



Home Grown: The Role of Community Gardens

By Rachel Odell



Fairbanks, Alaska, is a far cry from America's midwestern breadbasket, but PhD candidate Alison Meadow believes the city could provide enough food to feed its residents. Meadow, a doctoral candidate in Anthropology and the Resilience and Adaptation Program (an NSF-funded interdisciplinary graduate research program) at the University of Fairbanks, will spend the summer examining how efforts to produce more locally grown food can increase community resilience by improving access to fresh foods, increasing biodiversity in the region, and reducing the environmental damage associated with shipping large amounts of food over long distances.

And Fairbanks, at 65 degrees north latitude, and 1,500 miles from the major port of Seattle, provides the ideal classroom, she says. Given its isolation and extreme climate, along with its growing population (experts expect 100,000 people in and around Fairbanks by 2018, and the current population is about 96,000), Fairbanks could provide a case study of how local food production can work, and the impacts

it has on a community—lessons that could be exported nearly anywhere.

"Around the world, cities are growing, and it is really important to look at the health and well-being of the urban environment and urban citizens," says Meadow.

Why is local food production so important? Aside from a growing, grass roots "eat locally" movement, it can make nutritious food cheaper and more accessible. Currently, Alaska only produces about 10 percent of its own food, importing the rest at high prices and passing that cost on to the consumer, resulting in food that costs roughly 30 percent more than national averages. The shipping also consumes extensive fossil fuel.

Yet, before advocating for a major transition to a locally produced food economy, Meadow has three hypoth-

eses to test this summer. First, she thinks that growing food locally will reduce the food miles necessary to supply fresh foods to Fairbanks residents. Second, such measures will improve

the availability and affordability of foods in Fairbanks. Third, localizing food production can increase regional biodiversity by creating new and varied habitats for wildlife.

Most of the food eaten in North America travels about 1,500 miles from the farm to the

plate. Meadow believes that stimulating local food production will likely reduce that distance. However, she wants to understand the impact of the shift. Will transportation costs and miles be shifted from commercial shippers to individuals driving to-and-from farms on the urban fringe, farmers markets, or com-



Above: A late frost demands drastic measures. Plastic absorbs heat to protect planted seeds. Here: Along with food, the garden grows beautiful flowers. All photos by Alison Meadow.



The garden is also home to wildlife, such as the robin that laid these eggs.

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munity gardens? Calculating the size of that shift is critical to understanding the impact food system localization can have at a global scale, says Meadow.

“How you grow your food is an environmental decision,” says Meadow. “Yes, we all need to eat but in an ideal world we’d all be able to make a conscious decision about what we’re eating. We should have the ability to make decisions about how the food we eat was grown and who grows it.”



The Fairbanks community garden is a welcoming place.

The second component of Meadow’s work analyzes where grocery stores are in relation to the population, the accessibility of fresh vegetables for all of the residents of Fairbanks, and the cost of locally grown produce compared to commercial produce in order to best understand the current Fairbanks food system. Using GIS to map the stores and neighborhoods, she developed a visual aid to quantify who shops where, which locations receive the most traffic, and how people likely get to the store—by walking or driving.

Some researchers have found that lower-income people have less access

to locally produced food because of financial and accessibility issues. For instance, if a low-income household doesn’t have a car, traveling to small farms or a farmer’s market may be impossible. However, Meadow’s initial research shows that locally produced food in Fairbanks does not appear to be more accessible to higher-income residents, who tend to live on the outskirts of town.

“I expected to find reduced access to fresh fruits and veggies in lower-income areas and less access to locally-grown food,” says Meadow. “It’s still preliminary as I am not finished with the results, but I’m finding so far that is not the case in Fairbanks.”

Many lower-income people live within the city limits, and have to travel about the same distance as higher-income residents to reach the Tanana Valley Farmer’s Market or the full-service grocery stores. However, almost all the stores are in places that require driving or other transportation for access, which raises some questions about whether households without personal transportation can get to them – even if they aren’t more than a few miles away. This component of Meadows’ research provides important information to urban planners making decisions about a community’s food sources, she says. Most importantly, planners should strive for social equity, so that all residents, regardless of their socio-economic status, have access to nutritious vegetables.

“Where does the supermarket need to be and where does the community garden need to be? You’re missing a

very important link if poor people aren’t considered,” says Meadow.

Finally, to understand how much land is needed to feed the community, Meadow will calculate the agricultural footprint of Fairbanks this summer. By modeling the community’s nutrition needs and its production potential, she plans to quantify how much land would be necessary and which crops could grow those foods. Next, she’ll run the same model under a climate-change scenario to estimate how climate change could influence these results. Specifically, based on current projections of temperature and precipitation changes, Meadow wants to know whether the outlook for agriculture in the area will improve or decline, and ascertain what the implications are for the future of a locally-based food system in the region.

