

A Summary of the National Casuarina Management Plan for the Commonwealth of The Bahamas:

By Providence Energy Partners Holdings and Conservian Inc.



Remote Rum Cay with invasive Casuarina in foreground

Conservian©

Charge by Minister Desmond Bannister

"...I want to eradicate Casuarina in The Bahamas in my effort to clean up and beautify our Country and in so doing use the pervasive invasive species to generate economic activity for our people, especially young people. I would like you to set out a proposal for my consideration to accomplish that end." May 22, 2017.

The Minister of Public Works has committed to implement a nationwide program to manage invasive *Casuarina* to the greater benefit of The Bahamas.

In support of the Government's initiative, Providence Energy Partners Holdings (PEPH) and Conservian Inc., have created a proposal to manage, control, and harvest *Casuarina* to produce an efficient biofuel, and restore coastal lands degraded by the invasive plant species.

The Casuarina Problem

Planted and spread in the 1890's, invasive *Casuarina* (Australian pine) is found throughout the majority of The Bahamas and is causing widespread degradation of indigenous beach ecosystems and loss of beach dependent species. Invasive *Casuarina* destabilizes shorelines by causing beach erosion leaving The Bahamas increasingly vulnerable and unprotected from storm surge and sea level rise.



Casuarina's shallow connected root system eroding beaches (left) choking wetlands (right). Conservian©

Top Ten Negative Aspects of Invasive Casuarina

1. Aggressive growth rate, rapid spreading species
2. Poison needles and seeds (allelopathic)
3. Destroys endemic plant communities
4. Creates a mono-culture that does not support endemic wildlife
5. Chokes wetlands and tidal creeks destroying nursery habitat for crabs, fish, conch
6. Usurps migratory and nesting shorebird habitat
7. Roots trap nesting sea turtle adults and hatchlings
8. Grows to the waterline with a shallow root system
9. Falls over during storms further eroding beaches
10. Obstructs pedestrian use of beaches

The Casuarina Solution

The Plan presents a comprehensive framework for eradication and removal of this highly destructive invasive species. Throughout The Bahamas there exists substantial quantity of old growth *Casuarina* with sufficient yield to power biomass plants of the sizes required to supply power to many of Country's Islands.

Primary Objectives

- Eradicate the majority of *Casuarina* in The Bahamas and utilize the abundantly available invasive species to create an efficient biofuel
- Supplement harvested *Casuarina* with biofuel created from landfill waste, agricultural land refuse, and managed forest lands
- Restore wetlands and tidal creeks to increase populations of native fish, crabs, and conch
- Stabilize, increase, and restore coastal lands, providing a natural shield against the negative impacts of future sea level rise.
- Restore public recreational beaches.
- Reduce national unemployment by creating new economic opportunities for small businesses

Recommended Actions to Promote the National Plan:

1. Train and direct a labor force to begin the process of *Casuarina* harvesting
2. Conduct all *Casuarina* harvesting using methods that facilitate coastal ecosystem restoration
3. Begin pilot biofuel plant projects in The Bahamas, with the initial plant in North Andros
4. Use harvested wood to produce biofuel, mulch, logs, and charcoal

