Research on Foraging Turtles in Tobago

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Photo by Ryan Mannette

Photo by Lee Ann Beddoe

Local scenario

- Research, tourism and conservation efforts largely focussed on nesting leatherbacks
- Extensive nearshore foraging habitat but no studies conducted
- Greens and hawksbills exploited at sea in an unregulated fishery (5 month open season prior to 2011)
- Data on the sea turtle fishery is scarce
- No specific information available on regional linkages

Inadequate information to understand the local and regional context, and therefore for effective management and conservation

Photos by Ryan Mannette

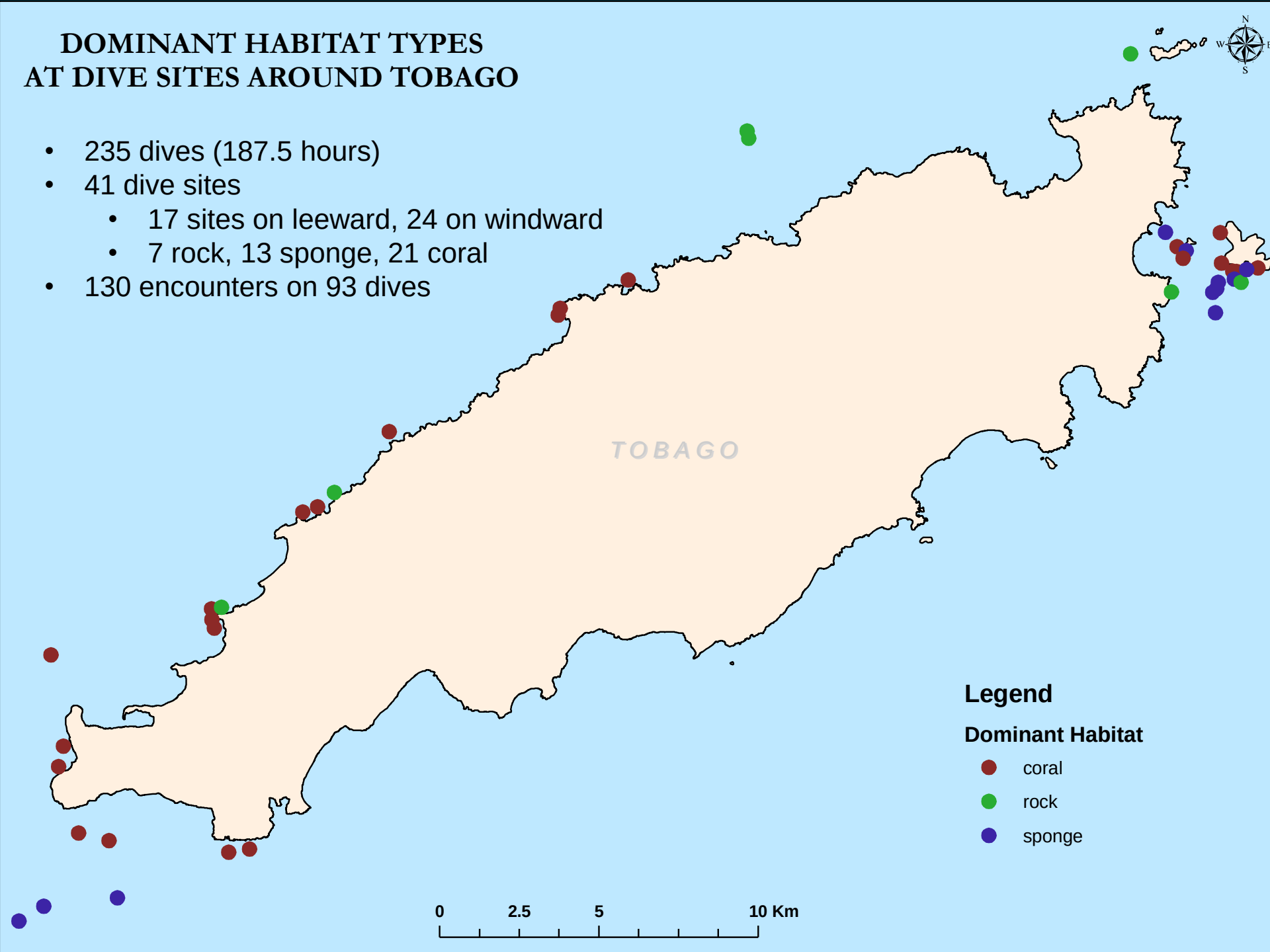
PhD research - Objective #1

Assess the distribution and abundance of turtles at dive sites around the island of Tobago

