Department of Environment
Marine Research News
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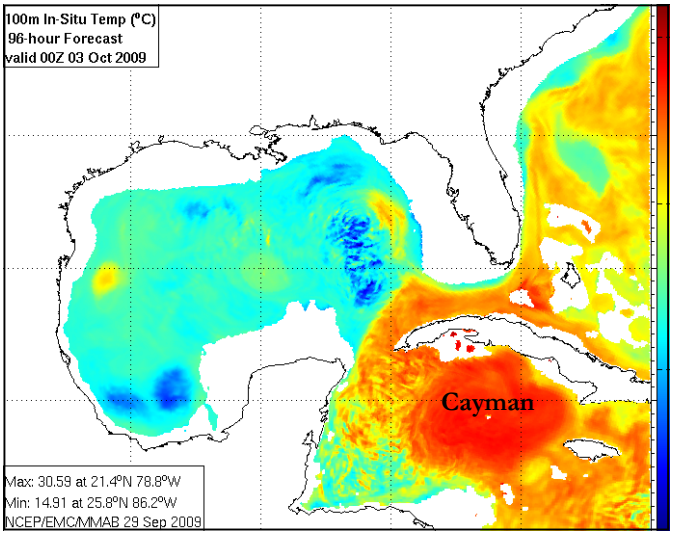
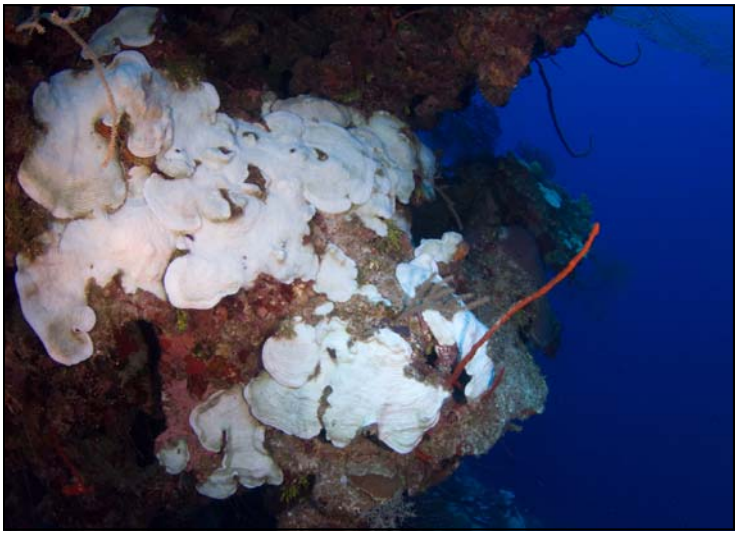
Cayman coral bleaching

The Cayman Islands have just experienced a severe coral bleaching event. Water temperatures rose above 30° C (86°F) for more than 6 weeks—and by the time sea temperatures began to cool (20 October) 99% of corals on shallow reefs and the deep wall showed signs of bleaching (colonies pale, partially bleached, or fully bleached).



Sea temperature hotspot around Cayman Islands (red shows high temperature, more than 30°C). Map: NOAA.



Bleached corals on North Wall, Grand Cayman, caused by high sea temperatures. Photo: Patrick Weir.

DoE diver records the incidence of coral bleaching and disease

DoE monitoring

Coral bleaching typically occurs during periods of high sea temperature, when the tiny algae cells (called zooxanthellae) which live within the tissues of corals are killed or expelled from their hosts. By photosynthesizing, zooxanthellae provide energy for corals and also give them their color. Thus, when zooxanthellae are lost, corals "bleach" a bright white.

While coral colonies can recover from short-term bleaching events (by taking in new zooxanthellae after sea temperatures cool), bleaching weakens corals and makes them more vulnerable to disease. In order to assess the effects of the current coral bleaching event, DoE is surveying reefs around Grand Cayman, using sites and techniques which are part of our routine reef monitoring program. We will repeat transect surveys at regular intervals to track mortality or recovery from bleaching and detect any increases in the incidence of coral diseases.

What can be done?

Healthy reefs are more resilient to stresses such as bleaching. Protecting our reefs from threats such as sedimentation, anchor damage, nutrient enrichment, and overfishing will help them survive bleaching events.

The Cayman Islands are also participating in the global effort to reduce climate change. For more information on the work of the Department of Environment Sustainable Development Unit see our department website: *http://www.doe.ky.*

In this issue...

DoE turtle nesting beach monitoring

2009 'turtle walking'

The 2009 sea turtle nesting season has just been completed, with DoE staff and dedicated volunteers surveying Cayman's beaches four days per week from May to September. When a potential nest is located, we determine the species of turtle by examining tracks left in the sand, confirm the presence of eggs, and GPS and triangulate the exact location. This allows us to evaluate abundance and distribution of turtle nesting and return to check nests when they are due to hatch. For more information on our turtle program (and how to volunteer) see us on YouTube, *http://www.youtube.com/watch?v=zzIur7CD5wg.*

Green turtle track, Seven Mile Beach. Photo: Lisa Hernandez

Triangulating the position of a nest (three precise measurements cross over the egg chamber, allowing it to be relocated). Photo: Mark Orr

Nests now hatching

In addition to determining population trends, it is important for us to locate nests to protect them from threats, especially when they hatch. Baby turtles dig their way out of their nests at night and scurry down the beach — crawling toward the brightest horizon, which on a natural beach should lead them to the sea. Lights near a beach can lead baby turtles toward parking lots and roads, so DoE works with beachfront property owners and others protect nests and make Cayman's beaches more turtle-friendly.