Next Steps

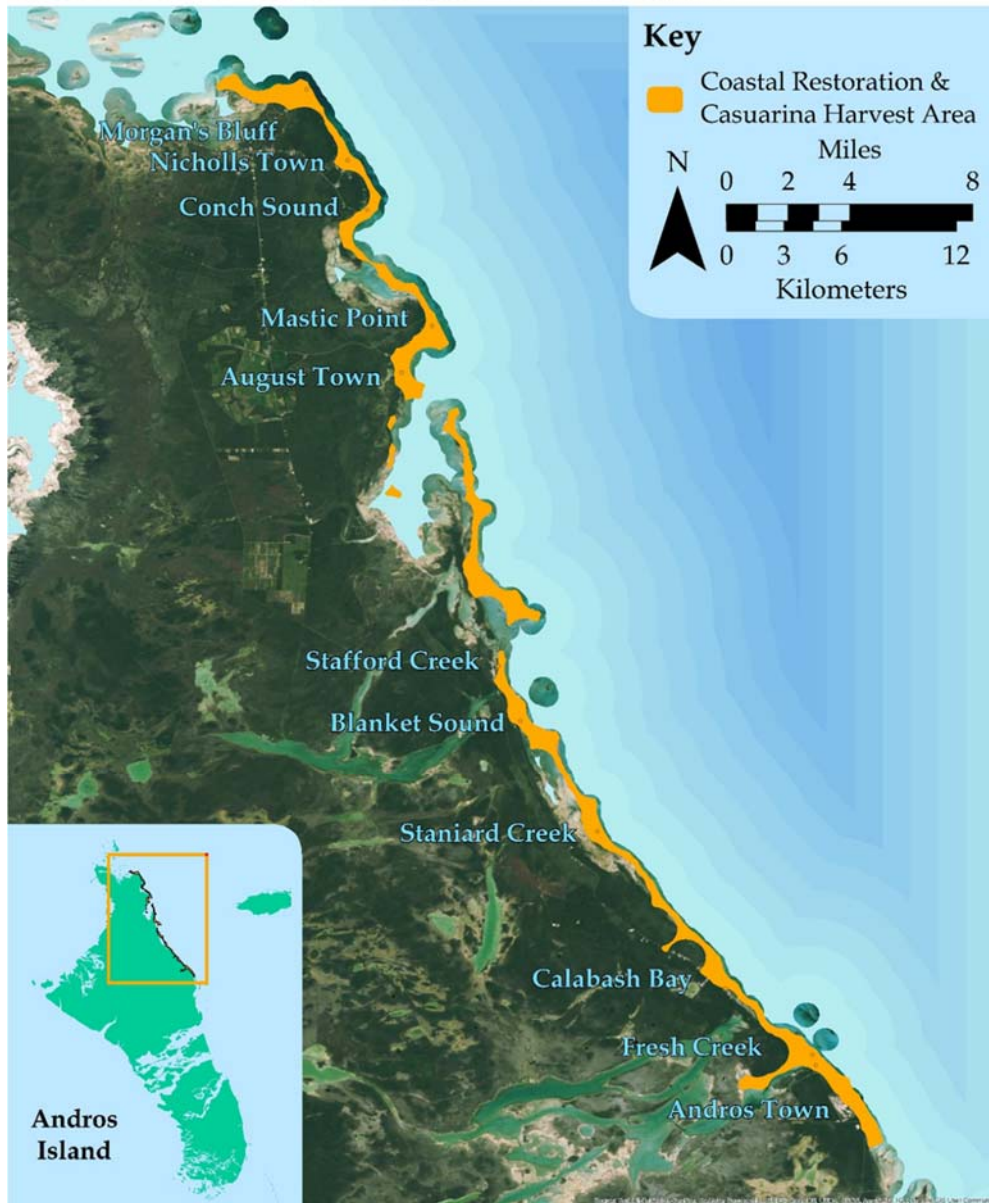
The following steps are required to bring the project to the environmental permitting and entitlement stage:

- Quantification of the resource on the selected islands
- Quantification of targeted population to estimate derived demand
- Authorization to harvest *Casuarina* on public lands
- Permission to establish selected staging areas for storing harvested material
- Preparation of sustainable financial models for the various activities
- A long-term Power Purchase agreement consistent with the demand for power on the selected islands
- Authorization of Independent Power Producer Status to PEPH