- In-water study using SCUBA
- Training from Barbados Sea Turtle Project and Bermuda Sea Turtle Project in 2006

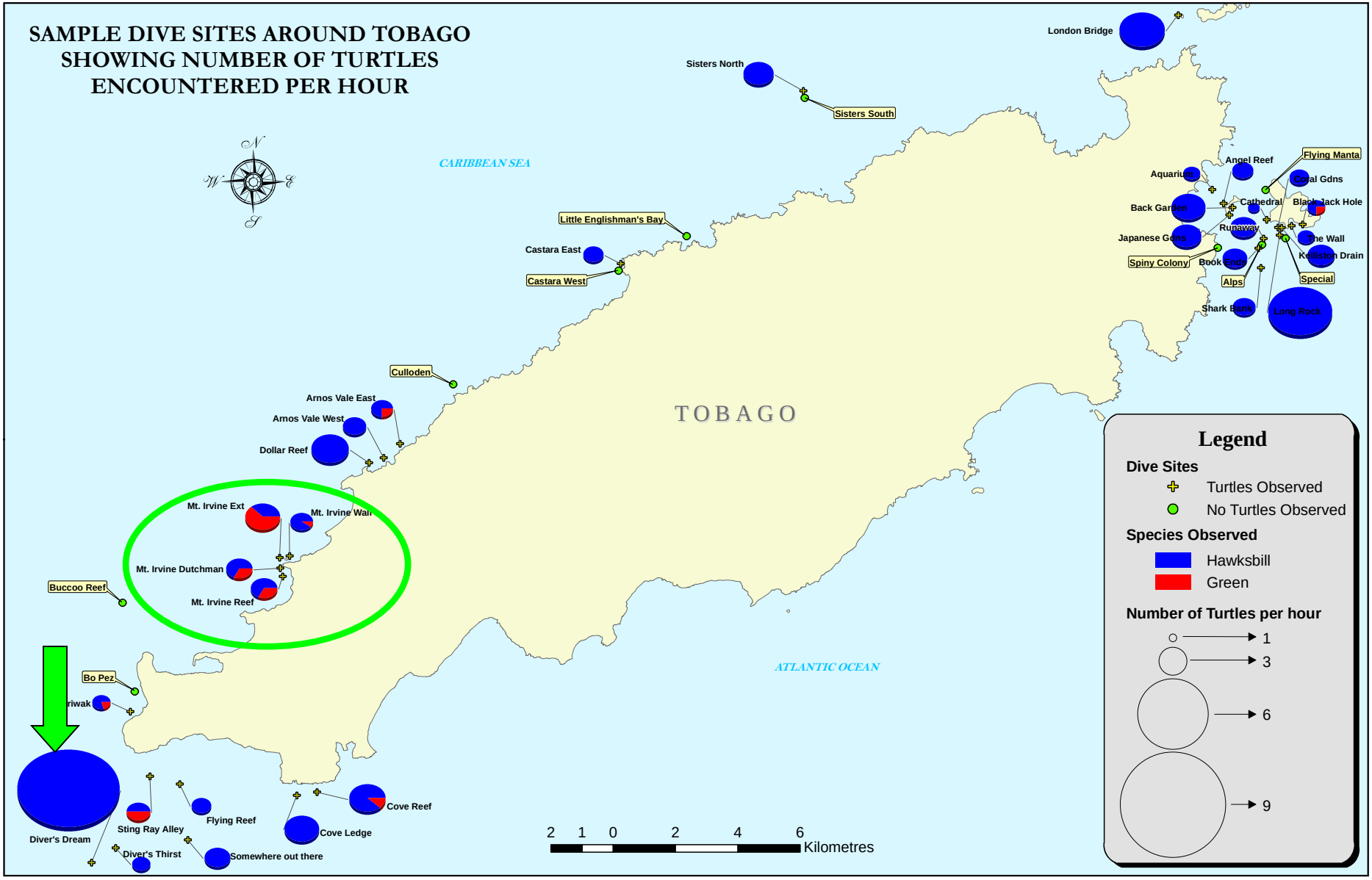
DOMINANT HABITAT TYPES AT DIVE SITES AROUND TOBAGO

- 235 dives (187.5 hours)
- 41 dive sites
  - 17 sites on leeward, 24 on windward
  - 7 rock, 13 sponge, 21 coral
- 130 encounters on 93 dives



