Extreme weather & disaster recovery from a business perspective

Perspectives from the Caribbean, opportunities/challenges of recovery & resilience

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SCDRP Annual Meeting

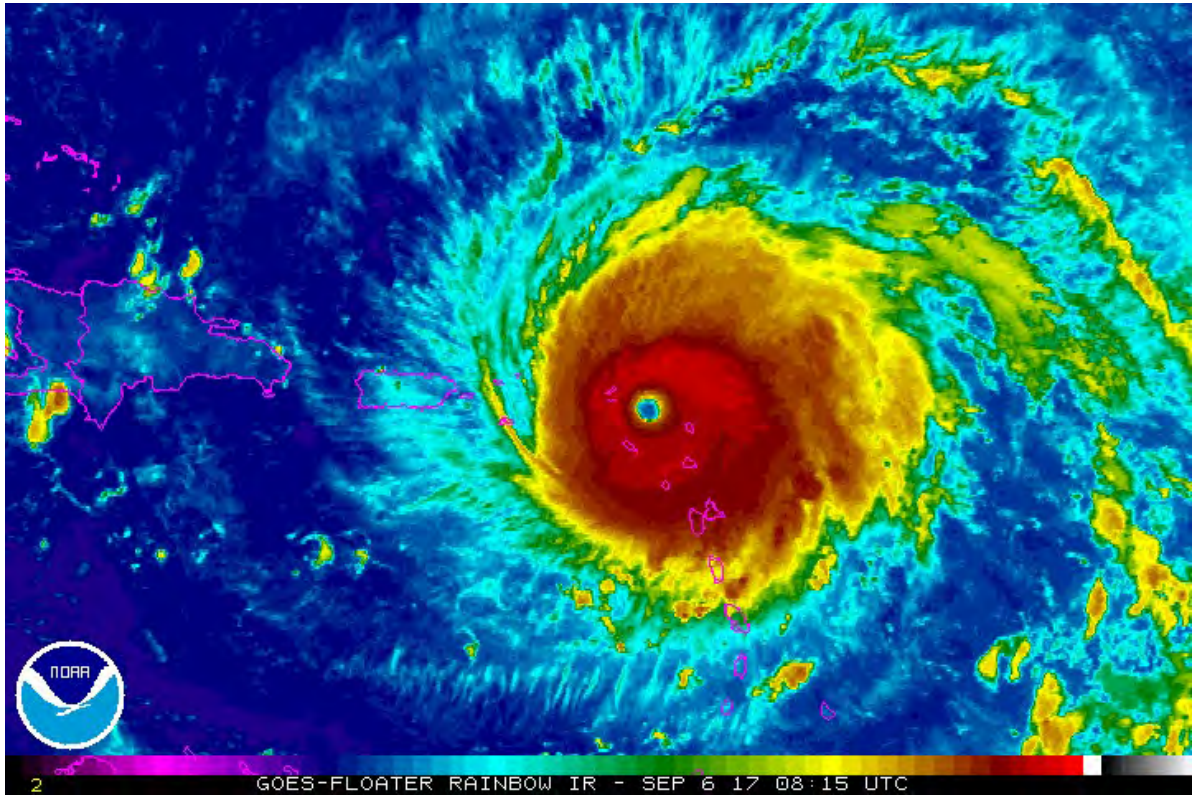
28 January 2021

Outline

- Effects of the 2017 hurricanes on trees and forests
- Timber salvage response timeline
- Business perspective of salvageable timber post hurricane Maria (2017)
- Lessons learned and challenges
- Opportunities for developing resilience: planning

