

# From Sapelo to Alaska

By Margaret Toussaint

In April, Dr. Melissa Booth of Sapelo Island traveled to Barrow, Alaska, the town that's at the tip-top of North America, for a week to collect seawater samples. With sunset at midnight and sunrise at five a.m. and with temperatures below freezing as the norm, Booth and her research team worked in a harsh environment. Though she wore layers of clothing, Booth experienced frostbite on her fingers.

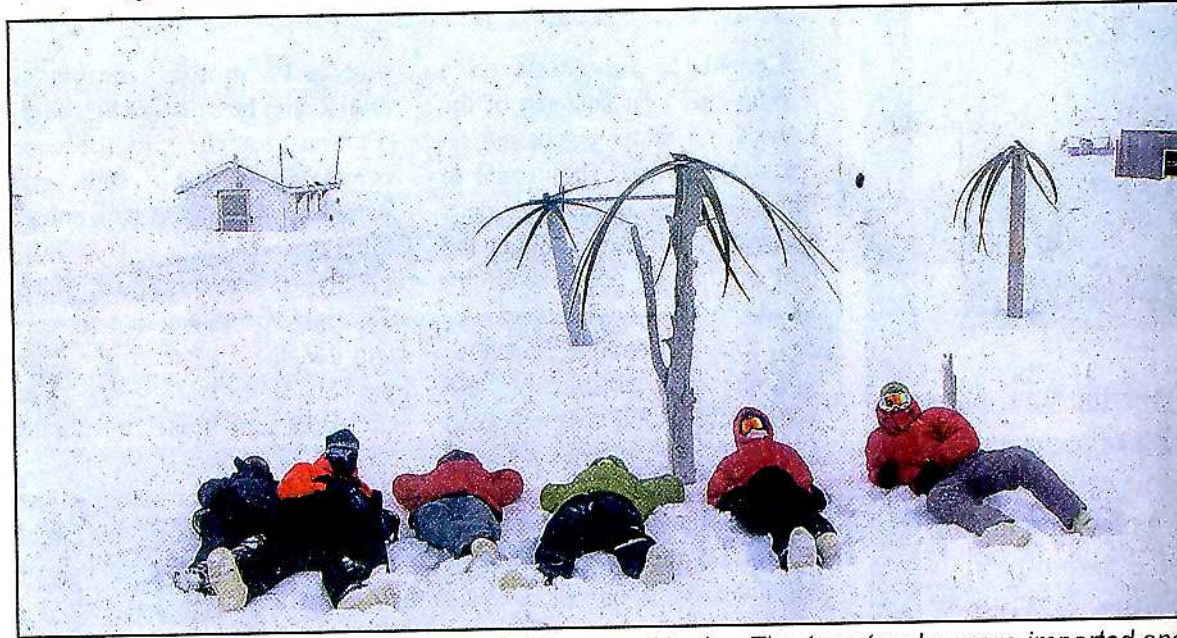
Booth, a four-year member of the research faculty at the University of Georgia Marine Institute on Sapelo, specializes in microbiology and molecular genetics.

"Microbes control everything," Booth said. "They generate the air that we breathe. They cycle nutrients. They do cellular processes in our body. They provide food for us." Booth pointed out that production of beer, wine, yogurt and bread rely on microbes.

In graduate school, she helped her faculty mentor with his study of the response of marine bacteria in areas of depleted ozone, such as Antarctica.

Working on that project stimulated her interest in studying the marine environment, specifically, marine microbes. Her current research on Sapelo investigates how microbes cycle nutrients in local rivers and estuaries, which has important implications for the health and productivity of our marshes and fisheries.

Her expertise matched favorably with a new, but related



**Alaskan humor:** The beach at Point Barrow, Alaska. The tree trunks were imported and "leaves" are whale baleen. Melissa Booth, second from left, and her colleagues enjoy an early cast day at the Alaskan "beach."



Dr. Melissa Booth, far right, and her students stand inside a bowhead whale, a staple native Alaskans.

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research effort in the arctic, where she was asked to collect sea water samples and to analyze the data.”

As the sea ice cover continues to shrink, there is more terrestrial input of organic matter in the coastal seas around Barrow, Alaska, an ecosystem, which supports whales, polar bears and numerous fisheries.

“Our study question is how will an increase in organic matter in the sea water impact this food web,” Booth said. “We’re looking at genes that are involved in bacteria and phytoplankton usage of carbon and nitrogen. There’s a delicate balance between phytoplankton and bacteria, because they compete for nitrogen.”

