An Overview of Mangrove Rehabilitation Efforts in Jamaica

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Introduction - Mangroves

- Flowering plants which dominate, tropical, sheltered intertidal zones
- Have special adaptations to survive in these harsh environments
- Viviparous seedlings (not seeds), with water borne dispersal
- Facultative halophytes (do not require salt water to live but are able to tolerate it) : *excrete or reduce salt intake*
- Specialized roots with spongy aerenchyma tissue (Hogarth, 2007) and lenticels (Tomlinson, 1986)
- Have support roots and buttresses (Duke, 1992)
Human/Mangrove Interactions are historical, vital, continuous...sustainable?

- 2 major airports construction, numerous marinas
- Flood water retention (Black River, Portmore)
- Eco-tourism: Black river Safari (500 per day*)
- Nutrient filter (Falmouth, Hellshire, Kingston)
- Wind-break for various shipping interests (cruise, bulk, trans-shipment, marinas etc): Coastal cities and towns
- Recreational and cultural (small vessel safety, tours, “crab-bush”, bird watching, bird-shooting etc)
- Majority of Jamaica’s coastal towns have coastal forest origins
Port Royal, Palisadoes and Kingston Harbour environs

- Commerce
- Habitats
- Ecotourism
- Nursery
- Fisheries
- Research and Education
- Housing
- Nurseries
- Energy
- Transport
- Defence
- Recreation
- Waste treatment/disposal
- Land accretion
- Trans-shipment
- Manufacturing
- Fisheries
- Filtration
- Land accretion
- Heritage
- Heredities
- Coral Reef
- Health
- Coastal defence
- Recreation
- Construction
- Energy
- Recreation
- Bulk Export shipping
- Cultural uses
- Education
- Coastal defence
Mangrove Threats

• Mangroves globally are threatened: mostly through land reclamation (dumping for economic development and human comforts) and other anthropogenic actions (pollution etc.)

• Mariculture accounts for 52% of current mangrove loss worldwide (Variela, 2001)

• Mangroves are also degraded through natural catastrophes such as hurricanes and tsunamis worldwide

• Wetland forests (mangroves) account for only 2% of Jamaica’s land mass: Jamaica has lost over 2000 hectares of mangroves between 1989 and 2010 (NEPA, 2013).....and less than 1% are protected
Oyster Bay-Trelawny (2017)

- Trelawny parish has lost over 160 hectares of mangrove forest between 2005 and 2010 (NEPA, 2010)

Figure 3: Final coverage of Wetland along the coast of Falmouth as per results of verification exercise

Photos: Dayne Buddo
Why doesn’t it grow?

• majority of **mangrove restoration** attempts worldwide have “failed but are not well documented”; “mangrove gardening” instead of an ecological rehabilitation approach (Lewis, 2005).

• An ecological mangrove restoration: the act of regaining the functions of the ecosystem by reversing/correcting any prevailing physical factors that were preventing that forest from regaining pre-disturbance state and characteristics.
Key factors: Hydrology=Topography=Tidal “liberation”

- **Tidal heights** (degree of wetting) using an Onset (U20-001-01-Ti) Hobo water level logger: placed at the observed/apparent high tide reference area and at the highest elevation of the impact sites.

- **Topographic surveys** - spot heights to calculate slope of degraded areas (and periphery of control site) and substrate volumes; *more advanced methods exist*
“Recent” mangrove forest failure/death/degradation

- Grazing of seedlings/saplings by cattle (e.g. goats in Portland Cottage)
- Hurricane damage - changes in original hydrology, breaks trees (many do not recover/coppice e.g. Red mangroves). *Recovery times understudied*  Hurricane Hugo-78% decline in Guadeloupe

- **Solid waste**- breakage, tangling etc. affects growth (Kgn sites)
- Agricultural and aquaculture conversions (reversible)
- Civic developments (lack of culverts, reclamation)
The mangrove rehabilitation approach should be specifically tailored, based on deterrents

- **Slope (cut and/or fill) and/or drainage corrections**: Airport Runway (AR), Bogue, Lilliput, *Boggy Pond*, Winn’s Morass

- **Solid waste segregation from regenerating forest**: Airport Runway and Palisadoes, Malcolm’s Bay*

- **Human management** (*adherence to building permit system, charcoal management, alternative livelihood/uses in the area, community outreach, fencing (goats)*) - Falmouth, Portland Cottage
Pre and post clean-up of hurricane damaged site
Malcolm’s Bay-2016

Trees cut and dispersed into forest/small mounds created
Lilliput-St. James. Pre-emptive steps (conservation) urgently needed to have sustainable coastal towns.

GOJ needs sustainable plans—or unplanned developers will thrive: 25 unprotected acres are adjacent.
Lilliput-24 months
Solid waste management (70% of project budget) key to mangrove sapling survival

- 70% survival over **12 months**
- Flowering *Avicennia*
- Increase in monitoring indices (height, # leaves)
- Faunal recruitment (snails, fishes, birds, **people ***)

- Govt. agency paused payments (no cleaning, fence breached)
- No new seedlings survive (despite falling from parents)
- 40% overall survival (**18 months survey**)
Refuge Cay-Kingston

Brown Pelican resting on solid waste on the harbour side of Refuge Cay.
Portland Cottage-progress and partnerships

Transplants: 40% survival
Recruits: 127% increase

Time 0                           After 24 months

Photos: Courtesy of NEPA
Early Results- from 4 pilot sites

Seedling recruits: Time 0 vs 24 months
Next steps: Pre-emptive rehab. in St. James

54 acres: 12 acres pristine, 20 acres of informal settlements
Jackson Bay- Rocky Point Mangroves

loss of over 600 acres of mangrove forest: closure of sugar company*

19 acres reduced to 1 acre in 15 years
Jackson Bay Beach

Need to re-open drainage connection-road has cut off mangrove connection
THANK YOU

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