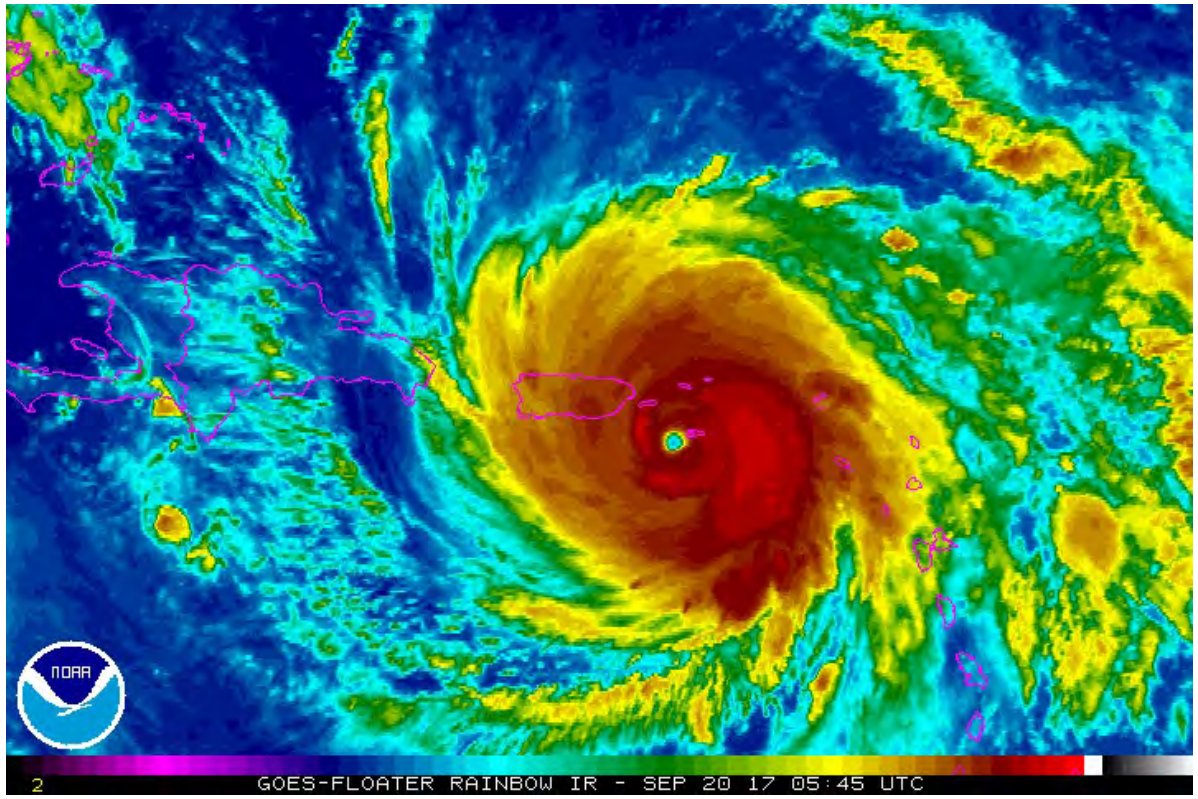
2017 Hurricane season in the U.S. Caribbean

September 6th Category 5 Hurricane Irma



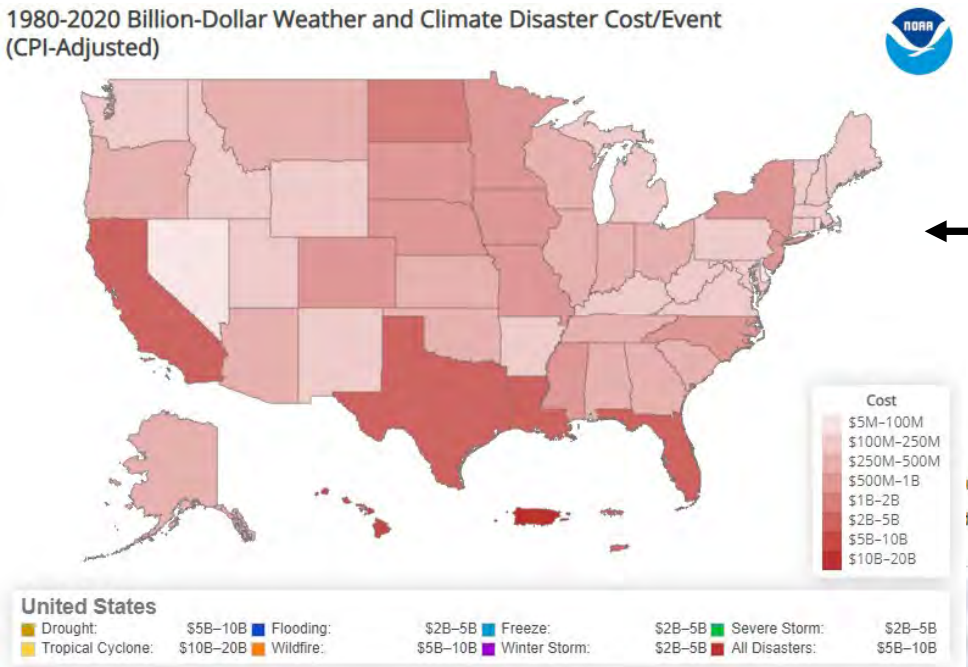
- Loss of power
- Loss of communication
- Closed roads, limited fuel