Along with producing enough food, the garden and local farms may also enhance the ecosystem, providing habitat and other resources for wildlife. Meadow plans to measure the impact of agricultural lands in Fairbanks by collaborating with the Alaska Bird Observatory to measure bird species abundance and diversity. She hopes to find out whether there is a difference in number and type of birds on agricultural lands (including the community garden) compared to non-agricultural lands like forests.

“If the region chooses to put more land into agricultural use, we need to know what the implications might be for wildlife,” she says. “Will they have more or less habitat? Will some species be favored over others because they can adjust to the new land use? Does having the community garden in the middle of a developed neighborhood improve wildlife habitat for the immediate area?”

Ultimately, says Meadow, her studies will promote the incorporation of food production and equitable food access into urban planning decisions, resulting in more gardens and locally grown food throughout the country and contributing to the creation of a healthier population.

“My main interest is looking at the links between human health and environmental health, and making those explicit,” she says. “Caring for the environment means caring for ourselves.” ●



Sullivan downloads data from a weather station.
Photo: Paddy Sullivan

alaska

The NSF-funded [Polar-Palooza](#) band of traveling science all-stars stopped in at Fairbanks to share their “Stories from a Changing Planet.” Now, many of them will pause their work as polar science outreach troubadours to conduct some arctic fieldwork of their own.

Speaking of which, University of Alaska’s (UA) Paddy Sullivan visited his [post-doc research](#) site in northwestern Alaska. He’s studying how trees respond to increased nutrients and water along a gradient of parent material depth. Sullivan visits his site on the banks of the Agashashok River (the “Aggie”) in Noatak National Preserve, several times per season to maintain his equipment and experiments, and to take measurements and collect samples. “The snowpack was deep this winter,” Sullivan reports, which is evident in the photos he sent. Check conditions at the project site by visiting <http://paddy.uaa.alaska.edu/noatak/noatak.html>.



Moving Nolan ice core tubes. Photo: Matt Irinaga

Mid-April, UA’s Hajo Eicken visited Barrow for his [seasonal sea-ice zone study](#). Eicken wants to know how the shrinking of multi-year sea ice in the Arctic may affect seasonal ice, and so he is helping to establish a monitoring network called [SIZONet](#) (Seasonal Ice Zone Observing Network). Eicken has established several observatories, including one in Barrow. His project team kept a [blog](#) about their April adventures, pictures included.

Around the same time, UA’s Matt Nolan and team put in to McCall Glacier to begin a season-spanning field effort for his new glaciology [grant](#), which continues long-term studies. Harvesting a series of 10-meter cores is part of the early season work, and a plane has just returned to Fairbanks with the third of four shipments of these. Nolan team researchers will be out all summer.



Sedinger researchers Mike Blom, Molly Sehreiner, Lyn Snoddy, and Manda Walker pick up field groceries. Photo: Matt Irinaga

Late in the month, a team for Jim Sedinger (University of Nevada) flew up to Bethel, Alaska, hopped over to nearby Chevak, and staged for their put-in to a site along the Tutakoke River on the Bering Sea coast, where the PI [studies a colony of Black Brant geese](#). PFS’ Matt Irinaga met the team and traveled with them via snowmachine from Chevak to the field site to help establish the field camp.



A Black Brant goose. Photo: Adrian Pingstone.



Chevak kids welcome the Sedinger team. Photo: Matt Irinaga

For nearly 25 years, Sedinger has been tracking how reproduction impacts the overall health and survivability of the parent—and how that, in turn, impacts productivity and survival in subsequent years. The team will be in the field until late July closely monitoring a population of banded birds, from nest building through fledging processes.

Matt reports that put-in weather was miserable, but the trip was nonetheless a lot of fun: “Sedinger’s team is great,” he says, “Really enthusiastic and hard-working.”

Finally, in early May, University of New Hampshire’s Cameron Wake led a team to Denali National Park for a month’s worth of reconnaissance, ice coring, and snow-sampling work. Wake’s new [project](#), in collaboration with Karl Kreutz of the University of Maine, tests the feasibility of drilling surface-to-bedrock cores from Denali.

The team specifically wants to recover “layer-cake” ice, wherein the temporal record is very clear, and so this year’s effort lies mainly in scouting for this kind of ice. After putting in to a base camp, the team is skiing to promising locales, occasionally using airlift to transfer to a location further afield. Given that they are hauling their equipment, including a portable, ground-penetrating radar to aid the search for the ice, this trip is surely not for wimps. The team has encountered a few spring storms, but they are making fine progress; their ice cores should be airlifted this week.

