



KEY MARINE SPECIES AT THE LIGHTHOUSE REEF ATOLL:  
BLUE HOLE & HALF MOON CAYE NATURAL MONUMENTS

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Biologist

## BAS

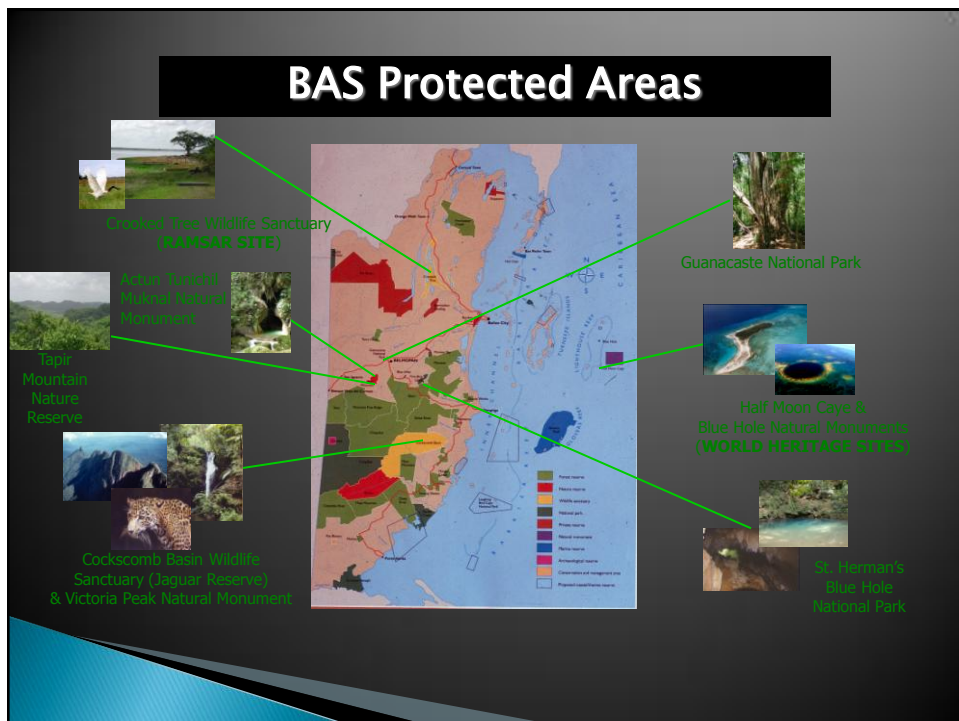
**“The Belize Audubon Society is a non-governmental membership organization dedicated to the sustainable management of our natural resources through leadership and strategic partnerships with stakeholders in order to create a balance between people and the environment”**