September 20th Category 4 Hurricane Maria



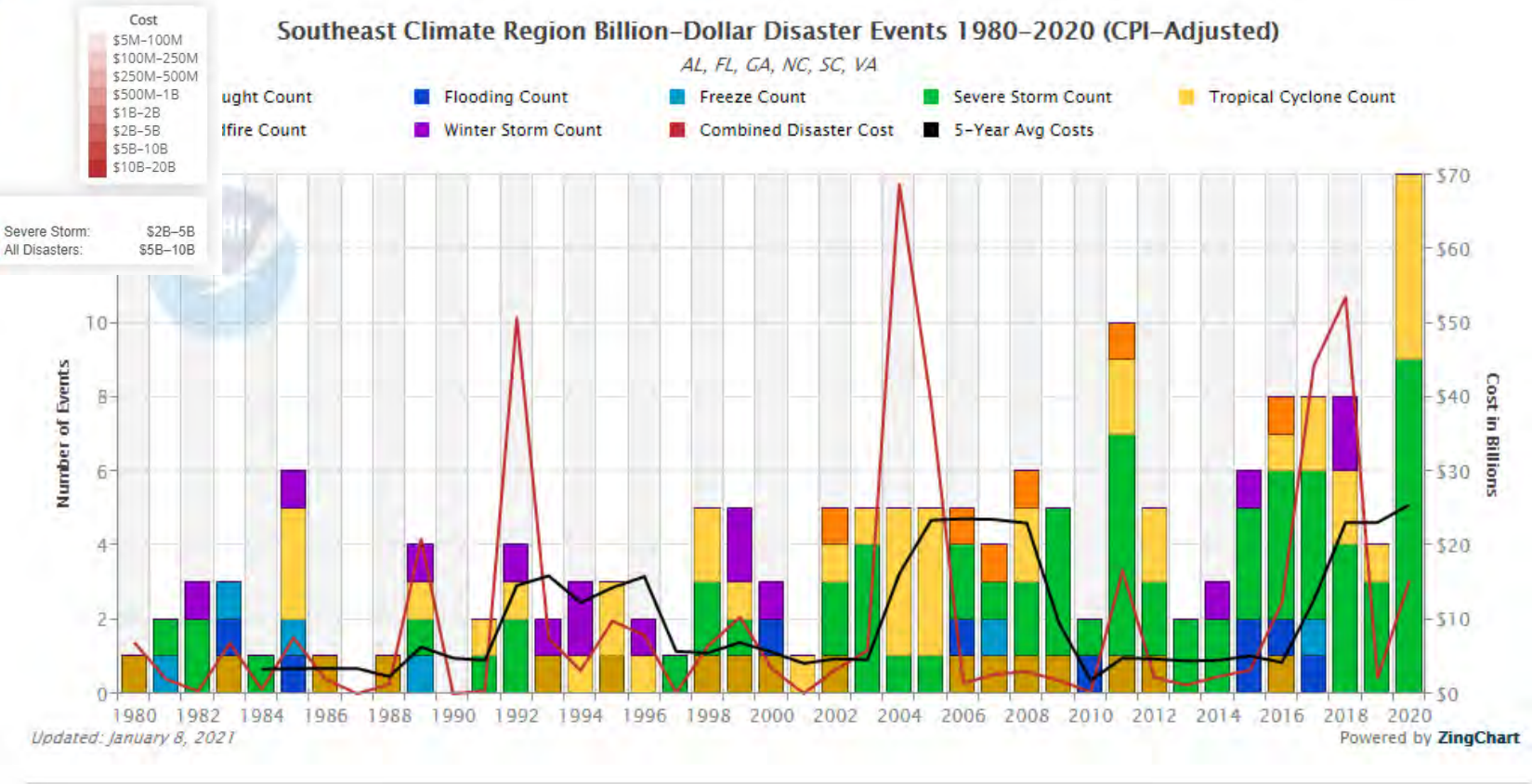
- Defoliation and downed trees
- 80% of poultry, coffee, fruit, vegetable crop value lost

Climate disasters in the U.S. Caribbean



Relatively high cost per event

Increasing cost of climate reated disasters in the Southeastern US



Climate Hub Post hurricane activity

HURRICANE ASSESSMENTS

HURRICANE DOWNED TREES

STRATEGIC REFORESTATION

TOOL DEVELOPMENT

- State and Private Forestry, US Forest Service
- University of Florida
- Southeast Climate Hub
- Department of Interior
- Green Wood NGO

Quantifying wind and rain

remote sensing

MDPI

Article

Hurricane Maria in the U.S. Caribbean: Disturbance Forces, Variation of Effects, and Implications for Future Storms

Ashley E. Van Beusekom *, Nora L. Álvarez-Berríos, William A. Gould, Maya Quiñones and Grizelle González

