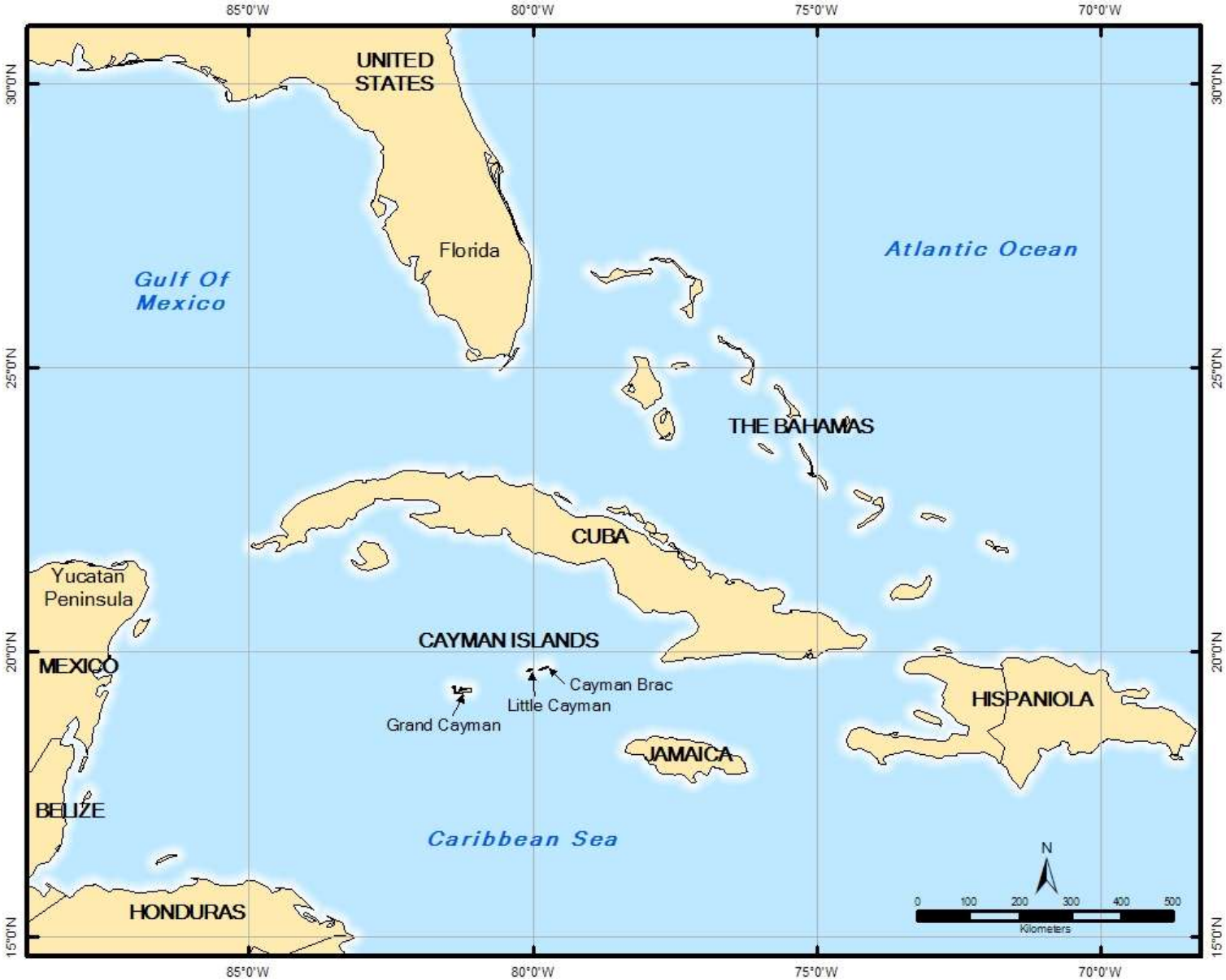
CAYMAN ISLANDS
DEPARTMENT OF ENVIRONMENT

DEPARTMENT OF
ENVIRONMENT
CAYMAN ISLANDS GOVERNMENT

WHAT DATA DO WE USE?

WHAT DATA DO WE COLLECT?

WHAT ARE OUR DATA NEEDS?



DEPARTMENT OF ENVIRONMENT
CAYMAN ISLANDS GOVERNMENT

GRAND CAYMAN

POPULATION (2010) = 52,601

LITTLE CAYMAN

SISTER ISLANDS

POPULATION (2010) = 2,779

CAYMAN BRAC

DEPARTMENT OF LANDS AND SURVEY

COLLECTS VIRTUALLY ALL BASE DATA
FOR THE CAYMAN ISLANDS

- DEPARTMENT OF ENVIRONMENT
- DEPARTMENT OF PLANNING
- HAZARD MANAGEMENT
- DEPARTMENT OF AGRICULTURE
- MOSQUITO RESEARCH AND CONTROL
- MET OFFICE

GOVERNMENT USERS OF BASE DATA
SORTED BY AMOUNT OF USAGE

DATA USED BY OUR DEPARTMENT THAT IS COLLECTED AND MAINTAINED BY DEPARTMENT OF LANDS AND SURVEY

WELL FUNDED FOR A LONG TIME AND CONSISTS OF A VERY COMPETENT TEAM OF SURVEYORS, PROGRAMMERS, DB ADMINISTRATORS, AND GIS GRUNTS

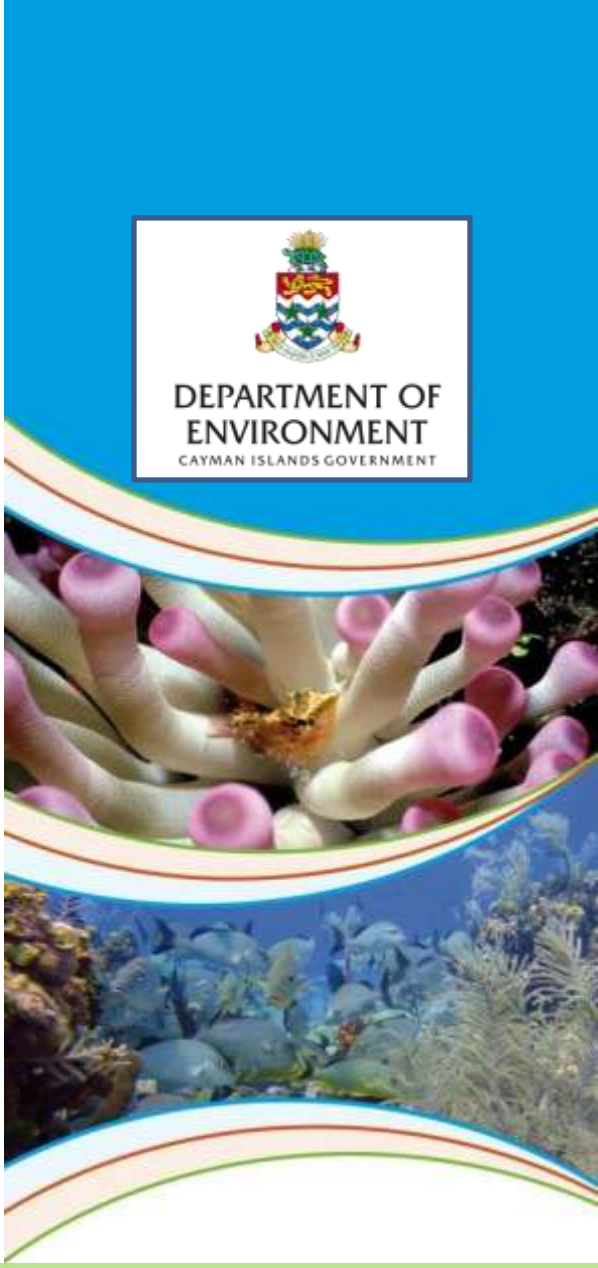
- IMAGERY
  - AERIAL PHOTOGRAPHY FROM 1971, 1994, 1999, 2004, 2008, 2013
- ROADS (EXISTING AND PROPOSED)
- PARCEL BOUNDARIES AND OWNERSHIP INFORMATION
- LIDAR DERIVED ELEVATION (DTM, DSM, CONTOURS)
- COASTLINES
- BUILDINGS (INCLUDING CONSTRUCTION AND VALUE INFORMATION)
- LIMITED BATHYMETRY
- PLANNING ZONES (FROM DEVELOPMENT PLAN 1997)
- PICTOMETRY
- MANY MORE

DATA THAT WE COLLECT

DEPARTMENT OF ENVIRONMENT STAFF

- **DIRECTOR**
- **2 ASSISTANT DIRECTORS**
  - BOTH USE GIS AT AN AVERAGE LEVEL
- **MARINE RESEARCH SECTION**
  - 8 MARINE RESEARCH OFFICERS (4 USE GIS AT A BASIC LEVEL)
- **TERRESTRIAL RESEARCH SECTION**
  - 2 TERRESTRIAL ECOLOGISTS (BOTH USE GIS AT A BASIC LEVEL)
- **SUSTAINABLE DEVELOPMENT UNIT**
  - 1 MANAGER AND 2 SDU OFFICERS (ALL USE GIS AT AN AVERAGE LEVEL)
- **OPERATIONS SECTION**
  - 4 OPERATIONS STAFF RESPONSIBLE FOR MAINTAINING OUR SYSTEM OF PUBLIC MOORINGS AS WELL AS BOAT/MOTOR MAINTENANCE
- **ENFORCEMENT SECTION**
  - 8 ENFORCEMENT STAFF THAT ENFORCE OUR MARINE PARK LAWS
- **GIS OFFICER!**

