

Preliminary Report on the Terrestrial and Marine Ecology of Barbuda for the Barbuda Historical Ecology Project 2010 Season

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This is a product of the Human Ecodynamics Research Center (HERC) and the Global Human Ecodynamics Alliance (GHEA).

1. Introduction

Dr. Nancy Todd and Dr. Wendy McFarlane were invited to participate in the Barbuda Historical Ecology Project. They have provided the tropical ecology and marine biology components, two key fields that are vital to our understanding of changing tropical environments. One of the first tasks is to establish modern baselines of species abundance. Work on Barbuda in related disciplines took place in the 1960's but nothing has been done since then. A primary objective for their research collaborative is exploring to what extent the island flora and fauna have experienced drastic change. Our questions span recent changes as well as attempt to identify the agents of long term change. An understanding of modern biological and plant specimens is also invaluable in identifying and interpreting similar finds from the archaeological horizons.

2. Objectives

Drs. McFarlane and Todd were able to do some preliminary surveys of terrestrial environments, the surrounding lagoon, and reef areas in order to plan future REU field research components. Dr. McFarlane collected photographic data of fish species and some initial observations on heavy siltation of the reefs, which may contribute negatively to overall reef health. Vegetation data was collected for the creation of a herbarium to stay in Barbuda as part of the resources available to the REU students for their projects and to Barbudan student and agencies. Survey and collection around one of the archaeological sites of interest, Highland House, resulted in ~2500 identified individual plants. Next year, the work at Highland House will expand to the areas outside the wall of the property. The list of species collected from this and subsequent REU seasons will result in a publication where the species present today can be compared to reports from the 1960's and of course from the paleoenvironmental work on pollen and phytoliths conducted by Dr. Allison Bain of Laval University, Dr. Deborah Pearsall and Dr. Lisa Kennedy.

3. Field Survey and Sample Collection

3.1 Codrington Lagoon

Preliminary surveys of the terrestrial environments, lagoon and reef regions were conducted alongside a close collaboration with the Codrington Lagoon National Park, as coordinated by Kelly Burton. Several of his rangers accompanied us on multiple occasions to teach them how to use the YSI meter and to discuss aspects of ecological sustainability as it applies to the lagoon. Water quality measurements were obtained from strategic study sites in the lagoon established previously by Dr. Mussington. We also began collecting quadrat and 50m transect data, as well as sediment characteristic data by the fishing wharf, one of the monitoring sites. On one of the boat excursions, we were able to swim towards one of the reefs on the NE side of the island, and Dr. McFarlane collected photographic data of fish species and some initial observations on heavy siltation of the reefs, which may contribute negatively to overall reef health.

3.2 Highland House

We spent a week at Highland House, collecting vegetation data. A 35m square was set up around the main stone structure, and every plant in the study square was identified, counted and GPS coordinates were collected. This includes ~2500 individual plants. For next year, we plan to extend this square out to the wall on the southern side. We can go no further on the W and N sides due to the cliff, and there is impenetrable vegetation on the E side.

We also began a successional study along some of the established dirt roads, Bumpy Well Rd., as well as a newly established road, and a nearby abandoned road in order to quantify the effects of grazers on regenerating vegetation. Transects were set up from the road to the extent of the clearing, and vegetation was counted and identified along each transect. The transects were 10m apart. Clear effects of grazing damage on individual plants were documented. After a heavy rain, we also documented the sudden appearance of spider lilies along one of the roads, only to see them quickly eaten over a 24 hr period. These data from the transects are currently being processed.

3.3 Coastal Zones

Preliminary data collected during this 3 week period in January includes algal, invertebrate, and vertebrate marine species from intertidal zones along the southern part of the island, as well as the lagoon (species list in Table 1). We are also working to establish an extensive identified mollusk shell collection from island shores, and have plans to create similar collections for both the high school and the Lagoon National Park. We will continue this project over the next year. Morphometric data was collected from extant West Indian Top shell snails as well as Queen Conch, for future comparison to archaic specimens and integration with the archaeological field school. Some preliminary water quality data (temperature, salinity, dissolved O₂, total dissolved solids, and ph) was also collected from various sites around the lagoon, the entrance to the Caribbean Sea, and Goat Island Flash. We are working with park rangers to create a protocol for periodic water testing in order to establish a database of water quality change over time within the lagoon. Since January, 2009, 107 plant species have been located and identified on the island (Table 2). We are working with the park rangers to establish a plant checklist for future use, and have begun assembling an herbarium of these species.

