, the event exceeded attendance goals, attracting about 49 in-person attendees and 60 online participants.



Inter organizational event committee for the second Forest Health and Protection Symposium.

At the symposium, DNER Forest Health and Protection Program Coordinator, Brian Ramos Güivas, provided updates on the agency's work to assess the impact of wildfires on forest health. In the same vein, Christina offered a talk on current needs and achievements of the forest health program at the federal level. Furthermore, speakers from the Caribbean Regenerative Community Development program talked about their work to restore soil health in the western region in Puerto Rico, while speakers from the National Ecological Observation Network provided information on forest monitoring tools they have available for communities. The day culminated with an outdoor training session on how to measure indicators of forest health which was facilitated by University of Puerto Rico in Mayagüez Entomologist,Edda Martínez, and Forest Inventory and Analysis scientist,Humfredo Marcano.Martínez illustrated techniques to detect and monitor forest insects whileMarcano guided participants through the identification of tree features that serve as indicators of declining tree health. Lastly, participants had the chance to work in small groups to identify a forest health problem and come up with mock action plans to be implemented within a 5-year timeframe. The event instilled comradery among participants and increased awareness of IITF SP & TF Forest Health program initiatives.

Initiative to monitor Royal Palm plant health in the US Virgin Islands

Species often show signs of health decline, but to the untrained eye, these often escape detection. For some time, the forestry community of the US Virgin Islands have noticed increased mortality of the Puerto Rico Royal Palm (*Roystonea borinquena*) in their territory. It was soon realized that something needed to be done, especially because the underlying causes of these deaths remained a mystery.

It didn't take long for IITF Forest Health Program Manager, Christina N. De Jesús Villanueva to step up to the challenge. Along with the help of IITF Forest Health RAP intern, Koralis Reyes, Christina gathered a group of USVI experts and asked them to help co-design a long-term monitoring project to decipher the causes of the declining health in these populations. The event was held on February 10, 2024, at the University of the Virgin Islands Albert A. Sheen Campus in St. Croix. Attendees included representatives from the Virgin Island's Department of Agriculture, the US Virgin Island's Department of Planning and Natural Resources, the University of the Virgin Islands, the Natural Resource Conservation Service, the US Forest Service Staff, the NGO St. Croix Environmental Association, and independent members of the science and management community.

Based on a literature review that encompassed the last five years of publications, Koralis presented the group an overview of the current information available for the genus *Roystonea*. She found that little information is currently available for the genus and that reports on forest health are lacking. Afterwards, and with the guidance of De Jesus Villanueva, the group started drafting a preliminary proposal to support a potential monitoring project.

Motivated these activities, the NGO St. Croix Environmental Association and the University of the Virgin Islands in collaboration with the Virgin Islands Department of Agriculture developed a two-year cooperative agreement with the Forest Health Program to assess the health status of the Royal Palm across US Virgin Islands. This agreement represents a step towards supporting the development of local forest health monitoring initiatives within the US Virgin Islands.



Environmental experts meet for the first time to discuss forest health monitoring needs for the Royal Palm in the US Virgin Islands. Forest Service photo by Christina N. De Jesús Villanueva.

Landscape Scale Restoration

Forest Stewardship Management and Habitat Restoration in Puerto Rico

The Landscape Scale Restoration Program is managed in Puerto Rico by the IITF State, Private, and Tribal Forestry unit. During FY 2024, one of their partners, Protectores de Cuenca, was selected to receive $498,705 to implement a project under this unique program. The project titled Forest Stewardship Management and Habitat Restoration in Puerto Rico focuses on priority landscapes and issues such as reducing the risk of wildfires, improving wildlife habitats, and enhancing water quality. The projects involves practices like invasive species mitigation, ecosystem improvement, and measuring ecological and economic benefits of forested landscapes. Protectores de Cuenca will produce 30 Forest Stewardship Management Plans that will include technical recommendations for habitat restoration, protect important watersheds to secure water quality, and reduce wildfire risks.

Forest Stewardship

Forest Best Management Practices and Planning Workshops in US Virgin Islands

The IITF SP&TF unit, in collaboration with the Virgin Islands Department of Agriculture, coordinated and delivered seminars and workshops on forest best management practices and planning in the Caribbean. Experts in forestry and forest management led the sessions, which were attended by landowners and stakeholders in Puerto Rico and the U.S. Virgin Islands—an important milestone for the Forest Stewardship Program in FY 2024.

Forest Best Management Practices Seminars by professor Oscar Abelleira of University of Puerto Rico in Mayagüez:
The hybrid seminars, held at the University of the Virgin Islands in St. Croix and St. Thomas from July 16–18, drew 44 participants from sectors including the Agricultural Extension Service, Virgin Islands Department of Agriculture, University of the Virgin Islands, non-profit organizations, NRCS, USDA Forest Service, local communities, and private forest landowners. Participants also visited a private agroforestry project at Little La Grange Estate and the Magen's Bay Arboretum, where UVI Extension Service Acting Director Dale Morton offered a guided tour.



Professor Oscar Abelleira of University of Puerto Rico in Mayagüez presenting to a captive audience at the University of Virgin Islands, St. Thomas Campus.

Professor Abelleira's visit was highly requested by local partners and forestry practitioners. His seminars helped strengthen connections between the U.S. Virgin Islands and Puerto Rico through forest knowledge, management, and collaboration.

Recordings are available at:Abelleira St. Croix and St. Thomas Presentation.

U.S. Virgin Islands Forest Stewardship Program Training:

During the week of December 9, the USVI Forest Stewardship Program held a week-long training to build local capacity and expand the program's reach. The training in St. Croix was led by Puerto Rico Forestal's Felix Rivera Montalvo and Timmons Group SMART developer Josh Baldwin. This effort supports VIDA Forest Stewardship Program Coordinator Mathilde Aurelien-Wilson's work to increase forest conservation and sustainable management of private forest lands, which make up most of the forests in St. Croix and St. Thomas. The capacity-building initiative is a collaboration among VIDA, Puerto Rico Forestal, and the USDA Forest Service IITF SP&TF.



Professor Oscar Abelleira with Aaron Hutchins, landowner of privately owned Agroforestry Project at Little La Grange Estate in St. Croix.

An initiative to propel tree nurseries in the US Caribbean and Pacific islands

In FY24, the State, Private, and Tribal Forestry (SP & TF) unit received the new Forest Service's National Center for Reforestation, Nurseries, and Genetic Resources' (RNGR) Tropical Nursery Specialist, Emily Senegal-Thyroff.Senegal-Thyroff, who holds a Ph.D. in Natural Resources and Environmental Management from the University of Hawa'i at Mānoa, visited the U.S. Virgin Islands' and Puerto Rico's nurseries alongside members of the SP&TF team to assess how she can better assist nursery efforts throughout the islands.

During her visit,Senegal-Thyroff and the SP&TF team exchanged ideas about current nursery needs with local government partners, the Virgin Islands Department of Agriculture and the Department of Natural and Environmental Resources of Puerto Rico. The needs identified span from research activities, forest health, workforce, to natural disaster mitigation. Several visits to private nurseries in US Virgin Islands, and the nurseries of non-profit partners in Puerto Rico including Para la Naturaleza, Protectores de Cuencas, Caribbean Regenerative Community Development and El Yunque National Forest, were also part of the activities carried out duringSenegal-Thyroff's visit. As a result, she learned about the array of initiatives focused on tree growth and planting in public and private lands in the region.

Senegal-Thyroff's visit is the start of a collaborative effort among SP&TF unit members, local governments, private nurseries, and non-profit organizations, to bring forward technical support and education opportunities to nurseries throughout the islands in the US Caribbean and the Pacific Island Territories. You can access more information aboutSenegal-Thyroff and the National Center for Reforestation, Nurseries, and Genetic Resources at https://rngr.net/.



Professor Oscar Abelleira with Aaron Hutchins, landowner of privately owned Agroforestry Project at Little La Grange Estate in St. Croix.



SP & TF team members and RNGR´s Tropical Nursery Specialist,Emily Senegal-Thyroff alongside team members from Para La Naturaleza (PLN) during a visit to Hacienda la Esperanza nursery in Manatí, Puerto Rico.

Urban and Community Forestry

Celebrating Urban and Community Forestry Projects grantees!

The International Institute of Tropical Forestry Urban and Community Forestry (UCF) Program team coordinated a press conference and Forest Service leadership visit to St. Croix to announce the projects and partners that were awarded Urban and Community Forestry grants in the US Virgin Islands. These projects received a total of $6.5 million dollars in funding through a competitive process. The activities from these projects will have long lasting impacts and will open new opportunities for the communities of US Virgin Islands. These efforts are essential to furthering adaptation to extreme weather challenges, improving forest health, increasing access to educational opportunities, green workforce development and others.

Associate Deputy Chief for SP&TF, Beattra Wilson, and Jasmine Forsberg, from the National Urban and Community Forestry Program, visited St. Croix to participate in the press conference, which was held on January 24th. During the week-long events associated with the press conference,Wilson and Jasmine also connected with local partners including the US Virgin Islands Department of Agriculture, Virgin Islands Trail Alliance, St. George Village Botanical Garden, and the St. Croix Hiking Association.

The press conference and related activities were highly successful and featured in local news outlets. The St. Thomas Source, a local newspaper in the US Virgin Islands, dedicated an article to the event and provided details about the projects. Please, go to the link to read about it here: https://stthomassource.com/content/2024/01/27/6-5-million-in-stx-urban-forestry-grants-hailed-as-investment-never-seen-before/.

A Flickr Album for the activities is available here: https://flic.kr/s/aHBqjBdiur. To learn more about these initiatives, go to: https://research.fs.usda.gov/iitf/news/featured/st.-croix-u.s.-virgin-islands-receives-historic-investments-equitable-access



From left to right: Jasmine Fosberg (National UCF Program Specialist), Andrés González (IITF UCF Program Specialist), Maya Quiñones (IITF UCF Program Manager), Louis Petersen (VI Department of Agriculture Commissioner), Diana Collingwood (VIDA Assistant Commissioner),Olasee Davis (University of Virgin Islands Professor), Beattra Wilson (National Cooperative Forestry Director),Grizelle González (IITF Director), Magaly Figueroa (IITF SP&TF Program Manager), Jo Ann Santana (IITF UCF Partnership Coordinator), Sarah Brady (IRA Awardee, St. George Village Botanical Garden)

The following table provide details about projects in the US Virgin Islands that were awarded in Urban and Community Forestry competitive funding:

Entity	Project and Description	Categories	Funding
Virgin Islands Department of Agriculture	**Sustaining Forest & Human Health Thru GREEN LOVE.** The project will provide subgrants to local communities and organizations in U.S. Virgin Islands to promote the priorities defined herein to directly benefit at risk communities by: 1. Exposing populations to the human health, environmental and economic benefits of forests and related resources. 2. Increase community literacy and engagement in urban forest planning. 3. Improve resilience to hurricanes, extreme weather events, and pests through the development and application of best management and maintenance practices.	• Tree Planting & Maintenance • Restoration & Resilience • Workforce Development • Extreme Heat • Education	$ 1,500,000.00
St. George Village Botanical Garden	**Strength of Our R.O.O.T.S.: The Community's Reclamation of Our Trees & Soil in the St. George Village Botanical Garden, St. Croix, U.S. Virgin Islands:** This conservation project will plant trees in the St. George Village Botanical Garden and several schools. The Garden will become an accredited arboretum and a center for local multigenerational education and workforce development in urban forestry, community food resilience, and extreme weather mitigation. It will serve as an accessible, shaded, and safe public space for disadvantaged residents.	• Tree Planting & Maintenance • Restoration & Resilience • Workforce Development • Extreme Heat	$ 2,500,000.00
Virgin Islands Trail Alliance, Inc.	**Healing Forests to Heal the People for Life:** This project will elevate access to revitalized urban forests in St. Croix USVI. The project includes volunteer efforts to remove invasive species and plant native species and fruit trees. Healthier forests will provide tools for resiliency to face daily and future environmental stresses.	• Tree Planting & Maintenance • Restoration & Resilience • Extreme Heat	$ 2,500,000.00

IITF's Urban and Community Forestry Program shines at the National Association of State Foresters' Urban and Community Forestry Committee meeting

The National Association of State Foresters (NASF) held their Urban and Community Forestry (UCF) Programs' meeting from June 10-13 and the State, Private, and Tribal Forestry's UCF Program was pivotal for its success.