ALL STAFF REQUIRE GIS DATA



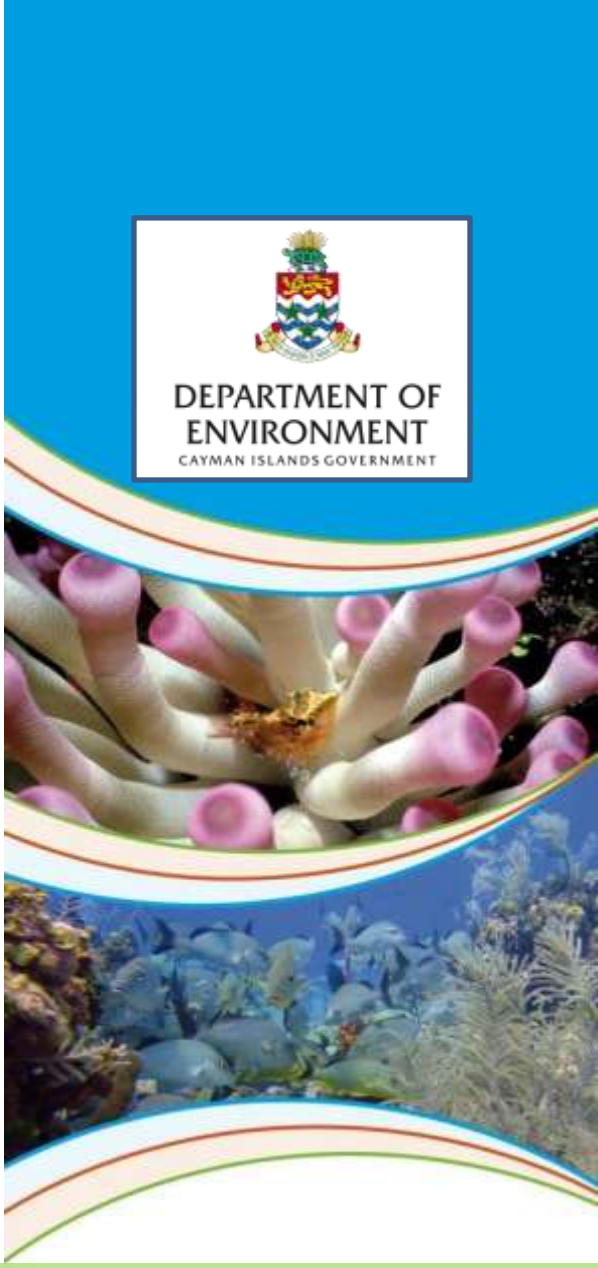
MAJOR DRIVER OF DATA COLLECTION IN RECENT YEARS

DARWIN INITIATIVE

PRIFYSGOL BANGOR UNIVERSITY

OUR DEPARTMENT HAS BEEN FORTUNATE ENOUGH TO RECEIVE TWO 3 YEAR DARWIN INITIATIVE GRANTS AS WELL AS A POST PROJECT GRANT

- **CREATION OF NATIONAL BIODIVERSITY ACTION PLAN, TERRESTRIAL AND MARINE HABITAT MAPS, A PROPOSAL FOR ENHANCEMENT OF OUR MARINE PARKS SYSTEM, MANY OTHER DATA SETS**
- **HAVE HAD OVER 12 MASTERS STUDENTS COMPLETE WORK OVER THIS TIME**



Rules for Cayman Islands Marine Parks

MARINE PARK ZONE

No taking of any marine life alive or dead, except:

- line fishing from shore is permitted (see FISHING LICENSES section over page);
- line fishing at depths of 80 ft or greater is permitted;
- taking fry and sprat with a fry or cast net is permitted.

NOTE: fish traps, spear guns, pole spears and other nets are totally prohibited.

- No anchoring - use of fixed moorings only, except:
  - boat
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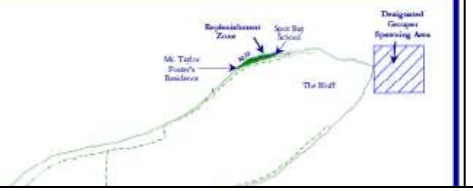
ENVIRONMENTAL ZONE

- No taking of any marine life, alive or dead with no exceptions;
- No in-water activities;
- Public may access only at speeds of 5 m.p.h. or less;
- No anchoring of any boat.

NOTE: Line fishing, fish traps, nets, spear guns and strikers are totally prohibited.

REPLENISHMENT ZONE

Cayman Brac



SUMMARY OF CAYMAN ISLANDS MARINE CONSERVATION LAWS

LOBSTERS

- **Closed season:** 1 March through 30 November. No one may take lobster from Cayman waters during these months. No one may purchase, receive or possess lobster taken from Cayman waters during these months.
- **Open season catch limit:** Three per person or six per boat per day, whichever is less.
- **Size limit:** Six inch tail minimum size.
- Only spiny lobster (*P. argus*) may be taken.

CONCH

- **Closed season:** 1 May through 31 October. No one may take conch from Cayman waters during these months. No one may purchase, receive or possess conch taken from Cayman waters during these months.
- **Open season catch limit:** Five per person or ten per boat per day, whichever is less.
- No one may purchase or receive more than five conch from Cayman waters in any one day.

WHELKS

- **Closed season:** 1 May through 31 October. No one may take whelk from Cayman waters during these months. No one may purchase, receive or possess whelk taken from Cayman waters during these months.
- **Open season catch limit:** Two-and-a-half gallons in the shell or two-and-a-half pounds of processed whelks per person per day.
- No one may purchase or receive more than two-and-a-half gallons in the shell or two-and-a-half pounds processed whelks from Cayman waters in any one day.
- Chitons, periwinkles and bleeding teeth may not be taken from Cayman waters at any time.

ECHINODERMS

- Echinoderms (includes starfish, sea eggs/urchins, sea cucumber and sand dollars) may not be taken from Cayman waters at any time.

TURTLES

- No one may disturb, molest or take turtles in Cayman waters without a licence from the Marine Conservation Board.
- Possession of turtle eggs is prohibited.
- For licensed fishermen, closed season runs from 1 May through 31 October.

SHARKS

- No one may feed, attempt to feed or provide or use food to attract any shark in Cayman waters.

NASSAU GROUPERS

- **Size limit:** Twelve inch minimum size limit applies throughout Cayman waters year round **EXCEPT**:
- **Designated Grouper Spawning Areas are protected.**
- No one may take Nassau grouper from any of the Designated Grouper Spawning Areas from 1 November through 31 March.
- No one may spearfish or set a fish-pot within a one–mile radius of any Designated Grouper Spawning Area from 1 November through 31 March.
- No one may use a speargun to take Nassau Grouper.

OTHER FISH

- **Protected fish:** Jew fish, tilefish (whities), filefish (pipers) and angelfish, including Grey, French and Queen angels (old monks), may not be taken from Cayman waters at any time.
- **Size limit:** Eight-inch minimum size on all other fish except goggle eyes, herrings (including sprats), anchovies and silversides (including loggerhead and fine fry).

FISH POTS

- Must be licensed by the Marine Conservation Board.
- Only Caymanians over 18 may be granted licences.
- Only two pots per family and pots must be identified with a DOE tag.
- No fish pot may be set within a one–mile radius of any Designated Grouper Spawning Area from 1 November through 31 March.

SPEAR GUNS & SEINE NETS

- No one may use a speargun (includes Hawaiian sling, polespear, harpoon, hookstick or any device with a pointed end which may be used to impale, stab or pierce any marine life but does not include a striker) or seine net without a licence from the Marine Conservation Board. NOTE: A striker is defined as a wooden pole, at least 10ft long, with a maximum of 2 barb-less prongs attached to one end.
- No one may possess a speargun without a licence.
- No one may import a speargun or any parts for a speargun.
- Only Caymanians over 18 may be granted licences.
- **Speargun catch limit:** Three fish per licensed person per day.
- No one may use a speargun in water less than 20ft deep.
- No one may possess more than six fish that have been caught by a speargun.
- No one may spearfish within a one–mile radius of any Designated Grouper Spawning Area from 1 November through 31 March.
- Licence holders must carry licence when using seine net or spear fishing and adhere to licence conditions.
- No one may use a speargun to take Nassau Grouper.

FISHING LICENSES

- Unless licensed by the Marine Conservation Board, residents who do NOT possess Caymanian Status may not take or attempt to take, by any means, any marine life while he is on shore or in any part of Cayman waters in which he can stand.
- No licence is required for catch and release fishing.

GENERAL RULES

- Damaging coral by anchor, chains or any other means **ANYWHERE** in Cayman waters is prohibited.
- No taking of **ANY** marine life alive or dead while on SCUBA.
- No taking of any coral, sponges, etc. from Cayman waters.
- Wearing gloves while diving or snorkelling in Cayman waters is prohibited.
- Export of live fish or other marine life is prohibited.
- Fishing with gill nets, poison or other noxious substances is prohibited.
- Dumping **ANYTHING** in Cayman waters is prohibited.
- The export of more than three conch shells and or any black coral requires a CITES permit, issued through the DOE.