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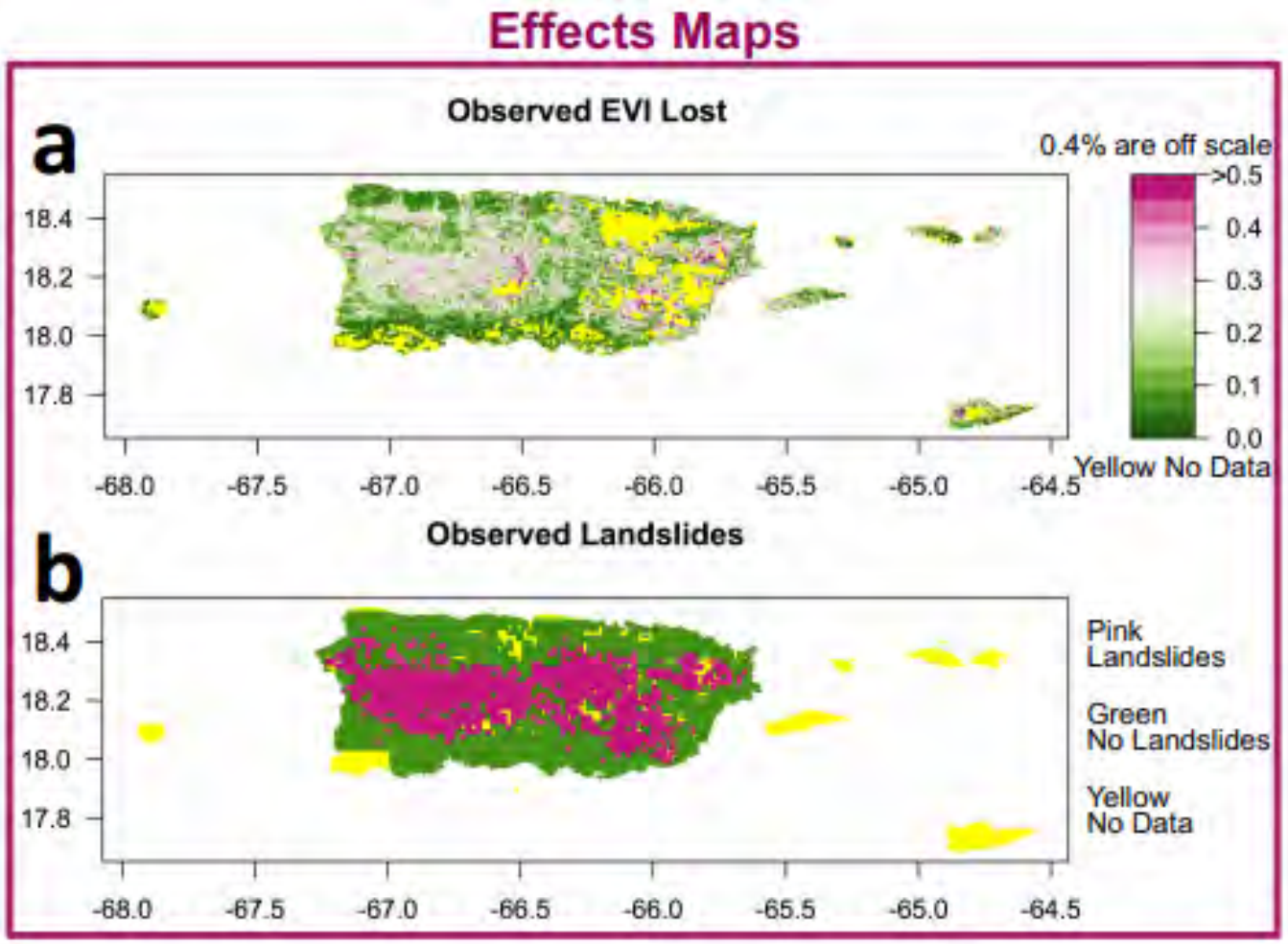
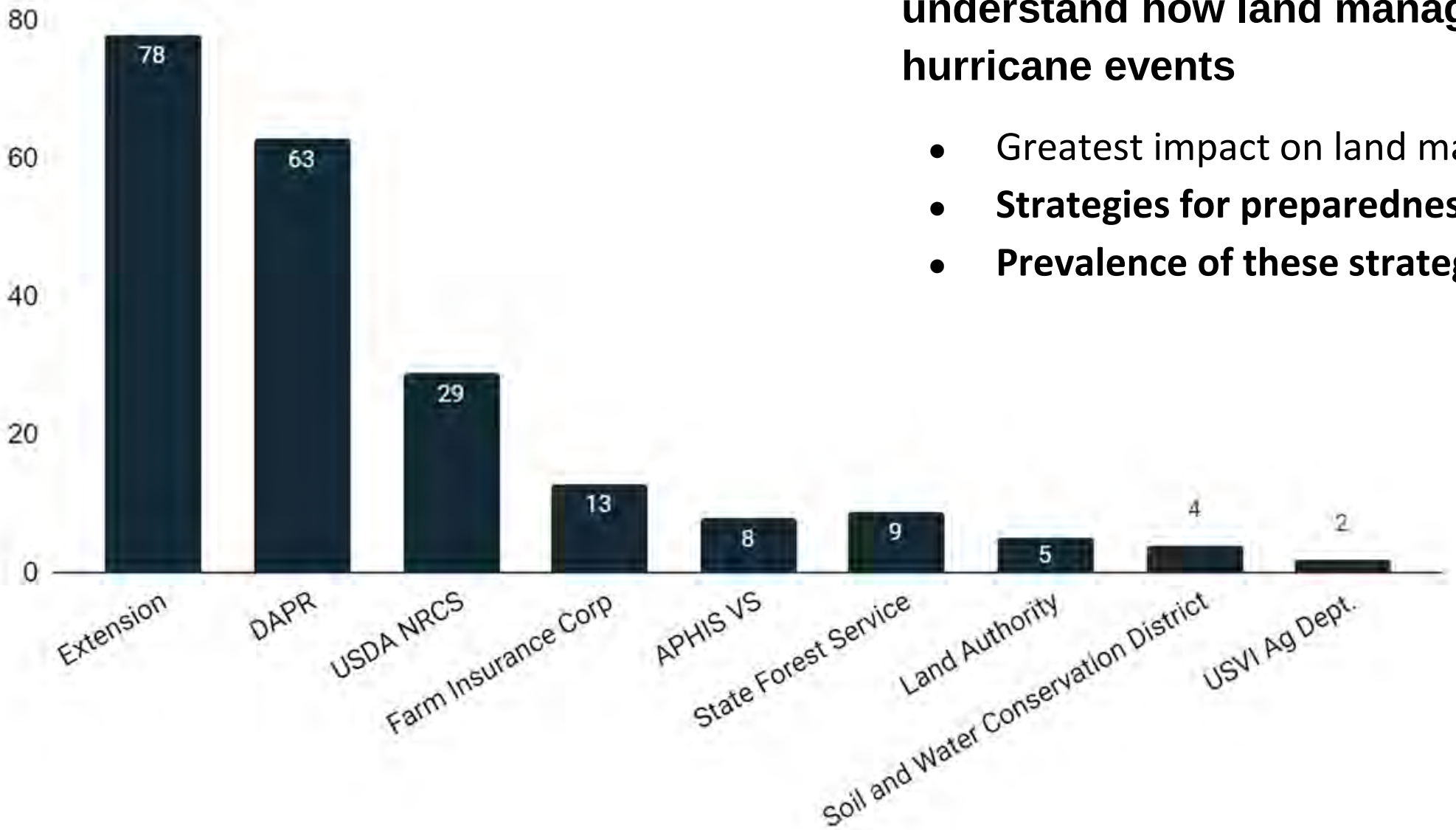