## Brief History

1969– Formed as a foreign chapter of the Florida Audubon Society

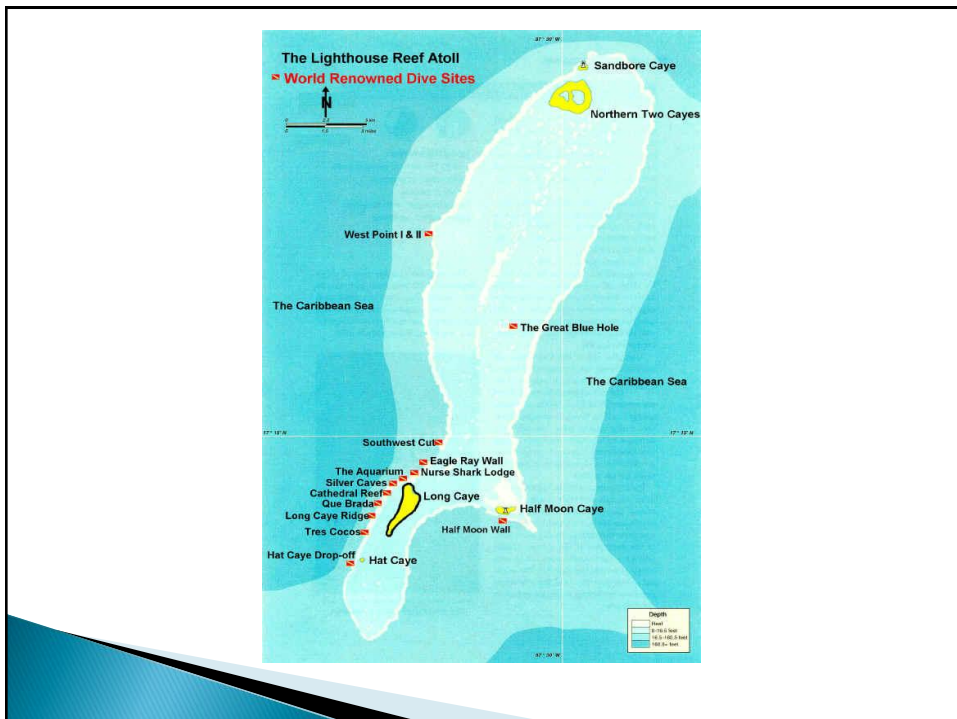
1973: Affiliated with The National Audubon Society of the USA and became completely independent

The Belize Audubon Society now manages 9 protected areas on behalf of the Government and people of Belize. These 162,000 acres cover the majority of ecosystems within Belize.



## BAS Research/Monitoring

- ▶ Long term monitoring program since 2008.
- ▶ Marine species native to BHNM and HMCNM.
- ▶ Long term data collection has assisted in determining the health and conditions of MPAs
- ▶ Helps in determining their strengths and weaknesses in the proper management of the MPAs.



## HMC & BH



## Species

- ▶ Nassau Grouper SPAGs
- ▶ Seagrass Monitoring
- ▶ Conch Monitoring
- ▶ Lobster Monitoring
- ▶ Coral Bleaching Monitoring
- ▶ Sea turtle Monitoring at HMC

## Nassau Grouper SPAGs

- ▶ Conducted at ‘Sandbore’
- ▶ Population Counts carried out during December, January and February.
- ▶ Early morning and late afternoon dives
- ▶ Species identified, behavior recorded, count estimated



## Results

- ▶ Reef Fish Spawning Aggregation Monitoring Protocol for the Mesoamerican Reef and Wider Caribbean.

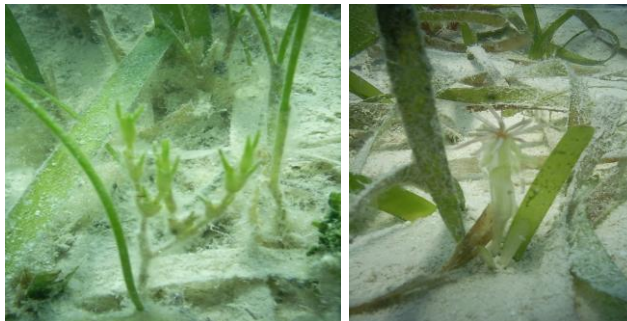
Site	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sanbore	1,800	2,500	1,800	1,205	1,495	1,250	2,050	2,000	1,300	1,350

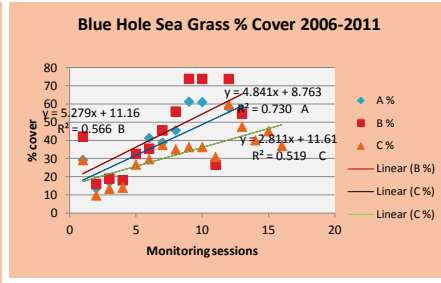
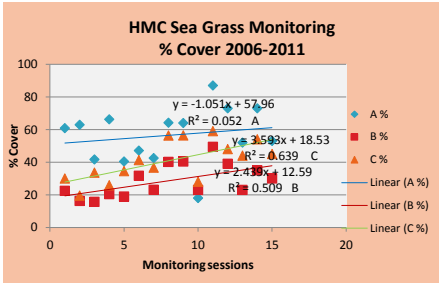
## Seagrass