During the meeting in San Juan, SP&TF Program Manager Magaly Figueroa presented the projects developed by the IITF's Urban and Community Forestry program in collaboration with its partners. The projects cover diverse topics, including food forestry initiatives, community engagement, and extreme weather resilience techniques. The event also provided the Puerto Rico State Forester Darien López, the US Virgin Islands (USVI) State Forester,Louis Petersen, USVI Assistant Commissioner, Diana Collingwood, and USVI Urban and Community Forestry Coordinator, Preston Brooks, and other NASF and US Forest Service members, the opportunity to discuss the successes and challenges that are present or may arise in the regions they serve.

The IITF UCF team, led by UCF Program Manager Maya Quiñones, Specialist Andrés González Nieves, and Partnership Coordinator Jo Ann Santana López, further provided an overview of the projects currently supported by the IITF UCF program to Nausheen Iqbal, Acting Director of the US Forest Service UCF Program. The team also led several field trips, including a visit to the Huerto Capetillo's community and food forest and separate trips to the Bosque Milenio in San Patricio and the Caguas' Botanical Garden.

Holding conversations regarding urban and community forestry in the Caribbean is useful for identifying areas for improvement in terms of extreme weather resilience, technical assistance, and customer service. These discussions are key for showcasing the value of the work that these partners perform in collaboration with the IITF UCF program.



Presentation given to the National Association of State Forester on the status of the Urban and Community Forestry in Puerto Rico

Conservation Education

US Virgin Islands Arbor Day Week: Engaging Youth in the Benefits of Forests and Trees

The US Virgin Islands Arbor Day, officially recognized on September 27th, was celebrated in style with a week full of interactive presentations, field trips and other educational activities focused on exploring the benefits of forests and trees. The activities, which took place from September 23-28, were co-organized by the State, Private, and Tribal Forestry (SP & TF) unit, the US Forest Service Community Navigator Initiative and the US Virgin Islands Department of Agriculture (VIDA). These were carried out in all three of the main USVI islands: St. Croix, St. John and St. Thomas.

Among the activities, SP & TF US Virgin Islands Specialist RAP intern, Damari Acosta, UCF Partnership Coordinator, Jo Ann Santana López, Community Navigator, Dennis Vázquez, VIDA's Urban and Community Forestry (UCF) Program Coordinators, Preston Brooks and Akil Andrews, and Pest Control Management Coordinator, Dornell Walters, visited various schools in St. Thomas and St. John to deliver educational and interactive presentations about the importance of wildfire prevention, the benefits of trees, and pest identification and management. In St. Thomas and St. John, the team visited the Ulla Muller Elementary School, Joseph Gómez Elementary School, and Julius Sprauve Elementary-Eighth Grade school. Apart from these engaging educational activities, the students and teachers received educational Smokey Bear and Woodsy Owl materials from the USDA Forest Service.

On September 27th-28th, Forest Landowner Support Specialist, Andrés Pérez, UCF Specialist, Andrés González, Program Support Assistant, Albertyadir de Jesús, and Forest Health RAP Intern, Koralis Reyes, joined the team in the US Virgin Islands to support VIDA during the Arbor Day Fun Educational Day event. Highschoolers from St. Croix Central Highschool and St. Croix Career and Technical Education Center (CTEC) participated from several presentations and other interactive activities that included creative rock painting, native tree seedling planting and a forestry bingo. Students also met key partners and stakeholders from the University of Virgin Islands School of Agriculture, the Virgin Islands Trail Alliance and the St. George Village Botanical Garden.

To wrap up Arbor Day celebration activities, the team took students, community members and other participants to a hike with the Virgin Islands Trail Alliance (St. Croix) and a visit to the Friends of the Virgin Islands National Park in St. John. Over 500 students were impacted by these activities, which were very well received by local communities, students and teachers.



(right) Urban and Community Forestry US Virgin Islands Program Liaison (RAP intern) Damari Acosta reading Smokey Bear's story to students.



(top) Virgin Islands Department of Agriculture's Urban and Community Forestry Coordinator Akil Andrews interactive presentation about trees with students.



(left) State, Private, and Tribal unit members showing the Don Fernando Mango Tree signage they made at the Rock Painting Station. From left to right, Andrés González, Jo Ann Santana, Andrés Pérez, Damari Acosta, Koralis Reyes, and Albertyadir de Jesús.

Celebrating USVI agricultural heritage at the 52nd AgriFest

A celebration of St. Croix rich agricultural heritage comes alive yearly at St. Croix Agriculture and Food Fair. The event, which is the result of a collaboration between the US Virgin Islands (USVI) government, the Forest Service, nonprofit organizations, and residents, was held in the Rudolph Shulterbrandt Agricultural Complex in Estate Lower Love, in the Virgin Islands Department of Agriculture (VIDA) grounds. Thousands of visitors participated in the 52nd AgriFest activities, which spanned from February 17-19, 2024.

The State, Private, and Tribal Forestry Unit at the Institute engaged significantly with current partners, including the Virgin Islands Fire Department, the AgriFest Board of Directors, VIDA, Natural Resources Conservation Services (NRCS), the Caribbean Climate Hub and the University of the Virgin Islands. The event also permitted the establishment of new partnerships with other governmental and non-governmental entities. Attendees interacted with experts, participated in interactive sessions, and gained insight about Forest Service programs in partnership with the Virgin Islands Department of Agriculture. These partnerships focus on forestry practices, conservation, and sustainable agriculture.

As part of the event, the IITF SP & TF unit celebrated the Inflation Reduction Act investment made in the USVI by organizing a ceremonial tree planting activity that was led byLouis E. Petersen and Assistant Commissioner Ms. Diana Collingwood. Specifically, The Virgin Islands Department of Agriculture (VIDA) received a $1.5 million allocation, the Virgin Islands Trail Alliance $2.5 million, and St. George Village Botanical Garden $2.5 million. These funds will support efforts to preserve the U.S. Virgin Islands' natural beauty and its resources for years to come. These initiatives are a testament to the successful collaboration between VIDA and SP & TF, having promoted sustainable practices, advocated for conservation, and engaged in community outreach.









Urban and CommunityForestry team joins the 52nd AgriFest in St. Croix.

Forest Legacy

Forest Legacy Program 2024 Biennial Summit

Over 120 participants representing multiple US states and territories attended the Forest Legacy Program (FLP) 2024 Biennial Summit from June 11-13, 2024, in Kalispell, Montana. Forest Legacy Program Coordinator of the US Virgin Islands Department of Agriculture, Mathilde Aureline Wilson, and Carlos J. Cruz Quiñones, Forest Legacy Program Specialist for the International Institute of Tropical Forestry, were among the Summit's participants.

The Summit addressed challenges, opportunities, and innovations at different levels, promoting learning through shared program developments, and encouraging a network of practitioners to leverage collective knowledge. Strengthening relationships and ensuring institutional knowledge transfer were also key goals. The summit offered a diverse selection of topics including successes and challenges through case studies and presentations from State Coordinators. Group conversations and breakout sessions focused on funding challenges, developing competitive projects, engaging with tribes and different communities, improving proposal quality, collaborating with land trusts, geospatial data tools, benefits to disadvantaged communities, and mapmaking for proposals. Attendees also visited the FH Stoltze Land and Lumber Company and Whitefish Mountain Resort, with presentations on wildlife habitat connectivity, conservation accomplishments in Montana, and the benefits of specific FLP projects in the landscape.

The 2024 FLP's Biennial Summit marked a significant milestone: over 3 million acres of forest conserved nationwide in 32 years. This achievement represents an investment of $2.17 billion across 1,108 tracts in 471 projects. These forests are managed in perpetuity for sustainable timber and non-timber products and are used for the benefit of local communities and tribes.

Joint Chiefs' Landscape Scale Restoration Partnership

De la Escuela al Bosque

The Joint Chiefs' Landscape Scale Restoration Partnership (JCLSRP) - Southwest Puerto Rico Project, in collaboration with the Department of Natural and Environmental Resources (DNER) Maricao State Forest and the State, Private and Tribal Forestry unit, hosted a one-day education event for second and third grade students from the Efrén Rodríguez Toro school in the municipality of Hormigueros. Rocío del Mar Rivera Ramos, Yahoo Lugo, Merari Román and representatives from the Puerto Rico Fire Department and the Fish and Wildlife Service offered educational workshops and supervised the activity. Smokey and the DNER welcomed the kids and introduced them to the activities of the day. The students participated in diverse activities, including talks and visiting different educational stations. The talks covered the history and purpose of protection and management of the Maricao State Forest, the Puerto Rican Parrot and its habitat, the importance of trees, the geography of southwest Puerto Rico, and the history of the Casa de Piedra and of the Civilian Conservation Corps (CCC) program. Activities included an interpretive hike to learn about the flora and fauna of the Maricao Forest and about wildland fire prevention.



"What to do in case of a fire" workshop for students in the Efrén Rodríguez Toro school in Hormigueros.

"Trails and Paths" workshop

On April 12th, the Joint Chiefs' Landscape Scale Restoration Partnership (JCLSRP) - Eastern Puerto Rico Project, the Natural Resources Conservation Service (NRCS) and the State, Private, and Tribal Forestry unit hosted a workshop for farmers and landowners from the eastern area participating and interested in the JCLSRP. The workshop took place at El Portal de El Yunque National Forest and focused on the different incentives available with the NRCS for establishing trails and paths in their properties.



Isela Ortíz, Executive Director of the Southwest Soil and Water Conservation District, addressing "Trails and Paths" workshop participants.

The Joint Chiefs' Landscape Restoration Partnership Project's workshop on forest management and planning

The Joint Chiefs Landscape Restoration Partnership project in Eastern Puerto Rico hosted a training for private landowners on sustainable forest management, conservation programs focused on forest conservation and management, and the components, benefits, and practices included in forest management plans. This orientation was offered by Félix Rivera, from Puerto Rico Forestal Inc., and targeted private landowners. Félix is a long-term collaborator of the project and specializes in forest management and planning. Isela Ortiz, from the Southwest Soil and Water Conservation District, provided a comprehensive orientation on the Joint Chiefs' Landscape Restoration Partnership project. The orientation informed on how to participate from the project, what are the target species and associated conservation components, incentives for implementing conservation practices, services offered to landowners, educational and training opportunities, long-term monitoring projects, etc.

Finally, Enrique Santiago from the Department of Natural and Environmental Resources, offered a presentation about the Auxiliary Forests Program. The July 1st, 1975, Puerto Rico Forest Law Article 10 grants the Secretary of the Department of Natural and Environmental Resources or his Representative the authority to designate private lands as "Auxiliary Forests". Private lands designated as auxiliary forests enjoy tax exemption on the property and on any income from the sale of forest products from the land as long as they maintain the minimum requirements of the Auxiliary Forests Program.



Enrique Santiago from the Department of Natural and Environmental Resources presenting the Auxiliary Forest Program.



Félix Rivera, from Puerto Rico Forestal, Inc., talking about the process and components of a forest management plan.

SP&TF and Our Communities

The IITF State, Private, and Tribal Forestry unit's commitment to the public extends far beyond the programs and opportunities they offer. Throughout the year, the unit actively shares valuable information and expertise on forestry in Puerto Rico and the U.S. Virgin Islands by participating in various educational and outreach events. The two very successful community engagement activities below are great examples of this commitment.

Celebrating Arbor Day and the 16 years of Caguas as a Tree City USA



SP & TF Program Manager, Magaly Figueroa, addressing the participants of the Arbor Day activity in Caguas. Photo credit: Municipality of Caguas.



Planting of the Roble Nativo (Tabebuia heterophylla) tree representing Barrio Río Cañas. Photo credit: Magaly Figueroa, SP & TF.

The Municipality of Caguas celebrated Arbor Day (April 26) and their 16 years as a Tree City USA by planting eleven trees of Roble Nativo (Tabebuia heterophylla) in the town hall and in the Lady Wilnelia Merced Promenade. The eleven trees represented each of the barrios in Caguas. Community members and leaders joined the Mayor of Caguas, William Miranda Torres, to plant the trees. State, Private, and Tribal Forestry Program Manager, Magaly Figueroa, was invited to the event as was part of the speakers at the activity joining Mayor William Miranda Torres and Omar Ortega, Director of the Department of Beautification and Urban Forestry Department.