An average of 0.17 EVI was lost over the U.S. Caribbean from Hurricane Maria and Irma. This is 31% of the initial EVI of the region and 51% of the LEF; 6% of the region and 41% of the LEF lost more than half of its initial (pre-hurricane) EVI.

An average of 34% of the U.S. Caribbean, and 52% of the LEF, had a density of at least 1 landslide per 1 km2 as a result of Hurricane Maria.

Survey to advisors in agriculture and forestry



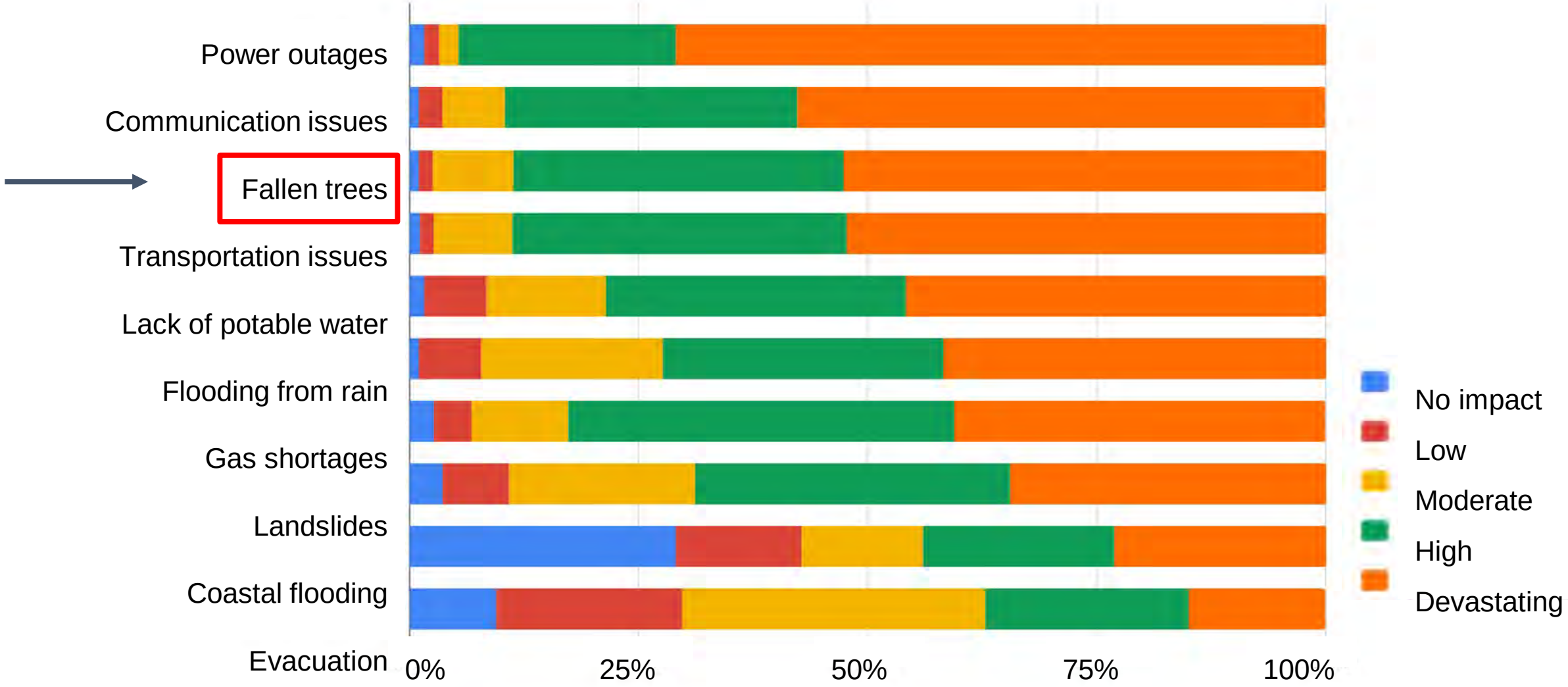
We rely on the perception of advisors to help understand how land managers cope with hurricane events

