



State and Private Forestry Fact Sheet

Puerto Rico 2020



Investment in State's Cooperative Programs

Program	FY 2019 Final
Community Forestry and Open Space	\$0
Cooperative Lands - Forest Health Management	\$0
Forest Legacy	\$1,451,326
Forest Stewardship	\$80,000
Landscape Scale Restoration	\$0
State Fire Assistance	\$212,000
Urban and Community Forestry	\$110,000
Volunteer Fire Assistance	\$15,000
Total	\$1,868,326

NOTE: This funding is for all entities within the state, not just the State Forester's office.

Puerto Rico's population is estimated at 3.9 million people and it is part of the Antillean archipelago located between the Caribbean Sea and the Atlantic Ocean. PR consists of the main island of Puerto Rico and a variety of keys and islands such as Culebra and Vieques to the east, and Mona, Monito and Desecheo to the west. The main and largest island is about one hundred eleven miles (160 km) long, thirty six miles (60 km) wide, and approximately nine thousand square miles (9,000 km²) of land area. The geographical regions and its geological primary substrates are divided into: Coastal Plains, Limestone Regions, and the Mountainous Interior that is composed of three main volcanic ranges; and the Plutonic batholiths and associated ranges. Fifty-three percent (53%) of the island is mountainous, twenty-five percent (25%) is plains, twenty percent (20%) is hilly, one percent (1%) is plateaus, and one percent (1%) is composed of rivers, lakes and reservoirs. According to Gould et. al. (2008) land cover in Puerto Rico today consists of 53% forest, woodland and shrub land vegetation; 32% dry and wet grasslands and pasture; 3% herbaceous agriculture, 4% saline and freshwater wetlands, 1% barren land, 1% fresh water, and 10% developed land. The history of land use is typical of most Caribbean islands. There are six Subtropical Holdridge Life Zones present in Puerto Rico (Figure 4) (Ewell and Whitmore 1973). At 62%, the Subtropical moist forest life zone contains the most land in mainland Puerto Rico. (Brandeis et. al. 2007). The Lower montane wet forest and the Lower montane rain forest zones combined are only slightly over 1%. Land area in the dry forest zone is almost 14%, and the combined wet forest and rain forest zones account for about 23%.

Program Goals

- Conserve working forests landscapes encompasses the need to perpetuate the multiple values, uses and services provided by the Puerto Rico forest cover. These benefits may be protected or increased by implementing better conservation practices. Two main objectives under this goal are: •identify and conserve high priority forest ecosystems and landscapes in Puerto Rico currently under private control; to manage private forested land actively and sustainably.
- Protect forests from harm: recognition of real threats or harm causes affecting forested lands, and to identify ways to control or reduce substantially their harmful effects. Two main objectives under this goal are: •identify, manage and reduce threats to forested ecosystems health; •reduce risks of wildfire impacts.
- Enhance public benefits associated with trees and forests: maximizing services of trees and forests: protect and enhance water quality and quantity; improve air quality and conserve energy; assists 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 global climate change.

Key Issues

- Fragmentation of forest ecosystems.
- Water resources and watershed conservation strategies.
- Information needs related to ecosystem services and other benefits from public and private forest land.
- Disturbances affecting forests (hurricanes, floods, fires, pests, etc.).
- Concerns over invasive species.
- Economic opportunities and alternative market development.

Forest Facts and Accomplishments

Selected Facts	Value	FY 2019 Accomplishments	Value
Population	3,725,789	Landowners Receiving Educational or Technical Assistance	314
Acres of Forest Land	1,206,316	Acres Covered by New or Revised Forest Stewardship Plans	304
Acres of Nonindustrial Private Forest Land	1,247,890	Acres in Important Forest Resource Areas Covered by New or Revised Stewardship Plans	300
Number of NIPF Landowners	19,951	Volunteer Fire Departments Assisted	12
Acres of Federal Land Under State Fire Protection	26,660	State Fire Communities Assisted	116
Acres of Private Land Under State Fire Protection	1,900,000	Coop Forest Health Acres Protected	0
Number of Rural Fire Departments	80	Forest Legacy Project Acquisitions	0
Cities and Towns	78	Communities Provided Urban Forestry Program Assistance	28
Forest Based Employment	1,541	Population Living in Communities Provided Urban Forestry Program Assistance	818,558
Economic Impact of Forestry (by rank)	20	Urban Forestry Volunteer Assistance	256
State Forestry Budget (All Sources)	4,089,319		