The Arbor Day Foundation certified the Municipality of Caguas as a Tree City USA in 2008. To maintain the certification, the municipality must comply with several requirements, including the establishment of the Department of Beautification and Urban Forestry Department and the adoption of reforestation and urban forestry plans for the main access roads and public spaces. Carrying out reforestation activities in the Traditional Urban Center and the main entrances of the city and having a dedicated budget for these activities are also required.

SMOKEY goes to Puerto Rico to celebrate his 80th birthday

The Puerto Rico Department of Natural and Environmental Resources, the Puerto Rico Firefighters Corps, and the International Institute of Tropical Forestry celebrated Smokey Bear's 80th birthday on Friday, August 9, 2024, from 9:00 AM to 2:00 PM at the Susúa State Forest Recreation Area in Sabana Grande.

The event was dedicated to spread Smokey's wildfire prevention message. Information on how to manage community landscapes to prevent wildland fires, creating safer communities, and how to contact the Puerto Rico Firefighters Corps to report wildland fires in the area was shared with participants. There were also several kiosks hosted by the SP & TF and IITF Library teams. These spaces served to share information about available workshops and educational activities, which included an art in the forest activity and guided tours to the Susúa State Forest. The team also oriented attendees about diverse conservation topics and state, federal and local NGO's working with wildfires. Smokey's birthday offered an excellent opportunity to make available educational resources and recreational activities to students and teachers. These initiatives ultimately help strengthen ties with community members and the public.

The SP & TF recognizes the work of its partners, which include: Department of Natural and Environmental Resources, Puerto Rico Fire Department, Puerto Rico Police Bureau, NRCS, Southwest Soil and Water Conservation District, Cafiesencia, Puerto Rico Emergency Management and Disaster Administration Bureau, Bureau of Medical Emergencies of Puerto Rico, Fish and Wildlife Service, 4-H, Puerto Rico Ornithological Society, Hispanic Access Foundation, Caribbean Regenerative Community Development (CRCD), Protectores de Cuenca, staff and volunteers.

Other characters, such as WOODSY, LEONEL, SPARKY, the PUERTO RICO CRESTED TOAD and the PUERTO RICAN PARROT joined attendees in singing happy birthday to SMOKEY along with his birthday cake.

Local media covered the celebration and was covered by social media, tv, radio, and newspaper. event was promoted by local TV (Teleonce and WAPA) and radio (WPRA) stations.





SMOKEY, Wildland Firefighter, Pomales; and SP & TF Program Manager, Magaly Figueroa, at TV station, Teleonce

IITF Library

The Institute's Library, established in 1939, operated as a Research Station library until 2007 when it became part of the National Forest Service Library (NFSL) Program. The National Forest Service Library, created in 2006, is an authorized national program with centralized funding coming from Research and Development (R&D), the National Forest System (NFS), and the State, Private, and Tribal Forestry (SP&TF) program. This integration streamlined operations, ensuring cost-effective access to a broad range of scientific and technical information for Forest Service employees. Direct oversight is provided by the Director of the Rocky Mountain Research Station where the main library collection is located.

Currently, the Institute's library is one of two specialized NFSL libraries, with the other located at the Forest Products Laboratory. Its primary focus is tropical forestry, particularly in the New World Tropics, making it a globally significant resource. While the primary users are Forest Service employees, the library branch at the Institute also supports international and local scientists, post-doctoral students, land managers, and other professionals in natural resource fields.

The library offers books, theses, journals (both physical and digital), and databases related to tropical forestry and natural resources. It also provides access to broader forestry resources through the NFSL network. Unique holdings include international government and tropical forestry documents categorized by country, as well as a small collection of maps, slides, and photographs. Most resources are available for on-site consultation.



IITF Volunteer Librarian, Sylvia Zavala (left) and Library Technician, Evelyn Pagán (right), discussing reference details of a publication.

IITF Library team:

Yariliz Quiles Martínez, Ed.D., IITFLibrary Director

Evelyn Pagán,Library Technician

Sylvia Zavala,Volunteer Librarian

Accomplishments

Collection development and management

During FY 2024, the Library Team received archival supplies for the Library's historical documents and continued working on inventorying and cataloging the collections. The library branch is undergoing a catalog cleanup project that includes making the online records more accurate with the print items. As part of this ambitious and highly technical project, the team inventoried 5,391 books from the General collection, created five new shelving locations and reorganized 726 items in those locations, processed 145 physical items; deleted 421 duplicate local holdings and edited 317 information resources records. This project aims to offer an online catalog that simplifies the information search process.

Information distribution services

During this fiscal year, the library team received 311 in-person visitors, distributed 718 IITF publications, performed 151 literature searches, and delivered 978 digital documents to scientists, graduate students nationwide, and members of our general community. The team also offered 17 library tours/instructional sessions to different groups. The Library team is available to help you explore their print and online information resources. Questions can be directed to the IITF Library Team. Requests for information can be emailed to the International Institute of Tropical Forestry Library in San Juan, PR, at sm.fs.iitflibrary@usda.gov. You can also submit requests to the National Forest Service Library Team at SM.FS.FSLib@usda.gov.

Library user services



Library outreach and strengthening ties

Meet & Greet event with a Library Bingo

Carrie Smith, Director of the National Forest Service Library Program, visited the IITF in June 2024 to learn more about the library and the Institute's mission and people. To guide the conversation, the branch team created a bingo and trivia about the library and the Forest Service.



Left to right, Evelyn Pagán, Yariliz Quiles Martínez the Director of the National Forest Service Library Program, Carrie Smith, and Sylvia Zavála.

A new forestry bibliography for the USVI

The IITF Library Team curated a selected bibliography of open-access materials focusing on forestry in the U.S. Virgin Islands. This valuable new resource can be accessed here: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd1165018.pdf.

Celebrating the 2024 National Library Week

The National Forest Service Library team members from the Rocky Mountain Research Station, Forest Products Laboratory and International Institute of Tropical Forestry Library branches celebrated National Library Week from April 8–12, 2024 with the theme, Ready, Set, Library! As part of the celebratory events, the IITF branch organized breakfast at the IITF Library on April 9th. As part of the activity, different members of our IITF employees shared their experiences as patrons of the Library. The activity provided a space to reconnect with colleagues and as well learn more about the numerous resources and services that are available in the Institute's Library.

New National Library videos



IITF Library Branch Director, Yariliz Quiles Martínez, with Porsche Schlapper, Forest Products Laboratory Library Branch Director, in one of the new National Library videos released during FY 2024.

As a continuation of the celebration of the National Library Week, the team members from the Rocky Mountain Research Station, Forest Products Laboratory and International Institute of Tropical Forestry library branches created videos about the services they provide to the Forest Service and other patrons. To watch the videos, access the RMRS SharePoint site.



Collections

Reference

This specialized book collection is extensively used for scientific research on tropical forestry and related fields. The description of these books can be found in the online catalog of the National Forest Service Library (https://www.fs.usda.gov/library/).

Journals

The collection includes hard copies of peer-reviewed journals and many electronic journals accessible to USDA/USFS staff through the National Forest Service Library.

Country Boxes

These are a unique collection of publications acquired through exchange agreements and technology transfer visits to other countries by the Institute's staff.

Posterity File

Includes copies of every publication generated by the Institute's scientific and technical staff since 1939. Most are available through Treesearch (https://www.fs.usda.gov/research/treesearch).

Legacy Collection

Materials created by Forest Service employees while working in Puerto Rico, not related to the International Institute of Tropical Forestry.

Puerto Rico Natural History Collection

This collection preserves historical materials related to forests in Puerto Rico (other than the Caribbean National Forest) and related subjects.

Photographs

A collection of historical photographs that document fieldwork done since the 1930's at the Luquillo Experimental Forest, as well as in other state and private forests. It also captures the work done by the Institute's scientists in Puerto Rico and around the world.

Maps

A collection of maps published by the Institute, along with a few historical maps of El Yunque National Forest and some state forests.

Services and Contact

Have a request or research consultation?

The IITF Library team can help!

Email: sm.fs.iitflibrary@usda.gov

Address: 1201, Calle Ceiba, Jardín Botánico Sur, San Juan, Puerto Rico 00926-1119

Open Hours

Monday to Friday9:00 AM - 3:00 PM (AST)
Note: The International Institute of Tropical Forestry Library can modify the service hours without prior notice.

Website

Scan the QR code provided here or access the following link to learn more about the history, services and broader impacts of the IITF Library!
(https://research.fs.usda.gov/iitf/programs/library)

Research & Development

The Research and Development (R&D) unit of the International Institute of Tropical Forestry is responsible for developing and implementing the Institute's research agenda, with a primary focus on advancing forest science in tropical regions. Operating under the designation "Tropical American Forest Conservation" (IITF-4151), this unit has historically prioritized activities such as reforestation, plantation forestry, tropical species identification, forest inventory methods, endangered species, and forest carbon. Notably, the Institute conducted significant silvicultural studies in Puerto Rico during the 1930s and 1940s. These efforts were characterized by varied treatments and rigorous controls and provided an important basis for tropical forest production in the tropics. The ecological dynamics of natural, unmanaged forests became a crucial component of the research program by the 1950s, along with new research on endangered species and ecosystem dynamics. Subsequently, forest biomass and forest carbon research were added in the 1980s, followed by the full-fledged exploration of watershed dynamics and biogeochemical studies by 1990, which persist as central research endeavors to this day.



Research Social Scientist,Tischa Muñoz-Erickson, sharing views with participants at the Community Meeting of the Alianza por el Río Piedras in November, 2023.

At present, the Institute continues to build upon its historical research endeavors, with research focused on forest ecology, disturbance ecology, ecosystem functions and services, urban ecology, watershed dynamics, migratory species, responses to climatic variation, and social sciences. These efforts allow a better understanding of the effects of natural and human-induced pressures on tropical forests and the landscapes in which they are found. New endeavors have been integrated into the Institute's research objectives, including efforts to understand the structure and function of tropical wildlands at watershed and landscape scales; to assess the effects of climate and land use/land cover change on tropical ecosystems, biodiversity, and people; to quantify ecosystem goods and services from working lands where human and ecological systems interact; and to explore the human dimensions of tropical ecosystems and their sustainability and resilience. These endeavors are critical to the advancement of tropical forestry and delivering knowledge and technology that support the sustained benefits of America's tropical forests and grasslands.

Research and Development team:

Kathleen McGinley, Research Social Scientist & Project Leader

Carlos R. Estrada Ruiz, Hydrologic Technician

Carlos Torrens, Biological Science Technician

Edgardo Valcarcel Ortíz, Biological Science Lab Technician

Edwin López-Soto, Chemist

Eileen Helmer, Research Ecologist

Humberto Robles, Biological Science Technician

Ivan F. Vicens, Forestry Technician

Jamarys Torres-Díaz, Administrative Support Assistant

Joel S. Olivencia-Fernández, Electronic Technician

María M. Rivera, General Biologist

Maribelis Santiago-Márquez, Chemist

Maysaá Ittayem, Chemist

Michael M. Keller, Research Physical Scientist

Miriam Salgado Herrera, Operations Assistant

Olga M. Ramos, Biological Scientist

Omar Gutiérrez del Arroyo Santiago, Research Ecologist

Tamara Heartsill-Scalley, Research Ecologist

Tana E. Wood, Research Ecologist

Tischa Aimee Muñoz-Erickson, Research Social Scientist

Wayne J. Arendt, Research Wildlife Biologist

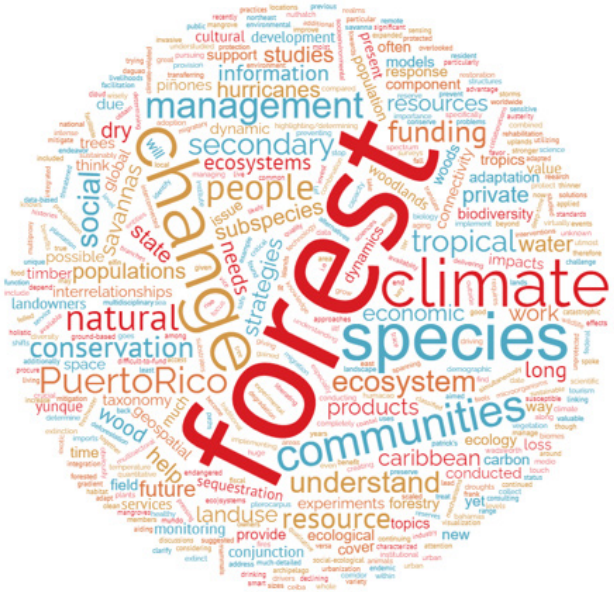
A new research "roadmap" for the International Institute of Tropical Forestry

Joel A. Mercado-Díaz, Kathleen McGinley and Michael Keller

Fiscal Year 2024 concluded on the highest note with the approval of the new Research Work Unit Description (RWUD) FS-IITF-4151 for the International Institute of Tropical Forestry (IITF). The RWUD, jointly approved by IITF Director, Grizelle González, and the FS Deputy Chief of Research and Development (R&D), is a strategic plan outlining the scientific problems the Institute will address over the next 10 years, the proposed methodologies to evaluate them, their potential solutions, and the outcomes expected from addressing these pressing issues.