- Greatest impact on land managers
- **Strategies for preparedness and recovery**
- **Prevalence of these strategies**

- **211 participants**
- **PR and USVI**
- **9 institutions**

Preliminary findings from survey to advisors

Rank the level of each impact on the land managers you work with:



Top-3 Devastating impacts: Power outages, Communication issues, Fallen trees

USACE Estimates: >4 million cubic yards of vegetative material; 60% woody debris

80 participants gathered on short notice to discuss:

- The use of wood from fallen trees after hurricanes and the valuation of wood as an economic asset;
- The status of trees and forests after the hurricanes, discuss the existing potential for sustainable forestry projects in Puerto Rico ;
- Wood management techniques, including measures to cut and store wood, the identification of tree species, their different uses (artisanal, construction, composting) and how to evaluate the value of fallen trees to determinate whether the wood should be rescued for processing or for alternate uses such as compost;
- A directory of artisans, sawmills, collection centers, people who are accepting wood, organizations with the capacity to advise on how to manage the wood, and those that are retrieving or processing wood products;
- Collect information on the challenges and opportunities related to the wood recovery.

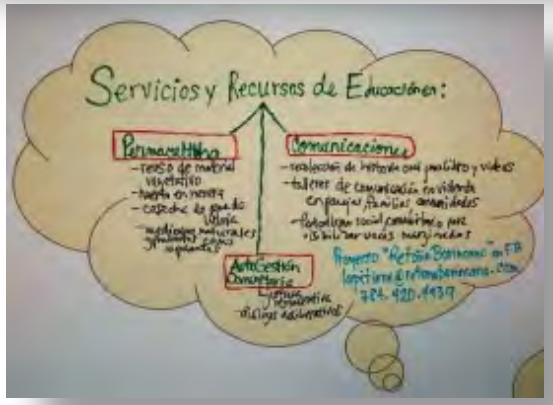
USACE Estimates: >4 million cubic yards of vegetative material; 60% woody debris

USDA Caribbean Climate Hub

WORKSHOP REPORT

SALVAGING WOOD FROM FALLEN TREES AFTER HURRICANES IRMA AND MARIA

San Juan, Puerto Rico
December 2017



Key messages:

- More than 3 million trees damaged or downed.
- initial plan to consider all vegetative debris as waste for incineration or landfill not making the best use of resources;
- Wood has value as compost, biochar, wood chips, artisanal uses, and low to high value milled lumber;
- Identifying, sorting, and processing as a first step to recovering value is complex and needs multiple sources of expertise and capacity.

Actions

- Federal, local agencies meet to discuss options;
- Initiate education efforts on the value of wood and how to salvage;
- Develop action plans with Federal, State, University, NGO and private partners;
- Efforts concurrent with ongoing contracts and actions to clear streets and dispose of vegetative debris.

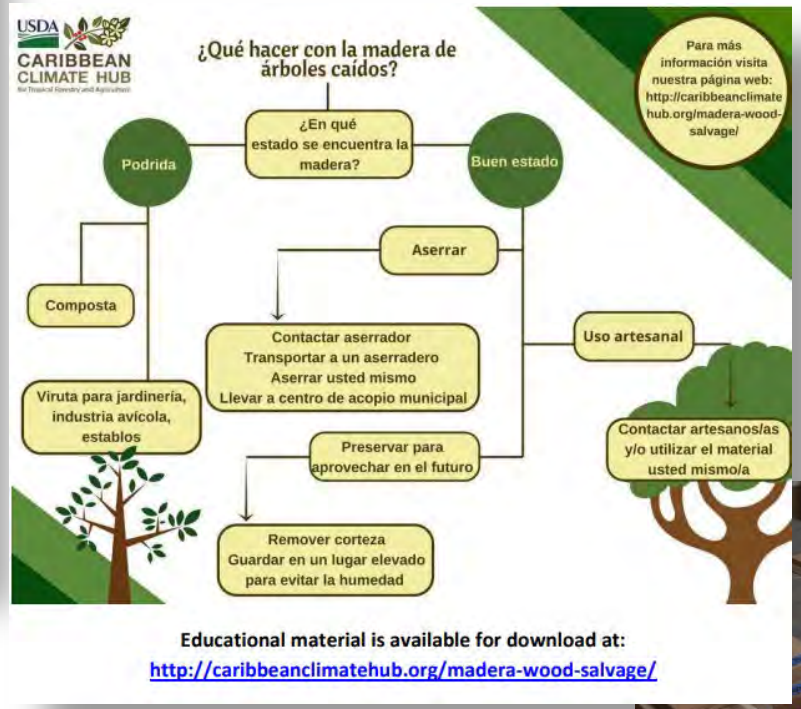
Follow up:

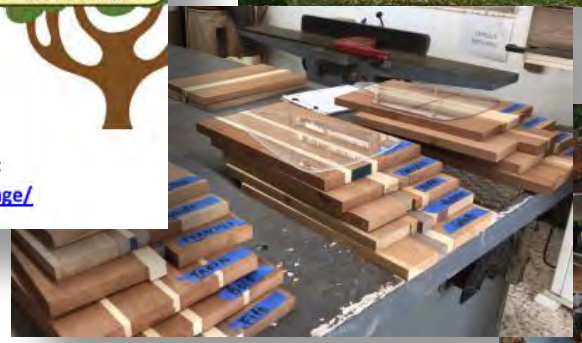
- More than 45,000 cubic yards of logs remained at debris sites 1.5 years after the hurricane – representing perhaps 1% of logs salvageable from right-of-way debris.

Timber salvage education efforts

Education efforts:

- Removing logs from waste stream;
- Which species are valuable;
- What can landowner do with fallen trees;
- Chainsawing, milling, wood product development.





Timber salvage

Scope of Work

Log Salvage Mission Assignment USFS

Mission Title: Hurricane Vegetative Debris Management: Salvaging Logs for Economic, Cultural, Educational, Ecological, and Research Benefits to Puerto Rico.

Mission Assignment: The scope of this work is to accept and manage valuable tropical logs, gathered in the post Hurricane Irma and Maria vegetation waste removal process, over a one year time frame, The goal is salvage value from downed wood and to build long term capacity and expertise to manage woody debris in a way that reduces vulnerability of waste stream management systems to future storm events. The rationale is that this work, in accordance with relevant resolutions, will provide for the economic, cultural, educational, ecological, and research benefits of the people of Puerto Rico in the emergency recovery efforts from the recent hurricanes.

A Proposed Visitor Focused Puerto Rico Wood Processing and Product Development Facility

Contacts: William Gould (william.a.gould@usda.gov), Javier Rosario (jer4787@hotmail.com)
USDA Climate Hub and Forest Service International Institute of Tropical Forestry

Summary. We propose the establishment of a model wood processing facility associated with the proposed visitor's center at the University of Puerto Rico Botanical Garden in Río Piedras, Puerto Rico. The concept includes facilities and expertise to receive locally produced wood, milling and drying capacity, and a tourist friendly product development and training facility where local wood products are made, finished, and offered for sale on site and in the nearby town center of Río Piedras. The scale would be at a nonindustrial level to minimize disturbance within the Botanical Garden, processing on the order of 300,000 board feet annually, employing staff, and including visiting expertise for research, training, and outreach. Startup costs would include planning, facilities development, and equipment for log handling, milling, drying, and wood working. Benefits include the value added to wood resources, training, increasing tourism traffic, and developing new products and economic opportunities for the private sector. The concept can be replicated in a hub and spoke model with associated facilities located in rural communities close to wood sources, i.e., in Luquillo near El Yunque National Forest.

Salvage needs to recover value:

- Initial identification: What to remove and where to go with it?
- Remove from waste stream and move to processing site;
- Identify resources;
  - Species, conditions, quantity, location, ownership;
- Sorting, and process to retain value and identify markets.
- Move to markets.

Primary obstacles:

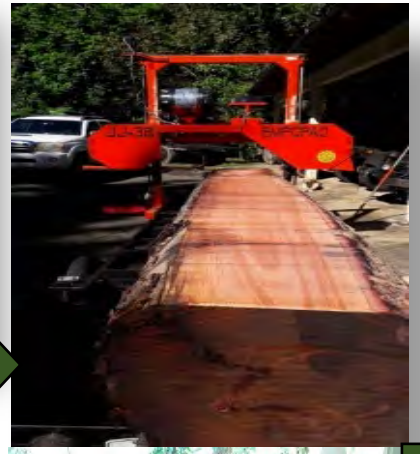
- Developing plan "after the fact";
- Lacked full support of recovery agencies;
- Lack of available processing equipment and capacity - including log handling, expertise, space for processing, storage, drying capacity, inventory.