- ▶ 2 seagrass sites are monitored: BHNM (4m) and HMCNM (2m)
- ▶ *Thalassia testudinum* (Tt, Turtle grass) and *Syringodium filiforme* (Sf, manatee grass), and *Halodule wrightii* (Hw, shoal grass).
- ▶ Monitoring is carried out using the SeagrassNet Caribbean Monitoring Protocol.
- ▶ Each site is monitored four times per year. Parameters monitored include total percent cover, species percent cover, canopy height, grazing evidence, presence of flower or fruit count by species and leaf biomass.

## Results

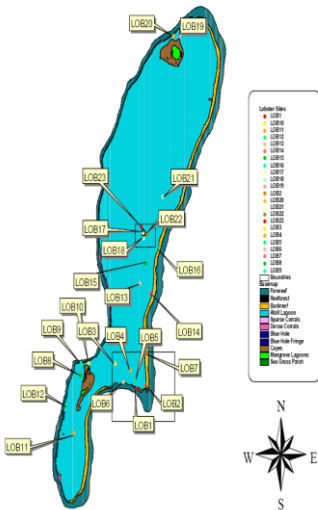
- ▶ Flowering period of *Syringodium filiforme* as November–August, with a peak in May and gradual decline to in August.
- ▶ Flowering period of *Thalassia testudinum* as May–August.
- ▶ No flowering period has been identified for the *Halodule wrightii*.





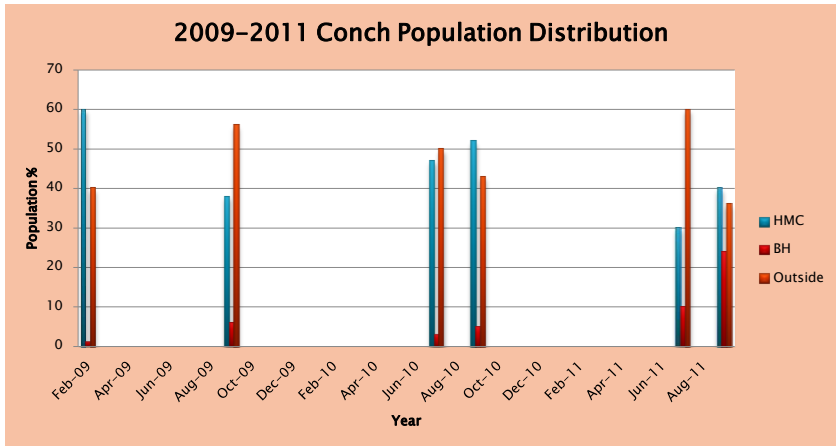
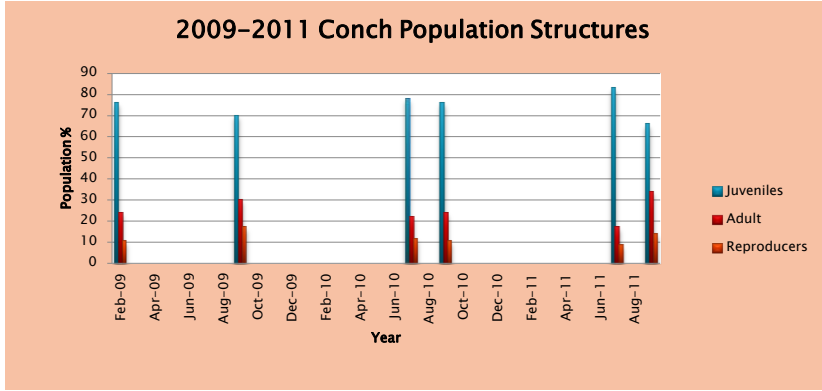
Seagrass % Increase Over 6 years			
	A	B	C
HMC	-7	7.6	15
BH	14.8	-1	8