PENALTIES

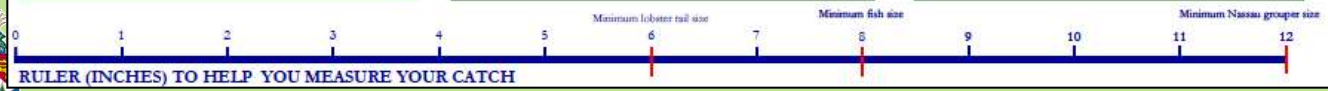
Violation of any of these laws is an offence carrying a maximum penalty of CI$500,000 fine and one year in jail. Upon conviction, forfeiture of the vessel or other equipment may also be ordered.

For additional information contact the Department of Environment
580 North Sound Road, Grand Cayman
Phone: 949-8469 Fax: 949-4020

http:/www.doe.ky doe@gov.ky

Report Offences to:
Grand Cayman: 949-8469 or 916-4271
Cayman Brac: 926-0136
Little Cayman: 916-7021 or 926-2342
VHF: Channel 10 or 911

Report oil spills or other marine pollution to the DOE 949-8469 or 911



RULER (INCHES) TO HELP YOU MEASURE YOUR CATCH

Marine Park Regulations & Marine Conservation Laws

Cayman Islands

Department of Environment

ENVIRONMENT
CAYMAN ISLANDS GOVERNMENT

DARWIN INITIATIVE

CONCH SURVEY

CONCH SURVEY

Step 1: Planning

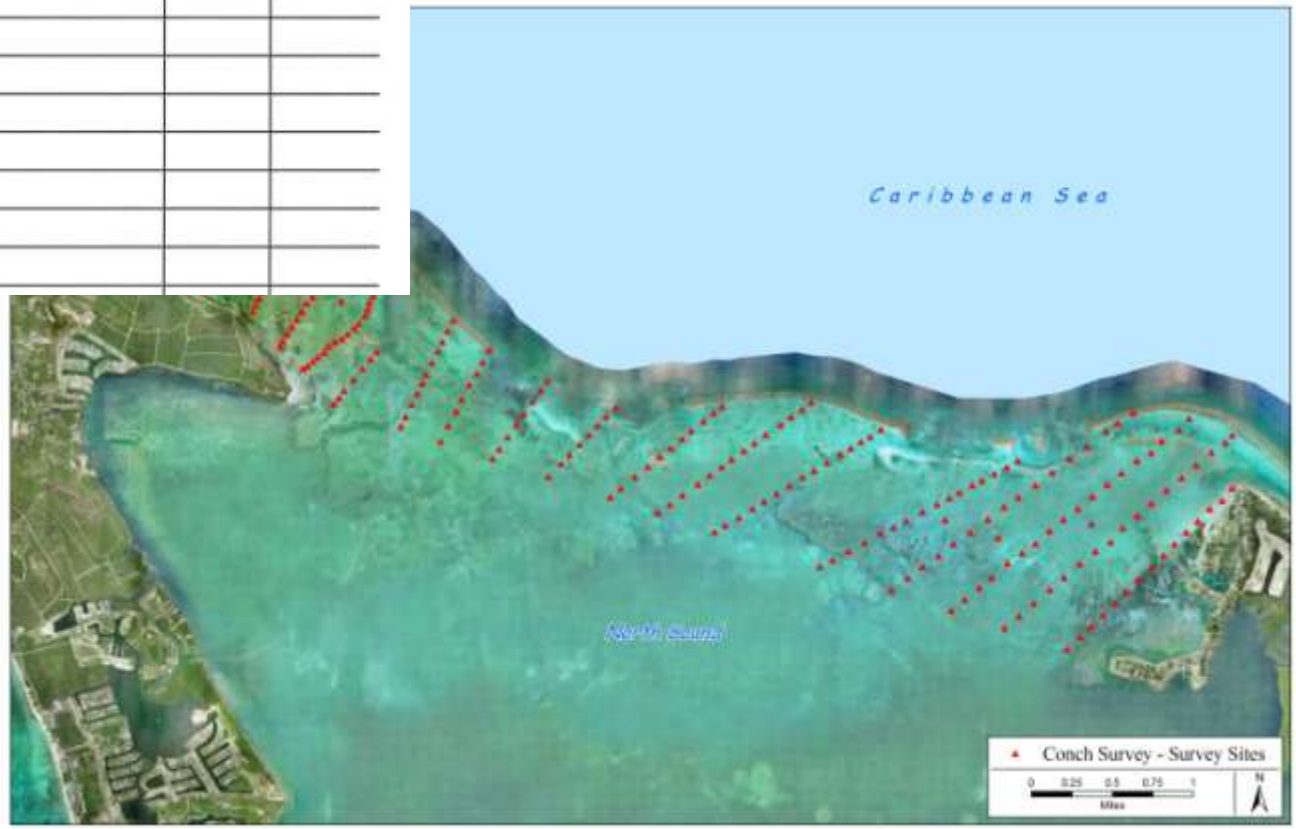
Date: Sound:

Boat: Recorder:

GPS: Crew:

S = Sand R = Rock A = Algae G = Grass Rb = Rubble Hb = Hard Bottom

Site #	Bottom	# Conch	Length (1/2 cm)	Thickness (1/2 mm)	Maturity	Comments

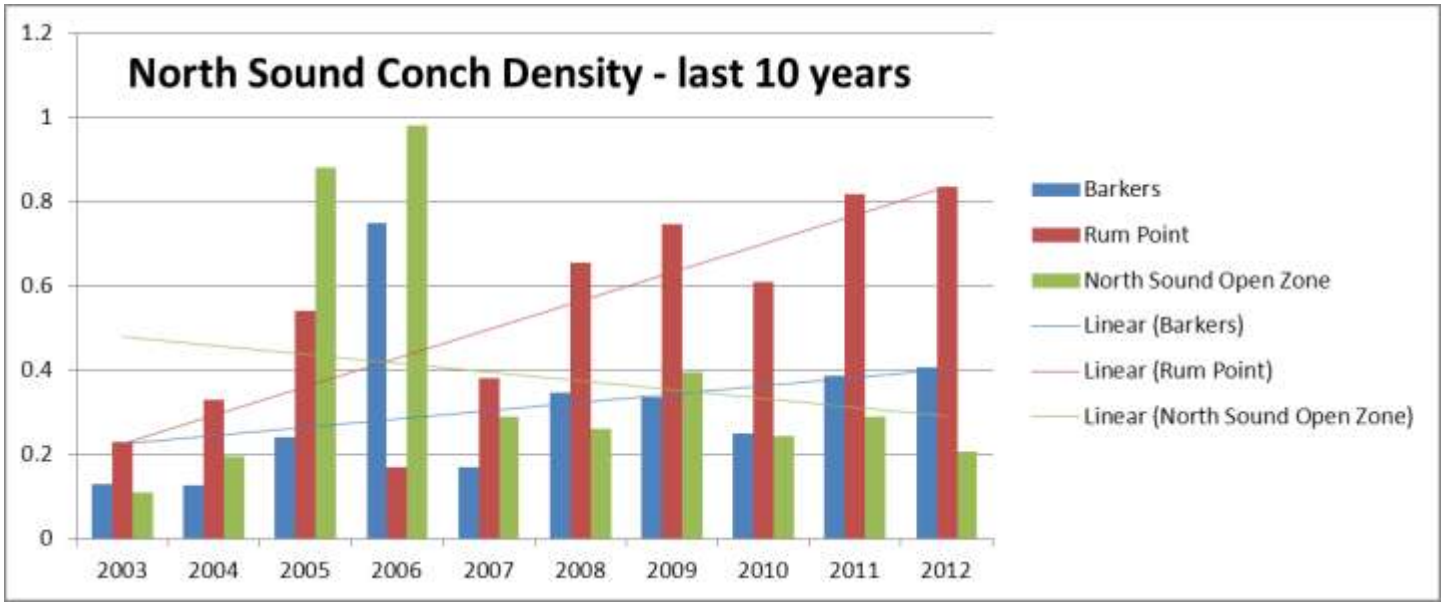


CONCH SURVEY

Step 2: Field Work

CONCH SURVEY

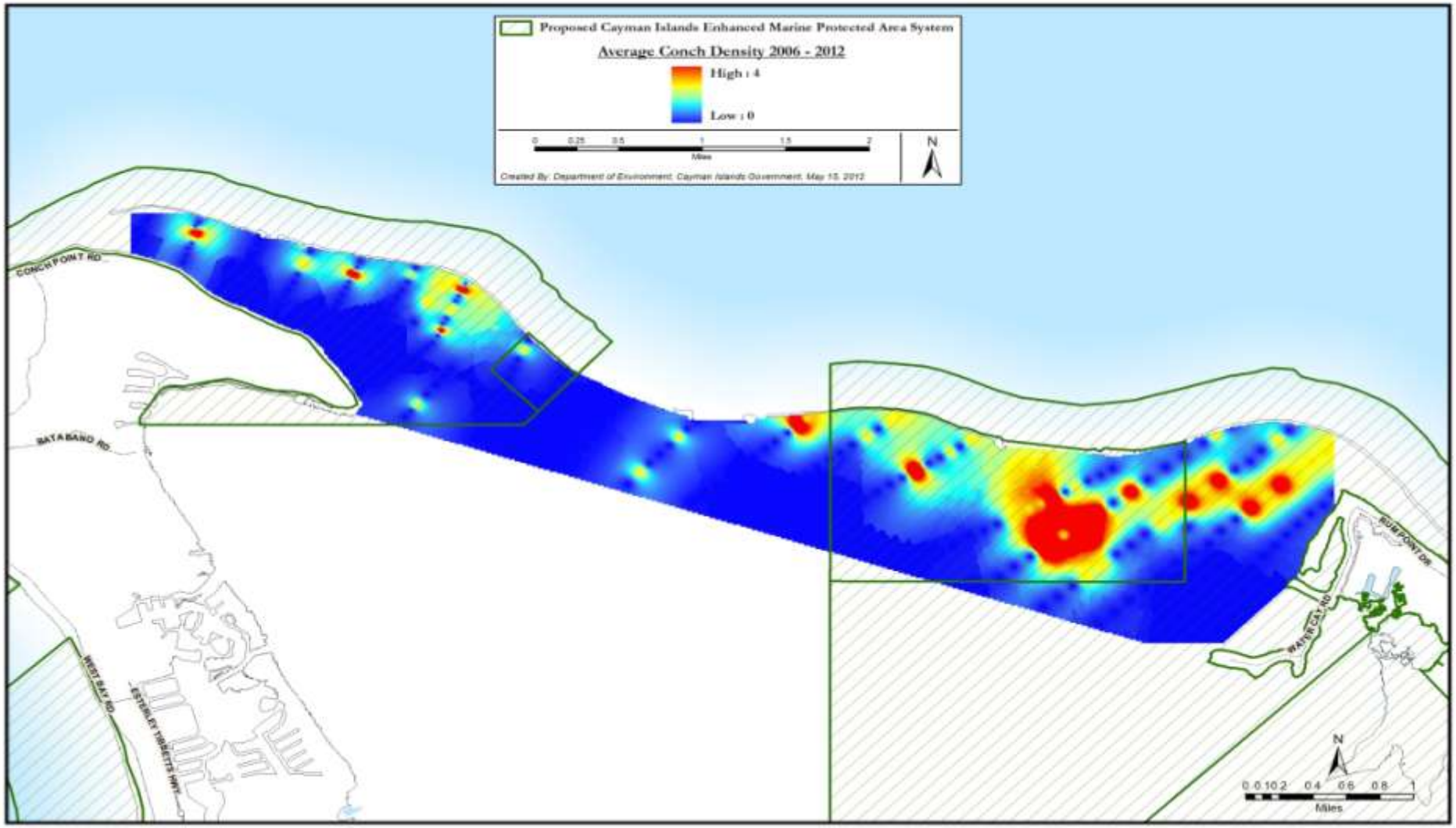
Step 3: Data Analysis



	AVERAGE DENSITY		
Year	**Barkers**	**North Sound Open Zone**	**Rum Point**
2003	0.13	0.11	0.23
2004	0.125	0.195	0.33
2005	0.24	0.88	0.54
2006	0.75	0.98	0.17
2007	0.17	0.29	0.38
2008	0.35	0.26	0.65
2009	0.33	0.40	0.75
2010	0.25	0.24	0.61
2011	0.39	0.29	0.82
2012	0.40	0.20	0.84

CONCH SURVEY

Step 4: Results Displayed in GIS



AERIAL PHOTOGRAPHY

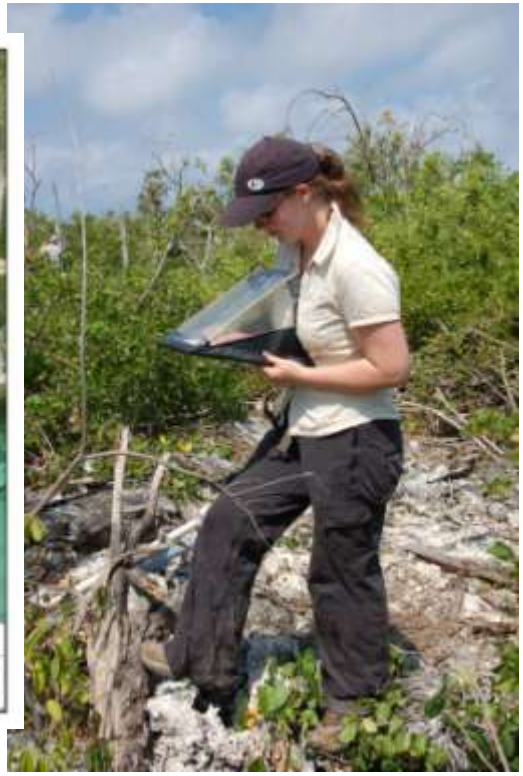
To Estimate Red-Footed Booby Abundance

AERIAL PHOTOGRAPHY

To Estimate Red-Footed Booby Abundance

Step 1: Ground Survey

- ***Used a Ground Survey combined with a separate Aerial Survey to estimate the Abundance and Distribution of the Red-Footed Booby north of Booby Pond, Little Cayman***