Program Highlights

Caguas Tree City USA Tenth Year Anniversary

The municipality of Caguas in Puerto Rico has a unique recognition in the island. The city-valley is the only town in the island holding the Tree City USA recognition program, given by the Arbor Day Foundation. Caguas has been receiving this recognition for the past 10 years. For their efforts over the course of a decade, the municipality of Caguas received the Tree City Growth Award.

The most recent award ceremony took place last Friday, April 26, during Earth Day Week. Employees, school kids and representatives from state and federal agencies gathered at city hall to celebrate, for the 10th consecutive year, the Tree City recognition.

The first time Caguas obtained the certification was back in 2009, positioning itself as the only city in Puerto Rico earning such an important certification. There are certain requisites that a city needs to comply with in order to receive this recognition: have an urban forestry department -Department of Embellishment and Ornamentation in the city hall, have a Municipal Tree Board or Council, have an urban forestry ordinance, have an Urban Forest Management Plan, have an assigned urban forestry budget, and celebrate an annual Arbor Day activity, that includes the participation and integration of forestry activities. The Department of Ornamentation and Beautification is responsible for improving and maintaining the green infrastructure of the city.

At the activity, Caguas mayor William Miranda Torres, recognized the work done by Ortega and his team and invited attendees to participate in a tree planting activity that took place after the ceremony. Magaly Figueroa, USDA Forest Service International Institute of Tropical Forestry, State and Private Forestry, along with Alberto Mercado, Department of Natural Resources, helped with the tree planting. The Forest

Service has been a replanting partner of Arbor Day Foundation. IITF has provided technical assistance since the first year Caguas received the title.

Community Forestry and Open Space

The community of Río Hondo celebrated in Mayagüez the acquisition of its community forest, a fight that the residents of the community have been holding for 10 years. Over 300 people from the community, alongside other invitees, gathered on Friday, March 22, to celebrate the rescue of the 67.9 acres of land. The place was attended by representatives of public and private entities, including representation of the Mayor of Mayagüez, José Guillermo Rodríguez. Other notable attendees included representatives from the PR Fire Department, the International Institute of Tropical Forestry, the U.S. Department of Agriculture and the University of Puerto Rico in Mayagüez, as well as other community groups and local artisans.

The place has great ecological and recreational value, not only for the community, but for the entire municipality and the enjoyment of the entire population. This forest is the first of its kind in Puerto Rico to receive funds from the Community Forests and Open Spaces program through State and Private Forestry. The property is 90% forested and consists of a secondary forest, as a result of the abandonment of previous agricultural uses.

The president of the community forest board, Betsy Acevedo, expressed with joy that "you have to give action to dreams, you have to be resilient with them. A 10-year struggle today has become a reality," she said referring to the acquisition of the forest.

The University of Puerto Rico in Mayagüez has numerous ongoing research projects within the forest. In it, there are valuable hydrological sources that nourish the forests and mangroves of the western and southern area of Puerto Rico. The community competed with many other projects at a national level, and it was precisely this hydrological value that made its proposal much more valuable to others.