# Conch Monitoring

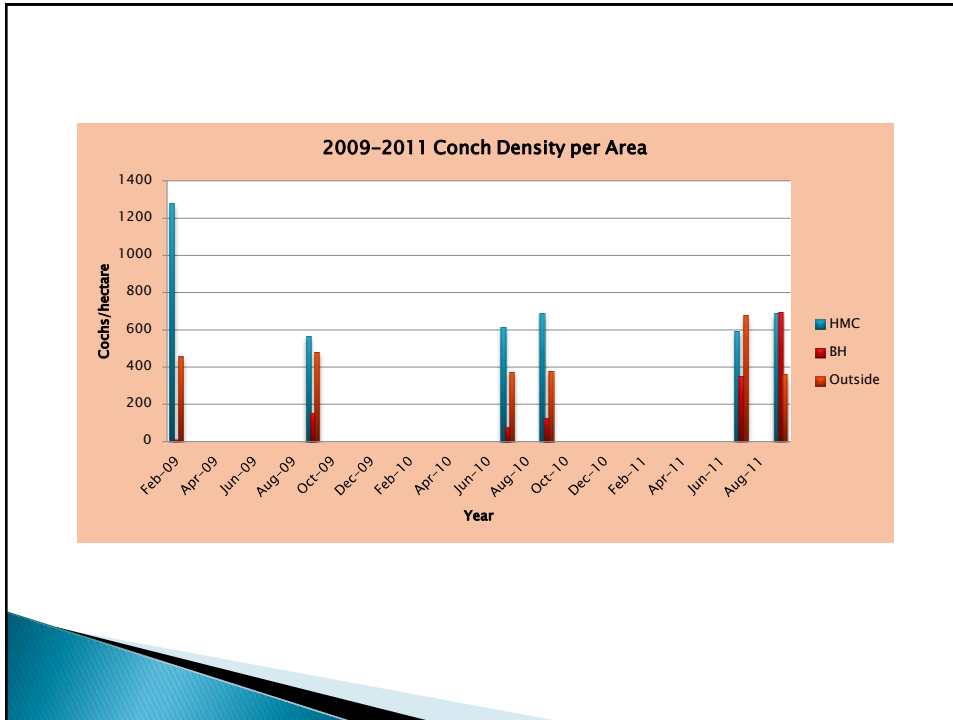


- ▶ Conducted using the LAMP Protocol.
- ▶ At 23 predestinated sites through out the LHRA.
- ▶ 7 sites= HMC, 4 sites= BH, and 12= Outside both Protected Areas.
- ▶ The monitoring is conducted every year just after the closing of the season in July (July 1<sup>st</sup>-September 30<sup>th</sup>) and immediately before the opening of the season in September (October 1<sup>st</sup>-June 30<sup>th</sup>)

# Results





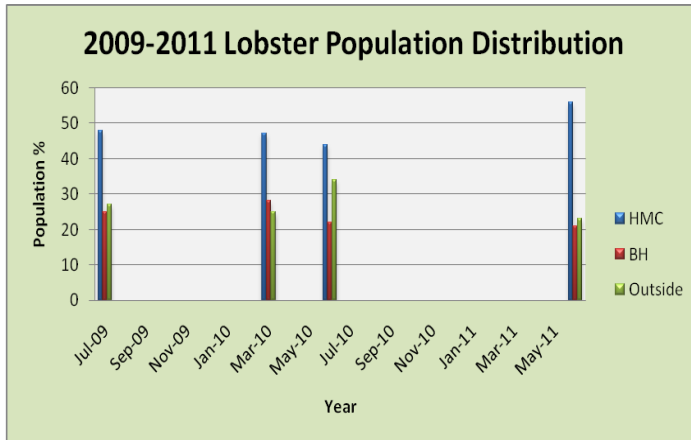
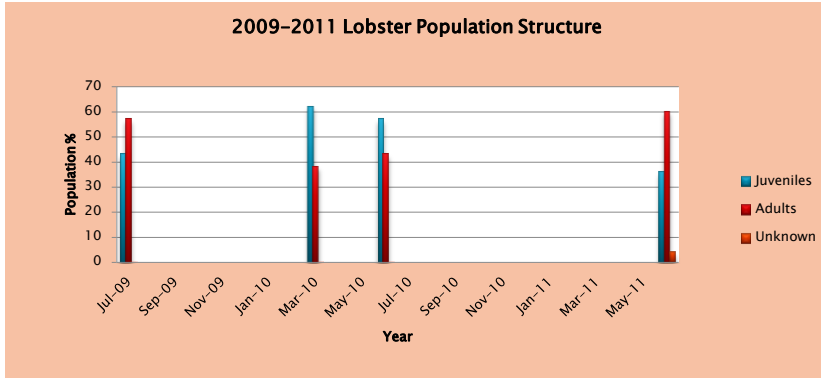