Turtle distribution and abundance

- A total of 130 turtle encounters (sightings) were recorded on 40% of dives (111 hawksbills and 19 greens)
- The encounter rate was 0.55 turtles per dive or 0.69 turtles per hour
- Hawksbills were widely distributed - encountered at 31 dive sites, and on 36% of all dives, and were more abundant at sponge sites
- Greens were encountered at only 9 dive sites, and on 7% of all dives


SAMPLE DIVE SITES AROUND TOBAGO
SHOWING NUMBER OF TURTLES
ENCOUNTERED PER HOUR
CARIBBEAN SEA
ATLANTIC OCEAN
TOBAGO
London Bridge
Sisters North
Sisters South
Little Englishman's Bay
Castara East
Castara West
Culloden
Arnos Vale East
Arnos Vale West
Dollar Reef
Mt. Irvine Ext
Mt. Irvine Wall
Mt. Irvine Dutchman
Mt. Irvine Reef
Buccoo Reef
Bo Pez
Diver's Dream
Sting Ray Alley
Flying Reef
Cove Reef
Cove Ledge
Diver's Thirst
Somewhere out there
Angel Reef
Flying Manta
Aquarium
Coral Gdns
Back Garden
Cathedral
Black Jack Hole
Runaway
Japanese Gdns
The Wall
Spiny Colony
Book Ends
Kelliston Drain
Alps
Special
Shark Bank
Long Rock
2 1 0 2 4 6 Kilometres
Legend
Dive Sites
Turtles Observed
No Turtles Observed
Species Observed
Hawksbill
Green
Number of Turtles per hour
1
3
6
9

Conclusions

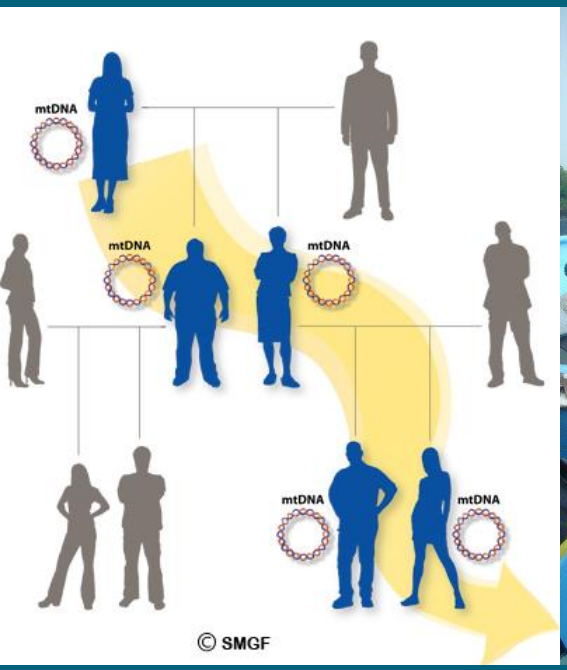
- Important developmental habitat; presence of mature turtles may be related to mating activity, prior to and during the nesting season
- Hawksbills most abundant at sponge dominated sites; suitable foraging habitat for hawksbills extends far beyond fringing reefs
- Site with greatest hawksbill abundance had numerous rock ledges which may offer abundant assisted resting places and/or refuges from predators at a shallow depth
- Greens not restricted to seagrass, but found on coral reefs – they may play an important role by grazing on algae