AERIAL PHOTOGRAPHY

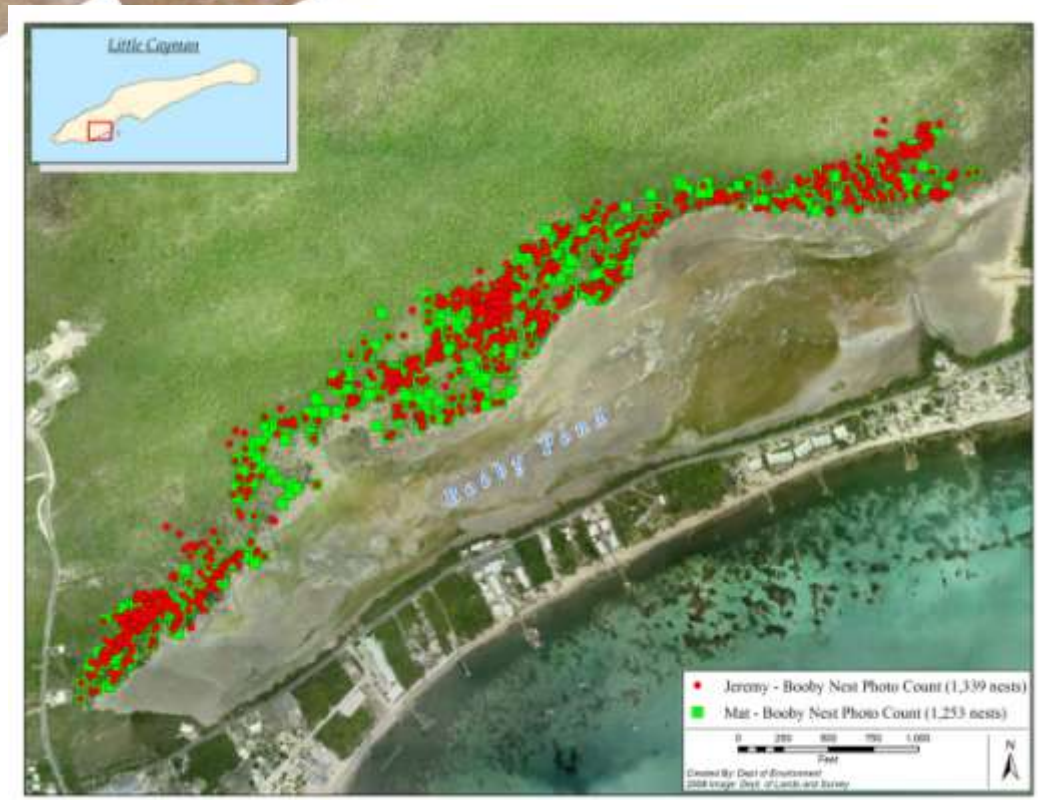
To Estimate Red-Footed Booby Abundance

Step 2: Plan For and Acquire Aerial Photography

AERIAL PHOTOGRAPHY

To Estimate Red-Footed Booby Abundance

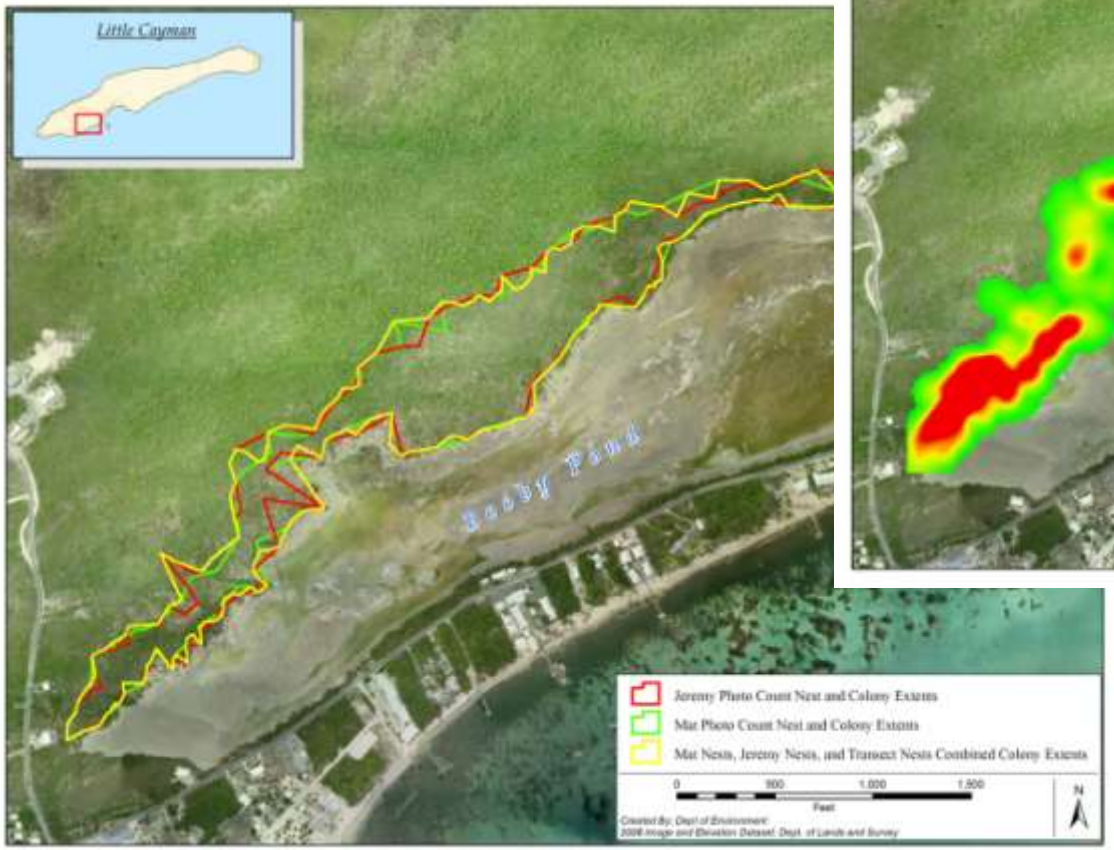
Step 4: Booby Nest Identification

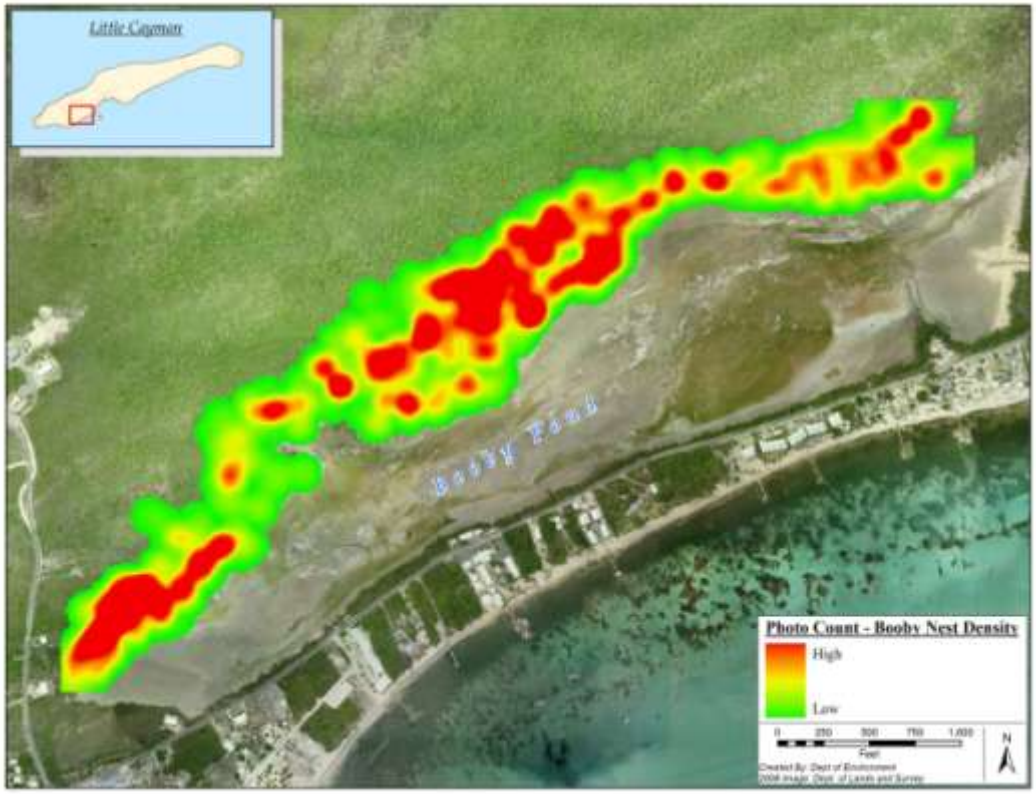


AERIAL PHOTOGRAPHY

To Estimate Red-Footed Booby Abundance

Step 5: Results Displayed in GIS





WETLAND LOSS

Mapping Wetland Loss Using GIS

WETLAND LOSS

Mapping Wetland Loss Using GIS

Step 1a: Planning

- *Find a 'Starting' Point With Data From The Earliest Possible Time. In This Case It Was a Paper Map Created In 1976*

WETLAND LOSS

Mapping Wetland Loss Using GIS

Step 1b: Planning continued…

- *Put the map in DIGITAL format by scanning it and then 'georeferencing' it (All GIS layers are displayed using a coordinate system [Such as Latitude/Longitude] so that they can overlayed and compared – georeferencing means to get it in the same coordinate system as other data)*

WETLAND LOSS

Mapping Wetland Loss Using GIS

Step 2a: Data Analysis

- *'DIGITIZE' the wetland areas present in the 1976 map. This means to digitally trace the wetlands from the map and create a data layer for 1976 WETLANDS.*

Digitize outside edge of 1976 wetland map

WETLAND LOSS

Mapping Wetland Loss Using GIS

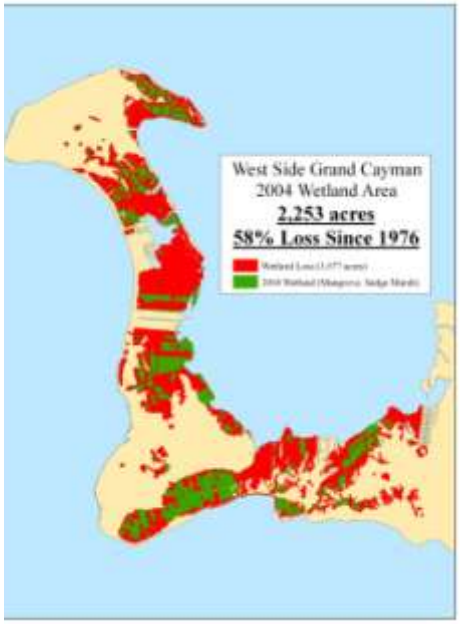
Step 2b: Data Analysis continued…

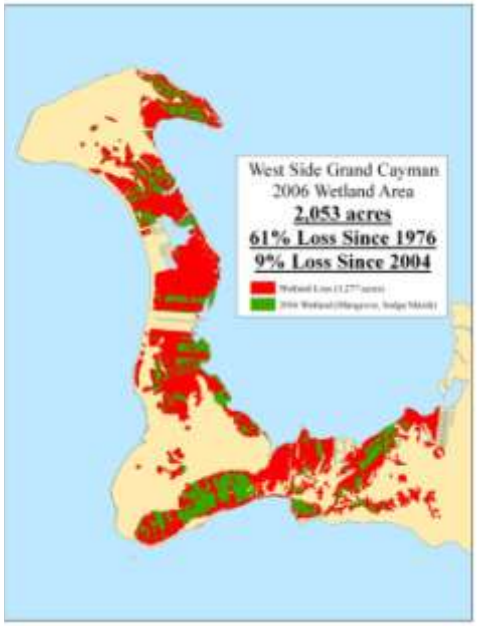
- *Use any data from 1976 to the present day that can reliably show all wetland areas for the west side of Grand Cayman.*
- *In this case we had very good aerial photography for the years 2004, 2006, and 2008.*
- *Areas that were wetland in 1976 and not wetland in each of the following image years were digitized.*