The RWUD is designed to align with Forest Service goals, with a mission to "*Create, develop, and disseminate knowledge and tools for the conservation, sustainability, and management of forest ecosystems, grasslands, watersheds and associated human well-being across the American tropics within the context of social and environmental change*". The plan incorporates feedback from both internal and external partners and stakeholders, who were instrumental in defining the new research priorities and strategies to be implemented over the next decade. Key partners include the Institute's State, Private, and Tribal Forestry (SP & TF) and International Cooperation (IC) units, as well as the El Yunque National Forest. The R&D unit also partners with other programs and individuals across all Forest Service deputy areas, in addition to numerous other federal, state, and local agencies, universities, civil society organizations, and private industry. Strong collaborations with these partners serve to foster knowledge co-creation and effective use of research and development resources and outputs.

With this new RWUD, the IITF continues to evolve its R&D program building on past research themes and anticipating future questions pertaining to the novel challenges that the tropics and its people will face in the next decades. In the following bullet points, the three thematic "Problem Areas" and associated research questions that the new RWUD proposes to address are synthesized. The subsection "Purpose" describes the motivation behind addressing a specific Problem Area. The "Proposed approach" subsection describe the general methodological approaches that IITF scientists will implement to tackle associated Problem Area questions. Lastly, the "Expected outcomes" subsection summarize specific outcomes that should result from successfully addressing these issues.



A word cloud displaying partner input on the 'most pressing issues, approaches, and sites that IITF R&D should pursue over the next 10 years', collected through online inquiry form and virtual partner engagement process.

1. Tropical forest ecosystem dynamics (P1)

Purpose:

- Improve knowledge about tropical forest function and integrity
- Assess ecosystem services provided by tropical forests.
- Identify potential shifts in these systems that may otherwise go unnoticed.

Proposed approach:

- Integrate plot-based and remote-sensing data to characterize tropical forest dynamics at varying spatial and temporal scales.
- Combine forest inventory data with models and diverse data collection protocols to examine the distribution of biomass, biodiversity and carbon pools in urban and rural environments.
- Conduct fundamental research and long-term monitoring to examine ecosystem processes along environmental and land-use gradients.

Expected outcomes: Reduce vulnerability and identify opportunities for restoration, adaptive management, and conservation of tropical forests.



A Kirtland Warbler in its wintering grounds in Eleuthera, The Bahamas. Photo credit: Cole Scrivner.

2. Interactions of tropical forests with changing climate and land use (P2)

Purpose:

- Determine the sensitivity of tropical forests to land use and disturbance changes, as well as organisms' capacity to adapt.
- Understand the dimensions of forest change and predict future trajectories.
- Ensure ecosystem health and guide sustainable forest management practices.

Proposed approach:

- Study historical and current extreme climatic events and utilize experiments and models to forecast organismal and ecosystem responses to future climatic challenges.
- Analyze spatiotemporal dynamics of species, communities, biogeochemical cycles, and ecosystem properties under shifting climatic and land-use regimes.
- Combine warming and drought experiments with remote sensing, machine learning, and other advanced techniques to improve forest carbon estimates and assess changes in forest structure, composition, and biomass.

Expected outcomes: Improved management of forests at the landscape-scale, ensuring diversity and functionality in the face of future environmental challenges.



A team of students and technicians excavating a column of soil at the El Verde Field Research Station in Río Grande, Puerto Rico for the installation of a clear acrylic minirhizotron tube used to study root dynamics as part of the Luquillo Throughfall Exclusion (drought) Experiment. (Photo credit: Tana Wood)

3. Tropical Forests and People (P3)

Purpose:

- Investigate the human dimensions of tropical forests, including governance, sustainability, and adaptation to social and environmental changes.
- Understand how social, ecological, and technological systems interact to affect the vulnerability and resilience of forests and human communities.
- Collaborate to create knowledge and actions promoting sustainability, resilience, shared collaborative governance and cooperative management of forests.

Proposed approach:

- Use survey-based research, focus groups, and other methods to document forest-related practices, values, and preferences.
- Apply multi-disciplinary methods and across-site studies to analyze relationships between people, institutions, and forests.
- Conduct comparative case studies on reforestation initiatives in tropical and island contexts.
- Conduct surveys, interviews and ethnographic participant observation to identify strategies to enhance resilience to major disturbances.

Expected outcomes: Development and implementation of effective policies, programs, and practices that enhance forest sustainability and resilience.

In essence, the new IITF-RWUD outlines a 10-year roadmap for IITF's R&D efforts, focusing on the intricate relationships between ecosystems and societal dynamics amidst environmental changes. By addressing these themes, the research aims to predict the future states of tropical forests under shifting climatic conditions, inform conservation initiatives, and inspire improved tropical forest management strategies.



Community leaders, urban practitioners, and scientists discussed watershed-level flood adaptation strategies during a co-production workshop in Río Piedras, San Juan, Puerto Rico, November 4, 2024. (Photo credit: Mandy Kuhn).

Research Highlights by Scientist

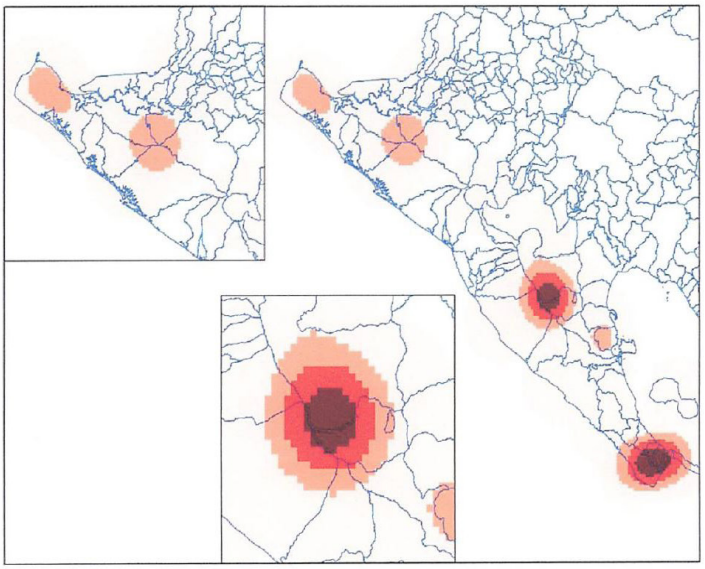
Dr. Wayne Arendt

Natural history of landbirds in the Nicaraguan Pacific Slope dry forests

The Pacific Slope of Nicaragua's dry forest ecosystem remains understudied, particularly regarding the status of its flora and fauna. This ecosystem is characterized by low precipitation and a pronounced dry season, rendering it significant for avifaunal diversity because of the exclusive species it harbors. More than 50% of avian species reported in Nicaragua are found in the Pacific Slope dry forest ecosystem, which has been the subject of numerous historical investigations, particularly over the past three decades.

IITF Research Wildlife Ecologist,Wayne Arendt, and his colleagues presented a concise historical overview of avifaunal research conducted within the Pacific Slope from the 16th century onward, followed by their own biodiversity research from 2009 to 2018. Although a diverse array of invertebrate and vertebrate bioindicator species was included in their investigation, their primary focus was on terrestrial birds.

This body of research showed that the distribution of avian species in the Pacific region exhibits considerable heterogeneity, influenced by factors such as latitude, altitude, and conservation status of the landscape, with a higher density of species observed in areas of greater elevation and the southwestern region. All species in this region, particularly sensitive and endangered, are subject to threats from habitat degradation, hunting activities, and largely unregulated development. Tourism, specifically eco- and avitourism, represents a significant opportunity in this area, offering economically sustainable conservation alternatives. The diversity of ecosystems and proximity between sites facilitate ornithological research within a limited temporal and spatial framework. Furthermore, the conservation of avian species is of paramount importance, as their ecological niches and provisioning, regulating, cultural, and supportive ecosystem services coincide with natural areas that provide essential ecosystem services, such as water recharge.



Heat map delineating regions with the highest density of forest-dependent species. The hydrogeographic units are marked in blue, indicating that numerous sites correspond to the watersheds of these units.

Institute Contact: Wayne Arendt

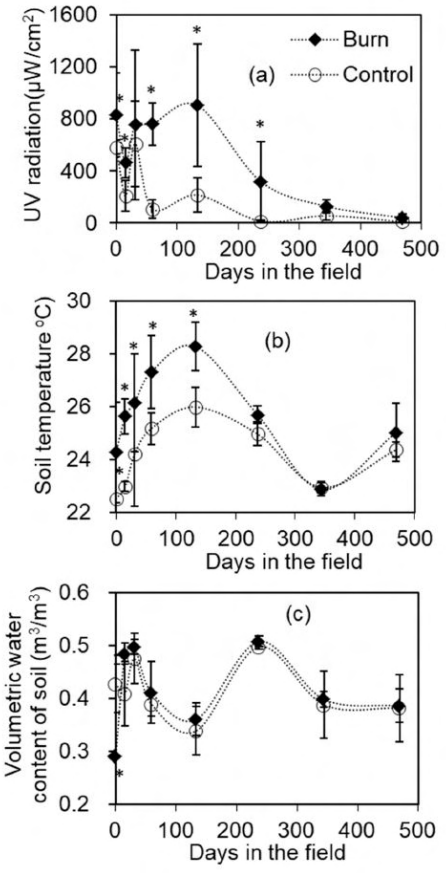
Related publication: Tórrez MA, Arendt WA, Castañeda E, Salgado ME, Sotelo M, Jarquín O. 2024. Historia natural moderna de las aves terrestres en la vertiente del Pacífico de Nicaragua. Pp. 214–235 In: Saldívar Gómez I. (ed.), Historia Natural del Bosque Tropical Seco de Nicaragua. *Revista Nicaragüense de Biodiversidad Número* 116. 2024.

Dr. Grizelle González

Changes in physiochemical conditions and arthropod biodiversity after prescribed burns in a tropical pastureland

Understanding the impacts of forest fires on species and ecosystems is a critical priority within tropical forest conservation. Prescribed burns, which replicate many characteristics of natural forest fires, have been extensively employed to investigate fire effects on various organisms and key ecosystem processes. For example, existing studies offer valuable insights into how fires alter soil/litter elemental composition and arthropod species diversity across numerous forest types. However, research addressing these dynamics within the tropics, especially pasture and grassland ecosystems, remains limited.

Within this context, a group of scientists from the Fijian Polythecnic Normal University, the University of Puerto Rico – Río Piedras Campus, and the Interamerican University, collaborated with IITF Director and Research Scientist, Grizelle González, to analyze the effects of a prescribed burn on litter arthropod species diversity and element content of decomposing grass litter in a tropical pastureland in Guayama, Puerto Rico. The experiment, which entailed a 469-days field incubation using litter from two grasses, *Dichanthium annulatum* and *Megathyrsus maximus*, showed that the prescribed burn substantially elevated ultraviolet (UV) radiation and soil temperature; and significantly decreased the diversity of litter total arthropods, especially predators and Mesostigmata mites, during the initial 5 months after the burn. They also detected a decrease in litter Sulfur (S) concentration and an increment in the immobilization of Manganese (Mn) and Iron (Fe) in decomposing litter. Considering the minimal effects on litter decomposition and short effects on arthropod abundance, and Carbon (C), Nitrogen (N) and Phosphorous (P) dynamics, the authors suggest that tropical grassland ecosystems can be highly resilient to fire disturbances. While they further conclude that well-implemented prescribed burns are a management practice that can conserve pastureland structure and functionality without significantly affecting biophysiochemical conditions and arthropod biodiversity, they note that fires could still result in long-term effects on the cycling of Fe, Mn and S cycling, and consequently ecosystem productivity.