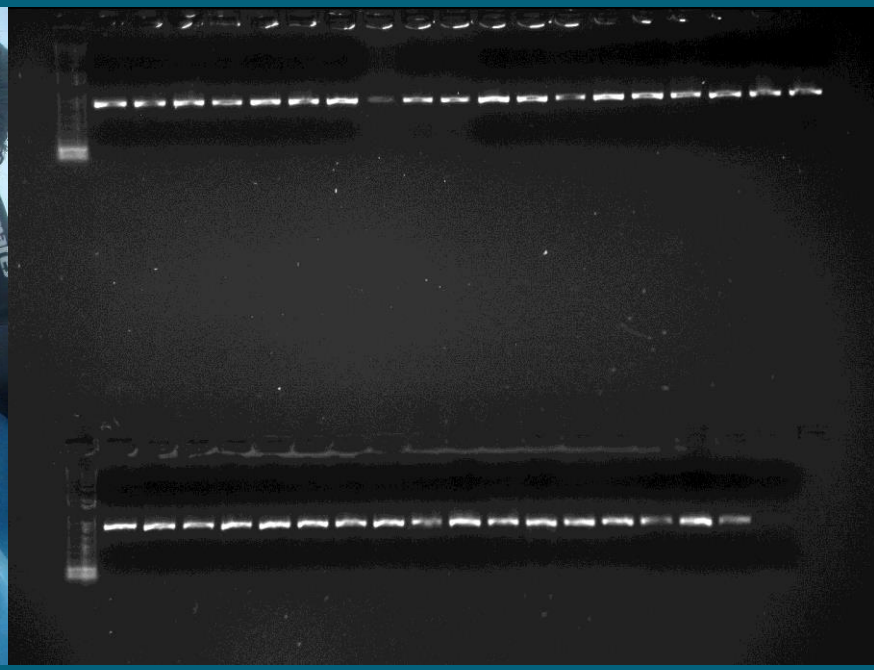

Photo by Sebastian Schmidt-Roach

PhD Research - Objective #2

Identify linkages among Tobago's hawksbill rookery and foraging ground and regional populations/aggregations

- Mitochondrial DNA (mtDNA)control region survey and mixed stock analysis (MSA)





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TCTGACCTAAAACATAAAATTATTGGTTTTACATAAACTGTTTAAACTACATGACTATTATACAGGTAATAAGAATG
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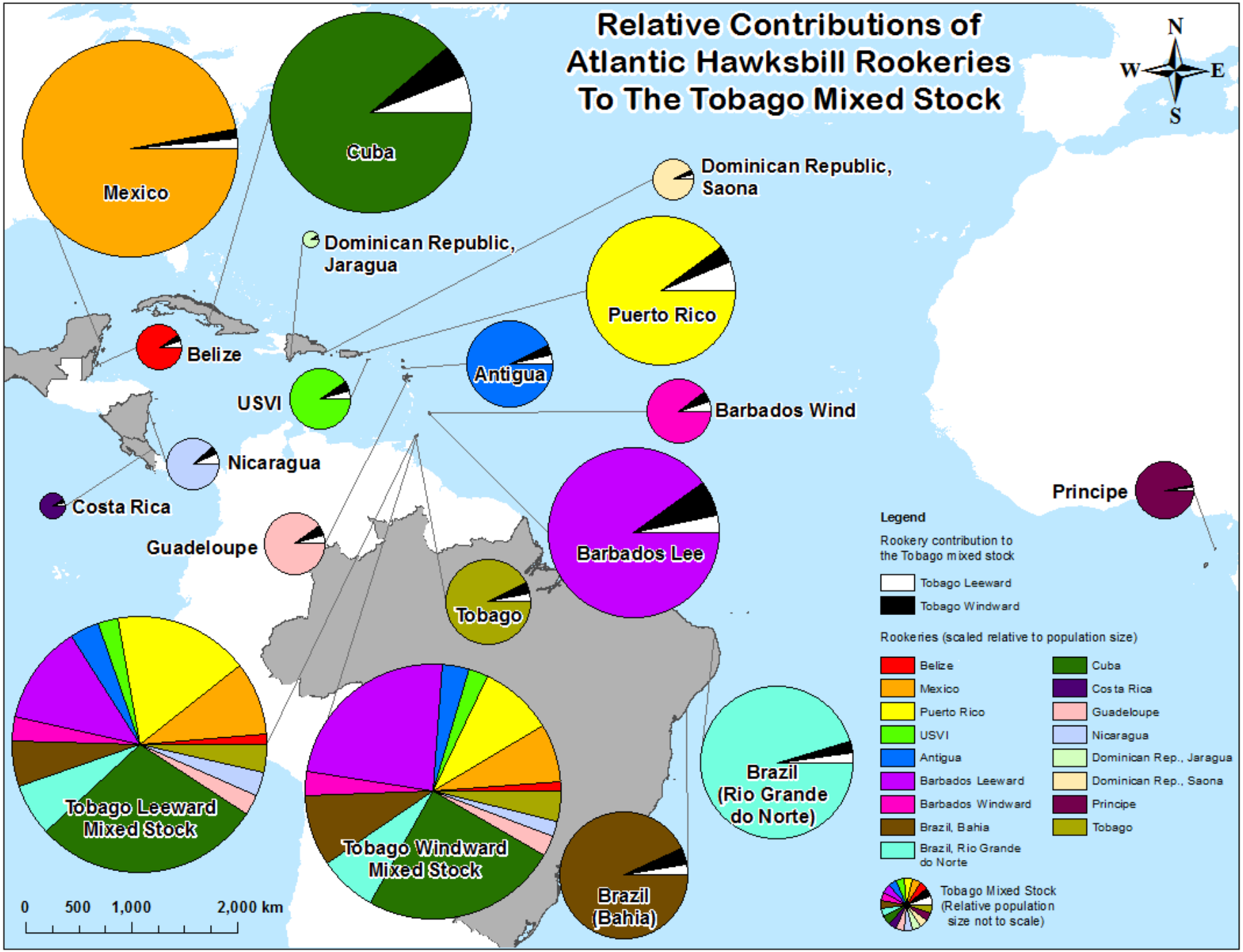
GCTCATCACGAG