The project, which includes researchers from UGA, Skidaway Institute of Oceanography in Savannah and the Virginia Institute of Marine Science, will span three years. The researchers will collect samples three times a year.

In April, Booth and her students, Zac Tait and Victoria Baylor, were accompanied on the ice by an Inupiat guide, because of the ever-present danger of polar bear attacks.

The team uses GPS to find the same spot at each sampling interval. The site was selected based on its proximity to a pressure ridge. (This lifting of ice into

peaks or pressure ridges occurs when land-based ice, also known as “fast ice,” pushes up against each other).

Holes were drilled through ice that was 22 inches thick, with samples taken at an 8-meter (26.4 feet) depth in the water column. The depth of water in that location was 23 meters (75.9 feet).

The air temperature hovered between 0°F and 20°F. These temperatures are below freezing, which complicated the collection of liquid samples, even though the samples were of seawater, which freezes at about 28.9°F.

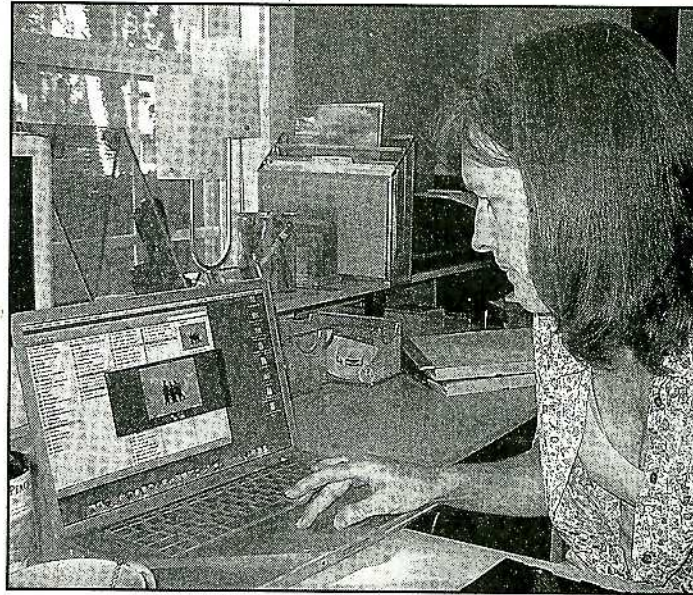
To compensate for the frigid air, they set up a sampling tent called an “arctic oven,” which concentrated the heat of the sun and blocked the chilling wind.

The seawater samples were filtered and then flash frozen in liquid nitrogen for transport to Skidaway Institute and the University of Georgia. Technicians are extracting RNA from the cells to determine which genes are being used in the cycling of nitrogen and carbon. Instead of focusing on individuals, this project focuses on the community dynamic, considering the entire scope of transcription processes within similar organisms.

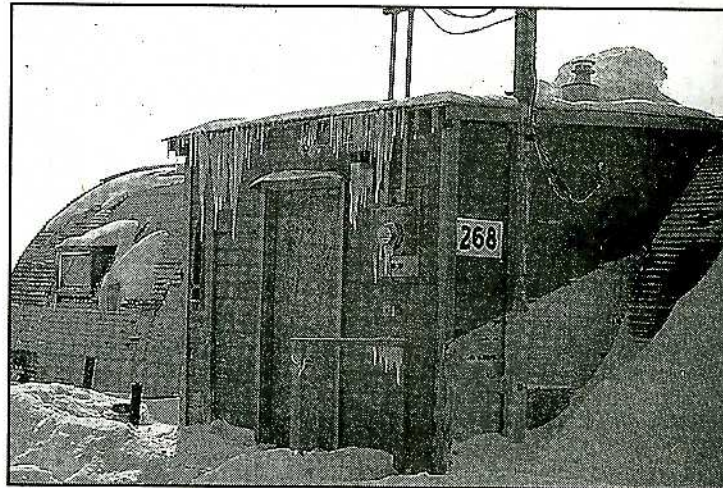
Booth noted that the Alaskan water seemed crystal clear and not turbid like Georgia seawater. However, when she filtered the samples, a surprising amount of residual matter was found.

“Both ecosystems are shallow and receive organic matter from adjacent land, which has an important influence on the base of the food web,” she explained, as the reason for the material she found in the water column.