North Andros Casuarina Energy Assessment

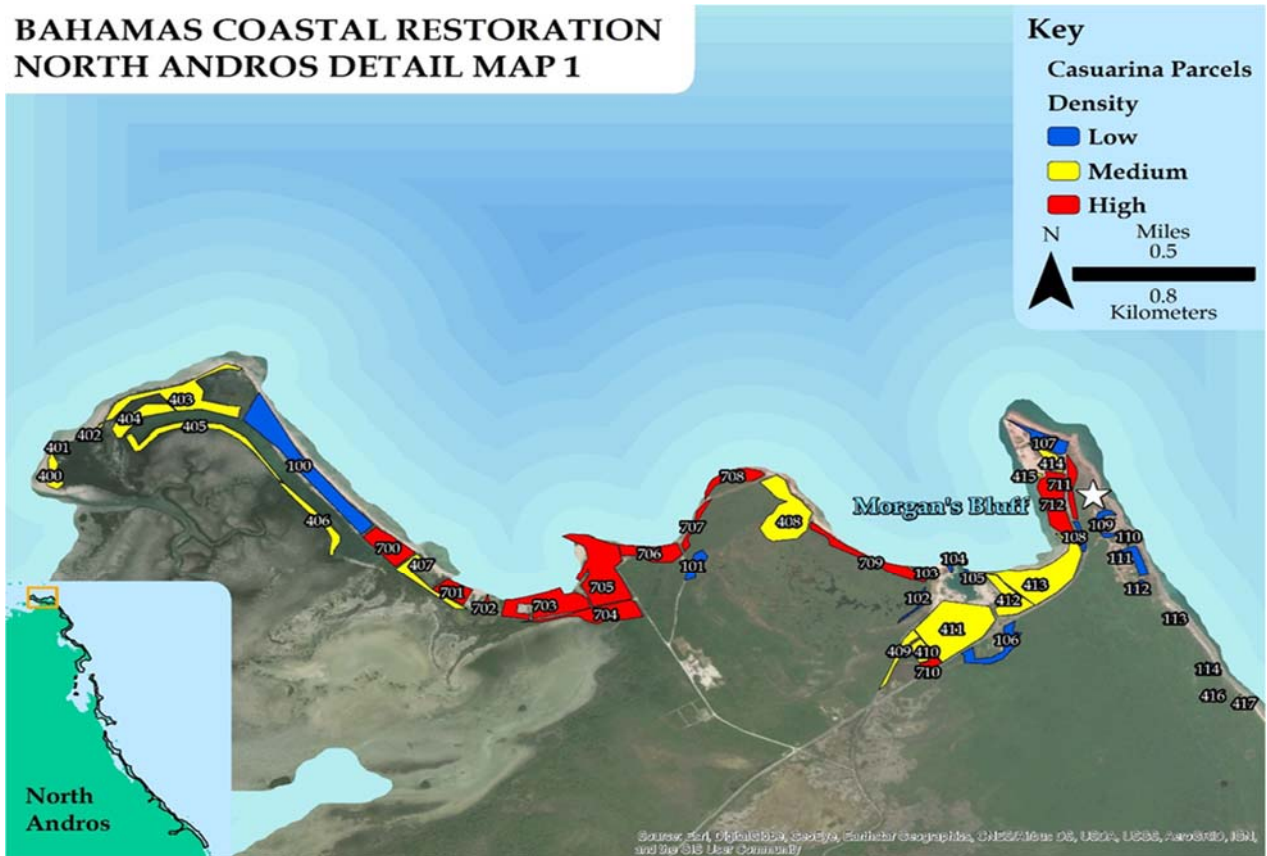
The eastern coast of North Andros has been selected as the first project area for energy assessment and coastal restoration. The total area of all identified coastal parcels in the project area that contain a significant component of *Casuarina* is approximately 1,053 acres (426 hectares), distributed over approximately 44 miles (71 km) of linear distance along the outer eastern coastline of North Andros. The project area also includes more than 25 tidal creeks and lagoons along the 44-mile span that will benefit from *Casuarina* removal. *The North Andros Island Coastal Restoration and Energy Assessment* is a template for converting a destructive invasive species into a valuable commodity for energy production, resulting in both economic and ecological benefits for the people of The Bahamas. It will provide guidance on what can be produced for each major island of The Bahamas, as the *National Casuarina Management Plan for the Commonwealth of The Bahamas* proposal moves forward with the goal of addressing large-scale habitat restoration and energy production. Each major island area of The Bahamas will be incorporated into the National Plan, following detailed assessments of biomass volume.

BAHAMAS COASTAL RESTORATION NORTH ANDROS PROJECT DETAIL MAP



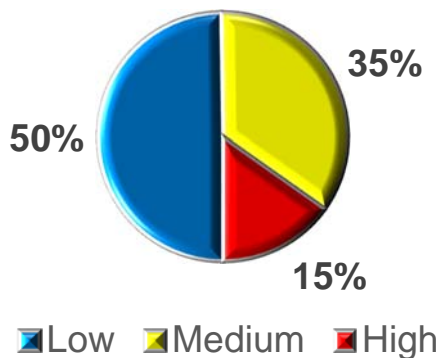
- The project area shown in orange is estimated to yield 155,000 to 218,000 long (Imperial) tons of biomass recoverable from the (green) trunks.
- The project area could reasonably yield between 70k and 113k megawatts of energy once the trunk material has been harvested and dried.

BAHAMAS COASTAL RESTORATION NORTH ANDROS DETAIL MAP 1



Example map above shows classification of *Casuarina* density levels.

North Andros Coastal Casuarina Density Levels Total coastal acres impacted = 1053



Low = Low density infestation/native species present

Medium = Medium density infestation/native species present

High = Casuarina monoculture/no native species present



For more information on the National Casuarina Plan proposal please contact: Kenwood N. Kerr, Chairman/PEPH LTD

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