TASK 1

Coral Sampling Interim Report

C-15877, Biscayne Bay Paleoecological Salinity Study
December 30, 2003

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This report is a documentation of the coral sampling which will be undertaken for this project.

The corals which will be analyzed for this project include one coral (*Montastraea faveolata*) taken from Bache Shoal and one from Alina’s Reef (*Montastraea faveolata*) (Figure 1). Corals at these locations were cored previously in 1986 and the stable C and O isotopic record determined in previous studies (Swart et al., 1996 and unpublished). An additional coral of a different species was cored in Caesar’s Creek (Figure 1). The purpose of the present study was to obtain coral cores from the same locations and analyze the stable oxygen and carbon isotopic composition. These same samples will be analyzed for their Sr/Ca and Mg/Ca ratios under a separate agreement supported by the National Park Service.

### Core Collection

On September 26, 2003 coral colonies were cored at the two locations mentioned earlier and shown in Figure 1. The reef condition at Bache Shoal (25°27.50, 80°09.56) was poor and many of the large corals previously cored were dead or badly eroded. We cored one reasonably healthy coral (*Montastraea faveolata*) and obtained a core 1 meter in length. After slabbing the coral, a record of 40 years was revealed. The coral is currently being subjected to X-radiography. A core of 2 meters (*Montastraea faveolata*) was obtained from Alina’s reef (25°23.42, 80°10.29) The core was broken into three pieces and exhibited a discontinuity near the upper surface. After slabbing the coral it was revealed that the growth record was not particularly good and that there may be problems in obtaining a good continuous records from this coral. X-radiography however showed that the corals had adequate growth and will be suitable for isotopic analyses. A third coral, *Solenastrea bournoni*, was collected from Caesar’s Creek.(25°23.40, 80°14.11). The X-radiographs from these corals are shown in figure 2, 3, and 4.

### Analyses

Stable isotopic analyses are being initiated as of December 10th, 2003. As of December 23, 2003 10 years of coral growth from Bache Shoal had been completely analyzed.

### Variances from projected work tasks

All work is proceeding according to plan.

Stable isotopic analysis of coral skeletons is currently being completed. The Bache Shoal coral

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has been analyzed between 2003 and 1994 at a resolution of 20 samples per year. A total of 30 years will be analyzed. This work will be completed in time for the deliverable date of March 2004.

Stable isotopic analyses of samples of ostracods supplied by the USGS have all been completed and the data delivered to the USGS. Other samples will be analyzed as they are supplied by the USGS. No foraminifera samples have been supplied by the USGS for analysis as yet.

Stable O and H isotopic analyses of waters are being completed and are up to date. Trace element samples have been measured as specified in the original contract.

Only one coral was collected from Caeser's creek, but this is suitable for the intended analyses. Only one coral was collected as it was felt that as a result of the paucity of corals in the area that it would not be necessary to disturb a second specimen. This was of prime concern to the Park Personnel who was accompany us during our collection. The analytical portion of the work actually only called for the analysis of one coral from Caesar’s creek and hence the presence of only one sample will not influence the proposed work. X-radiographic analysis showed that this coral was suitable for the project.

Insolation data for performing the refined estimates of evaporation in Biscayne Bay are dependent upon a sensor being installed at a weather station being installed on Adam’s Key. The sensor has been purchased by University of Miami and supplied to Biscayne National Park (BNP) although not yet installed. For preliminary estimates we are using insolation data collected at the Key Largo Ranger Station. We are investigating the possible use of other insolation data including that collected at the University of Miami for this project. Other evaporation estimates will be made using stable isotopic data collected from Biscayne Bay as outlined in the scope of work.

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Figure 1: Location of the three coral which will be used in this project.

References


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Figure 2: X-radiograph from specimen of *Montastraea faveolata* from Bache Shoal.
Figure 3: X-radiograph of specimen of *Montastraea faveolata* drilled from Alina’s reef.
Figure 4: X-radiograph of specimen of *Solenastrea bournoni* collected from Caesar’s creek