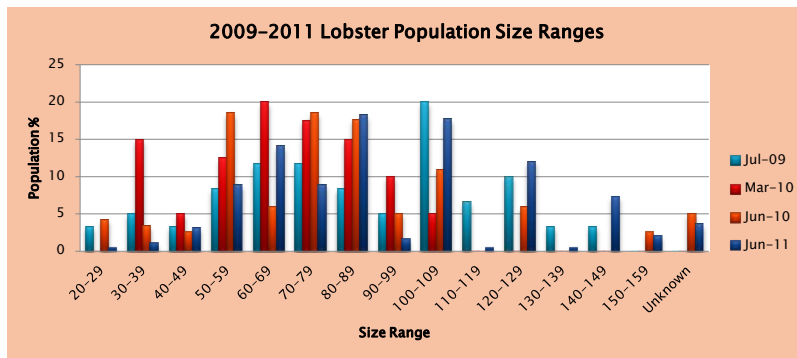
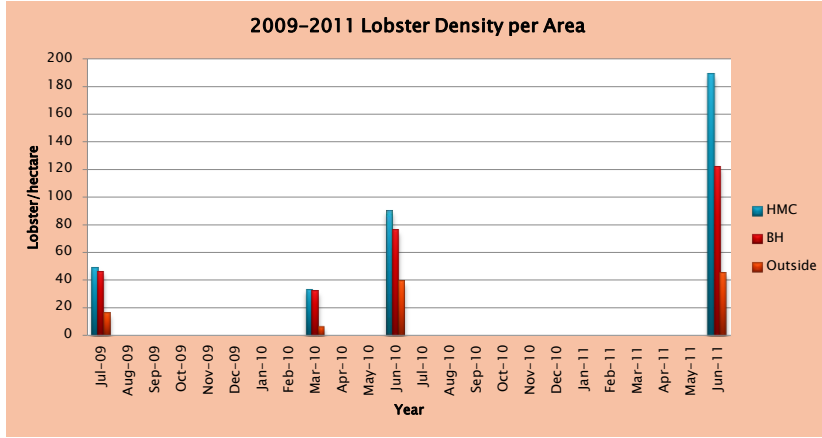
## Lobster Monitoring

- ▶ Conducted using the LAMP Protocol.
- ▶ The monitoring is conducted every year in March just after the closing of the season (February 15–June 14) and in June immediately before the opening of the season (June 15–February 14).

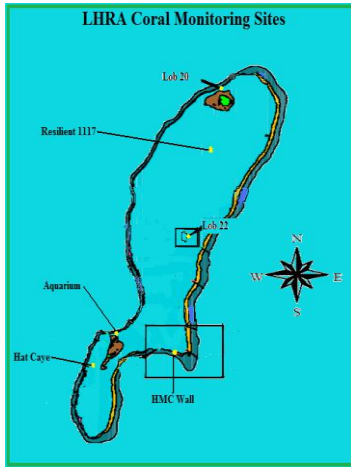


# Results





# Coral Bleaching Assessments



▶ Weighted-bar Swimming transect (WBST) Method for Assessing the Extent of Coral Bleaching and Disease Incidence by Mcfield 1999 and later modified by Kramer & Kramer 2000.