Effect of prescribed burn on (a) ultraviolet radiation level, (b) soil temperature and (c) volumetric water content (mean ± standard deviation, n = 4). Asterisks indicate significant differences between treatments for a given sample date (P < 0.05).

Institute Contact: Grizelle González

Related publication: Huang, W., González, G., Barberena-Arias, M. F., Liu, W., & Zou, X. (2024). Changes in soil arthropods and litter nutrients after prescribed burn in a subtropical moist pastureland. *Pedobiologia*, 106, 150990.

Dr. Tamara Heartsill-Scalley

Ecological and disturbance-related factors influence bryophyte distribution in the Luquillo Experimental Forest.

Hurricanes, droughts and land use changes significantly alter environmental conditions in tropical forests of the Caribbean. These disturbances profoundly influence species distributions and preferred habitat conditions. While the effects of such changes on numerous organisms andacross different spatial scales are well documented, their impact on understudied groups like bryophytes remains poorly understood.

To address these shortcomings, Research Ecologist, Tamara Heartsill-Scalley, collaborated with Coral Matos, graduate student from the College of the Atlantic, and Amelia Merced, from the University of Puerto Rico, to investigate habitat preferences of common bryophytes in the Luquillo Experimental Forest. To accomplish this, they surveyed the presence, abundance, and size of patches of *Thuidium urceolatum* and *Plagiochila* spp. to assess if differences between these variables were observed in riparian vs. upland areas, and in areas of high vs. low past land use. Their results revealed fewer and smaller patches of *Thuidium urceolatum* in upland areas with high past land use, which they link to lingering effects of documented past land uses. Riparian zones in areas with high past land use had patches of *T. urceolatum* and *Plagiochila* spp., which suggested that these areas provide the necessary elements for bryophyte colonization and growth. Moreover, some of these species responded to changes in canopy openness which was tightly linked to differences in hurricane effects across these areas. Results from this study help us understand how some bryophytes are distributed in heterogeneous tropical landscapes and demonstrate that like trees and other groups of organisms, bryophytes can also be used to track the effect of different types of forest disturbances.



Thuidium urceolatum*, the moss investigated by Coral Matos and Drs. Heartsill-Scalley and Merced in the Luquillo Experimental Forest.*

Institute Contacts: Tamara Heartsill-Scalley

Related publication: Matos, C., Merced, A., & Heartsill-Scalley, T. (2024). Habitat preferences and distribution of some common bryophytes in a tropical forest at the Luquillo Experimental Forest, Puerto Rico. The Bryologist, 127(1), 56-65.

Dr. Eileen Helmer

Understanding landscape-scale habitat needs is vital for conserving the near threatened Kirtland's Warbler

Factors like food availability, predation risk, and competition between individuals of the same species influence how species use space. Many species, such as the Kirtland's Warbler (*Setophaga kirtlandii*), exhibit flexible space use mostly because they migrate from breeding grounds in northern regions to nonbreeding grounds in the tropics. The extent and degree of overlap of the non-breeding home, and which areas they most intensively use, their "core areas", are useful "barometers" to understand space use in these species. Further, this information can provide insights about partitioning of habitat resources among individuals.

A team of scientists from the USDA Forest Service, including Research Ecologist, Eileen Helmer, Emeritus Research Wildlife Biologist, Joe Wunderle, and colleagues from Antioch University of New England and the American Bird Conservancy, used radio telemetry to quantify size and overlap of space use by sedentary Kirtland's Warblers in Eleuthera, The Bahamas, to identify factors that may influence non-breeding space use. They also related home range and core area size to factors known to influence these variables, such as bird sex and age class, year, winter period, forest age since disturbance, vegetation structure, fruit biomass and foliage cover of fruit-bearing shrubs. Their work shows that the warbler's sedentary non-breeding home range was larger than most other wintering Nearctic-Neotropical migratory passerine birds studied to date. Further, researchers showed that home range and core area size increased with the age of site disturbance, consistent with declines in fruit abundance in older forest patches. Relatively high home range overlap between individuals varied by study site and winter period. Core area overlap was limited, apparently due to antagonistic interactions between conspecifics. Their findings highlight the importance of implementing landscape-scale approaches for the conservation of this vulnerable species.



A Kirtland Warbler in its wintering grounds in Eleuthera, The Bahamas. Photo credit: Cole Scrivner

Institute Contacts: Eileen Helmer

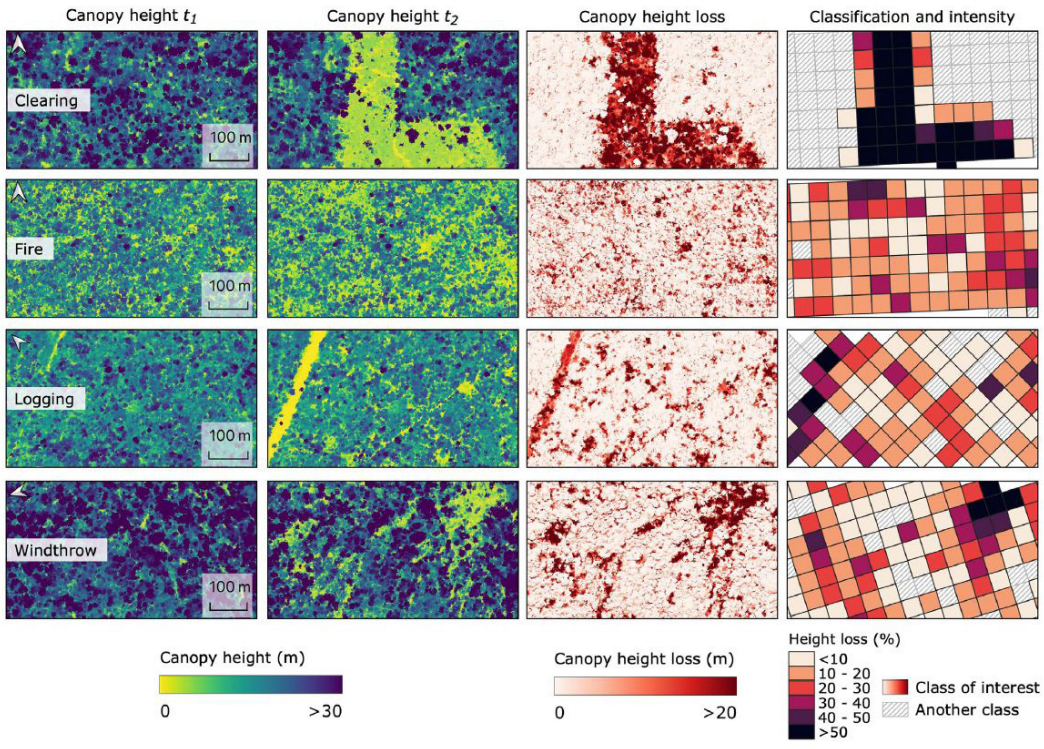
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Dr. Michael Keller

Anthropogenic and natural disturbances trigger carbon loss in the Amazon Arc of Deforestation

Portions of the Brazilian Amazon have transitioned from being a carbon sink to a source due severe deforestation and degradation that has affected the region over the last decades. As opposed to estimates of carbon loss due to deforestation, the carbon impact of forest degradation (i.e. selective logging, forest fires, and fragmentation) in this region is not well understood, mainly due to estimation difficulties at large scales. Because satellite-based approaches tend to suffer from coarse resolution, repeated airborne lidar (light detecting and ranging), a technique that accurately detects changes in forest structure between different acquisitions, provides an ideal avenue for estimating carbon losses and gains attributed to these types of disturbances.

A team of scientists led by IITF Research Physical Scientist, Michael Keller, recently utilized unique repeated airborne lidar data to provide a direct, detailed, and high-resolution partitioning of aboveground carbon gains and losses in the Brazilian Arc of Deforestation. Their work shows that disturbances directly attributed to human activity impacted 4.2% of the survey area while windthrows and other disturbances affected 2.7% and 14.7%. Their estimates, covering the period between 2016 and 2018, demonstrated a greater loss of carbon through forest degradation than through deforestation and a net loss of carbon of 90.5 ± 16.6 Tg C y−1 for the study region attributable to both anthropogenic and natural processes. These results significantly advance our understanding of degradation in tropical forests and its implications for the carbon budget highlighting the need for improved and continued high-resolution monitoring of forest structure and assessment of forest disturbances and recovery.



Canopy height loss calculated from lidar time-series and the classification (clearing, fire, logging, and windthrow) based on 50 × 50 m cells. The first two columns show the canopy height from the first (t1) and second (t2) airborne lidar campaigns. The third column displays the canopy height loss in the period between the two acquisitions. The fourth column shows the cells identified as one of the four disturbance events and the intensity of relative height loss.

Institute Contacts: Michael Keller

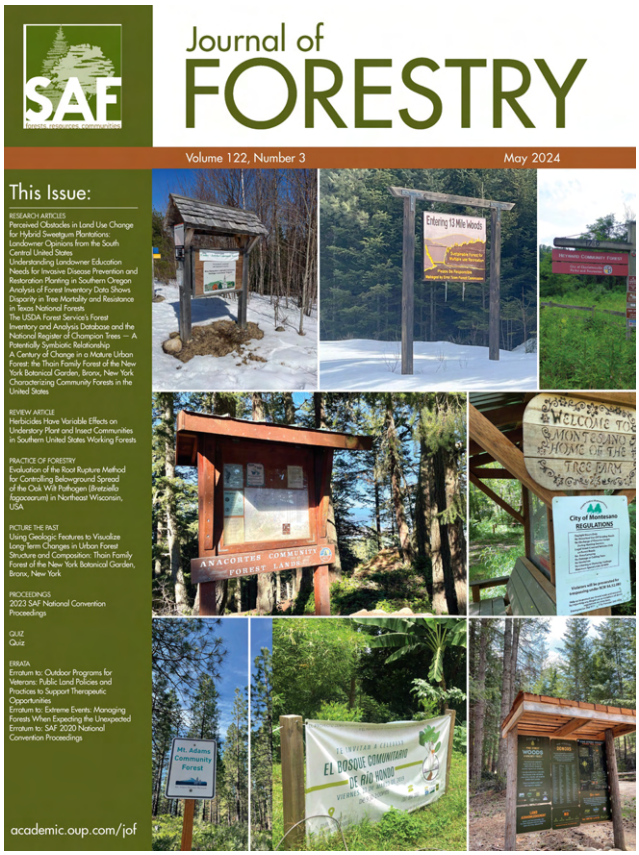
Related publication: Csillik, Ovidiu, M. Keller, M. Longo, A. Ferraz, E. Rangel Pinagé, E. Görgens, J.P. Ometto, V. Silgueiro, S. Saatchi (2024) A large net carbon loss attributed to anthropogenic and natural disturbances in the Amazon Arc of Deforestation.Proceedings of the National Academy of Sciences Vol. 121 No. 33 e2310157121.https://doi.org/10.1073/pnas.2310157121

Dr. Kathleen McGinley

Characterizing community forests in the United States

Community forests (CFs) are forest areas that provide local access to natural resources and are primarily managed by local community members who gain both direct and indirect benefits from their stewardship and related activities. Community forests have a relatively small footprint across the United States, including Puerto Rico and US Virgin Islands, but represent a rapidly developing model of forest ownership, governance, and management that helps protect forest land and ensures local access to forest goods and services. Yet, unlike many other countries around the world with communal property systems, CFs in the United States do not exist as a distinct land tenure or ownership class. They rather have been established on a variety of public, private, and tribal lands and have diverse land tenure arrangements that have made it challenging to study their establishment, functionality, and outcomes.

