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From the frozen Arctic, South Florida team tests the planet's health

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Friday, June 20, 2008

BARROW, Alaska — The team from South Florida plods out to the freezing site of the experiment on the Arctic tundra, one mile of knee-high rubber boots clonking against a low wooden boardwalk built above 950-feet of permafrost.

They're here - the Barrow Arctic Science Consortium in the Northernmost city in North America - to help test the health of planet Earth, to take Mother Nature's temperature, to figure out how climate change will progress.



 **Photo gallery:** [See the Alaskan adventure](#) mattress slung on the floor.

At least 50 researchers are calling this camp of corrugated steel-roofed "huts" home this summer.

As many as 100 have lived here at a clip, sleeping four to a room, sometimes shoe-horning in one more scientist with a

It's been that way for decades in this bush town on the icy Chukchi Sea, where supplies and building materials are so hard to import that giant

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shipping containers are turned into offices and apples cost \$13.99-a-pound.

A new shiny \$19 million laboratory opened last year, standing out among the rusting

cylinder-shaped barracks that began springing up near the end of World War II when the Naval Arctic Research Laboratory at Barrow became the base for exploration in Alaska's National Petroleum Reserve.

For Florida International University professor Steve Oberbauer this is the fourth year in a four-year study to measure greenhouse gas emissions from the warming permafrost and the hearty florals that struggle up every summer in the 24-hours-a-day of sunlight.

He traveled 4,200 miles from Miami for this research, but there are others here too: birders, archeologists, ice experts, engineers, botanists, geographers, and biologists from all over the world, and all in Barrow because the temperature-sensitive Arctic is the harbinger of global warming.

"This is the eco-system that will first show changes," says Steve Hastings, a senior scientist who lives in consortium housing at the edge of Barrow year-round. "It is something that really, truly is going to affect us all."

Higher temperatures would further melt the sea ice used by polar bears for seal hunting. Warming weather would evaporate the pools of water collecting on the permafrost, making them unable to support the plants and insects that feed the migratory birds coming to the black sands of the Arctic Ocean to mate. Lemming population booms would likely decrease as temperatures rise, causing a domino effect on the animals that eat the hamster-like creatures, and the animals that eat those animals.

Talking about their projects, consortium researchers, disheveled from hours in the frigid field, build into a frothy enthusiasm, speaking faster, dropping highly scientific language that is highly unintelligible to the average listener.

"I'm sorry. I'll shut up. Here we go again. Another long story," says Oberbauer, sitting in the 1960's cafeteria that is attached to the consortium's administrative offices and Ilisagvik College - a two-year school with about 1,000 students.

Oberbauer, 6-foot, 5-inches, and 53-years-old with a thatch of curly dark hair, says he doesn't sleep much while in Barrow, which is 330 miles north of the Arctic Circle. It's easy to understand sleep deprivation in the eternal summer daylight where midnight can just as easily be noon.

Bedtime is harder to define when the sun never sets.

He has experiments going in Costa Rica, and the tundra, and is an impassioned teacher.

Showing his team how to use a portable pressure chamber on the tundra to measure the amount of

water in Arctic vegetation, he excitedly tests different plants in the gray coldness as his students pop in and out of a nearby shack to stay warm.

"Let me just go get a pussy-willow," he says. "I think there's a patch back there."

And he's off, jumping on a mountain bike used sometimes to make the trek to the experiment site faster.

On his main team is Paulo Olivas, an FIU Phd candidate and the project's field coordinator; Jose Luciani, an FIU undergraduate; Elizabeth Eubanks, a teacher at St. Mark Catholic School in Boynton Beach; and Sandee Apang, a teacher at Southwest Miami Senior High School and an FIU student.

All from South Florida. All huddled right now in 35-degree weather around a Plexiglass tube attached to a humming machine that measures carbon dioxide emissions.

The whole rig, and Oberbauer's crew, are balanced on the two-foot-wide boardwalk that keeps boots dry and reduces damage to the tundra's spongy "active layer" of soil that melts in summer and is covered with varied levels of water and snow still present in mid-June.

Jacket hoods pulled over their winter hats, noses running, they twist tiny hose nozzles onto the contraption with bare hands red from the cold.

Oberbauer's instructions threaten to be lost to the wind, but are critical to his team, who, at week's end, were pulling four-hour shifts taking around-the-clock measurements of the amount of carbon dioxide released from plots of land the size and shape of round trash-can lids.

For 7,000 years, organic matter has been frozen and stored in the Arctic permafrost. If it melts - and research shows permafrost is warming - the carbon release would be huge, causing more warming, which would cause more melting.

"No one has ever tried an experiment of this magnitude," Oberbauer says. "It's a real challenge up here, it's hard to do research in the Arctic."

Hard is an understatement. Besides leaving spouses for weeks at a time and living with roommates in dorm-style housing, the logistics of getting supplies to Barrow can test anyone's patience.

Because there are no roads into the 4,000-resident city, material must come by plane, barge or snowmobile. The barge arrives only in summer, when Arctic ice begins to melt. Planes can't carry many of the necessary chemicals, including the glue used on Oberbauer's Plexiglass containers.

Then there are the lemmings, which chewed up so much tundra grass this year it clogged pumps used to move water around Oberbauer's experiment, and the weather, which stayed so cool this spring, ice is still covering some land, delaying data gathering until it melts.

There are also cultural differences between the scientists and the native Inupiat.

While the Inupiat are modern people with cable TV and wireless Internet, their priorities are still rooted in their traditional culture, which includes subsistence hunting.

Louis Brower, the consortium's station manager and a Barrow native, is a liaison of sorts between the scientists and the Inupiat. He arranges for guards to protect researchers from polar bears in the field, for translators fluent in English and Inupiaq - the Inupiat language - and transportation.

One of his biggest challenges, he says, is to find reliable Inupiat workers for the consortium who will put their job before the hunt.

"We're more subsistence-minded people," Brower says. "I may hire someone who comes to work for a few days, but then they find something more important to do."

Brower himself took a couple days off work this week to pull whale meat out of a freezer dug into the permafrost. On Saturday, Barrow residents shared the meat in a celebration marking a recent successful hunt.

Oberbauer, whose easy-going style makes him immune to many of the stresses of other scientists, will rely this summer mostly on Luciani and Olivas. Eubanks, who is representing Polar Trec - a National Science Foundation group - will leave next month. Apang, who came on a National Science Foundation grant, left Friday.

As the measurements begin, the crew hauls around the Plexiglass container on specially-modified backpacks, measuring greenhouse gas emissions with fingers stiff from the cold.


It's not an experiment easy for the lay person to grasp - nothing like the lemming guy from the University of Alaska Anchorage, who is trapping the cute critters for a population study - but the greenhouse gas project is crucial to predict the amount and rate of warming on the Arctic tundra, which is crucial to everywhere else.

"Somebody in Florida, you'll see the negative effects sooner than we will, if the oceans rise," Hastings says. "It's not just people who are hunting seals or whales. It is a global question and concern."

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