Human-Environment Interactions: Sea-Level Rise and Marine Resource Use at Eleanor Betty, an Underwater Maya Salt Work, Belize

Valerie Renae Feathers, Louisiana State University and Agricultural and Mechanical College

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Abstract
Dissertation excavations were performed in the spring of 2013 at the underwater site of Eleanor Betty in Paynes Creek National Park, Belize. The marine environment preserved wooden architecture associated with the salt works. Excavation goals included: 1) excavating and defining the boundaries of the submerged shell midden; 2) collecting sediment samples for paleoenvironmental analyses; and 3) recovering cultural remains to determine the site’s purpose (residence versus production workshop).

Four transects were added to the existing transect from excavations performed during the 2011 field season. The shell midden measured 5 meters in length (north-to-south throughout all transects) by 0.5-to-1 meters in width (east-to-west across all transects). Sediment samples were subjected to loss-on ignition (the burning of sediment to determine the percent of organic matter present) and microscopic identification of sediment to identify the type of organic matter present. Analyses revealed a high organic content coupled with an abundance of Rhizophora mangle (fine red mangrove roots), which keep pace with sea-level rise and fall. Results indicate that Eleanor Betty was built on the cleared red mangrove stands and submerged by sea-level rise.

The shell midden was determined to be a cultural midden as charcoal and archaeological material were recovered throughout all levels of the submerged midden deposit. Approximately 4,733 pieces of shell resulted from the excavations. Of the 4,733 pieces, 3,979 fragments were identified as Crassostrea rhizophora (red mangrove oysters). Microscopic analyses suggest the shell were part of a meal, perhaps a feasting ritual, as evidenced by the break patterns on the shells’ ventral margins. Assessment of height-length ratios for predation indicates the procurement of shells was a one-time event.

An abundance of charcoal (~16,000 grams) and briquetage (~215,000 grams) – pottery used to evaporate brine over fires to make salt, was recovered from the 2013 field excavations. No household items, such as figurine whistles or pottery used for food storage, were recovered. The excavation results indicate that Eleanor Betty was a salt production workshop.

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Committee Chair
McKillop, Heather
The rising sea level is flooding major cities and making hurricanes worse. It's caused by global warming. Here are 7 steps you can take to reverse it. Scientists use this method to determine the sea level millions of years ago. They look for fossils of ocean organisms, sedimentary deposits, and even the actions of waves. Effects of the Rising Seas. The rising sea level is affecting coastal areas all over the world. It increases flooding, worsens hurricane damage, and leaches saltwater into tidal areas. It increases migration, weakens military preparedness, and threatens historical sites. Local governments are spending billions to defend against these effects. human–environment interactions at regional scales is, therefore relevant to our understanding of environmental change at all scales, and is particularly relevant to the scale of action (and inaction) that controls human states. and techniques used in reconstructing human–environment interactions are shared with palaeoclimatologists, but with exceptions. a result that may help explain the high levels of sediment flux to the coasts of SE Asia where catchments are relatively small.