



## Sensor to monitor ocean acidity helps Belize to protect its marine ecosystem



Belize has a unique coastline and marine ecosystem which includes the 300-mile Barrier Reef, described by Charles Darwin as 'the most remarkable reef in the West Indies.'

The ocean acidification sensor measures every two hours the pH (acidity), temperature, salinity and oxygen of sea water.

### CHOGM THEME

A more sustainable future

### PROJECT TITLE

Commonwealth Marine Economies programme

### COUNTRY

Belize

### IMPLEMENTING PARTNERS

National Oceanography Centre (NOC)

The coral reef is home to more than 500 fish species – including grouper, porcupine fish, tarpon, barracuda, cowfish, frogfish and yellowtail snapper. However, there are now growing concerns that increasing ocean acidification has contributed to reduced marine populations. This in turn has a knock-on effect on the fishing industry, which is an important export and foreign exchange earner for Belize. To help manage and preserve Belize's coastal waters, the Commonwealth Marine Economies (CME) programme has assisted Belize in installing a sea water acidification monitoring system. The monitoring system provides the Government with the information it needs to take action.

Evidence suggests that since records began in 1850, the acidity of the oceans has increased by 26 per cent. This is a direct result of increasing levels of carbon dioxide

(CO<sub>2</sub>) in the atmosphere from human activity. CO<sub>2</sub> alters the chemistry of the Earth's water by making it more acidic. The current increase in ocean acidity is roughly ten times faster than any time in the last 55 million years.

According to Professor Abel Carrias from the University of Belize, growing levels of ocean acidity pose a significant risk to Belize's marine ecosystem. When water acidity increases, it can also make it more difficult for calcifying organisms, such as corals, clams, mussels, lobster and some planktons to form shells and skeletons. This is of major concern to the fishing industries across the region. "Whenever fisheries collapse, those who are most affected are humans," said Professor Carrias. "Livelihoods are affected....it happened in Chile, it happened in Mexico, it happened in the United States."





Gilbert Andrews, Environmental Lab Technician & Arlene Young, Director of Coastal Zone Management Institute.

‘This... will allow Belize to implement appropriate adaptation and mitigation measures’

**Arlene Young**

Integrated Coastal Zone Management Plan due next year. This document provides recommendations on how to ensure the sustainable use of Belizean coastal resources. Information on water acidity will inform recommendations concerning future research and monitoring.

## Building capacity

The Commonwealth Marine Economies Programme, through its delivery partner, the UK National Oceanography Centre, has assisted the Belize Coastal Zone Management Authority and Institute (CZMAI) through the installation of a sensor. It can measure in real-time (every two hours) the pH (acidity), temperature, salinity and oxygen of sea water. The sensor was initially piloted in October 2019 and was subsequently installed at its permanent location near the English Caye Light, an active lighthouse on a small island off the coast in November 2019. It has been providing data for analysis since then.

‘Unfortunately, historically we have made decisions that are not based on science.’

**Professor Jair Valladarez**

Before this water monitoring capability was established, Belize relied on manual and sporadic measurements of water acidity and temperature. This meant that the country lacked the essential data it needed for policy decisions in connection with its marine environment. “We resorted to doing that simply because we did not have the capacities that a project like this Commonwealth initiative can provide,” said

Professor Jair Valladarez from the University of Belize.

In addition to essential scientific water monitoring equipment, the project has also provided training in the use and maintenance of the sensor to staff from the Coastal Zone Management Authority and Institute (CZMAI), the Belize Port Authority and the University of Belize. This project has established a solid partnership between three national institutions: the CZMAI – the owner and custodian of the sensor, the Port Authority that supports its maintenance and the University that uses the emerging data for analysis and further research.

## Robust data on ocean acidification

Data provided by the sensor will form part of the CZMAI’s broader water monitoring programme. The priority at the moment is to establish, for the first time, robust baseline information on water acidity. “We are trying to get a good baseline of pH and see whether and how it changes and the impact this might have [on the marine ecosystem],” explained Arlene Young, the Director of CZMAI. This in turn will allow Belize to implement appropriate adaptation and mitigation measures.

The baseline data on water acidity will also be used in the revision of the National

As a result of Commonwealth Marine Economies Programme Belize will be the first country in the region to report progress against *Sustainable Development Goal 14.3. Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.* “Something we should be proud of,” said Professor Jair Valladarez.



The ocean acidification sensor was placed at its permanent location in Belize in November 2019.