To better understand the diverse social, ecological, and economic contexts, inputs, and outputs associated with CFs in the United States, Research Social Scientist and Project Leader, Kathleen McGinley, and her colleagues from the USDA Forest Service's Pacific Northwest and Southern Research Stations, Oregon State University and North Carolina State University, inventoried ninety-eight (98) CFs across the United States, including Puerto Rico. Based on data collected pertaining to their ownership, management, accessibility, benefits provided, and conservation values, McGinley and her collaborators found that while ownership type (i.e. publicly-, privately- and tribally- owned) shaped some key functions of CFs, this factor had minimal influence on their ultimate size, management goals, allowed activities, timber production, or sources of income. The researchers also found that the primary management goals of CFs centered on recreation and environmental services, though timber production and a range of other income sources were significant contributors to their budgets. According to authors, the broad diversity among CFs and their goals, management and governance approaches, and outcomes for local communities is evidence of their grassroots nature, but also one of the main reasons why creating a comprehensive inventory and typology of CFs remains challenging. Their work provides a foundational dataset for further research on the impacts and contributions of community forests in the United States.



The work on community forests in the US by McGinley and collaborators was selected as "Editor's Choice" and featured on the cover of the May 2024 issue of the Journal of Forestry.

Institute Contacts: Kathleen McGinley

Related publication: Hajjar, R., McGinley, K., Charnley, S., Frey, G. E., Hovis, M., Cubbage, F. W., Schelhas, J. & Kornhauser, K. (2024). Characterizing community forests in the United States. Journal of Forestry, 122(3), 273-284.https://doi.org/10.1093/jofore/fvad054

Dr. Tischa Muñoz-Erickson

Built environment, urban systems and cities

Built environments and cities, which include human-made or modified landscapes, structures, and infrastructure systems that bring together people, services, and economic activities, are major drivers of environmental and weather-related hazards. Decisions and policies implemented in these areas can result in increases in heat and flooding, with risks unevenly distributed across populations. While many cities across the USA are making significant strides to curb these types of impacts, long-term efforts can be hampered by resources and capacity constraints.

Along with twelve other scientists from various federal agencies and universities across the U.S, Research Social Scientist, Tischa A. Muñoz-Erickson, synthesized existing knowledge about how people in cities and towns are experiencing multiple natural hazards and strategies they are implementing to mitigate and adapt to them. Key findings from their assessment include: 1) reaffirming that urban areas are major drivers of environmental challenges; 2) attributes of the built environment exacerbate climate impacts, risks, and vulnerabilities; 3) urban environments create opportunities for hazard mitigation and adaptation; 4) community-led actions signal a shift toward equitable adaptation governance. Their work concludes that choices we make today in the built environment to grapple with both observed and projected environmental risks and hazards are expected to have long-term implications for urban residents' livelihoods, well-being, and quality of life. This synthesis makes significant advances from previous efforts with better quantification of urban GHG emissions, discussion of projected losses and efforts to finance / fund targeted actions and assessment of mitigation and adaptation management options.



Conversations among community leaders, urban practitioners, and scientists about watershed-level flood adaptation strategies to lower the effects of environmental and weather-related hazards in urban settings was a key aspect discussed in the Built environment, urban systems and cities chapter of the 5th National Climate Assessment Report (NCA5). This image show members of these groups, including Tischa Muñoz Erickson, (standing to the right), during a knowledge co-production workshop in Río Piedras, San Juan, Puerto Rico, November 4, 2024. (Photo credit: Mandy Kuhn).

Institute Contacts: Tischa A. Muñoz-Erickson

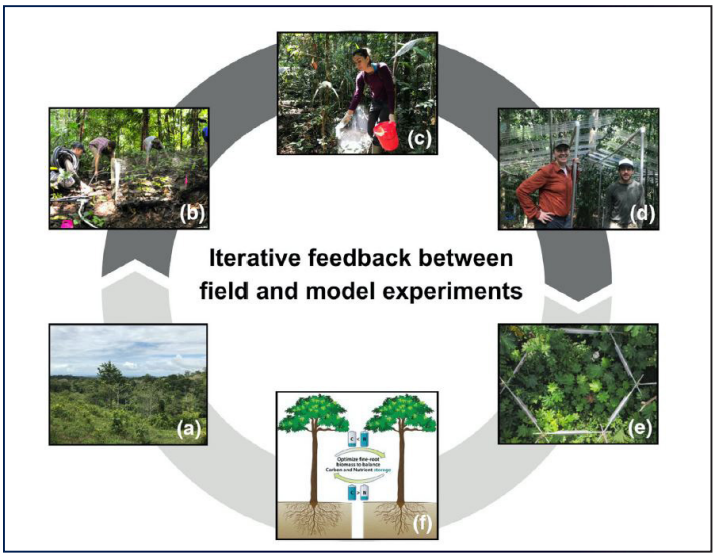
Related publication: Chu, E.K., M.M. Fry, J. Chakraborty, S.-M. Cheong, C. Clavin, M. Coffman, D.M. Hondula, D. Hsu, V.L. Jennings, J.M. Keenan, A. Kosmal, T.A. Muñoz-Erickson, and N.T.O. Jelks, 2023: Ch. 12. Built environment, urban systems, and cities. In: Fifth National Climate Assessment. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. https://doi.org/10.7930/NCA5.2023.CH12.

Dr. Tana Wood

Current state and research needs of large-scale global change experiments in tropical forests

Tropical forests store large carbon (C) pools, making them key regulators of the global climate system. Currently, numerous long-term global change field experiments and modeling efforts are enhancing our understanding of critical tropical forest-climate feedbacks. While significant progress has been made, major gaps remain due to limited synthesis efforts, cross-site comparisons, and standardized multi-site experiments, all of which are essential for disentangling the complexities of ecosystemic processes and responses.

Motivated by the recent INSPIRE session "Tropical Forests & Global Change: Biogeochemical Responses and Opportunities for Cross-Site Comparisons" at the 108th Annual Meeting of the Ecological Society of America, a group of scientists and experts leading large-scale global change experiments in tropical forests compiled an overview of current experimental initiatives and key research areas requiring further attention. These include cross-site comparisons and the integration of findings with ecosystem-scale models. Participants, including Research Ecologist and Principal Investigator of the Tropical Responses to Altered Climate Experiment (TRACE),Tana Wood, emphasized the importance of spatial and temporal variation in tropical forest responses to global change, as well as the differing responses of various ecosystem components (e.g., aboveground vs. belowground). Four main goals were identified for future progress: 1) Expanding participation from researchers in tropical countries and with varied research backgrounds. 2) Increasing synthesis of past and ongoing experimental findings. 3) Planning the next generation of broad scale, coordinated experiments across tropical forests, and 4) Promoting iterative feedback between field projects and dynamics vegetation models to improve large-scale predictions of tropical forest responses to climatic alterations. Engaging audience participation further underscored the need for ecosystem models to better represent plant-microbe-soil interactions unique to tropical forests, enhancing the accuracy of response predictions.



Large-scale field experiments in the tropics as discussed at the 'Tropical forests & global change: biogeochemical responses and opportunities for cross-sites comparisons' INSPIRE session at the 108th Annual Meeting of the Ecological Society of America. A heating structure from TRACE is shown in image (e).

Institute Contacts: Tana Wood

Related publication: Cusack, D. F., Reed, S., Andersen, K. M., Cinoğlu, D., Craig, M. E., Dietterich, L. H., Hogan, J. A., Holm, J. A., Nottingham, A. T., Ostertag, R., Soper, F. M., Wood, T. E. & Wong, M. Y. (2024). Tropical forests and global change: biogeochemical responses and opportunities for cross-site comparisons, an organized INSPIRE session at the 108th Annual Meeting, Ecological Society of America, Portland, Oregon, USA, August 2023. New Phytologist, 241(5).

Many Units, One IITF

Despite the dedicated efforts of the Institute's four main work programs—Research & Development, State, Private, and Tribal Forestry, International Cooperation, and Business Operations—along with the IITF Library and the Caribbean Climate Hub, there remains ample opportunity for cross-unit collaborations and joint initiatives. These efforts highlight the underlying unity of the Institute, demonstrating that behind its diverse programs, there is a singular IITF working towards shared goals. The following major accomplishments exemplify the collaborative spirit:

Second World Forum on Urban Forests

The month of October 2023 was a hallmark for cross-unit collaborations with the celebration of the Second World Forum on Urban Forests held in Washington, DC. The event, organized by Food and Agriculture Organization (FAO), the Arbor Day Foundation, the U.S. Forest Service, the Smithsonian Institution, the City of Washington DC, the International Society of Arboriculture (ISA), and Politécnico di Milano and the Società Italiana di Selvicoltura ed Ecologia Forestale (SISEF), included participation from the State Private & Tribal Forestry Program Manager, Magaly Figueroa; the Urban and Community Forestry (UCF) Program Manager, Maya Quiñones, Program Specialist, Andrés González Nieves, and Resource Assistants, Andrés Pérez Cintrón and Jo Ann Santana López. International Cooperation Program Manager, Gerald "Jerry" Bauer, also participated from the event.

With the theme, "Greener, Healthier and Happier Cities for All", the forum highlighted the importance of building welcoming and accessible cities where the goods and services of urban forests and trees are universally available.



UCF teams from the Caribbean and Pacific Islands with UCF Program Lead, Beattra Wilson, at the Second World Forum on Urban Forests.

The SP & TF team attended conferences regarding urban forestry science, forest benefits, and related topics. In addition, the team participated in the Latin American Reception and an Islanders Meeting with Assistant Director Beattra Wilson from the Washington Office. During this gathering, people from the Pacific and Caribbean islands came together to engage in a dialogue regarding resources, challenges, and to discuss future collaborations. The IITF UCF Team, together with UCF Region 5, took the opportunity to plan for future networking events.

The International Cooperation team participated from several technical sessions and engaged with both local and international participants. They aided with two off-site field excursions on urban green area conservation/ resilience and forest therapy that were held in Baltimore, Maryland and Washington DC. About 50 forum attendees from six countries participated in these field excursions making them a unique opportunity to interact with the international community.

Gerald (Jerry) Bauer participated in a special reception with global partners and interested parties to discuss the practice of Forest Therapy and generate collaboration and partnerships among the participants. This "meet & greet", held at the International Programs (IP) office in Washington DC, led to an open discussion and brainstorming session where participants shared their thoughts and/or recommendations to generate interest and global collaboration around the practice of Forest Therapy. The main guest at this session was Won Sop Shin, President of the Korea Forest Therapy Forum and Delegate from the Republic of Korea. Seventeen participants, representing 10 public and private organizations and five countries, participated in this gathering.



Forest Therapy guides and participants of the Second World Forum on Urban Forests at the USDA People's Garden at USDA Headquarters in Washington DC.

North Carolina State University Catalyst program visits PR

At the end of March 2024, and in coordination with the International Cooperation program, the Institute was privileged to host the visit of a group of 34 students from the North Carolina State University Catalyst program (CSA-GIST) —an award-winning high school program designed to create STEM opportunities for students with disabilities. The two-day visit to IITF headquarters and the Sabana Field Research Station allowed the students to learn more about IITF, its units and the wide variety of STEM careers available within the Forest Service.

Among the activities at the headquarters, this diverse group of highschoolers took a tour of the IITF Library and received an orientation about their facilities and services. As part of the orientation, an exhibition was prepared with a sample of all the types of materials and collections that the Library manages. Next, they visited the GIS and Remote Sensing Lab where they learned about the Lab's geospatial resources, initiatives, and scientific projects. The Caribbean Climate Hub team presented an overview of the Lab's background and demonstrated research maps, geospatial tools, and other products designed to assist farmers and landowners in their planning. In addition, the students interacted with Hubs' educational materials and web-based tools. The group also received additional information about the International Cooperation and State, Private and Tribal Forestry units.

During the second day of their visit, the group visited the Sabana Field Research Station where they interacted with field equipment and further learned about the Station's projects. Afterwards, they took a hike through the Angelito trail and Puente Roto.

In anticipation of their visit, the group of students received from Research Social Scientist and Project Leader,Kathleen McGinley, a lecture titled 'Tropical Forests: Climate, Biodiversity, People, and Sustainability'. She also worked with the students in the field as they tried out new field equipment to be used in their highly anticipated visit to the island. The visit from students in the North Carolina State University Catalyst Program (CSA-GIST) was arguably the Institute's most significant outreach event of FY 2024. Its success was made possible by the seamless collaboration of all IITF units, the IITF Library, and the Caribbean Climate Hub.



Kathleen McGinley during her talk 'Tropical Forests: Climate, Biodiversity, People, and Sustainability' which was offered to students participating from the NCSU Catalyst Program.



Gerald (Jerry) Bauer and students and staff from the North Carolina State University CSAGIST program visiting the IITF Headquarters.