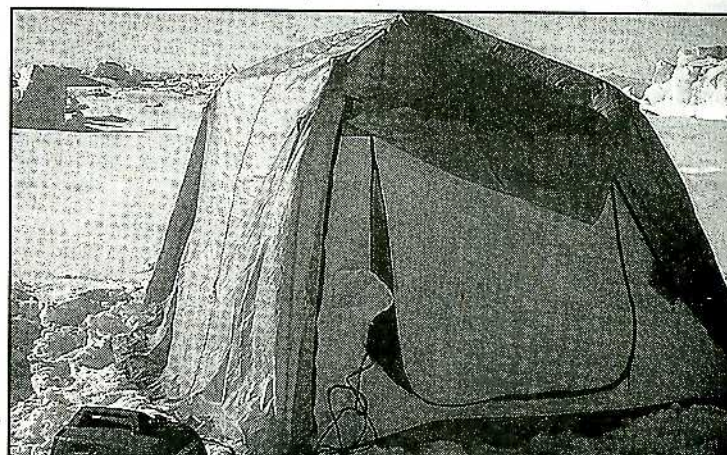
She expects to find similarities between the microbial processes in Sapelo and Barrow, Alaska. “These processes are at the very base of the food web. What hap-

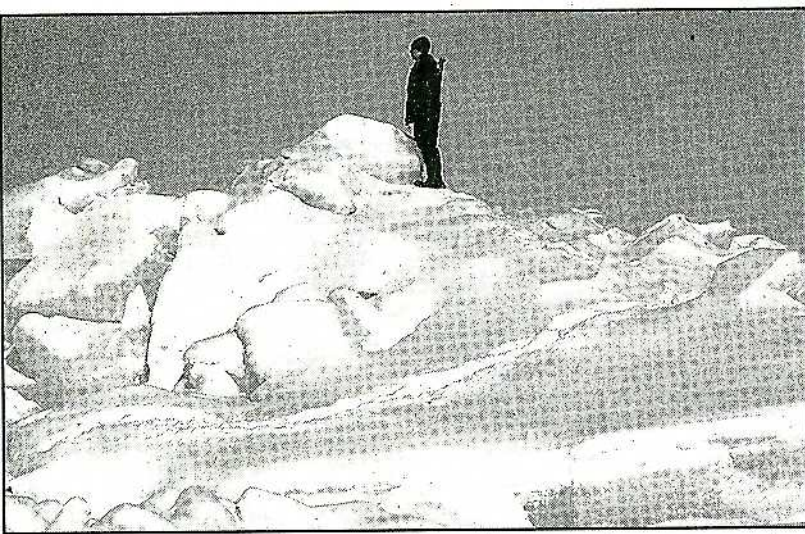


*Dr. Melissa Booth of Sapelo shares pictures of her research trip to Barrow, Alaska.*

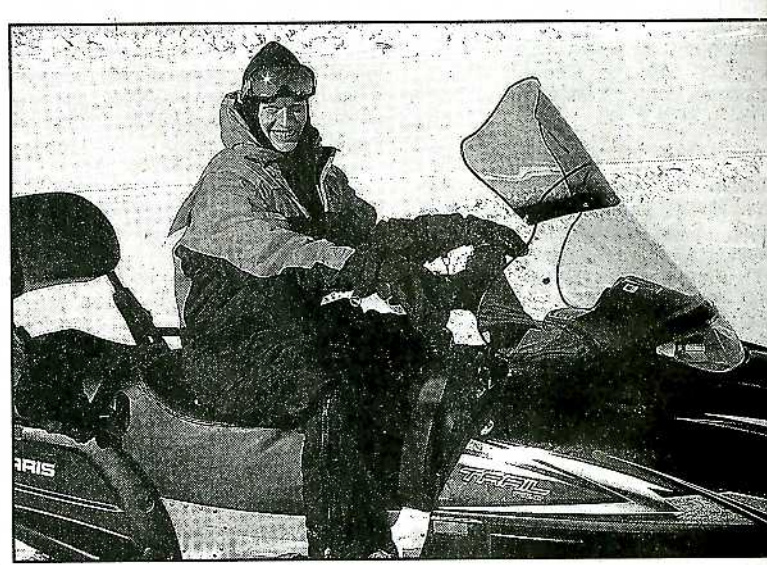


*This Quonset hut is where the team bunked at night. Bright orange entry ways on all Quonset huts are left un-locked because at any time polar bears may appear in camp. This is another door which may be kept locked for privacy.*





*An Inupait guide accompanied the researchers on their trek to the sampling site at a pressure ridge (the raised chunks of ice). Polar bears are known to hide behind such terrain before they go after their prey.*



*Microbiologist Dr. Melissa Booth of Sapelo recently traveled to Barrow, Alaska, where the means of travel over the icy terrain was snowmobile.*