Wake and Kreutz intend to fit the information from the Denali work into a network of measurements around the Pacific Northwest (and over the entire Arctic as well) aimed at describing the region’s climate history in detail going back about 2000 years. ●

POSTCARD FROM THE NORTH SLOPE: SPRINGTIME IN BARROW

Story and photos by Richard Perales

It's May and I'm thinking about global warming as I look out my window here in Barrow, Alaska, to a world as white as this sheet I'm writing on. I arrived on April 23rd, greeted by blowing snow and temperatures fit for a walrus. For the Inupiaq, the indigenous people of Alaska's North Slope, the weather is unremarkable. My arrival brings a smiling, "Welcome to the Arctic," and "I hope you brought enough clothes with you."

This time of year, Barrow is filled with the energy of annual whale subsistence hunting. You can feel the anticipation and exhilaration in the air and see it in people's faces. Whaling is at the core of the Inupiat culture--it is what defines them and what they live for. Their traditions and their customs are anchored by it. The food that a whale provides is shared amongst the community with much of it stored for the winter and for many of the community's festivals.

The Chukchi Sea, which hugs the Barrow coastline, is frozen for a few miles out to where a gap of water (lead) has opened up and is now sprinkled with the various whaling camps set up



The author, Richard (Chico) Perales.

by different crews. But like research camps in remote and hostile locations, the whalers are at the mercy of the environment and the weather. Winds shift at the wrong time, rising temperatures cause pools of melt water and cracks to develop, and the currents shift and push the ice unexpectedly, adding to the stress. If pack ice forms, the whaling crews are forced to make decisions--and making the wrong one can cost them their lives. The pack ice can tear apart the traditional seal-skin boats if the hunters decide to pursue a whale and then they find themselves trapped in the ice. It's a remarkable way of living.

To be in Barrow to witness a way of living that is also being impacted by climate change is an opportunity of a lifetime.

But I also have work to do. This is the fourth year that I have worked on the Barrow Environmental Observatory (or BEO) [hydrology and manipulation project](#), located on a section of land near Barrow set aside in 1992 by the local Native corporation for science research. I first arrived in early April 2005 and went out to the site, with co-PI Craig Tweedie of the University of Texas at El Paso, to lay markers in preparation for installing the infrastructure needed for their research.

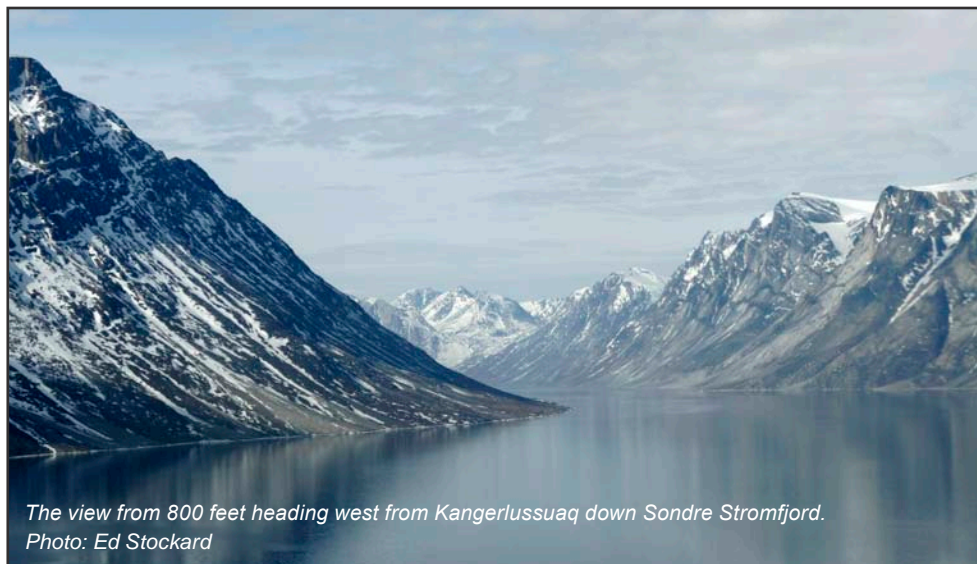
Located on a shallow lake, the study site has been transformed from its natural landscape to one with artificial dams, elevated boardwalks (to protect the tundra and lake from being crushed by pedestrians), various other buildings and infrastructure, and a whole array of scientific instrumentation consisting of eddy covariance towers, analyzers, data loggers, remote sensors, flow meters, gauges and so forth. This year, workers will install a hydrology system to drain and flood (manipulate) the middle and north sections of the lake using the southern one (the control section) to establish the levels.