Relative Contributions of
Atlantic Hawksbill Rookeries
To The Tobago Mixed Stock
N
W
E
S
Mexico
Cuba
Dominican Republic,
Saona
Dominican Republic,
Jaragua
Puerto Rico
Belize
Antigua
USVI
Barbados Wind
Nicaragua
Costa Rica
Principe
Guadeloupe
Barbados Lee
Tobago
Tobago Leeward
Mixed Stock
Tobago Windward
Mixed Stock
Brazil
(Rio Grande
do Norte)
Brazil
(Bahia)
0
500
1,000
2,000 km
Legend
Rookery contribution to
the Tobago mixed stock
Tobago Leeward
Tobago Windward
Rookeries (scaled relative to population size)
Belize
Mexico
Puerto Rico
USVI
Antigua
Barbados Leeward
Barbados Windward
Brazil, Bahia
Brazil, Rio Grande
do Norte
Cuba
Costa Rica
Guadeloupe
Nicaragua
Dominican Rep., Jaragua
Dominican Rep., Saona
Principe
Tobago
Tobago Mixed Stock
(Relative population
size not to scale)

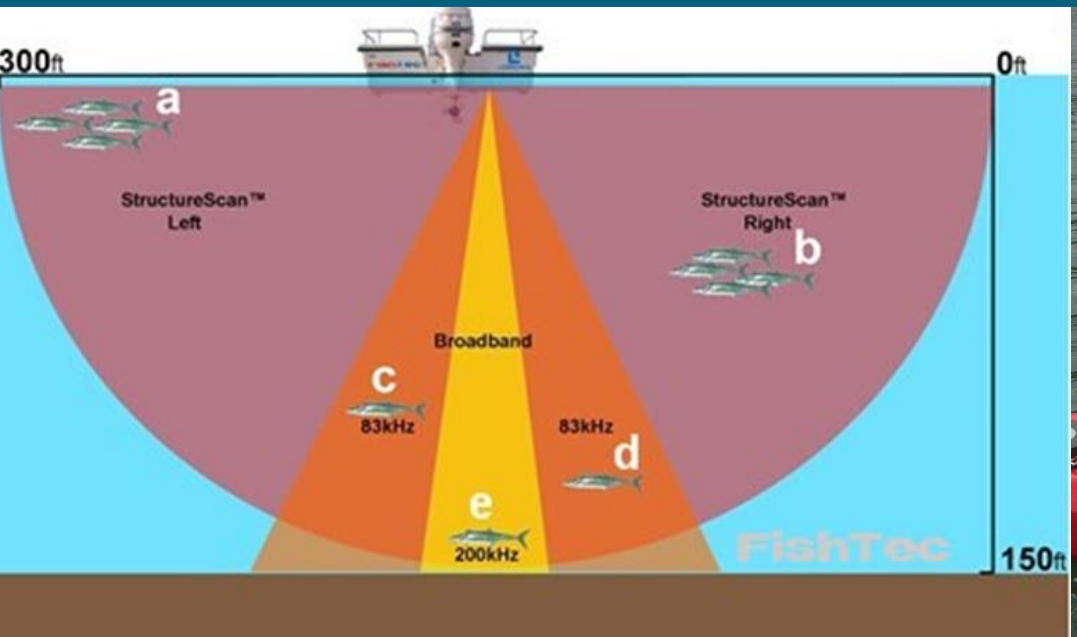
Other studies on foraging turtles

Turtle Village Trust

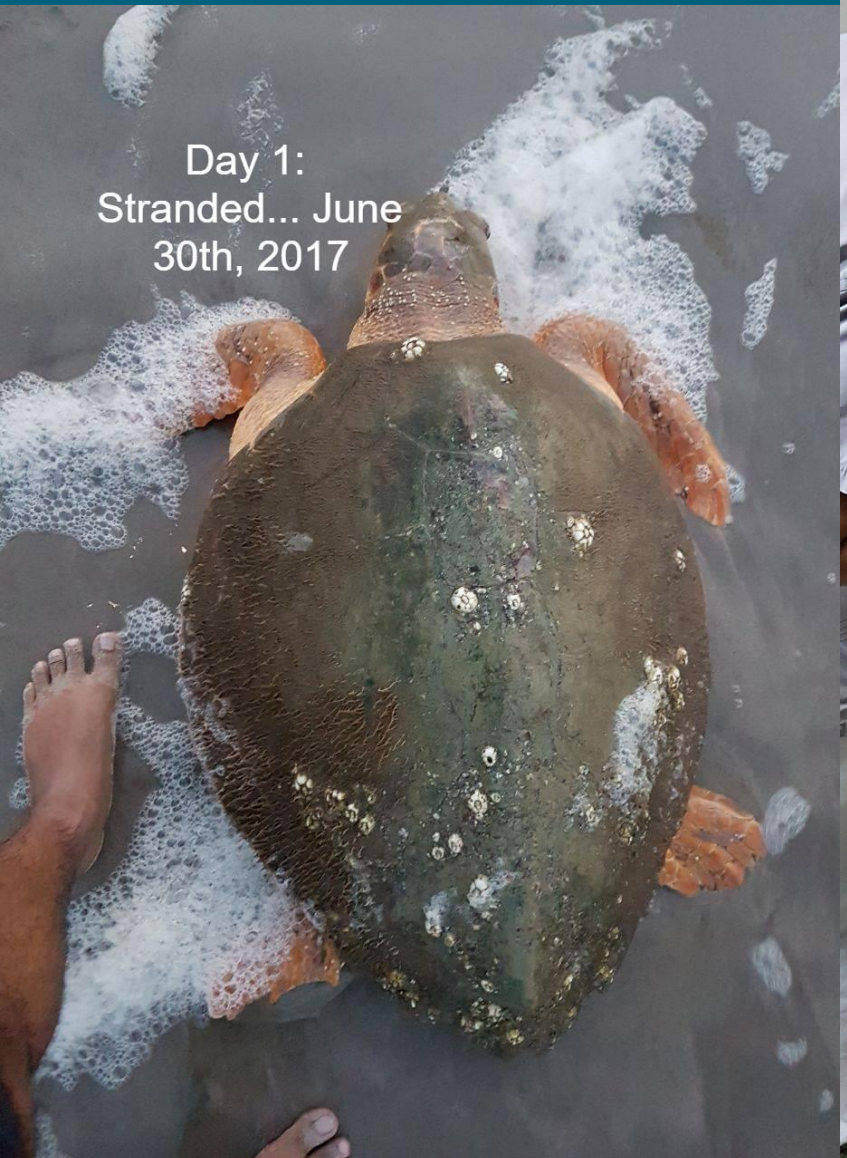
- 6 month pilot project in 2009 (during my time as Turtle Conservation Officer)
  - In-water study using SCUBA – tagging and collection of tissue samples that were contributed to my PhD research
  - Kayak surveys at seagrass beds
- ERIC (Environmental Research Institute Charlotteville) was engaged in 2017 – in-water study using SCUBA – some new dive sites captured
- GRNTGA (Grande Riviere Nature Tour Guide Association) engaged in kayak surveys
- Some attempts at netting

Side Scan Sonar – Ryan Mannette

- SSS is capable of detecting marine turtles
- Not reliable with model used under these test conditions
- Better suited for deeper water and calm conditions
- A higher resolution SSS or different type of Sonar may be more effective



Sammy the loggerhead




McGyvering
it... Work with
what ya got!


Wonderful
volunteers!


10 weeks later-
Completely submerged
and resting comfortably
at full depth...
September 6, 2017

www.turtlevillagetrust.org/map

What next?

