

## Caribbean Foresters Take Steps Towards a Network of Permanent Forest Plots in the Caribbean: A Meeting Report

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**Abstract** - This manuscript contains an overview of the 16<sup>th</sup> meeting of Caribbean Foresters that resulted in the establishment of a network of forest plots throughout the region with the purpose of increasing understanding of the patterns of long-term forest dynamics. Research projects in the network will improve collaboration among those working in Caribbean forests and will facilitate development of conservation plans consistent with the responses of Caribbean forests to hurricanes and other types of disturbances.

The 16<sup>th</sup> meeting of Caribbean Foresters took place in the Dominican Republic during 4–10 August 2013, and for those like myself who have participated in these meetings before, the structure of the meeting had many familiar components including country reports, scientific talks, a field trip, a banquet, a guest speaker, and discussion-group reports with recommendations for future actions and activities. This familiar formula for Caribbean Foresters meetings has existed since 1982 when the group met for the first time in Saint Lucia and was hosted by Gabriel Charles, Conservator of Forests for that island state. In the Dominican Republic, Dr. Marilyn Headley, Conservator of Forests in Jamaica, gave the keynote speech and reminisced about the past 30 years of Caribbean Foresters activities and their relevance for the future. Marilyn also became the first recipient of the Gabriel Charles Award, a forest conservation award given to a distinguished Caribbean Forester that through his or her career emulates the forest-conservation values and high moral and ethical conduct that characterized Gabriel Charles (González and Heartsill Scalley 2016 [this issue]).

However, in spite of the familiar meeting format, this Caribbean Foresters meeting was far from ordinary. Most of the group's previous gatherings had been organized and conducted before the uncertainties of climate change had exerted their influence on resource managers of the region. This meeting faced climate change head-on with a data-driven strategy that, if successfully implemented, will not only advance the understanding of Caribbean forests, but also provide critical information for their conservation as they adapt to changing environmental conditions. Moreover, this strategy takes advantage of available computing technology and social media to communicate research results to the general public. A paper at the meeting by Kasey Jacobs explained the Caribbean Conservation Landscape Cooperative, a program that is designed to collect, synthesize, and

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disseminate critical scientific information to conservationists, landowners, and governmental and non-governmental organizations of the Caribbean region (see [www.caribbeanlcc.org](http://www.caribbeanlcc.org)). Presentations and all meeting information, including the research strategy designed at the meeting, are available through the Caribbean Foresters' interactive webpage ([www.caribbeanforesters.org](http://www.caribbeanforesters.org)), which was upgraded in support of this meeting's agenda.

The meeting had 5 working groups that dealt with the following topics: forestry training opportunities and capacity building, biomass and species studies across islands, mangroves and dry forests, national forest-inventories, and information sharing. Manuscripts in this volume by Marcano Vega et al. (2016) and Heartsill Scalley et al. (2016) contain the respective results of the latter 2 working groups. The working group on training and capacity building recommended the following subjects as training priorities for Caribbean foresters: forest-inventory practices, forest utilization, entomology and pathology, watershed management, nursery management, wildlife conservation, parks and recreation, community forestry, forestry-specific statistics and math-focused training, and agroforestry. The biomass and species studies working group recognized the many institutional and technical obstacles that impede consistent botanical and ecological work in the region (Table 1). The mangroves and dry forests working group report is available from the Caribbean Foresters website.

Tamara Heartsill Scalley, a scientist from the International Institute of Tropical Forestry, organized the approach to this meeting to partially mitigate the institutional and technical obstacles to a regional synthesis of the present and future state of Caribbean forests. The objective was to gather as many data sets as possible from existing forest plots in the Caribbean region, use powerful analytical tools to examine those data sets, and identify temporal and spatial patterns in forest responses to changing environmental conditions. Details of the approach and its goals are contained in the manuscript by Heartsill Scalley et al. (2016) in this volume.

The Caribbean region has a long history of forest research that can be traced to permanent forest plots established in Puerto Rico in the 1940s and to the classic vegetation work of J.S. Beard, L.R. Holdridge, A. Borhidi, P.R. Bacon, N.L. Britton, H.A. Gleason, R.A. Howard, and many other scientists who described vegetation in the region (see review by Lugo et al. 2000). Forestry departments in the Caribbean islands established and maintain forest plots similar to those in Puerto Rico, but the data from those plots were used mostly to address local conservation issues and were not available to the scientific community at large. Heartsill Scalley developed a mechanism by which anyone in the region who has forestry-plot data and pertinent metadata can make it available to others. Thus, the value of the information can be enhanced when it is incorporated into a database of similar plots from throughout the region. In addition, those who contribute data will be acknowledged for any analysis or in publications resulting from the use of their plot data.

At a time when scientists are using data from a network of forest plots in the Amazon to make regional and global generalizations about the role of tropical

forests on climate (Brienen et al. 2015), it behooves our region to band together to understand how our forests respond to environmental change and disturbance, and to determine if Caribbean forests have unique responses relative to other tropical forests. The proceedings of the meeting, presented in this special issue, represent another first for Caribbean Foresters meetings (i.e., publication in a scientific journal), contain data depicting long-term behavior of Caribbean forests subjected to hurricanes, and underscore one of the dramatic differences between Caribbean and mainland forests not subject to hurricane disturbances. Caribbean forests are resilient and are subject to greater year-to-year variation in structural, functional, and species-composition parameters than mainland forests where recurrent and often catastrophic disturbances do not occur. This difference alone, shown schematically in Figure 1, has fundamental implications for forest conservation in our region. Our forests exhibit rapid succession after disturbance and are exposed to changes in species composition after each disturbance event.