There's more snow in the area this year than in previous years, and I'm preparing to oversee a flurry of activity that will begin once the weather warms enough to start to melt the snow.

It is the middle of May and the temperatures have begun to rise. The snow and ice have begun to melt and the scientists will soon arrive with all of their gear, their enthusiasm and their energy. For the whaling crews and the researchers at the BEO hydrology manipulation project it is Showtime. ●



A traditional seal skin boat.



The view from 800 feet heading west from Kangerlussuaq down Sondre Stromfjord.
Photo: Ed Stockard

greenland

PFS staffers around the world's largest island have geared up into full summer mode. By now, our group has supported science put-ins and take-outs, resupply flights, station openings, construction operations, and preparation for a surface traverse feasibility study.

Kangerlussuaq

Last week was the fifth flight week of the season, reports Mark Begnaud from the helm at the CPS office in Kangerlussuaq. The early season has been event-filled, in keeping with what we now expect from the IPY. Operational support highlights included the C5 mission bound for Thule Air Base, which stopped in at Kangerlussuaq for cargo and passengers en route.

Around the island

The PFS team in Kangerlussuaq is now supporting groups of researchers dotting

the Greenland ice cap. Among them:

--**Konrad (Koni) Steffen** (University of Boulder), who has visited Greenland seasonally since 1975. Steffen operates a network of automated [weather stations](#) jointly funded by NSF and NASA, and he travels north each spring to conduct maintenance on some subset of these. He started mid-April from Ilulissat, moving to Qaanaaq and then on to Thule and other northern sites. This work accomplished, Steffen's team then repositioned to southern Greenland and visited a group of sites there.

The spring AWS work completed, Steffen next established his group at Swiss Camp the first week of May to work on an array of experiments—four at least—around the Jakobshavn Glacier. On arrival, the team discovered that several Weatherport tents had been damaged over the winter by high winds. A *Rolling Stone* reporter in Ilulissat, waiting to join Steffen's group, was able to find repair materials, and arrived a day or so later at Swiss Camp armed with the reinforcements.

--**Liz Morris** (Scott Polar Research Institute), making the first of two snow-machine-mounted radar validation traverses this season across central Greenland to the [NEEM](#) drill site, where she is due at the end of this month. So far, Morris and traverse partner Martin Hignell are on track, making about 30 km every two days. [Morris' effort](#) helps to validate ice thickness data from [CryoSat 2](#), a European Space Agency-funded radar altimetry mission studying variations in land and sea ice.

--A collaborative ski traverse led by University of Montana's **Joel Harper** aimed at validating [meltwater infiltration processes in models](#). Harper and five colleagues traveled to Swiss Camp late in May, launching from there along an old survey line. So far, the work has been going well. At a recent radio check in, one researcher reported that the team is "happy as a dog with two tails." They're taking measurements enroute meant to better understand how meltwater on the surface percolates to the bottom of the ice sheet. Harper's Web site has some informative graphics depicting meltwater plumbing mechanisms in glaciers. View them [here](#).

Summit Station

A PFS crew arrived in mid-April to prepare Summit for station opening late in the month. Staff set up "tent city," the summer camp where most visitors (including those who visit all summer) have their personal quarters. They also established various temporary structures around "town," including a satellite camp and a new buried facility located some distance from town in the clean air sector, to support the research to come. All

GREENLAND con't. on page 6



Launching a balloon with an instrumented payload is no easy feat in 20-knot winds. Summit Station research assistants launch these often, sometimes daily, for various atmospheric monitoring efforts, including those looking at climate-forcing chemistry. Photos by Robin Davies.



Welcome to Summit Station. Photo: Robin Davies

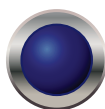
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this activity required use of some heavy equipment. When variable winds kicked up on some days and aimed the engine exhaust at the clean air sector—where scientists take very precise measurements of air, snow, and ice that must be free of local contamination—Summit's science technicians suspended some sampling activities until the conditions changed.

Around May 7, Summit staff received the year's first science group set to conduct field work from the station, Richard Hindmarsh and team from the British Antarctic Survey. Hindmarsh's [project](#) is intended to provide information about ice-deformation properties, and how these affect the rate at which ice finds its way to the sea. His team will work at the site of an old borehole about 30 kilometers from Summit for most of this month, conducting radar profiles for their project and an associated effort.