Citizen science – dive shops

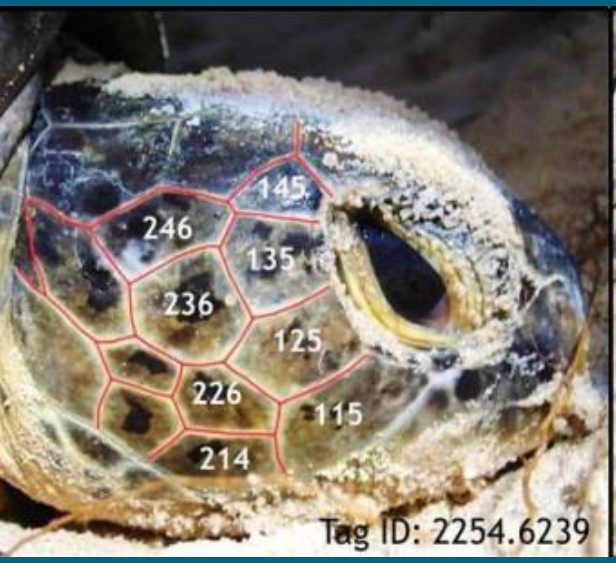
- A lot of resources required to monitor turtles at sea and a lot of dives required to gather enough data to be useful
- Dive shops each engage in hundreds of dives per year – this adds up and could be a great source of data
- Important to gather data on **effort** - Ideally dive shops should report ALL dives, and ALL turtle encounters (maybe other rare species too)

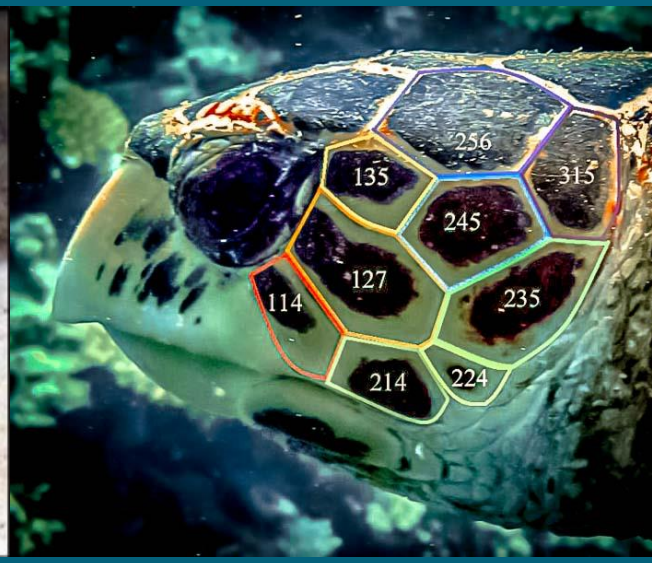
How can we get dive shops to participate:

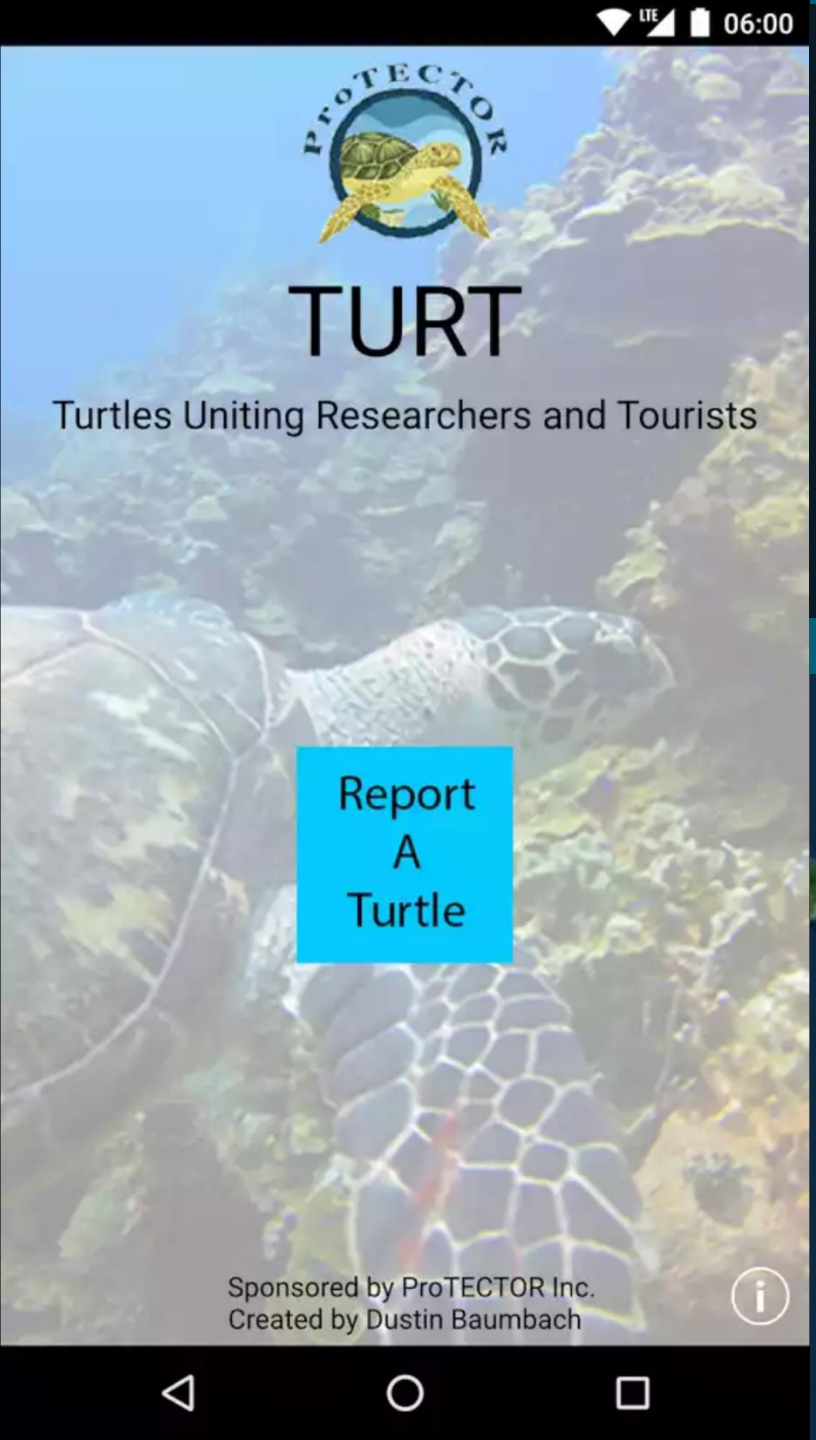
- Make it easy to participate
- Target their customers to complete the data logs
- Incentives – branded programme with materials for their shop; recommend participating dive shops to SOS' followers