After the nests found in our surveys hatch we count the number of egg shells (hatched eggs) left behind and examine all unhatched eggs to determine hatch success and fertility. Fertility could drop due to low turtle population sizes but results from the past eleven years of DoE turtle monitoring are encouraging: while our turtle populations are still critically small, more than 80% of eggs are fertile. This indicates that with sufficient protection our wild turtle nesting populations can recover (and indeed an overall upward trend has been observed in recent years).

Green turtle hatchlings on Seven Mile Beach. Photos: Mark Orr (above) and Janice Blumenthal (inset)

DoE conch survey

Student helps measure a conch. Photo: DoE

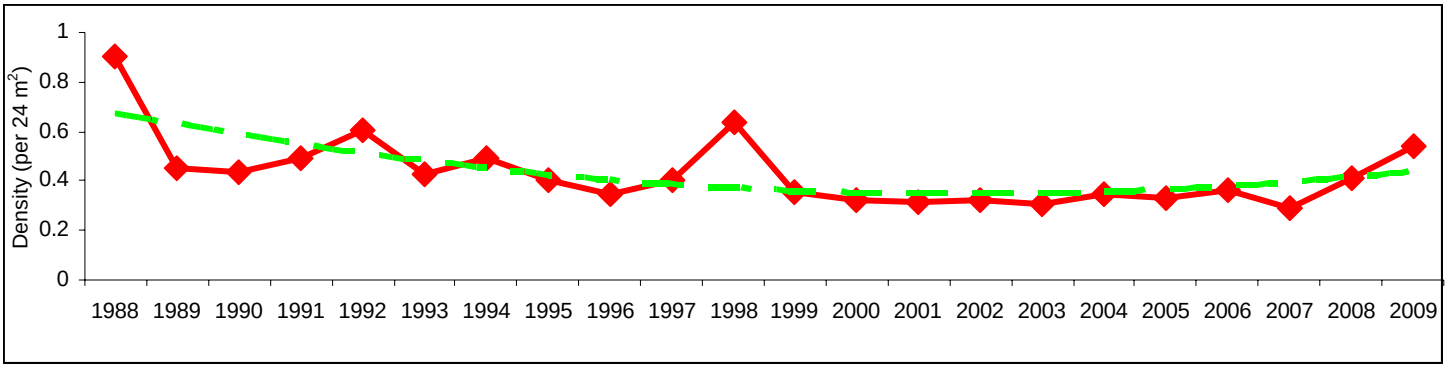
2009 survey

Between June and August of this year the Department of Environment conducted our annual conch survey. During the survey we sampled over 920 transects within the shallow sounds of Grand and Little Cayman, in both protected areas and open zones. We used small boats and snorkel gear to carefully survey these transects (an area the size of four American football fields)—counting and measuring all conch and recording habitat types in order to determine abundance, distribution, habitat use, and trends for Cayman conch populations.

Staff member with two meter pole (above), used to measure distance along transects (inset). Photos: DoE

Conch survey—21st anniversary!

DoE's conch survey has been conducted every year since 1988. Density of conchs decreased between 1988 and 2003 but recently seems to have stabilized and may be increasing. However, we must be cautious in interpreting data: there are natural peaks and valleys in conch numbers and we will have to wait and see if the recent upward trend continues into the future. By looking at too short a time frame, or ignoring earlier, larger decreases in density, a small increase could be mistaken for real population recovery. Management is also complex: changes in Cayman's human population size and economic situation can influence pressures on conch populations (e.g. by determining numbers of conch taken legally and illegally each year).



National yearly average conch densities, 1988-2009. Red line: density. Green line: trend

DoE sighting program — highlights

The DoE sighting program has gotten off to a great start, with more than 80 sightings of whales, dolphins, sharks, manta rays, adult turtles, and other large marine animals reported to date. Recently we've seen several rare deep water creatures near our shores: first a baby sperm whale which stranded in Little Cayman and then a giant squid which was discovered floating at the surface off Grand Cayman.

Baby sperm whale. Photo: Cayman Free Press.

Baby sperm whale

In June 2009, a dead sperm whale washed onto a reef in Little Cayman. Female sperm whales reach maturity at about 30 ft and males at about 60 ft. The stranded animal was nearly 20 ft long but examination of the teeth showed that they were small and rounded, indicating that the animal was a nursing male calf rather than a nearly adult female. Adult sperm whales are occasionally seen migrating through Cayman's offshore waters — where they likely dive to depths of several thousand feet in search deep sea squid and other prey.

Giant squid

This 6 ft squid was discovered by Dennis Denton, Stuart Mailer, and M. Christine RoseSmyth-Mailer while deep sea fishing off Rum Point. It is only the 5th of the species ever to be found in the Atlantic. Researchers from the Smithsonian Institute and University of South Florida have expressed great interest in examining and dissecting the squid (which is now preserved at DoE) as almost nothing is known about these rare deep water creatures.

Deep sea squid. Photo: Dennis Denton

Please report <u>your</u> sighting: DoE@gov.ky or 949-8469

DoE asks the public to report sightings of whales, dolphins, sharks, large turtles (>3 ft shell length), manta rays, and other large marine animals to our sightings database! Where possible, please include photos.

Coming soon...

- ***Deep Sea Research.*** A research vessel is currently on a mission to search for life in the deep sea around Cayman, using a remote operating vehicle to dive more than 4 miles below the surface. You can track the journey online at *http://oases-expedition.blogspot.com/*
- ***Mammal and shark surveys.*** DoE and visiting experts are surveying Cayman waters for large marine animals, including sharks and marine mammals. See upcoming newsletters for details.
- ***DoE's "Environment Break"*** is live on CITN and online via *http://www.cayman27.com.ky./news/daybreak*. See upcoming features on the coral bleaching and other topics.
- ***For more information*** on ongoing and upcoming projects, visit our website at *www.DoE.ky*.