While assisting the Hindmarsh group, the staff at Summit are also preparing for a major influx of scientists to the world's roof: Projects led by Summit veterans, [Jack Dibb](#) (University of New Hampshire), and [Mary Albert](#) (Cold Regions Research and Environmental Laboratory), will have boots on the snow by month's end. In addition, two new projects by Richard Honrath (Michigan Technical University)—an [air/snow exchange project](#) for NSF and a [tropospheric chemistry effort](#) for NASA—get underway as well. Stay tuned. ●

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media

● The Interior Department [announced](#) mid-month that it would add polar bears to the threatened species list.

Within a week, environmental groups [responded](#) with lawsuits saying the ruling did not do enough to protect the bears, as it failed to include measures to curb human-caused climate change.

● Recent [US-Russian research](#) suggests ancient peoples were whaling at least 3,000 years ago, 1000 years earlier than earlier data had suggested.

● Meanwhile, over at the [Narwals](#). . .



The UN narwal stamp.

● Speaking of food miles: [Scientists have discovered](#) that long-distance food trading practices go back 1000 years.

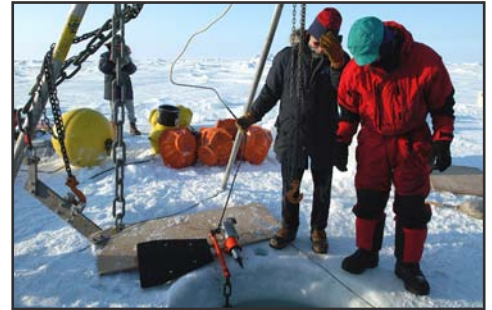
● [Caribou numbers are declining](#) as a result of warming-caused “trophic mismatch,” says Eric Post.

● In his latest, Ned Rozell [meets up with](#) Charlie Bentley, iconic figure of both the IGY and the IPY.

● Alaska is setting aside millions of dollars to [battle erosion](#) threatening several coastal villages, in hopes that the Feds will do likewise.

north pole

For once, April was not the cruellest month for scientists working at the [North Pole Environmental Observatory](#) (NPEO). Led by UW's Jamie Morison, the NPEO team staged its assault on the North Pole this year from Longyearbyen, on Norway's Svalbard Archipelago. After last year having to leave in place the two-mile-long mooring that is anchored to the seafloor, the team was relieved to pull the chain out of the water, service all the instruments, and get the entire pack-



Top: Principal Investigator James Morison, of the University of Washington, takes water samples at the NSF's North Pole Environmental Observatory (NPEO). Bottom: Morison consults with a field technician about the retrieval of a deep-sea mooring. Photos: Peter West, NSF

age redeployed. Other experiments also were productive. On a side note, *The New York Times*' Andy Revkin reported on the NPEO deployment on his blog, [Dot Earth](#); his post received an enthusiastic comment string, including a note from Jamie Morison.

field notes

By Polar Field Services, a member of the CH2M HILL Polar Services team.

Jill Ferris, Operations Manager
field notes Production Team:
Oversight: Diana Garcia-Lavigne
Writing/Editing: Kip Rithner
Graphics/Writing: Susan Zager

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THULE AIR BASE, GREENLAND

After more than a year of planning, a traverse team arrived in Thule late in April to establish a base from which to mount the first phase of a proof-of-concept traverse across Greenland. The overarching goal is to find a safe route to Summit Station. This season's big effort is to establish a seasonal traverse staging base near Thule, and to profile the first 100 km of the path for crevasses. A ground route to Summit means the arctic program could use this more sustainable mode for resupplying the NSF-funded station on the crest of the Greenland ice sheet.

After arriving, staff built sleds and positioned traverse equipment on the ice edge about 12 miles from Thule. Many Thule contractor personnel assisted with staging efforts, making a huge effort manageable.

Next, the team operated a ground-penetrating radar system from a boom on the front of a Tucker Sno-Cat. At the same time, Dartmouth students Eric Trautmann and Kevin Olds tested [Yeti](#), an experimental radar robot under development for polar research. (Trautmann and Olds posted blogs on a project [Web site](#).)

The CRREL team's GPR studies have found a few crevasses where satellite imagery suggested they would be, and the team has established safe routes around these. Warmer-than-average temperatures for this time of year are making the going tough, but the team has switched to night operations to leverage cooler evening temperatures. More traverse news next month!



Setting the stage for the traverse at Camp Tuto. Photo: Jay Burnside



The Tucker with GPR boom. Photo: Jason Weale



Fill 'er up: The Case QuadTrac. Photo: Susan Zager



CRREL's Jim Lever. Photo: Susan Zager



The Case being offloaded from the C-5 in Thule. Photo: Pat Smith



The remote-control Yeti with GPR in tow. Photo: Jason Weale

