Flag report

Background

Climate change and environmental pressure are having drastic impact on coral reefs worldwide. Thermal and pH stress combine with infections to kill this, the most diverse and productive ecosystem in the ocean.

The challenge today is to understand what is happening. This requires rapid and widespread assessment of the health of coral reefs. Reef assessment currently is labor intensive, requiring the efforts of many people and much time.

Project overview

Can we assess the health of a coral reef by listening to it? Early research suggests this is possible.

We deployed a hydrophone over a number of reefs to record the natural sounds. Then we dove the reefs to assess their health using photography and observation/measurement. The goal was to collect data from several reefs of varying health to better understand how sounds relate to health.

Research to date has shown that both the volume of sound and the frequencies of the sound reflect the health of coral reefs. This research technique has been tested in only a few locations worldwide. The expedition is expanding the geographic coverage and attempting to formulate new testing protocols that will radically speed up reef assessment.

Project objectives:

The objective is to test and evaluate creative approaches to determining the health of coral reefs. This involves recording sounds generated on coral reefs and SCUBA divers making observations of coral health and reef inhabitants.
Curacao Reef Acoustics Expedition
Ed Sobey, PhD.

Project participants

Fourteen people joined the expedition. Seven are members of The Explorers Club:

- Ed Sobey, PhD, Leader
- Charles Carmona, Chair Southern California Chapter
- Brenda Powel, MD
- George Weghorst, MD
- Barbara Berg, Dive Master
- Denéa Buckingham, Dive Master
- Keith McBride, Dive Master
Project methods:
We used the facilities and support provided by the Caribbean Marine Biological Institute on Curacao, a Dutch Caribbean island. Over one week we made a series of SCUBA dives to record acoustic signatures of reefs, visual observations of reef health, and measurements of healthy and un-healthy coral.

Acoustic recordings were made by lowering a hydrophone directly over coral reefs from the surface. A swimmer maneuvered a float bearing the sound recorder, hydrophone, and 65’ of wire. Twenty recordings were made on seven reefs.

SCUBA divers dove on the reefs to observe and record the numbers of specified reef species and to assess the percentages of diseased and dead coral.

Project results:
Analysis of the data is on-going. Two specific thesis are being investigated:

1. Is there a correlation between the shape of the soundscape spectrum and the health of the reef? In one earlier study the acoustic spectrum of a healthy reef differed substantially from that of a nearby unhealthy reef. We hope to find the same clear distinction in Curacao.

2. Can the health of a reef be determined by citizen scientists conducting visual surveys of reef inhabitants? Do the data recorded by our divers agree with previous surveys?

Project implications:
If we are able to show that listening to a coral reef provides enough information to determine its health reef health surveys could be completed much faster and more economically than they are now.
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Denea Buckingham
Participants of the Curacao Reef Acoustics Expedition
Ed Sobey swimming the recording float and hydrophone to a sampling station