Timber salvage from pilot to proof of concept

Debris and log handling

Inventory of Logs

Milling and drying



Product development and marketing

Document the cultural and economic opportunities that could be achieved in post hurricane or other log salvage scenarios

Timber salvage take home

Planning with many partners:

- FEMA
- EPA
- Municipalities
- Solid Waste Management
- Natural Resources
- Agriculture
- Forest Service
- NGOs
- Private business
- Artisans
- Landowners
- Power company
- Transportation

With a common understanding:

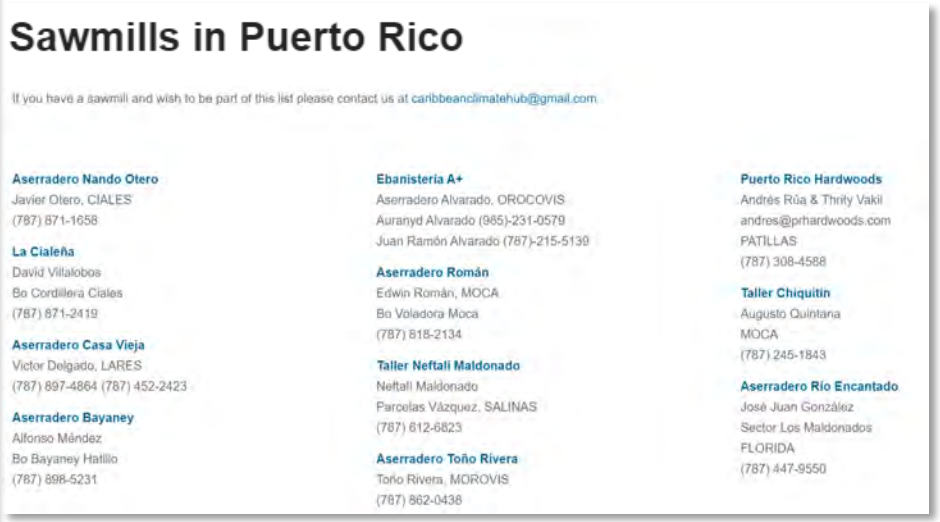
- Vegetative debris is a resource as well as a risk;
- Wise use reduces waste and cost, increases benefit.

Benefits include:

- Value added local products;
- Carbon sequestration;
- Increased awareness of value of live trees, forests, wood, and innovation
- Wholistic planning and management that recognizes hurricanes and salvage as part of a cycle.

Business perspective of salvageable trees post Hurricane Maria (2017)

- PR and USVI hit by 2 strong hurricanes that generated tons of salvageable trees; Maria was a CAT 5
- Limited capabilities of recovery equipment and know-how of local sawyers
- Distributors/retailers import most wood locally used: what's the market for wood products from fallen trees?
- Extremely small, local material handling capacity (government and businesses) to handle volume of organic material. Most fallen trees were moved by mainland-based companies.
- PR does not have disposal facilities for organic material for the generated volumes
- FEMA included a transportation to export solid waste debris from USVI post hurricanes Irma and Maria



Lessons learned and challenges

- Federal, central and municipal gov’ts, and businesses not prepared to handle volumes of fallen trees
- No effective planning or preparedness locally available for disaster management/recovery from CAT 5 event
- FEMA and USACE are looking into mitigation strategies to prevent this from happening again
- Businesses don’t have material handling equip to handle salvageable and non-salvageable fallen trees
- Processing capacity of local sawyers is small compared to volumes of fallen trees

Photo credit: Caribbean Climate Hub
Javier Rosario

Opportunities for developing resilience: Planning & mitigation

- Develop a solid, disaster response approach towards salvageable and non-salvageable fallen trees
  - Government, businesses, sawyers, **farmers** and other stakeholders
  - Should significantly **reduce disaster recovery expenses** (mitigation)
- Evaluate cost/benefit of transforming fallen trees into usable products as economic, disaster recovery and mitigation strategic elements of Disaster Management
- Promote @ municipal/regional level NGO'S to evaluate business development models for recovery operations
- **Farmers** and local businesses (construction industry) could act as "fallen trees first responders" to:
  - salvage and remove usable and non-usable trees; and,
  - receive monetary compensation to **mitigate** their economic losses from natural disasters.
- Abandoned public schools, government buildings could be used to:
  - store equipment for disaster operations;
  - store usable trees & make them available to local sawyers and artisans (reconstruction efforts, etc)

Photo credit: Caribbean Climate Hub
Eva Holupchinski. Jan 30, 2018.

Opportunities for developing resilience: Preparedness

- Train: chainsaw operation and safety, winches, tractors or telehandlers with grapples, etc.
- Drill, drill, drill
- Procure/revise adequate supplies prior to hurricane season: equipment, parts, gas, oil, etc
- Implement disaster management/response strategies:
    - Logistics: ready mode (seasonal); alert mode (imminent impact)
    - Coordinate with government agencies
    - Integrate
- Validate via performance methods
- Review and revise: planning, preparedness, disaster management/response

Chainsaw safety, use and maintenance training in Puerto Rico. USDA Caribbean Climate Hub and Forest Service. August 2019.

“All that glitters is not gold”

- Future responses from the federal, local and municipal governments and businesses must be carefully evaluated.
- Salvaged trees converted to wood may or may not be economically viable
  - Hence, we need to have a plan B, C, etc. in place before the next disaster

The first tree harvested from El Yunque National Forest in over 50 years. Photo credit: Caribbean Climate Hub, 2019.

Contact

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