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Lisa Delissio
Salem State University

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Assessing and addressing global warming impacts on the Culebra archipelago

By Lisa Delissio, Ph.D., Salem State College, Salem, MA

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What do you hold dear about Culebra? If you grew up here, what memories from your childhood do you treasure? You may have snorkeled around the coral reefs, watched sea turtles nesting on the beaches, enjoyed cool evening breezes in November, or a refreshing swim in ocean in April. Perhaps you have observed the migrations of birds and butterflies. Maybe you make your living in tourism or a related industry.

Do you have, or plan to have, children or grand children? What does the future of Culebra look like for them? Will they enjoy the same way of life and have the same opportunities?

Continued heavy reliance on fossil fuels will keep the world on a high emissions pathway, and, in the consensus view of experts around the world, risk severe consequences for local and global economies and wellbeing. If emissions are reduced, however, analysts strongly believe that it is possible to dramatically improve the long-term outlook.

The Earth is already committed warming over the next few decades as the result of carbon dioxide and other emissions from recent history. The climate in the Caribbean is already changing. The air temperature in the Caribbean has increased faster than the global average. There are more very hot days, and fewer cool days or nights. Sea levels are slowly rising as the ocean warms and expands, and as ice near the Poles melts at an accelerating pace.

Last year, the Intergovernmental Panel on Climate Change (IPCC), issued a report. (The IPCC is a scientific intergovernmental body set up by the World Meteorological Organization and by the United Nations Environment Programme that includes hundreds of scientists from all over the world.) The IPCC found that Earth's climate is unequivocally warming. Moreover, they are more than 90% certain that human emissions have caused most of the increase. They also demonstrated that future warming trends depend the emissions choices that are made today.

As a small island, Culebra is particularly vulnerable to global warming. It is isolated from many resources including specialized medicine and maintenance needs, and it has an economy that relies to a large extent on a small number of industries, including tourism. Erosion, sewage, and fishing pressure magnify global warming impacts. Also, like many other small islands, the airport, gas stations, as well as many restaurants, stores, tourist accommodations and homes are situated near the shoreline.

So, what does Culebra look like under a high-emissions scenario according to the IPCC?

It is predicted that in the Caribbean, summers will become drier. Paradoxically, there will also be more winter days with heavy rainfall, so more freshwater will be lost as run-off. This change is likely to result in more frequent local water shortages, meaning less water in cisterns when the piped water is unavailable, and more erosion during wet times.

The predicted sea-level rise of more than one and half feet by the end of the century will cause beach erosion, destroying more than one-third of the existing sea turtle habitat as well as large portions of the beaches. Extreme weather events are expected to increase in frequency, and seawater surface temperatures will increase. The higher sea level combined with storm surges will almost certainly result in much more frequent flooding of homes and facilities located along the water and in low-lying areas, especially considering the loss of mangroves and coral reefs that protected the shoreline in the past.

These changes combined with pollution and an increased carbon-dioxide concentration in the ocean water are predicted have a strong negative impact on the fishing industry, as well as on the remaining coral reefs. The increased frequency of severe weather events should result in an increased risk of dengue, ciguatera, and food- and water-borne diseases, and the higher air temperatures will put a strain on human health.

Culebra's plants and animals rely to a large extent on surface water. If dry times become drier, it is likely that some species will go extinct locally, and may be replaced by invasive species from elsewhere. A loss of native species equates with Culebra's natural heritage, which currently attracts tourists.

There is a general concern in the scientific community that the world may be at a tipping point; changes that start a decade or two from now may come too late to avert the most dramatic impacts of global warming.

From the South Pacific to the Caribbean to Europe, other small island communities around the world are taking steps to assess climate change risks, and to develop and implement adaptation strategies. Adaptation strategies are typically most effective when local people, including parents, educators, business owners, and government officials, among others, are highly involved in decision-making.

While, of course, Culebra is not a developing country, the work of the Small Island Developing States Network has produced many relevant global warming resources including "Surviving Climate Change in Small Islands – A guidebook", that is available for free on the web at <http://www.tyndall.ac.uk/publications/surviving.pdf>.