Acknowledgements

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Table 1. Barbuda marine species - 2010 field season

INTERTIDAL SPECIES	
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<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
Frillfin goby	<i>Bathygobius soporator</i>
Sergeant major (juvenile)	<i>Abudefduf saxatilis</i>
Prickly winkle	<i>Nodilittorina tuberculata</i>
Zebra winkle	<i>Littorina ziczac</i>
Beaded periwinkle	<i>Tectarius muricatus</i>
Fuzzy Chiton	<i>Acanthopleura granulata</i>
Checkered nerite	<i>Nerita tessellata</i>
Barnacle	<i>Balanus trigonus</i>
White spotted dove snail	<i>Mitrella ocellata</i>
Chestnut turban	<i>Turbo castanne</i>
Atlantic modulus	<i>Modulus modulus</i>
West Indian topshell	<i>Cittarium pica</i>
White spotted latirus	<i>Leucozonia ocellata</i>
Stocky cerith	<i>Cerithium litteratum</i>
Lined planaxis	<i>Planaxis lineatus</i>
Four-toothed nerite	<i>Nerita versicolor</i>
Bleeding tooth nerite	<i>Nerita peloronta</i>
Sally Lightfoot shore crab	<i>Grapsus grapsus</i>
Rock boring urchin	<i>Echinometra lucunter</i>
Sea egg	<i>Tripneustes ventricosus</i>
Trumpet petticoat algae	<i>Padina pavonica</i>
Forked sea tumbleweed	<i>Dictyota dichotoma</i>
Three cornered hat algae	<i>Turbinaria turbinata</i>
Grape alga	<i>Caulerpa racemosa</i>
Variable caulerpa	<i>Caulerpa cupressoides</i>
White tangled bryozoan	<i>Bracebridgia subsulcata</i>
LAGOON SPECIES	
<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
Flagfin mojarra	<i>Eucinostomus melanopterus</i>
Yellowfin mojarra	<i>Gerres cinereus</i>
Gray snapper	<i>Lutjanus griseus</i>
Schoolmaster snapper	<i>Lutjanus apodus</i>
Bluestripe grunt	<i>Haemulon sciurus</i>
Great barracuda	<i>Sphyrna barracuda</i>
Sprat	<i>Not yet identified</i>
Spiny lobster	<i>Panulirus argus</i>
Blue crab	<i>Callinectes sapidus</i>
Upside-down jellyfish	<i>Cassiopea xamachana</i>

Chicken Liver sponge	<i>Chondrilla nucula</i>
Heavenly sponge	<i>Dysidea etherea</i>
Stinker sponge	<i>Ircinia, sp.</i>
Black sponge	<i>Not yet identified</i>
Atlantic modulus	<i>Modulus modulus</i>
False cerith	<i>Batillaria minima</i>
Stocky cerith	<i>Cerithium litteratum</i>
Cantharus	<i>Cantharus, sp.</i>
Striated bulla/Bubble snail	<i>Bulla striata</i>
Mangrove oyster	<i>Isognomon alatus</i>
Common egg cockle	<i>Laevicardium laevigatum</i>
Shoal grass	<i>Diplanthera wrightii</i>
Turtle grass	<i>Thalassia testudinum</i>
Cats tail algae	<i>Bathophora oerstedii</i>
Mermaids wineglass	<i>Acetabularia calyculus</i>
Mermaids fan	<i>Udotea flabellum</i>
Mermaids shaving brush	<i>Penicillus capitatus</i>
Halimeda	<i>Halimeda incrassata</i>
Sea lettuce	<i>Ulva lactuca</i>
Green moss	<i>Chaetomorpha, sp.</i>
Tufted caulerpa	<i>Caulerpa, sp.</i>

Table 2. Barbuda Plant species – 2009 & 2010 field seasons
BARBUDA PLANT SPECIES

COMMON NAME	SCIENTIFIC NAME
Acacia	<i>Acacia macrantha</i>
Acacia	<i>Acacia nilotica</i>
Acacia	<i>Acacia farnesa</i>
Acacia	<i>Acacia tortuosa</i>
Aloe vera	<i>Aloe vera</i>
Australian pine, Beefwood, Willow, whistling pine	<i>Cassuarina equisetifolia</i>
Balan	
Bananas	<i>Musa paradisiaca</i>
Beach creeper	<i>Ernodea littoralis</i>
Beefwood	<i>Casuarina equisetifolia</i>
Black mangrove	<i>Avicennia nitida</i>
Black Mangrove	<i>Avicennia nitida</i>
Blackberry	<i>Rubus allegheniensis</i>
Bougainvillea	<i>Bougainvillea gabbra</i>
Bouganvilla	<i>Bougainvillea sp.</i>
Bread and Cheese	