## Results

### 2011 General Coral Bleaching Report for LHRA

Pale	3.36%
Partly Bleached	2.33%
Wholly Bleached	1.31%
Not Bleached	92.99%

Disease Infestation	2.99%
Recent Mortality	0.00%
Old Mortality	2.02%

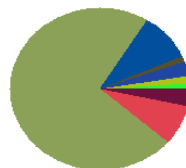
#### 2011 LHRA Disease Incidents

BB: Black Band	0.11%
WB: White Band	0.23%
WS: White spots, patches or pox	2.17%
WP: White plague	0.28%
YB: Yellow blotch (or Yellow band)	0.03%
RB: Red Band	0.08%
DS: Dark spot disease	0.05%
UK: Unknown	0.03%

### BLEACHING COMPOSITION



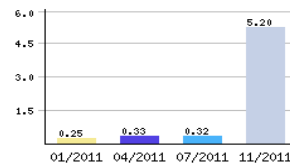
### DISEASE INCIDENTS



### 2011 Bleaching Incidents at LHRA

Date	01/2011	04/2011	07/2011	11/2011
Bleaching Incidents	0.25%	0.33%	0.32%	5.20%

### BLEACHING COMPARISON



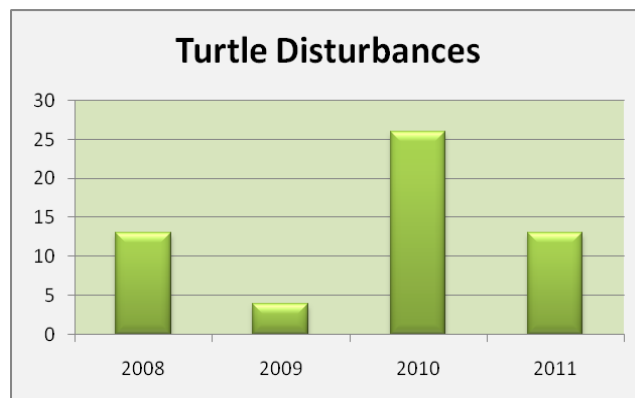
## Turtle Monitoring

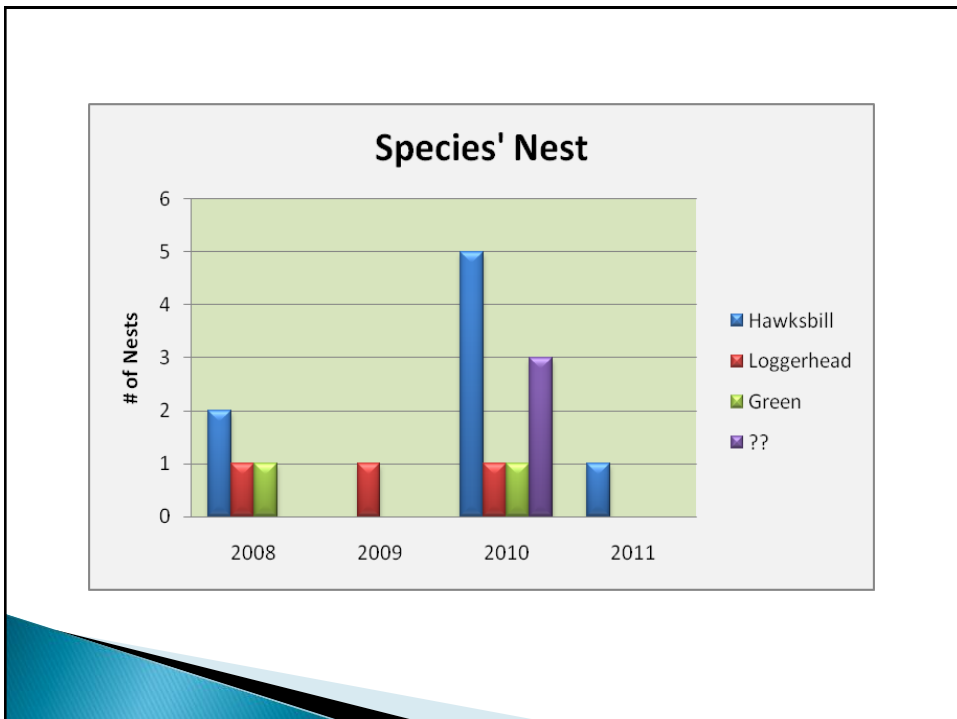