Students and staff from the North Carolina State University CSA-GIST program visiting the IITF GIS and Remote Sensing Lab.

Publications

1. **Chu, E.K.; Fry, M.M.; Chakraborty, J.; Cheong, S.-M.; Clavin, C.; Coffman, M.; Hondula, D.M.; Hsu, D.; Jennings, V.L.; Keenan, J.M.; Kosmal, A.; Muñoz-Erickson, T.A.; Jelks, N.T.O. 2023**. Built environment, urban systems, and cities. In: Crimmins, A.R.; Avery, C.W.; Easterling, D.R.; Kunkel, K.E.; Stewart, B.C.; Maycock, T.K., eds. Fifth National Climate Assessment. Washington, DC: U.S. Global Change Research Program. Chapter 12. https://doi.org/10.7930/NCA5.2023.CH12.

2. **Crespo-Vélez, S.; Guzmán-Colón, D.; Arzola, C.; De la Torre, J.; Gould, W. 2024.** Prácticas para manejar impactos climáticos: 4.1 Aves. In: Guía de adaptación: cambio climático en fincas y terrenos boscosos en el Caribe. San Juan, PR: Departamento de Agricultura de EE.UU., Centro Climático del Caribe, Servicio Forestal, Instituto Internacional de Dasonomía Tropical. 26 p. https://caribbeanclimatehub.org/wp-content/uploads/2024/06/folletoaves4.1.pdf.

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Science Delivery Activities

Product ID	Authors	Title
108790	Murray, Lara; McGinley, Kathleen; Robertson, Guy;...	2020 National Report on Sustainable Forests - Key Findings. USFS ScienceX Week 19 May 2023.
109207	Helmer, Eileen; Shannon, Kay; Marcano-Vega, Humfredo;...	Hurricane effects on forest dynamics and structure. Oral presentation presented at the USDA Forest Service Atmospheric Science R&D Workshop, Atlanta, GA, November 15-17, 2023.
109359	Carrera-Martinez, Roberto; Gómez, Nicolás; Hernandez-Natera, Mercedes;...	Evolution and Diversity of Trigasterid Earthworms of Puerto Rico and The Virgin Islands Archipelago
109916	Medina-Rodríguez, Viviana; Alvarez-Berrios, Nora; Cotto Santos, Gabriela;...	Apoyando la toma de decisiones informadas en Puerto Rico y las Islas Vírgenes hacia una agricultura y silvicultura climáticamente inteligentes
109933	Rodriguez-Serrano, Paloma; McGinley, Kathleen; Alvarez-Berrios, Nora;	Hurricane Fiona's effects on Puerto Rico's Plantain and Banana Plantations and Farmer's Adaptation and Recovery Strategies
109948	Helmer, Eileen;	Forest Modeling with University of California researcher. Dr. Polly Buotte
109950	Haghtalab, Nafiseh; Hogan, Aaron; Heartsill Scalley, Tamara;...	Disturbances and Their Effects on Forest Carbon Dynamics: A Case Study in Puerto Rico. Oral presentation at the American Geophysical Union Fall Meeting, December 11-15, 2023, San Francisco, CA.
109951	Buotte, Polly; Longo, Marcos; Shi, Mingjie;...	Land use and climate effects on secondary tropical forest trajectories. Oral presentation at the American Geophysical Union Fall Meeting, December 11-15, 2023, San Francisco, CA.
109970	Helmer, Eileen;	Applications of medium resolution optical satellite imagery from tropical forests. Invited lecture, Antioch University of New England, Introduction to GIS class
109971	Akresh, M.E.; Wunderle Jr., Joseph; Currie, D.;...	Conservation implications of large home range size and overlap in nonbreeding Kirtland's Warblers in The Bahamas.
110418	McGinley, Kathleen;	Implementation Pathways, Partnerships and Policy Coherence for Achieving Ambitious Reforestation and Forest Restoration Goals. XXVI IUFRO World Congress.
110419	McGinley, Kathleen;	Forest Policy Reform and Implementation in Perú. XXVI IUFRO World Congress

Product ID	Authors	Title
110420	Heartsill Scalley, Tamara;	Regional seminar bolsters climate change resilience in the Caribbean. Inside the Forest Service piece
110421	Munoz, Tischa A.;	Participatory mapping of spaces in communities. Puerto Nuevo Junto al Rio community outreach and recreation event.
110422	Munoz, Tischa A.;	NCA5 en espanol. Oportunidades de NCA6. Capitulo 12. Entorno construido, sistemas urbanos y ciudades. US Global Change Research Program webinar
110423	Wood, Tana;	Several presentations at the Luquillo LTER Annual Meeting
110424	Grullon-Penkova, Iana; Barreto, Tatiana; Rubio Lebron, Laura;...	Tour about the TRACE experiment and the Sabana Field Research Station (SFRS). International Programs visit to the SFRS.
110425	Wood, Tana;	Talk about TRACE experiment. International Programs visit to the Sabana Field Research Station
110426	Wood, Tana; Gutierrez del Arroyo, Omar;	Appearance of Drs. Wood and Gutierrez del Arroyo in the Telemundo network documentary "Nuestro Planeta: Voces del Cambio Climático".
110456	Wood, Tana;	Appearance of Dr. Wood in the CBS's show "On the dot with David Schechter".
110458	Wood, Tana;	TV Globo network interview about the TRACE experiment
110460	Heartsill Scalley, Tamara;	Scientific exchange among panel of regional experts in Streamflow Duration Assessment Methods (SDAMs). 1st workshop on U.S. Caribbean Streamflow Duration Assessment Method, U.S. EPA Caribbean Environmental Protection Division (CEPD) offices in Guaynabo
110461	Heartsill Scalley, Tamara;	Ecología de zonas ribereñas: retos y oportunidades. Plenary talk at the Primer Simposio de Ecología y Ciencias Ambientales de Puerto Rico (SECAS-PR). Universidad Ana G. Mendez, Cupey campus.
110462	Heartsill Scalley, Tamara;	Briofitas: Pequeñas plantas con una gran contribución a los bosques. Article published in the El Nuevo Dia newspaper
110463	Gutierrez del Arroyo, Omar; Gonzalez, Grizelle;	Scientific writing. Offered to students at the Facultad de Ciencias Forestales - Universidad Nacional de la Amazonía Peruana (FCF-UNAP)
110464	McGinley, Kathleen;	Peruvian Community Forest Governance. Facultad de Ciencias Forestales - Universidad Nacional de la Amazonía Peruana (FCF-UNAP).
110465	McGinley, Kathleen; Gonzalez, Grizelle; Gutierrez del Arroyo, omar;	Scientific knowledge exchange between IITF scientists and students and collaborators at the Facultad de Ciencias Forestales - Universidad Nacional de la Amazonía Peruana (FCF-UNAP)

Product ID	Authors	Title
110466	Keller, Michael;	Functionally assembled terrestrial ecosystem simulator (FATES) for hurricane disturbance and recovery. Article about Dr. Keller's work published in the USFS Research and Development national newsletter.
110467	McGinley, Kathleen;	Characterizing community forests in the United States. Article about Dr. McGinley's work published in the USFS Research and Development national newsletter.
110468	Munoz, Tischa A.;	"Mujeres de frente al rio y de la mano de las comunidades". Article on Para La Naturaleza NGO website highlighting Dr. Munoz-Erickson work on the Rio Piedras watershed.
110469	McGinley, Kathleen;	Community Engagement with Community Forests Under Different Ownership Models. Nortwest Community Forest Coalition Winter Quarterly Meeting.
110470	Wood, Tana;	CNN interview for the program “Llamado a la tierra” which focuses on documenting the environmental challenges facing planet Earth, as well as the solutions
110471	Heartsill Scalley, Tamara;	Upland forest restoration efforts and challenges. Presentation at the Natural Infrastructure for Caribbean Resilience (NICaR) program meeting in Trinidad and Tobago.
110472	Heartsill Scalley, Tamara;	Community and urban resilience in the Caribbean. Presentation at the Natural Infrastructure for Caribbean Resilience (NICaR) program meeting in Trinidad and Tobago.
110473	Wood, Tana;	CBS interview about the TRACE experiment, the TRACE crew and about the topic of human intervention for the preservation of biodiversity
110474	Gutierrez del Arroyo, Omar;	CBS and Telemundo interviews about climate change and for gathering content to develop a documentary addressing this topic. Sabana Field Research Station
110480	Gutierrez del Arroyo, Omar;	CBS and Telemundo interviews about climate change and for gathering content to develop a documentary addressing this topic. Sabana Field Research Station
110481	Wood, Tana; Grullon Penkova, Iana; Barreto, Tatiana;...	CBS and Telemundo interviews about climate change and for gathering content to develop a documentary addressing this topic. Sabana Field Research Station
110482	McGinley, Kathleen;	Tropical Forests: Climate, Biodiversity, People, and Sustainability. Lecture offered to North Carolina State University (NCSU) Catalyst program students.
110483	Keller, Michael;	Tropical Forests: Climate, Biodiversity, People, and Sustainability. Lecture offered to North Carolina State University (NCSU) Catalyst program students.

Product ID	Authors	Title
110484	Wood, Tana;	Recognizing climate change impacts: let's take action now! University of Puerto Rico, Medical Sciences Campus.
110486	Wood, Tana; Grullon Penkova, Iana; Barreto, Tatiana;...	Tour about the TRACE experiment and the Sabana Field Research station to BIOGEOMON conference attendees.
110487	Wood, Tana;	TRACE experiment. BIOGEOMON International Symposium at the University of Puerto Rico, Rio Piedras Campus.
110488	Keller, Michael;	A Scoping Study for a NASA Tropical Forest Terrestrial Ecology Campaign. AGU Fall Meeting 2023, San Francisco, CA.
110489	McGinley, Kathleen; Alvarez-Berrios, Nora; Gonzalez, Grizelle;	Chapter 23 - US Caribbean - The Fifth National Climate Assessment. AGU Fall Meeting 2023, San Francisco, CA.
110490	Wood, Tana; Grullon-Penkova, Iana;	Water volume and nutrient fluxes from the canopy to the root zone across different environmental gradients in the Neotropics. AGU Fall Meeting 2023, San Francisco, CA.
110491	Keller, Michael;	High-resolution aboveground carbon changes in the Brazilian Amazon using repeated airborne lidar. AGU Fall Meeting 2023, San Francisco, CA.
110492	Keller, Michael;	Climate Change and Land Use Change Impacts on Structurally and Functionally Diverse Tropical Forests. AGU Fall Meeting 2023, San Francisco, CA.
110493	Keller, Michael;	Forest Disturbance and Recovery in Puerto Rico Represented by Field Measurements and ELM-FATES. AGU Fall Meeting 2023, San Francisco, CA.
110494	Keller, Michael;	Amazon forest structure estimated using GEDI spaceborne lidar. AGU Fall Meeting 2023, San Francisco, CA.
110495	Keller, Michael;	State-dependent ecosystem sensitivity to aridity and water storage deficit compromises recovery of the tropical South America carbon balance from the 2015-2016 El Niño. AGU Fall Meeting 2023, San Francisco, CA.
110512	Wood, Tana; Grullon-Penkova, Iana;	Higher than expected rates of tropical soil carbon loss in a warmer world: Evidence from a field warming experiment in Puerto Rico. AGU Fall Meeting 2023, San Francisco, CA.
110516	Heartsill Scalley, Tamara; Wood, Tana; Helmer, Eileen;	Climatic Disturbances and Their Effects on Forest Carbon Dynamics: A Case Study in Puerto Rico. AGU Fall Meeting 2023, San Francisco, CA.
110522	Helmer, Eileen; Martinuzzi, Sebastian; Keller, Michael;	Land use and climate effects on secondary tropical forest trajectories. AGU Fall Meeting 2023, San Francisco, CA.
110524	Helmer, Eileen;	Interview on Moderate Resolution Spectroradiometer (MODIS) on deforestationdriven changes in clouds over Southeast Asia during the AGU 2023 Fall Conference meeting