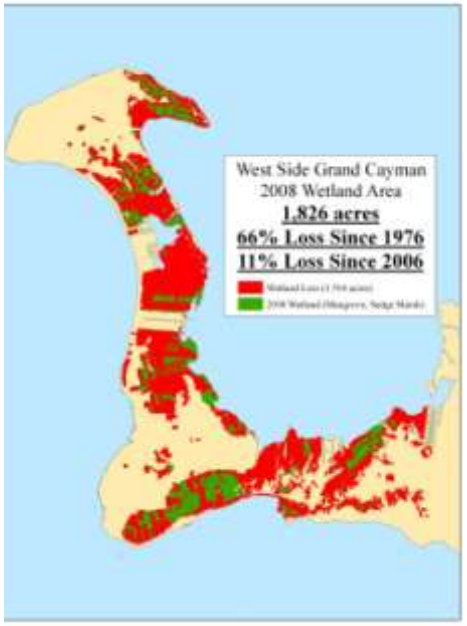
WETLAND LOSS

Mapping Wetland Loss Using GIS

Step 3: Results Displayed in GIS



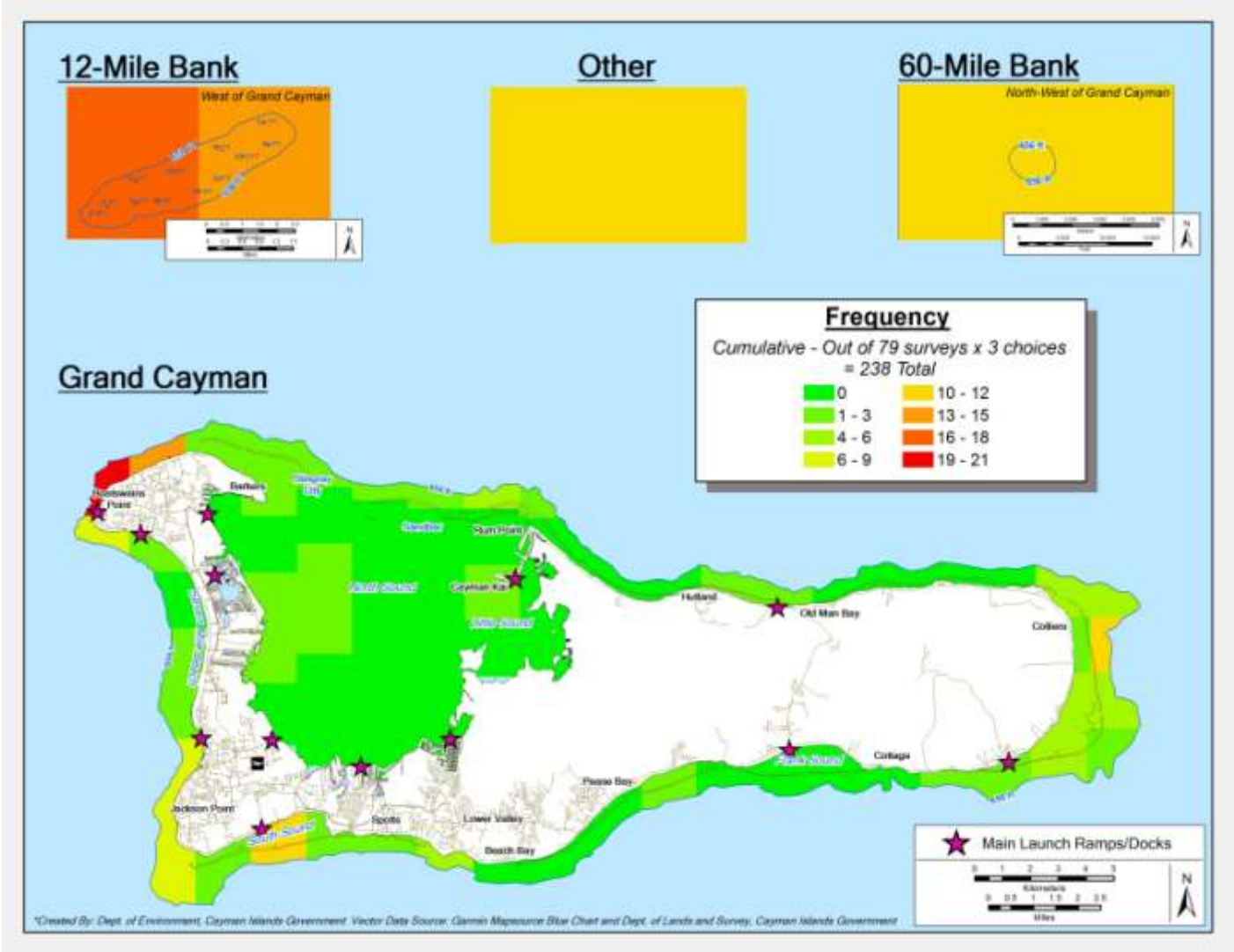




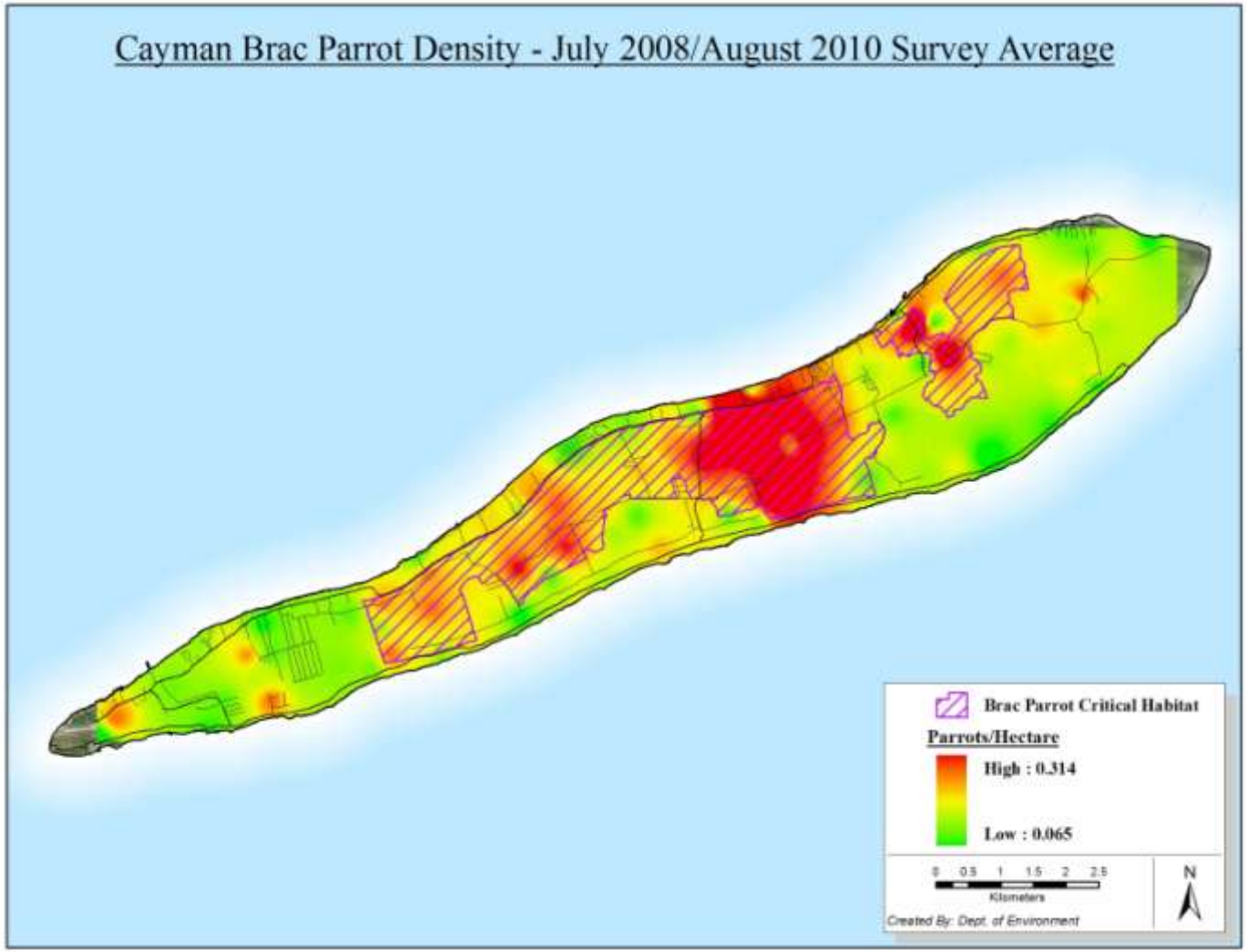
1972 Aerial Photography
West Side, Grand Cayman
Seven Mile Beach
North Sound