Citizen science:
Photo ID and TURT mobile app

- Divers and others can use “TURT” mobile app to submit photos that can be used to ID individual turtles (“Individual Identification System (I3S)” Software)






06:00
ProTECTOR
TURT
Turtles Uniting Researchers and Tourists
Report A Turtle
Sponsored by ProTECTOR Inc.
Created by Dustin Baumbach


Marble Island
Rocky Mountain High
South St. Giles (St. Giles Drift)
Long Rock
Sisters South
Charlotteville (Man-O-War Bay)
Sleeper
Parlatuvier
Flying Manta (Cathedral)
Tokyo Drift
Belmont Bay
Englishman's Bay
Shark Back
Rock Garden
Castara
Spiny Colony
Celery Bay
Inner Space
Cotton Bay (Big Bay)
Tobago
Argyle
Plymouth (Back Bay)
Tobago
Turtle Beach
Back Bay (Mt. Irvine)
Goodwood (Goldsborough Bay)
Grange
Buccoo Channel
Buccoo Bay
Hope
Studley Park (Fort Granby)
Pigeon Point
Minister Bay (Big Bacolet)
Coco Reef
Tobago
Sandy Point
Little Rocky Bay (Lambeau)
Flying Reef
Cove Reef
Lambeau (Magdalena Grand)
Somewhere out there


Mission
Marianne
Macqueripe
Sena
PORT OF SPAIN
San Juan
Matura
Arima
Sangre Grande
Fishing Pond
Chaguanas
TRINIDAD AND TOBAGO
Cocos Bay (Manzanilla)
San Fernando
Mayaro Bay
Point Fortin

Netting and acoustic tracking

- Target juvenile greens in shallow seagrass habitat
- Monitor movements to examine habitat use and home range
- Allow for tracking growth and collecting samples to monitor health, conduct genetic analysis to identify regional linkages

Fig. 3. (a) (i) and **(ii)** Juvenile green sea turtle (*Chelonia mydas*) that stranded in Chaguaramas (Case 1). **(b)** Juvenile green sea turtle (*Chelonia mydas*) that stranded at Moruga (Case 3), **(i)** dorsal view with GPS unit for scale **(ii)** view of ventral surface **(iii)** dorsal view of head, neck and fore flippers.

Fibropapilloma

- Cazabon-Mannette and Phillips. 2017. "Occurrence of Fibropapilloma Tumours on Green Sea Turtles, *Chelonia mydas* in Trinidad, West Indies". Living World 2017
- Cases on west, east and south coasts of Trinidad
- Since then, one case in Tobago (photo evidence)

THANK YOU!

SAVE OUR SOS SEATURTLES
TOBAGO W.I.

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