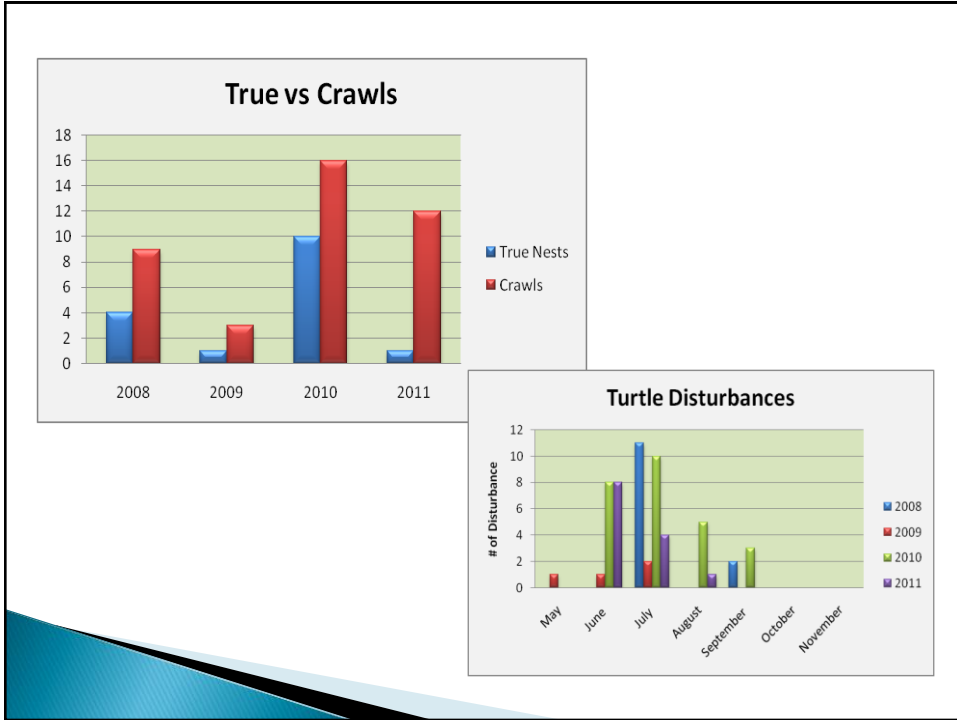
- ▶ Adopted in 2008 from the Research and Management Techniques for the Conservation of Sea Turtle, IUCN Marine Turtle Specialist Group 1999.
- ▶ Program runs from June to November.
- ▶ Nesting activity and hatchling activity are documented: Includes nest counts, species identification, clutch size and hatchling success.
- ▶ The monitoring program has two sections namely: a nesting period and a hatching period.



## Results

- ▶ 3 Species: Hawksbill, Loggerhead, & Green





## Threats

- ▶ Awareness
- ✓ Harvesting of turtles & eggs
- ✓ By-catch
- ▶ Climate change
- ✓ Often-stronger storms
- ✓ Nesting grounds loss-erosion of beach
- ✓ Deposition of debris/coral rubble on beach
- ✓ Incubation temperature changes-heavy rains





## Turtle Protection!!!!



Our Responsibility!!!!