Cooperative Fire Protection

Puerto Rico is now facing its second dry season since the 2017 hurricanes, and because of the remaining woody debris in the field, firefighters have been establishing several preparedness methods to combat the increasing wildfires in the midst of a drought. The dry season in Puerto Rico has different stages and characteristics depending on the geographical zone. In Puerto Rico, for some areas the dry season starts around January and extends throughout April. In May the island experience certain relief in some areas, and then it starts again around June, continuing throughout August. In Puerto Rico, the southern region is characteristically dry all year-round. This zone is always dry and prone to wildfires from January through May because of low precipitation. The USDA Forest Service, the Puerto Rico Firefighter Corp, the National Weather Service, and other agencies are involved in wildfire prevention and management in Puerto Rico. All these agencies work together in the response phase, planning, resources and the monitoring of the wildfires. The Forest Service identifies and provides funding in the case of forest fires. Wildland Firefighters, established a centralized operation center at the municipality of Juncos. From there, they integrate island-wide efforts, from which wildfires and other specialized operations are handled. During wildfire and dry season, they have other crews in the south, southwestern and northern area, and an extra unit located at the municipality of Ponce. Firefighters use firebreaks in abandoned terrain to make a trail that the fire will follow, away from important land. This method helps stop the fire expansion to other areas, thus making it easier for firefighters. This year has been and will continue to be very active in terms of forest fires. In the midst of a generalized drought, there hasn't been enough rain to mitigate the fire incidence due to fuel. It is estimated that Puerto Rico experience 2,000 to 5,000 forest fires annually.

Forest Health Protection

A cooperative effort between the International Institute of Tropical Forestry and the University of Puerto Rico Herbarium led to the creation of a survey of epiphyte and bryophyte vegetation. The survey emphasized the role epiphyte and bryophyte vegetation play in supporting arthropod and invertebrate fauna and assisted in developing adaptive management guidelines for montane wetland and cloud forest vegetation communities within and outside of El Yunque National Forest. Montane cloud forests are high elevation environments characterized by persistent clouds or fogs, sometimes with small trees, with abundant lichens, mosses, ferns and other similar plants. This project shows how bryophytes are critical components in the indicators for forest health, both in El Yunque and in urban forests.

Within the forest types of El Yunque, cloud forests stand out when compared with other forest types in terms of their abundance of epiphytes, including liverworts and mosses (Bryophyta). El Yunque/Luquillo Experimental Forest contains more than one-half of Puerto Rico's moss flora. However, the role of epiphytes and bryophytes in maintaining unique ecosystems and as forest health indicators is severely under-documented.

One of the main goals for this project is creating educational materials for public identification and protection of the species through its inclusion in forest management plans. Bryophytes include a wide range of mosses, liverworts and anthocerotae. In the last surveys--more than 20 years ago--284 moss species, 232 hepatics and 5 anthocerotae are recognized for the area. This project was initiated in 2017 and it is expected to be completed in 2020. Collaborators include experts from the IITF as well as the UPR Herbarium, located in Rio Piedras. To date, 34 specimens representing 20 different species have been identified at El Yunque National Forest and Las Cucharillas Swamp in Cataño.

Forest Stewardship

The Forest Stewardship Program emphasized on three (3) priority areas, namely: areas prone to forest fires, wildlife and water resources. Specific recommendations were included in the management plans, of practices that address how to control fires, focused on the most prone areas that coincide with the semi-arid ecoregion of the island. Likewise, habitat improvement for wildlife was considered, using the reintroduction of tree species that provide food and shelter. The commitment of the participating owners to protect and conserve forested areas in the highest part of the river basins helped to maintain and improve the quality of water bodies.

In addition, funds will be used for possible expenses at the meeting of the 2020 State Forestry Meeting of the Southern Group, which is planned to be carried out in PR; and, on the other hand, funds will be used for the revision of the State Plan for Forest Action 2020. A call was made to invite proposals (RFP) for both projects.

It is intended to continue with the recovery measures of forests that still exhibit the effects of past hurricanes, as proposed in last year's proposal. Therefore, the strategy of including forest recovery practices in management plans remains in force. For this year we will need the professional services of forestry consultants to prepare new management plans and, also, to give continuity to a certain number of drafts that are in different stages of progress

Landscape Scale Restoration

The Joint Chief Landscape Restoration Initiative in Puerto Rico was established two years ago, after the devastation caused by hurricanes Irma and Maria. The initiative to "Establish Biological Corridors and Restore Ecosystem Functionality after the Impact of a Major Hurricane in the Caribbean" is now on its second-year phase. The project is focused on a specific area within the central mountain range of western Puerto Rico, which is comprised of six important watersheds. This selection is done based on the ecological benefits these watersheds provide in the area. These watersheds are: Rio Grande de Añasco, Rio Guanajibo, Rio Culebrinas, Rio Guajataca, Rio Camuy and Rio Grande de Arecibo.