Product ID	Authors	Title
110525	Wood, Tana;	The heat is on!: assessing the future of El Yunque National Forest's plant species in a rapidly changing world". Science Café Lecture at the University of Puerto Rico, Bayamon Campus
110526	Munoz, Tischa A.;	First Alianza por la Cuenta del Rio Piedras Summit. Antiguo Acueducto de Rio Piedras.
110527	Helmer, Eileen;	Hurricane María's effects on forest dynamics and structure in Puerto Rico. USDA Forest Service Atmospheric Science R&D Workshop, Atlanta Georgia.
110528	Wood, Tana; Grullon-Penkova, Iana; Barreto, Tatiana;...	Tour about the TRACE experiment and the Sabana Field Research Station to Boy Scout's Troop 51.
110531	Gonzalez, Grizelle;	(Multimedia SDP) How can soil organisms help create healthier forests?
110532	Munoz, Tischa A.;	(Multimedia SDP) Science in Action: Sustainability and resilience of social and ecological technology systems in the tropics. USFS SCIENCEx Human Dimensions week
110533	McGinley, Kathleen;	(Multimedia SDP) Diverse approaches to collaboration in forest governance and management under different ownership regimes. USFS SCIENCEx Human Dimensions week.
110597	Mendez-Lazaro, Pablo; Chardon-Maldonado, Patricia; Carrumba, Lisamarie;...	Science and Society / The Fifth National Climate Assessment: Risks, Impacts, and Responses.
110599	Gonzalez, Grizelle;	Visit to US Virgin Islands to meet with Urban and Community Forestry Program (UCF) partners and other partners and for in-person meeting of the US Virgin Islands Forestry Working Group.
110600	Gonzalez, Grizelle;	Research and Development. Introductory presentation. All USDA FS R&D Employees Engagement.
110602	Gonzalez, Grizelle;	Strategic Priority Panel: Applying Knowledge Globally. Virtual presentation. Orientation to New FS Employees
110603	Gonzalez, Grizelle;	Video on Caribbean Heritage Month. Shared through social media.
110604	Gonzalez, Grizelle;	Interview on career development as soil scientist / researching hidden figures of science.
110606	Gonzalez, Grizelle;	Research and Development. Introductory presentation. Third All USDA FS R&D Employees Engagement. Virtual presentation.
110609	Gonzalez, Grizelle;	support to Peruvian partners such as the Peruvian Forest Service and local universities and meet with other US government agencies such as the US Agency for International Development and Foreign Agricultural Service. LIMA, PERU. April 21-27, 2024

Product ID	Authors	Title
110612	Gonzalez, Grizelle;	Presentation on Career Paths in the FS. Oregon State University. Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS) Chapter and College of Agricultural Sciences' students. In-person presentation.
110613	Gonzalez, Grizelle; Orellana, Yvette; Medina, Karina;	USFS Latina Leaders Panel: Women Who Advocate for Equity, Diversity and Inclusion.
110615	Gonzalez, Grizelle;	Press conference to announce IRA UCF awards in the US Virgin Islands. ST. CROIX,
110618	Gonzalez, Grizelle;	Closing remarks presentation. National Hispanic Heritage Month Celebration (Celebración del Mes Nacional de la Herencia Hispana). Virtual presentation.
110619	Gonzalez, Grizelle;	USDA FS Puerto Rico Career Workshop. Welcome and panel presentation on R&D careers in the FS. In person talks
110779	Helmer, Eileen; Keith, David;	Consultation with Dr. David Keith, Professor, University of New South Wales, New South Wales, Australia. May 2-5, 2024.
110780	Helmer, Eileen;	In June of 2024 (6/26/24), Dr. Alison Write, Senior Editor of the Cross-Journal Editorial Team for Nature Journals, contacted Dr. Helmer requesting a quote for a Research Briefing on an article soon to be published in the journal Nature Sustainability that published global maps of Holdridge Life Zones. Dr. Helmer provided a quote on the innovation and usefulness of the new research, which was published in the briefing article.
110788	Giselle, A.M.; Cole, Scrivner; Brown, Demonica;...	Kirtland's Warbler habitat mapping project: recent work in The Bahamas. BirdsCaribbean Meeting, Santo Domingo, Dominican Republic, July.
110791	Haghtalab, N.; Helmer, Eileen; Heartsill Scalley, Tamara;...	Mapping Tropical Forest Biomass. Lightening talk. Luquillo Experimental Forest Long Term Ecological Research Site Annual Meeting. May 29-31, Puerto Rico, USA.
110792	Aaron Hogan, J; Kay, Shannon; Vargas, German;...	Hurricane disturbance and the growth-mortality trade-off of Caribbean trees. Offered poster presentation at the Ecological Society of America Annual Meeting, August 2024, Long Beach, CA, USA and presented as a lightening talk at the Luquillo Experimental Forest Annual Meeting, May 29-31, 2024, Puerto Rico, USA.
110800	Gould, William; Guzman, Diana; Crespo, Silmarie;	Climate Adaptation Guide for Tropical Agriculture and Forestry Workshop, University of Puerto Rico - Utuado.
110866	Heartsill Scalley, Tamara;	Invited as a subject matter expert on tropical forests vegetation for the first meeting of regional geneticists at EYNF.
110867	Heartsill Scalley, Tamara;	Supporting the development of El Yunque National Forest management actions in riparian zones

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110868	Heartsill Scalley, Tamara;	Presenter and Panel Member, USDA Forest Service panel on Climate Change Research at the Women of Color STEM Conference, Detroit, Michigan, October 12-14th 2023.
110869	Heartsill Scalley, Tamara;	Research presentation to USDA FS WO-IP staff at Sabana Field Research Station, April 17th 2024, Long Term Forest Dynamics in the Caribbean and Permanent Plot Networks
110870	Heartsill Scalley, Tamara; Vicens, Coralys; Ramos, Yeraldin;	Ecología de zonas ribereñas: retos y oportunidades". Additional contributed presentations co-authored, presented by student leads (IITF volunteers)
110871	Heartsill Scalley, Tamara;	Using historical tree plot inventory data to investigate the biogeography of Tropical America June 27, 2024 Session: Legacy tropical forest data: current status, uses, and securing them. Presented by Karina Banda, 14 co-authors from Synthesis of Tree Biodiversity in Tropical America with Plot Inventories (SynTreeSys), at 26th IUFRO World Congress, Stockholm, Sweden - June 23-29, 2024.
110872	Heartsill Scalley, Tamara;	Understanding patterns of biogeography and threat of tree species diversity across Latin American biomes. July 23, 2024. Session: Plant diversity, biogeography and evolution in the tropics for sustainable use. Presented by Pennington T., 14 co-authors from Synthesis of Tree Biodiversity in Tropical America with Plot Inventories (SynTreeSys), at XX International Botanical Congress, Madrid July 21-27, 2024.
110873	Heartsill Scalley, Tamara;	Invited presentation at UPR-Humacao "Investigación y trayectoria en el paisaje entre bosques y ríos" to advanced course Perspectivas críticas sobre la emergencia climática an NSF funded course of the Instituto Transdisciplinario de Investigación-Acción Social-Geo. May 3rd 2024. 20 personas
110874	Hagthalab, Nafiseh; Helmer, Eileen; Heartsill Scalley, Tamara;	Nafiseh Haghtalab, Eileen H. Helmer, T. Heartsill-Scalley, Tana E. Wood (talk) Evaluating Hurricane-Induced Changes in Puerto Rican Forest Biomass: Integrating Field Measurements, LiDAR, and Machine Learning. AGU 2024 Session: "B009 - Advances in Understanding and Predicting Forest Demography and Carbon in a Changing World"
110875	Banda, Karina; Heartsill Scalley, Tamara;	Synthesis of Tree Diversity in Tropical America. (Webinar) Presented by Karina Banda (14 co-authors, SynTreeSys). 11 of July 2024 (9-10am GMT-5 Bogota, 4-5pm CET Paris).

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110876	Banda, Karina; Heartsill Scalley, Tamara;	Vulnerability of Tree Species and Communities to Global Change. (Webinar) Presented by Karina Banda, moderated and co-authored by T. Heartsill Scalley (along with 13 co-authors, SynTreeSys) held on 04 September 2024 (9-10am GMT-5 Bogota, 4-5pm CET Paris)
110877	Segovia, Ricardo; Heartsill Scalley, Tamara;	Drivers of Alpha Diversity in Tropical America, (Webinar) Presented by Ricardo Segovia (14 co-authors, SynTreeSys). 24 September 2024 (9-10am GMT-5 Bogota, 4-5pm CET Paris).
110878	Pstor Lopez, Antonio; Heartsill Scalley, Tamara;	Hosting and collaborating international visitor, Antonio Pastor López, on Sabbatical during FY24 Q4 and FY25 Q1. Sabbatical goals include manuscript development from data collected in permanent forest plots in thew Dominican Republic. This data will be integrated also into SynTreeSys analyses and other Caribbean tree species analyses.
110879	Heartsill Scalley, Tamara; Merced, Amelia; Matos, Coral;	Participation in Annual LUQ LTER meeting– May 2024
110900	Gonzalez, Grizelle; Figueroa, Magaly;	Press release - Asignan millones de fondos federales para reforestar (El Nuevo dia)
110901	Gonzalez, Grizelle;	Press release - Grizelle González: la primera mujer en más de 80 años en dirigir instituto sobre estudio y conservación de bosques
110902	Heartsill Scalley, Tamara;	Press release - Vitales los musgos para los bosques: desde almacenar agua hasta determinar usos históricos de terrenos
110903	Figueroa, Magaly;	Press release - Invitation through different media outlets to join Smoke's 80th Birthday
110904	Heartsill Scalley, Tamara;	September 2023.Technical support travel to meet with program partners and grantees conducting reforestation and management activities for climate resilience at field sites in Dominica. (not reported in FY23)
110905	Heartsill Scalley, Tamara;	Consultation for forest restoration projects in The Bahamas
110951	Muñoz-Erickson, Tischa A.;	Alliance for the Río Piedras Watershed. The Island of Enchantment: Atmospheric Grounds. Landscape Architecture Department, Graduate School of Design, Harvard University. Polytechnic University of Puerto Rico.
110952	Munoz, Tischa A.;	Invited presentation. Urban Labs. Urban Resilience Podcast
110953	Muñoz-Erickson, Tischa A.;	Invited Presentation. Experiences building inclusive communities. All USDA FS R&D Employees Engagement.

Product ID	Authors	Title
110954	Muñoz-Erickson, Tischa A.; Torres-Abreu, Alejandro;	Consultation with Dr. Alejandro Torres Abreu. Associate Professor, Department of Social Sciences. University of Puerto Rico, Humacao
110955	Muñoz-Erickson, Tischa A.;	Invited Presentation. Planificación de bosques urbanos comunitarios centrada en la resiliencia y adaptación justa: el caso de la Cuenca del Río Piedras (San Juan, Puerto Rico). Curso Micro Bosques. Ciudad Viva Perú 19 April 2024
110956	Muñoz-Erickson, Tischa A.;	Invited Presentation. Transformando procesos de planificación y gobernanza para fomentar la resiliencia y adaptación justa en la cuenca del Río Piedras. FEMA Webinar Series. 2 June 2024.
110957	Muñoz-Erickson, Tischa A.;	Invited Presentation. Participación comunitaria y multi-sectorial en la cuenca del Río Piedras: Práctias basadas en la adaptación justa y transformadora. UPR-MS, SAAM 8995: Environmental Health Doctoral Research Seminar I. 16 April 2024
110977	Muñoz-Erickson, Tischa A.;	Consultation with Dr. Richard Alomar, Associate Professor of Landscape Architecture, Rutgers University.
110978	Chester, Mikhail; Miller, Thaddeus; Helmrich, Alysha;...	Sensemaking for entangled urban social, ecological, and technological systems in the Anthropocene. Mikhail Chester, Thaddeus Miller, Tischa Muñoz-Erickson, Alysha Helmrich, David Iwaniec, Timon McPhearson, Elizabeth Cook, Nancy Grimm, Samuel Markolf. 31st International Symposium on Sustainable Systems and Technology – ISSST 2024
111006	Gonzalez, Grizelle;	Puerto Rico Career Workshop - Dr. Grizelle González Presentation.

Multimedia

Fiscal Year 2024

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110531	Gonzalez, Grizelle;	How can soil organisms help create healthier forests?
110533	McGinley, Kathleen;	Diverse approaches to collaboration in forest governance and management under different ownership regimes. USFS SCIENCEx Human Dimensions week.
110532	Munoz, Tischa A.;	Science in Action: Sustainability and resilience of social and ecological technology systems in the tropics. USFS SCIENCEx Human Dimensions week.