Bromeliads	<i>Bromeliaceae</i>
Button Mangrove	<i>Conocarpus sp.</i>
Catbush	
Cattle Tongue	
Cinnamon	<i>Canella winterana</i>
Chenille Plant, monkey tail, Red hot cat tail	<i>Acalypha hispida</i>
Christmas bush	<i>Pimenta racemosa</i>
Christmas candles	<i>Cassia alata</i>
Clammy cherry	<i>Cordia oblique</i>
Coccoloba	<i>Coccoloba uvifera</i>
Coco Plum	<i>Chrysobalanus icaco</i>
Coconut palms	<i>Cocos nucifera</i>
Common Name	<i>Scientific name</i>
Cough bush	
Croton astroites	
Croton Plant	<i>Codiaeum</i>
Curassavica (wild sage)	
Dagger plant	<i>Agave karatto.</i>
Dagger plant	<i>Yucca aloifolia</i>
Dark wood privet	
Date Palm	<i>Phoenix dactylifera</i>
Dilleni	
Diversifolia	
Dolly tomato	<i>Solanum americanum</i>
Erectus	
Figger's nut	<i>Jatropha gossyifolia</i>
Flamboyant	<i>Delonix regia</i>
Germanis (??)	
Giant airplant	
Globsa (Black sage)	
Goat bush	<i>Castela erecta</i>
Haggarbush	<i>Clerodendrum aculeatum</i>
Hibiscus	<i>Hibiscus sp.</i>
Hogbush	<i>Comocladia dodonaea</i>
Indian Rubber Tree	<i>Ficus elastica</i>
Indigo	<i>Indigofera sp.</i>
Inkberry	<i>Scaevola plumieri</i>
Jerusalem Thorn	<i>Parkinsonia aculeata</i>
Krugii (whitewood, wild grape)	
Loblolly	<i>Pisonia subcordata</i>
Logwood	<i>Haematoxylon campechianum</i>
Manchaneel	<i>Hippomane mancinella</i>
Marsh Fleabane	<i>Pluchea odorata</i>
Monkey no climb	<i>Euphorbia</i>
Morning glory	<i>Ipomoea sp.</i>

Mutton porridge, mutton polly	
Neem Tree	<i>Azadirachta indica</i>
Noni	
Okra?	
Opuntia	<i>Opuntia rubescens</i>
Organpipe cactus	<i>Cephalocereus nobilis</i>
Palmetto palms	<i>Sabal palmetto</i>
Pawpaw	<i>Carica papaya</i>
Periwinkle, ramgoat rose	<i>Catharanthus roseus</i>
Plant Identification	
Poison Ash	<i>Comocladia dodonaea</i>
Privet	
Red mangrove	<i>Rhizophania mangle</i>
Right wattle	<i>Callicoma serratifolia (Black wattle??)</i>
Satinwood	<i>Zanthoxylum flavum</i>
Sea grape	<i>Cocoloba uvifera</i>
Sea hibiscus	
Sea Ox-eye	<i>Borrichia arborescens</i>
seaside heliotrope	<i>Heliotropium curassauicum</i>
Simaroubaceae	
Soursop	<i>Annona muricata</i>
Spanish bayonet	<i>Yucca aloifolia</i>
Spider lily	
Sweetsop	<i>Annona squamosa</i>
Tamarid	<i>Tamarindus indica</i>
Tillandsia utriculata	
Tisane	<i>Euphorbia prostrata</i>
Torchwood	<i>Jacquinia arborea</i>
Turks Head cactus	<i>Melocactus intortus</i>
Turpentine	<i>Bursera simaruba</i>
Variegated wattle	
Wattle	
White Cedar	<i>Chamaecyparis thyoides</i>
White Mangrove	<i>Laguncularia racemosa</i>
Whitewood	<i>Bucida buceras</i>
Wild balsam	<i>Echinopepon</i>
Wild pomegramma	
Wild sage	<i>Sida rhombifolia</i>
Wild tamarind	<i>Tamarindus indica</i>
Wild Thyme	<i>Thymus pulegioides</i>
Worm weed, bitterweed	<i>Chenopodium arbrosoides</i>
Yellow Alamanda	<i>Alamanda</i>
Yellow sander	
Yellow Wattle	<i>Acacia flavescens</i>
Zwi Zwi	

Strumpfia maritima