The USDA Forest Service and National Resources Conservation Service in the island are working together, along with over ten different partners, towards reducing soil erosion and improve water quality and soil health, mitigating fire threats to communities and landowners, and improving habitat quality for at-risk species. To accomplish this, they are implementing conservation practices such as the establishment of vegetation and tree planting, erosion control measures, nutrient and waste management, the establishment of fire breaks and wind breaks, propagation of native species for agroforestry practices and forest enhancement, habitat restoration for targeted species, and debris and obstruction removal, among others. One of the most important goals of the project is the establishment of biological corridors linking private and public lands. This will improve abandoned agricultural lands into native forests, thus reducing wildlife risks. Among the targeted species is the Puerto Rican parrot, the elfin-woods warbler, the broadwinged hawk and sharp-shinned hawk. Partners involved in the different stages of the project are Southwest Conservation District, Protectores de Cuenca, Cafiesencia, Envirosurvey, and Para La Naturaleza.

Urban and Community Forestry

Puerto Rico continues recovery efforts after the 2017 hurricanes Irma and Maria. Although we continue

working towards recovery from these two devastating storms, our two university campuses and city participating in the Arbor Day Foundation programs continued their work with reforestation in urban areas. During 2019, we also had three active Urban and Community Forestry Program (UCF) cost-share grant projects running in different parts of Puerto Rico.

The city of Caguas celebrated 10 years as a Tree City USA. The city received the 2019 Sterling Community Award, which denotes communities that have gone beyond the four standards of Tree City USA for 10 years in a row. Hurricane María destroyed 400 of the 606 trees in the central part of the city in 2017. Cleanup required 14,000 truckloads to clear the streets and other property, but replanting is well underway. (Information from Tree City USA Bulletin)

In spite of the damages suffered by the university campuses participating in the Tree Campus Program; both campuses, the Inter American University of Puerto Rico--Metropolitan Campus and the Universidad Ana G. Mendez, completed their applications and retained their tree campus title.

This year we reconvened the UCF Advisory Council, volunteers who advice and help in different aspects of the Program. A cost-share grant proposal window was opened for organizations and communities to request funds for forestry activities in urban and community forest areas of Puerto Rico. Two UCF cost-share grants proposal writing workshops were offered in December 2019. We have received great interest from different groups and we are already receiving proposals for this new cycle.

Urban Forestry Manual for Puerto Rico and the US Virgin Islands

On May 7, the University of Puerto Rico at Mayagüez and its Agricultural Sciences College presented the new Urban Forestry Manual for Puerto Rico and U.S. Virgin Islands. The manual addresses important forestry topics in an understandable language, suitable for all audiences. This new version substitutes the previous one, launched back in 1998. The manual was presented at the facilities of the International Institute of Tropical Forestry in San Juan and is the result of several years of work done by members of the Agricultural Service Extension in Puerto Rico. The publication was part of a special project and it was possible thanks to the help and support from IITF-State and Private Forestry.

Inside the manual there is information on benefits of urban forests, biology of the different trees and plants, applicable regulations and permits, how to evaluate species for their selection in specific urban areas, establishment and stewardship of urban forests, description of species, concepts on design and urbanism, prevention and management before and after natural disasters, and a glossary of terms related to biology, forestry and urbanism, among others.

During the initial launch, 200 physical copies were distributed among key players in urban forestry. However, a digital copy in Spanish is available at their site. More physical copies will be available during the following months, and an English version of the manual is expected to be available by the end of this summer. This second edition aims to present recent and comprehensive data on how to correctly address and manage situations related to landscape and urban forestry in communities in Puerto Rico.

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