2008 Aerial Photography
West Side, Grand Cayman
Seven Mile Beach
North Sound

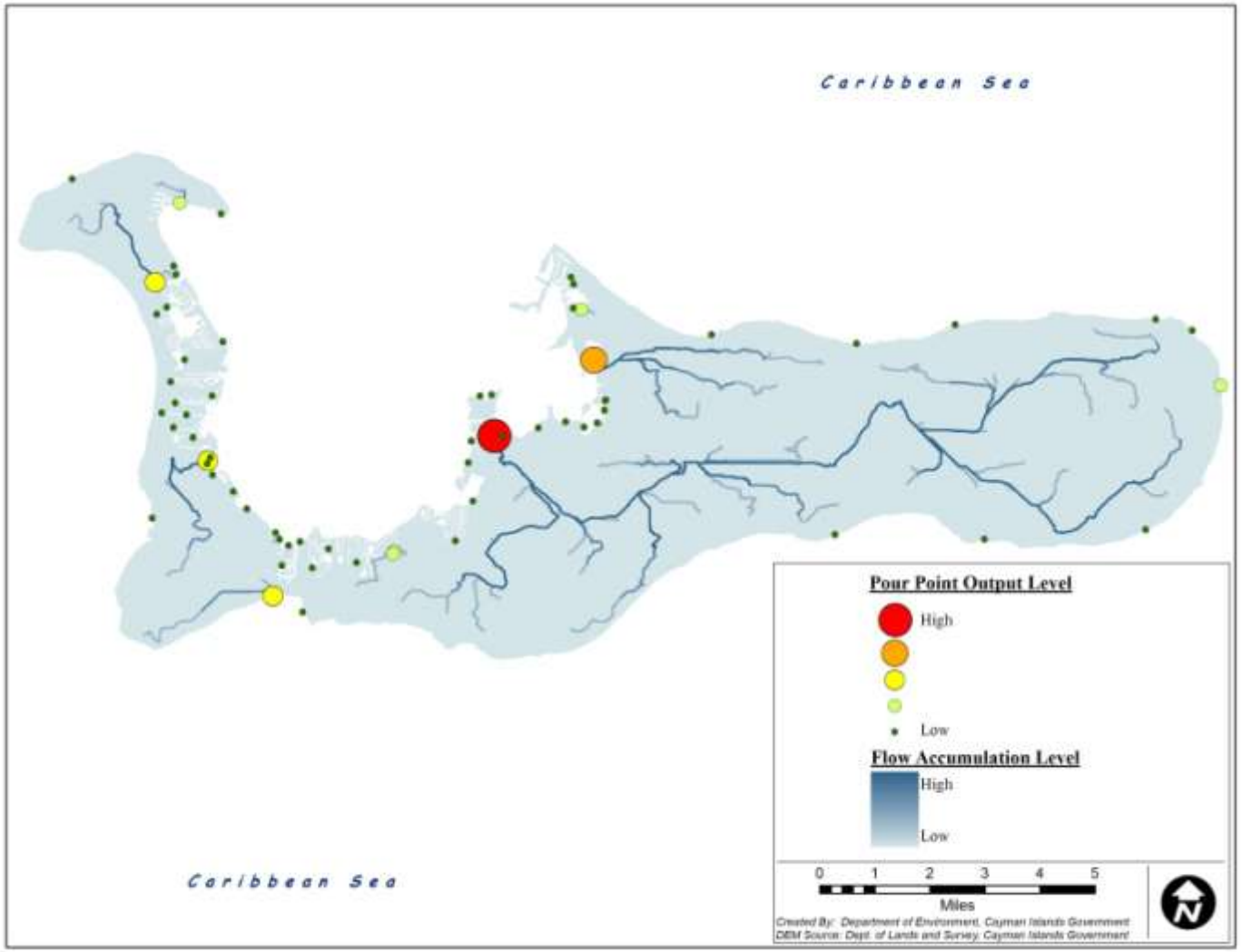
FISHING PRESSURE SURVEY



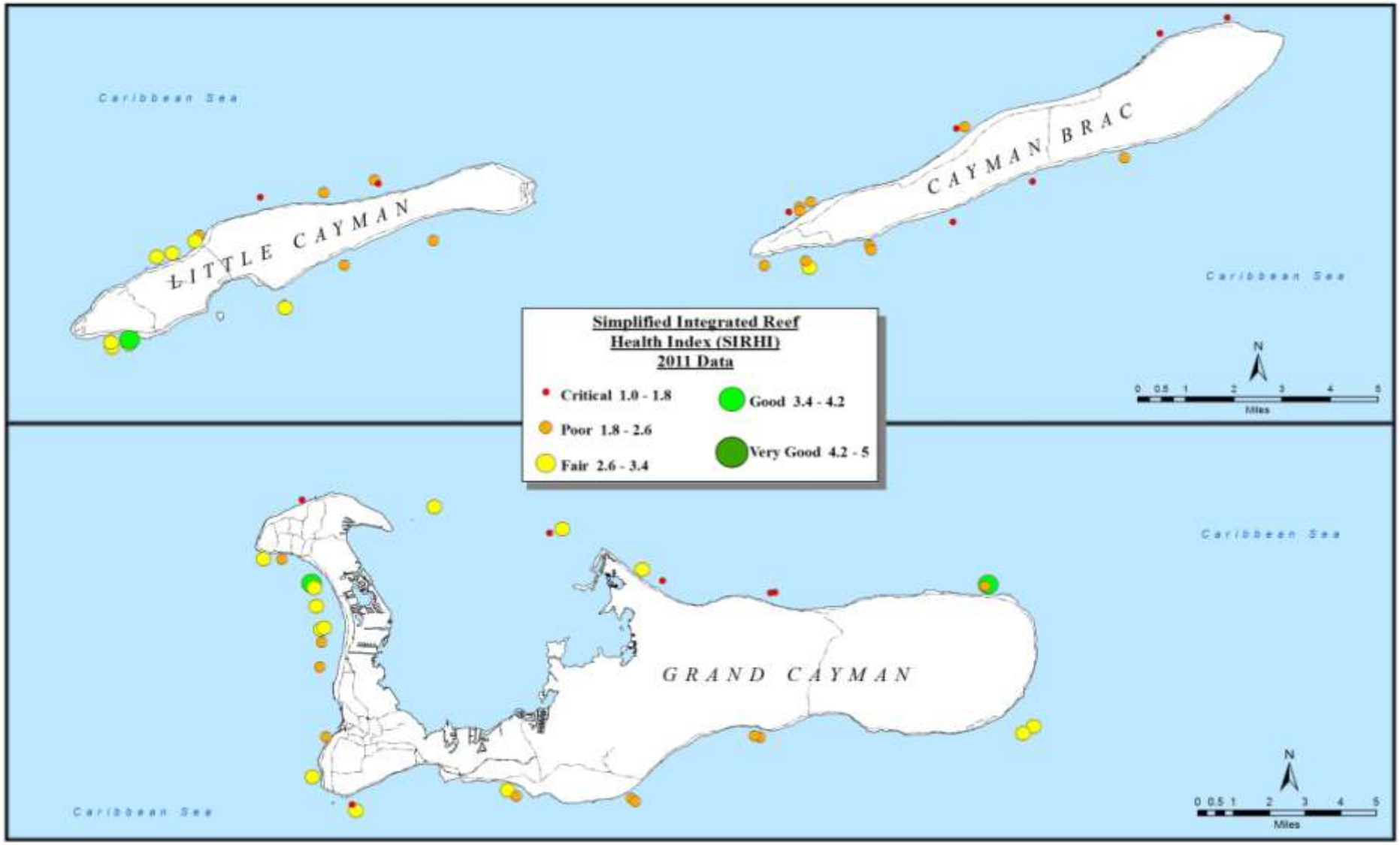
CAYMAN BRAC PARROT DENSITY SURVEYS



FLOW ACCUMULATION MODELS

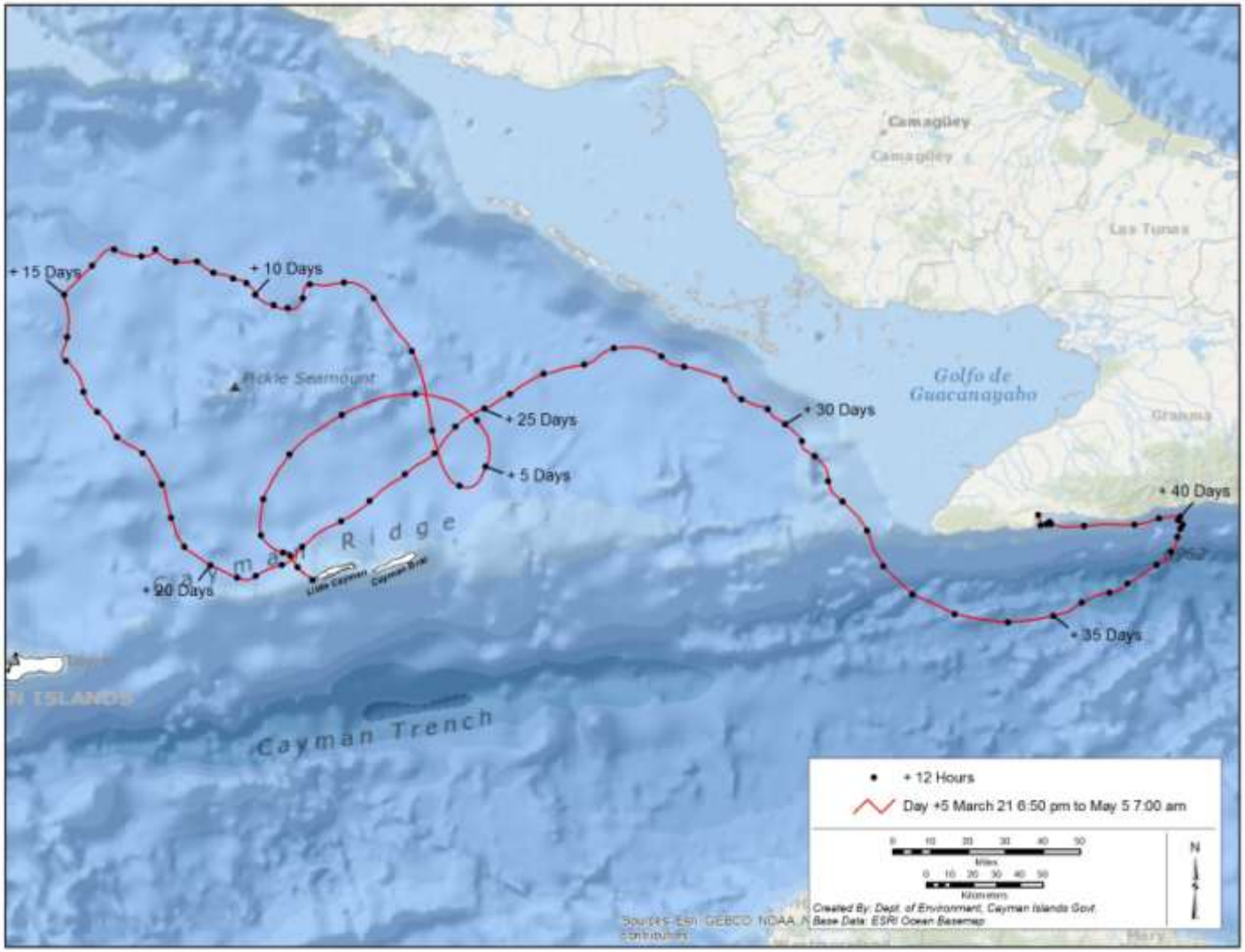


CAYMAN ISLANDS: RELATIVE REEF HEALTH

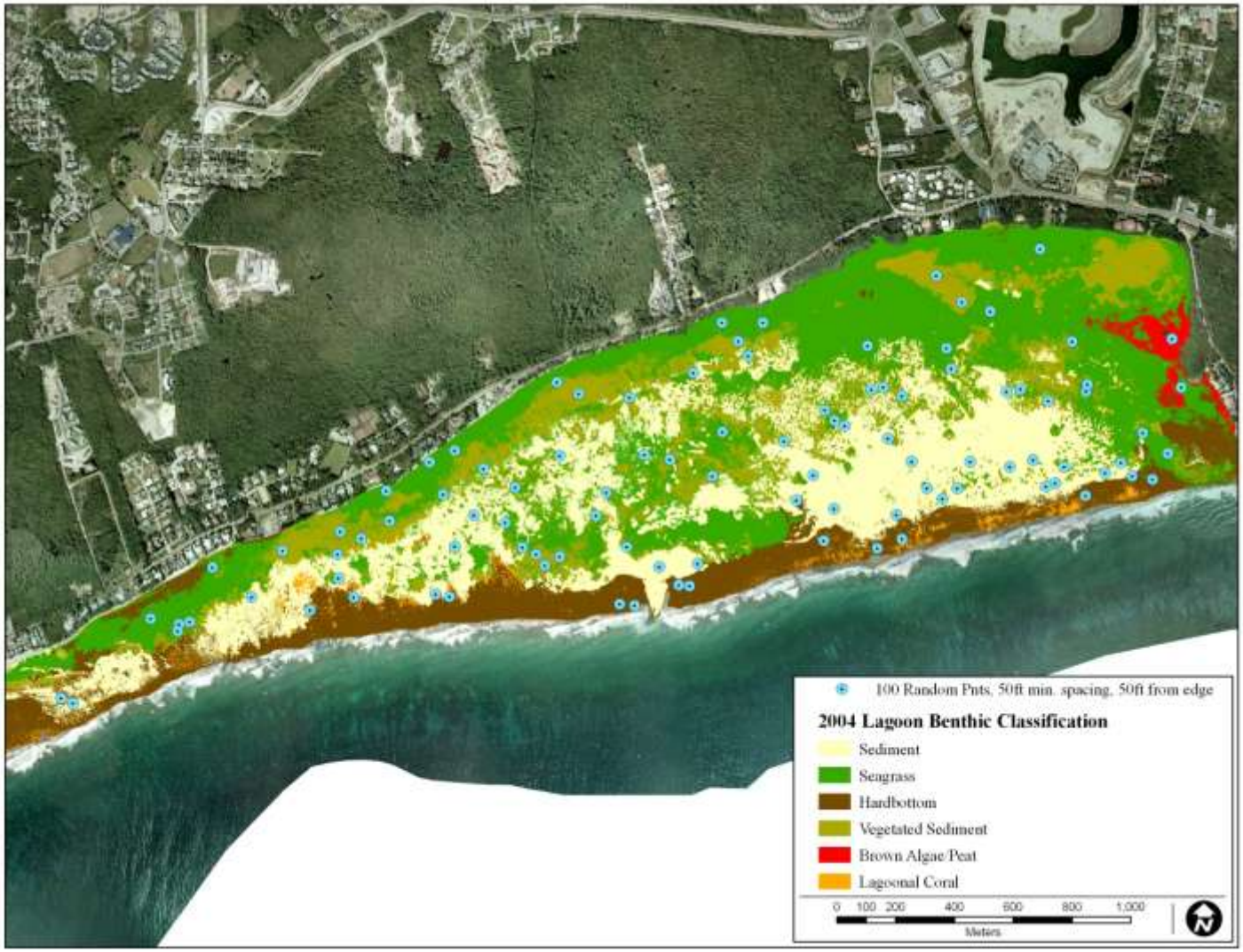


DEPARTMENT OF ENVIRONMENT
CAYMAN ISLANDS GOVERNMENT

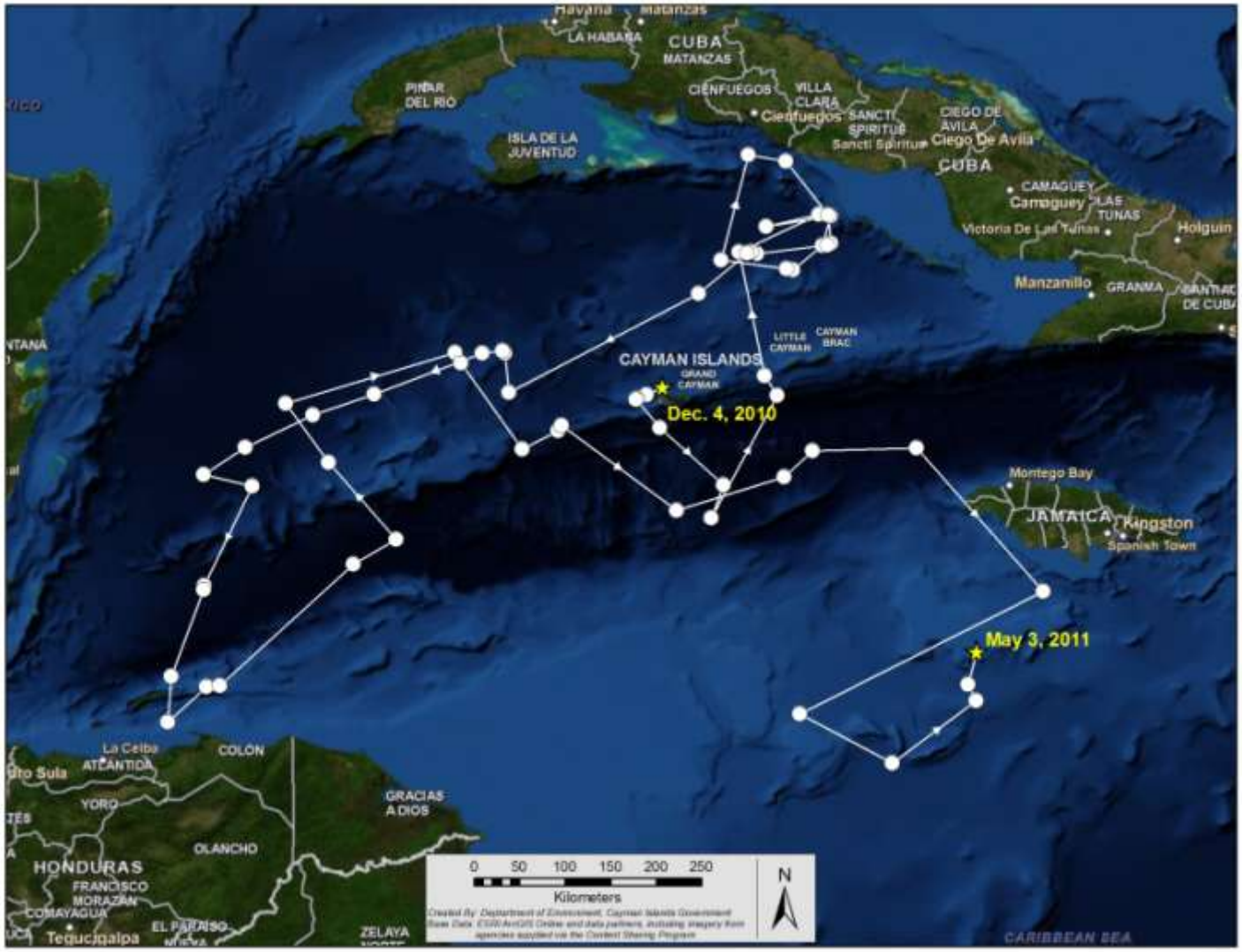
LARVAL DRIFT MODELING



HABITAT MAPPING



SATELLITE TAGS ON TIGER SHARKS



MANY MORE DATASETS

- COASTAL WORKS DATA
- INVASIVE SPECIES MAPPING
- NASSAU GROUPER AND SHARK MOVEMENTS
- MARINE TURTLE NESTING AND INWATER STUDIES
- ELKHORN AND STAGHORN LOCATIONS
- ENDEMIC SPECIES MAPPING
- ETC…

OUR NEW TOY

DATA WISH LIST

- BLUE/GREEN LIDAR BATHYMETRY
- METATDATA!
- MORE VALUE ADDED DATA USING IMAGERY
- SPATIAL RELATIONAL DATABASE
- NEARSHORE CURRENT MODELING
- ADVANCED SPATIAL STATS

CLOSING NOTES

- MEASURE TWICE CUT ONCE!
- VALIDATE! VALIDATE! VALIDATE! (THANKS DRE)
- DON’T NEED A LOT OF RESOURCES TO COLLECT A LARGE NUMBER OF DATASETS
- HAVING SAID THAT FUNDS AND PERSONEL HELP!
- HAVE THE RIGHT PEOPLE IN PLACE
- JACK OF ALL TRADES
- COLLABORATION IS KEY

Thank you.

Questions?