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Table 1. Recommendations from the working group addressing f biomass and species studies in the Caribbean.

- Build capacity in Caribbean plant taxonomy and systematics so that the groups of Caribbean plants that are poorly taxonomically known can be properly identified in the field or at a local level. Find funding to support these positions at Caribbean institutions so they remain focused on Caribbean groups and Caribbean taxonomic issues.
  - Build a central Caribbean herbarium and voucher-specimen repository to support identification and systematic research into Caribbean forest species. This is currently done at Smithsonian Institution, West Indies, Herbarium, under the direction of Pedro Acevedo (e.g., *Flora of the West Indies*; Acevedo-Rodríguez and Strong 2015).
  - Develop DNA barcodes for Caribbean forest species to aid systematic research and species identification.
  - Allow younger foresters to study with current para-taxonomists to capture their knowledge before they retire. Make sure they identify species together in the forest to provide on-the-job training.
  - Develop digital field guides and keys to Caribbean forest-plant species based on geographical distribution. Capture the identification characteristics for Caribbean forest plants (preferably sterile features) in the field guides.
  - Develop a bibliography of literature that targets each one of the independent islands. Post this information on the Caribbean Foresters website and, when possible, make the publications available.
  - Encourage publications like calendars (e.g., Dominican Republic), field guides for technicians and the general public, and electronic interactive taxonomic keys.
  - Develop a list of plant-species uses including applications for non-timber forest products, medicinal uses, ethnobotany, and agroforestry.
  - Develop a list of Caribbean species that have been translocated across islands (e.g., for forestry purposes) and understand their distribution and dynamics.
  - Study species from the point of view of conservation with the potential to add species to the IUCN Red List.
  - Share information regarding hurricane effects on tree species and forest types across islands.
  - Promote peer review publications that include Caribbean species and encourage regional studies.
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By establishing a network of forest plots throughout the region, consolidating forest data, and analyzing those data for temporal and spatial patterns over the long-term, Caribbean foresters are taking a bold step towards addressing forest conservation during a time of climate change. They are using available technology to gather, store, analyze, interpret, and disseminate information for the benefit of all those in the region who care about Caribbean forest conservation. This focus on science and technology in support of conservation has always been at the heart of Caribbean Foresters meetings, but it was not until this session that the availability of the internet and powerful computers have made possible the level of inter-institutional collaboration needed to make Gabriel Charles’ dream of conserving Caribbean forests a reality.

**Acknowledgments**

This manuscript was developed in collaboration with the University of Puerto Rico. My colleagues Tamara Heartsill Scalley, Mildred Alayón, and Gisel Reyes and 2 anonymous reviewers helped improve the manuscript.

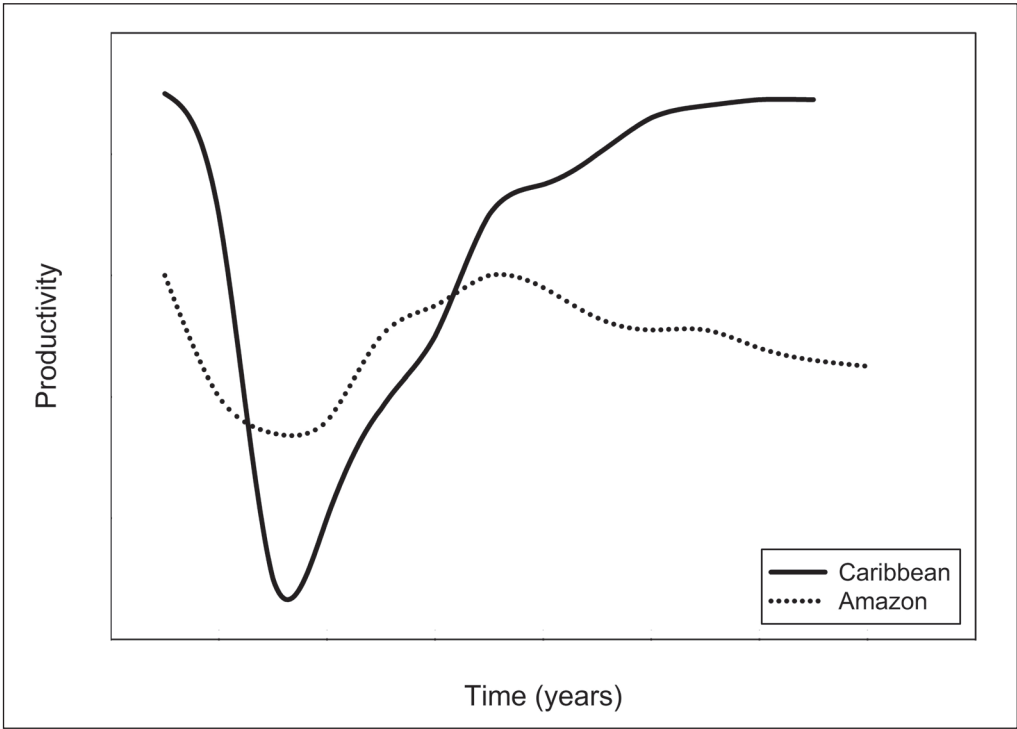


Figure 1. Conceptual presentaion of the temporal behavior of a Caribbean and an Amazonian forest based on the work of Brienen et al. (2015) in the Amazon, and Lugo and Frangi (2016 [this issue]) in the Caribbean. The Caribbean forest is depicted as responding to an acute hurricane event, while the Amazonian forest is responding to a chronic drought event. Note that the timing, magnitude, and direction of the response are different for both forest types.

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